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**FINDING SAFETY IN THE SKIES: THE FEDERAL AVIATION
ADMINISTRATION AND THE PROCESS OF REGULATION**

by

STEVEN R. SCONFENZA

A dissertation submitted to the Graduate Faculty
in Sociology in partial fulfillment of the
requirements for the degree of Doctor of
Philosophy, The City University of New York.

1996

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Abstract

FINDING SAFETY IN THE SKIES: THE FEDERAL AVIATION ADMINISTRATION AND THE PROCESS OF REGULATION

by

Steven R. Sconfienza

Advisor: Professor Robert Alford

This research examines the regulatory process in a government agency. Using the Federal Aviation Administration (the FAA) as a case study, the research develops a model of goals and applies those goals to actions. The goals developed are an objective response, a symbolic response, a response framed in a multiple patron-client environment, and a chaotic response developed where processes and objectives are unclear. Four FAA actions are studied: a rule-making action concerning pilot licensing and currency requirements; an externally-mandated modification to internal FAA structure that affected regulatory units; an externally-mandated modification to internal FAA rule-making processes; and an aircraft certification issue that reasonably ought to have resulted in a rule-making action, that did not, but that did include alternative regulatory processes. In each case the study finds that while objective safety of flight issues exist that may require

legitimate rule-making action or be factors in real or potential actions, the organization is also dealing with pervasive needs for symbolic action as well a balancing significant demands from a variety of external agents. These forces produce within the organization uncertainty, and at times conflict, as to objectives and processes. The effect of this on the FAA's processes of regulation, possible alternatives to the structure as it now exists, and how this may be generalizable to regulatory bodies generally is discussed.

Preface

I first got the idea of writing about the Federal Aviation Administration over a decade ago. Having enrolled in graduate school after a period of working in the aviation industry, I was fascinated to discover that things I had noticed years earlier had a context. So began my long pursuit of the answers to the many questions still in my mind about the aviation industry and the organizations that populate it.

My understanding of the context of the aviation industry first developed as a graduate student at the State University of New York at New Paltz. I first saw something in Max Weber's essay "Bureaucracy," which to this day I find an amazing work in laying the foundation, in its breadth and detail, of the ideal type of bureaucracies. However, I was aware that this ideal type alone did not explain what I had seen when in the aviation industry. After reading an undergraduate paper of mine on the aviation industry, a professor handed me Petr Kropotkin's *Mutual Aid*, thus offering to me an entirely new aspect of how an organization may exist. Here is where I first began to think critically about people and organizations, and this background provided

me with a theoretical perspective I have retained throughout this project.

This work itself comes from several seeds. Some of them did not make it into a study of their own, but have been present in the background nevertheless. Some of them have come through in the final work, if only between the lines. One such interest that is still visible is the work process, professionals, and professionally-run organizations, but I might have written an entire work on, for example, the role of professionalization in the pre-World War II aviation industry. I have also had strong interests, and presumably some development of skill, in both quantitative and qualitative research, including ethnomethodology. While quantitative skills are not evident in this work, they do account for my being employed for the past several years as a researcher in a state agency that has no connection whatsoever with aviation.

This finished product hopefully does some justice to both the Federal Aviation Administration and the aviation industry generally. I did come to it with certain feelings about how things are, how they are done, and what is right or wrong about flying. This is only natural for a person who spent several years (and several thousand hours) in constant and intense proximity to the ultimate research objective. And, as a matter of practicality, it was my love of flying that has insured that I see this project through.

Acknowledgments

This work has truly been a group project: many people and organizations have played a part in it. Greatly needed and appreciated financial support for this research came from the National Science Foundation, "Doctoral Dissertation Research in Sociology," Grant No. SES-9201781; from the National Academy of Sciences (National Research Council: Transportation Research Board), "Graduate Research Award Program on Public-Sector Aviation Issues, 1993" (which was sponsored by the Federal Aviation Administration); and from the City University of New York, the Arthur Schlesinger, Jr. CUNY Dissertation Fellowship, 1991-1992. Beyond the Dissertation Fellowship, the University has always been extremely gracious to me in its financial support, and the Department of Sociology has played a great role in this.

Numerous organizations have played a role in facilitating this research, including (alphabetically) Aeronautical Radio, Inc; The Aircraft Owners and Pilots Association, The Boeing Corporation; and the Federal Aviation Administration's Aircraft Certification Service, Flight Standards Service, and Office of Aviation Policy, Plans, and Management Analysis. Past and present FAA staff too numerous to mention individually were always courteous

and supportive, speaking freely and informatively. When asked they never hesitated to provide further contacts in the agency and the industry in order to further this work. The Boeing Company was also especially gracious to me. While I now confidently fly in Boeing products, I hope that that has not become a bias reflected by my academic self. I am also grateful to many others in the industry, individually as well as and corporately. Many pilots, controllers, mechanics, and other aviation professionals have given freely of their time and insights, and to these persons too I am grateful.

Many friends, colleagues, and students have been supportive in this project. These have included students in sociology classes I taught at Hunter College, who had to endure rough drafts of diagrams, but who helpfully showed me relationships hidden therein that I had not seen previously. I am also indebted to my fellow students at the Graduate Center. Throughout my studies there they provided support and insight. Again, there are more names here than space permits, including the members of a small study group for the first exam and less organized groups attacking statistics homework, but be confident you are not forgotten. The faculty at both SUNY New Paltz and at the Graduate Center were of constant support and enlightenment. Many faculty members at New Paltz provided ongoing support: long after I had left SUNY they continued to take an interest in

my work and progress. The faculty at the Graduate Center are an outstanding group who have helped me more than I could ever have imagined.

Several people I would like to personally acknowledge. I wish to thank FAA Historian Edmund Preston for providing me with background information on the organization not available elsewhere. A number of the faculty at the Graduate Center have had special meaning to me. Bogden Denitch in his own way provided me with intellectual stimulation and not a little amusement. Andrew Beveridge did the same, along with starting me on my track of quantitative researcher. Paul Attewell, always seeming beleaguered by one too many projects, always had time to spare for one more student, and I have spent many happy lunches with him. Cynthia Fuchs Epstein has provided ongoing support and encouragement. My committee chair, Robert Alford, has worked tirelessly on this -- literally for years -- especially over the past two semesters. Lindsey Churchill and Dean Savage provided a happy mix to complete the committee, they have offered encouragement when I felt that I could not do one more revision, and of course they too have spent much time and effort on the project. Many of my friends and colleagues outside of my academic circle have provided me with support and encouragement. This includes my many colleagues at the New York State Office for the Aging, many of whom have read some or all of

this work and graciously offered their comments. I am particularly indebted to my supervisor in the Research Unit, David Sutton, who provided subtle but unceasing encouragement in this work.

An intrinsic part of the work are the people who were actively involved in thinking through my theoretical positions and reading the manuscript as it progressed from a loose collection of chapters to a more or less coherent document. Susan Lehrer spent many hours in these discussions and in reading early drafts of chapters: she has always played a major role in the development of my critical social thought. Cynthia Marshall has read the entire draft through several iterations and commented voluminously and in intricate detail: much of the style and flow of this work can be traced to her careful editing. Without their support this work would never have been possible.

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CHAPTER ONE, THE STUDY

Introduction

Typically, organizations exist with a clear formal mandate that details what function they have been created to perform. However, organizational literature is replete with material concerning the differences among formal goals (e.g., those written into an organization's founding or operating documents, its formal mandate), functional goals (those that the organization actually aims for and defines through methods other than its the formal goal structure), and goal displacement (a process by which formal goals become functional goals).¹ Therefore, how an organization understands and operationalizes its formally defined goals will influence how the organization does whatever it does.

Organizations often develop functional goals that are at odds with their formally stated goals. This may be the result of several factors: (1) there may be an unclear formal mandate; (2) there may be multiple and/or contradictory formal mandates; or (3) it may be impracticable to implement a clear formal mandate given a particular political or economic situation. Ultimately, organizations may develop functional goals that are different from the formal goals, a process that may be

¹ Peter M. Blau, and W. Richard Scott, *Formal Organizations* (San Francisco: Chandler, 1962); and Richard H. Hall, "Professionalization and Bureaucratization," in *American Sociological Review* 33, no. 1 (February) 1968, pp. 92-103.

referred to as goal displacement. This goal displacement may result in the organization developing and implementing policy options that are unpredictable or at odds with the formal goals explicit in the formal mandate.

This research explores the Federal Aviation Administration (the FAA) to determine to what extent Federal aviation policy is influenced by factors other than strict adherence to formal goals. The FAA has a formal mandate to provide the regulation necessary for the safety of flight; it is also formally charged with fostering a healthy industry. It is both the regulatory agency for aviation and the operating agency of the U.S. airspace system, a multi-billion dollar industry crucial to transportation in the United States, and because it holds a central position in an important sphere of commerce, it represents an organization that may be particularly subject to the forces that create goal displacement.

This research poses the question of how the Federal Aviation Administration has goals and correspondingly makes decisions aimed at realizing those goals. In particular, it studies the factors, both direct and indirect, affecting the goals and decisions around rule making. It examines a number of factors affecting these FAA goals and decisions, including its adherence to formal goals, the development of functional goals, how formal and functional goals -- at times contradictory -- coexist in within the organization,

and the impact of professional, political, and economic forces on its goals and decisions. Methods of accommodating and mediating these various goals and processes are examined.

Specifically, the goal of the research is to trace the variations in the impact of several factors affecting rule making and potential rule making, as evidenced by four cases presented in this study. These factors include the internal dynamics of the FAA itself, external and internal pressures from interest groups in the industry, Congress, and pilots, and the need to construct an impression of efficiency, rationality, public accountability, and service to maximum safety and promotion of the industry. These factors will vary in their importance depending on the character of the rules involved or potentially involved, and what is at stake in their implementation. These factors are explored both in the formal processes of rule making and through other processes that are either non-regulatory in nature or existing outside the FAA.

The research looks at the FAA through several key cases, in one of which serious accidents has been a repeated outcome. These cases include first a formal rule-making action. This was the creation of a new class of pilot license along with a revision to standards some pilots were required to meet in order to maintain legal proficiency. A second case is the efforts made to centralize the FAA's

decision making apparatus and transportation policy as a whole during the past several decades. Dating to the mid-1960s and the creation of the Department of Transportation and, more recently, with the FAA program of straightline reporting -- which is the process of modifying regional offices' position in the chain of command, with authority resting more clearly in offices at the Washington headquarters -- authority has continually become formally centralized and under Executive control.² This is in contrast to the original form of the contemporary FAA, as an agency outside the direct control of the Executive Branch, which was consistent with Federal policy of insulating agencies that exercise both Executive and Legislative powers³. A third case is an externally mandate aimed broadly at Executive agencies. This was an Executive Order

² On 2 March 1966, President Johnson proposed creation of the Department of Transportation. This was to remedy the existing issue that

The responsibility for transportation within the Federal Government [is] fragmented among many agencies; hence there [is] no central leadership in the transportation field. The result [is] a series of separate, uncoordinated policies and programs by mode of transportation. What [is] needed [is] a single department to develop and carry out comprehensive policies and programs keyed to transportation in its totality.

See Arnold E. Briddon, Ellmore A. Champie, and Peter A. Marraine, *FAA Historical Fact Book: A Chronology, 1926-1971* (Washington, D.C.: Department of Transportation, Federal Aviation Administration, Office of Information Services, 1974), p. 159.

³ Briddon, Champie, and Marraine, p. 34.

intended to insure that agencies balanced the costs of implementing a rule with its benefits. Finally is the case of a complex regulatory issue that did not result in any substantive regulatory changes, but which arguably should have. This was the case of an aircraft that had been successfully certificated but that has had a nagging history of problems, with the loss of many lives. While the processes worked correctly as they exist, the lack of a general remedial action is itself a decision.

This country, stretching some 3000 miles across, has developed hand in hand with its transportation networks. Because of this, transportation has become one of the Federal government's areas of concern. The Federal government has taken on a major role in promoting the industry since the days of the first transcontinental railroads. This has been in large part because of the great costs involved in establishing and running such networks. Once established, these industries can have a strangle-hold over their customers, so the Federal government has an interest in tempering the economic power of the industry. The large transportation networks cross state lines, an obvious and Constitutionally prescribed area for Federal oversight, so the Federal government, through the powers assigned it in the Constitution, has the authority to make rules in areas that transcend the interests of the

individual states. State and local ordinances can be "pre-empted" by the Federal government's interest in these areas.

The United States government may or may not be conceived as new; transportation organizations are definitely not new, dating to the earliest forms of trade and conquest. Indeed Columbus's "discovery" was based on the need for transport for economic advancement. Aviation, in such a timeline, is new; as transportation it only has come of age in the last half of this century, and the Federal Aviation Administration as a transportation-related organization shares that newness. But more than this simple newness of age, air transport poses issues that sociologists may not have had to concern themselves with in the past: it represents a stunningly high technology environment, where the captain of an aircraft may be compared to the captain of a sailing ship of a century ago alone making life and death decisions.

Air travel is now reliable transportation. This reliability is well understood in contemporary culture. Whether or not a person is an air traveller, everybody has an interest in air travel, and particularly in the reliability and safety of air travel. This is true even if it is only for a person to believe that he or she will not get hit while on the ground or in his or her house by a crashing airplane or helicopter. Flying has become ubiquitous to life in the United States. If Americans are

not busily scurrying someplace by plane for business or pleasure, they at least will look to the sky and see a vapor trail passing overhead.

If everybody has an interest that aircraft not crash, this is especially true for the people who fly in aircraft. Of all people flying, the ones who have the most control over their destinies are the pilots, and pilots certainly have a very great interest that their aircraft are flown safely, whether those aircraft are operated for business or pleasure. Businesses, even in their institutional, non-personal senses, that own and operate aircraft or whose employees fly in aircraft certainly lose very much in aircraft accidents. Ideally, then, airplanes and helicopters and gliders and other such vehicles in the sky should not crash, ever. The Federal Aviation Administration, as the part of the Federal government's aeronautical regulatory apparatus charged with making and enforcing the regulations governing air safety, has a very strong concern that aircraft do not crash.

The FAA is itself an interesting type of organization. It is a government agency that has a regulatory role as well as an operational role. This may be compared with such regulatory organizations as the Interstate Commerce Commission, the Securities and Exchange Commission, and other Federal transportation agencies such as the Federal Railroad Administration and the Federal Highway

Administration, which do not operate the systems they are charged with regulating. The Department of Energy does have operational and regulatory roles: these are in separate administrations, so it is not analogous to the FAA, but the Department as a whole has operational and regulatory tasks. The FAA also serves executive, legislative, and judicial functions. The FAA is a legislative body in that it is charged with making rules, a task previously held by the Civil Aeronautics Board. It is an executive body in that it enforces these rules, a task previously held by the Civil Aeronautics Agency (the direct ancestor of the FAA). It is a judicial body in that it is the first line of adjudication for violations of the rules, a task also previously held by the Civil Aeronautics Board.

In a sense, because of the power that rests in the ability to regulate and set rules, the FAA has a large role in defining what aviation will be in the United States. Because of this, it is, as an organization, of concern to all who have any contact with the industry: all share the same sky, and one of the most influential players in determining what that sky will be like is the FAA. But the FAA is more than this. The FAA is also a reflection of the forces that are acting on aviation, forces that are both inside the industry and outside of it, forces that sometimes have no active interest in flying beyond watching planes pass overhead.

The industry regulated by the FAA obviously has many elements and interlocking fields of concern. The industry has certain concerns relating to the economics of business. Within the overtly business-oriented segment of the industry -- where people are trying to make money out of their aircraft -- there are air carriers, aircraft and component manufacturers, flying schools, charter operators, traffic spotters, light aircraft rentals, and crop dusters. The industry also encompasses the oil companies that produce aviation fuel, electronics companies which make communications and navigation systems, the military which shares the airspace, and the Department of Commerce which makes the charts; and the list could go on and on! Individuals who fly are also the industry, from renter-pilots who fly a few hours a year to professional pilots-- flight instructors, airline and charter pilots, crop dusters. Last, but certainly not least, are the consumers. These are the people who fly on United Airlines or who ship via Federal Express, to give just a couple of examples from among the many offering services. They, too, are a critical element in the industry.

These elements of the industry have often critical perceptions of the FAA. To some it does not regulate enough, and this is covered widely in the general media. To others, it overregulates. A prominent voice in the general aviation industry, *Flying Magazine*, published an article

called "The Enforcers."⁴ The tenor of the article was one of an authoritarian agency waiting to enforce its rules. Another article was entitled "The Agony and the STC," which deals with the procedures necessary to obtain a supplemental type certificate -- usually a structural modification to an already certificated airframe -- and it is, essentially, a guide to the FAA's red tape.⁵ These two articles present the FAA in a entirely different light than the articles in the media following the DC-10 accident, which often pilloried the agency.⁶ Hence, it is possible for the industry to think of itself as over-regulated while the public is concerned about the apparent under-regulation of the same industry. Indeed, in the October 1985 issue, the letters to the editors of *Flying* reveal outrage on the part of the flying public that the enforcers article was far too kind to the FAA.

This is an ongoing perception. Numerous interviews developed the same critique of the agency. Respondents reported that the FAA, generally in the person of an inspector or a controller, was overly aggressive in enforcing rules, either in the role of police detective (the Flight Standards role) or traffic cop (the Air Traffic

⁴ "The Enforcers," in *Flying Magazine*, July 1985.

⁵ "The Enforcers," in *Flying Magazine*, August 1985.

⁶ See Chapter 9.

role).⁷ It seems a right of passage to become one to criticize the FAA for its regulation of the airspace system, something that becomes ingrained during one's student-pilot stage. The perception of the Flight Standards Service may be likened to the recent National Rifle Association critique of the Bureau of Alcohol, Tobacco, and Firearms (whose agents were characterized as "jackbooted thugs," and which prompted former President George Bush to resign from the NRA in protest). Air Traffic has been said to be the perpetrator of "airspace grabs." Interestingly, the Flight Standards critique was sometimes linked to specific field offices.⁸ It has even been linked to specific inspectors.⁹

⁷ This sentiment, without substantive deviation, was evident during a number of interviews held over a period of years for this and previous research. For example, interview no. 1, with an Associate Editor at *Flying* was held as a follow-up to the previously cited article; interview no. 10, with the owner of a pilot school in the Hudson Valley (New York State), who agreed to be an informant for this research; interview no. 11, with three general aviation pilots (light aircraft owners) at the same airport; interview no. 15, with two general aviation pilots at an airport on Long Island, who were contacted through a pilot school; interview nos. 16 and 17, with general aviation mechanics at the airport in the Hudson Valley; interview no. 18, with three student pilots at the airport in the Hudson Valley, and interview no. 19, with two general aviation pilots at the airport on Long Island.

⁸ Interview No. 10, previously cited.

⁹ I can speak from personal experience as a flying school manager here: I have encountered several instances where a specific inspector is "known" in the local aviation community to be extremely strict on flight tests or in matters of paperwork; other times, a "new" inspector needs time to learn what the local standards are.

The Background

Herman Melville started *Moby Dick* with a chapter entitled "Loomings." This was the story of Ishmael's drift to the whaling ships and the village of New Bedford. Melville understood that the story does not begin with the actions described in the first chapter, but instead has its seeds planted earlier. So it is with the aviation industry and the FAA.

Large transportation networks and their regulation preceded the aviation industry by a century, and so it is that aviation policies have their seeds in the last century. Aviation followed the rails as the United States' primary mode of long distance transportation. Thus, it is not surprising that there is some relationship of historical forms to contemporary aviation. This is one reason the FAA has developed in the way it has: there was an organizational history before there was even an organization. This history was shaped in the Nineteenth Century, a period of the development and growth of the railroads. The railroads had, in their turn, grown from the network before them, the canals. During the building of the western railroads, thousands of square miles of Federal land were given to private industry in exchange for the construction of the transcontinental railroads. A Federal agency, the Interstate Commerce Commission (ICC), regulated the economic function of railroads once they were built, often serving as

a buffer between shippers and the railroad companies. When the elimination of passenger services became a battle-ground following the Second World War, the ICC was the field of battle along with state public service commissions.

Railroad regulation continues to be part of the Federal government's interest, and as rail travel has been overtaken by more modern forms of travel, the Federal government and its transportation-related agencies have likewise evolved.

The Era of Rails

The great railroad networks developed in an age when the concept of government's role was very different from what it is today. During that age, railroad competition and mergers were mediated -- and moderated -- by J. P. Morgan rather than the Interstate Commerce Commission and the Justice Department.¹⁰ Cartels, "communities of interest," were encouraged by Morgan to stabilize the industry against rate wars and the construction of spite rail lines.¹¹ Government did not have a role in this.¹²

¹⁰ Robert Sobel, *The Fallen Colossus* (New York: Weybright and Talley, 1977).

¹¹ Sobel, 1977.

¹² Governments forays into transportation had taken two forms: of being a backer or even of being the builder. The string of communities stretching west from Philadelphia historically known as the "The Main Line" traces its roots to the original State-sponsored rail/canal network -- "the main line" -- built to central Pennsylvania; New York's Erie canal was similarly developed to access interior New York State. While among these ventures the Erie Canal was noteworthy for
(continued...)

The ascendancy and domination of the railroads came in the period of industrialization and *laissez-faire* capitalism. The two elements of regulation -- economic constraint and operating regulation -- were absent. However, as public outrage developed against the abuses of the robber barons, there were increasing calls for economic regulation of the industry. Over a torturous period of evolution, the ICC came into being.¹³ At the same time, the states began enacting operating rules that the railroads would have to follow, such as the number of crew members per train.

There are a number of issues that have to be considered when reviewing this organizational pedigree. One is that the ICC really did not work well. In 1917, the railroads were unable to supply the necessary transport for the war effort, and the United States Railway Administration (USRA) was formed to improve service, in effect nationalizing the rails. Although still under private ownership and management, the railroads were operated by the USRA. The

¹²(...continued)
its success at least as much as it was a force in propelling the development of western New York if not as a money maker, most of these ventures went the way of the Main Line in Pennsylvania: dismal failure. The Jacksonian era put an end to any further thought of an expansionary role for government spending. By the time the railroads came on the scene, governments were not a factor in the transportation business, and would not be again until the land-grant railroads of the West after the middle of the Century.

¹³ Sobel, 1977.

causes and impact of this action have been speculated upon endlessly. One theory has it that the railroads were initially unable to meet war transportation demands because at the time of the war they were already in a cyclical period of decline. They then lost approximately one billion dollars during the USRA era of 1917 to 1920; consequently, they were in poor overall condition and were unable to either rebuild or get out of debt before the start of the Great Depression in 1929.

Hence, the railroads arrived at the start of World War II still saddled with the crushing debt burden they held at the end of World War I. In addition, the USRA had seriously damaged the railroad's physical plant by running trains far in excess of capacities and had not rebuilt the deteriorated physical plant. The nine year interval between the end of the USRA and the start of the Depression did not permit the rails sufficient time to rebuild due to their debt. By the end of World War II the rails were making huge cash outlays for new rolling stock, especially passenger cars which were soon destined to be surplus as aviation took over domestic passenger travel. Still the World War I debt had never been serviced properly, so the rails arrived in the 1960s loaded with debt, with passenger car fleets that were redundant, and teetering on the brink of the unthinkable: industry-wide bankruptcy. The merger of two railroads flush with these problems was enough to push the nation's standard railroad

over the brink, and thus Penn Central became the largest of corporate bankruptcies up to that time.¹⁴

What does all of this have to do with regulation of the airways? This brief historical sketch calls attention to the Federal government's willingness to regulate, even to nationalize, when it so desired. But in the early years of aviation, the government specifically did not desire to regulate it. In 1917 aviation was becoming a military force, but it was still a weak sister to the land and sea roles of the Army and Navy. Commercially it would not have a role until the advent of air mail service, and economic regulation began to take shape. This was an evolutionary process. Not until an economic impact was obvious was there an attempt to regulate. This economic impact was seen in the huge government subsidies to the nascent air carriers for supplying mail service. Thus, regulation came along with the Federal government's largess. As this economic regulation was developing, at the end of the 1930s, safety regulation also became a prominent part of the Federal mandate.

¹⁴ See Joseph R. Daughen, *The Wreck of the Penn Central* (Boston: Little, Brown, 1971); Stephen Salisbury, *No Way to Run a Railroad: The Untold Story of the Penn Central Crisis* (New York: McGraw-Hill, 1982); Richard Saunders, *The Railroad Mergers and the Coming of Conrail*, (Westport, Conn.: Greenwood Press, 1978); "United States Railroad Administration," in *Trains*, April 1991; and Sobel, 1977.

The Rise of Aviation

What devastated rail passenger travel was the evolution of several forms of transportation that did not exist when the great rail networks of the late 1800s and early 1900s were being built. Highways and airways replaced rails. Cars, trucks and busses replaced the trains on the surface, and aircraft replaced them in the skies. The automobile destroyed the railroad's local traffic -- except for commuters -- while the airlines took away long-distance travel.

The governmental regulatory apparatus has had to evolve to keep pace with these changes, and the FAA and its predecessor agencies have been prominent in that regulatory apparatus. The FAA has been part of the United States Department of Transportation (DOT) since 1967. Before that, it was an independent Federal agency, and before that, its predecessors were part of the Department of Commerce (DOC), where Federal regulation of aviation had begun.

In the very beginning, the only aeronautical regulation nationally was by a so-called aero club. The Aero Club of America issued United States pilot licenses, while the only government agency was an advisory board, the National Advisory Committee for Aeronautics. Eventually, the Aeronautics Branch of the DOC was created, which became the Bureau of Air Commerce, to take-over licensing and to maintain an airway system. Formal licensing of pilots and

aircraft was begun under the DOC in 1925. This structure lacked economic regulatory authority, and safety regulation had been left to the states.

In 1934, a government commission, the Federal Aviation Commission, recommended that aviation be regulated like a public utility. At this time, President Roosevelt favored ICC regulation. However, the relationship between the rails and the ICC, that is the ICC's economic oversight of the rails, was generally perceived uncomfortably and with deep suspicion. Adding more authority to the ICC was not generally favored, and a bill to implement this died in Congress in 1936. In 1938 Roosevelt reversed himself and in that year the Civil Aeronautics Act created a new body in the DOC, the Civil Aeronautics Authority. So a new structure to regulate aviation was created at a time when the ICC already existed to regulate transportation. The Federal presence in aviation would continue to be through the Department of Commerce in order to avoid having the ICC regulate aviation.

In 1940, this body was reconstituted with the creation of both the Civil Aeronautics Board and the Civil Aeronautics Agency. Thus, the regulatory body was broken into two parts. One component was to conduct economic regulation and make flight-safety regulations: this was the Civil Aeronautics Board, the aeronautical equivalent of the ICC. The other part was to enforce safety regulation: this

was the Civil Aeronautics Agency, the direct ancestor of the FAA. Both of the new bodies came under the Civil Aeronautics Authority on paper, but the old CAA served no function.

This structure flowed directly out of the politics surrounding the rails, and was innovative in as much as there had been no Federal safety body for land transportation. It perhaps inadvertently remedied a problem of multiple and conflicting jurisdictions which plagues the rails to this day. To complete the formation of the FAA into the agency we know today, the Federal Aviation Act of 1958 removed the Civil Aeronautics Authority -- both parts: the Civil Aeronautics Agency and the Civil Aeronautics Board -- from the Department of Commerce, transferred the function of making safety-related rules from the CAB to the CAA, and turned the Civil Aeronautics Agency into Federal Aviation Agency. Ultimately, this FAA (F.A. Agency) became the FAA (F.A. Administration) that is today part of the Department of Transportation.¹⁵

¹⁵ Along with the FAA in the DOT, the DOC, or existing independently of an executive department are several other agencies performing aviation-related duties. The Office of the Secretary of Transportation (OST) performs tasks associated with the economic regulation of certificated air carriers, including service problems. The National Transportation Safety Board (NTSB) is an independent federal agency, whose function is to investigate aviation accidents, report on their cause, and -- as a separate function -- review on appeal suspensions, revocations, or denials of operating certificates, documents, and licenses issued by the FAA: it was created in 1966, assuming functions of the Civil
(continued...)

Also significant when reviewing the history of regulating the aviation industry is the de-regulation that occurred in the late 1970s. In fact, as the above history reveals, there are two different types of regulation that exist in the airline industry. One of those types of regulation is economic regulation, and indeed the fundamental concepts of economic regulation were revamped in the 1970s with the elimination of the Civil Aeronautics Board and many of its associated regulatory functions. These were functions that related to the economics of aviation, whom could fly on what routes in competition with -- or free of competition from -- whomever else. A second type of regulation is safety regulation, the job assigned to the FAA, and this type of regulation was never undone. It is to this latter type of regulation and its principal organization that this study is addressed. With the elimination of the FAA's sister organization, the CAB, the era of economic regulation of interstate passenger

¹⁵(...continued)
Aeronautics Board. The National Ocean Survey (NOS), a component of the National Oceanic and Atmospheric Administration (NOAA) of the DOT, publishes aeronautical charts. The Research and Special Programs Administration (RSPA), part of the DOT, collects and disseminates aviation information used by DOT, including overseeing the financial and traffic reporting requirements for certificated air carriers, commuter air carriers, and foreign air carriers. The DOT came into existence on 1 April 1967 through the enactment of The Department of Transportation Act (Public Law 89-670), combining 31 Federal elements.

transportation seemed to have been ended.¹⁶ In fact, some of these responsibilities have merely been transferred to the ICC, an ironic twist of fate as the original intent of the Federal government had been to provide aviation with a unique regulatory body, specifically not the ICC.¹⁷

Meanwhile, other functions have been transferred to the OST, the U.S. Postal Service, and the Department of Justice. But even with that minor subterfuge, the airlines found little limit to their economic activities; however, the FAA has maintained its vigilance over their flight operations.

THE STRUCTURE AND PURPOSE OF THE FAA

The Basis for the Organization

The FAA is part of the Executive Branch of the Federal government. It possesses a high degree of formalization and has specific goals. In its own words, it describes itself as follows:

The Federal Aviation Administration, the air transportation component of the Department of Transportation (DOT), regulates as well as fosters civil aviation. Its mission is directed primarily to aviation safety and to the establishment and enforcement of safety standards applicable to virtually every aspect of civil air transportation. In the discharge of its mission,

¹⁶ Works on the deregulation of the aviation industry are not generally germane to this study. As that genre deals with the economic deregulation, and the safety regulation is so politically loaded, the discussion of deregulation is strictly limited.

¹⁷ Robert Burkhardt, *The Federal Aviation Administration* (New York, F. A. Praeger, 1967).

the agency issues regulatory, advisory, technical, scientific, administrative, educational, and informational publications that affect civil aviation at every level.¹⁸

The legal authority for the FAA is contained in Title 49 of the United States Code, "Transportation," the body of law passed by Congress. Title 49 USC outlines in broad strokes how the FAA and other transportation-related entities are to function, the definition of certain positions and qualifications (e.g., there will be a Secretary of Transportation, there will be an Administrator of the Federal Aviation Administration, whether that person may be a military officer, etc.), and other broad definitions of purpose.

The body of law that governs the real operation of the FAA is the Code of Federal Regulations (CFR), the Executive Law that defines the Executive branch of the government. Title 49 Code of Federal Regulations (49 CFR) deals with transportation. However, unlike 49 USC, 49 CFR does not cover the FAA: the FAA is covered under 14 CFR, Chapter I, "Aviation and Space," parts 1-200. Title 14, Chapter I of the Code of Federal Regulations is divided into the sub-chapters and parts delineated in Figure 1.1.

¹⁸ Federal Aviation Administration, *Guide to Federal Aviation Administration Publications* (Washington, D.C.: U.S. Dept. of Transportation, Federal Aviation Administration, 1991), p. 1.

The FAA is part of the Department of Transportation [the DOT], which is itself a cabinet-level agency. The FAA is under the President and the Secretary of Transportation. Along with it in the DOT are the Federal Railroad Administration, the Federal Highway Administration, the National Highway Traffic Safety Administration, the Urban Mass Transportation Administration, the United States Coast Guard, the Maritime Administration, and the St. Lawrence Seaway Development Corporation. These agencies are all funded by Congress and have their existence defined legally in the United States Code.

Aviation research and development, maintaining the physical plant of the airway structure, air traffic and related flight services, and regulatory and enforcement efforts are the operational goals for which the FAA is responsible: formally and explicitly, promoting the aviation industry and the safety of flight.

These goals are in the FAA Charter, now located in Chapter 20 of the Appendix to Title 49 of the United States Code.¹⁹ The agency charter is the Federal Aviation Act of 1958 (Pub. L. 85-726, 23 Aug 1958, 72 Stat. 731). That Act, as amended, is now Chapter 20 of the Appendix to Title 49 of the United States Code. The charter states that

The [Administrator] is empowered and directed to encourage and foster the development of civil

¹⁹ Title 49 USC, Appendix, Chapter 20, §§1301, et. seq.

aeronautics and air commerce in the United States and abroad.

.
The Administrator is further authorized and directed to prescribe air traffic rules and regulations[.]

.
The Administrator is empowered and it shall be his duty to promote safety of flight of civil aircraft[.]²⁰

By its charter the FAA is ordained to promote aviation while insuring air safety. The FAA is charged with "The assignment and maintenance of safety as the highest priority in air commerce".²¹ At the same time it is also charged with "The encouragement of air service . . . , " "The encouragement, development and maintenance of an air transportation system relying on actual and potential competition . . . , " "The promotion, encouragement and development of civil aeronautics and a viable privately owned . . . industry," and "The promotion, encouragement, and development of civil aeronautics[.]"²² Its broadest dictate--especially in a geographical sense--is that "The Secretary of Transportation is empowered to encourage and

²⁰ 49 U.S.C. 1346, 49 U.S.C. 1348[c], 49 U.S.C. 1421[a]. The word "Administrator" in the first paragraph is in brackets as the wording is now "Secretary of Transportation": with the advent of the DOT many of the powers assigned to the FAA Administrator were transferred to the Secretary of Transportation, and in various places in 49 U.S.C., though not all, references to the Administrator were changed to the Secretary.

²¹ 49 USC 1302[a][1].

²² 49 USC, §§1302[a][6], 1302[a][9], 1302[a][11], and 1303[b].

foster the development of civil aeronautics and air commerce in the United States and abroad."²³ This combination is expressed with an additional caveat: "The regulation of air commerce [will be conducted] in such a manner as to best promote its development and safety and fulfill the requirements of national defense . . ."²⁴

The Structure of the Rules

Title 14 CFR, Chapter I, is broken into several subchapters, each dealing with specific areas of regulation that are applicable to various aspects of promoting either safety or a healthy industry or the general conduct of the FAA or a combination of the three.²⁵ As evidenced by this body of rules, accompanied by volumes of guidance material that in effect explain how to interpret and comply with the rules, the FAA provides a formalized, bureaucratic system with the intention of fostering safe flight or some other such goal.²⁶ The FAA also operates the air traffic control

²³ 49 USC 1346.

²⁴ 49 USC 1303[a].

²⁵ The complete list of titles of the Parts of Title 14, Chapter I of the Code of Federal Regulations, Aviation and Space, are in Figure 1.

²⁶ These are the Advisory Circulars (ACs, publications of advisory nature with reference to groups or sections of rules, generally referring to some aspect of flight or airport operations or maintenance); additionally, the FAA publishes Directives, Handbooks, and Orders, similar documents that are used by FAA personnel to assist in their interpretation and implementation of the rules (14 CFR) and Advisory Circulars.

system, which controls the movement of many aircraft flights, and has units dedicated to the development of new flight technology. The research and development work and the regulatory efforts form the companion concepts that the FAA is responsible for the safety of flight and for the promotion of the issue of the national airspace system.

The FAA also has an explicit rule-making process, which covers all aspects of its activities. This process begins with an initial internal draft being sent to the Office of Rule Making, where it undergoes first an "editor review" and then a "preliminary Team Concurrence." At that point it is in a proper written form for placement into 14 CFR where it to be enacted. Thereupon, at this point the process takes the rule from the Office of Rule Making and sends it to the Office of Aviation Policy and Plans, where it undergoes economic review. The proposed rule is then sent to the Department of Transportation and later to the Office of Management and Budget. Finally, after the external approvals, the FAA has a rule (see Figure 1.2).

There are both internal and external foundations for this process. The internal foundation is the FAA's legal regulatory structure (14 CFR 11, *General Rule Making Procedures*). The procedure sending agency actions to both the Office of the Secretary of Transportation and the Office of Management and Budget for review is external to the agency, constituting Executive oversight. These latter

steps are generated through the Executive political structure and are of a nature that is different than the aeronautically operational decision-making process or formal procedures outlined in 14 CFR 11.²⁷

Rules may be generated by the FAA as an internal process or by the public or industry groups. For example, if the FAA were petitioned to make a rule, the petition would accordingly be published by the FAA in the *Federal Register*. A petition for rulemaking is only a request for the FAA to investigate the feasibility of a rule change. Its publication in the *Federal Register* does not indicate any binding intent on the part of either the petitioner or the FAA. Before proceeding with a rule or a change to an existing rule, the FAA must publish in the *Federal Register* a Notice of Proposed Rule Making (NPRM). This notice includes the solicitation of feedback from the public and may lead to the change or refinement of the rule proposal.

Feedback from the public does not necessarily mean public in the global sense. The aviation industry is the

²⁷ During interviews for this research, informants at the FAA and elsewhere, referring to the whole body of regulations, indicated that the industry built the FAA rule structure. They also said that when the FAA identifies the need for a rule, for example from accidents or from public requests, it turns to the industry, announcing the intention to write a rule and asking for suggestions. It was also mentioned that even after a rule is written there are provisions for exemptions and deviations to offer relief, which may be sought if a rule were trying to remedy specific circumstances and exceeded the needs of a given operation.

subject of lobbying just as other industries are. The array of input comes from a variety of sources, and these are often referred to as "the alphabet groups":

ARINC, Aeronautical Radio, Incorporated, owned by a consortium of airlines, this is the operator of the airlines' proprietary communications network and their principal advisor on electronic technical issues;

ATA, the Air Transport Association of America, the principal lobby of the airline industry;

AOPA, the Aircraft Owners and Pilots Association, a principal lobby of the general aviation industry, specifically owners and pilots of light aircraft (e.g., small, single engine piston, two, four, or six seats);

EAA, the Experimental Aircraft Association, another principal lobby of the general aviation industry, specifically geared to homebuilders, kit-builders, and those with similar interests;

NAFI, the National Association of Flight Instructors, a lobby representing flight instructors and flight training interests in general aviation (but not having quite the same scope and stature of the previous two);

There are also ALPA (Airline Pilots Association, the pilots' union), RAA (Regional Airline Association, or commuter airlines), and dozens of other like organizations of varying degrees of influence or of interest in being influential. An AOPA reference on aviation organizations lists 17 pages of these organizations.²⁸ Among them is

²⁸ AOPA Air Safety Foundation, *AOPA Air Safety Foundation Handbook for Pilots 1993* (Frederick, Maryland: AOPA Air Safety Foundation, 1993).

Tailhook: some of these organizations, rather than being prestigious or influential, are just embarrassing.

Legally, these groups have no formal standing with the FAA. As a matter of law, all people and groups have formally equal access to the agency and to its formal rule-making apparatus. As a practical matter, many organizations do have dedicated staff who are in legal or research capacities. Further, some organizations are major players in the U.S. economy. For example, during an interview with an Associate Administrator, a hypothetical situation was described. I suggested that Congress may attempt to protect the jet engine industry by specifying in law that all over-water operations be with at least three engine aircraft. He said, pointing to a model of the twin-engine Boeing 777, that such a law would destroy that company, and that the FAA would do its best to prevent such a law from being passed. Alternatively, an AOPA representative told an assembly that it was important for them as individuals to write to the FAA in response to an NPRM, as a comment from AOPA or a like organization was counted as one comment, whereas a comment from an individual was equated as 20,000 votes.²⁹

The Administrative Structure

The formal structure of the FAA is a classic bureaucracy. Within FAA Headquarters there is an

²⁹ Stated at AOPA Air Safety Foundation, Flight Instructor Refresher Clinic, East Hartford, Conn., October 1995.

Administrator, a Deputy Administrator, nine Assistant Administrators, and three Executive Directors, the latter three having a total of eight Associate Administrators reporting to them. There are nine geographically based regions, whose regional administrators report to one of Executive Directors. There are a total of 254 various local offices nationally. There are two FAA centers. The Mike Monroney Aeronautical Center in Oklahoma City, Oklahoma, is the site of the FAA Academy. It is also a major aeromedical center for research and policy-making. The FAA Technical Center in Atlantic City, New Jersey, is the site of research on flight safety issues, where new systems are flight tested. The FAA is also divided into functional units. These units include a cluster under the Executive Director for System Operations, which houses the FAA's major operational elements (Airway Facilities, Air Traffic, Regulation and Certification, and Aviation Standards). This includes air traffic services, with air route traffic control centers and other assorted terminal control facilities, control towers, and flight service stations scattered about the country. It also includes the Flight Standards and the Aircraft Certification Services, with field offices responsible for pilot and aircraft certification (see Figure 1.3 for an organizational chart of the FAA and Figure 1.3a for a chart of the FAA centers).

The FAA's hierarchy is complicated by two clear but competing rationales. First, a geographically-based structure runs from the FAA headquarters in Washington, D.C. through regional offices to local offices. Below FAA headquarters in the hierarchy are the nine regions such as the Eastern Region, which covers Delaware, the District of Columbia, Maryland, New Jersey, New York, Pennsylvania, Virginia, and West Virginia.³⁰ Within each region are a host of different local offices. Second, the FAA's operating and regulatory units form discrete chains of command that are separated, with constituent field offices reporting upward through these separate channels. Thus, one arrives at the field office level by one of two paths, with the field offices including Aircraft Certification Field Offices (ACOs), Airports District Offices (ADOs), an Airports Field Office (AFO), Flight Standards District Offices (FSDOs), and Manufacturing Inspection District Offices (MIDOs).³¹

Congress itself has a strong role to play in the processes of the agency. For example, members of Congress

³⁰ The FAA's regional boundaries change from time to time. Although Federal agencies were at one time supposed to conform to standard regions, the FAA never did. These limits for Eastern Regions were accurate in the early 1990s, but may have changed again.

³¹ Nationally, for example, there are 64 Flight Standards District Offices, which report ultimately to Flight Standards Service in Washington, but which also go through a Flight Standards Office in each region.

may formally request the FAA to provide them with information on proceedings. As an informal indication of their importance, these requests take an administrative toll on the agency. I was informed by a former Flight Standards Inspector who had been posted at headquarters that answering Congressional inquiries -- which are loosely referred to as Congressionals -- was a priority for him to the point of taking precedence over all other work.³² It should go without saying here that the FAA is trying to gain the support of Congress, so a prompt response is appropriate to these persons with the purse strings. This person informed me that his priorities in Washington were as follows (exactly as written by him):

³² Interview No. 25. This person appeared genuinely pained recounting his FAA experience. In his office were several FAA commendations, along with a photograph of him in front of "his" DC-9, an FAA aircraft he had flown. Confirmation of this assessment came in other interviews as well: specifically, persons at headquarters were dealing with these tasks. For example, interview No. 33 included one person who had previously been at the headquarters and confirmed that the headquarters staff did devote a great deal of time to peripheral tasks. However, this person indicated that that went with the territory in headquarters, along with the higher pay grades, and that answering Congressionals was a task essential to the agency as it assured a cordial relationship with the Congress, which after all controls the FAA's finances.

Effective Priorities

1. Answer Congressional requests
2. Answer FOIA [Freedom of Information Act] requests
3. Weekly, monthly reports (lots of them)
4. Answer mail
5. Training (non-technical)
-
-
-
10. Improve aviation safety (time permitting)

He cited this situation as his reason for leaving the FAA.

Through the 1980s the degree of autonomy exercised by the regions was greatly curtailed. This was done first under a program called "lead region" and later through a program called "straight-lining." This meant that the field personnel would report to their counterparts in Washington rather than to their superiors in the regional offices. The chiefs of the individual regions were thus reduced, in the words of one source, to holders of ceremonial positions without authority over their subordinates, and this is the structure that still exists today.³³ This functional reorganization is a major part of this study.

Internal Conflict: Two Mandates for Action

The Federal Aviation Administration's dual mandates, as laid out in its charter, to promote aviation and to ensure safety, are potentially conflicting goals.³⁴ It is both an operating agency (Air Traffic Control, Airways Facilities)

³³ Interview No. 7(b).

³⁴ FAA Charter: 49 USC, Appendix II.

and a regulatory agency (Flight Standards, Aircraft Certification). The popular press has criticized the existence of these two mandates in a single organization as contradictory.³⁵ The agency, they say, cannot promote and regulate the industry at the same time.

Safety can have a stifling impact on an industry, especially an industry that may be operating for the first time in an economically "deregulated environment." Likewise, promoting an industry may cause one to look for the least constraining method of obtaining an objective, with the costs associated with safety being among the corners to be cut. This conflict can lead to many diverse, conflicting pressures on the organization. Such pressures on any organization may lead to inertia or even counterproductive actions.

The contradictions of the dual roles of the FAA are more essential than simply the organization being in an untenable situation. They go to the heart of what the FAA is. The FAA, as an organization, is composed of various political and career officials, of professional staff members, of non-professional career civil service workers, (etc.), carrying out the two mandates. The organization and its employees define and decide how the mandates are

³⁵ This issue has been raised in popular publications, such as *Flying Magazine*, as well as in participant and informant interviews, where the operational versus the regulatory aspects of the FAA were coupled with this as one of the FAA's structural "problems."

interpreted into organizational objectives; how they are executed; if one is to be compromised, and, if so, which one; and what will be the mechanism of these objectives. On the one hand the FAA is an organization based on career pilots, engineers, and maintenance personnel who received their formative training outside the organization, and who in fact come to the organization as a second career. On the other hand there is an organization based on personnel trained within the agency to do specific tasks, such as air traffic control.

Some informants cited the FAA and its staffing structure as an issue of professional versus technical organizations.³⁶ Meanwhile, there is an administrative organization that supports both of these. This creates at this juncture the specter of three entities: one, a professional organization dedicated to flying as a vocation; a second, a technical organization without a dedication to flying *per se* but with a foundation in some aspect of aviation; and third, a civil service organization with no commitment to either flying or technical expertise. Further, the administrative organization contains the career civil service and the political administrators.

³⁶ Interview No. 36.

The Context of Decisions

The organizational decision-making process in the FAA is intertwined with both (1) internal formal and traditional mechanisms and (2) external interrelationships. The FAA has a body of rules. Around these rules, which are themselves open to fairly flexible interpretation, are policies governing interpretation and execution. Some of these have the strength of legal precedent and enforcement. The interpretation of a rule that may make its way into the operations specifications of a certificated operator, for example, becomes regulatory for that operator. An Advisory Circular, not in itself regulatory, may in fact be binding if it outlines the only acceptable way in which compliance with a rule may be documented. Once established, these policies form an internal, historical constraint on the actions of FAA.

External to the FAA are interrelationships with aviation as a commercial industry and a recreational activity, with the government outside the FAA, and with public opinion as it is transmitted and interpreted by these various elements. The FAA is constrained and buffeted by forces both internal and external to it, and these forces cause it to change the perception of the boundary between its two formal mandates. Changes may sometimes be spasmodic, as the organization resists or is opposed, then suddenly moves forward, propelled by a media-intensive event

or some window of opportunity. One major change in FAA decision-making, the mandate to perform cost-benefit studies in rule-makings, is an example of an external force and constitutes a major part of this study.

These interrelationships are further influenced both by individual factors and by factors inherent in the professionalization characteristic of pilots, whether they be professionals in the airlines, business owners who fly in furtherance of their interests, or more recreationally oriented flying enthusiasts. Individual factors are the idiosyncratic imprints of individuals. Within the organization, these individual factors are reflected in the relationship between the part of the organization that is composed of various political and career officials and the part of the organization that is composed of professionalized staff. These relationships are played-out against formal and informal policies forming an internal, historical constraint on actions and against the FAA's body of rules that are themselves open to fairly flexible interpretation. While individuals have similar ideas about their duties, and the organization itself presents them with an historical constraint on how to conduct themselves, the basic rules of the FAA are flexible enough to permit idiosyncratic decision making. This includes differences in policy between units of the FAA, and will be the context in

which the study of the organization's reorganization is undertaken.

Who Are Aviation Professionals?

Aviation professionals, pilots along with others such as flight and ground instructors, flight engineers and flight navigators, aircraft dispatchers, and mechanics, receive a license from the FAA. All must meet specified minimum standards to receive a license. Pilots have the most complex system of licensing. These levels of licenses grant greater privileges to pilots who have demonstrated greater experience and higher training levels. There are also ratings that may be placed on some licenses to enhance the privileges of those licenses. These ratings may refer to the classification of aircraft a pilot may fly, or the privileges that a pilot may exercise (see Figure 1.6). To receive a license a pilot must either meet specified training and testing requirements or meet military equivalencies, all of which are specified in 14 CFR 61. As a note on usage, the common language term pilot "license" becomes what the FAA calls a pilot "certificate." These terms will be used interchangeably here, as they are often used in practice.

Pilot licenses are specifically hierarchical in nature. Each higher grade of license contains all of the privileges that the lower grade license has. They are also specific to certain types of aircraft, for example helicopters or single

engine aircraft. These specificities are called ratings or in some cases, limitations. A rating on a license might include "airplane, single engine, land" or "rotorcraft, helicopter" or "glider." A limitation may be "day VFR only" (i.e., only flight during the day under visual flight rules is permitted as specified, perhaps only for one type of aircraft or for the license generally). The bureaucratic specifics of licensing are laid out in meticulous detail.³⁷ Further, the details of how to translate those bureaucratic specifics into when and what to do with the controls inside the airplane are codified into textbooks published by the FAA, formally presented at lectures by the FAA and schools acting as certificated air agencies (Part 141 schools), and supplemented by books and other sources on the commercial market. These are examples of the FAA delineating the very mechanism by which new aviators are indoctrinated into the profession. The FAA's extensively published material on flight training forms the body of this formal knowledge.³⁸

³⁷ In the following overview of pilot licensing procedures, unless otherwise specified, when there are rule disparities among the classes of aircraft for which a pilot may be licensed (e.g., airplane, helicopter, glider), the rules cited (for example, a minimum flight experience) will be that for airplanes.

³⁸ For example, see The Federal Aviation Administration, *The Pilot's Handbook of Aeronautical Knowledge* (Washington, D.C.: Superintendent of Documents, 1969), The Federal Aviation Administration, *The Flight Training Handbook, AC 61-21A* (Washington, D.C.: Superintendent of Documents, 1980), The Federal Aviation Administration, *The Aviation Instructors Handbook, AC 60-14* (continued...)

Under FAA guidelines, the entry grade license is a "student pilot." The next higher grade of license is the "recreational pilot," which is a new license that is quite restricted in its privileges. The next higher grade of license is the "private pilot." This is the traditional basic pilot license. The acquisition of the required pilot skills may be accomplished in several ways (see Figure 1.10 for a typical Private Pilot curriculum). The next higher license is the "commercial pilot license." This is the basic license for those who wish to be paid for flying. The highest grade license issued is the "Airline Transport Pilot" (ATP) license. This license carries all of the privileges of the preceding licenses without limitations, and also permits the operation of aircraft governed under air transport regulations.³⁹

³⁸(...continued)

(Washington, D.C.: Superintendent of Documents); an excellent example of a non-FAA publication is William Kershner, *The Student Pilot's Handbook* (Ames, Iowa: Iowa University Press, 1970); Kershner, *The Advanced Pilot's Flight Manual* (Ames, Iowa: Iowa University Press, 1972); and several others in this series aimed at instrument pilots and flight instructors.

³⁹ Airline Transport Pilots certification is governed under Title 14 CFR, Part 61, Subpart F, 61.151 et. seq.; Flight operations under which the pilot in command is required to be an ATP are governed under Title 14 CFR, Part 135, "Air taxi operators and commercial operators" (some but not all of the operations entailed therein) and Title 14 CFR, Part 121, "Certification and operations: Domestic, flag, and supplemental air carriers and commercial operators of large aircraft" and Part 127, "Certification and operations of scheduled air carriers with helicopters."

In addition to the foregoing pilot licenses, the FAA also grants other certificates. Flight instructors are licensed by the FAA according to the aircraft in which they may give instruction. Mechanics are licensed according to the types of maintenance they may perform (airframe and/or powerplant, and an additional authorization to perform annual inspections). Various ratings may also be placed on pilot certificates, for example, an instrument rating, which may be obtained by a private pilot with at least 125 hours and is virtually mandatory for a commercial pilot (ATPs do not have a separate instrument rating as it is an integral part of the license).⁴⁰

Facilities are also licensed: airlines generally must be licensed, some maintenance facilities, certain flying schools, although for the latter two it is generally optional, with certification granting certain privileges (although the absence of such certification does not prevent operation). For example, a private pilot may be licensed at an FAA certificated school under 14 CFR 141 in 35 hours instead of 40 hours; a commercial pilot may be licensed at a 141 certificated school in 190 hours instead of 250 hours under Part 61.⁴¹

The aforementioned instrument rating appears to be an important safety mechanism. This may be for several

⁴⁰ Title 14 CFR, Part 61, §61.65.

⁴¹ Title 14 CFR, Part 141, "Pilot Schools."

reasons. Many accidents have been attributed to continued flight into unsafe weather conditions. The following data provide some indication of this. The Air Safety Foundation found the following:

7.8% of all accidents occurring in all phases of flight were weather related, with a higher percentage involving single-engine retractable-gear aircraft followed by twin engine aircraft.

10.4% of the accidents whose causal factors were pilot related involved weather. 19.1% of all twin accidents and 19.7% of the single-engine retractable accidents that were pilot related involved weather.

A predominant number of the accidents were attributed to initiating or continuing VFR flying into IMC [instrument meteorological conditions] by non-instrument-rated pilots, followed by instrument-rated pilots attempting to continue VFR flight into IMC.⁴²

While all pilots are required to have some instrument training as an integrated element of their private pilot training, the training for an instrument rating is far more rigorous than what a private pilot encounters and, in fact, provides the pilot with all of the procedures for operating an aircraft from departure to arrival in weather conditions below what would be required to safely control an aircraft by visual reference only. In addition to the practical knowledge obtained and demonstrated in the course of obtaining this rating, the pilot is often returned to a rigorous flight training environment for the first time

⁴² A.O.P.A. Air Safety Foundation, *General Aviation Accident Analysis Book, 1991 Edition* (Frederick, Md.: AOPA Air Safety Foundation, 1991), p. 21.

since private pilot training when obtaining an instrument rating. For both of these reasons, instrument rated pilots have better accident records than do non instrument rated pilots.⁴³

One Pilot's Brief Case History

A relevant part of this research is the background of the researcher. I have an extensive background in the aviation industry as a pilot and principal in a small aviation business. There are various ways that a person can arrive at the position of professional pilot or small business person. One's indoctrination into the field may or may not be similar to the next person in the cockpit. These different paths have an effect on how much experience the person has when he or she begins flying commercially, perhaps even teaching other pilots. It may affect how a person has learned to do flight maneuvers (such as stalls), has learned certain maneuvers (such as spins), or does routine flight operations (such as instrument approaches).

I started lessons at a certificated (Part 141) flying school while in high school, soloed at age 16, and received my private pilot license a year later at age 17.

Thereafter, I flew during my college years for a local sky-diving club, without pay, while logging sufficient hours to comply with the requirements for a commercial pilot license

⁴³ See Figures 1.8 and 1.9 for data on accident rates and pilot certificates.

with an instrument rating (250 hours).⁴⁴ With approximately 200 hours, I went to a school in Dade County, Florida, and received -- in this order -- a multiengine rating on my private pilot certificate, then an instrument rating on my private pilot certificate, then took the flight test for commercial pilot in both single and multiengine aircraft during the same testing session. This training cost approximately \$1500.⁴⁵ At this point, I started to fly commercially in various multiengine aircraft for the company where I had taken the lessons.⁴⁶ Shortly thereafter, I added a single engine sea rating to my commercial pilot license at a cost of \$125. At about 400 hours I received a flight instructor certificate for single engine airplanes, and the following year, having saved enough money from working as a pilot and instructor (approximately \$1000), added an instrument rating to the flight instructor certificate. About 18 months after that, now working full time as a flight instructor and again having saved money from work (again, about \$1000), I added a multiengine rating to my flight instructor certificate. At age 23, I took the Airline Transport Pilot tests. At this

⁴⁴ This is called "time building" in the industry.

⁴⁵ All of these dollar figures are from between 1975 and 1978 -- costs have risen since then according to such factors as inflation, the availability of aviation fuel, and the market for training aircraft (which are no longer in general production).

⁴⁶ This is "time building" for multiengine time.

point I was working as a chief flight instructor at a certificated part 141 school in which I had an interest, and was also the chief pilot of our certificated air-taxi (part 135). At this point I was both a worker in the field and a small business person. I was flying and instructing in various single and multiengine aircraft (although I never have flown a seaplane after my seaplane flight test in 1975), and managing the flying school and air taxi business.

After several years of not making a lot of money, in fact of losing money periodically, my partner and I decided to close the school. We sold all the aircraft. I continued to teach my remaining students as an employee of another school at the same airport, but I started few new students. Finally, I left the industry altogether.

As a working pilot, I experienced the idiosyncracies of the aviation industry, and learned there was more than one correct way to fly an airplane, both from the point of view of the airplane and the FAA. For example, my personal experience when I was Chief Flight Instructor at a part 141 school acquainted me well with how the FAA inspector assigned to the school wanted the plane stalled.⁴⁷ I was instructed never to use the ailerons -- the flight controls on the wings of the aircraft -- for bank control during a

⁴⁷ A stall is that condition when the wings of the aircraft are no longer providing sufficient lift to support the weight of the aircraft. This condition is typically associated with low speed flight or steep banked turns.

stall, as this could aggravate the stall and cause a spin: they should be kept in a neutral position. On a flight check I took with a different FAA inspector -- for qualification to become a check pilot -- I was told that this was a completely wrong method of stalling the aircraft, that on modern aircraft the wing is designed for the aileron to be flown at all times during the stall. On a recent checkout at a flying school, I was again told that the ailerons should be neutral through the stall. It is my belief that either one of these techniques could produce either an aggravated stall or a well trained pilot. In the airplane, people -- while knowing what a stall is -- still do them differently.

Even more critical from the point of view of safety and accident prevention is the matter of spins. A perennially debated issue, the matter is whether or not to have spins in the curriculum. Decades ago they were, but were removed formally: now only flight instructors need to have received spin training. The curriculum in Figure 1.10, however, selected from a northeastern flight school (mine), does include spins because I, as the chief flight instructor, believed students should know about spins before they get a license, before they solo, and with an instructor in the plane with them.

Instrument approach procedures are critical times for flight operations: the aircraft is often operated in

restricted visabilities close to the ground. A question, still unanswered to my satisfaction, is how to conduct a descent when there is no electronic glideslope to guide the descent. One school of thought is to descend as rapidly as possible in order to descend through any overcast and reach visual meteorological conditions as quickly as possible, thus facilitating locating the airport and runway environment and easing the transition to the landing configuration. However, aircraft descending at high sink rates close to the ground (a typical instrument approach without electronic descent guidance may have a minimum descent altitude of 600 feet above the ground) risk descending too far too quickly. The FAA attempted to address this concern by instituting something called a visual descent point (VDP). An aircraft at the VDP could make a relatively gentle descent to the runway; further, it has been taught on occasion to establish the gentle descent (actually a 3° angle of descent) so as to reach the VDP on this descent angle, and continue the same descent rate through the VDP to the runway. This may keep the aircraft in the clouds longer, but it promotes a less precipitous descent. I prefer the rapid descent in order to clear the clouds as quickly as possible. Neither of these techniques is necessarily right or wrong, as each has its benefits and hazards. The same can be said of the industry as a whole: as both a pilot and an entrepreneur, there were both

benefits and hazards. Very few people made great financial gains in the industry, but it was at times a very rewarding place in which to work.

FRAMING THE FAA

By Federal law, the FAA regulates and promotes the aviation industry. These are the two goals formally assigned to it in its charter. By acts of Congress, Federal agencies such as the FAA are created, but their conduct is usually left up to the Executive Branch. From time to time, Congress may also attempt to shape these agencies by passing laws explicitly requiring some actions, which is in itself an interesting question about separation of powers in the United States government.

All of the foregoing relationships -- among industry, government, and the FAA -- are further colored by the interactions among all the other players in the industry, by the airlines and other commercial operators, by the manufacturers, by the military, by general aviation interests, and by the users -- especially passengers and shippers using such services as overnight delivery.⁴⁸ These forces all interact continually in a maze of relationships. These forces define what the FAA is and what role it performs in a complex and changing environment

⁴⁸ These relations are also influenced by the separation of powers in the U.S. government, as well as by which social groups and interests have more power over different federal agencies.

consisting of industry, government, and consumers, all conditioned by and shaping aviation technology and culture.⁴⁹

There have been other such industries in this country, especially noteworthy among them being the airlines predecessors in national transportation, the railroads. But the FAA has tasks that are clearly a step beyond former types of organizations in the transportation industry both in the manner it conducts itself and in its social ramifications. Railroads never had a private operating agency, while the airlines, a multi-billion dollar industry, have the airways operated for them by the FAA.⁵⁰ There is a dearth of Federal regulation of the railroads, while there is a great deal of state regulation. For example, NYS §49, covers railroad operations, while there is nothing codified

⁴⁹ This is also an element of the so-called "iron triangle," the interrelationship of government and industry made up of the U.S. Congress, the Federal Executive bureaucracy, and lobbyists representing special interest groups. These three groups may work together to formulate legislation, and in some fields it has been said that most legislation is a product of the iron triangle. The ties linking these three groups are quite strong: often former members of Congress or other members of the bureaucracy become lobbyists. In many areas of legislation, for example agriculture, transportation, and defense, the iron triangle has a direct influence on public policy. See, for example, Gordon Adams, *The Politics of Defense Contracting: The Iron Triangle* (New Brunswick, N.J.: Transaction Books, 1982).

⁵⁰ Although today in parts of the country Amtrak owns rights of way over which privately operated freight trains operate: the Northeast Corridor, between Washington and Boston, is an example of this operation.

on air regulations.⁵¹ Title 49 CFR Subtitle B, Chapter II, Parts 200-299 "Federal Railroad Administration, Department of Transportation," is a very small section, with very little regulation, compared to the aviation regulations in Title 14 CFR: until recently railroad engineers did not even have to be licensed.

Pilots themselves are another topic of FAA rules. Professional and non-professional pilots alike share high status and professionalization. How does the FAA address these people in the regulations? And how does it try to get them to conduct their operations? Issues concerning regulation and organizational logic are relevant themes in a study of the FAA.

This project develops a social history of the FAA. This history will center on a debate over a rule, on how the need for a rule is explored, and on how the organization emerged from a significant restructuring. This centers on the process by which the FAA defines a need for action. Although the formal regulatory process is a major way in which the FAA communicates with the industry, there are also less formal, non-authoritarian mechanisms which the FAA employs, and there is also the manner in which the FAA

⁵¹ NYS §49, "Railroad Law," is 263 pages in *New York Consolidated Law Service*, Vol. 26A (Rochester, N.Y.: Lawyers Cooperative Publishing Co., 1983). There is no separate codification of aviation law or aircraft. These are instead listed under their relevant headings, such as General Business, Workers Compensation, or Penal.

constitutes itself. There are safety newsletters from the Flight Standards Service that are sent to all pilots by the local FAA offices. There are newsletters sent to all flight instructors and pilot examiners by Flight Standards. There are safety seminars held periodically by the local Flight Standards offices which are open to the public, and there are town meetings held when changes to the air route structure are contemplated. These are examples of the regulatory body acting in the role of a fraternal body, and in this case it is one specific part of the agency that is acting as the fraternal body.⁵²

The FAA may be a study of role strain and conflict. If the organization formulates a policy to tread lightly and be the nice guy on the block one need only look at its last

⁵² FAA policies and the decisions underlying them will be unknown to all but the aeronautical intelligentsia if there are never reasons to question them. If there are no plane crashes, no near misses, no newsworthy events, there will never be a reason to second guess an FAA decision, but let just one engine fall off an airplane and there will be a furor in the media. What if an aircraft with a problem known to engineers that its engines were improperly bolted on to its wings were not the subject of regulatory action because that knowledge was not "officially" known? Something like this became known with a vengeance after an accident taking over 270 lives, and the FAA was under a microscope. Was this just a bad break or a case of regulatory malfeasance? I argue that the FAA attempted to deal with this issue without any overt coercive action, instead using a collegial approach to insure the safety of this aircraft. This non-regulatory approach failed to avoid the accident. On the other hand, any pilot or operator will gladly enumerate the mountain of useless, even capricious rules that the FAA has promulgated on an innocent, beleaguered flying populace. While some rules may seem useless to some interests, as will be noted later in the case studies, self-interest (and a desire not to spend money) also has much to do with what seems to be a useful rule.

disaster to be cowed. But, if the organizational policy is to be the tough guy, there is a hostile constituency sending the hounds of Congress to bark at its heels. So the study of the FAA becomes one of understanding how those in the organization think about themselves and the job they have to perform, how they actually go about performing that job, and how they get pushed or pulled from the outside.

The FAA as an Organization

Organizations reflect the society in which they are formed. It has been argued, for example, that railroads could not have developed had not the necessary social structures also existed (i.e., social structures for the central administration of such physically disperse enterprises, e.g., bureaucratic management). This included the evolution of organizational structures, such that would permit administration of far flung enterprises, and family structures, such that the family would no longer being the basic unit of production. So, social structure and what frames social structure -- technological change, for example -- predicate organizational structure. This concept is a basic concern.

The FAA deals with evolving technology, which is never quite totally perfected (or at least made totally fool proof), and is always visible to the travelling public. Air transport helps make the United States a unified country. No longer does it take days to travel from coast to coast:

with the airplane that trip is a matter of hours, while rails and busses seem almost relegated to museums or government-subsidized oddities. Citizens depend on air travel, and expect it to be reliable and safe. That puts the FAA under tremendous pressure either to deliver or at least to appear as if it is continually on the job. The social structure that is an outgrowth of the technological revolution in transportation that framed the middle part of this century has framed the environment in which the FAA is a principal player; thus, the FAA reflects this new social reality.⁵³

The structure of the FAA is also an issue. Is the FAA a bureaucracy, at least in the sense of the ideal type described by Max Weber? Of course it is, but of a special type. In practice it will not be as Weber described the ideal-type bureaucracies, but there are models that describe more of a continuum from rational systems (bureaucracies) to natural systems (a more anarchistic form -- but still an organization with goals and processes -- harkening to the philosophies of Rousseau, Proudhon, and Kropotkin).⁵⁴ In

⁵³ As an aside, if the latter part of the Twentieth Century will be remembered as the information revolution, the middle part, with the evolution of the modern airline infrastructure after the Second World War -- and coincidentally the development of the Interstate Highway System and the rise of the family automobile -- should be remembered as the transport revolution.

⁵⁴ W. Richard Scott, *Organizations: Rational, Natural, and Open Systems*, 2nd edition (Englewood Cliffs, N.J.: Prentice Hall, 1987), p. 75.

this model, an organization may be somewhere along that continuum in from either end, and it is useful to remember it when considering how the FAA actually functions.

Perhaps the very tools of the trade must be considered when examining this issue: aviation deals with the cutting edge of technology in various fields, including aircraft design and electronics. Is the FAA a technocracy or a related structure? That is, is the FAA an organization that bases its rationale for decision-making on rational goals determined by starkly technical standards, such as an uncompromising, "what is the technically best way to get an aircraft through a cloud deck and onto a specific runway at a specific airport (on time, smooth landing, . . .)?" This imperative, driven by the technologically associated standards of its professional work force, may define the terms in which the organization "thinks," that is, the way goals are formed, the way personnel are promoted through the structure; in fact, it may define the structure of the organization. Contingency theory -- the approach that implies that there are no ideal types but instead evolutions that do certain things more or less well -- would explain then why the FAA developed differently from other organizations.⁵⁵ And of course the FAA is part of the

⁵⁵ See, for example, Paul R. Lawrence and Jay W. Lorsch, *Organization and Environment: Managing Differentiation and Integration* (Boston: Graduate School of Business Administration, Harvard University, 1967) and John Kenneth (continued...)

Executive Branch of the United States government itself. The Federal government is designed to function in certain ways (e.g., separation of powers), and the FAA's structure must fit into these external structures.

The FAA has a formal goal, Congressionally legislated, outlined in 49 USC. This obvious reference point permits several questions to be postulated. Considering this goal, what are the functional goals that the FAA actually addresses? How does the FAA handle its relationship with its overseers (the Congress, the Executive branch)? How does the FAA handle its relationship with its subjects (the corporate players in the industry, individual pilots, and air travellers)? The answer to these questions lies in the FAA's own foundation, the rules it makes for itself and sets as a guide for the function of its minions.

The FAA's formal structure, evidenced in both its form and its regulatory processes, lends itself to specific analysis. Accidents and pilots directly relate to how safe the skies are: how the FAA relates to these issues, and responds to calls on its attention, are central issues, and provide insight into the function of the organization that is just a little bit different from what is described in *Flying* magazine or the FAA's own *Aviation News*. The point is to make a critical examination of the FAA's structure,

⁵⁵(...continued)
Galbraith, *The New Industrial State* (Boston: Houghton Mifflin, 1967).

particularly processes around rules -- creating and interpreting them, through both formal internal structures and external mandates.

The approach of this study is more that of a case study than of a broad comparative work. Aviation is different from other industries, even other transportation industries. This is likewise true of the FAA -- that it is different from other organizations, from other government organizations, other aviation organizations. This may cast the analysis in what may be called the "technological imperative" school. This is not a school of thought developed at length in the study itself. It is not the intent of the study to predict what the FAA will do tomorrow based on a micro-level theory or organizational behavior; rather, the study intends to develop an understanding of long term historical processes of organizational change.

The FAA may be viewed as having goals and processes that are broadly understood and accepted by the participants in the organization. Thus the organization is a single entity, not as an organizational anarchy with a multitude of free-agent operators each of whom decides a piece of policy. The FAA may well be structured so as to permit free-agent decision-making in some quarters, but it is within the organization's structural context that this occurs. While still allowing for individual factors, the organization possesses a culture of its own, which assimilates its

workers into that culture or selects its workers for compatibility with that culture, and which maintains that culture through successive waves of worker cadres. This implies that the FAA of today can see itself as -- and can be fundamentally the same as -- the FAA of a decade, two decades, or even half a century ago. This envisions a rank-and-file FAA insulated from top leadership that is imposed on it from outside the organization: no "great man" theory of organizations is applicable here. Rather, there is an attempt to maintain an even course with a clearly identified and stable goals. If a professional culture of safe flight becomes the driving goal of decision-making, and alternative goals are subverted in order to attain safe flight, a transcendental organizational culture is clearly evident.

Insulation from change is not always possible, and great men and women or external mandates have fundamentally altered the shape, function, and direction of the FAA. As a case in point, the hierarchical structure of the FAA was defined as decentralized by an FAA Administrator and subsequently defined as centralized by a Secretary of Transportation.⁵⁶ However, this may be seen as falling within the bounds of normal evolutionary forces as the FAA has been forced to change in response to the its political

⁵⁶ The Administrator was Najeeb Halaby, who was one of the architects of regional autonomy; the Secretary of Transportation was Elizabeth Dole, who was the instigator of the re-centralized administration.

environment. More important in this evolution is how resources are allocated to it by the Congress and Executive branches, and how Congressional and Executive mandates are operationalized within the agency.

Figure 1.1: List of Parts of Title 14, Chapter I of the Code of Federal Regulations, Aviation and Space

Subchapter A: Definitions

Part 1: Definitions and Abbreviations.

Subchapter B: Procedural Rules

Part 11: General Rulemaking Procedures.

Part 13: Investigation and Enforcement Procedures.

Subchapter C: Aircraft

Part 21: Certification Procedures for Products and Parts.

Part 23: Airworthiness Standards: Normal, Utility, and Acrobatic Category Airplanes.

Part 25: Airworthiness Standards: Transport Category Airplanes.

Part 27: Airworthiness Standards: Normal Category Rotorcraft.

Part 29: Airworthiness Standards: Transport Category Rotorcraft.

Part 31: Airworthiness Standards: Manned Free Balloons.

Part 33: Airworthiness Standards: Aircraft Engines.

Part 35: Airworthiness Standards: Propellers.

Part 36: Noise Standards: Aircraft Type and Airworthiness Certification.

Part 39: Airworthiness Directives.

Part 43: Maintenance, Preventive Maintenance, Rebuilding, and Alterations.

(continued)

Figure 1.1: List of Parts of Title 14, Chapter I of the Code of Federal Regulations, Aviation and Space (continued)

Part 45: Identification and Registration Marking.

Part 47: Aircraft Registration.

Part 49: Recording of Aircraft Titles and Security Documents.

Subchapter D: Airmen

Part 61: Certification: Pilots and Flight Instructors.

Part 63: Certification: Flight Crewmembers Other Than Pilots.

Part 65: Certification: Airmen Other Than Flight Crewmembers.

Part 67: Medical Standards and Certification.

Subchapter E: Airspace

Part 71: Designation of Federal Airways, Area Low Routes, Controlled Airspace and Reporting Points.

Part 73: Special Use Airspace.

Part 75: Establishment of Jet Routes and Area High Routes.

Part 77: Objects Affecting Navigable Airspace.

Subchapter F: Air Traffic and General Operating Rules

Part 91: General Operating and Flight Rules

Part 93: Special Air Traffic Rules and Airport Traffic Patterns.

Part 95: IFR Altitudes.

(continued)

Figure 1.1: List of Parts of Title 14, Chapter I of the Code of Federal Regulations, Aviation and Space (continued)

- Part 97: Standard Instrument Approach Procedures.
 - Part 99: Security Control of Air Traffic.
 - Part 101: Moored Balloons, Kites, Unmanned Rockets, and Unmanned Free Balloons.
 - Part 103: Ultralight Vehicles
 - Part 105: Parachute Jumping.
 - Part 107: Airport Security.
 - Part 108: Airplane Operator Security.
 - Part 109: Indirect Air Carrier Security.
 - Subchapter G: Air Carriers, Operators for Compensation or Hire, and Operators of Large Aircraft*
 - Part 121: Certification and Operations: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft.
 - Part 125: Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More.
 - Part 127: Certification and Operations of Scheduled Air Carriers With Helicopters.
 - Part 129: Operations of Foreign Air Carriers.
 - Part 133: Rotorcraft External Load Operations.
 - Part 135: Air Taxi Operators and Commercial Operators.
 - Part 137: Agricultural Aircraft Operations.
- (continued)*

Figure 1.1: List of Parts of Title 14, Chapter I of the Code of Federal Regulations, Aviation and Space (continued)

Part 139: Certification and Operations: Land Airports Serving CAB-Certificated Scheduled Air Carriers Operating Large Aircraft (Other Than Helicopters).

Subchapter H: Schools and Other Certificated Agencies

Part 141: Pilot Schools.

Part 143: Ground Instructors.

Part 145: Repair Stations.

Part 147: Aviation Maintenance Technician Schools.

Part 149: Parachute Lofts.

Subchapter I: Airports

Part 150 Airport Noise Compatibility Planning.

Part 151: Federal Aid to Airports.

Part 152: Airport Aid Program.

Part 153: Acquisition of U.S. Land for Public Airports.

Part 154: Acquisition of U.S. Land for Public Airports Under the Airport and Airway Development Act of 1970.

Part 155: Release of Airport Property From Surplus Property Disposal Restrictions.

Part 157: Notice of Construction, Alterations, Activation and Deactivation of Airports.

Part 159: National Capital Airports.

(continued)

Figure 1.1: List of Parts of Title 14, Chapter I of the Code of Federal Regulations, Aviation and Space (continued)

Part 169: Expenditures of Federal Funds for Nonmilitary Airports or Air Navigation Facilities Thereon. .

Subchapter J: Navigational Facilities

Part 171: Non-Federal Navigation Facilities.

Subchapter K: Administrative Regulations

Part 183: Representatives of the Administrator.

Part 185: Testimony by Employees and Production of Records in Legal Proceedings and Services of Legal Process and Pleadings.

Part 187: Fees.

Part 189: Use of Federal Aviation Administration Communications Systems.

Part 191: Withholding Security Information From Disclosure Under the Air Transportation Act of 1974.

Figure 1.2: Steps in Rule-Making

The FAA's formal steps have been defined internally as the following:

FAA Steps:

- Initial Draft
- Editor Review
- Preliminary Team Concurrence
- Economic Evaluation
- Final Team Concurrence
- Principal Briefing
- Associate & Executive Review

Leaves FAA

OST (Office of the Secretary of Transportation)

OMB (Office of Management and Budget)

FINAL RULE

At some point in the above procedure, generally prior to the economic evaluation, the rule is published as a Notice of Proposed Rule Making. The rule is at that point formally presented to the public for comment, with a specified comment period.

The industry may submit its own economic evaluations or contributions to the FAA's evaluation. Agency personnel in the economic analysis unit have stated that if the industry submits data they are obligated to accept it, as they do not have the statutory authority to judge its validity.¹

¹ Interview No. 26, three analysts in the Regulation and Organizational Analysis Division. This interview is described in Chapter Nine, note 19.

Figure 1.3, FAA Organizational Chart

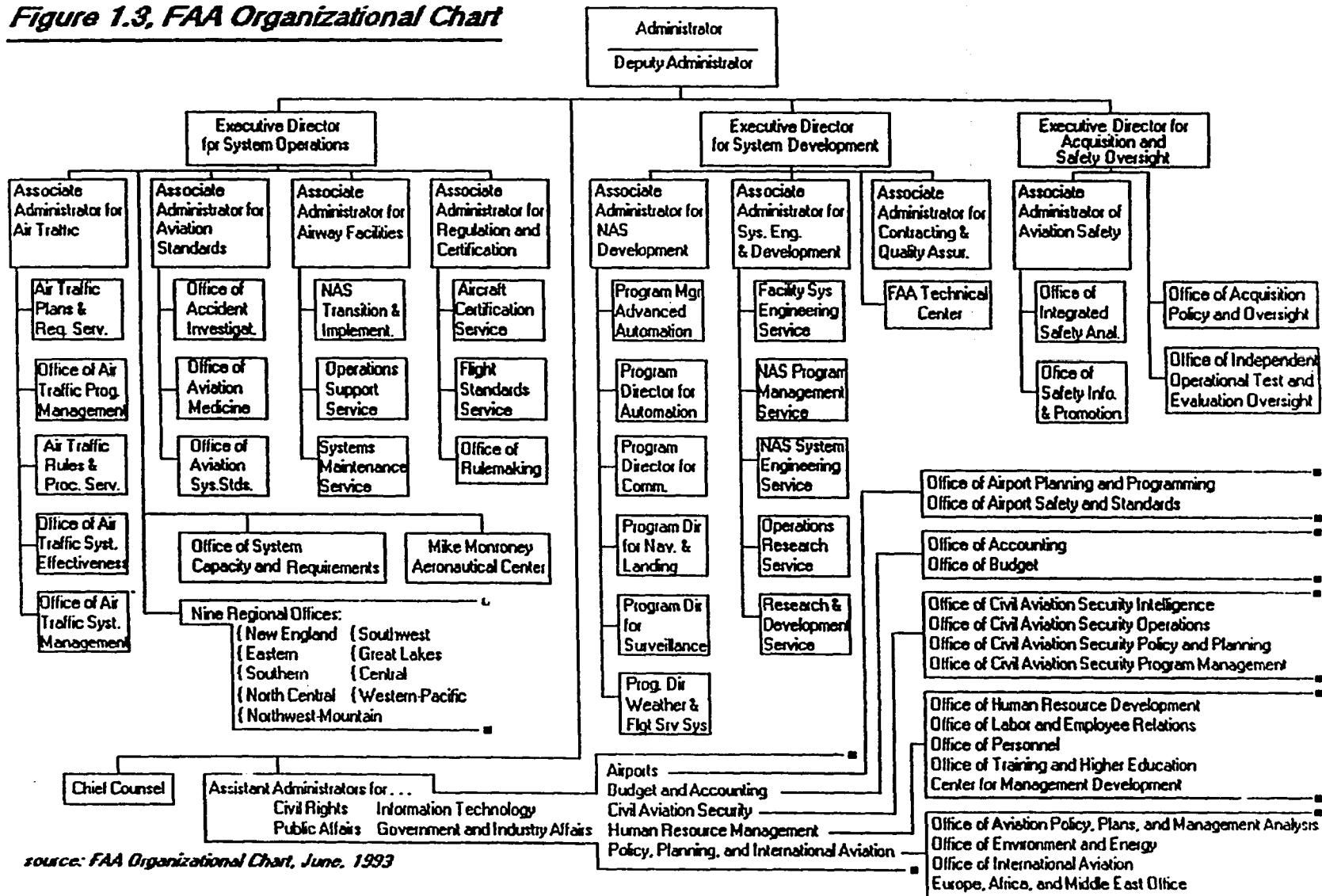


Figure 1.3a, Federal Aviation Administration Centers

Mike Monroney Aeronautical Center

(Under the Associate Administrator for Airway Facilities)

National Airway Systems Engineering Division

(Under the Associate Administrator for Regulation and Certification)

Regulatory Support Division

(Under the Associate Administrator for Aviation Standards)

Office of Aviation System Standards

Civil Aeromedical Institute

FAA Technical Center

(Reporting directly to the Executive Director for System Development)

Office of Research and Technology Applications

Aviation Security Research and Development Service

Engineering Integration and Operational Evaluation Service

Engineering, Research, and Development Service

Engineering, Test and Evaluation Service

Resource Management Service

(Under the Associate Administrator for Airway Facilities)

National Automation Engineering Field Support Division

National Automation Field Support Division

National Data Communications Systems Engineering Division

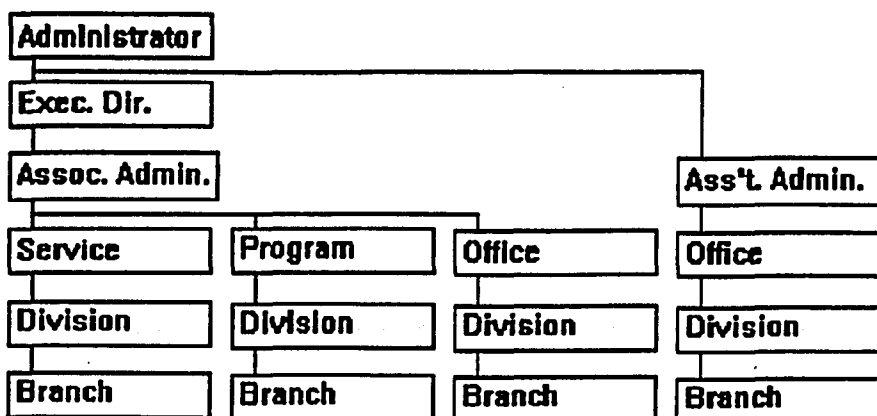
Center for Management Development

as a center, under the

Assistant Administrator for

Human Resource Management

Figure 1.3b: Chains of Comand



source: Federal Aviation Administration, 7/93

Figure 1.4: Staff Appointments:

Presidential Appointment requiring Senate Confirmation:

Administrator
Deputy Administrator

Presidential Appointment (non-Senate):
none

Schedule C:
none

Non-Career Senior Executive Service
Chief Counsel
Assistant Administrator for Public Affairs

Career Senior Executive Service
87 positions, including most Assistant and Associate Administrators and many unit Directors/Managers and their deputies.

note: Assistant and Associate Administrators are at the same salary scale; however in scope of authority, Associate Administrators have broader authority based on the scope of programs under their purview.

source: Federal Aviation Administration, 7/93

Figure 1.5: Classification of Pilot Licenses and Ratings

pilot certificates:

Student Pilot
 Recreational Pilot
 Private Pilot
 Commercial Pilot
 Airline Transport Pilot

ratings for pilot certificates:

1. category ratings: associated class ratings:

airplane	single engine, land single engine, sea multiengine, land multiengine, sea
rotorcraft	helicopter gyroplane
glider	
lighter-than-air	airship free balloon
2. instrument rating:

instrument-airplane
instrument-helicopter
3. type ratings:

for all turbojet powered aircraft, all aircraft with a certificated gross weight over 12,500 lbs., and certain other helicopters and airplanes as specified.

See Figures 1.11 through 1.16 for details on requirements for selected licenses and ratings.

(continued)

**Figure 1.5: Classification of Pilot Licenses and Ratings
(continued)**

Licenses are issued for a grade of license and associated aircraft ratings. For example, the pilot certificate of a commercial pilot who is rated to fly single and multiengine land airplanes, has an instrument rating, and a type rating in a Boeing-727, would read as follows:

COMMERCIAL PILOT

**AIRPLANE SINGLE AND MULTIENGINE LAND
INSTRUMENT-AIRPLANE B-727**

and the pilot certificate of an Airline Transport Pilot who took the ATP flight test in the Boeing would read as follows:

AIRLINE TRANSPORT PILOT

**AIRPLANE MULTIENGINE LAND B-727
COMMERCIAL PRIVILEGES
AIRPLANE SINGLE LAND**

Figure 1.6: Table of Active Certificated Pilots and of Non-Pilot Certificates

Pilot Certificates:			Non-Pilot Certificates:		
airplane only or airplane and other category:				Total	%
	Total	%			
student	120,203	17.4	mechanic	366,392	70.8
recreational	161	1 ¹	parachute rigger	7,916	1.5
private	293,306	42.4	ground instructor	70,086	13.6
commercial	148,365	21.4	aircraft dispatcher	11,607	2.3
ATP	112,167	16.2	flight navigator	1,225	0.2
			flight engineer	60,236	11.6
total airplane	674,202	97.4			
no airplane category rating:					
only:	Total	%			
helicopter	9,860	1.4			
glider	8,033	1.2			
lighter-than-air	n/a	n/a			
Total Pilot Certificates:			Total Non-Pilot Certificates:		
	692,095	100.0 ²		517,462	100.0
other summaries:					
	Total	%			
flight instructor	69,209	10.0 ³			
helicopter (total)	32,605	4.7 ³			
glider (total)	19,570	2.8 ³			
instrument	303,193 ⁴	⁵			
women	40,931	5.9 ³			

(all notes on following page)

Notes to Figure 1.6, Pilot Certificates

¹ Less than 0.1%

² This number is derived from several sources, including medical certificates and actual licenses presumed active from those issued: thus it does not sum exactly.

³ Of all active pilots.

⁴ AOPA has informed me that they have included ATPs in the count of instrument ratings, although ATPs do not hold a separate instrument rating as it is an integral part of the ATP license. Thus this number is not only the number of instrument ratings (as written on the pilot license) but also the number of pilots whose licenses indicate they have instrument privileges (those Private and Commercial Pilots with an Instrument Ratings and all ATPs).

⁵ This number may be conceptualized in three different ways. First, it is 43.8% of all pilots, which includes Student and Recreational Pilots who are not eligible for an Instrument Rating. Second, of the universe of pilots who are eligible to hold a discrete Instrument Rating, 441,671 Private and Commercial pilots hold 191,026 Instrument Ratings, 43.2%; in fact, as an instrument rating has been a virtual requirement for the Commercial license since 1973, it is likely that nearly all Commercial Pilots now hold an instrument rating, thus extrapolating from this would indicate that 293,306 Private Pilots hold 42,592 instrument ratings, only 14%. Finally, of all pilots who could legally hold instrument flying privileges, 553,835 Privates, Commercials, and ATPs, 54.7% have instrument flying privileges.

source: Aircraft Owners and Pilots Association.

Figure 1.7: Table of Active Pilots' Flight Experience

Pilot Certificate:	Total	%	Estimated Average Total Flight Time ¹
student	120,203	17.4	25
private	293,306	42.4	175
commercial	148,365	21.4	775
ATP	112,167	16.2	3930

¹ For airplanes, in hours, rounded to the nearest whole hour.

source: estimated from data available through the Aircraft Owners and Pilots Association and the Federal Aviation Administration.

Note on the data:

This data is not collected by the FAA, although pilots may self-report their flight time on their medical certificate applications. That data, which would be the best data available, has never been compiled or made available by the FAA, this according to the Statistics and Forecasts Branch, Planning Analysis Division, Office of Aviation Policy, Plans, and Management Analysis.

Figure 1.8: Table of Aircraft Accidents, 1982 - 1988, by Pilots' Certificates and Instrument Rating

Pilot Certificate	accidents 1982-1988 ¹	% of all accidents	avg. % of pilots to accidents ²	ratio of pilots to accidents
student	1,603	9.6	1.3	75.0:1
private	7,722	47.6	2.6	38.0:1
commercial	5,762	35.5	3.9	25.7:1
ATP	1,373	8.5	1.2	81.7:1
none	110	0.7	---	---
unknown	171	1.1	---	---
	n=16,220	100.0%	2.3	42.7:1
instructor	2,352	14.5 ³	3.4	29.4:1
instrument rating				
yes	6,639	40.9	2.2	46.7:1
no	9,197	56.7	2.4	42.3:1
unknown	384	2.4	---	---
instrument privileges ⁴				
yes	8,012	49.4	1.9	51.8:1
no	7,824	48.2	2.8	35.4:1
unknown	384	2.4	---	---

Notes to Figure 1.8

¹ accident is as defined in 49 CFR 830: an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury or in which the aircraft receives substantial damage. Substantial damage is defined as damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowlings, dented skin, small puncture holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wing tips are not considered "substantial damage" (i.e., not an accident).

² that is, were each accident to be a different pilot having only one accident in the reporting period: this is an assumption for the purposes of this comparison and is not documented in the data.

(continued)

Notes to Figure 1.8, Aircraft Accidents by Pilots' Certificates (continued)

³ instructor accidents are also counted with commercial and ATP accidents, as appropriate; these include training accidents where an instructor is flying with student pilots, which are not counted as student pilot accidents as the student pilot is not pilot-in-command of an aircraft carrying another person.

⁴ instrument rating/ATP: see note four to table 2.2 preceding for additional comments on this measure.

source: Aircraft Owners and Pilots Association.

Figure 1.9.1: Table of Aircraft Accidents, 1982-1988, by Pilots' Flight Experience

Of all flight experience levels [N = 16,220]

Total Flight Time (Hours)	#	% (of N)	Total Flight Time (Hours)	#	% (of N)
0- 400	5670	34.98	5201-5600	144	0.89
401- 800	2160	13.33	5601-6000	166	1.02
801-1200	1229	7.58	6001-6400	100	0.62
1201-1600	918	5.66	6401-6800	121	0.75
1601-2000	703	4.34	6801-7200	138	0.85
2001-2400	496	3.06	7201-7600	98	0.60
2401-2800	451	2.78	7601-8000	107	0.66
2801-3200	421	2.60	8001-8400	62	0.38
3201-3600	307	1.89	8401-8800	62	0.38
3601-4000	302	1.86	8801-9200	54	0.33
4001-4400	196	1.21	9201-9600	58	0.36
4401-4800	206	1.27	9601-10,000	101	0.62
4801-5200	211	1.30	> 10,001	879	5.42

unknown = 850, 5.24%

Detail: Pilot Flight Time For Pilots Having Accidents

900 hours is the median flight time

the interquartile range for flight time is 3100 hours

75% Q3	3400
50% Med	900
25% Q1	300
Q3-Q1 Range	3100

source: Aircraft Owners and Pilots Association.

Figure 1.9.2: Table of Aircraft Accidents, 1982-1988, by Pilots' Flight Experience

Detail: up to 2000 hours flight experience

[N_{< 2000} = 10,680]

65.84% of all accidents are pilots with 2000 hours or less
 34.98% of all accidents are pilots with 400 hours or less

Total Flight Time (Hours)	#	% (of N)	Total Flight Time (Hours)	#	% (of N)
0 - 100	2139	13.2	1001-1100	287	1.8
101 - 200	1522	9.4	1101-1200	263	1.6
201 - 300	1102	6.8	1201-1300	233	1.4
301 - 400	907	5.6	1301-1400	234	1.4
401 - 500	685	4.2	1401-1500	235	1.4
501 - 600	586	2.8	1501-1600	216	1.3
601 - 700	447	2.8	1601-1700	178	1.1
701 - 800	442	2.7	1701-1800	168	1.0
801 - 900	339	2.1	1801-1900	156	1.0
901 -1000	340	2.1	1901-2000	201	1.2

source: Aircraft Owners and Pilots Association.

Figure 1.9.3: Table of Aircraft Accidents, 1982-1988, by Pilots' Flight Experience

Detail: up to 100 hours flight experience [$N_{\leq 100} = 2142$]
 13.21% of all accidents are by pilots with 100 hours or less

Total Flight Time (Hours) # % (of N)			Total Flight Time (Hours) # % (of N)		
0 - 25	475	2.9	50 - 75	518	3.2
26 - 50	567	3.5	76 -100	579	3.6

source: Aircraft Owners and Pilots Association.

Figure 1.9.4: Table of Aircraft Accident Rates, 1991, by Hours Flown and Departures

	general aviation		air carrier	
	accidents	fatal	accidents	fatal
per 100,000 hours flown	6.97	1.35	0.77	0.22
per 100,000 departures	4.46	0.86	1.27	0.36 *

* 48.0 million general aviation departures, 10.5 million air carrier departures

source: Aircraft Owners and Pilots Association.

Figure 1.10: Typical Course of Instruction:

1. **Basic Aircraft Control:** Pitch and Bank control, Turns to headings, Power control, Climbs & Descents.
2. **Slow Flight:** Flight at minimum controllable airspeed.
3. **Stalls:** in various configurations -- clean and with flaps -- and in various flight situations -- climbing, descending, and turning -- (1) "basic stall" [power off, straight ahead], (2) power off stalls (clean and flaps), (3) power on stalls (clean and flaps), and (4) accelerated stalls; and introduction to Spins.
4. **Steep Turns**
5. **Ground Reference Maneuvers:** Turns around a point, Rectangular patterns, S-turns along a road.
6. **Takeoffs and landings:** normal and crosswind; short field, and soft field.
7. **Emergency Procedures:** rejected landings; power failure during & after takeoff and in the traffic pattern; and review aircraft control solely by reference to **Instruments** (part I: Straight-and-Level, Climbs & Descents, Turns to Headings, and Unusual Attitudes).
8. **Pre-Solo Stage Check**
9. **Solo flight:** in the traffic pattern.
10. **Flight out of the traffic pattern:** the local practice area.
11. **Solo Practice:** Landings, Flight Maneuvers
12. **Cross Country Flight Procedures:** flight planning, "pilotage" (basic flight navigation) and VOR tracking.
13. **Review aircraft control solely by reference to Instruments** (Part II: Straight-and-Level, Climbs & Descents, Turns to Headings, Unusual Attitudes, and Radio and Radar Services).
14. **Solo Cross Country** (10 hours total, usually 3 flights).
15. **Night Flying** (3 hours instruction, no solo)
16. **Review for Flight Test & Pre-Flight Test Stage Check**

Figure 1.11: Selected Regulations -- Student Pilots

Concerning student pilots and the aeronautical knowledge requirements for the written test, Title 14 CFR Part 61.87(b) reads as follows:

(b) Aeronautical knowledge: A student pilot must have demonstrated satisfactory knowledge to an authorized instructor, of the appropriate portions of Parts 61 and 90 of the Federal Aviation Regulations that are applicable to student pilots. This demonstration must include the satisfactory completion of a written examination to be administered and graded by the instructor who endorses the student's pilot certificate for solo flight. The written examination must include questions on the applicable regulations and the flight characteristics and operational limitations for the make and model aircraft to be flown.

Concerning flight training, 14 CFR 61.87(c) and (d) read as follows:

(c) Pre-solo flight training. Prior to being authorized to conduct a solo flight, a student pilot must have received and logged instruction in at least the applicable maneuvers and procedures listed in paragraphs (d) through (j) of this section for the make and model of aircraft to be flown in solo flight, and must have demonstrated proficiency to an acceptable performance level as judged by the instructor who endorses the student's pilot certificate.

(d) For all aircraft (as appropriate to the aircraft to be flown in solo flight), the student pilot must have received pre-solo flight training in --

- (1) Flight preparation procedures, including preflight inspections, powerplant operation, and aircraft systems;
- (2) Taxiing or surface operations, including runups;
- (3) Takeoffs and landings, including normal and crosswind;
- (4) Straight and level flight, shallow, medium, and steep banked turns in both directions;
- (5) Climbs and climbing turns;
- (6) Airport traffic patterns including entry and departure procedures, and collision and wake turbulence avoidance;
- (7) Descents with and without turns using high and low drag configurations;

(continued)

Figure 1.11: Student Pilots (continued)

- (8) Flight at various airspeeds from cruising to minimum controllable airspeed;
- (9) Emergency procedures and equipment malfunctions; and
- (10) Ground reference maneuvers.

At this point, 14 CFR 61.87(e), (f), (g), (h), (i), and (j) give specific flight training requirements for aircraft, rotorcraft (all helicopters and other than single-place gyroplanes), single-place gyroplanes, gliders, airships and free balloons, respectively. For example, 14 CFR 61.87(e) specifies the following:

(e) For airplanes, in addition to the maneuvers and procedures in paragraph (d) of this section, the student pilot must have received pre-solo flight training in --

- (1) Approaches to the landing area with engine power at idle and with partial power;
- (2) Slips to a landing;
- (3) Go-arounds from final approach and from the landing flare in various flight configurations including turns;
- (4) Forced landing procedures initiated on takeoff, during initial climb, cruise, descent, and in the landing pattern; and
- (5) Stall entries from various flight attitudes and power combinations with recovery initiated at the first indication of a stall, and recovery from a full stall.

Figure 1.12: Selected Regulations -- Recreational Pilots

Title 14 CFR Part 61.99, "Aeronautical Experience"
(concerning recreational pilots) reads as follows:

- (a) An applicant for a recreational pilot certificate with an airplane rating must have had at least a total of 30 hours of flight instruction and solo flight time which must include the following:
 - (1) 15 hours of the 30 hours total time are flight instruction, including at least:
 - (a) 2 hours outside the vicinity of the airport from which the instruction is given, including at least three landings at another airport that is more than 25 nautical miles from the airport of departure; and
 - (b) 2 hours in airplanes in preparation for the recreational pilot flight test; and
 - (2) 15 hours of the 30 hours total time are solo flight in airplanes.

Title 14 CFR Part 61.97, "Aeronautical Knowledge," reads as follows:

An applicant for a recreational pilot certificate must have logged ground instruction from an authorized instructor, or must present evidence showing satisfactory completion of a course of instruction or home study in at least the following areas of aeronautical knowledge appropriate to the category and class of aircraft for which a rating is sought:

- (a) The Federal Aviation Regulations applicable to recreational pilot privileges, limitations, and flight operations, the accident reporting requirements of the National Transportation Safety Board, and the use of the applicable portions of the *Airman's Information Manual* and the FAA advisory circulars;
- (b) The use of aeronautical charts for VFR navigation using piloting with the aid of magnetic compass;
- (c) The recognition of critical weather situations from the ground and in flight and the procurement and use of aeronautical weather reports and forecasts;
- (d) The safe and efficient operation of aircraft including collision and wake turbulence avoidance;
- (e) The effects of density altitude on takeoff and climb performance;

(continued)

Figure 1.12: Recreational Pilots (continued)

- (f) weight and balance computations;
- (g) Principles of aerodynamics, powerplants, and aircraft systems; and
- (h) Stall awareness, spin entry, spins, and spin recovery techniques.

And 14 CFR 61.97, "Flight proficiency," reads as follows:

The applicant for a recreational pilot certificate must have logged instruction from an authorized flight instructor in at least the pilot operations listed in this section. In addition, the applicant's logbook must contain an endorsement by an authorized flight instructor who has found the applicant competent to perform each of those operations safely as a recreational pilot.

(a) In airplanes --

- (1) Preflight operations, including weight and balance determination, line inspection, airplane servicing, powerplant operations, and aircraft systems;
- (2) Airport and traffic pattern operations, collision and wake turbulence avoidance;
- (3) Flight maneuvering by reference to ground objects;
- (4) Pilotage with the aid of a magnetic compass;
- (5) Flight at slow airspeeds with realistic distractions and the recognition of and recovery from stalls entered from straight flight and from turns;
- (6) Emergency operations, including simulated aircraft and equipment malfunctions;
- (7) Maximum performance takeoffs and landings; and
- (8) Normal and crosswind takeoffs and landings.

(b) In helicopters . . .

(c) In gyroplanes . . .

Title 14 CFR, Part 61, §61.101, "Recreational Pilot Privileges and Limitations," reads in part:

(a) A recreational pilot may --

- (1) Carry not more than one passenger; and

(continued)

Figure 1.12: Recreational Pilots (continued)

- (2) Share the operating expenses of the flight with the passenger.
- (3) Act as pilot in command of an aircraft only when --
 - (i) The flight is within 50 nautical miles of an airport at which the pilot has received ground and flight instruction from an authorized instructor certificated under this part;
 - (ii) The flight lands at an airport with 50 nautical miles of the departure airport; and
 - (iii) The pilot carries, in that pilot's personal possession, a logbook that has been endorsed by the instructor attesting to the instruction required by paragraph (a)(3)(i) of this section.
- (b) Except as provided in paragraphs (f) and (g) of this section, a recreational pilot may not act as pilot in command of an aircraft --
 - (1) That is certificated --
 - (i) For more than four occupants;
 - (ii) With more than one powerplant;
 - (iii) With a powerplant of more than 180 horsepower; or
 - (iv) With retractable landing gear.
 - (2) That is classified as a glider, airship, or balloon;
 - (3) That is carrying a passenger or property for compensation or hire;
 - (4) For compensation or hire;
 - (5) In furtherance of a business;
 - (6) Between sunset and sunrise;
 - (7) In airspace in which communication with air traffic control is required;
 - (8) At an altitude of more than 10,000 feet msl or 2,000 feet agl, whichever is higher.
 - (9) When the flight or surface visibility is less than three statute miles;
 - (10) Without visual reference to the surface;
 - (11) On a flight outside the United States;
 - (12) To demonstrate that aircraft in flight to a prospective buyer;
 - (13) This is used in a passenger-carrying airlift and sponsored by a charitable organization; and
 - (14) That is towing any object.
- (c) A recreational pilot may not act as a required pilot flight crewmember on any aircraft for which more than one pilot is required by the type certificate of the aircraft or the regulations under which the flight is conducted[.] . . .

(continued)

Figure 1.12: Recreational Pilots (continued)

- (d) A recreational pilot who has logged fewer than 400 flight hours and who has not logged pilot-in-command time in aircraft within the preceding 180 days may not act as pilot in command of an aircraft until the pilot has received flight instruction from an authorized flight instructor who certifies in the pilot's logbook that the pilot is competent to act as pilot in command of the aircraft[.] . . .
- (e) The recreational pilot certificate issued under this subpart carries the notation "Holder does not meet ICAO requirements."
- (f) For the purpose of obtaining additional certificates or ratings, while under the supervision of an authorized flight instructor, a recreational pilot may fly as sole occupant of an aircraft
 - (1) For which the pilot does not hold an appropriate category or class rating;
 - (2) Within airspace that requires communication with air traffic control; or
 - (3) Between sunset and sunrise, provided the flight or surface visibility is at least 5 statute miles.
- (g) In order to fly solo as provided in paragraph (f) of this section, the recreational pilot must meet the appropriate aeronautical knowledge and flight training requirements of §61.87 for that aircraft. When operating an aircraft under the conditions specified in paragraph (f) of this section, the recreational pilot shall carry the logbook that has been endorsed for each flight by an authorized pilot [sic] instructor who --
 - (1) Has given the recreational pilot instruction in the make and model of aircraft in which the solo flight is to be made;
 - (2) Has found that the recreational pilot has met the applicable requirements of §61.87; and
 - (3) Has found that the recreational pilot is competent to make solo flights in accordance with the logbook endorsement.
- (h) Notwithstanding paragraph 61.101(a)(3), a recreational pilot may, for the purpose of obtaining an additional certificate or rating, while under the supervision of an authorized flight instructor, act as pilot in command of an aircraft on a flight in excess of 50 nautical miles from an airport at which flight instruction is received if the pilot meets the flight training requirements of §61.93 and in that pilot's personal possession is the logbook that has been endorsed by an authorized instructor attesting that:

(continued)

Figure 1.12: Recreational Pilots (continued)

(1) The recreational pilot has received instruction in solo cross-country flight and the training described in §61.93 applicable to the aircraft to be operated, and is competent to make solo cross-country flights in the make and model of aircraft to be flown;

(2) The instructor has reviewed the student's preflight planning and preparation for the specific solo cross-country flight and that the recreational pilot is prepared to make the flight safely under the known circumstances and subject to any conditions listed in the logbook by the instructor.

Figure 1.13: Selected Regulations -- Private Pilots

14 CFR 61.103, "Eligibility," reads in part:

To be eligible for a private pilot certificate, a person must --

- (a) Be at least 17 years of age[.]
- (b) Be able to read, speak, and understand the English language[.] . . .
- (c) Hold at least a current third class medical certificate under Part 67 of this chapter[.]
- (d) Pass a written test of the subject areas on which instruction or home study is required by §61.105;
- (e) Pass an oral and flight test on procedures and maneuvers selected by an FAA inspector or examiner to determine the applicant's competency in the flight operations on which instruction is required by the flight proficiency provisions of §61.107; and
- (f) Comply with the sections of this part that apply to the rating he seeks.

14 CFR 61.109, "Flight Experience," reads in part:

An applicant for a private pilot certificate with an airplane rating must have had at least a total of 40 hours of flight instruction and solo flight time which must include the following:

- (a) 20 hours of flight instruction . . .
 - (1) Three hours of cross country;
 - (2) Three hours at night, including 10 takeoffs and landings for applicants seeking night flying privileges; and
 - (3) Three hours in airplanes in preparation for the private pilot flight test within 60 days prior to that test; and
- (b) 20 hours of solo flight time, including at least --
 - (1) 10 hours in airplanes;
 - (2) 10 hours of cross country flights, each flight with a landing at a point more than 50 nautical miles from the original departure point. . .
 - (3) Three solo takeoffs and landings to a full stop at an airport with an operating control tower.

(continued)

Figure 1.13: Private Pilots (continued)

14 CFR 61.118, concerning limitations on private pilots, reads in part:

**§61.118, Private pilot privileges and limitations:
Pilot in command.**

Except as provided in paragraphs (a) through (d) of this section, a private pilot may not act as pilot in command of an aircraft that is carrying passengers or property for compensation or hire; nor may he, for compensation or hire, act as pilot in command of an aircraft.

(a) A private pilot may, for compensation or hire, act as pilot in command of an aircraft in connection with any business or employment if the flight is only incidental to that business or employment and the aircraft does not carry passengers or property for compensation or hire.

(b) A private pilot may share the operating expenses of a flight with his passengers.

(c) A private pilot who is an aircraft salesman and who has at least 200 hours of logged flight time may demonstrate an aircraft in flight to a prospective buyer.

(d) A private pilot may act as pilot in command of an aircraft used in a passenger-carrying airlift sponsored by a charitable organization, and for which the passengers make a donation to the organization, if --

(1) The sponsor of the airlift notifies the FAA . . .

(2) The flight is conducted from a public airport that is adequate . . .

(3) He has logged at least 200 hours of flight time;

(4) No acrobatic or formation flights . . .

(5) Each aircraft is certificated . . .

(6) The flight is made under VFR during the day.

Figure 1.14: Selected Regulations -- Commercial Pilots

14 CFR Part 61.125, "Aeronautical Knowledge" reads as follows:

An applicant for a commercial pilot certificate must have logged ground instruction from an authorized instructor, or must present evidence showing satisfactory completion of a course of instruction or home study in at least the following areas of aeronautical knowledge appropriate to the category and class of aircraft for which a rating is sought:

(a) Airplanes --

(1) The regulations of this chapter governing the operations, privileges, and limitations of commercial pilots, and the accident reporting requirements of the National Transportation Safety Board;

(2) Basic aerodynamics and the principles of flight which apply to airplanes;

(3) Airplane operations, including the use of flaps, retractable landing gears, controllable propellers, high-altitude operation with and without pressurization, loading and balance computations, and the significance and use of airplane performance speeds; and

(4) Stall awareness, spin entry, spins, and spin recovery techniques for airplanes.

(b) Rotorcraft . . .

(c) Gliders . . .

(d) Airships . . .

(e) Free balloons . . .

14 CFR 61.127, "Flight Proficiency," reads as follows:

The applicant for a commercial pilot certificate must have logged instruction from an authorized flight instructor in at least the pilot operations. In addition, his logbook must contain an endorsement by an authorized flight instructor who has given him the instruction certifying that he has found the applicant prepared to perform each of those operations competently as a commercial pilot.

(a) Airplanes --

(1) Preflight duties, including load and balance determination, line inspection, airplane servicing;

(continued)

Figure 1.14: Commercial Pilots (continued)

- (2) Flight at slow airspeeds with realistic distractions and the recognition of and recovery from stalls entered from straight flight and from turns;
- (3) Normal and crosswind takeoffs and landings, using precision approaches, flaps, power as appropriate, and specified approach speeds;
- (4) Maximum performance takeoffs and landings;
- (5) Operation of an airplane equipped with a retractable landing gear, flaps, and controllable propeller(s), including normal and emergency operations; and
- (6) Emergency procedures, such as coping with power loss or equipment malfunctions, fire inflight, collision avoidance precautions, and engine-out procedures if a multiengine airplane is used.
- (b) In helicopters . . .
- (c) In gyroplanes . . .
- (d) Gliders . . .
- (e) Airships . . .
- (f) Free balloons . . .

14 CFR 61.129, "Airplane Rating: Aeronautical Experience," reads in part:

- (a) General. . . .
- (b) Flight time as pilot. An applicant for a commercial pilot certificate with an airplane rating must have a total of at least 250 hours of flight time as pilot[.] . . . The total flight time as pilot must include --
 - (1) 100 hours in powered aircraft, including at least --
 - (i) 50 hours in airplanes; and
 - (ii) 10 hours of flight instruction . . . in an airplane having retractable landing gear, flaps, and a controllable-pitch propeller; and
 - (2) 50 hours of flight instruction . . . including--
 - (i) 10 hours of instrument instruction, of which at least five hours must be in flight in airplanes; and
 - (ii) 10 hours of instruction in preparation for the commercial pilot flight test; and

(continued)

Figure 1.14: Commercial Pilots (continued)

- (3) 100 hours of pilot-in-command time, including at least --
 - (i) 50 hours in airplanes;
 - (ii) 50 hours of cross-country flights, each flight with a landing at a point more than 50 nautical miles from the original departure point. . . . ; and
 - (iii) five hours of night flying including at least 10 take-offs and landings[.]

Figure 1.15: Selected Regulations -- Airline Transport Pilots

The basic requirements for an Airline Transport Pilot license, as enumerated in 14 CFR 61.151, are as follows:

- (a) Be at least 23 years of age;
- (b) Be of good moral character;
- (c) Be able to read, write, and understand the English language and speak it . . .
- (d) Be a high-school graduate, or its equivalent . . .

The flight experience and aeronautical knowledge requirements are also at the highest level of any of the foregoing. The experience requirements in 14 CFR 61.155 are somewhat oddly worded, but they can be broken down as follows:

- (1) 1,500 hours of total flight time as a pilot (including second-in-command and a limited amount of flight-engineer time in addition to pilot-in-command time), including
 - (a) 500 hours of cross-country flight time;
 - (b) 100 hours of night flight time;
 - (c) 75 hours of instrument time, at least 50 hours of which were in flight (i.e., not in a ground-based aircraft simulator); and
- (2) 250 hours of pilot-in-command time (of the 1,500 above), including
 - (a) 100 hours cross-country flight time and
 - (b) 25 hours of night flight time.

Figure 1.16: Selected Regulations -- Instrument Rating

The minimum qualifications for an instrument rating, as specified in 14 CFR 61.65(e), are as follows:

- (1) A total of 125 hours of pilot flight time, of which 50 hours of the 125 hours total are as pilot-in-command cross-country flight in powered aircraft, each cross-country flight having a landing at a point more than 50 nautical miles from the original departure point;
- (2) a total of 40 hours of simulated or actual instrument time, of which 20 hours of the 40 hours of instrument time are in flight (i.e., not more than 20 hours of the 40 hours are instrument flight instruction in a ground-based instrument simulator);
- (3) 15 hours of instrument flight instruction, of which 5 hours are in an airplane (or a helicopter, as appropriate).

CHAPTER TWO, THE RESEARCH

The Hypotheses to be Tested

The research examines both formal decisions and participants' explanations of how decisions are made. This creates a context for decisions that demonstrates the goals that the organization is striving to attain. Evaluation of this data will provide evidence upon which the decision to reject or accept the null hypothesis is based. The research hypothesis is the following:

The FAA's operational goals differ from the formal goals elucidated in the formal legal mandate of the organization in ways that correspond to four specific goal models.

These goal may be categorized according to the following models:

- (1) goals are based on objective demands for action *vis-a-vis* either the organization's formal (legal/bureaucratic) mandate or the individual objective determinations (professional/non-bureaucratic) standards of its members;⁵⁷
- (2) goals respond to symbolic, legitimating needs of either the organization or its parent or oversight bodies -- including the Federal government as a whole;⁵⁸

⁵⁷ For example, Max Weber, "Bureaucracy," in *From Max Weber: Essays in Sociology*, trans. & edited C. W. Mills and H. H. Gerth (New York: Oxford University Press, 1946); and Malcolm Waters, "Collegiality, Bureaucratization, and Professionalization: A Weberian Analysis," in *American Journal of Sociology* Vol. 94, No. 5 (May) 1989, pp. 945-972.

⁵⁸ Murray Edelman, *The Symbolic Uses of Politics* (Urbana: University of Illinois Press, 1964); and *Constructing the Political Spectacle* (Chicago: University of Chicago Press, 1988); also John W. Meyer and Brian Rowan, "Institutionalized (continued...)"

- (3) goals are based on an interaction among various competing interests that have control over or receive from the FAA resources, and which in turn attempt to influence other resources;⁵⁹ and
- (4) goals are chaotic with little relationship between cause and effect.⁶⁰

These goals may be operationalized concurrently, and in specific issues will be contradictory and difficult to reconcile.

The null hypothesis is therefor the following:

The specific multiple goal typologies model is inapplicable in this case, that operational goals do not differ from the formal goals in these fundamental manners, and that there is no corresponding contradiction in goals.

Discussion of Hypothesis

The existence of multiple, potentially contradictory processes and goals seems likely based on a review of the literature and assessment of the evidence. The

⁵⁸(...continued)
Organizations: Formal Structure As Myth and Ceremony," in *American Journal of Sociology*, No. 83, No. 2 (September, 1977), pp. 340-363.

⁵⁹ Katherine Newman and Paul Attewell, "A Compliance-Resource Theory of Regulatory Failure: the Case of OSHA," in *The International Journal of Sociology and Social Policy* Vol. 5, No. 1, 1985, pp. 29-53; and Robin Stryker, "A Tale of Two Agencies: Class, Political-Institutional, and Organizational Factors Affecting State Reliance on Social Science," in *Politics and Society* Vol. 18, No. 1, March 1990, pp. 101-141.

⁶⁰ M. D. Cohen, J. G. March, and J. P. Olsen, "A Garbage Can Model of Organizational Choice," in *Administrative Science Quarterly* 17, 1972, pp. 1-25; and J. G. March and J. P. Olsen, editors, *Ambiguity and Choice in Organizations* (Bergen, Norway: Universitetsforlaget, 1976).

organization, regardless of any explicit formal mandate, finds itself developing political solutions to objective operational issues. These political solutions reflect processes of compromise and consensus, or outright power, processes either controlled by the FAA or aimed at it. Compromise and consensus may indicate where the organization brokers a decision among its own internal interests or between its interests and outside interests, or where decisions are mutually agreed-to, reflecting interests on all parts, with no party objecting to a process. Power may indicate where the organization is intimidated -- or intimidates others -- into a decision or acceptance of a decision that would be otherwise unacceptable. These resolutions do not necessarily represent unsatisfactory solutions, merely solutions that are a product of processes that exist outside the formal internal process of the organization that are aimed exclusively at the organization's more narrowly defined formal goals.

THE STRUCTURE OF THE STUDY

Methods

The research involved both interviews and analysis of written material. The interviews were intended to develop a view of the corporate sense of environment. Persons were interviewed from top policy-making positions through middle-level management to non-policy, non-supervisory positions within the FAA, both at FAA headquarters in Washington,

D.C., and at FAA field offices. Written material ranged from specific rule-making material to FAA publications of general interest to the aviation community. This material is analyzed for content both overtly and in underlying themes.

The Interviews

How the Interviews Were Obtained Interviews with FAA respondents were conducted at FAA facilities; non-FAA respondents were interviewed (generally) at airport and other aviation-related locations. Sufficient background information was collected to determine if a respondent is (or was ever) a licensed pilot. Interviews followed the standard form sufficiently to provide a uniform body of information for each respondent; however, interviews were varied freely to accommodate the specific circumstances of each respondent. This included -- where appropriate -- questions concerning the respondent's work, interactions with the FAA and/or the aviation community, schooling and training, and general life experiences.

Interview Usage Several key indicators were developed to guide the interview process. These included the following four items.

(1) *An internally-generated measure of organizational professionalization.* The research issue here is, as viewed by those inside the organization, (a) is the FAA run as a professionalized fraternal organization and

(b) are there professionalized cohorts within the organization?

(2) *A more specifically centered measure of pilot professionalization as a cohort within the organization. The research issue here is, as viewed by those both inside and outside the organization, is FAA policy set by pilots or dominated by the judgement of pilots?*

(3) *An externally-generated measure of the organizations's professionalization. The research issue here is, as viewed by those outside the organization, (a) is the FAA run as a professionalized fraternal organization and (b) are there professionalized cohorts within the organization?*

(4) *Internally- and externally-generated measures of the organization's responses to specific safety-related issues. The research issue here is, based on the respondents insight and judgement relative to selected issues and issues of their own suggestion, does the FAA respond well to safety-related issues.*

In developing these measures, each interview should be viewed as a collection of individual questions (a "traditional" interpretation) and as a tool for developing an understanding of the respondent's total perception of the organization and its key issues (an "ethnomethodological" interpretation). This interpretive technique is a critical element in the understanding of responses made by individuals in, for example, policy-making (or similar politically sensitive) positions, where any response may be taken as (1) an official statement made for public consumption or (2) an actual personal opinion. Although it may be impossible to convincingly make this determination, making reasonable determinations of purpose is a crucial

part of interpreting responses from politically-oriented respondents.

Several areas of response were specifically explored. While these were not the specific questions that were asked of every respondent, they were subject areas on which the formal questionnaire focused and were themes that underlaid the questions. These included (1) is the organization run by pilots, (2) does the organization act as a professional organization as a whole, (3) what does the aviation community think of the FAA and what does the FAA think of itself, and (4) does the organization respond effectively to safety issues? These issues are important themes as they bear on how the organization develops and attains its functional goals. The first two elements reflect on formal hierarchy and professionalism in the organization. Increasing reliance on professionalism, and specifically on cliques of professionals (themes one and two) will influence how the organization's formal goals become functional goals. The external and internal perceptions of the organization reflect on the environment, whether it is predictable and conducive to stable goal formation or if the environment is unstable and conducive to chaotic goals. Finally, the fourth element reflects a specific concern that runs through the formal goal of flight safety and the professional concerns of pilots. This theme will indicate the way that this important formal goal has been operationalized and how,

as a functional goal, it has been placed in relation with other organizational goals. By subjective interpretation of the interviews in these response areas a model of the FAA's structure has been inferred. This model has then been used in conjunction with the case studies to develop a model of agency action beyond what is identifiable from formal records of action.

To coincide with the case studies, several specific agency actions were included in the interviews (as appropriate to the respondents' position and knowledge): these included the "Recreational Pilot/Annual Flight Review" rule-making action; the "Cost-Benefit" Executive Order, specifically as it affected the "Child Safety Seat" rule-making action; and the "Straightlining" internal structural reorganization. Additionally, the hypothetical reorganizations of spinning-off Air Traffic Control or Regulation and Certification were also explored where appropriate.

Access to FAA and Other Respondents The FAA, through the Office of Aviation Plans and Programs, provided an initial point of entry to the agency. Through this access, the Office of the Associate Administrator for Regulation and Certification was engaged. This office, in addition to providing access within the agency, provided access to industry sources, including The Boeing Corporation, among other contacts. The referrals by the Associate

Administrator's office were all done informally, although a letter of introduction was provided upon request. This method of access was consistent with the vision of the interview process, which was to obtain access to key agency and industry personnel along with agency field personnel.

Additional interviews were obtained through contacts of long standing in the general aviation and airline communities. These include former and present professional colleagues, employees, employers, and students. This provided access to a non-scientifically derived "convenience" sample of users of the airspace system. While not a scientifically derived sample, this method did facilitate collection of data from the key targeted groups in the non-FAA aviation community, which included pilots (including student pilots), maintenance and other support people, and airport and aircraft operators and entrepreneurs.

Interview Details A total of sixty-two persons were interviewed for this project. There were forty-eight separate interviews, with up to three persons in each. Slightly more than half of the interviews, 27 of the sessions, were conducted from May through July of 1993. These interviews were conducted according to a standardized interview form, and were targeted to last one hour. Thirty-five of the subjects were from the FAA, while the balance

(27) were non-FAA. Additional details of the interviews may be found in the Appendix.

Several of the interviews were conducted before the formal interview process for this research began. These were occasioned by ongoing actions in a rule-making process, during the collection of background material for this study, or as parts of related studies then in progress.

Interview subjects may be considered informants, participants, or both. Participants are individuals who have an identified role in the FAA, its systems, or the aviation industry. Informants are individuals who are outside the FAA or the industry. It should be noted, though, that several of the FAA respondents might be considered both participants and informants. They assumed the latter role as they spoke about units in other divisions with which they felt little affiliation and described as being outside the "real FAA." Likewise, certain non-FAA interviewees were considered to be more in the role of participants than informants when, for example, they had some regulatory involvement in the industry. In several cases it could easily be stated that respondents played dual roles during the course of the interview.

Written Material

Material Usage Written material has been analyzed along the same four key indicators as the interviews: (1) an internally-generated measure of organizational

professionalization, (2) a more specific measure of pilot professionalization as a cohort within the organization, (3) an externally-generated measure of the organizations's professionalization, and (4) both internally-generated and externally-generated measures of the organization's responses to specific safety-related issues.

Access to Material All of the material is available from Federal sources such as the Government Printing Office or the FAA, or it may be obtained from aviation-related organizations such as the Aircraft Owners and Pilots Association. None of it is confidential and it did not require Freedom of Information Law access. Generally, it is not beyond the reach of any person except that some expertise is required to locate it in the various bureaucracies; to this end, some rapport with specific individuals is often helpful, and is facilitated by common backgrounds as pilots or researchers.

Literature

The literature for this research centers on the study and analysis of administrative process and the functions of government organizations. To present this study of the Federal Aviation Administration, it is useful to divide this work into four functional groups: organizational analysis, government policy, disaster and risk assessment, and history. The principal aim of this study is to take the

existence of an organizational issue at the FAA, a government agency involved in a high-technology industry, and explain this particular issue, sometimes by drawing on outside theory, essentially a concern to tell what has happened in a particular historical case. This is not an all inclusive history, as that is beyond the scope of this study; rather, it need only be a review of what helped to create the FAA and how it has developed to the present time.

Studies of organizations address questions of what an organization is, its formal goal, how it operationalizes that goal into a functional goal, and how these goals can differ or be displaced. Also examined is how the external environment influences organizations. These studies take diverse perspectives, but most helpful to this study are the reviews of organization types, political institutions, and organizations' management of risk in high technology environments. Examples of these, and how they relate to the study of the FAA, follow.

Oddly enough, a dedicated approach to how the FAA accomplishes its task in terms of its structure, its place in government, and its defining what it considers to be acceptable risk without, a study that does not resort to the sensationalistic or popular fashion, has not happened. This is a shortcoming of such works. Such studies have been conducted around nuclear power; however although nuclear power (the Nuclear Regulatory Commission and the industrial

operators, personnel, and consumers) and aviation (the FAA, airlines, pilots, mechanics, etc., and passengers) are related by virtue of both being high technology, high risk industries, there is no explicit case for generalizability.

Organizations

There are many models of how organizations function and many ways of classifying both the organizations and the models. Some are, for this study, convenient and appropriate, while others are more spurious or not applicable at all. A description of some of the relevant models, and how they might apply to the FAA, follows.

Walter Powell and Paul DiMaggio identify organizations according to various types that exist as part of institutional life. Further, they point to isomorphism, the concept of organizations in specific fields tending to resemble each other. They specifically note the resemblance among regulatory agencies.⁶¹ This usefully enables the FAA to be defined as a type. Further, it may help to explain why an organization that I argue is professionalized must also maintain a distinct bureaucratic structure.

⁶¹ Walter W. Powell and Paul J. DiMaggio, "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields," in *The American Sociological Review*, No. 48 (April, 1983), pp. 147-160; and Powell and DiMaggio, *The New Institutionalism in Organizational Analysis* (Chicago: University of Chicago Press, 1991).

If regulatory organizations may be considered as a type, then studies of government and policy, which specifically address how government agencies go about developing and executing policy, are the next step in the examination of the FAA. There are several interesting examples in this field. Works on government agencies critique how these organizations identify their tasks and then undertake them. Much of it is generalizable to the FAA. These examples provide excellent theoretical base to describe how structural forces work to deflect, defeat, or mis-align the organization's goals and decisions.

James Q. Wilson specifically addresses the FAA in his work on organizations.⁶² Generally, he concludes, successful organizations' incentives, culture, and authority match their tasks. Unfortunately, he believes, the political environment has incentives that force a different course of action. His five key points are the following: (1) executives should understand the culture of their organizations, (2) external political constraints should be clearly differentiated between the essential and the marginal (although fragmented legislative authority may make this impossible: all constraints may be essential), (3) the distribution of authority should be matched to the environment, (4) activities should be judged by results, and

⁶² James Q. Wilson, *Bureaucracy: What Government Agencies Do and Why They Do It* (New York: Basic Books, 1989).

(5) political inputs cause bureaucracies to mis-align their goals. These concepts of political issues and organizational culture are strongly linked to this study.

Wilson has a strikingly pertinent observation about the FAA. Discussing the agency's place in the Federal bureaucracy, he questions,

[W]here should the FAA be located? . . . When it was independent, critics claimed there was no way to "coordinate" air safety with other transportation programs; when it was part of [an Executive Department], critics charged that air traffic safety was being "downgraded." Should a president favor coordination at the cost of downgrading, or upgrade at the cost of autonomy. There is no obvious answer, especially since the FAA is embedded in a network of interest groups (airline companies, private-pilot associations, airplane manufacturers, and the air traffic controller's association, among others) with divergent views as to what would be desirable.

Whatever the president decides, it will be congress that has the final word. . . .

While his concern about of the agency's administrative location is different from the thrust of this research, his point that the FAA's mission may be unclear, due to the network of organizations in which the FAA exists is well taken.

Randall Ripley sees that the U.S. Federal government has evolved from a very detached, *laissez-faire* approach, to a very actively involved, manipulatory approach, that

influences the private sphere.⁶³ He breaks this into three elements, influencing the rate of private activity (e.g., control via subsidies, grants-in-aid), influencing the conditions under which private activity can take place (control via regulation), and control by rewards for private activity (manipulation; his examples are taxation, Medicare, Social Security). He notes that some techniques are more susceptible to capture than others (e.g., the structure of taxation or the ICC's regulatory structure are very susceptible to capture).

These ideas are similar to G. William Domhoff, who posits agency capture by the industries that they are charged with regulating.⁶⁴ Taken together, these two works lead to the conclusion that the government evolves into an entity that manipulates the private sector but does so as the captured entity of that private sector. Whether or not this is the case with the FAA is an important issue: as the regulator of a high technology industry, the FAA must rely on input from outside the organization. Whether or not this constitutes capture will be addressed.

Francis I. Rourke sees government organizations as having a special function. They work as the government's

⁶³ Randall B. Ripley, *Policy Implementation and Bureaucracy*, 2nd edition (Chicago: Dorsey Press, 1986).

⁶⁴ G. William Domhoff, *The Powers That Be: Processes of Ruling-Class Domination in America* (New York: Random House, 1978).

mechanism for developing and executing public policy.⁶⁵ He states that the policy process has been bureaucratized, that the appointed officials, rather than the elected officials, negotiate policy. He further states that a major political agenda should be to control the bureaucracy. This theme is not unlike Alan Wolfe's argument that a parallel state structure has evolved in the Executive branch that in effect functions as the actual, but hidden, government.⁶⁶

The power that is vested in the Federal bureaucracy is an especially relevant theme to the FAA, which has a major role in setting aviation policy: should the Congress set this policy, or is the proper theater for such debate down Independence Avenue from the Capitol in the FAA Building? If the crucial issue is the safety of air traffic, should not that task be legitimately given to those whose training is specifically in aviation? On the other hand, what role does non-professional, but Constitutionally prescribed, legislative oversight have in the regulation of such technology?⁶⁷

⁶⁵ Francis I. Rourke, *Bureaucracy, Politics, and Public Policy* (Boston: Little Brown, 1969).

⁶⁶ Alan Wolfe, *The Limits of Legitimacy: Political Contradictions of Contemporary Capitalism*, New York: The Free Press, 1977; also, it may be noted that Wolfe's typology also includes the circumstances where the state works in the direct interests of capital, as with Ripley's model.

⁶⁷ This study does not intend to question the Constitutional doctrine of public oversight of government agencies. However, it would be Constitutionally practicable
(continued...)

Murray Edelman argues that government's symbolic uses of power are key to understanding what governments do.⁶⁸ He argues that more important than governing, governments must appear to govern. This means, for example, that FAA action may be orchestrated to present the impression that the agency is taking some forceful action. In the wake of an accident, this may mean grounding the type of airplane involved in the accident until a finding is made that the airplane is safe to fly or that some necessary repairs are made. This is indeed what happened with the DC-10 following an accident, and persuasive evidence will be presented that, although it previously knew of problems with the aircraft, the FAA only took this action when it became a public issue and government action was demanded.

There are a number of studies of specific Federal agencies. Among them are Robin Stryker on the National Labor Relations Board (NLRB) and the Federal Trade Commission (FTC) and Katherine Newman and Paul Attewell on the Occupational Hazards and Safety Administration

⁶⁷(...continued)
to place the FAA beyond the reach of Congressional and Presidential micro-management. Two different approaches to this issue presently exist in the Federal Reserve Board and the Military Base Closing and Realignment Commission. This is an issue that this study will address.

⁶⁸ Murray Jacob Edelman, *The Symbolic Uses of Politics* (Urbana: University of Illinois Press, 1964).

(OSHA).⁶⁹ These provide specific points of reference for the study of the FAA.

Stryker addresses the fates of units within the two subject agencies. Her point is that the workers in the NLRB economic unit were in a lower status location than the workers a similar unit in the FTC, and that within the NLRB economists had lower status than attorneys. She presents arguments for these status locations within the agencies, and argues that both status and "political-institutional" factors came to play in what was ultimately the demise of the NLRB economic unit. The concepts of status ramifications within an agency and divergent status of workers and units within an agency are relevant to the FAA. If it is arguable that a cadre of workers with a specific background have a higher status within an agency than other workers without that background, then the FAA is fertile ground for that to happen. Without making the argument here, it may be said that pilots in the FAA are a high-status group of workers. That status may enable them to establish perquisites that other groups in the agency do not have.

Newman and Attewell argue that regulatory failure is caused substantively by a flawed legislative mandate. This is a structural failure and results in a compliance crisis,

⁶⁹ Stryker, "Two Agencies"; and Newman and Attewell, "Compliance-Resource Theory."

during which the agency cannot bring the industry into regulatory compliance. They see this as based in internal contradictions in the agency's enabling legislation. Further, they state the agency does not have the necessary resources for the inspection and enforcement process. They trace this to the earliest periods of OSHA, and specifically detach OSHA's regulatory failure from presidential meddling.

This has both similarities and differences from the FAA. The FAA is not without its own set of internal contradictions in its enabling legislation, and the FAA Charter is legendary in the aviation community for this. Further, a shortage of resources was one of the arguments used in the early decentralization of the FAA, moving certain processes from one central location to several regional locations, where they could be expedited. The question of regulatory failure is one that is not a foregone conclusion, and will be addressed in this study.

Micheal Blau contrasts the study of internal social process with the study of interdependent organizational attributes.⁷⁰ This serves as an example of a level-of-measurement question, as it stands in contrast to the larger structure issues of other models. It does not require a universal adjudication: indeed, socio-psychological process must be considered when studying at population levels if

⁷⁰ Peter Michael Blau, *On the Nature of Organizations* (New York: Wiley, 1974).

only to get a hint at why an organization does something odd, a throwback to "the great man theory" of history. Indeed, within a bureaucracy the internal social processes can play a part in the formation the informal mechanisms of function.

Risk and Risk Management

If a government agency is supposed to be regulating a high technology transportation industry, then one of the elements it must consider is the risk involved in the technology. Studies of risk associated with technology and risk management consider the circumstances that can lead to accidents, the cost of accidents as opposed to the costs of preventing them, and the inherent interactions at work in complex systems that may lead inevitably to accidents regardless of foresight.

Disaster and risk assessment has been a timely field in the years since the *Challenger* and Three Mile Island disasters. It has become even more timely since Chernobyl proved that Three Mile Island was not a unique instance of operator ineptitude. There are many dedicated works on the subject. There are works on both nuclear and aviation disasters, not surprising as aviation disasters have killed far more people than have nuclear disasters, but nuclear accidents seem to threaten more people. The literature often deals with specific airline disasters -- most works deal mainly with the details of a particular accident, often

in a sensational or popular fashion. Some works are academic treatments of the issues in risk management and include aviation accidents in their accounts.

For example, Charles Perrow argues that in tightly coupled, complex systems even the smallest failure in a seemingly non-substantial unit may cause unforeseen and unpredictable interactions that result in catastrophic failure.⁷¹ The FAA itself is not a tightly coupled organization, and this point will be demonstrated at length. (What is certainly not in need of demonstration is that an aircraft in flight is a tightly coupled system.) Perrow's argument leads to the conclusion that tightly coupled technologies will produce high-risk accidents -- not frequent accidents, but catastrophic ones that will be virtually impossible to prevent.

Patrick Lagedec, as with other authors in this genre, considers nuclear accidents along with other high risk technologies such as aviation and space travel.⁷² He sees this issue of risk as socially defining, and develops a paradigm incorporating social relationships into the management of risk. He has three main points. One is that political structures seek to avoid new constructions of

⁷¹ Charles Perrow, *Normal Accidents: Living with High-Risk Technologies* (New York: Basic Books, 1984).

⁷² Patrick Lagedec, *Major Technological Risk: An Assessment of Industrial Accidents* (Oxford: Pergamon Press, Ltd., 1982).

risk, and to continue doing this "the old way." They name "technical commissions" to find "good" answers to catastrophes, and the citizens are happy. His second is that when political structures take risk into account, their rules of action must be changed substantially, and the political process for decision-making must be opened considerably. Finally, he believes that major technological risk ultimately calls into question all social power relationships. (Lagedec does not mention this, but the point on technical commissions is very much like the Rogers Commission that investigated the *Challenger* disaster.) This is an important tie-in to the structure and purpose of the organization. The FAA may not be able to properly regulate risk in the isomorphic structure prevalent in the Federal bureaucracy. However, the bureaucratic structure has, as Powell & DiMaggio and Rourke imply, attained a certain legitimacy and permanence, and the new structure called for by Lagedec may be unlikely to emerge.

Reasons for regulatory failure in this high-technology, high-risk environment are addressed by Maureen Hogan Casamayou.⁷³ She draws a specific contrast between what she cites as Perrow's argument (that regardless of how well designed and engineered, accidents are bound to happen) and what she has uncovered in the cases of the *Challenger* and

⁷³ Maureen Hogan Casamayou, *Bureaucracy in Crisis: Three Mile Island, The Shuttle Challenger, and Risk Assessment* (Boulder, Colo.: Westview Press, 1993).

the Three Mile Island disasters. She argues that information about the level of risk and its imminence was available but that individuals in authority failed to act on it. Thus, they apparently took unnecessary risks that led to catastrophe. She also sees this as a tremendous dysfunction, as the organization courts institutional disaster by opening itself to the political repercussions of catastrophe. She sees three potential issues here: (1) that the communications were faulty and key decision-makers were not aware of the risks, (2) that the communications were misunderstood by the key decision-makers and that the risks were therefore not perceived properly, and (3) that external pressures overcame the reality of the information at hand and caused key decision-makers to make poor decisions. Casamayou concludes that the information did reach the proper levels, but that it was misperceived or ignored under external pressure. In the case of the *Challenger*, President Reagan's State of the Union address the evening of the disaster is among the key suspects. Further, she believes that excessive risk taking can become endemic in organizations that lack a clear sense of mission, and that a catastrophe may be the only operable constraint in such situations. Might pilot and aircraft certification and airline regulation follow a similar course of action?

Edleman warrants some mention here as well as above. One of his points, not directly associated with risk

management but part of the equation in risk management nevertheless, is that organizations can never be completely rational because (1) knowledge of consequences is always fragmentary, (2) qualitative judgements made in the future, based on future values, cannot be predicted, and (3) all possible alternatives will not be considered. Whether deciding what colors to make the agency flag or whether or not to launch a space craft, these same three constraints on rationality will hold.

Risk management describes a field that may answer the question central to air safety: accidents still happen, but are they arguments for a necessary conclusion of regulatory failure in aviation?

Professionalization and Bureaucratization

There are many models of organizations, with different forms and methods of functioning. For example, Richard H. Hall lists a population-ecology model, a resource dependence model, a rational choice model, a Marxist (or class) model, and an institutional model; Richard Scott lists Etzioni's structuralist model, Lawrence and Lorsch's contingency model and Thompson's levels model, then goes on to list his own closed rational system model, closed natural system model, open rational system model, and open natural system

model.⁷⁴ This is a field with many branches, including the study of formalized structure, resource availability, organizational environments, to name only a few. These often present conflicting models, but they also present the foundations for developing a working synthesis. Some of these models will be utilized in this study. One of the elements to come from this working synthesis is the four-fold model of decision-making explicated in the hypothesis.

Classical theories of bureaucratic structure and function are fairly appropriate to any formalized organization, but the FAA is also dealing with an organization for which a skilled and professionalized workforce is central: pilots. Useful in understanding this unique feature of the FAA are works by Richard Hall and Malcolm Waters. They address collegiality as a distinct organizational form.⁷⁵

Hall argues bureaucratization is in general inversely related to professionalization. Further, he concludes that professionalization and formalization are incompatible. Formalization in a professionalized organization leads to conflict and alienation in the workforce. This is because both professionalization and formalization are designed to

⁷⁴ Richard H. Hall, *Organizations: Structures, Process, and Outcomes*, fourth edition (Englewood Cliffs, N.J.: Prentice-Hall, 1987), pp. 298, ff.; Scott, pp. 94, ff.

⁷⁵ Hall, "Professionalization"; Hall, *Organizations*; and Waters, "Collegiality."

do the same thing, to organize and regularize the functions of the organization through a set of standards for the members of the organization.

Waters sees collegiality as an ethical substitute for formalized legitimation. These are related to Durkheim's concepts of an association of like persons within the division of labor constituting a miniature source for the restoration of mechanical solidarity and restraint against anomie.⁷⁶ Water's develops seven key points: that (1) collegiality is a separate ideal type of a rational organization from bureaucracy; (2) collegials developed in the mid-Nineteenth to mid-Twentieth centuries to establish status closure and to resist bureaucratic control; (3) in the U.S. he identifies the collegiality of medicine, law, and academia (to which I add, as a functional form, aviation); (4) resistance to bureaucratic control is limited by [a] contestation of the premise of expertise and [b] that it is inefficient; (5) thus there are now no pure collegials; (6) that maintaining collegials is thus based on the continued interest of status closure, non-accountability, and self-policing of professionals; and (7) that, at any rate, such "nonauthoritarian or integrative social action" is purely internal: external action is otherwise. This last piece is an interesting corollary to

⁷⁶ Emile Durkheim, *The Division of Labor in Society* (New York: The Free Press, 1973).

the idea that an external self (of the organization) must be presented to the public for public legitimization. Thus it is possible that the public form must be bureaucratic even if the internal form is collegial and professional.

Unfortunately, the argument of how collegiality manifests itself in aviation is left unexplored. Work that can reflect how this occurs centers on the immediate interaction of the cockpit crew, which the FAA refers to as Cockpit Resource Management. It does not explore the role collegiality plays in how the FAA itself functions or how or if it uses collegiality as a means of insuring flight safety.⁷⁷

An interesting, alternative way to conceptualize organizations may be based on Cohen, March, and Olsen, who describe a type of organizational anarchy that they associate with organizations that lend themselves to collegial decision-making, such as universities.⁷⁸ The link here is that organizations without bureaucratic administration develop unpredictable ways of dealing with issues. The collegial environment relies, as Hall and Waters agree, on professional standards to foster orderly and appropriate decision-making. However, in the absence of

⁷⁷ However, Cockpit Resource Management, now taught in various FAA mandated training, links efficient cockpit function to a collegial relationship among the flight crew, specifically between the Captain and the First Officer.

⁷⁸ Cohen, March, and Olsen, "Garbage Can Model."

formal rules of conduct and decision-making (e.g., if the condition is "a" then do "b") the decisions may still be appropriate but they may not be orderly or predictable. In fact, they may be chaotic and unpredictable, if still appropriate.

The FAA as History

There are several Federally published histories of the FAA, and others published generally; however, their value is limited by their non-academic approach. While there is no contemporary authoritative resource in this area, the FAA histories are an excellent chronology of the CAA/FAA. These include the earliest periods of Federal civil aviation policy, which led to the first regulatory statute in 1926 and culminated in the enactment of the Civil Aeronautics Act of 1938;⁷⁹ the first 14 years of the CAA, through World War II, the Cold War, and Korea;⁸⁰ the CAA through President Eisenhower's two terms;⁸¹ and the FAA from the inauguration of President Kennedy through the end of President Nixon's

⁷⁹ Federal Aviation Administration, *Bonfires to Beacons: Federal Civil Aviation Policy Under the Air Commerce Act, 1926-1938* (Washington, D.C.: Superintendent of Documents).

⁸⁰ Federal Aviation Administration, *Turbulence Aloft: The Civil Aeronautics Administration Amid Wars and rumors of Wars* (Washington, D.C.: Superintendent of Documents).

⁸¹ Federal Aviation Administration, *Takeoff at Mid-Century: Federal Aviation Policy in the Eisenhower Years, 1953-1961* (Washington, D.C.: Superintendent of Documents).

first term.⁸² In addition to these chronologically oriented works, the FAA also has published two works on specific issues, one the political repercussions after the death of Senator Bronson Cutting in 1935, the other the debate on cockpit staffing.⁸³

It is worth noting that there are several scholarly studies of this type of the FAA's former sister organization, the Civil Aeronautics Board. This study does not propose to fill this gap; however, it does seem noteworthy that so little work in this area exists. What this means in terms of the study is the need to produce, if for no other reason than as background information, a general record of what the FAA has done and when it has done it.

It may be interesting to speculate on why the available literature neglects what seemingly ought to be so central an organization as the FAA. One line of speculation may be that since the late 1970s there have been two overriding events that deflected risk and government policy studies on the one hand and government policy and social history studies on the other. Those two events were Three Mile

⁸² Federal Aviation Administration, *Save, Separated and Soaring: A History of Federal Civil Aviation Policy, 1961-1972* (Washington, D.C.: Superintendent of Documents).

⁸³ Federal Aviation Administration, *The Cutting Air Crash* (Washington, D.C.: Superintendent of Documents); and Federal Aviation Administration, *The Third Man: A History of the Airline Crew Complement Controversy, 1947-1981* (Washington, D.C.: Superintendent of Documents).

Island and the "deregulation" of aviation via the disbanding of the Civil Aeronautics Board. It may be speculated that risk students have been siphoned off by the spectacular record of nuclear power, while aviation students have been more concerned with the very timely study of deregulation. Of course, risk has always existed in flying, and flying was never actually "deregulated": only the route and fare structure was deregulated.

CHAPTER THREE, SOME THEORIES OF ORGANIZATIONS AND HOW THE FAA FITS INTO THOSE THEORIES

General Theories of Organizations

Introduction

There are many models of how organizations function and many ways of classifying both the organizations and the models. One convenient, and for this study, appropriate, typology of the models is Richard Scott's, based on organizational structure and relationship to the environment.⁸⁴ Brief outlines of these models follow, arranged according to Scott's typology. An important matter to be kept in mind when thinking about them is that while an analysis of an organization may take place within the framework of one or more of the models, there is no "truth" that one model or another is the correct model to use, either with respect to an individual case or to all cases, only circumstances where a model is useful. This means that the result one obtains will have much to do with the model one has applied as a standard. This question of perspective must constitute an *a priori* assumption of the terms in which any question is to be decided. In an analytical project, these organizational frameworks can spell the difference between saying an organization is good or it works well on the one hand and saying that an organization is

⁸⁴ Richard Scott, *Organizations: Rational, Natural, and Open Systems*, 2nd Edition (Englewood Cliffs, N.J.: Prentice-Hall, 1987).

dysfunctional or it does not know what it is doing on the other.

The descriptions of the models that follow are an attempt to describe a comprehensive and consistent way in which to judge how an organization functions. These models, while not being a definitive statement on the field of organizational studies, present an eclectic statement on how the field of organizational studies may be fine tuned and further the study of a given organization, allowing that other studies in other contexts may well look at their issues from completely different viewpoints. That is not to say that other studies are wrong, only that they use the tools at their disposal in a slightly different manner, and are thus bound to have a different perspective.

Rational Systems Theory of Organizations

Scott defines rational systems theories as those that presuppose some definite form which includes goal specificity and formalization of structure.⁸⁵ A prime example of the rational system is the structure of bureaucratic, administrative mechanisms described by Max Weber.⁸⁶ Weber outlined a system of administration that attempted to avoid a decision-making process adjudicated by

⁸⁵ Scott, 1987.

⁸⁶ Max Weber, "Bureaucracy," in *From Max Weber: Essays in Sociology*, translated & edited, C. W. Mills and H. H. Gerth (New York: Oxford University Press, 1946).

individual standards. Especially important was the bureaucracy's role in making rules or procedures before the fact and then applying those procedures to all situations universally. Weber saw bureaucracy as a way to define the role and scope of the government. He described "fixed and official jurisdictional areas, which are generally ordered by rules." "Official duties" are described, and provisions are made "for the regular and continuous fulfillment of these duties . . ." He further called for the "prevention of the development of a closed status group . . . in the interest of a universal accessibility of office, and minimization of the authority of officialdom in the interest of expanding the sphere of influence of 'public opinion' . . ." One area of importance here is Weber's description of bureaucrats: "[O]nly persons who have the generally regulated qualifications to serve are employed. . . . [T]here is a supervision of the lower offices by the higher ones . . . [And management] usually presupposes thorough and expert training. . . ."

This definition is in contrast to Waters' definition of the nature and role of collegials cited in Chapter One.⁸⁷ Waters states that implicit in collegials are closed status groups. Pilots have already been identified as professionals (in Chapter Two), and the collegial structure

⁸⁷ Malcolm Waters, "Collegiality, Bureaucratization, and Professionalization: A Weberian Analysis," in *American Journal of Sociology*, No. 94 (March 1989), pp. 945-972.

of the F.A.A. within specific professionalized units is a major theme of this study.

While Weber's outline of the bureaucracy is the core of the rational system, it is not definitive on how goals are operationalized or reached. For example, Scott uses Ahab chasing the white whale as an example of an irrational goal with rational means of attainment.⁸⁸ The pursuit of Moby Dick is not the formal goal of the *Pequod*, but it is rationally, if disastrously, implemented. Thus Scott's rationality is one of process and is irrelevant to the operationalization of the formal goals of the organization.

In light of the residue found by the *Rachel*, it is evident that a paradox of the rational system of administration is that it is still perfectly capable of producing the irrational outcome. This is also noted by Burrell and Morgan.⁸⁹ Referring to Herbert Simon, they question how rationally any individual or group of individuals within the rational organization will act.⁹⁰ This is one of a family of models which question individual actions and, in turn, expect some measure of performance less than the maximum to come from the rational

⁸⁸ Scott, 1987, p. 31.

⁸⁹ Gibson Burrell and Gareth Morgan, *Sociological Paradigms and Organizational Analysis* (London: Heinemann, 1979).

⁹⁰ Herbert Simon, *Administrative Behavior; A Study of Decision-Making Processes in Administrative Organization* (New York, Macmillan, 1947).

organization. The individual actors are assumed to be incapable of acting in as rational a manner as should fit their rational organization. This dysfunction places a cap on the organization's ability to perform. Thus, rationality is fully capable of producing totally irrational results.

Another criticism of bureaucracy may be the location of power in an organization. Weber postulated that bureaucracy came into existence to oppose "notable rule".⁹¹ The rules of the bureaucracy are supposed to limit or define the collection of power by the rulers -- who may in fact be the administrators in the bureaucracy -- but these rules do not necessarily succeed in that goal; and, by the very action of establishing rules, power is taken from the citizenry, for rules specifically allocate power to the bureaucrats even as they limit the power of the bureaucrats. Further, the organization may take on a life of its own, with no other interest than self-perpetuation. The removal of power from the individuals presents a specifically top-down flow of control, as opposed to bottom-up control which would seem to be more in line with Weber's concept of "popular opinion."⁹² The bureaucracy thus can become a hierarchical tool of a ruling structure to dominate the individuals over which it presides. This can lead to the abuse of the bureaucracy's power.

⁹¹ Weber, 1946.

⁹² Weber, 1946.

Weber's idea of expert administration also raises troubling issues in contemporary society. There is a great deal of attention to improprieties in government. This has been especially true with respect to the relationship between regulating agencies and the industries that they are charged with overseeing. If the relationship between agency and industry appears to be too close, there are questions raised. The academic literature includes specific references to regulating agencies that are so close to the industries they regulate, in terms of personnel and objectives, that they are, essentially, captives of those industries.⁹³ With respect to this criticism, the concept of an expert in a government bureaucracy would have an intrinsic flaw: expertise in a field might only be accumulated by participating in the field, but such participation may in turn lead to the intertwining of the bureaucrats in a regulating agency with those who are regulated. This question must be raised when persons are not only bureaucrats and but also bureaucrats who are also very specifically government administrators.

This issue in expert rule is Domhoff's analysis. In one example, he describes the Pennsylvania State Insurance Commission, which he believes has been captured outright by

⁹³ G. William Domhoff, *The Powers That Be: Processes of Ruling-Class Domination in America* (New York: Random House, 1978).

the industry which it is charged with regulating.⁹⁴ While this is possible, one need not view it to mean that there is an abuse of influence taking place; rather, it may mean that there is a recognized commonality of objectives and that the bureaucracy with industry-trained administrators can produce win-win outcomes for both the industry and the overseers. Concerns with the mechanisms of regulation can be misplaced, as they may confuse the desired result of efficient administration with a blind adherence to the forms of such administration. This adherence to form may become the organizational goal.⁹⁵ It has also been noted that "to promote efficiency undermines an organization's ceremonial conformity [to institutionalized rules] and sacrifices its support and legitimacy."⁹⁶ This reflects the fear that the security of the entire mechanism is threatened when formal mechanisms are bypassed, but an unthinking adherence to formal mechanisms has been called a "dysfunctional behavioral pattern," and it has been further noted that the increasing centralization often associated with it limits

⁹⁴ Domhoff, 1978.

⁹⁵ See, for example, Phillip Selznick, *TVA and the Grass Roots: A Study in the Sociology of Formal Organizations* (Berkeley: University of California Press, 1949).

⁹⁶ John W. Meyer and Brian Rowan, "Institutionalized Organizations: Formal structure as myth and ceremony," in *American Journal of Sociology*, 83, No. 2 (September, 1977), pp. 340-363.

the efficiency of systems operating in heavily bureaucratized structures.⁹⁷

Central to the issue of form is the existence of the other forces at work accomplishing objectives. In their early analysis of this, Roethlisberger and Dickson wrote that patterns of interaction in the organization have no representation in the formal structure, that these "informal organizations are not 'bad,' as they are sometimes assumed to be . . ." and that "at all levels of the organization informal organizations exist as a necessary condition for collaboration."⁹⁸ There is the possibility that these mechanisms alone will outperform the hierarchical structures of the bureaucracy.⁹⁹ Identifying these informal mechanisms indicates that bureaucracies cannot be as structured and rigid as intended; however, it is these informal mechanisms that can act as lightning rods in any hunt for governmental improprieties. Indications are that there is much to be gained from bypassing the formal mechanisms, but those are the very mechanisms that provide a

⁹⁷ Alvin Ward Gouldner, *Patterns of industrial bureaucracy* (Glencoe, Ill.: Free Press, 1954); Walter Rice Sharp, *International Technical Assistance: Programs and Organization* (Chicago: Public Administration Service, 1952).

⁹⁸ F. J. Roethlisberger and William J. Dickson, "Formal and Informal Status," in *Reader in Bureaucracy*, eds. Robert K. Merton, et. al., (New York: The Free Press, 1952).

⁹⁹ Murray Bookchin, *The Ecology of Freedom: The Emergence and Dissolution of Hierarchy* (Palo Alto, Calif.: Cheshire Books, 1982).

feeling of security. However, describing these as internal alternatives to the rigidity of a rational system is an inadequate description of actual function: Weber's bureaucracy is an ideal type, and the informal mechanisms are what happens when the ideal type is seen in practice. However, an ideal type may be developed around the informal mechanisms themselves.

Natural Systems Theory of Organizations

An alternative to rational systems like bureaucracy may be found in natural systems. Here, organizational function does not rely on the effective conduct of a pre-ordained structure of rules and protocol. The organization is a collective "whose participants share a common interest in the survival of the system and who engage in collective activities, informally structured, to secure this end."¹⁰⁰ Within the frame of the informal system, which is itself "structured and orderly," the organization acts based on "increasing the ease of communication, facilitating trust, and correcting for the inadequacies of the formal systems."¹⁰¹

This may produce a formulation of a non-hierarchical form of administration. Much of the non-hierarchical concept can be found in the anarchist philosophies that

¹⁰⁰ Scott, 1987.

¹⁰¹ Scott, 1987.

developed in the nineteenth century. These philosophies argued that anarchism is not chaos but only the absence of a dedicated power and control from above structure. An important element in the development of non-hierarchical, non-authoritarian structures was the communal-anarchist philosophy of Petr Alexyevich Kropotkin.¹⁰² Mutual aid is, in fact, the cornerstone of non-hierarchical organization. Kropotkin called for unified action by all members of a society toward a common objective: he was especially opposed to competition. In contemporary times, Murray Bookchin has called non-hierarchical mechanisms the natural way to manage the organization of a highly technical, industrialized society.¹⁰³

With Kropotkin's understanding that the community benefits from the actions of the individual and the reverse observation that the individual benefits from the health of the community comes the concept of sociable life and mutual support. The individuals in the community support each other and, in turn, they lend their mutual support to the community as a whole. The community flourishes and individuals are free of the necessity of surviving against their opposition unsupported.

¹⁰² Petr Alexyevich Kropotkin, *Mutual Aid: A Factor of Evolution* (Boston: Extending Horizons Books, 1955).

¹⁰³ Bookchin, 1982, and Bookchin, *Post-Scarcity Anarchism* (Berkeley, Calif.: Ramparts Press, 1971).

Whether or not this model works hinges upon certain understandings by individuals in an organization, whether that organization is taken as a corporate bureaucracy or a local community. One necessity is that there is a recognition of a common good toward which all members of the organization aspire. That is, these systems function when there is a universal organization-wide commitment to mutual goals, although it is not clearly stated that contemporary complex organizations can sustain this commitment. The second necessary understanding is the recognition that some work will achieve that common objective, so that individuals will strive without coercion in that work for the betterment of the community and themselves. The aforementioned existence of informal structures in bureaucracies may be an indication that the formal hierarchy is being bypassed by informal mechanisms analogous to these non- or lesser-hierarchical structures. The concern over mechanisms can be related to the non-hierarchy of the natural systems models of organizations.

There exist, unfortunately, several critical weaknesses with the natural systems model when generalized to complex organizations. One of the weaknesses is that people are not born with innate understandings of what the common good is and how to direct labor toward that common good in concert with the rest of the community. This is akin to the already noted problem of the non-rational actor in the rational

organization. If that rational organization is plagued by non-rationality and an inability to maximize performance, how seriously affected will be the unrationalized, natural system? Even given the direction of a hierarchy, the actors are unable to perform beyond some satisfactory level (not to a maximal level) due to " . . . the fact that the behavior of individuals never reaches any high degree of rationality."¹⁰⁴ It is important to note here the distinction between the rational organization on the one hand and the actors in some organization -- maybe a rational organization; maybe a natural, non-hierarchical organization -- acting more or less rationally on the other hand. It is important to note also the question for these actors, "whose rationality, based on what measure?"

It would seem to be necessary to develop an awareness of community-based common good in individuals through intense socialization. But this again leaves the issue of whose community. Is the community the organization, to be protected at all costs? Is the community some broader unit, perhaps politically or geographically defined, that needs protection against other organizations? For an actor with multiple affiliations, to which does the principal sense of loyalty belong, and how are loyalties to be ordered through layers of multiple membership?

¹⁰⁴ Burell and Morgan, 1979.

In areas where objectives may be considered straightforward and easily recognizable by all members of an organization or organizations, or when objectives of various members of the community are not mutually exclusive but perhaps complementary, then there is a greater probability that this model could appear. If one considers organizations where all parties of organization or groups of organizations share certain concerns, then that could be fertile ground for the unquestioned existence of mutual aid and a natural systems organization.

Open Systems: Populations of Organizations Living in their Environments

Lawrence and Lorsch recognized that not all organizations depend equally or at all on the formal structures which are assumed to govern their operations: for them, these are not really the effective elements in the organization's functioning.¹⁰⁵ Their concept showed a continuum from rational to natural systems, with organizations varying because of adaptation to differing environments. This view of organizations, as a counterpoint to the rational- and natural-systems models, dovetails with ecological models in that it recognizes how the structure of the organization will be buffeted by forces competing for recognition.

¹⁰⁵ Paul R. Lawrence and Jay W. Lorsch, *Organization and Environment* (Cambridge, Mass.: Harvard University Press, 1967).

Studying organizations in terms of their environment is much like calling the organization a plant or species of plant and seeing how it grows and evolves over time. This can be further developed into how an organization's species characteristics evolve over time. This contrasts with the rational system view that the organization is a machine with logical and predictable actions. In a Darwinian sense, it is sometimes expressed that the outside forces will determine what the organization or population of organizations becomes. The models that approach organizations and their environments from the most purely evolutionary perspective include the population ecology models that are well represented by Aldrich and by Hannan and Freeman.¹⁰⁶ Lesser degrees of evolutionary purity also serve to make the environment clear as a force. The organization may have some ideal design and function, but--especially for government agencies--the outside world will intrude on them, and force them to consider mandates that are broader than what is simply written in their charters. These outside forces can be capitalists demanding the right to make money, engineers demanding more research and development funding, professionals "turning up their noses" at outside oversight, or customers demanding protection from

¹⁰⁶ Howard Aldrich, *Organizations and Environments* (Englewood Cliffs, N.J.: Prentice-Hall, (1979); also, Micheal Hannan and John Freeman, *Organizational Ecology* (Cambridge, Mass.: Harvard University Press, 1989), among the latter's many works in this area.

robber-barons (or robber-barons demanding protection from each other). Most likely the outside forces will be all of these and more.

The open system model also owes some debt to Stinchcombe, who specifically interlinked social structure with organization forms.¹⁰⁷ In his first sentence he states that "The general topic of this chapter is the relation of the society outside organizations to the internal life of organizations." Stinchcombe went on to develop a correlation between age and structure, with the premise that the structure that an organization is born with is the one it retains, and that it is born with a structure that is indicative of the social structures in the overall society at the time of its birth. This rigid typology does not consider the ability of individual organizations to change form or modify those key elements of structure that Stinchcombe identified as markers from their founding. This is carried over to population ecology, which identifies institutional diversity as a function of selection rather than individual modification.

Domhoff, in his criticism of regulating agencies, seems not to have adequately addressed how difficult it is to localize an individual organization from a population of related organizations. Aldrich states it plainly, that "The

¹⁰⁷ Arthur Stinchcombe, "Organizations and Social Structure," in *Handbook of Organizations*, ed. James G. March (Chicago: Rand-McNally, 1965).

major factors that organizations must take account of in their environments are other organizations."¹⁰⁸ The FAA's population of related organizations -- in the broadest terms of the community -- is anything that is aviation- or politically-related. This broad environment reflects the necessity of "theory and research at the population (and, ultimately, the community) level."¹⁰⁹ This level of analysis then considers, for any particular organization (or family of like-organizations), the appearance, function, and retention of organizational types, the nature of the organizations' environments, the flow and management of resources and information, and interorganizational relations.

It was noted that the foregoing typology is based on Scott's rational-natural-open mode. And as was noted, it is not the only way to look at theories. It is not even the only way to look at this particular construct. Bidwell and Kasarda develop a typology of closed-control-open systems.¹¹⁰ They argue that existing open system modeling is not that at all: it is a "control system," and they provide their own alternative. Thus, the typology presented

¹⁰⁸ Aldrich, 1979.

¹⁰⁹ Micheal Hannan and John Freeman, "The Population Ecology of Organizations," in *American Journal of Sociology*, 82 (March 1977), pp. 929-964.

¹¹⁰ Charles E. Bidwell and John D. Kasarda, *The Organization and its Ecosystem: A Theory of Structuring in Organizations* (Greenwich, Conn.: JAI Press, 1985).

is a useful, although not an exclusive, way of looking at organizations.

The Environment: Aviation and American Society

An integrated concept of organizational function may be seen in the open system models. These models see the organization not as a discrete unit but as a member of a larger population of organizations functioning in some external environment. An analysis of an organization in the United States must consider the interests and actions of other organizations which affect that organization either directly or indirectly. It must consider the general social structure of the United States. It must also consider competition, the existence of private property, and the personal or corporate accumulation of capital. Through competition, individuals and organizations may accumulate property. In such a context, the bureaucracy -- at the level of a single organization or of the government as a whole -- may become a mechanism by which a ruling class can enforce its will on the masses. A capitalist economic system was recognized by Marx and Proudhon as a major impediment to communal consciousness and individual freedoms. Kropotkin argued that competition, the hallmark of capitalism, makes individuals less interested in the success of their communities and more interested in their own personal success. A regulatory model based on shared perceptions of common objectives may flounder in such a

climate, especially if a question of safety must be balanced against a question of capital and power.

Apart from its role in capitalist economics and class-based power, the whole government is also the aviation environment in an ambient, "just the way it is" manner. The Federal government mandates the FAA; however, the FAA may face what happened with the Civil Aeronautics Board, an organization whose roots dated back as far as did the FAA's. Another organization, a part of the FAA's former parent, the Department of Commerce, further illustrates the difficulties faced by a governmental entity:

An understanding of ETIP [Experimental Technology Incentives Program] must begin with an examination of the program's place in the federal bureaucracy. ETIP is located at the National Bureau of Standards (NBS) [now the National Institute of Technical Standards (NITS)], part of the Department of Commerce (DoC), and its relationship with both of these larger organizations has greatly affected program development.

DoC for example, keeps a closer watch on ETIP than on more traditional branches of NBS. Even though ETIP at first had difficulty developing an active program, DoC wanted projects to begin quickly. DoC also seems to view ETIP more as a change agent than as a detached analyst of technology policy. The program is under constant pressure to demonstrate that it has aided the development and commercialization of new technology or otherwise fulfilled DoC's broader economic goals.

ETIP is also subject to pressures within NBS. As part of the director's office, the program had a rather unusual location at the bureau, somewhat outside the regular "table of organization." Unlike most of the bureau's efforts, ETIP is not directly involved in "hard" scientific research. NBS administrators sometimes see it as a "soft" program, more concerned with self-aggrandizement

and public relations than with science. In addition, they fear that ETIP's politically controversial projects may eventually become a source of embarrassment.

None of these pressures would pose severe problems if ETIP's future funding were certain. ETIP, however, is a new program, and a similar effort at the National Science Foundation has already been scrapped. During the past few years there have been several times when ETIP's demise appeared imminent. Doubts about ETIP's "usefulness" and "scientific value" make it necessary for the program to demonstrate its worth through highly "visible" projects, leading at times to unwise project choices. DoC's interest in practical effects, furthermore, is not always consonant with NBS's concern for scientific rigor. It is thus not surprising that ETIP often vacillates in its emphasis between "science" and "practical value."¹¹¹

As the above demonstrates, simply being a governmental organization does not guarantee permanence or that bureaucratically modeled decisions will be routinized or simple. But, considering organizational mortality, NASA's poor performance in the space shuttle program -- specifically the loss of the Challenger -- apparently did not cut short the life of that organization. Of course, one of the defining aspects of ETIP was the very ambiguous role it has been given to play. It is that ambiguity along with its perceived odd placement in the organizational chart that create the organizational tensions that are identified as doubts about usefulness and scientific value, unwise project

¹¹¹ Gerald M. Britan and Ronald Cohen, editors, *Hierarchy and Society: Anthropological Perspectives on Bureaucracy* (Philadelphia: Institute for the Study of Human Issues, 1980).

choices, and vacillation in emphasis. While ETIP was an example of a new program with multiple constituencies and thus contradictory expectations and demands -- typical for new government and private programs or agencies -- this is also relevant to the FAA, where technology is often new and constituencies are diverse.

A Brief Synthesis

There are three models delineated here. Each of the models describes an ideal-type, a pure organizational structure, and provides useful insights into actual organizations such as the FAA and their structures. However, the complexities involved in being part of the real world insures that there are no perfect fits of abstract models to actual organizations.

The first model delineated is the rational system model, which some find desirable because of its safeguards against individual abuses. Secondly, there is the natural system model, which seems to bypass the delineated authority of the bureaucracy, depending on individual acceptance of community goals. The failure of either of these ideal types to clearly explain organizational behavior has led to contingency theory, that organizations develop their own forms, lying between the limits of these ideal types.¹¹² Contingency is in contrast to isomorphism, and leads lastly

¹¹² Lawrence and Lorsch, 1967.

to the open model, an environmental model that can encompass the other models, and which goes on to focus on the interaction among the competing forces inside and outside the organization, other organizations and even the social structure.

One element of organizational ecology that deserves specific comment that has been neglected to this point is the concept of selection. Above all else, this explains organizational change by selection of the fittest. The point is that organizations do not change into something that endures or even exists at any given time but that those organizations that exist at some time have been selected out of the population of all organizations previously existing. The baseline of the selection model rests on a population of hundreds of organizations in numerous forms. This concept weakens when applied to the FAA and a population of one or two of a specific type. However, the statistical properties of this concept can be put aside while the underlying concept is retained: the FAA can face mortality if it does not evolve or continue to serve an operationally and politically useful function. There is reason to be hopeful about the FAA's ability to remain strong and fit in the future -- it has a special relationship with the Congress and the Executive Branches that many governmental agencies lack, and thus, it has the opportunity to evolve whereas an

organization with more limited input or resources would founder.

Organizational Environments: An In-depth View

Introduction

In 1956, Talcott Parsons wrote of his concept of an organization:

[I]t will be treated as a functionally differentiated subsystem of a larger social system. Hence it will be the other subsystems of the larger one which constitute the situation or environment in which the organization operates. . . . [T]he characteristics of the organization will be defined by the kind of situation in which it has to operate, which will consist of the relations obtaining between it and the other specialized subsystems of the larger system of which it is a part.¹¹³

This convoluted description of a simple concept is typical of Parsons, but the concept is enlightening. The organization exists in a much larger system, and that system -- including other organizations -- will define the characteristics of the organization. The study of the individual organization therefore implies the study of the entire system, and that system constitutes an environment. In fact, the FAA functions in an environment that includes many other organizations. These organizations are at various locations with respect to the FAA, forming a

¹¹³ Talcott Parsons and Neil J. Smelser, *Economy and Society: A Study in the Integration of Economic and Social Theory*, (Glencoe, Ill.: Free Press, 1956).

hypothetical matrix that includes higher and lower levels of a hierarchical dimension with respect to the FAA and a division of labor among the various organizational types (see Figure 3.1). This is the organizational environment. In aviation the environment is everything from the airlines to lobby groups and all other manner of organizations. In government the environment is everything from the military to the Peace Corps. The military makes demands on the airspace, and the FAA regulates the airplanes in which the Peace Corps flies its personnel and material.

Studying the Environment

Some organizational studies rely on a model of organizational environments and even a submodel, population ecology, to make clear the distinctions of differentiation and competition. Some recent work has attempted to make clear the concept of organizational life and function in the broad sense of the community of organizations by tying organizational study to biological models.¹¹⁴ This

¹¹⁴ e.g., Aldrich, 1979; Glenn R. Carroll, "Concentration and Specialization: Dynamics of Niche Width in Populations of Organizations," in *American Journal of Sociology*, 90 (May 1985), 1262-1283; Hannan and Freeman, 1977; Hannan and Freeman, 1989; Hannan and Freeman, "Structural Inertia and Organizational Change," in *American Sociological Review*, 49 (April 1984), pp. 149-164; Hannan and Freeman, "The ecology of organizational mortality: American labor unions, 1836-1985," in *American Journal of Sociology*, No. 94 (July 1988) pp. 25-52; and John Freeman and Michael Hannan, "Niche Width and the Dynamics of Organizational Populations," in *American Journal of Sociology*, 88 (May 1983), pp. 1116-1145.

approach has not been without controversy.¹¹⁵ Without joining in the controversy it is possible to adapt such an idea as the competition for resources into a systematic analysis of specific organizations and environments in an attempt to understand organizations' actions and motivations.

This goes beyond Parsons's model, which concludes that the supra-organization is ultimately "a society."¹¹⁶ What is Parsons's society as applied to aviation? It is too limited a term when the airliners of dozens of countries enter United States airspace every hour. The supra-organization is the world community, a community of societies, and in fact the total environment in which aviation exists. On the local level is the United States, the FAA's small pond.

This presents the synthesis of the model to the FAA: the overall environment in which the FAA functions is beyond it or its immediate patrons complete control. The FAA -- a rational bureaucracy -- can have strong internal forces that work to establish informal systems -- a natural structure -- in a broad system of interrelated organizations -- the open system.

¹¹⁵ Ruth C. Young, "Is population ecology a useful paradigm for the study of organizations?" in *American Journal of Sociology*, No. 94 (July 1988) pp. 1-24; Discussion, in *American Journal of Sociology*, No. 95 (September 1989), pp. 425-446.

¹¹⁶ Parsons, 1956.

The Fit of the FAA

What Oversight Is

Governments, behind the banner of concern for their citizenry, have had an interest in establishing various types regulatory mechanisms. These mechanisms may be charged with the oversight of a monetary system, an industry, or public behavior. Centuries ago nations would contract with private bankers to handle their finances, while national defense was still a matter of less than national armies.¹¹⁷ Today, governments around the world have established a plethora of agencies under national control to oversee and regulate such things as police and defense functions, the economy, and commerce. One may say that there exists a niche of "government agency" in which one may find a certain species of organizations, the "government agencies." These are, in practice, somewhat fluid, as the organizations are not always permanent (the sub-niche of "which agency" can even be abolished), or the character of the organization can be transformed (the Federal Communications Commission plays a far different role today than when it was first established). These agencies have objectives set for them, to regulate air commerce or the money supply or whatever, to provide various police or military services, and all the other functions a government

¹¹⁷ Richard W. Kaeuper, *Bankers to the Crown; the Riccardi of Lucca and Edward I*, (Princeton, N.J.: Princeton University Press, 1973).

should provide. It would seem that those objectives should determine the actions of the organization.

The FAA's dictates are both implicitly and explicitly for an organization that will be a research and development agency and a clearinghouse for technology. At the same time it will be some type of policing agency. These have been attacked in the popular aviation press as contradictory goals--promotion versus policing--but they are at least clear goals. In the environment as described, the FAA would have to make rules to govern flying, monitor aviation for compliance with those rules, and develop and disseminate new technology both in conjunction with its rule structure and as a matter of providing services. All of this would have to be done in the spirit of finding the absolute best course of action based on the needs of the flying community, specifically based on the attainment of safety of flight (or, of finding the "best" overall compromise, one that is acceptable to all interested parties, even if it does not meet the requirements of attaining the maximum safety of flight).

The FAA's Reality in a Political World

The FAA has many relationships that have little or nothing to do with flying. These relationships are influenced by the nature of government and industry. There are the relationships that develop between Federal agencies and the Executive and Legislative Branches of the Federal

government; there are political pressures between the Executive and Legislative Branches and the many corporate players in industry; and there is the pressure between the industry and the agency itself. One name that has been given the particular forces among a regulatory agency, the Congress, and the regulated industry is the "iron triangle." All are pulling and pushing each other, with the agency forced to maintain a political base in each of the other two camps (see Figure 3.2). All of these forces remove the process of the agency from the Weberian ideal type and make its decision making process less egalitarian, less objective oriented. Of course, the subordination of any agency to the industry and with Congress is only partial; it is indeed an independent actor, with legal authority and power, negotiating with other actors who have certain resources to influence their policy making. And the FAA appears to be fully aware of the iron triangle, as it has explicitly incorporated it into its organizational structure: there is an Assistant Administrator for Government and Industry Affairs who reports directly to the Administrator (see Figure 1.3). Mishandling these relationships may be disastrous: the Civil Aeronautics Board [the CAB] either mishandled its relationship with the industry and Congress or it did not adequately change to keep up with the changes in commercial aviation. For whatever reasons, it lost its political base and was legislated out of existence by a

rather complex time-table outlined in 49 USC 1551. Its functions were divided among the DOT, the Department of Justice, and the Postal Service with various phase-out dates of 31 December 1981, 1 January 1983, and finally 1 January 1985.

What Exactly Is The FAA's Role and How Stable Is It?

The "government agency" as a role requires a careful thinking of its circumstances. Our government agency has more concerns than simply safety of flight. It has to think about its funding. Had the CAB been properly concerned about its own mortality, if an organizational goal of sustaining an uninterrupted flow of funds through unyielding Congressional support had existed and been met, it would not have been voted out of existence coincident with route-structure deregulation, its most prominent but not its only function.¹¹⁸ This indicates a crucial element of the government-agency. The organization is forced to address issues that have no bearing on its operational objectives.

¹¹⁸ The CAB had been the traditional regulator of this, delegating specific routes and destinations to the various commercial operators. Also, prior to the Federal Aviation Act of 1958 the CAB had also been the body that made the Federal Aviation Regulations (now 14 CFR), a function transferred to the FAA when the CAA became an independent Federal agency, and prior to the Department of Transportation Act, the CAB had conducted accident investigations, a function transferred to the newly created NTSB (1966). Route-structure regulation was not the CAB's sole function at the time of deregulation: it also regulated the insurance on carriers' aircraft, regulated mail transport, and considered anti-trust exemptions. After deregulation these tasks were transferred to the ICC, the Postal Service, and the Justice Department, respectively.

Even falling short of mortality, dismemberment may be as deadly a threat. Organizations, faced with multiple goals, conflicting goals, or unclear goals may be forced to address them selectively or to address none of them in order to survive politically.

One issue to be faced is how to, in good faith, balance clear but also distinctly different objectives. For example, there may be intrinsic elements of conflict present in promoting an industry that must also be regulated. This conflict exists right in the FAA's charter. The FAA can become the object of pressure from interest groups, ranging from passenger safety lobbies to airline and manufacturer lobbies, one side demanding more regulation while the other demanding less regulation and more assistance. Those lobbies need not address the FAA alone: they may go to Congress, at which point the FAA may become caught between its operational objectives and its political realities. For an organization working with state of the art technology, this can be a source of institutional role strain. Professionals are likely to exhibit less bureaucratization than non-professionals;¹¹⁹ Waters states that professionals exhibit "collegiality in organizational structure," specifically listing academia, law, and medicine as examples

¹¹⁹ Richard H. Hall, "Professionalization and Bureaucratization," in *American Sociological Review*, 33, No. 2 (February 1967), pp. 94-104.

of fields where this would be apparent.¹²⁰ Aviation professionals are fellow candidates for this structure. This should very likely have an effect on the form of the organization, at least on how the organization actually gets its business done.¹²¹

Unbureaucratized professionals may find themselves caught in very difficult situations. Domhoff finds this a critical fault of government agencies, although he seems to attribute it more to the pervasiveness of personal abuse than an inevitable structural consequence.¹²² This is an important point, and it should reflect the definition of structural that Garfinkel used when writing,

By calling interests "structural" we wish to convey that the interest is not governed by personal considerations in advancing a cause but is related to demands of organized practice which the member treats as his real circumstances.¹²³

A civil servant or a political appointee, either of whom could be an aviation professional, may have to make decisions based on the political necessity rather than the

¹²⁰ Malcolm Waters, "Collegiality, Bureaucratization, and Professionalization: A Weberian Analysis," in *American Journal of Sociology* No. 94 (March 1989), pp. 945-972; Discussion, in *American Journal of Sociology* No. 96 (July 1990), pp. 186-200.

¹²¹ Lawrence and Lorsch, 1967.

¹²² Domhoff, 1978.

¹²³ Harold Garfinkel, *Studies in Ethnomethodology* (Cambridge, U.K.: Polity Press in association with Basil Blackwell, Oxford, England, 1984, 1967).

operational objective. This occurs not only because the alternative may be to face a ruined career but also because he or she may not even recognize that an alternative is possible.

An alternative to a personal, professionally based -- perhaps totally unprofessional -- decision-making process can be a ritualization of the bureaucracy, which is a dysfunction of its own.¹²⁴ It may lead an organization to find it impossible to function using its operations objectives for a goal. Even with the most clear-cut, complementary goals -- and it should be noted that there is not always an intrinsic contradiction between promoting aviation and insuring its safety -- the FAA is forced to respond to social pressures that have no relation to either promoting or policing aviation, but instead respond to political expediency.

The FAA, as a government agency, faces a similar problem to that of the CAB. It is not inevitable that there be an FAA. Dismemberment or dissolution is possible: other agencies could divide the FAA's functions, just as Transportation, Justice, and the Postal Service divided the functions of the now defunct CAB. Organizations are forced to protect their turf and to compete for finite Federal funding. For example, the Interstate Commerce Commission (the ICC) might assume the regulatory aspects of the FAA's

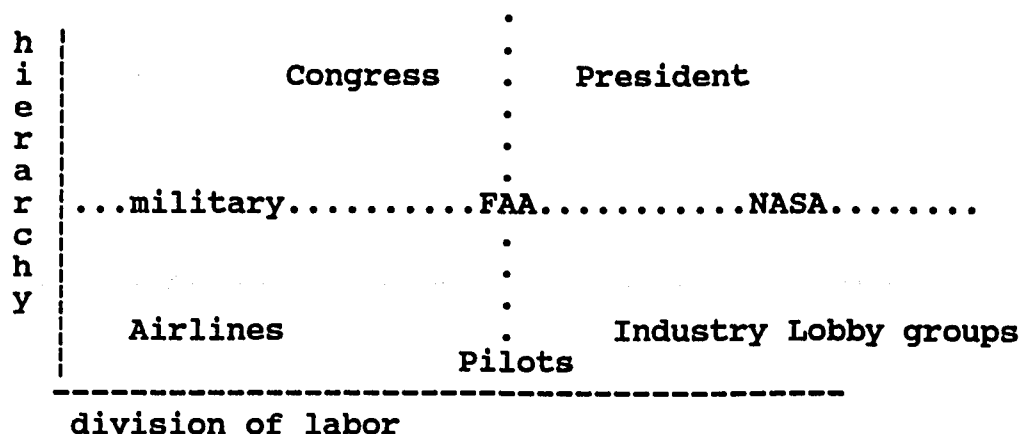
¹²⁴ Meyer and Rowan, 1977.

function; the National Aeronautics and Space Administration (NASA) might assume the promotion and the flight-operations functions, and the Air Force might assume the air traffic control functions and any flight functions that NASA did not handle. It would not be unreasonable to assume that in today's Washington, NASA, still reeling from Challenger and other disasters in 1990 and -- like all other Federal agencies -- threatened with budget cuts, is already hungrily eying the FAA's budget. Nor would it be unreasonable to assume that the Air Force, now with peace in the world seemingly ready to break out, might wish to expand its purpose to protect its own existence, and air traffic control would be no more than a return to a previous function that it exercised in the pre-FAA days. In fact it is a function that it did not willingly give up. It is even not unthinkable that some elements within the FAA may wish to loose air traffic control, and would seek to have those functions spun-off.

In order to insure its survival, the FAA must therefore cater to the Legislative Branch of the government. The Congress can have as great control over the FAA as does the Executive Branch, as Congress not only controls the purse strings but can eliminate the FAA by removing the authorization for its existence from 49 USC. Title 49 USC notwithstanding, the Executive Branch still can hire and fire, and do so with the top policy-makers at will, so

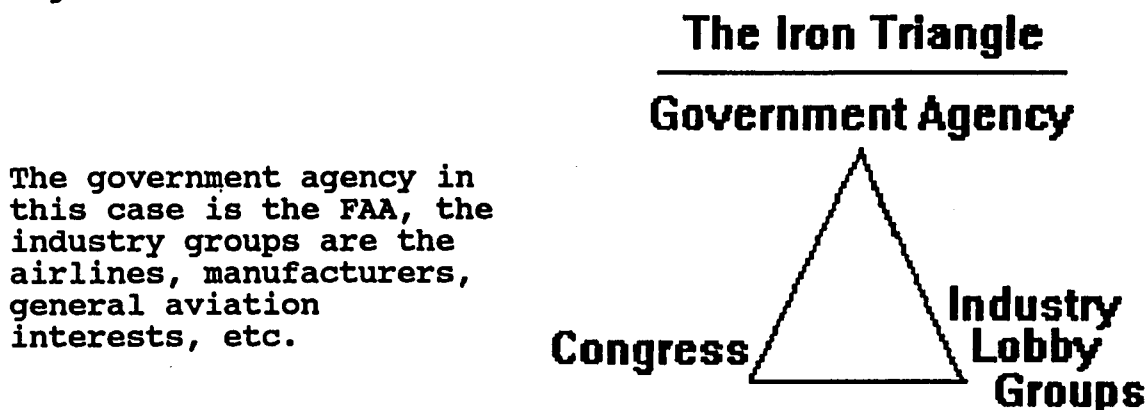
individuals within the organization will also have a sword of Damocles over their heads: they too must satisfy their patrons, but on a more individualized basis. And they, once appointed, must be confirmed by and answer to Congress. Congress may be influenced by the industry: so exists the complex system of interactions.

Figure 3.1: Organizational Matrix



The dimensions are not scalar, nor are they static. For example, the industry groups could be envisioned under some circumstances as being superordinate to Congress, considering the force of PACs and home-town industries. Also, it may be hard to imagine that there is a division of labor between the airlines and the industry lobbies, but quite simply one provides transportation while the other provides for the providers. Where the individual pilots are is also questionable, but the bottom of the hierarchy seems not unreasonable.

Figure 3.2:



CHAPTER FOUR, HYPOTHESES OF GOALS: HOW ORGANIZATIONS WORK**Introduction**

Under what conditions do organizations take action when confronted with an issue? Do they act according to sharp and unambiguous rules and decision-making processes, do they act chaotically, or do they act in some other fashion? A variety of reactions may occur within the same organization, perhaps as alternative processes competing with each other or as different processes in different organizational settings. That there can be such different answers to the question of organizational action indicates how ambiguous the theoretical foundations for organizational analysis remain. Ideally organizations will know issues when they see them and act appropriately. This naive, ultra-simplified hypothesis makes clear its own internal contradictions: how does an organization know an issue, and how does it know what an appropriate act is?

Four Hypotheses of Goals

Chapter Two reviewed literature central to several themes in this study. The literature whose concern is the issues of organizational decision-making was among them. From that literature, several hypotheses may be developed to describe how an organization sets goals and determines when and why it must act.

One hypothesis is that an organization responds to objective demands. This derives both from bureaucratic

models of rational action aimed at attaining formal goals and from non-bureaucratic models of professional standards in fields such as law, medicine, and academia. This may be called the "objective response hypothesis." A second hypothesis is that an organization will respond to symbolic/legitimizing demands. This refers to the role that certain organizations have in legitimating social structure and on the nature of ceremony in legitimating organizations. This may be called the "symbolic response hypothesis." A third hypothesis is that organizational action is the product of the many contradictory, competing demands made on the organization by other organizations that have a potentially controlling influence on critical resources. Under these circumstances of interaction with powerful patrons, the organization is forced to define and continue to re-define circumstances that do or do not require its attention. This may be called the "multiple patron/client hypothesis." A fourth hypothesis is that organizations are issue and decision-process garbage cans. They collect all manner of processes and problems, filter and match them, making applications haphazardly, and, as in the previous hypothesis, define and continue to re-define circumstances that do or do not require attention. Since processes and issues may be haphazardly matched, the outcomes are chaotic and unpredictable. This may be called the "garbage can

hypothesis." These are all in essence variations of or deviations from the ideal type bureaucracy.

Thinking About Objectives: Conflict and Consensus.

The subject of this study, the FAA, has formally defined organizational objectives to insure flight safety through its regulation of aviation and to promote the development of the industry. The attainment of the flight safety goal requires that the organization, through its political and internal mechanisms, operationally define what flight safety is and, conversely, what an unsafe flight condition is. These mechanisms constitute the process through which the FAA determines that a flight safety issue exists. This prompts the question, what is a flight safety issue? For that matter, how can one determine what a flight safety issue is?

To think about organizational action, a theory of foundation events must be presented. How do the FAA officials understand that a flight safety issue exists? They can not resolve this issue in a vacuum. Far from being able to make this decision on their own, they may have to consider many disparate voices before they can subjectively decide if an issue exists. This subjectivity and the need to deal with disparate constituencies will be shown with two examples, both illustrative ultimately of the objective response model.

In one case, an airliner may have been designed so that an airline might maintain it in a manner that, while not overtly contrary to any specific rules, has the effect of damaging the engine/pylon/wing assembly. A catastrophic structural failure becomes possible. Ultimately an inflight failure occurs, an aircraft is lost along with several hundred lives, and similar aircraft are found to have structural weaknesses consistent with the case of the inflight failure.

This is an example that may have varying interpretations up to a certain point. Is a maintenance procedure safe; is the design safe? This issue has become at least partly institutionalized in the past decade as the FAA now falls under an Executive Order to conduct cost-benefit studies in certain regulatory actions. This constitutes a type of risk analysis that the FAA must add to determinations of safety (cost-effectiveness, risk-proneness). However, once a problem that produces catastrophic inflight failure is recognized as endemic, a broad consensus is reached: the public demands protection; the industry's commercial concerns, faced with an obvious safety and public-relations crisis, concede that a problem exists; Congress, responding to the public's clamor and in the absence of industry opposition, demands action. The agency joins in this consensus and uses its regulatory apparatus to ground the aircraft and initiate its

recertification with the design inadequacies corrected. Everybody readily agrees that something is wrong when aircraft as a type begin to show signs of imminent inflight disintegration. The only question is how quickly things can be set right.

In a second case, the builder/pilot of a home-built aircraft removes one support strut from the horizontal stabilizer after a similar strut on the other side falls off. Immediately afterward, while practicing for an airshow, the aircraft suffers an inflight failure of the stabilizer. Rendered uncontrollable, the aircraft falls to the airport runway below, killing the pilot, its lone occupant.

Idiosyncratic, unique factors explain the event. The builder of the aircraft -- who is the master of its design -- makes an impromptu structural modification. The aircraft is then immediately involved in aerobatic flight, during which flight the parts that were modified fail. The aircraft crashes within the confines of the airport, with no other property damage involved, and with the pilot the sole casualty. There are no "others" who might feel threatened by this accident or in need of some legal justice: who cares that some crazy guy who ought to know better kills himself? There are so many individual elements in this case that it is impossible to generalize it beyond the single event. It is precluded from being seen as an issue.

These extreme cases would make it easy for the FAA to either act immediately and in as forceful a manner as it desires on the one hand or not to act at all on the other hand. It is all the other cases, the in-between ones, that make the question "under what conditions do organizations take action when confronted with an issue?" a theoretical matter. For example, under conditions of uncertainty, such as when one plane crashes and the causes are not at all clear, what decision-making criteria are necessary for the agency to decide that a regulatory action should or should not be undertaken? Perhaps it takes more than just one plane to crash to make the causes clear: as the agency's knowledge of events increases, it is able to construct an issue. Also to be considered is a presupposition about the formalized nature of the FAA's legal mandate: as a formalized, rational bureaucracy, the FAA has to believe there is a cause for things; and, if there is a cause, the agency must act or decide on a good reason not to act.

An Extended Critique of the Models.

Hypothesis One: Objective Demand.

The FAA's first critical decision point may be stated not as "the FAA determines if action should be taken" but as "the FAA determines that an unresolved flight-safety issue that may require action exists." The existence of an unresolved flight safety issue will require that "the agency decides whether or not action is warranted to resolve the

issue." In the absence of an agency action -- or a good reason not to act -- the agency will be failing to fulfill its formal organizational goal of insuring the safety of flight. The FAA might also determine that an "overresolved flight-safety issue" exists, which would be the case where the agency has either acted to the detriment of the aviation industry by imposing a draconian rule or by imposing -- or perpetuating -- a rule where no flight-safety issue exists. In addition to its formal mandate for action, the FAA as an organization will also be responding to the individual factors inherent in its professional staff. That professional staff will have an inherent interest in flight safety beyond the formal definition of the agency's goals. This model of action flows from the systems of Weberian bureaucracies along with collegial models.¹²⁵ At its heart, this is a rational system of action. The flow chart in Figure 4.1 is offered as an outline of this model.

The objective demand hypothesis is a plausible explanation for several reasons. Professional pilots have a common interest: that interest is to avoid being killed in an aircraft accident, and, on a different level, their professional training instills in them the *esprit de corps*

¹²⁵ For example, Max Weber, "Bureaucracy," in *From Max Weber: Essays in Sociology*, trans. & edited C. W. Mills and H. H. Gerth (New York: Oxford University Press, 1946); and Malcolm Waters, "Collegiality, Bureaucratization, and Professionalization: A Weberian Analysis," in *American Journal of Sociology* Vol. 94, No. 5 (May) 1989, pp. 945-972.

that promotes collegiality and shared values. Taking this as analogous to lawyers and doctors, other highly trained professionals, pilots should be self-regulating, unbureaucratized, and objective. Their sanctioning agency should act outside of the arena of public pressure or other partisan concerns. Regardless of pilots' professionalization, the FAA itself is very highly formalized and is quite plainly responsible for flight safety. Each of these will affect the FAA's decision making processes.

The FAA is also an active agent itself. It has an organizational ability to shape and affect its environment, so it can affect the exogenous variables. For example, the FAA's ability to set flight training curricula is the ability to determine the character of the professional training that pilots, its own staff included, will receive. In effect, the FAA has a role in determining the professional standards that will ultimately be used by the professionals in the FAA to determine professional standards. Likewise, the FAA is handed a legislative mandate to promote safety. The legislative mandate of Title 49 of the United States Code is not the same, however, as the Federal Aviation Regulations, written by the FAA and its predecessors, that find their way into Title 14 of the Code of Federal Regulations. The FAA is in the position to formally interpret its own legislative mandate. It is

almost a truism of the analysis of government decisions that fairly abstract legal and statutory language (purposely left ambiguous because of the need to create a majority legislative coalition) must be translated into the implementing language of rule-making by a series of negotiations about what the legal language will mean in practice, a role ultimately delivered to the FAA. It thus has the interesting ability to interpret a formal goal into an operational goal that itself has the legal-rational foundation of being a formal goal.

Hypothesis Two: Symbolic Response Hypothesis.

There is a strong ideological imperative to confirm the objective demand hypothesis. This is a functionalist explanation: the agency works, the government works, the people are happy, so there is social solidarity. But this self-evident observation leads to inherent problems with the model. The demands on any government agency go far beyond simple cause-and-effect action. Organizations respond to a variety of prompts for action, many of which have nothing to do with formal goals. Rather, the agency has a functional goal which can be at odds with the formal goal. One quite functional goal that a public agency performs is to insure public confidence in the governing structure (not to mention the social structure as a whole). The agency is a symbolic guardian of the public well being. In this case, it is not so concerned with making the determination that an

unresolved flight-safety issue exists as it is with responding to public opinion concerning the issue: this may be stated as "the FAA determines that the public perceives that an issue exists that may require action." The existence of this public perception (of an unresolved flight safety issue) is what will require that "the agency decides whether or not action is warranted to resolve the issue," for in the absence of a determination of action the agency will be failing to fulfill its symbolic organizational goal of acting to insure the safety of flight. The public perception of an issue may or may not have something to do with a real flight safety issue: that is not the concern of the agency or of its symbolic response and is irrelevant to this analysis. What matters is that if there appears to be an issue there also appears to be a response.

This model is based in the literature on government action that has the explicit purpose of legitimating the government, such as Edelman, and on organization action that has the purpose of legitimating the organization, such as Meyer and Rowan.¹²⁶ While this may be considered a rational response system on the part of the organization to what have been constructed as its real issues, that is,

¹²⁶ Murray Edelman, *The Symbolic Uses of Politics* (Urbana: University of Illinois Press, 1964); and *Constructing the Political Spectacle* (Chicago: University of Chicago Press, 1988); also John W. Meyer and Brian Rowan, "Institutionalized Organizations: Formal Structure As Myth and Ceremony," in *American Journal of Sociology*, No. 83, No. 2 (September, 1977), pp. 340-363.

responses to functional goals, it is not so rational a response system when applied to the formal goals; thus, in this model, it can be seen that there can be a distinct difference between the formal and the functional goals. The flow chart in Figure 4.2 is offered as an outline of this model.

This hypothesis is plausibly supported by the FAA's pattern of action. There are many FAA actions in many different circumstances, many with little public notice, but it certainly acts in a very public way at times of public concern, indignation, or fear. Also tending to confirm this hypothesis is often the lack of action in instances when the public is not concerned with an issue. For example, more general aviation accidents occur than airline accidents, claiming more lives than airline accidents, but public clamor usually is not heard for rules regulating general aviation (see Table 2.5.4 for accident comparisons between general aviation and air carriers). The agency has developed a much less stringent rule structure for general aviation operations than exists for airline operations. In effect, this seems capable of explaining a great deal of the FAA's behavior. The FAA appears to respond more to the public's demands for action than to other demands: this is a crisis management scenario, whereby the public declares a crisis, and the FAA responds; that is, an FAA process is triggered which considers action and then either corrects

the problem or offers some reassurance that there really is no problem. What triggers the crisis and response mechanism is itself problematic: perhaps there is a threshold number of events (near-misses, hijackings, crashes) beyond which people are very upset, and this level somehow is communicated to the agency. This policy-trigger level is beyond the scope of this study, but further research in this area seems appropriate.

Hypothesis Three: Multiple Patron/Client.

Public perception does not evolve in a vacuum; similarly, the FAA does not respond to public opinion in a vacuum. The FAA is balancing forces and not simply responding to one force. It exists in a network of organizations that have particular interests. Further, these organizations have interests in, and control over, strategic resources relevant to the FAA such as operating funds, political campaign funds, even organization mortality. The FAA depends on the Congress and the Executive Branch for funding and the appointment and confirmation of top officers; the Congress and the Executive depend on powerful interest groups for campaign funds and political support; the industry depends on the government to provide a habitable competitive environment free of what it considers overregulation. The FAA, concerned about its own resources, must maintain proper relations with its governmental and industry patrons while at the same time

presenting to the public the symbolic actions that are necessary to assure them that something is being done to insure air safety. The FAA's external interest groups are part of the overall "public" for which symbolic responses are constructed: the agency may make a decision that is a tangible (that is, real and substantial) response to an external interest group's demands, or it may make a merely symbolic response. Its interaction with Congress is an example: the appearance of a quick and effective response to an airline accident is all that is needed to satisfy the political requirements of Congressional concern. This suggests that the FAA determines that its public perceives that an issue exists which may require action, and simultaneously determines what actions are feasible to allay this public perception given the existing political circumstances. This hypothesis is multi-dimensional: under these circumstances, the existence of a public perception of a need for some action is only a small part of the agency decision whether or not to take action, for the agency has other powerful influences balancing public opinion as a criteria for action, inaction, or alternative action. The presence or absence of an agency action now is the agency reaching a political and internal organizational decision on how to fulfill its functional organizational goals of insuring symbolic legitimacy, maintaining of its intragovernmental relations, and maintaining its relations

with its industry patrons. This promotes a complex system of interactions such as in Figure 4.3.

Complicating these relationships is the agency's legal responsibility--its formal legislative mandate--to both regulate and promote the industry, which makes the FAA the patron in the FAA/industry, patron/client relationship. These have been indicated by the bi-directional arrows; further, all of the relationships may share this characteristic to some extent. These relationships are further clouded by the nature of the patron relationships. There are actually only two direct patrons, the Congress and the Executive Branches: these have actual control over the agency funds and staffs. However, the industry and public are indirect patrons through their ability to influence the Congress and the Executive Branches. Table 4.1 describes these complex roles.

This hypothesis, like the preceding, flows from pragmatic organizational concerns. It is based not only in the literature on legitimating government action (e.g., Edelman), and legitimating organization action (e.g., Meyer and Rowan), but also in the literature on government organizations, such as Newman & Attewell and Stryker.¹²⁷

¹²⁷ Edelman, *Symbolic Uses of Politics and The Political Spectacle*; Meyer and Rowan, "Institutionalized Organizations"; Katherine Newman and Paul Attewell, "A Compliance-Resource Theory of Regulatory Failure: the Case of OSHA," in *The International Journal of Sociology and Social Policy* Vol. 5, No. 1, 1985, pp. 29-53; and Robin Stryker, "A Tale of Two (continued...)"

And again, while this may be considered to be a rational response system on the part of the organization to what are constructed as real issues, the formal and the functional goals at this point may bear little or no resemblance.

This hypothesis is also plausibly supported, as it rightly considers the agency's interrelationships with its patrons. For example, any perceived negligence on the part of the FAA may be transferred from the public to the Congress. Hearings may result. This may occur just as the industry opposes agency action and itself goes to the Congress to demand relief. Any action that the FAA takes under these circumstances may well be a political rationalization (as opposed to a legal rationalization), and the formal organizational goal of safety of flight has been subsumed by the functional organizational goal of not endangering its flow of resources by alienating its patrons.

Hypothesis Four: The Organizational Garbage Can

Given a complex and stifling environment, it may appear that the agency can be as prone to action as to inaction. With a response system developed, but swamped by political concerns, the agency may be able to act when only within a limited set of conditions. Thus, there are rulemaking and enforcement procedures, but they can only be applied

¹²⁷(...continued)

Agencies: Class, Political-Institutional, and Organizational Factors Affecting State Reliance on Social Science," in *Politics and Society* Vol. 18, No. 1, March 1990, pp. 101-141.

haphazardly. A different approach to this issue of haphazard response considers the organization to be simply a collector of all manner of processes and problems which filters and matches them, making applications haphazardly, and, as in the previous hypothesis, it defines and continues to re-define circumstances that do or do not require its attention. Since processes and issues may be only serendipitously matched, the outcomes are apt to be chaotic and unpredictable. The organization is merely a collector of processes and problems -- a big can into which things are tossed -- and any response is as much a product of accident as of design. This "big can" model of the organization, along with the tendency to garbage-in/garbage-out decisionmaking, aptly leads to the name "garbage can hypothesis." Figure 4.3 suggests the input/output flow of an organizational garbage can. On the one hand this hypothesis is based on both the models of collegials and organizational anarchies and in the collegial professionalization that supports them. On the other hand it is based on situational models where organizations are uncertain as to goals or procedures, where other aspects of the environment are unclear, or the organization is apt to face crises.¹²⁸ But while this is a crisis management

¹²⁸ Waters, "Collegiality"; M. D. Cohen, J. G. March, and J. P. Olsen, "A Garbage Can Model of Organizational Choice," in *Administrative Science Quarterly* 17, 1972, pp. 1-25; and J. G. March and J. P. Olsen, editors, *Ambiguity and Choice in* (continued...)

technique, it does not necessarily mean that the organization is itself in a crisis, only that it is managing a crisis or that it is unclear what it is that it is managing or how it is that it is supposed to be doing it.

This hypothesis, like the previous ones, is plausibly supported. The agency has a collection of formal decision making processes. These procedures are waiting to be applied to a situation: if a situation comes along, the agency acts. In a crisis, the agency acts frantically, with whatever process it can produce from the garbage can. Further, an organization, intent on appearing to be useful, may become a veritable vacuum cleaner for issues to which it can apply its dormant or underutilized decision-making tools. As with the symbolic response hypothesis, this is a crisis management system. A major issue will force a decision process to be applied to it regardless of the fit. Further, the nature of the fits may be more or less forced one way or another depending on what faction is in charge: a hard line, rule enforcement faction may demand a disciplinary remedy (license suspension) for every rule violation, while a conciliatory, education oriented faction may demand a training remedy (additional flight or ground

¹²⁸(...continued)
Organizations (Bergen, Norway: Universitetsforlaget, 1976);
 Richard H.Hall, "Professionalization and Bureaucratization,"
 in *American Sociological Review*, Vol. 33, No. 2 (February
 1967), pp.
 94-104.

instruction) for every rule violation. The existence of mechanisms which include either or both of these remedies makes their application subject to the whims of whatever factions can enforce their will, and in fact the FAA has vacillated between these two approaches for unauthorized incursions into controlled airspace around certain busy airports. Finally, any influence the agency has on its environment will be haphazard and unpredictable. This is not a rational model (i.e., legal/rational, as a Weberian bureaucracy) of organizational function.

Discussion of the Theoretical Perspectives.

A practical theory should integrate the preceding hypotheses. Each hypothesis contains the implicit question, "when and how does the agency act." In reality, the agency acts differently at different times, according to how its members understand the organization's goals. This is the issue that will be tested in order to describe the circumstances of when each hypothesis is true. Exploring the political and formal processes that underlie the hypotheses is necessary to determine when, which, or how many, of them are active. The key issue is determining under what conditions each of the models will operate.

These models are then contradictory goals. The first model represents the organization responding to the goal of following rational formal objectives. The second model represents the organization responding to the goal of

maintaining an appearance of legitimacy. The third model represents the organization responding to the goal of complying with the demands of external constituencies that control crucial resources. Finally, the fourth model represents the organization responding to the goal of immediately responding to crises with whatever actions will quell criticism or challenges.

The earlier examples of the airliner and the homebuilders may be examples of these processes. There is no public perception of crisis in the case of the homebuilders, so there is no goal to maintain an appearance of legitimacy (symbolic response hypothesis): by organizational inertia the FAA tends not to respond. Perhaps, while not sensing a crisis or challenge, it also does not have an automatic process to apply, so there is no goal to immediately respond with whatever actions are available (garbage can hypothesis): again, by inertia it tends not to respond. Perhaps the professional pilots in the organization are outraged at the homebuilders's reckless way of modifying the aircraft and then subjecting it to a rigorous and stressful aerobatic sequence, so the goal of following a rational formal objective is effective (objective demand hypothesis): the organization does tend to respond. Maybe the Experimental Aircraft Association demands that every homebuilder have the right to modify his or her own aircraft, so the goal of complying with the

demands of an external constituency that may control crucial resources is effective (the multiple patron/client hypothesis): by force of an industry patron it tends not to respond. Essentially, the latter two forces will be in conflict (objective demand and multiple patron/client) and will have to be balanced within the agency through its own political and formal processes, either producing or not producing some type of response.

In the case of the airliner, all four of these hypotheses would tend to explain the organization's goals after the crisis. Prior to the crisis (that is, the empirically observable issue: the loss of a large aircraft), when the design problem was still in an exploratory stage, the following scenario may be closer to the truth: the public, perhaps unaware of a problem, would be silent (no goal of legitimation); the industry, perhaps unwilling to admit to a problem or agree to its magnitude, might be fighting any action by both direct lobbying to the agency and indirect lobbying through the Congress (a goal of complying with the patron's wishes); hesitant to implement what could be perceived as an overresponse, some half-way measure would be found in the garbage can (goal of relieving a challenge). The organization's own conflicting formal goal would only serve to reinforce the lack of action, as any regulatory action could tend to be detrimental to the industry (no formal goal that is identifiable).

Actions in rational, natural, or open systems

There was presented previously not only a review of the literature that led to the foregoing hypotheses, describing how an organization determines when and why it must act, but also a description of three grand theories of organizations, the rational, natural, and open systems. These systems have a correspondence to the models, although the match is not always unique or exclusive. The rational systems model clearly corresponds to the objective-response hypothesis. Both have a foundation in the legal-rational foundation of action. However, the natural system, with the individuals having a deliberatory role, also explains action here, based on collegiality and the shared judgements of a professional group. So, hypothesis one can be related to both the rational and natural systems of modelling organizations. Both of these models will produce a type of ordered behavior in response to an objective issue. Thus, either model will produce a goal where the organization's action is a rational response to an issue.

The open system model, with external forces coming to bear on the organization, forms the foundation for both the symbolic-response and the multiple patron-client models. These models are both predicated on the organization's response to external forces, either in a narrow form or a broader matrix of organizations. Thus, there is a relationship in the performance of legitimating functions

for symbolic reasons and in order to maintain critical resources. These are in effect linked through the necessity of the organization to respond to the external environment in ways that well transcend the formal goal. Both the symbolic response and patron-client goals are responses to external conditions.

Finally, the organization garbage can is really a combination of all three systems based on situational factors. The interactions that the garbage can is predicated upon can be related to natural systems. The existence of collegials and organizational anarchies staffed by professionals are both likely to reflect attributes of the natural systems model. However, the garbage can is also a residual process that will take effect in rational systems when goals, procedures, or staffing are uncertain or a crisis is at hand. Finally, these uncertainties may be the result of external forces, which can be explained by the open system model, creating the goal uncertainty that creates garbage-can process determination.

Structures and processes are not easily separated. Structures blend together, and processes can seem intertwined. As stated earlier, a key issue is when and under what circumstances are the various goals that the organization may operationalize at work. In those circumstances, which of the structures described seems best to describe the organization? This forms the core of the

synthesis of the models of organizational goals and decision-making. Multiple goals will be operational at any given time, with corresponding processes to realize them.

Figure 4.1: Flow Chart of Agency Action: Objective Response Hypothesis

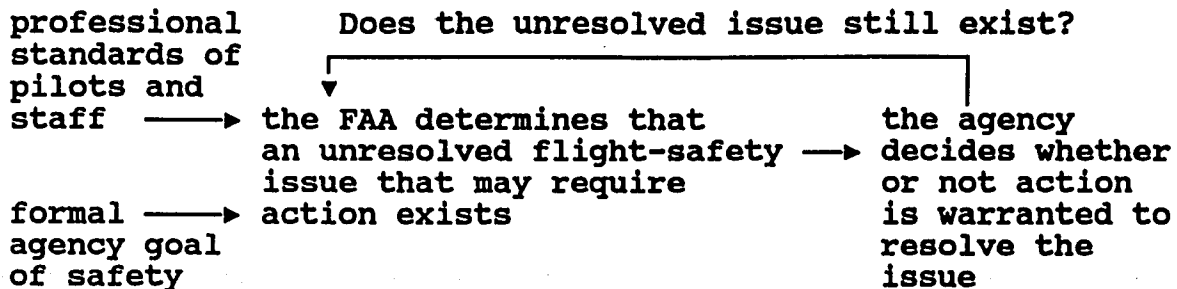


Figure 4.2: Flow Chart of Agency Action: Symbolic Response Hypothesis

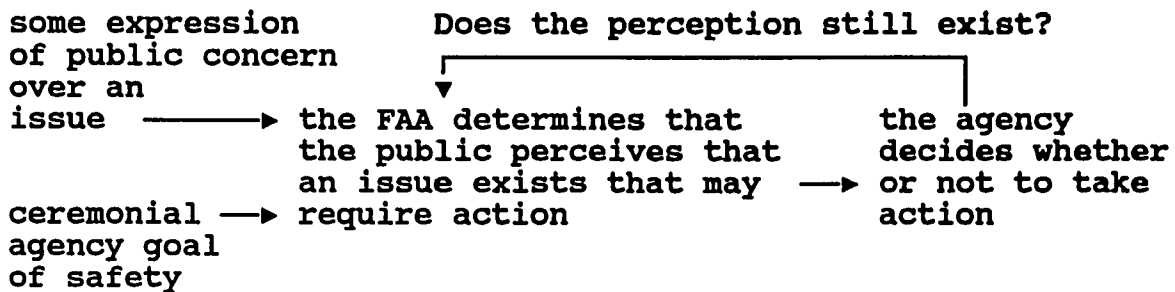


Figure 4.3: Flow Chart of Agency Action: Multiple Patron/Client Hypothesis

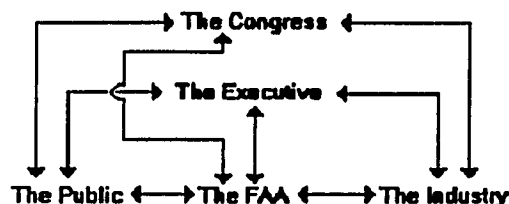


Figure 4.3a: Relationships in the Multiple Patron/Client Hypothesis

The FAA: regulates the aviation industry, thus has the ability to control the flight environment (i.e., the industry); also, acts as a technical clearinghouse, and provides air traffic and meteorological services for the industry. Also has the ability to influence the technical discourse upon which the public and Congress base perceptions of the flight environment.

The Executive: has direct statutory control over the FAA through the DOT. Appoints agency's two top officials.

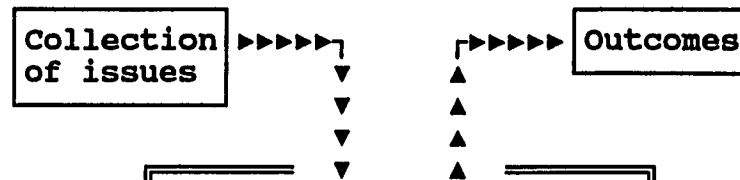
The Congress: controls the FAA's finances; also, has oversight authority over the agency. Is subject to lobbying and electoral pressure from both the industry and the public, who may have contradictory interests, and thus may be in a position to force the FAA into either more or less action on any given issue.

The public: elects the President and the Congress; thus, via Congress and President has influence over the FAA; as consumers from industry, has the power of not purchasing airline tickets if the industry is deemed unsafe (although alternative transportation is poorly equipped to compete with the airlines).

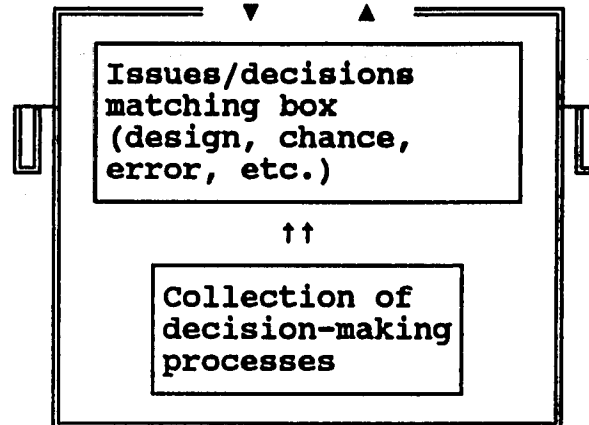
The industry: has influence through lobbying over the executive, the Congress, and the agency; also, as expert in the field advises agency on legal and technical matters. Has a near monopoly in the United States on inter-city travel, especially over 100 miles.

Figure 4.4: Input/output flow of issues/decisions: the Organizational Garbage Can

The Outside:



The Agency:



CHAPTER FIVE, DECISIONS: THE FOUNDATION FOR THE RESEARCH

The Decision List: The Population of Decisions

A "Population of Decisions" is best defined as actions, conscious lacks of action, new policies and old policies left unchanged, all undertaken, proposed, or maintained by an agency. These decisions may be internally generated or thrust upon it from outside. For the analysis, I initially considered decision-making processes that fit an a-priori assumption of mine that they represented important theoretical issues. This a-priori assumption was based on my conclusion that certain decision processes would be illustrative to the main points raised in the preceding chapters and would involve key players in the FAA and the aviation community. Specifically, these decision processes would demonstrate elements of the four ideal-types of goal determination processes and illustrate the organization's manifestations of the three ideal-types of organization structure.

With this in mind, I began my review of the first decision process. In the course of very preliminary investigation of that case, another issue meeting my a-priori assumptions of relevance became apparent when an informant said, "this is going to be important." As a result of research concerning the second issue, a third issue of which I was only slightly aware appeared to be having a significant impact on the organization. At this

same time, an old issue also appeared to still be relevant in the life of the FAA. At this point, with four cases in hand, it seemed that the decision list was whole.

My initial decision was clearly safety related. This was the process of revising regulations concerning licensing and continued qualification to fly. This was centered clearly on issues of safety and the related impact on the industry. During this research my attention was called to the straightline reporting reorganization by several FAA staff. I was told that this would have a significant impact on how the FAA functioned, in particular that it would change long-standing lines of authority within the organization. Within certain units of the FAA these lines of authority had a considerable history, and such a reorganization might have a significant impact on their function. As these branches included units with direct authority over flight operations, it was apparent that a tie-in to safety might exist, and how this reorganization was implemented would be of significant importance to matters of flight safety. Along with this reorganization was another reorganization of sorts, the compliance of the agency with an Executive Order mandating cost analysis of rules. Such a quantification of benefit would have a significant impact on rulemaking, and it would also have a significant impact on the historical perception of safety within the agency. Finally, an issue that was often raised

-- and not because I asked about it -- was the issue of the DC-10 aircraft certification. These four issues constitute the case studies.

Goals and Structures

Applying Ideal Types to the Real World

The systematic models of how organizations exist -- rational, natural, open systems -- are, like Weber's model of bureaucracy, ideal types that will not exist in the real world in the exact form described. Likewise, my models of goal determination -- objective response, symbolic response, multiple patron-client, garbage can -- are ideal types. Applying ideal types to the conditions at work in the agency is an exercise in combining forms and deconstructing actions, for these processes and structures will likely not exist uniquely but in combination with each other. One of the elements for examination in this study is to understand when in the decision-making process, under what conditions and to what extent elements of each model of goal formation are evident. In the following sections of this chapter, each case study will be examined in some detail to describe what it was or is, to explain why it was selected, and finally to link it to the assumptions of relevance and to the theoretical framework.

All of the decisions relate to the issue of flight safety, especially if one wants to define flight safety as any safety consequence occurring at any point downstream

from a decision. Agency decisions occur in this milieu. For example, in somewhat simplified terms, a flight safety issue may be constructed around the question of whether flight safety is ultimately enhanced if the local Flight Standards Office reports to the Regional Director or if it reports to the Flight Standards Service in Washington. This issue of administration and paper work stretches the common-sense definition of flight safety. There is no question that an unrestrained child hitting a bulkhead in an emergency landing is a safety issue, but who reviews and processes paperwork appears to be a more abstract issue. Nonetheless, such issues are included in this review because the content of a flight safety decision is strongly impacted by who it is that makes the decision.

Some decisions were hard to pinpoint. Sometimes informants did not so much describe a decision as they described a decision-making idea. For instance, when somebody said, we do it this way but that other office does it another way, it should be taken as an overall description of the thinking process that takes place in a specific organizational location. Thus, the need to be as broad and flexible as possible in selecting "decisions" became apparent as the fieldwork made evident the complexities of the issues being faced.

Relating the Goals to the Organizational Models

In preceding chapters, the rational, natural, and open systems models or organizations and their relationship to the four ideal-types of goal processes has been described. The objective-response goal can be related to both the rational and natural systems. Both of these models will produce a type of ordered behavior in response to an objective issue. The open system model, with external forces coming to bear on the organization, forms the foundation for both the symbolic-response and the multiple patron-client goals. These are both predicated on the organization's directing its response to external forces, either in performing legitimating functions for outside consumption or to maintain critical resources in a matrix of organizations. Finally, the organization garbage can is a combination of all three systems. The interactions upon which the garbage can is predicated can be related to natural systems, which is similar in concept to collegials and organizational anarchies staffed by professionals. However, the garbage can is also a residual process that will take effect in rational systems when goals, procedures, or staffing are uncertain or a crisis is at hand. These uncertainties may be the result of external forces, which can be explained by the open system model.

As stated earlier, organizational structures, goals, and processes are related. Structures blend together, and

processes are intertwined. The key issue is when and under what circumstances are the various goals operationalized, and under what circumstances is it most useful to classify the organization according to each of the three structural models.

What to Study: The Key Decisions

If I were to state that FAA decisions do not happen in a vacuum, as there is an interacting population of causes and effects, most readers would say "that's obvious." In addition to my awareness of interactions, when I approached this research I knew three other things as well. First I was aware that policies that may seem well intentioned or at least benign, functionally bland or intellectually unexciting -- but not political -- may become very political. Secondly, I knew that was when things appear to work well they are not always working just the way everybody wants them to work. Finally, objectives and procedures may seem to be changed but then still be the same.

Each of the key decision processes will now be described. The description will include the following: first a summary statement of the fundamental question of the issue; second an overview of the action, what its origins were (internally or externally generated), and to which of the FAA's formal goals it was directed (flight safety, industry, or both); third what it is that this says about the FAA, and its link to the overall theoretical framework

of the study; and finally its links to the four goals to which the agency may potentially be responding (objective response, symbolic response, multiple patron-climate, garbage can). In the context of linking the case to the four potential goals a brief description of how each of the four goals could provide an explanation for the decision process is provided. These potential rationales will be examined and then accepted or dismissed in the particular case study chapters.

General Thoughts on the Decisions

If everything that the FAA does may be defined as the "population of decisions" then the "decisions" described here are the ones that stand out from the others. They have been specifically selected as being important with respect to critical areas of research. My formal justification for making these the core of the research is that each of these cases examines how the organization has operationalized a goal and produced a decision through an internal process. Further, these processes demonstrate how various models of goal-setting and decision-making mechanisms come into play under various conditions. Each of these decisions has been driven at least in part by external mandates of one form or another.

Each of these has played out in ways that I find intriguing, both with regards to my instincts as a pilot (though not necessarily as a small business person) and with

regards to my instincts as a sociologist. As a pilot, I was long convinced that the driving goals of the FAA were defined by fellow pilots. Locating this as a sociologist led me to theories of collegial organization, but I was not able to define FAA processes of power and interest-group influence in terms of collegial administrative processes: indeed, as an ideal type, collegial administration and power politics are contradictory forms. Thus, I was faced with paradoxes of explaining why there was both collegiality and power politics, alienation and consensus, existing either perceptually or theoretically side by side.¹²⁹

¹²⁹ Chronologically, I was drawn to each of these case studies in three distinct periods of my life. The first was when I was active in the flying community: along with friends and colleagues the arrival of a notice regarding "recreational pilots" was greeted with much cheer. The second case occurred just after I had argued for decentralization in my masters thesis: I greeted the announcement of the Straightline Reporting with skepticism and concern. During this research, I was exposed to the full extent of the cost-benefit process, and I was reintroduced to the pain still surrounding the DC-10. Much of these insights were based on my "insider" knowledge of the industry as a professional pilot and as a principal in several general aviation concerns providing flight services -- but here two dialectical instincts kick in: my small business person instincts and my Marxist sociologist instincts.

CHAPTER SIX, MAKING RULES: THE RECREATIONAL PILOT/ANNUAL FLIGHT REVIEW RULE-MAKING ACTION

Modifying Pilot Licensing and Recent Experience Rules: The History of the Rule

Pre-History: The 1973 Action

In 1973, the FAA revised pilot licensing and recent experience requirements. This was accomplished by Amendment 61-60 to Title 14 of the Code of Federal Regulations, Part 61, "Certification: Pilots and Flight Instructors."¹³⁰ The revised Part 61 required instrument training, training flights into airports with operating control towers, training flights at night, and the use of radio aids in visual flight navigation for all new pilots.¹³¹ It also required a biennial (that is, once every two years) flight review (BFR) for all pilots. These changes were in keeping with the increasing number of locations requiring air to ground communications, such as Terminal Control Areas that were being implemented at that time. Further, instrument training and the BFR were in keeping with the FAA's efforts to sustain what the FAA cited as an "existing long-term declining trend in accident rates."¹³²

Following the adoption of the revised Part 61 in 1973, pilots who did not wish to participate in the air traffic

¹³⁰ 38 *Federal Register* 3161, 1 February 73.

¹³¹ These licensing requirements, which are the present requirements, were described in detail in Chapter Two (reference 14 CFR 61.107).

¹³² 54 *Federal Register* 13035, 29 March 1989.

control system -- en-route or at airports with control towers -- were still required to spend more time and money in sophisticated aircraft learning about a system they did not intend to use. This made obsolete an entire existing category of training aircraft, and it eliminated the possibility of any new aircraft being used for training that did not meet the revised equipment requirements (many homebuilt aircraft, for example).

In subsequent reports the FAA stated that the 1973 revisions were successful. For example, the following data were cited by the FAA in the proposals to broaden the flight review:

[F]ollowing implementation of the biennial flight review requirement, which became mandatory on November 1, 1974, there was a one time 10 percent decrease in fatal accident rates beyond the existing long-term declining trend in accident rates (i.e., a statistically significant discontinuity was observed in the downward sloping curve of accident rates as a function of time).¹³³

and

the average general aviation accident rate during the 1974-1981 period following implementation of the biennial flight review was 22 percent lower than the accident rate which existed at the beginning of the period[, although this reduction reflects other safety initiatives in addition to the biennial flight review, such as the Pilot Proficiency Program, and includes the general aviation activity of all pilots, not just private pilots[.]¹³⁴

¹³³ 54 *Federal Register* 13035, 29 March 1989.

¹³⁴ 50 *Federal Register* 26294, 25 June 1985.

In addition to those training requirements, the 1973 revision to Part 61 also required the flight review for all pilots. This could be administered by a flight instructor specifically as a BFR or could be credited from a flight test, a flight check as part of a commercial operator's proficiency program, or some other inflight examination. For many pilots -- primarily those commercially employed -- this rule had no effect, as they were already taking flight checks that would fulfill this requirement annually or bi-annually; however, pilots not commercially employed were now covered by a rule requiring a flight review.¹³⁵

The FAA explanation of the decrease in accidents rates is not unreasonable, although it is also not necessarily to be taken at face value. In the above context, it is plainly a political and bureaucratic rationalization of a proposed agency action. Furthermore, it indicates that there are a number of factors at work in lowering the accident rate, including a non-regulatory program, the Pilot Proficiency Program, which is a voluntary program conducted by flight instructors and sponsored by the FAA.

Political motivations notwithstanding, there has never been any debate about a causal relationship between

¹³⁵ For 1991, there were 261,532 pilots holding commercial or airline transport pilot licenses, meaning they potentially could be employed and covered by commercial operators' requirements for currency checks, either six month or annual; there were 293,467 private or recreational pilots, meaning they were precluded from commercial employment and had to comply on their own with the requirements for a flight review.

proficiency training and safety. The guiding principles evident in the recent experience requirements delineated in 14 CFR 61 for all pilots, and further requirements are detailed in sections such as 14 CFR 121 and 135 for air carrier and other commercial flight operations, is that pilots are supposed to be trained and ought to remember what they have been taught. If necessary, they should be able to demonstrate that they remember what they have been taught through a flight check.

Despite the acceptance of the need for some type of testing of pilot proficiency, there is circumstantial evidence that there were serious unintended consequences of the 1973 revisions. There was a considerable decrease in both the number of new pilot licenses issued and in the total number of pilots. In the past decade alone, the number of licensed pilots overall has decreased by 9.4%.¹³⁶ For student pilots this trend was even more striking: in 1980 the number of student pilots was 210,000, dropping to 103,583 in 1993, a decline of 50.7%.¹³⁷

¹³⁶ From 1981 to 1991, total licenses decreased from 764,182 to 692,095 (Aircraft Owners and Pilots Association [AOPA], *AOPA's 1993 Aviation Fact Card*). For 1993, the total number of certificates held was 665,062 (AOPA, *AOPA's 1995 Aviation Fact Card*).

¹³⁷ Federal Aviation Administration, *FAA Aviation Forecasts, Fiscal Years 1993-2004* (Washington, D.C.: Superintendent of Documents, 1993), p. V-2, and (Aircraft Owners and Pilots Association [AOPA], *AOPA's 1995 Aviation Fact Card*). The number of student pilots was 180,000 in 1982, the year of the NAFI proposal; 150,000 in 1985, the year of
(continued...)

Further, during this period when licenses were declining, light aircraft manufacturing virtually ceased. There was an 89.2% decrease in new aircraft production from 1981 to 1991.¹³⁸ In particular, sales of piston general-aviation aircraft -- the type most likely used by the class of pilots affected by the 1973 rule change -- declined 96.9%.¹³⁹ The general aviation manufacturers never indicated that this decline was associated with a decrease in student starts. In fact, they argued that onerous tort laws had forced the costs of liability insurance to such high levels that the price of new aircraft was beyond the reach of buyers.¹⁴⁰ Indeed, two- and four-seat training aircraft reached the \$50,000 to \$100,000 price range in the 1970s. Whether or not the manufacturers

¹³⁷(...continued)
the FAA's NPRM; and 125,000 in 1992, at which point the FAA had deferred compliance with the provisions of the Annual Flight Review.

¹³⁸ Aircraft Owners and Pilots Association [AOPA], *AOPA's 1993 Aviation Fact Card*: shipments fell from 9,457 to 1,021.

¹³⁹ Federal Aviation Administration, *Aviation Forecasts*, p. V-14: production fell from 17,032 in 1978 to 526 in 1992; the 1994 production was only 337 airplanes. Ironically, although the overall 1994 production including jets and turboprops of 928 airplanes was the lowest ever -- down 3.7% from 1993 and 95% since 1978 -- the net billings for those aircraft was the highest since 1981, totally \$2.35 billion ("Ratheon, Piper Fare Best in 1994 Piston Market," in *AOPA Pilot* [April, 1995], p. 26).

¹⁴⁰ In 1995 Congress passed, and the President signed, the General Aviation Revitalization Act limiting product liability in the general aviation industry to 18 years. Cessna is apparently to resume production of its 172 model in 1996, but pricing of the airplane is not yet determined.

argument on tort reform is to be taken at face value, it is also possible that the high costs of new training aircraft may have driven student and private pilots out of the market, especially those with the most limited resources and, therefore, the least ability to obtain proficiency training. Thus it may have been that the reason the accident rate dropped in the period following the 1973 rule change was not that pilots became more proficient but that a group of non-proficient pilots were being nudged from the skies. In light of its mandate to promote aviation these trends for pilots licenses and aircraft production disturbed FAA officials, who termed licensing requirements a burden, and presented a situation that was ripe for some remedial action.¹⁴¹

The Beginning: The 1982 Petition

The 1973 requirement to include instrument and radio training in the private pilot curriculum mandated more items to be covered for the license and necessitated a certain level of aircraft equipment that had not existed previously.

¹⁴¹ As later stated by the FAA, "The changes in training requirements have made the private pilot certificate increasing difficult and expensive to earn. . . . Neither the aircraft [many] pilots operate nor the environment in which they fly warrant training in radio equipment or instrument navigation. . . . Under the proposed rule, although pilots who are engaged in sport and recreational flying would have to demonstrate a level of competency consisted with operations within the national airspace system, they would not be burdened by the additional certification requirements of the private pilot who flies in a more complex environment." 50 *Federal Register* 26287, 25 June 1985.

This increased the cost of flight training as it required a longer curriculum and a more expensive aircraft. These rules had created a need for instrument and radio work in preparation for a pilot license for pilots who specifically had no intention of using those skills.

In the early 1980s, in relief of those requirements, the FAA was petitioned for rulemaking to create a new category of pilot license, recreational pilot. The proposal to create the recreational pilot license along with other revisions to Part 61 came from the National Association of Flight Instructors (NAFI) in a "Petition for Rulemaking" dated 9 February 1982 as a revision of 14 CFR 61 (Certification of Pilots and Flight Instructors).¹⁴² The NAFI petition was submitted to the FAA under provisions governing the amendment of the Code of Federal Regulations, as noted in Chapter One. At the time of the NAFI petition, the FAA had already been approached by the Aircraft Owners and Pilots Association (AOPA) to revise Part 61, but AOPA deferred to NAFI with the submission of their petition.¹⁴³

¹⁴² Published in 47 *Federal Register* 11026-11034, 15 March 1982; the proposal itself was dated (as written to the FAA) 9 February 1982, and was published verbatim. As this petition formed the basis for the rule-making action, this is taken as beginning of the formal process.

¹⁴³ Interview No. 49, with staff at the AOPA Air Safety Foundation who had been involved with the preparation of the AOPA response to the Annual Flight Review rule-making. This person stated that AOPA had submitted a proposal to the FAA, but with the formal submission of the NAFI petition for rulemaking the AOPA had withdrawn its proposal in favor of the (continued...)

There is neither any formal record nor anecdotal evidence indicating why NAFI became the representative of the general aviation industry in this regard.

In an effort to revive flight training, NAFI proposed to make it easier to get a pilot license by creating a grade of license that would require less training than the post-1973 private pilot license required. They argued that such an exception could be made by clearly defining the groups to which it would be applied. The NAFI petition requested the creation of a grade of pilot license with less stringent training requirements than those of the present private pilot, to be called recreational pilot. Financial considerations were a principal element of this petition; however, care was also taken to insure that an unsafe pilot would not be introduced into the system by carefully defining the terms of what was desired. What was proposed was a shortened, less complex course of instruction for those not desiring to exercise the full limits of privilege granted by the private pilots license.

To develop its position NAFI formed a so-called "blue ribbon" committee to draft a rule. Anybody can form a committee and call it whatever they wish. And anybody can submit a petition for rulemaking to the FAA. Without formal

¹⁴³(...continued)
NAFI petition. He did not indicate that there had been any coordination between AOPA and NAFI prior to the submission, although NAFI indicates that the AOPA Air Safety Foundation was represented on its committee writing the petition.

process, NAFI had put together a committee to draft a rule. This committee happened to represent a part of the aviation community with an interest in general aviation operations or in flight training. It included three universities with established aviation programs (North Dakota, Illinois, and Auburn), a nationally known pilot school that functions like a university (Embry-Riddle), a large pilot school specializing in advanced training (Instrument Flight Training), and a unit of the FAA itself (not one that would be involved in the writing or implementation of the rule itself). These institutions represented a fairly high-end academic approach to flight training, and their recommendations would most likely be well respected in the industry. It is interesting to note that NAFI never explained how it formulated the committee or any of history of the committee.¹⁴⁴ It was the work of this committee that was submitted to the FAA as the Petition for Rule Making.

The NAFI petition stated that

The last major change to the pilot certification rules in Federal Aviation Regulations (FAR) Part 61 was completed in 1973 . . . the result of over 7 years of development[.] . . .

¹⁴⁴ The members of the committee were listed as the University of North Dakota, University of Illinois, Flying Magazine, Embry-Riddle Aeronautical University, Auburn University, AOPA Air Safety Foundation, and Instrument Flight Training, Minneapolis, and Office of Flight Operations, FAA (50 Federal Register 26286, 25 June 1985).

The adoption of revised Part 61, with its requirements for instrument training, flights into airports with operating control towers and the use of radio for VFR navigation, virtually eliminated the use of airplanes such as the Piper J-3, Aeronca 7AC, Taylorcraft BC-12D or a homebuilt airplane as a trainer. These rules, therefore, required the individual to learn to fly in a more complicated airplane even though his/her ultimate goal was to fly and carry a passenger in a noncomplex airplane. The added time in flight necessary to acquire the aeronautical knowledge and skills to pass the flight test has placed the private pilot certificate out of the financial reach of many persons . . . While the minimum required flight time . . . has remained at the 40-hour level (a flight time that was established in the '30s), by the late '70s the average flight time to acquire the certificate exceeded 66 hours because of the added requirements.

There is a need to provide a level of pilot certificate for those persons who desire to fly and carry a passenger in a relatively simple class of airplane and who would not object to certain limitations . . .¹⁴⁵

This stated the problem as NAFI saw it and their proposed solution. As noted earlier, the number of student pilots was dropping dramatically. Costs were too high for the industry to function. NAFI stated that "The added time in flight necessary to acquire the aeronautical knowledge and skills to pass the flight test has placed the private pilot certificate out of the financial reach of many persons[.]"¹⁴⁶ Thus, the decline in student starts is being ascribed to the 1973 rule change. Not mentioned here (or anywhere else) was that aircraft production had

¹⁴⁵ 47 Federal Register 11027, 15 March 1982.

¹⁴⁶ 47 Federal Register 11027, 15 March 1982.

virtually halted: this was not a part of the NAFI project and had not been identified as an issue. Ironically, in explaining a solution to one problem the above excerpt also shows the roots of another problem: the proposal indicates a need to return to older planes for instruction. Were this to come to pass, the production of new trainers would likely be affected. Of course, without new students, there would be no new trainers either. In either case, the manufacturers to not profit from this.

To address the issue of student starts in particular NAFI stated in their summary that "the new rule would permit the issuance of a . . . Recreational . . . Pilot Certificate."¹⁴⁷ NAFI submitted this proposal as a general revision of Part 61 with emphasis on the licensing and currency requirements for entry level pilots. As a general revision, it included proposals for changes to Part 61 beyond recreational pilot. Among them was a requirement for an annual flight review (AFR) for pilots not holding at least a commercial pilot license or having 400 hours total time.

NAFI stated that "A review of private pilot accidents has shown that there has been an inordinate number of accidents by pilots who have logged less than 400

¹⁴⁷ 47 Federal Register 11027, 15 March 1982.

hours."¹⁴⁸ This statement, like the FAA's statement above concerning the 1973 revisions, is a political and bureaucratic rationalization of a proposed action, and it fails to consider many critical factors. Table 1.9 shows that 35% of accidents occurred with pilots who have less than 400 hours, and Table 1.8 shows that private pilots have 48% of all accidents. However, the statement that this is an "inordinate number of accidents" is imprecise, and in fact it is no more documentable now than it was then.¹⁴⁹ Table 1.9.2 indicates that while, by 100 hour increments, there are more accidents per increment below 400 hours than below, the number of accidents per 100 hour increment remains above two percent up to 1000 hours. Had NAFI picked this latter number as its cutoff, it would cover over half the population of pilots having accidents, as the median flight experience for pilots having accidents is 900 hours.

Also included in the NAFI petition is the concept of "training and testing to a standard." This concept of licensing relies on minimum proficiency requirements based

¹⁴⁸ 47 *Federal Register* 11029. Nobody with whom I have ever spoken has known where this came from.

¹⁴⁹ For example, it is not clear that 35% of all pilots do not have less than 400 hours -- they may but that figure cannot be discussed because neither the FAA nor anybody else has that data. And in fact 42% of all licenses are private pilots, which is not an "inordinate" difference from the 48% of accidents. Commercial pilots actually have a higher accident rate based on the number of commercial license than do private pilots, and the time estimates in Table 2.3 indicate that the average flight time for commercial pilots is well over 400 hours.

on a number of flights and specific training requirements.¹⁵⁰ This entails abandoning minimum flight time requirements as a key indicator of when a pilot is ready to be licensed. Potentially, it could lower the number of hours necessary for a license if a student met the proficiency standards. The NAFI petition stated that "specific minimum flight times are not described nor are arbitrary milages specified for cross country legs. . . . There is also a requirement for the student to pass a pre-solo written test . . ."¹⁵¹ On this last point, although it was never argued outright, NAFI was offering a stricter requirement for solo flight in exchange for training to a standard.

Although the NAFI proposal was heavily biased for flight instructors, it had benefits for the general aviation industry. For flight instructors it created a larger pool of potential students, reorganized training in a way that was central to instruction, and doubled the frequency with which those pilots who were customers of flight instructors would have to take flight reviews.¹⁵² For individual pilots, particularly for students who did not wish to move

¹⁵⁰ 50 *Federal Register* 26287.

¹⁵¹ 47 *Federal Register* 11027, 15 March 1982.

¹⁵² This is not unreasonable for an organization purporting to represent flight instructors, but the FAA never commented on such apparent self-interest in their subsequent comments on the petition that were to appear in their own NPRM.

up to instrument flying or engage in cross country flying, licensing of recreational pilots provided an inexpensive way to fly in an older aircraft, a homebuilt, or an antique. Increasing this pool of pilots would potentially channel money into various segments of general aviation, including fixed base operators selling fuel, tie-downs, and hanger space; mechanics; and other suppliers of services to these people.

The FAA's Formal Proposal: The 1985 NPRM

The Context in which the FAA Takes Action: Why did the FAA accept the NAFI position and identify the need for recreational pilot as a legitimate problem for action? The answer to that question is complex and suggests that the FAA's response was a product of its own internal processes, which go beyond the formally defined rulemaking apparatus and address issues much broader than proficiency requirements.

For example, during interviews at several stages of the research, subjects stressed the FAA's need to be responsive to industry input.¹⁵³ One person, at the Washington headquarters, noted that "there was a large segment of the

¹⁵³ Ultimately in this action there would be a great deal of input from the industry. That input would be a major force in shaping the outcome. Oddly, the light aircraft industry was not now and would not later become a player in this proceeding; as noted earlier, the light aircraft would become a player in a proceeding of its own, the limiting of product liability, which they blamed for causing prohibitively high insurance.

aviation community pushing for this thing for a long time" (long time being the time period after the initial rule change in 1973).¹⁵⁴ This person indicated that the FAA was responding to a segment of the industry that had a legitimate desire for a new class of pilot license outside the existing rule structure, and continued on to mention the following:

airspace is considered free and public,
and anyone who wants to fly can fly;

a group who only wanted to fly on
weekends around the pattern was pushing
the recreational pilot idea;

one of the FAA's objectives is to decide
how to license these people and fit them
into the existing system.

The group in question that wanted to "fly on weekends around the pattern" referred to the class of pilots who would be considered hobbyists. Stereotypically, these pilots would have non-aviation jobs during the week and fly on weekends. The reference to around the pattern indicates that the pilots intended to fly in the immediate vicinity of an airport, pretty much without cross-country flying of any kind. These pilots would often be flying from small

¹⁵⁴ Interview No. 2. This person was in the unit that was responsible for writing the preliminary drafts of rules, and was listed as the contact person for the NPRM in the *Federal Register*. As such, he was the person who was the "point person" for the FAA on the rule. This makes the information obtained biased, in that this can be a party line. However, this is not an unreasonable person from which to get this information on the rule as a participant in its development.

airports without radio facilities. Their planes would be older and less well equipped than the most basic new trainers then being produced. As a base of knowledge, they would not require training in instrument flying, cross-country navigation, or radio communications as their aircraft would often have none of this equipment. Key lobby groups for these pilots would be the Experimental Aircraft Association (EAA), composed of homebuilders, the Antique Aircraft Association, composed of owners and devotees of older aircraft, and AOPA, the general aviation industry's overall lobby.

That series of thoughts was concluded by saying the FAA has to listen and respond to the aviation community. Interestingly, this point comes from the same person who stated that the industry built the FAA bureaucracy, thus when the FAA needs guidance it turns to the industry for writing rules. This is indeed as it happened with recreational pilot, where "the industry," in this case an industry group representing the flight instruction community, wrote a rule. If a single person writes a letter requesting a rule, it may be considered idiosyncratic and would indeed probably not be "listened to." However, coming from a group in the industry lends legitimacy, and those comments receive a better hearing from the agency. The interviewee's comment that the agency has to listen is operative within certain limits, and those limits have to do

with balancing the FAA's constituencies, which include groups or corporate entities with the power to influence Congress.

Two comments cast additional light on this. While legally corporations and lobbies have no formal standing with the FAA, as a practical matter many of these organizations have dedicated staff who are in legal or research capacities and can present persuasive arguments to the FAA. Also, some of these corporations are major players in the U.S. economy, which enhances their standing with governmental entities. For example, during an interview with an Associate Administrator, a hypothetical situation was described. I suggested that Congress may attempt to protect the domestic jet engine industry (General Electric, Pratt and Whitney [a division of United Technologies]) by specifying in law that all over-water operations are restricted to at least three engine aircraft. He said, pointing to a model of the twin-engine Boeing 777, that such a law would "destroy that company," and that the FAA would do its best to oppose it.¹⁵⁵

Alternatively, as noted in Chapter One, an individual at the FAA reportedly told an AOPA representative the

¹⁵⁵ Interview No. 31, an Associate Administrator, who was interviewed in the course of the interviews at FAA headquarters. This person spoke on a wide range of topics, including the FAA's role in advocating before Congress and in interpreting laws passed by Congress in preparation for appropriate rules to be written.

following rationalization. It was reportedly stated that a form letter received from an individual, or a comment from a lobby such as AOPA, is considered by the FAA as one single comment from one commenter -- one vote; a letter from an individual, sent as a personal letter and not as a form letter, equals 20,000 votes. Response from an individual therefore may carry considerably more weight than a response from an industry lobby.¹⁵⁶

I was also told that occasionally the FAA over-reacts and where possible -- if aware that such is happening -- should guard against this.¹⁵⁷ An example of measuring necessary against overreaction that was suggested had to do with atmospheric ozone depletion due to high altitude jet aircraft emissions. This person stated that a causal relationship could not be proven, so the FAA did not see a legitimate reason for action limiting such flight (i.e., the FAA not overreacting); however, a causal relationship could not be disproven either, so the Dutch government did see a legitimate reason for action to not permit such flight. He noted that the Dutch position had global implications, as an

¹⁵⁶ Stated at AOPA Air Safety Foundation, Flight Instructor Refresher Clinic, East Hartford, Conn., October 1995.

¹⁵⁷ Interview No. 22, the Deputy Director of Aviation Policy, Plans, and International Aviation. This interview was conducted during the interviews at FAA headquarters. The person was commenting on the FAA's overall process of generating new rules, and was indicating that not all rules meet an exact test of cost and benefit or of direct need.

international convention on such flight was in the balance. Another area he said was prone to overreaction was when the FAA makes policies in a response to the National Transportation Safety Board (NTSB). At times like that he said the FAA is amenable to rules changes that are not directly related to issues of flight safety. This does not mean that the rule is counter to safety; it just means that the rule is enacted in response to issues that are themselves not fundamentally related to safety or not clearly causally related. Issues of the FAA and the NTSB have their own organizational history, which is explored in greater detail in Chapter Ten on the DC-10. Given this rationale, recreational pilot may have appeared to be an appropriate for an overreaction.

The NPRM The NAFI petition was the foundation for a Notice of Proposed Rule Making (NPRM). It was signed on 4 October 1984 and published in the *Federal Register* on 25 June 1985.¹⁵⁸ The FAA's proposal continued the direction in which the NAFI petition had started. The NAFI petition was a fundamental revision to Part 61, and thus included a number of revisions that were not necessarily related. It included new standards for judging pilot curriculums and competency. As summarized in the NPRM,

¹⁵⁸ 50 *Federal Register* 26286 ff, 25 June 1985.

Based on the NAFI petition . . . the proposed rulemaking would significantly amend Part 61 of the current regulations by -- (1) Adding certification categories for student recreational and recreational pilots; (2) Formalizing and emphasizing the concept of training and testing to a standard or level of proficiency for all types of recreational and private pilot certificates; and (3) Adding review and training requirements for all types of recreational and private pilot certificates.¹⁵⁹

Concerning the recreational pilot license, the FAA stated in the NPRM that it was accepting the argument that not all pilots are involved in flight activities that warranted the increased training requirements associated with the private pilot license:

The certification rules contained in Part 61 have been amended over the years to accommodate advances in aviation technology and the increasing complexities of operating aircraft in the national airspace system. These changes in the aviation environment have created additional aircraft equipment needs and training requirements for the pilot. The changes in training requirements have made the private pilot certificate increasingly difficult and expensive to earn.

Overlooked in the revised training procedures are the simpler operations, in less complicated aviation environments, that comprise a large segment of aviation activity known as sport and recreational pilots. Aviation has become technologically more complex, but not for approximately 28,000 pilots who operate simple aircraft without communication equipment . . . [who] fly without air traffic control facilities or radio communications capability. . . . Their range of operations is typically too limited to

¹⁵⁹ 50 *Federal Register* 26287, 25 June 1985.

benefit from the current private pilot training requirements.¹⁶⁰

Therefore, according to the FAA's reasoning, flight safety would not be compromised by permitting this group of pilots to receive a license with a lower level of flight training. The FAA has set forth a logical rationale in the NPRM for accepting the NAFI position, and is using that as the argument that it is not a compromise of safety to lower standards in this particular instance. On the face of it this is a plausible explanation; further, the FAA is publicly second-guessing itself, stating that it had overlooked a segment of the aviation community, an issue which it now intends to redress.

In this regard the NPRM was in fact the NAFI petition and not a disguised effort to maintain the status quo. By supporting the NAFI committee's recommendations, the FAA went beyond a return to the pre-1973 circumstances and opened aviation to pilots in a way that would not have complied with the 1973 rules. The licensing of recreational pilots opened new vistas of aviation to the public, and, although it represented regulation of the industry in the form of a new rule structure around recreational pilots, it also resurrected a type of flying that had not existed for decades.

¹⁶⁰ 50 *Federal Register* 26287, 25 June 1985.

The FAA stated that it accepted NAFI's assertion that pilots with less experience were having a disproportionately high number of accidents. For the purpose of identifying "less" experience, the FAA agreed with NAFI's basic criteria of the flight time of 400 hours and the pilot with a license grade below that of commercial pilot or not having an instrument rating:

[T]he [NAFI] committee decided that the usually high number of accidents involving pilots with less than 400 flight hours could be reduced by requiring a flight review every 12 months for this pilot population.

[T]he NAFI petition proposed annual review requirements for pilots with less than 400 hours of flight time because private pilot accident statistics show an inordinate number of accidents for pilots in this category. . . .

Private and recreational pilots with less than 400 flight hours (except private pilots holding an instrument rating) will be required to accomplish a flight review annually instead of biennially as now required for all pilots in command.¹⁶¹

Pilots not meeting one of the requirements of holding a commercial pilot license or having at least 400 hours flight time or having an instrument rating -- the latter FAA's addition to the NAFI criteria -- would have to take the AFR. This would require those pilots the FAA identified as most at risk to be evaluated twice as often as the BFR rule required.

¹⁶¹ 50 Federal Register 26286, 26290, 26294, 25 June 1985.

The FAA stated that they were adding the instrument rating to the NAFI criteria "because they have been tested and found competent in an operational environment that is more difficult than that on non-instrument rated pilots." This reasoning is consistent with the FAA policy already noted of encouraging pilots to take instrument training and obtain an instrument rating. It dovetails with their desire to have pilots competent in the expanding environment of air-ground communications and to increase their flight training.

Response to the NPRM What followed was opposition from general aviation lobby groups, particularly the AOPA and the EAA. The EAA mounted a letter writing campaign during the NPRM period against the proposal.¹⁶² Much of the EAA input came in the form of form letters from members. These letters explicitly opposed the creation of the recreational pilot license and the AFR requirement, and also opposed the use of the single rule-making action to do both.¹⁶³

I was initially surprised by the industry's opposition. Having been actively involved in flight instruction, I had assumed this proposal would be well received in general aviation quarters. The change promised to reverse the

¹⁶² The FAA does not explain this response in the preamble to the final rule, but research at FAA headquarters, where the docket was examined, developed this fact.

¹⁶³ As was indicated in the rule docket, noted above.

precipitous decline in student training. Apparently I had missed the feelings of "the industry" -- "the industry" meaning the most vocal of the opposing lobby groups, the EAA, although other groups such as AOPA were also in opposition. It was not until months later that I settled in my own mind what was happening, when I developed a critique separating the two aspects of the rule making proceeding, the revision to pilot certification and the revision to flight-review requirements. At this point I became convinced that the general aviation lobby chose to oppose the Part 61 revisions based on the AFR rather than support them based on recreational pilot licensing. This is a reasonable explanation. While the general aviation lobbies seeking to expand flight instruction were focusing on recreational pilot, not the AFR, the non-instructional lobbies such as EAA were not in favor of the AFR, opposed it outright, and did not support recreational pilot. A plausible response to the NPRM was to pursue the separation of the two issues as a matter of procedure, and this was in fact one of the courses of action pursued. Had this occurred at this point, with, for example, a second round of comments on separate NPRMS, opposition or support could have been more focused. The FAA's decision to tie these issues together was an impediment to such focused comments.

The EAA made its opposition known not only through the formal rule-making process where public comments are invited

but also directly to the Congress. The rule docket contained Congressional inquiries made at the behest of constituents opposed to the rule.¹⁶⁴ These were uniformly very polite and conformed to a similar format: on Congressional letterhead they stated that a constituent had raised the issue, that the Congress-person shared the constituent's concern, and would the FAA explain the matter. The FAA never made mention of the Congressional inquiries, so formally their impact is not quantifiable. While I did not have the opportunity to read these responses, which are not part of the public record on the rule, I was informed that the FAA responded to the Congressional inquiries by explaining why the proposal was in the best interests of the industry and of safety, as was later described formally in the final rule published in the *Federal Register*.¹⁶⁵

The Final Rule is Published: 1989

The FAA Analyzes the Comments In 1989 the FAA published a Final Rule. In the rule document the FAA stated that there were 2,881 comments received. Of that number, "more than 1,300 commenters oppose[d] the [AFR], while only

¹⁶⁴ This is in the comments kept at the Chief Counsel's office during the certification period. Congressional inquiries are kept here along with other comments on the proceedings. In my reading of the comments, I came across several Congressionals, all questioning the NPRM at the urging of constituents.

¹⁶⁵ One may wish to speculate that one reason to oppose an NPRM with Congressionals is to harass the organization, but nobody ever suggested this.

84 favor[ed] it."¹⁶⁶ The FAA further reported that 1537 commentors opposed using a single rule-making action to both modify the general pilot requirements in Part 61 and to establish recreational pilots.¹⁶⁷ The FAA also reported that many of the opposing comments were on the restrictions placed on the recreational pilots' various operations.¹⁶⁸ Additionally, some of the commenters took aim at the entire rule and opposed the action based on what they said would be "unsafety" of the potentially undertrained recreational pilots, and some claimed that the FAA was taking away the public's right to use the airspace.¹⁶⁹ Although these comments on the public's right to use the airspace were relatively rare in the total body of comments, they are not unlike the previously quoted statement from an FAA official that "airspace is considered free and public, and anyone who wants to fly can fly."

In its formal summary of the comments, the FAA broke the comments it received during the formally defined comment

¹⁶⁶ 54 *Federal Register* 13034, 29 March 1992.

¹⁶⁷ 54 *Federal Register* 13028, 29 March 1989. The FAA does not indicate the number of comments that opposed recreational pilots as a license; rather, it counts comments on specific parts of the rule. However, those overall comments were in the docket, and were a significant number.

¹⁶⁸ 54 *Federal Register* 13031-13032, 29 March 1989.

¹⁶⁹ This was gathered from the comments docket to the rule, on file at the FAA Counsel's office.

period into six pieces. Located in the final rule, it stated that

The issues discussed in these comments fall into six categories. All but the first category of comments relate to the new recreational pilot certificate. The categories are: (1) Changes affecting student and private pilots [i.e., the AFR and the other changes not including recreational pilot], (2) pilot qualifications, (3) aircraft restrictions, (4) operating restrictions, (5) training, and (6) currency requirements.¹⁷⁰

The FAA did not classify comments into a category that was opposing the overall recreational pilot rule or the NPRM in general. As a practical matter this enabled the FAA to avoid the issue of exactly how many comments opposed the entire NPRM.

Some comments opposed the entire license because of one specific part. One example was not requiring recreational pilots to speak English. Under the FAA's summary, that was not opposition to the NPRM or to recreational pilot but instead a comment on pilot qualifications. This particular aspect was opposed 280 to 10.¹⁷¹ The FAA concurred on this point and dropped that provision.

Some comments opposed the entire NPRM in that recreational pilot and overall revisions to Part 61 were unrelated and therefore should not be contained in a single

¹⁷⁰ 54 *Federal Register* 13028, 29 March 1989.

¹⁷¹ 54 *Federal Register* 13030, 29 March 1989.

action. In response to this argument the FAA said that -- for the most part -- it agreed:

The FAA has carefully reviewed these proposed private pilot rules and, with one exception, has decided not to make changes to private pilot requirements in the same rulemaking that establishes a recreational pilot certificate. The one exception is the annual flight review requirement for the non-instrument-rated private pilot who has logged fewer than 400 hours of flight time.

National Transportation Safety Board (NTSB) accident data indicate that pilot accident rates are much higher for pilots with fewer than 400 flight hours than they are for pilots with more than 400 flight hours. The data show a strong correlation between a higher number of total flight hours and lower accident rates. Instrument-rated private pilots have been tested and found competent in an operational environment that is more demanding than that of non-instrument-rated pilots. For this reason, and in the interest of safety, the FAA is adopting the proposal to require non-instrument-rated private pilots, with fewer than 400 hours of flight time, to satisfactorily complete an annual flight review in order to act as pilot-in-command of an aircraft.¹⁷²

It should be noted here, as was noted in Table 1.7, that data on pilot flight time is not collected by the FAA, and the unit that compiles such statistics, the Statistics and Forecasts Branch, Planning Analysis Division, Office of Aviation Policy, Plans, and Management Analysis, will not supply such estimates to the public and says the data does not exist. The statistics cited appear to be no more than the summaries of accident data presented in Table 1.9.1.

¹⁷² 54 *Federal Register* 13029, 29 March 1989.

This data indicated that approximately one third of all accidents were occurring with pilots with less than 400 hours. The correlation described by the FAA does not consider the total numbers of pilots, because nobody knows how many pilots there are with specific hours of experience. This is as the FAA has consistently stated. Thus, any generalizations based on these numbers are serving the cause of carrying a legal, not an empirical, argument.¹⁷³

The point about the validity of the FAA data aside, this response was also noteworthy in that the FAA here states that in the interest of safety it is going ahead with a rule even when response during the formal comment period, both to the proposal itself and to procedural issues around the proposal, was negative. By this action, the FAA demonstrated its formal legal ability to take action that is in opposition to the public comment received during the formal NPRM comment period. Why it would do this is open to speculation. I inferred from the interviews both within the FAA and with outside sources that the FAA had developed a

¹⁷³ It may be noted that as safety is a primary goal not only of the bureaucratic structure of the agency but also of the professional staff, and if pilot time is known to be correlated with accidents, why the FAA does not collect this data is very odd ("known" used in the sense that this is very strongly suspected based on very strong anecdotal evidence). This is a non-decision that, for example, allows the FAA to use data in its legal arguments based on its suppositions about fact.

strong organizational commitment to the AFR.¹⁷⁴ With that commitment, and an institutional mechanism to count the negative responses in such a way as to diminish their apparent strength, the FAA went ahead with the rule to which it had the commitment and implemented it.

Based on the rationale of not including changes to pilot requirements with the recreational pilot action, the provision to eliminate the minimum time requirements for a licensed pilot, recreational or private, set at 40 hours, was lost. This was a minimum established during the 1930s and that has remained unchanged since. Under the NPRM a person with much less flight time could have been licensed. The FAA did not adopt training to a standard, dismissing it by citing comments that the definition of "flights" (as opposed to hours) was too vague and that

[T]he concept of a minimum number of flights is not compatible with the minimum flight hour requirements of other pilot certificates and ratings and with the rules of the International Civil Aviation Organization. By retaining the current concept of minimum flight hours, it will be simpler for the recreational pilot to use the recreational pilot certificate as a building block toward earning a higher grade pilot certificate.¹⁷⁵

¹⁷⁴ Interview No. 41, cited previously, a senior FAA administrator, indicated the FAA had sought this rule; interview no. 49, cited previously, an AOPA staff person, also indicated the appearance of an FAA commitment to this rule.

¹⁷⁵ 54 *Federal Register* 13029.

So without the revision to private pilot requirements the adoption of this provision for recreational pilots would be awkward. The revolution in flight training accountability vanished and flight time remained the criteria.

Ironically, one aspect of recreational pilot licensing that was supported was not implemented specifically because of the comments supporting its implementation. This was self-certification of medical fitness. The FAA reports that

An overwhelming majority of the comments received on this issue favor self-certification. Many of these commenters state that they do not qualify for a third-class medical certificate [the minimum grade medical certificate required for flying powered aircraft] and that they would be able to fly powered aircraft if the rule allowed self-certification. . . .

.
 . . . The intent of a self-certification rule is not to allow medically unqualified pilots to fly aircraft but to save costs for pilots . . . The fact that some commenters to this rulemaking believe that they would be permitted to operate powered aircraft under a self-certification rule, although they are medically disqualified from receiving a third-class medical certificate, weighs heavily against adoption of a rule allowing self-certification.¹⁷⁶

Thus, saying the wrong thing in support of an action can be as damaging to that action as opposing it.

The FAA maintains a mechanism of sorts for interpreting responses, and this may have aided it in interpreting the high volume of negative responses it received on the AFR. As noted above, the FAA does not weigh sponsored or form

¹⁷⁶ 54 *Federal Register* 13030, 29 March 1989.

letters as heavily as it weights individual letters, which can be weighted as up to 20,000 to one in terms of potential votes. With this slight of hand it could even avoid the 15.5:1 ratio of comments opposing the AFR. Utilizing such an interpretive rationalization may have enabled the FAA to process the high opposing ratio of comments into something other than a response that made implementation of the rule politically unfeasible.

The FAA's Cost Analysis of the AFR The FAA presented a quantitative analysis in support of the costs incurred in implementing the AFR. While offered in support of the FAA's position, the analysis was actually required under Executive Order 12291. This Executive Order requires all executive agencies to conduct cost-benefit analyses prior to implementing new or revising current regulations.¹⁷⁷ The study was placed in the Final Rule under the heading "Regulatory Evaluation."

The FAA stated that the AFR would accomplish between a three and five percent reduction in the fatal accident rate (see Table 6.2 for an excerpt of the text of the FAA's analysis). The FAA estimated the cost for each pilot to comply with the annual flight review to be \$81, for a total average annual cost of \$6.4 million. At a three percent reduction this would produce an average reduction of 2.4

¹⁷⁷ The background of this policy and an analysis of it is presented in Chapter Eight.

fatal accidents per year, avoiding an average of 4.8 fatalities per year, which would avoid an annual property damage and injury cost of \$866,000: it would therefore cost \$6.4 million dollars in flight reviews minus \$866,000 in costs avoided, a net of \$5.534 million dollars, or \$1.153 million per fatality avoided. At five percent this would produce an average reduction of 4 fatal accidents per year, avoiding an average of 8 fatalities per year, which would avoid an annual property damage and injury cost of \$1.4 million: it would therefore cost \$6.4 million dollars in flight reviews minus \$1.4 million in costs avoided, a net of \$5.0 million dollars, or \$625,000 per fatality avoided (the FAA rounded this number down to \$620,000).¹⁷⁸ Thus, the cost of implementing the rule would be between \$625,000 and \$1.153 million per fatality avoided. The FAA stated -- without further elaboration -- that this was an acceptable cost.

As was noted above, that data on pilot flight time is not collected by the FAA. Nevertheless, an FAA office developed an estimate of the number of pilots affected by the rule and based their favorable analysis on it. Therefore, deconstructing the data, one may note that the Operation Regulatory Analysis Branch, Regulation and Organizational Analysis Division, Office of Aviation Policy, Plans, and Management Analysis (same Office) assumed the

¹⁷⁸ 54 *Federal Register* 13035, 29 March 1989.

number of 79,000 private pilots subject to the rule. That is \$6.4 million divided by \$81 per flight review equals 79,000 private pilots subject to the rule. This number of pilots is consistent with reasoning that approximately half the private pilots had less than 400 hours, and that about 15% of them (in 1989) held instrument ratings. While the number of private pilots with instrument ratings is obtainable from certificate information that the FAA holds, it does not have the information on flight time. This number, while as reasonable an estimate as anything anybody (the FAA, AOPA, or myself, for example) has ever produced, is -- as the FAA has stated to anybody who has asked them (including the AOPA and myself) -- fundamentally without basis.¹⁷⁹ However, this suggests that approximately 80,000 private pilots would pay this expenditure to save four to eight of their number. Accepting the FAA's best case scenario that it would cost \$620,000 per fatality, this is a direct per pilot cost of \$7.75 per fatality prevented that is not absorbed in the amorphous overall societal savings of casualty costs avoided.

During this time period -- circa 1988 -- after the FAA's draft rule had gone to DOT for review, I was reading the rule docket at the FAA's Chief Counsel's office that dated to the NPRM's formal comment stage, three years

¹⁷⁹ My most recent contact with either the FAA or AOPA concerning this issue was in September of 1995, when AOPA again confirmed that the FAA does not have this information.

earlier. I occasionally asked the persons responsible for the docket what the status of the rule was. These people were quite forthcoming concerning the process that was underway. I was informed that the delay in implementation was not on the part of the FAA but was due to the ongoing review of the rule at the OST. I was told that the DOT's legal staff was reviewing the rule, and was I specifically told that what happened at OST was being held confidential (not a technical term). The extended review at OST was attributed to the degree of controversy the proposal had engendered, including questions from Congressional sources, which I had in fact already read in the comments.¹⁸⁰

Although the OST review is not part of the public record, anecdotal evidence from sources at the FAA indicated that DOT was extremely deliberate and was working in a legal and political manner, not in a manner that was relying on aviation expertise or an analysis of the data. I gathered from this informant that the OST's actions were at least in part a hinderance to the FAA's legitimate action; that the FAA actually wanted the decision to be made sooner and did not welcome the DOT's delays, even though the DOT could ultimately shoulder responsibility for making the tough decision. In effect, the legal and political action of the

¹⁸⁰ Interview No. 12. This was the second person with whom I had become acquainted at the Chief Counsel's Office. The person was a periodic source of information to me concerning the status of the regulation.

DOT was contrasted unfavorably with the action of the FAA. These staff seemed genuinely disturbed that they were prohibited from telling me the final wording of the rule while it was still formally at DOT.

In fact the FAA also had some guidance from the DOT at the outset of this process. The FAA stated in the preamble to the final rule that

The Secretary[of Transportation]'s Safety Review Task Force identified this regulation [AFR] as a significant safety item in its August 1985 report. The Task Force recommended, "That the FAA and the Office of the Secretary of Transportation [OST] cooperate to expedite issuance of the Final Rules or other appropriate follow-up to Notices of Proposed Rulemaking [NPRMs] on recreational and private pilot certification and training[.]"¹⁸¹

This report was only two months after the FAA published the NPRM, which was three years after the NAFI committee produced its petition for rulemaking.

The FAA ultimately implemented both recreational pilot and AFR, stating that it had, with one exception,

. . . decided not to make changes to private pilot requirements . . . The one exception is the annual review requirement for the non-instrument-rated private pilot who has logged fewer than 400 hours flight time.¹⁸²

And to support this they cited accident data from the National Transportation Safety Board (NTSB) indicating that

¹⁸¹ 54 *Federal Register* 13028, 29 March 1989.

¹⁸² 54 *Federal Register* 13029, 29 March 1989.

pilot accident rates are much higher for pilots with fewer than 400 flight hours . . . in the interest of safety, the FAA is adopting the proposal . . .¹⁸³

So the FAA ultimately acted on the aforementioned organizational commitment to the AFR. It cited supporting evidence for its position, including material from the DOT supporting its position. This included reference to the AFR by DOT is significant as it is a possible source of external pressure to implement the rule regardless of public opposition, although nobody at the FAA said so much as "we were forced to." Such external input cannot be ignored, neither by the agency nor the researcher.

The Debate Continues After Enactment

The second phase of the response to AFR took place after the "final rule" was published in the *Federal Register*. The AFR part of the NPRM had not been modified during the comment and review process. It was extensively revisited after its publication as a final rule and beyond the time of its implementation on 31 August 1989. The AOPA and EAA had petitioned the FAA on 22 May 1989 and 25 July 1989 respectively not to implement the AFR. On 30 July 1989, Secretary of Transportation Samuel Skinner met with representatives of EAA and AOPA at the EAA's annual convention in Oshkosh, Wisconsin. At that meeting he

¹⁸³ 54 *Federal Register* 13029, 29 March 1989.

promised that the FAA would review the data presented by FAA as the basis for the AFR. Still there was no action and the AFR took effect under this cloud of debate. In this period, the EAA and the AOPA had become, through no formal process, representatives of the general aviation industry. At this juncture, in 1989, AOPA became the lead in opposition to the AFR as the debate became one between them and the FAA on the quality of the data. During this time, no voices were heard to support the AFR.

The Data Revisited With the AOPA now in the forefront, data was presented to the FAA for reconsideration. The data indicated that while private pilots hold approximately 40% of the licenses issued they account for approximately 48% of accidents, thus the "finding" that private pilots have a disproportionate number of accidents.¹⁸⁴ Other data indicated that pilots involved in accidents hold an instrument rating 40% of the time, while approximately 44% of the pilot population hold an instrument rating, thus the "finding" that instrument-rated pilots had disproportionately fewer accidents.¹⁸⁵ (See details on this figure for instrument ratings in Figure 1.6, and details on accident data in Figures 1.8 and 1.9.) Neither

¹⁸⁴ AOPA Air Safety Foundation, *General Aviation Accident Analysis Book*, 1991 Edition (Frederick, Md.: AOPA Air Safety Foundation, 1991).

¹⁸⁵ Air Safety Foundation, *Accident Analysis Book*.

of these findings are odd or counter-intuitive, nor are they mutually exclusive.

The FAA interpreted this data to indicate the "finding" that private pilots have a disproportionate number of accidents and warrant closer supervision. This is a reasonable conclusion. Taking student pilots as a model, these pilots with less experience than private pilots have a far better accident ratio. They operate at all times under the supervision of an instructor and are limited in their flight operations. Without such supervision and limitations inexperienced private pilots may get into trouble.

To the AOPA the data indicated the "finding" that the instrument rating was critical in preventing accidents. This too is a reasonable conclusion. Traditionally the flight time requirement for the instrument rating was near that for a commercial pilot. It also explicitly requires additional flight instruction. Simply to be eligible for an instrument rating pilots were required to be more experienced than the basic private pilot requirements. In fact, the 200 hour minimum in effect for an instrument rating up until 1986 may alone have contributed to the lower accident rate. To this is added instruction the instrument student receives, with much of it specifically emphasizing areas where pilots find themselves in trouble: aircraft control and weather. This is high-quality, focused instruction. While AOPA agreed that low flight time pilots

are at more of a risk than those with higher time, the question they pursued was what constitutes low time and what ancillary factors are to be considered.

The data are not conclusive. As indicated in Figures 1.8 and 1.9, private pilots and low time pilots are having many accidents, and as cited above this does point to an issue with low flight time private pilots. However, Figure 1.8 also indicates that the group of pilots most at risk are commercial pilots, based on the number of commercial pilots to the number of accidents.¹⁸⁶ This is in all likelihood attributable to the increased exposure that commercial pilots have to risk: pilots in this group are by definition likely to be employed flying, with a much higher level of activity than private pilots, but they are not yet in the very structured, therefore safer, environment of scheduled airline operations in which airline transport pilots work. It is also likely that the commercial pilots are flying more hours than the private pilots, so they are likely to be

¹⁸⁶ Excerpt from Figure 1.8:

Pilot Certificate	accidents 1982-1988	% of all accidents	avg. % of pilots to accidents	ratio of pilots to accidents
student	1,603	9.6	1.3	75.0:1
private	7,722	47.6	2.6	38.0:1
commercial	5,762	35.5	3.9	25.7:1
ATP	1,373	8.5	1.2	81.7:1
instrument privileges				
yes	8,012	49.4	1.9	51.8:1
no	7,824	48.2	2.8	35.4:1

having fewer accidents on a per-hour flown basis than are private pilots.

In fact the alternative interpretations of the data are not only reasonable but also likely. The AOPA critique of the data was that the primary indicator of the high accident rate among low-time general aviation pilots was whether the person had an instrument rating, not whether they had a commercial pilot license and not whether they had passed the 400 hour mark, and the FAA never disputed the value of the instrument rating in this regard. The FAA interpretation of their own data demonstrated that by simply focusing on the recurrent training and evaluation of a group that for whatever combination of reasons produced a lot of accidents (e.g., twice as many private pilots as commercial pilots, more activity by the less-than 400 hour private pilots than by low-flight-time commercial pilots), the number of accidents could be reduced.

The aforementioned instrument rating does appear to be an important safety mechanism. This may be for several reasons. Many accidents have been attributed to continued flight into unsafe weather conditions. Already presented in Chapter One, and repeated here, is the following data from The AOPA Air Safety Foundation, that

7.8% of all accidents occurring in all phases of flight were weather related, with a higher percentage involving single-engine retractable-gear aircraft followed by twin engine aircraft.

10.4% of the accidents whose causal factors were pilot related involved weather. 19.1% of all twin accidents and 19.7% of the single-engine retractable accidents that were pilot related involved weather.

A predominant number of the accidents were attributed to initiating or continuing VFR flying into IMC [instrument meteorological conditions] by non-instrument-rated pilots, followed by instrument-rated pilots attempting to continue VFR flight into IMC.¹⁸⁷

The FAA's thrust with the AFR was to lower the number in the column "percent of all accidents," where private pilots are the highest percentage, and not, for example, the ratio of pilots to accidents, where commercial pilots are the worst off. Thus, by picking and choosing, both the FAA and the AOPA utilized data to argue positions that were not clearly causally related but that are central to their overall ideological departure points. Both the EAA and the AOPA came to support a strengthened BFR. In fact, both the FAA's and the AOPA's interpretations appear to be rational interpretations of data, they shared common ground, and agreed on the objective.

Reconsidering the Rule On 13 July 1990, representatives of the FAA met with representatives of EAA and AOPA. At this point, the FAA offered a deferment, which was acted upon formally when the FAA published a notice in the *Federal Register* on 30 November 1990 that both extended

¹⁸⁷ A.O.P.A. Air Safety Foundation, *General Aviation Accident Analysis Book*, 1991 Edition (Frederick, Md.: AOPA Air Safety Foundation, 1991), p. 21.

the deadline for compliance and solicited new comments on the AFR. With this, the AFR requirement was suspended until 31 August 1991, two years beyond its implementation date in the rule.

In 1991 the FAA was in the process of revising the AFR again, but did not have a rule in hand. So, in September 1991, the rule was again deferred. This deferment was formally instituted out of Washington on 5 September 1991 and conveyed to local offices in writing and published in the *Federal Register*. As a footnote to this entire proceeding, this deferment was not implemented in a timely fashion: the rule came back into effect for four days, and some pilots took AFRs in order to be flying legally.¹⁸⁸

With the compliance deadline for the new rule extended until 31 August 1993, the FAA published an NPRM on 14 July 1992 and a new rule on 19 July 1993 revoking the AFR. The FAA stated that

As a result of the petitions from AOPA and EAA, and further discussion of their safety data, the FAA determined that the annual flight review deserved further consideration.

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In March 1990, the FAA completed a preliminary reevaluation of the data that was the basis for adopting the annual flight review requirement for the affected pilots (§61.52(e)).

¹⁸⁸ I attended a Flight Instructor Refresher Clinic in October, 1991. Whether or not the rule was in effect was one of the topics discussed: it was not, but several instructors at the clinic reported that they had received no local guidance and so had given AFRs to pilots whose most recent flight check had been August 1990.

This data showed the private pilot accident totals from 1976 to 1981; it was organized into fatal and non-fatal accidents, and by pilot age and total flight hours [of the pilots having the accidents]. . . .

Because the total number of accidents was higher in each of the first four 100-hour increments than in any of the other increments, the 400-hour pilot time level was selected as the time level for the annual flight review requirement. However, the FAA determined on reevaluation that the data did not indicate whether the higher accident totals for these subgroups reflected higher accident rates per pilot, or greater activity levels (i.e., exposure), or a combination of these factors.

Also, the accident data did not distinguish between instrument-rated and noninstrument-rated pilots. Thus, it was impossible to determine the extent to which relatively inexperienced instrument-rated pilots may have contributed to the accident totals.

Based on its reevaluation, the FAA concluded that the data used in the development of the annual flight review rule was insufficient to justify imposing this requirement on the affected pilots. Therefore the FAA proposes to delete it[.]

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The FAA's Office of Safety Analysis has initiated three interrelated studies on general aviation safety.¹⁸⁹

In this action revoking the AFR the FAA retracted its previous statistical analysis, including its cost-benefit analysis, to present new justifications for the new rule.¹⁹⁰ Further, it has moved the study on general aviation safety from the Office of Aviation Policy, Plans,

¹⁸⁹ 57 *Federal Register* 32681, 22 July 1992.

¹⁹⁰ 58 *Federal Register* 40565, 28 July 1993.

and Management Analysis, which was doing the analysis in the context of the regulatory review, to the Office of Safety Analysis, which as a unit is more closely focused on issues of safety as issues in and of themselves without the regulatory context.

Much of what happened at this stage must be inferred from the FAA's written record and from sources in and out of the FAA, as this was beyond the formal regulatory process. The FAA developed an internal consensus to drop the rule. According to the AOPA, their stance has been that (1) the FAA was never able to substantiate its position, (2) AOPA proved that to them, (3) the FAA finally agreed they could not substantiate the position, and (4) they gave up the rule.¹⁹¹ Concerning the FAA's internal processes, I was told that (1) the AFR was traded for the two year "mandatory BFR," (2) the process "produced at least as good -- perhaps a better -- rule" than the AFR, and, (3) on investing the political capital that the FAA was in defending the AFR, "you do so a great deal in the beginning, but you don't fall on your sword."¹⁹² Concerning the FAA's analysis of the rule, I found the cost-benefit analysis vague, if not outright flawed, on both the enactment of the rule and its

¹⁹¹ Interview No. 41, previously cited.

¹⁹² Interview No. 31, previously cited, with the Associate Administrator for Regulation and Certification. These comments were not confidential, specifically the setting of the interviews for this research.

revocation. It bore all the appearances of having been performed solely to satisfy the Executive Order and to buttress the FAA's policy argument. Concerning the DOT, there was, as a matter of fact, the July 1989 statement from the DOT Secretary promising the FAA reevaluation of the rule. While perhaps only for public consumption, this may have also been heard by the FAA, and it may even have been accompanied by verbal directions to the FAA to end the debate. In any case, it could have provided a policy basis that enabled the FAA to disregard the clear statement of imperative from the DOT Safety Review Task Force of four years earlier.

Clearly, the FAA (and the DOT) were balancing a number of issues. One issue was an accident rate with imprecisely targeted causes and remedies. A second issue was a cost it was enduring to implement the rule. Neither of these is a particularly objective reality. What emerged from this process was a compromise to strengthen the existing BFR and eliminate the AFR (this included abolishing the "biennial" nomenclature: it is now simply a "flight review" that is required every two years). This was a compromise that, for the quasi-public consumption of my research, the FAA believes provided for as good or better deal than what it was originally getting with the AFR.

The Theoretical Links and What This Says About the FAA

There were a family of decisions related to the FAA's attempt to revise licensing and currency requirements. A study of the processes in these decisions provides evidence for conclusions regarding the relationships among the FAA, the industry, and political agents. While this was not a high profile issue generally, it was controversial within the general aviation community. It became politicized, and it prompted the FAA to back down from an earlier position. This fit the a-priori assumption of mine that this action was important from the point of view of bureaucratization. Further, it demonstrated the tensions present in the rule-making actions, and how motives and effects can become clouded, becoming tests of strength in which the organization had never intended to become involved. The Recreational Pilot rule process did not turn out well for the FAA. While a rule is in place now, it is a watered-down shell of what it could have been given the full support of the industry. This support was squandered in the battle over the AFR.

The following stages of this process are key links to the theoretical framework:

1. The response of the organization to a proposal for a major overhaul of longstanding procedures: A proposal of an industry group to develop new policies concerning the entry-level licensing of pilots is received by the FAA.

2. The agency's development of its own concept of a major overhaul of longstanding procedures: The FAA adopts a course of action it

intends to implement seemingly regardless of its backing or opposition.

3. The development of an intra-industry debate on the proposal: Faced with the inclusion of increased flight review requirements, the general aviation lobbies decide to oppose this element, but operationalize that with the effect that the entire rule is opposed. Meanwhile, the FAA is committed to the package.

4. The implementation of the rule and the subsequent amendments: The key elements of the rule are implemented, but the FAA ultimately accepts the industry position that the flight review will not be effective and revokes the rule. This happens after the industry changes its opposition from the entire rule to the specific inclusion of the annual flight review provisions.

The Role of the Goal Processes

All four models of goal process are visible to some extent in this one episode. In fact, they often overlap and are at times difficult to separate. Certain of them, however, are more clearly demonstrated and provide a stronger rationale than others. The rule generating process is not simply an internal process: it is both formally and substantively the product of the input of formally defined interests and structurally effective interests, both of which are external to the FAA. The FAA's actions are not only objective responses to safety but also objective responses to a demonstrably faltering industry. Not surprisingly, symbolic actions addressing seemingly unresolvable problems are apt to produce chaotic, ill focused outcomes.

This process began with the NAFI petition that included recreational pilot and the AFR. It ended as the result of the AOPA opposition to the AFR. In between it became the focus of a debate on how to address safety, which was not just a debate about safety. Recreational pilot was unfortunately tied to the AFR in this debate and probably never really got considered solely on its merits but was instead always part of this broader revision of Part 61.

Objective Response

The original rulemaking action by all appearances was a well intentioned response to an industry request for relief from the burdens of a change in pilot licensing rules of a decade earlier. Coupled with the vexing problem of accidents in the general aviation community, the FAA took action on both fronts and provided a license with reduced initial requirements while at the same time increasing training requirements for low flight-time licensed pilots.

There is no doubt that the overall concept of a broad revision to Part 61 was an objective, if ill focused, response to several issues. One issue that was considered in the overall process was the still continuing drop in student pilots. The FAA conceded that the revised private pilot license may have evolved to a point where a lower grade of license above student pilot was worth consideration. At the same time, a less clear issue was addressed, as the FAA made its formal action in addressing

the issue of flight training requirements along with the new requirement for an annual flight for specified low-experience pilots. The relevance to flight safety was twofold. The FAA was creating a license with less training but that was very tightly controlled. At the same time it was creating stricter pilot currency standards in order to address what it perceived as a high accident rate.

Concerning the AFR, it appeared that certain pilots were having a disproportionately high number of accidents. For their purpose of identifying "certain pilots," the FAA chose the flight time of 400 hours and the pilot license grade of commercial pilot as demarcating the safe range. The AFR would require those pilots the FAA had identified as most at risk to be evaluated twice as often as the "biennial flight review" rule required (and still does require).¹⁹³

¹⁹³ The biennial flight review is specified in 14 CFR 61.56(b) and (c), which became effective 1 October 1973; the annual flight review was an amendment (61.56(d)(1)). Prior to its revocation, the relevant text as implemented in this action and published as a final rule (54 *Federal Register* 13037-13038) read,

61.56 Flight Review.

(a) . . .

(b) no person may act as pilot in command of an aircraft, within the period specified in paragraph (c) or (d) of this section, as applicable, unless that person has --

(1) Accomplished a flight review given in an aircraft for which that pilot is rated by an appropriately rated instructor certificated under this Part or other person designated by the Administrator; and

(2) A logbook endorsed by the person who gave the review certifying that the pilot has satisfactorily accomplished the flight review.

(continued...)

Objectively, these were rational responses to the issues at hand. Concerning recreational pilots, the FAA recognized that it was a fact that, as presented by NAFI in its proposal, not all pilots were going to be involved in the flight activities that had warranted the increased training requirements associated with the private pilot license. Therefore, flight safety would not be compromised by permitting this group of pilots to receive a license with a lower level of flight training.

The objective goal of the role of safety is one that is central. The FAA addressed a safety issue in 1973 when it believed that pilots required more training in specific types of operations. In 1985 it published an NPRM with the effect of revoking a part of the 1973 safety regulations. Thus, safety is not a clearly quantifiable commodity, and

¹⁹³(...continued)

(c) Except as provided in paragraph (d) and (e) of this section, each pilot must have complied with the requirements of this section since the beginning of the twenty-fourth calendar month before the month in which that pilot acts as pilot in command.

(d) Except as provided in paragraph (e) of this section, each recreational pilot who has logged fewer than 400 hours of flight time as a pilot and each non-instrument rated private pilot, other than a glider-rated private pilot, who has logged fewer than 400 hours of flight time as a pilot must comply with the flight review requirements of this section since the beginning of the twelfth calendar month before the month in which that pilot acts as pilot in command of an aircraft. The flight review required by this paragraph consists of a minimum of one hour of flight instruction and one hour of ground instruction.

(e) . . .

Part 61.56 remains the basis for the flight review (61.56(c), effective 31 August 1993).

this creates conditions of uncertainty in rule-making procedures. The NAFI petition had laid the groundwork for explaining the contradictions about safety by asserting that the specific safety issues addressed in 1973 were not relevant to the 1985 revision (that is, they occurred outside of the realm of these specified operations). Armed with the argument that there was no safety issue the FAA acted to lower training requirements.

The rule generating process was not guided by clear bureaucratic standards, but rather was flexible. It was in fact aimed at the attainment of two decidedly different formal objectives. These formal objectives were bargained between. As will be noted again below under patron-client, the discussion between FAA and industry took the form of a compromise exercise, with the industry ultimately giving its support to the strengthened BFR. Here is an example where objective response does not support the organization's ability to make clear, unambiguous decisions, but plays a part in developing compromises. The compromise that was reached was an objective response: it was a response to the higher accident rate among private pilots, and -- like the AFR -- provided for a closer and more standardized review of pilots reasonably identified to be at risk.

The rule generating process was not guided solely by universal standards of a professional cadre. It was (and still is) a process where the professionals existed in both

the industry and the FAA and, as a result, given their different roles there were subtly different interpretations of the issues present. Therefore, a consensus was (and is) not always likely between the professionals in the industry and the professionals in the agency. This is a contradiction of Water's point that the collegials are alternatives to bureaucracies in that both produce ordered outcomes: as an alternative to the bureaucratic structure the FAA/industry collegial environment did not and does not produce an ordered outcome. One's professional standing is influenced by one's corporate standing. However, as with the compromise discussed above, this does not mean that a lack of an ordered outcome is not an objective response; it is just not predictable.

Throughout the initial phase of this process response, which can be placed through the formal steps of the regulatory process that culminated in the publishing of the initial "Final Rule" in 1989, the FAA received feedback and evaluated the responses, as it is required to do under law. Few favorable responses were heard, but the FAA did not alter its original intent and instead continued with the AFR proposal. But the comment period is not an election with majority rule, and the agency may interpret or outrightly ignore the responses as it sees fit. The FAA may well have acted according to a rational assessment of the feedback. In the instance of medical self-certification, the feedback

inexplicably indicated that self-certification, a certification that the person is free from known disqualifying medical conditions, would be used to evade known disqualifying conditions. And why would anybody put this in writing to the FAA to begin with? Considering these supporting comments, not implementing self-certification fulfilled an objective goal of keeping medically disqualified persons out of the air, regardless of how much support the proposal received. No such issue exists with the AFR. The FAA did not say that they received -- and I did not read -- any comments that the rule was unenforceable and pilots would fly without the AFR (a risk with the BFR all along), nor were there comments from unqualified pilots who were afraid of taking a flight review for fear they would not pass (if they would write the above about the medicals, why not write this, too?).

This example also demonstrates the tenuous nature of the cost-benefit process and how little support it provided the agency. A practical example of the vagaries of economic considerations and supporting the industry is to consider who benefits from permitting the use of simpler aircraft. One might note that the specific aircraft mentioned by NAFI are all old aircraft. This is an indication that there was not a movement to protect the market for new aircraft at the expense of the potential recreational pilots. However, light aircraft production has indeed virtually stopped. The

assumption in the NAFI petition for rulemaking was that should their rule be implemented, there would be more students. However, student starts are down drastically. From an economic perspective, there should have been expected a decrease in the expenses entailed for pilots seeking only the recreational privileges, opportunities for many individuals who would not otherwise have learned to fly, and thus a boon to the individual pilots and small operators. The manufacturers and the large schools -- the likely monied interests -- received little if any compensation and even stood to lose business at first implementation, while the smallest and poorest members of the community were potentially the greatest gainers. In time, one might expect a market for new aircraft in this niche. Thus, there are indications that some segments of the industry stood to gain considerably, although the exact circumstances are still unclear.¹⁹⁴

Symbolic Response

The AFR was vigorously defended by the FAA, passed empirical cost-benefit muster, and then was empirically shown to be not the correct response. The FAA actions themselves were symbolic politics, paying service to the symbolic legitimating goals of the process but having a

¹⁹⁴ And it should be noted that in 1982 the full extent of the downturn in light aircraft production was not fully evident.

predetermined outcome anyway. For example, this calls into question the usefulness and accuracy of cost-benefit analysis, and shows how precariously balanced was the FAA's response to the high accident rate in general aviation. Nevertheless, internal and external forces suggested that an issue existed, and the agency attempted to take some action that it promoted as the correct action.

The recreational pilot and AFR were without doubt a part of the FAA's symbolic goal operationalization. The FAA has strong symbolic reasons to make clear that it recognizes and strives to attain its formal goals. As symbolic action may be necessary to influence public opinion or industry patrons or the Congress, for any of these constituencies the FAA had good reason to believe it would meet this goal through recreational pilot and AFR.

The FAA is under periodic scrutiny over accident rates -- in general aviation in particular, in aviation overall -- so even without newspaper headlines or Congressional hearings the agency was still compelled to act. This was not a specific public mandate requiring public legitimation, but as far as legitimating functions for the government as a whole this is an ever-present issue. In order to be acting in the interest of safety, or in the interest of the industry, the FAA would need to act.

The FAA also has internal mandates. These are from the Executive Department and from its own professional staff.

These may well have been constructed to mean that, even if you have to take criticism from the industry you, will proceed with the AFR rule. In fact, that is just what it did. In this case, the rule is disconnected from the ill-defined reality of accident statistics. The statistics reasonably say exactly what both the FAA and the AOPA initially claimed them to say. Predicting who will have an accident is not an exact science. So the AFR is an action that simply demonstrates the agency in action. This demonstration is for the benefit of those who simply believe there should be some action. This is not unreasonable.

The issue of the industry was not well defined here. As it has happened, there are very few recreational pilots, fewer than 1000. The license has been largely ignored by the general aviation industry. The issue of general aviation safety was never relevant to this license for it has not gained wide acceptance. The FAA has never made the recreational pilot license one of its issues. It is not spoken of at flight instructor seminars. It is not suggested as an entry-level license. The FAA has not said it acted here, so it is not using the license as symbolic of its interest in the health of the industry. The case for the recreational pilot license being offered as a symbolic bargaining chip for the AFR is interesting. In fact these were linked in the regulatory process from the very beginning, but no concrete evidence emerged that this was in

fact what was intended (as was the case with the AFR being traded for the "mandatory BFR").

Multiple Patron-Client

The general aviation lobbies' response to the proposal to add the AFR to Recreational Pilot was one of vigorous opposition (pressure from industry client/patrons) and the lobbies pulled strings in Congress (Congressional patrons). This caused extensive review, with the process spanning a decade. The agency was able to enact the AFR rule over this opposition, but the rule, under continued opposition, was ultimately revoked.

In looking at the patron-client relationship, it may be noted that the FAA is maintaining a relationship with its industry patrons by responding to their requests for action. However, what makes the industry the FAA's patron is that in patron-client relationships there is also a concern with the ability to control critical resources. While the FAA can control the critical resource of the pool of potential students by effectively raising or lowering the costs of a pilot license, the industry in this example is not clearly controlling the FAA's resources, specifically its budget as allocated by the Congress. However, that pressure was present later in this process.

There was clear pressure from the aviation industry to remedy a problem which had been created with the revision of Part 61. At some point between 1973 and 1985 the FAA, in

its internal mechanisms, accepted the need to seek comment on a rule change. This was evolutionary and in response to industry pressure. The specifically affected community had joined together to write the rules by which it would live. In effect the guidance of the organization came from below, not from above in a formal chain of command: this is as one might expect in the multiple patron-client relationships. Lines of authority were not clearly delineated or in obvious steps from one level to another; rather, various interests interacted in their attempts to exercise influence. And, although this relationship was not overtly coercive, it demonstrated how the FAA is the patron of the industry (by writing rules which are themselves coercive, but which may be more or less intrusive) and also the client of the industry (in this immediate matter by responding to the industry's own initiatives that had the effect of modifying the FAA's formal rule structure, and thus modifying how the FAA implements its two formal goals).¹⁹⁵

The FAA made a clear response to industry input. However, the industry is not monolithic; instead, it is composed of many groups whose interests may or may not coincide. These groups include (but are not limited to)

¹⁹⁵ This process also demonstrates the many segments of the industry: the flight training people were prominent in the NAFI petition, while later the broader pilot lobbies represented their interests. Manufacturers in retrospect were in an extremely needy position throughout this, but were not represented.

general aviation (itself a broad category with potentially varied interests that include private pilots in their own aircraft, flying schools with single engine propeller aircraft, and Fortune 500 corporations with business jets), the airlines, and manufacturers. Some segments of the industry simply took no part here: among them were the manufacturers, who seemingly had much at stake, but who do not appear in the formal record. In fact, in retrospect, they may have done well to support the recreational pilot initiative, but their circumstances were unclear at the time, so their input to the FAA was, if appropriate and justifiable, not forthcoming.

The AFR had been considered of major importance to maintaining standards among low time pilots in order to lower the accident rate (as such justification was given by the FAA), but the AFR was lost in the end. The decade that began with a petition for a rule and ended with the revocation of the rule saw various parties contribute to the process with arguments that often bargained between safety and cost (e.g., EAA's position was that the AFR would unduly burden an already declining general aviation industry, and it was willing to sacrifice the potential enhanced safety resulting from the AFR rule: "EAA . . . noted the continuing decline in general aviation and commented that the general

aviation public feels unduly burdened : . . ").¹⁹⁶ The discussion between FAA and industry took the form of a compromise exercise, where EAA and AOPA ultimately supported strengthening the BFR, seemingly offering this upgraded BFR to the FAA in exchange for the AFR.

The recreational pilot rule-making also presents evidence of the coercive aspect of the patron-client system, where Congress is brought into play at the behest of -- in this case -- a segment of the aviation industry. Faced with Congressional concern, the FAA had to proceed cautiously. The evidence indicates this opposition had some impact: according to informants at the FAA who were involved in the writing of the rule and in the administration of the formal process, the rule went through torturous review at both the FAA and the DOT. Nevertheless, the rule received what was ultimately an ill-fated approval in these steps.

Garbage Can

This is the weakest of the goal processes in this study. The FAA had objective, symbolic, and patron-client goals to satisfy, and those goals together can well explain the FAA's approach to this rule-making. This action does show, however, the FAA operating under conditions of

¹⁹⁶ 57 *Federal Register* 32680, 22 July 1992. This seems to bear a striking resemblance to the slogan of motorcyclists who object to wearing a helmet: "let those who ride decide"; except here -- it may be noted in passing -- the potential exists that when one decides to fly without benefit of a flight review one may impact a third party's house.

uncertainty, where its goal may have been clear but its processes were not, inasmuch as it could never definitively pinpoint a clear cause-and-effect relationship between low-flight-experience pilots and accidents. So along with those goals there are still plausible circumstances of the organization operating under conditions of uncertainty, feeding a process where the tenable response was simply an available one.

The opposition to the AFR forced a compromise to be reached: the FAA strengthened the already existing Biennial Flight Review (BFR) rather than continue to fight opposition to the AFR. Although this was a course of action that could have occurred at the outset, the FAA did not reach for this solution until its own solution had been gravely injured in the empirical debate, and the FAA had to scramble to salvage the situation. Also, the same opposition to the AFR may have been focused on the mandatory BFR, so having the AFR proceed ahead of the mandatory BFR may have created the political climate in which the mandatory BFR was acceptable.

It was noted above that predicting who will have an accident is not an exact science, and taken in that light the AFR was an action demonstrating the agency in action for the benefit of those who simply believe there should be some action. This is prime ground for garbage-can decision process along with the symbolic response. The AFR was a reaction to the high accident rate among private pilots,

using procedures at hand and applying them with uncertain though well-intentioned justification. Rescinding the AFR and strengthening the BFR was a reaction to the unceasing industry opposition and the reality that that was as likely to yield the same desired result.

The concept of a flight review for general aviation pilots had emerged in 1973 in the form of the BFR, so it was not something new to be sold either internally or externally. Still, the FAA faced the vexing problem of the accident rate in general aviation being higher than the accident rate in corporate or commercial aviation.¹⁹⁷ With various mandates for action and a procedure at hand, the FAA was provided with an easy method by which to proceed. It did not wish to continue to face the opposition, so the FAA sought a different take on the procedure at hand.

There was no ready clear-cut course of action to lower the accident rate: the ambiguity of the data makes that clear. However the FAA still felt compelled to do something. Targeting low time, low experience-level pilots may have seemed a good approach to the accident problem, and indeed it makes sense that inexperienced persons would be at

¹⁹⁷ Current data (as noted in Chapter One, Figure 1.9.4) indicates the following: for data per 100,000 hours flown -- 6.97 general aviation accidents, 1.35 fatal, as compared to 0.77 air carrier accidents, 0.22 fatal; for data per 100,000 departures (48.0 million general aviation departures, 10.5 million air carrier departures) -- 4.46 general aviation accidents, 0.86 fatal, as compared to 1.27 air carrier accidents, 0.36 fatal.

most risk and therefore warrant the closest supervision. However, it was not demonstrably justified by the available data. Politically it was a poor choice, as it had oddly constructed parameters that were difficult to substantiate. It did, however, enable the FAA to enact a new procedure. Paradoxically, it is counter-intuitive to believe that low-time pilots will stop having accidents. Student pilots have lower accident rates since their flight environment is very much controlled. Such controls have never been considered practicable for the private pilot license. Left without a clear course of action, the flight review would perform little more beyond a symbolic action. However, this would be better than nothing, and the procedure at hand was one with which the FAA and the aviation community were both familiar.

Summary

The licensing/AFR process demonstrated several issues. The agency was working within the framework of each of the general organizational constructs. It is a rational system, with formal rules of procedure and addressing formally constructed issues. It is a natural system with open input from the agents it is formally charged with regulating and supporting. It is an open system within the network of the government and the industry.

This study demonstrates an important point about the relationship between the goal processes and the perceived

structure of the organization. Experts in the industry were called upon, in a collegial manner, to support the FAA in objectively resolving issues. This is one interpretation of what has happened. Alternatively, the industry exerted pressure on the FAA to establish policies in the industry's interests. This is a second interpretation of what has happened. In both cases, a formal goal of the FAA was addressed, although a different one of the two formal goals is addressed in each instance. And in the former case the FAA responds as a natural system, with structured input and functioning coming from outside the formal boundaries of the organization, while in the latter case the open system, the network of organizations, is in evidence.

That the FAA was able to explain its rationale for reassessing the 1973 rules change in legal rational terms is an important point. The ostensibly predictable bureaucracy is able to be unpredictable and still state it is being bureaucratic (i.e., ordered and predictable). Another important point is the mechanism the FAA used to reassess the rule. This method was to abide by the recommendations formulated by a lobby of the affected community, and it happened twice here: first the FAA went with the recreational pilot recommendation that came from the industry; and second, faced with strong industry opposition, it gave in to the opposition to the AFR. This may be a good example of a case of expert decisionmaking; on the other

hand, one should wonder what their interests would be beyond an expert determination of safety in the certification of recreational pilots. This requires consideration of the recurrent economic versus safety question, a question addressed under mandated economic impact analysis.

Unfortunately, economic impact analysis is a quagmire, which is examined in detail as a specific case study.

Nevertheless, the organization functioned according to a rational systems structure in the invoking of its formal processes. Even if the rational system did not provide much guidance, they were the processes that were at hand for restructuring the regulations.

Figure 6.1: Recreational Pilot/Annual Flight Review Timeline

1973	promulgation of revised Part 61 with requirement for biennial flight review (BFR) and increased private pilot training requirements
1974	revised Part 61 takes effect 1 November 1974
1982	National Association of Flight Instructors petitions FAA for revisions to Part 61, including creation of recreational pilot license and provision for annual flight review (AFR)
1985	FAA releases NPRM proposing revisions to Part 61, including creation of recreational pilot license and provision for AFR
1989	revisions to Part 61 providing for recreational pilot license and AFR promulgated; revisions take effect 31 August
1989	AOPA and EAA petition FAA not to implement AFR
1990	FAA suspends AFR, defers reimplementation until 1991
1991	FAA defers AFR until 1993
1992	FAA publishes NPRM proposing to abolish the AFR and to make specified elements of the BFR mandatory
1993	FAA promulgates revisions to Part 61 abolishing the AFR and making specified elements of the BFR mandatory

Figure 6.2: FAA's Statement of Regulatory Analysis

The benefits expected to result from this amendment are the avoided casualty costs resulting from accidents prevented because of the annual flight review that non-instrument-rated private pilots with less than 400 hours flight time will be required to receive. . . .

Accident rates have historically been about 60 percent higher for these low-time private pilots than for more experienced private pilots. Although one commenter [unspecified in the text but this is AOPA] attempts to demonstrate that the 400-hour total-flight-time criterion is invalid, the accident and activity data provided do not distinguish between types of pilot certificates, and no information on the composition of the activity base is included. . . .

The costs of the amendment primarily involve the additional aircraft operating costs and the labor cost of the flight instructor's time that will be incurred for pilots to comply with the flight review requirement. . .

. . . for serious injuries and for destroyed and damaged aircraft, [there is] an average injury and property damage cost of approximately \$361,000 (1986 dollars) from all accidents for every occurrence of a fatal accident. This value is the benefit of avoided injuries and hull losses realized for every fatal accident prevented. . . .

Completion of the flight review will require a minimum of 1 hour of dual flight instruction and 1 hour of ground instruction. Based upon an \$18 per hour instructor's fee, and a typical rental rate of \$45 per hour for a non-retractable, single-engine airplane, the cost for each pilot to comply with the annual flight review has been estimated at \$81. A total average annual cost of \$6.4 million has been estimated for all affected private pilots to comply with the amendment [in the initial eight year period]. . . .

The FAA estimates that the subgroup of private pilots affected by this amendment would

(continued)

**Figure 6.2: FAA's Statement of Regulatory Analysis
(continued)**

experience an average of about 80 fatal accidents annually in the absence of the new annual flight review requirement. . . .

Should the amendment result in an average 3 percent of reduction in the fatal accident rates, then an average 4.8 fatalities will be avoided per year, and \$666,000 in quantifiable benefits will be realized annually in avoided property damage and injury costs. Deducting the quantifiable benefits from the total annual compliance cost of \$6.4 million gives that portion of costs attributable to preventing fatalities. The cost-per-fatality-avoided, if a 3 percent reduction in fatal accident rates is achieved, is estimated at \$1.1 million. . . .

. . . following implementation of the biennial flight review requirement there was a one time 10 percent decrease in fatal accident rates . . . Current accident rates for private pilots with less than 400 hours total flight time, however, still remain approximately 60 percent higher than the rates for private pilots with more than 400 hours flight time. Therefore, further improvement is warranted for these low-time pilots. Because of the accident rate reductions observed following implementation of the biennial flight review, the FAA expects that a 3 to 5 percent reduction in average fatal accident rates will be achieved by the low-time private pilots affected by the annual flight review and that the acceptable costs estimated for each fatality avoided will result. . . .

source: 54 Federal Register 13034-13035, 29 March 1989.

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CHAPTER SEVEN, ORGANIZATION AND REORGANIZATION: MANAGING LEVELS OF HIERARCHY

A Linking Chapter

This chapter serves as a link between two chapters that explore not only issues that are direct elements of the rule-making process but also agency reaction to external pressures that may range from informal influences to formal mandates. In the previous chapter the vagaries of the rule-making process under both bureaucratic and professional standards was demonstrated. Also, evidence was presented of external direction, from the DOT, to implement a rule, the AFR. In the end the rule-making process did not produce the AFR, although this should not be called an altogether failed rule-making initiative as it did produce a strengthened BFR, some source of comfort to the FAA. In the following chapter the ramifications of an external mandate aimed directly at the FAA's formal rule-making process are explored. This chapter's focus examines another external mandate along with how the agency operationalized that mandate. Units that play important roles in the agency's rule-making process have had their internal structures affected by the reorganization, so any change they manifest under external mandate would have implications for the agency's decision- and rule-making.

This chapter explores the circumstances around a decade-long period of centralization of authority within the FAA, which included an externally generated (DOT) mandate

for reorganization. An agency reorganization is not an exceptional event, and that this process happened was consistent with agency history, but it was a departure in as much as there existed new problems and pressures that the organization was addressing. Over half a century there has not been one continuous movement of centralization or decentralization, nor has there been a long-term movement, with occasional steps back, in a single direction of centralization or decentralization. Instead, in response to situational forces, the FAA has moved one way or another. Reorganization may have been to address various concerns, safety among them, and the way it may address regulatory actions can be influenced by structures and reorganization.

The CAA/FAA has for nearly fifty years tilted back and forth between centralized and regional administration. Under the subject reorganization agency processes were being developed into a specifically centralized hierarchical track, explicitly creating the appearance of a rational bureaucracy. This reorganization was external in genesis, coming from the Department of Transportation. While not specifying any direct safety problem with the old system, the reorganization was promoted as a way of concentrating resources on safety functions; \further, it was to solve problems of confusion and inefficiencies, which had allegedly generated complaints from the aviation community. I have not been alone in thinking this is an interesting

issue, for people at FAA headquarters were telling me that this restructuring, which they called "straightlining" (an obvious abbreviation of the official "straightline reporting"), was something to watch.¹⁹⁸ Based on these informants and my personal interest in the FAA hierarchy's effect on decision- and rule-making, this was noteworthy.

In this role, the analysis of the reorganization fit an *a-priori* assumption of relevance and importance as it ran counter to my previous studies of non-hierarchical administration serving the FAA's internal decision-making and formal rule-making processes. Because the FAA's internal structures would ostensibly have an affect on the rule-making process, this would be potentially a factor in how rules would be generated, not simply in their implementation and interpretation.

The History of Reorganization

One Key Example

An area in which the FAA had specific goals in terms of centralization and decentralization was in the certification of the design of aircraft and their components.

Certification is the process by which manufacturers establish compliance with the relevant sections of 14 CFR.

¹⁹⁸ Interview No. 7(b), who was a person in the Statistics and Forecasts Branch, Planning Analysis Division, Office of Aviation Policy Plans, and Management Analysis; this person had, over a period of a year, been both a resource for locating data and had become a trusted informant concerning FAA policy and history.

This offers evidence that the aircraft or component is airworthy. Standards that must be met are found in Subchapter C, Aircraft (titles in Parts 20 to 30: see Figure 1.1 for the Part titles). These include standards for the certification of small airplanes, transport airplanes, small helicopters, transport helicopters, aircraft engines, and propellers, among other items.

Fifty years ago, authority for these functions was moved from the FAA headquarters to the FAA's regional offices. There was no formal standardization among the various regions. However, in the last decade authority was placed with a program office that reports directly to Washington. With this the center of FAA authority came full circle (see Figures 7.1/7.1a and 7.3.2). Aircraft certification was not the only area in which the FAA faced issues of decentralization and centralization of authority, but it periodically led the movement and was (and still is) itself a microcosm of the issue as a whole.

The Evolution of Decentralization

The FAA, like many Federal agencies, is divided into a number of geographically based regions. These regions have an organization that is similar to the structure at the headquarters, with a regional administrator and regional program directors of the various FAA units. The organization of the FAA has included the regional offices in the chains of command of the various units, and regional

offices have had a role in interpreting and implementing policy. The development of a specific structure was not one that simply happened. Over the course of the last half century the FAA (in continuity with its CAA/FAA predecessors) has alternated between central and regional authority. This was represented in specific policy implementations designed to either vest authority in the regions or to bring it back to Washington (see Figure 7.1). Decentralization also extended beyond the traditional Federal geographic breakout of regions to the FAA Aeronautical Center in Oklahoma City and the FAA National Aviation Facilities Experimental Center (NAFEC) in Atlantic City.

The development of what was to become an overall decentralized structure was specifically implemented. A specific benchmark of decentralization occurred in 1946 as aviation entered the post-War boom. During that year, the flow of authority outward from Washington developed a major impetus. Authority for the approval of production certificates for aircraft manufacturers, flying schools, repair stations, ground schools, mechanic schools, and parachute lofts was then specifically vested in the regional offices. The Aeronautical Center was also created in 1946 with the move of the Standardization Center from Houston to Oklahoma City and the transfer to Oklahoma City of two other facilities, along with the policy of transferring similar

activities to that site in the future. (See Figure 7.1 for a more detailed description of these delegations and figure 7.2 for the CAA organizational chart for the year 1947).

Two years later, the authority to issue Type Certificates for Aircraft was vested in the regions. Continuing beyond regionalization, NAFEC was created in 1958, and the Aeronautical Center was formally established as a separate entity, the FAA Academy, in 1959.¹⁹⁹

By policy announced on 26 May 1961, the FAA was to "decentralize Agency operational responsibilities and broaden the authority of regional executives" and to this end staff had been detailed ". . . to develop a pilot plan for regional transition to the decentralized method of operation."²⁰⁰ In July of that year the FAA announced an extensive reorganization:

Termed "evolutionary" and keyed to a revised concept of Washington-filed relations, the reorganization was intended to strengthen Agency management by centralizing development of programs, policies, and standards in Washington and delegating broad operational responsibilities to regional offices. The seven regional offices would be headed by assistant administrators responsible for the executive direction of all FAA programs in the field. . . . The statutory Deputy was to serve as general manager of the Agency's operations, coordinating the activities of the

¹⁹⁹ Arnold E. Briddon, Ellmore A. Champie, and Peter A. Marraine, *FAA Historical Fact Book: A Chronology, 1926-1971* (Washington, D.C.: Department of Transportation, Federal Aviation Administration, Office of Information Services, 1974), pp. 50, 52, 94.

²⁰⁰ Briddon, et. al., *Fact Book*, p. 109.

regional offices and the operating programs in Washington.²⁰¹

This statement of intent attempted to link the decentralized operational authority of the agency with centralized development and interpretation of policy, and included a coordinating agent, the agency's statutorily defined Deputy Administrator. This was referred to as the "Agency Long Range Decentralization Program."

In 1965 the directors of the two facilities (NAFEC and the Academy) were designated to report directly to the Administrator, not to the program directors who had programs at these sites. Also in 1965 of area offices were created within the regions.²⁰² The goal of this program was to give area managers line responsibility over four key FAA programs: Air Traffic, Flight Standards, Airway Facilities, and Airports. These were programs that were previously in the hands of the Regional Directors and the Regional Program Division Chiefs.

Evidence indicates that in this era much of the organization's policy came directly from regional interpretations. During the course of this and previous research, some interviewees stated that the FAA was in fact

²⁰¹ Briddon, et. al., *Fact Book*, p. 110.

²⁰² Briddon, et. al., *Fact Book*, p. 154, 155.

run from the regional offices.²⁰³ This is consistent with the formally stated intent behind decentralization.

However, the interviewees indicated a greater extent of regional autonomy than the above policy indicates was intended, and further indicates that having the Deputy

²⁰³ This information was obtained from various interviews:

(1) Interview No. 1, the then Associate Editor at *Flying* magazine. This interview was initially prompted by the publication an article concerning FAA enforcement activities. It was based on this person's ability as an agency outsider and as a journalist to be an informant on FAA activities. This person stated that policy (my emphasis: he said policy, not "an interpretation of policy") was generated at the region level, that the FAA was run from the regions. He stated this as a recognition of fact, without specifically endorsing or criticizing such a structure. He did indicate that it posed certain operation issues, such as shopping-around for favorable rule interpretations and the inability to generalize policies from one region to another.

(2) Interview No. 21, a manager in a Federal agency who supervised activities related to aviation and aviation policy. This person had volunteered to be available as an informant concerning those FAA policies and actions about which some insight could be offered: he stated that policies had traditionally differed from region to region. His specific example was that runway paving standards in Southwest region differed from all other regions, which substantially agreed with each other. He stated that work by construction companies was hindered by this lack of uniformity in standards.

(3) Interview Nos. 43 and 44: No. 43 was a manager in the Transport Airplane Directorate, and No. 44 was a manager at the Seattle Aircraft Certification Field Office. Both were among FAA staffers interviewed for this project, and were selected as participants who could reasonably provide information on present and past FAA policies and on the history of selected actions. There was no particular reason for establishing a background of trust in sensitive information, but their information could reasonably indicate an accurate historical record and a personal perspective on FAA function. Both confirmed that aircraft certification standards had differed among regions during the time period before reorganization.

Administrator coordinate regional and agency activity may not have been as effective as envisioned. This was because a policy affecting one unit -- for example, Aircraft Certification, Flight Standards, or Airway Facilities -- would not be defined in Washington and communicated directly from there to subsidiary offices nationwide but would instead be directed to the regions for implementation.²⁰⁴ This produced a lack of standardization from region to region in how policies were implemented.

The Evolution of a Straight Line, Part I: Lead Regions

The Concept is Initiated A step in the move toward standardization was "Lead Regions." Lead regions were announced in November 1979 becoming effective on 1 January 1980. It was stated that they were to

take over various aircraft, propeller and engine certification staff functions that up until now have been handled by Washington headquarters. This means that regions highly experienced in certain phases of aeronautical certification will be the lead region for the entire FAA in their area of expertise. . . . Overall the new organization is expected to increase the agency's effectiveness, national standardization and accountability[.]²⁰⁵

²⁰⁴ See Figure 1.3 for a flow chart of the present agency hierarchy, which may be compared with Figure 7.2 of the 1946 agency. Although the structure has changed since the mid 1980s, the apparent high-water mark in the era of decentralization, the basic outline of the structure remains.

²⁰⁵ From an internal FAA publication, *FAA Intercom*, 13 Nov. 1979.

Notice of the implementation was transmitted to all Regional Directors on 31 December 1979 by a memo from the Administrator.²⁰⁶ It was then formally established through a series of internal orders through 1980.²⁰⁷ The lead region concept was in keeping with the existing regional structure, but it was formalizing a somewhat more centrally controlled channel of decisionmaking, even if central control was not central to Washington.

Decentralization was never linked to any accident, to some specific safety of flight issue, or any other safety concern. Conversely, centralization was never linked to improving safety. Safety was not mentioned in the above list of goals. In fact, safety was never mentioned as relevant to any aspect of this process. This may simply have indicated that, as a bureaucratic rationalization, safety was not one of the ones chosen to be used. But while avoiding safety as an argument does not indicate that it was not an issue, there is no evidence to the contrary: safety did not and does not appear to have been an issue in the lead-region phase of reorganization.

The 1980 establishment of lead regions was centered in aircraft, propeller, and engine certification. From the start of lead regions, the driving rationale was to place

²⁰⁶ Memo from Langhorne Bond, "Implementation of the Aircraft Certification Lead Region Program," 31 Dec 79.

²⁰⁷ Orders 8000.44, 23 August 1979; 8000.44A, 30 May 1980; and 8000.44B, 31 December 1980.

the certification authority in the geographic areas where the activity was principally occurring. To this end, the initial lead regions were the following:

Central, for airplanes under 12,500 lbs.;
Southwest, for rotorcraft;
Great Lakes, for propellers;
New England, for engines; and
Northwest, for transport airplanes.

Central, Southwest, Great Lakes, and New England were designated at the very inception of Lead Regions, effective 1 January 1980, while Northwest was designated effective 1 July 1980.

The FAA stated that

"... regions highly experienced in certain phases of aeronautical certification will be the lead region for the entire FAA in their area of expertise. For instance, the Central Region, the home of many large manufacturers of light planes [e.g., Cessna, Beech], will be the lead region for matters pertaining to airworthiness standards for small aircraft (Part 23). The New England Region, where Pratt & Whitney and small G.E. engines are manufactured, will be the lead region for aircraft engine certification (Part 33). . . . The Southwest Region, home of Bell Helicopters, is to be in charge of certificating both heavy and light rotorcraft (Parts 27 and 29).

A Lead Region Example Northwest (now Northwest Mountain) Region's designation to be the lead region for transport airplane certification meant that policies developed in that office would be used nationally as the certification standard for transport airplanes, henceforth,

superseding all other policies.²⁰⁸ The policies themselves were interpretations and operationalizations of 14 CFR 23, "Certification of Transport Category Airplanes." As a matter of formal policy, an interpretation of 14 CFR 23 by the Northwest Region would become FAA policy on that issue and would be binding on all other regions. This formally established the foundation for the single national interpretation of standards. This policy did not preclude other regions from granting certification of a transport category airplane, and no formal line of authority for obtaining or implementing these interpretations existed from certification field offices in other regions to Northwest Region. Thus while formally binding, there was not a formal chain of command for the implementation of policies or for oversight of decisions.

Seattle, as may be well known, is the home of the Boeing Corporation, and suburban Renton happens to be the home of one of the Boeing Aircraft Company's major assembly plants.²⁰⁹ The FAA offices and Boeing are within walking

²⁰⁸ Transport category airplanes are generally those airplanes that are suitable for operation in airline service, which is formally defined in the regulations as aircraft over 12,500 lbs.

²⁰⁹ There are three major Boeing plants in the Seattle area. Presently, Renton, south of Seattle, builds Boeing's narrow-body aircraft, the 757 and 737 aircraft, and previously built the now out of production 727 and 707/720 series. (There is still a seaplane ramp at the back of the Renton plant for the flying boats Boeing used to build.) Wide body aircraft, the 747, 767, and the just rolled-out 777, are built
(continued...)

distance of each other in Renton, but Boeing has facilities throughout the Seattle area. While there are Boeing offices literally across the street from the Renton building housing the offices of the FAA's Northwest Mountain Region, both located in an area of new, modern, manicured, industrial parks, more offices are down the road, and one factory complex -- for narrow-body (737 and 757) aircraft -- is a five minute drive away. This does not imply that the region is owned by Boeing. In reality, the Boeing area Regional Office was one with very much expertise in transport aircraft certification specifically.

Transport aircraft production generally was taking place on the west coast when this change took place: Lockheed was building its L-1011s in Burbank, California, and McDonnell Douglas was building its DC-10s in Long Beach. Both of these locations are in Los Angeles County. I was told that the reason transport aircraft lead region was not announced at the same time as the other lead regions is that a decision had not been made on where to place it. Two regions seemed to be logical locations for this program: Northwest Region in the Seattle area or Western Region in the Los Angeles area. The decision was finally made that Boeing was the greater presence in the field, and that the

²⁰⁹(...continued)

in Everett, to the north of Seattle. Boeing's third major airport site is at King County airport, but major assembly work does not take place there. There are many other Boeing sites scattered throughout the Seattle area.

office should go to Seattle.²¹⁰ This decision proved prescient: Lockheed has since ceased production of civilian aircraft, and McDonnell Douglas was prepared to halt its wide-body (DC-10/MD-11) projects before the Air Force selection of the DC-10-based KC-10 as their new tanker.

Giving Formal Authority to the Structure What were lead regions became -- in 1982 -- directorates. For the lead region for transport airplane certification this meant that it became the Transport Airplane Certification Directorate, with formalized authority over transport airplane certification nationally. The other lead regions were similarly reorganized, with each of the new directorates located at a regional office.²¹¹ The Central regions lead-region functions of certification for aircraft under 12,500 pounds became the Small Airplane Certification Directorate, with headquarters in Kansas City at the Central Region; the Southwest regions lead-region functions for rotorcraft became the Rotorcraft Certification Directorate with headquarters in Fort Worth at the South Central region; and the lead-region functions for Great Lakes region for propellers and for New England region for engines became the Engine and Propeller Certification Directorate, with

²¹⁰ Interview No. 21, cited previously.

²¹¹ Federal Aviation Administration, *Aircraft Certification Directory* (Federal Aviation Administration, March 1992).

headquarters in Boston at the New England region. Now field offices in all regions would report to these specific offices. At this point (1982), Aircraft Certification Offices (ACOs) and Aircraft Certification Field Offices (ACFOs) with responsibility for transport airplane certification all reported to Renton, which in turn reported to Aircraft Certification in Washington, D.C. (see Figure 7.3).

Like regions these directorates are geographically defined, and correspond for the most part to regions; however, the directorates encompass multiple regions. None of the directorates have certification offices within their geographically defined areas of other directorates, and none of the directorates geographically overlap. Therefore, all of the ACOs and ACFOs that are responsible for transport airplane certification are in fact within the geographically defined confines of the Transport Airplane Directorate, which overlays Northwest Mountain, Alaskan, and Western-Pacific Regions. Likewise, all of the ACOs that are responsible for small airplane certification are within the geographically defined confines of the Small Airplane Directorate, which overlays the Southeast, Central, and Great Lakes regions; the Engine and Propeller Directorate overlays the New England and Eastern Regions; and the Rotorcraft Directorate overlays the South Central Region.

Similar structures were implemented in other units of the FAA, such as in Flight Standards, where regional program officers are under the authority of the Flight Standards office in Washington rather than of the Region Director. Program officers or directorates are formally freed from the administrative authority of their home regions. They instead have a formal direct contact to their program offices (Flight Standards, Aircraft Certification, etc.) in Washington. Formal authority extends directly to field offices nationally through the program offices, as opposed to the indirect authority existing previously when program officers in the regions were under the authority of the Region Directors.

The Construction of a Problem

Regional autonomy was developed in my prior research, conducted in the mid 1980s, which had established that, on a day-to-day basis, the FAA was run from its various regions with minimal input from Washington.²¹² At that time, in 1985, I wrote the following, looking at the FAA as it was then:

. . . [T]he individual inspector [in a district office has] a great deal of autonomy in dealing with the operator and in the application of the rules. Often, over a period of years, only the one inspector or one group of inspectors will be evaluating the operator,

²¹² Steve Sconfienza, *The Deemphasis of Formal Hierarchy in the Regulation of the Aviation Industry* (Thesis, S.U.N.Y. College at New Paltz, 1985).

and it will be the inspector in the field who will be making the decisions about the operator's compliance with the rules. Occasionally, the inspector may turn to the region for an interpretation of the rules if there is some specific ambiguity. Rarely, however, does Washington become involved.

Similarly, at the regional level, it is usually an individual inspector making rule interpretations or being assigned to an operator. Herein lie the potentials for departure from formal bureaucracy, indeed even from the informal bureaucracy and away from delineated hierarchy. Decision-making authority becomes lodged in an individual. That individual becomes an almost autonomous operative, and is free to deal with the operators on an equally individual basis, choosing to apply the formal rules and procedures only as needed in the view of the individual. Different individuals may apply the powers of the bureaucracy differently, and indeed what was the power of the bureaucracy becomes the power of the individual.

Furthermore, at the regional level, it may be observed that there is little operational control existing above that point. An editor at a national aviation publication observed that each FAA region constituted a separate entity, and that they often had different interpretations of the same rules. Specifically, he said that he felt that the FAA is run from the regional level, and that each region is virtually autonomous. Washington only involves itself with the rule-writing procedures and the issues involved with nationally prominent situations. The FAA attempted to eliminate this in some way by instituting what they refer to the "lead region" concept, whereby certain matters were decided nationally by a single region. This is, however, still an example of decentralization well below the national level.

The Department of Transportation is again trying to eliminate the autonomy of the regions, as was reported in the 17 August 1985 *New York Times*:

[T]he Transportation Department's three-member Safety Review Task Force . . . said interpreting and carrying out rules and policies was not uniform around the country.

While acknowledging its value, the task force said decentralization had resulted in a "degree of autonomy that has been largely responsible" for some of these problems.

The panel recommended more centralized control of the agency.

The lead region concept and these intentions of the Department of Transportation do not appear to be in keeping with the safe operating practices of separating radically different environments. Alaska and Florida present radically different airspace, and the supervision should reflect that. However, the national bureaucracy, while declaring in the above article that the existing decentralization of the FAA does not impede its mission of insuring the safety of flight, insists on attempting to exert control. Such standardized control may provide little more than such standardization and will not necessarily lead to any enhancement of safety.²¹³

Pressure to once again change its structure was not internally generated: it was imposed on the FAA from the DOT. The then Secretary of Transportation, Elizabeth Dole, following the Task Force recommendation, implemented a program that would standardize decision-making processes across all regions of the FAA. The Task Force's recommendation of "more centralized control of the agency" demonstrates their idea that centralization of control was a desirable and viable objective. However, their reasoning is not without questioning.

It had been evident to me that policies had traditionally differed from region to region, and the DOT's Safety Review Task Force made it clear that the FAA and the DOT knew about this disparity. Still, there was never a connection made between issues of safety and the cited issues of differing policies. As was noted above in the

²¹³ Sconfienza, *Formal Hierarchy*, pp. 22 ff.

discussion on the implementation of Lead Regions, the absence of a topic from a list of justifying causes does not mean that the topic is absent as an issue. There may have been safety-related concerns that were not discussed. I had been told when I was a pilot school manager in the 1970s that the FAA would not easily admit to a system-induced accident, and an accident based on internal FAA structure would certainly fit that description of system-induced. Certainly a bureaucracy does not wish to announce that its own structure is causing the very outcomes it is intended to prevent. On the other hand, neither the media nor anyone else ever made that connection between structure and outcomes. I agree with the perception that different regions were not certificating unsafe aircraft, air carriers, or pilots, although they may have had the formal authority to certify them differently.

The need for standardization across regions is not something that had gone unnoticed under decentralization. The need for "Standardization" was all along an element of the FAA's policies; for example:

- flight instructors have to be reviewed every two years in order to renew their certificates under Part 61.
- at certificated (Part 141) pilot schools, flight instructors are "standardized" by the chief flight instructor at least once a year.
- people performing standardization tasks are required to be standardized to norms themselves:

- chief flight instructors at Part 141 schools are required to take annual standardization rides with FAA inspectors from Flight Standards
- Flight Standards inspectors themselves go to Oklahoma City for periodic standardization

So regions never were totally autonomous or without some overarching authority or standardizing agent, but the authority was not from the political apparatus in Washington.

Even with standardization there were problems that arose from time to time. Regions would sometimes have different approval criteria for identical tasks. At times, one region would stand alone against the others. An example that was described to me was of airport construction: "It's just is not done that way in some places whether its roads or runways."²¹⁴ I heard this quote when being described the issues around runway paving standards. These standards were reported to me to have differed in Southwest Region from other regions, which substantially agreed with each other. This was described to me to be in part due to *bona-fide* practices in the paving industry (roads and runways) in that part of the country (in particular in Arizona and New Mexico). This construction is an example where single-site approval is required, rather than having a single operating approval nationally. Such differences reportedly made it difficult for national contractors, precluding their use of

²¹⁴ Interview No. 21, cited previously.

uniform national standards; further, with idiosyncratic local interpretations it was not possible to have FAA-based national standards be effective. Also, I can report from personal knowledge that there have been cases in which different offices have interpreted (and been widely known to interpret) vague rules differently, such as the various potential definitions of a "cross-country" flight (see glossary).

In March, 1988, Secretary of Transportation Jim Burnley convened a task force to review the FAA, placing "a high priority on reviewing the FAA's regional structure." He said,

The regional system is a relic of the days when aviation was a much less dynamic industry. It creates needless confusion and inefficiencies because the regions frequently interpret supposedly national, uniform standards inconsistently.

At the same time, FAA Administrator Allan McArtor, referring to the restructuring, said, "This is a job that needs to be done."²¹⁵

What was addressed may have been little more than a perceived problem: that is, decentralized (read inconsistent or idiosyncratic) decisionmaking made national policies difficult to standardize. This, in turn, made it difficult for national operators who required local approval in

²¹⁵ Department of Transportation, News Release DOT 18-88, 9 March 1988.

several regions. Differences in policies among the regions would be an issue for national suppliers, as was indicated in several interviews.²¹⁶ This is noted as a perceived problem in that I did not find a clear consensus in any phase of the research -- in interviews or elsewhere -- that this was a significant safety or operationally related problem in need of correction. For example, most operators, such as airlines, operate under certification only from the one region holding their operating certificate: there is no problem for them as individual operators who operate into several regions.²¹⁷ The operators encountering difficulty would be those with projects such as airport construction that had to undergo an approval process with each new undertaking in each new locale. Nevertheless, the lack of consistent policies across regions and the desire as expressed above by the Safety Review Task Force to bring policy control to Washington was ostensibly at the center of the reorganization. That point was to correct what was identified at the policy-making level -- that is, within the Department of Transportation, as evidenced by the DOT report

²¹⁶ Interviews Nos. 1 & 21, both cited previously.

²¹⁷ The term "operator" is used here in a broader sense than is defined in 14 CFR 1.1 for "commercial operator," which states "a person who, for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier or foreign air carrier . . . ". Here the meaning is any commercial operator, certificated air carrier or foreign air carrier, or other entity doing services under authority of an operating certificate or other authorization from the FAA.

-- to be an issue in FAA function, the lack of a standardized FAA policy across regions.

The Evolution of a Straight Line, Part II: Straightline Reporting

Following lead regions and directorates, a more sweeping reorganization was implemented: straightline reporting.²¹⁸ For aircraft certification, activities under the direction of the Regional Director were in 1990 placed under the direction of the Aircraft Certification Service at FAA Headquarters in Washington, D.C., reporting to the Associate Administrator for Regulation and Certification, with formalized authority over all certification directorates nationally. This is the very essence of straightline reporting.

Physically, there is no evidence of a change. The Transport Airplane Directorate is located in the same building with the Northwest Mountain Region offices in Renton. Their offices are maintained by Northwest Mountain Region, and Northwest Mountain Region handles the personnel lists. Administratively, however, the directorate is now a

²¹⁸ My first encounter with this word was in the summer of 1988, when -- on a visit to the statistical analysis branch of the FAA -- I was told to be alert for this thing called straightlining, which would radically alter the organization (Interview No. 7, cited previously). It is mentioned in internal FAA/DOT documents in April of that year, with the announcement of the recommendation of the recommendations of a "Task Force on Internal Reforms of the FAA" (28 April 1988) among several "improvements of practices and procedures including 'straightlining' of reporting relationships."

fully autonomous unit from the region with direct lines of reporting to Washington.

It has been reported to me that there were identifiable changes in function during the transition period of 1979 (the first implementations of lead regions) to 1990 (the formal establishments of directorates). The process for standardization was far more centralized than before the lead region structure was implemented, and was made even more formalized when certification was constituted as a directorate with authority only to Aircraft Certification in Washington. In interviews I conducted at both the Transport Aircraft Directorate and at the Seattle Aircraft Certification Office (also located in the same building in Renton) I was told that while there was some difference in going to lead region, a more significant change happened when all oversight of aircraft certification was removed from the regions.²¹⁹ This marked a point of full independence for the certification office from the regional offices: certification functions and lines of authority no longer went through the Region Director. It was matched fiscally as funding for the directorate came from Washington, as opposed to regional funding for offices in a lead region and when the directorates were under the Region Director. This was a new structure that had not existed before. Lead region first and then the initial

²¹⁹ Interview No. 43, cited previously.

implementation of directorates, which still reported to their respective regional offices, gave a regional program office standing nationally, but with the transition to a directorate reporting directly to the program office in Washington was the creation of a bureaucratic structure with separate channels of resources as well as authority (see Figures 7.3.1 and 7.3.2).

This notwithstanding, I was unable to determine that a significant change had taken place in terms of the actual conduct of the aircraft certification process. A real operational issue would be if something were to be referred to a higher level of authority for a policy determination. For example, when a fuel additive for preventing jet fuel from clogging, called *Hi-Flow Prist*, was marketed, a local office questioned if such a combustible liquid could legally be carried in the cabin of an aircraft. It asked the regional office for a clarification; however, I was told that this was an infrequent occurrence.²²⁰ In fact the manager of the ACO was the person who signed the certification for an aircraft or component, and that did not change with lead region or directorates. In reality, certification takes place at the local level, whether the

²²⁰ I was present in an FSDO when this issue of a combustible additive to fuel arose. The additive is supposed to be added to the fuel as the fuel is pumped into the aircraft's tanks. The issue was whether the additive could be bought in advance and carried in the aircraft, or if it had to be purchased at the same time the fuel was purchased.

certificating authority was the regional office or is a directorate. While administrative changes had been made, operationally there was not a fundamental shift in the locus of action.

Changes similar to lead regions and directorates were taking place in other FAA units as well as in Aircraft Certification. Flight Standards had never developed a lead region function. However, the Aeronautical Center had been at the center of Flight Standards activity, particularly standardization. Straightlining has centered the authority of Flight Standards clearly in Washington. Similarly, Air Traffic Services were removed from the oversight of the regional offices as the regional program officers were reassigned from the Regional Director to the program officers in Washington. However, although both of these units have had authority centralized, there is no evidence that the organizational restructuring changed the decision-making processes regarding safety.

This has produced a decrease in the authority and prestige of both the regional offices and the Aeronautical Center.²²¹ For example, in April of 1986, in a move to consolidate Aviation medicine expertise and responsibilities, the FAA transferred direction of the Civil Aeromedical Institute from the Director of the Aeronautical

²²¹ Nick Komons, *Draft Material for updated FAA History, 1978-1986* (FAA unpublished draft), p. 969.

Center to the Federal Air Surgeon, who reports to the Associate Administrator for Aviation Standards (see Figure 1.3a). Oklahoma City as a nationally unifying program center was de-emphasized. Long-time staff drifted back to their home regions, where they had permanent positions.²²² However, for regional staff, these positions were sometimes ambiguous. Regional program officers still were in positions of oversight with respect to the field offices in their regions, and these program officers still reported to somebody, but the region director and his or her associated staff were now cut out of the chain of command. For program officers both at field offices and regional offices this represented no significant change.

At this point in time, the beginning of the 1990s, the structure was in place.

Observations on the Process

Straightlining or Stovepiping?

The Scenario An issue that was raised in my interviews was the tension between centralizing authority within specific parallel channels on the one hand (the announced intended outcome) and operationally segmenting the organization into unrelated pieces on the other (not an announced outcome and perhaps a dysfunctional one). Changing the geographically decentralized structure may have

²²² Interview No. 36, cited previously.

created the opposite problem from the one originally identified and that precipitated straightlining. Evolving from regions to "lead regions" to "straightline reporting" created discrete chains of command for the discrete programs. This was the explicitly desired outcome. The chains of command remain discrete to and within Washington: that is, even within the Washington headquarters there is a separation among the various FAA units. As a case in point, at the regional level aircraft certification functions are no longer under the purview of the same office as all the other functions in the agency (e.g., air traffic, airways, etc.).

Either form is consistent with organization theory that postulates loose-coupling among units. With loose coupling, units can function with little interplay from other units in their organization; however, they also may drift in purpose from those units. This is sometimes considered a good form that is intentionally engineered into the organization. The loosely coupled organization prevents separate functions from interacting. In some quarters a "Chinese wall" is intentionally engineered into an organization so that a formally segmented structure permits different units to perform tasks that may be inherently a conflict of interest, for example permitting a brokerage house to act as both a vendor of issues and an advisor to buyers.

Previously the loose coupling in the FAA was between the regions; now it is between programs. This latter outcome in the FAA is not unreasonable. Some subjects think this is a good idea, and there is some legal foundation for this, such as the dual-mandate promoting alternative goals that the organization must recognize. In fact, there is strong sentiment for a clear differentiation among the FAA's units. This exists as both a matter of professional *esprit-de-corps* and of politics.²²³

²²³ Interview No 36, cited previously, and Interview No. 31, which was with a person selected as participants who could reasonably provide information on present and past FAA policies and on the history of selected actions. This person held the rank of Associate Administrator, and was particularly forthcoming in describing the political, intra- and inter-governmental roles that the agency as a whole and he in particular had to play. In particular, he stated that there were strong elements of support within the organization for particular units and professions. His critique of the structure was in part that

- concerning Flight Standards, people are all in second careers [a virtual requirement based on the experience requirements, typically several thousand hours flight time for flight inspectors and analogous requirements for maintenance inspectors], and so they have high professional standing and morale, but Flight Standards pay scales vis controllers and air-line pilots are very low;
- the FAA is an organization of people whose vocations and avocations coincide -- while in administrative and legal areas this is only occasionally true, in Aircraft Certification and Flight Standards [i.e., those units under the Associate Administrator for Regulation and Certification] there are people who build and own their own aircraft, and their commitment to aviation as goal is stronger than could be found with respect to the formal goals in any other agency;

(continued...)

Such differentiation has been identified by sources both internally and externally as a problem. This is referred to as "stovepiping," and, like straightlining, this term is heard around the FAA.²²⁴ In these scenarios, there are multiple discrete structures; loosely coupled, exercising different tasks and having discrete goal-setting mechanisms (see Figures 7.3.1 and 7.5). This is not necessarily different in operation from the previous structure, but the restructuring formalized these discrete channels and kept them separate through to the headquarters offices. So the evidence of high *esprit-de-corps* in Regulation and Certification may also be evidence of a lack of coordination with other units.

²²³ (...continued)

- concerning Regulation and Certification, it is only one quarter of the FAA, the other three [Air Traffic, Airway Facilities, and the related operational and development elements] are the problems [this is an overly centric view of the FAA: cf. Figure 1.3];
- management at other branches is weak; and
- concerning Air Traffic, there is not a lot of credibility on Capitol Hill.

²²⁴ Interview No. 36, cited previously, and No. 37, who held the FAA position of Special Assistant for Environmental Affairs in the in the Office of Environment and Energy, Office of Aviation Policy, Plans, and management Analysis, who was referred to me by Interview No. 21, and who agreed to be available as an informant concerning those FAA policies and actions about which some insight could be offered: he was the first person whom I heard using the term, and he stated that this was an ongoing issue even though an task force had been established to facilitate communications among managers in the different units.

If This Is a Problem, Where Did It Come From? It was reported to me that the FAA had established an executive task force to facilitate intra-unit communications. At the executive level this is viewed as a dysfunction of straightlining that requires attention.²²⁵ The task force is designed to eliminate the isolation of the units; however, I was informed by the same person that this has not eliminated the perception of stovepiping. Thus within the headquarters there is a divergence of program goals that is viewed as dysfunctional.

Whether or not this issue of "stovepiping" is a result of the reorganization or existed already through other mechanisms, the "problem" with stovepiping is that unit goals may diverge from the foreseen overall goals of the organization and may not be clearly under the control of a central policy-making body within the organization. These units may develop autonomy in their goal-setting, and even if it is not from the central headquarters it may at least be so from each other. It may be evident from the foregoing, and it will be argued again shortly, that units such as the Regulation and Certification unit have done exactly that in contrast, in the foregoing example, to Air Traffic. Not only do these units have formally different functions, but also they view themselves differently and operationalize their goals from these different

²²⁵ Interview No. 37, cited previously.

perspectives. Such apparently autonomous goal-setting will also be made evident in the subsequent case-study, on the FAA's implementation of Executive Order 12291. Evidence is presented of the organization developing autonomous goal-setting mechanisms among its units and retaining those autonomous goals within the central headquarters. This can become a firmly entrenched condition as differing senses of mission become the guiding principals for operationalizing goals within the separate units.

The stovepipes may in part be the result of an administrative artifact of the restructuring. It was noted earlier that in the 1961 reorganization the statutory Deputy would be the individual responsible for being the general manager of the Agency's operations, coordinating the activities of the regional offices and the operating programs in Washington. This role was superseded by the creation in 1987 of an Executive Director, who performed these functions. Under the straightline reorganization (June 1988), the FAA increased that number and presently has three Executive Directors who are responsible for various functions under the headings of System Operations, System Development, and Acquisition and Safety Oversight, and each of these Executive Directors oversees at least one Associate Administrator and at least three units overall (see Figure 1.3 for the organization chart indicating the various Executive Directors, Associate Administrators, Assistant

Administrators, and units, and Figure 1.3b for details on the nomenclature of unit naming). As the Executive Directors report directly to the Office of the Administrator, the segmentation of the organization begins at the very highest levels.

Even within the scope of a single Executive Director there is strong segmentation. One high ranking administrative person referred to the piece of the FAA under the Associate Administrator for Regulation and Certification (that is, Flight Standards Service, Aircraft Certification Service, and Office of Rulemaking) as "the real FAA," specifically contrasting these services to the operating services (Air Traffic and Airway Facilities), even though Air Traffic, Airway Facilities, and Regulation and Certification are all under a single Executive Director.²²⁶

An organization might develop a vertically segmented form of administration (i.e., straightlining) on its own if that is the best way for it to operationalize its goals. With its dual formal mandates of being both operational and regulatory it would not be surprising for the FAA to have evolved a loosely coupled form to meet its operational needs.²²⁷ This is simply the organization responding to two

²²⁶ Interview No. 31, cited previously.

²²⁷ As a clarification, the organization does not know that operation and regulation are contradictory any more than a fox knows that eating all the rabbits and having enough rabbits left to insure future rabbits are contradictory. In
(continued...)

difficult to reconcile formal goals: it tries to do them both, and finds the best way to do them is to separate the functions as strongly as possible. It may do this more or less well depending on one's perspective. It is a reasonable response of the organization to its environment. Horizontal buffering by regions did not suit this need as the different tasks were joined under single administrative units.

The contingency theory of organizations suggests that there are no ideal types but instead evolutions that do certain things more or less well.²²⁸ The vertical administration may not be formally prescribed, or if it is it may not be defined in the way it is operationalized, but the structure of the organization's environment may lead to such a form. Loose coupling in any organization may lead to internally differentiated goals and objectives regardless of formal structure. This supports the ability of the organization to function. It has been noted that complex

²²⁷ (...continued)

fact, the framers of the Agency Charter did not necessarily know that these were contradictory functions they were vesting in the single organization. Although they appear contradictory, the strongest things to be said are (1) that they evolved that way, (2) they are now perceived to be contradictory, and (3) the organization's functions may appear compromised. As a result of this, individuals in the organization may feel role strain, and segments of the industry may be dissatisfied.

²²⁸ For example, Paul R. Lawrence and Jay W. Lorsch, *Organization and Environment: Managing Differentiation and Integration* (Boston: Graduate School of Business Administration, Harvard University, 1967).

organizations may be composed of, and depend on for their function, a number of similarly structured but unconnected units.²²⁹ Similarly, a change in formal structure such as the FAA underwent has been described as a signal to outsiders that change is occurring independently of whether or not the new "goals" (in the case of the FAA more cohesive national policy) are pursued.²³⁰ In effect, the issue of lack of coordination was not addressed meaningfully, and, as the quotes above from an Associate Administrator demonstrate, the agency continues to display different operationalizations of its goals through its core units.

Visible Contrasts in the Agency Several forces in the structural vertical form of the agency have been identified. Central to them is the formal dual mandate the organization faces, as discussed above and in the Chapter One on the FAA's structure. This division presents daunting tasks for managing the organization. In fact, *esprit de corps* within the FAA is not universally "good" or "bad"; rather it varies from unit to unit. Within the professional organization, in Flight Standards, for example, morale appears quite high, based on interviews with Flight Standards personnel who not

²²⁹ W. Richard Scott, *Organizations: Rational, Natural, and Open Systems*, 2nd edition (Englewood Cliffs, N.J.: Prentice Hall, 1987), p. 84.

²³⁰ Marshall Meyer, "Organizational Structure as Signaling," in *Pacific Sociological Review* No. 22 (October, 1979).

only self-reported their morale as good but also indicated that they believed that Flight Standards works well. Air Traffic Control -- a more technical unit -- still suffers from many of the same problems experienced when the controllers' struck in 1981, and no controllers self-reported morale as high (although some did say that they liked their work as controllers). This indicates an organization that has developed multiple internal elements. They not only have already defined alternative formal goals but also are capable of generating alternative operational goals, but in this case simply operationalizing the formal goals at face value produces units within the organization that do not want to do the same things. In fact, straightlining has only reinforced this already contradictory trend in the present from Agency Charter. This is the FAA as the stovepiped organization.

A method by which such separation of structure has happened within the FAA is that right from an employee's entry into the professional fields of the FAA, the person is channelled into ATC, Flight Standards, or some other track, and the training for that is done at the FAA Academy in Oklahoma City. Controllers, for example, all go to controller school there regardless of the region into which they will ultimately be posted.²³¹ Flight Standards

²³¹ An example of professionalization, which may ultimately serve as an alternative rationale for operationalizing goals among controllers.

inspectors also go to school there, but as a separate cohort, honing different skills. Thus, distinct identities are developed at the worker level.

Evidence of stovepiping, segmentation, and rivalry can be seen in some agency publications. For example a publication of one FSDO, mailed to all of the FSDO's local pilots, develops the argument that air traffic control is something that is to be taken with an appropriate amount of subversion.²³² In an article entitled the "Ten Rules of Aviation" one finds mostly cute comments on safe flight; however, several of them have an edge to their humor, and taken together (and somewhat reordered) they tell a larger story:

TEN RULES OF AVIATION

- I Do not bust your butt
- II Do not let anyone else bust your butt
- III Remember, the pilot is always the first to arrive at the scene of the accident
- IV If in doubt, . . . get out!
- V In instrument flying, one peek at the ground is worth a thousand cross checks.
- VI Thunderstorms and ice are like being just a little bit out of fuel, . . . there is no such thing as just a little bit.
- VII Forgiveness is easier to obtain than permission.

²³² The Albany Flight Standards District Office, *The Albany FSDO Copilot* (Vol. 2, No. 3, Fall, 1994).

VIII Remember, airplanes fly because of Bernoulli not Marconi.

IX If a crash is inevitable hit the softest and cheapest thing you can find as slowly as possible.

X What you don't say, you don't have to take back at the hearings.

XI Don't forget rule one

For the uninitiated, this is clearly humorous. It reminds pilots of a number of concerns that are constantly raised about flight safety in small aircraft and transport category aircraft. Most planes do indeed have adverse reactions to ice and thunderstorms, although many larger aircraft, and some light ones as well, are capable (legally as well as physically) of flight into known icing conditions.²³³ The point is that ice is bad; so are thunderstorms. What is more telling is that there is a pattern in these rules that locate pilots in opposition to controllers. Rule eight is the more telling comment. Bernoulli refers to the law of gasses that states that pressure drops as velocity increases: the airplane flies because it is drawn into the air by the lower pressure of the accelerated air over the top of the wing.²³⁴ Marconi

²³³ However, in point of fact "severe" and "extreme" icing are defined in the *Airman's Information Manual* as icing conditions in which on-board de-icing/anti-icing equipment are not capable of handling. This means, put simply, that there are conditions in which no aircraft can be operated safely.

²³⁴ Yes, airplanes, gliders, and rotorcraft are sucked up from above, not pushed up from below.

invented the radio. The implication is clear -- fly the airplane first and don't let the radio (i.e., ATC) interfere with that task. This brings rules three, one, two, six, and four into a different context. Since the pilot is the one who will be intimately involved with an accident, don't let somebody else cause it (for example, do not let ATC provoke the pilot into making a poor decision, such as continuing on a heading that will bring the plane into a thunderstorm). Items seven and ten are as suggestive as eight: seven tells the pilot to act first, then ask ATC for permission; ten recommends saying as little as possible (to be recorded by the ATC tape recorders).

This shows how Flight Standards is actively teaching pilots to win a game being played with another unit of the agency. While humorous on the whole, the bottom line is that units of the agency are competing. Why this should not be an issue to the formal bureaucracy while decentralization was an issue is explainable if one considers the concern over decentralization to be a symbolic concern of appearance and not an operational one of formal bureaucratic function.

An Aggravating Issue: Air Traffic Control and the Strike

Even without the formal process of vertical administration, the ATC situation was creating vertical administration. Within the FAA, ATC was described to me -- as seen from the outside -- as a purely technical unit, with

rapid but limited advancement.²³⁵ And, as noted above, no controllers reported high morale even when they liked their work. This is not a recently developed situation, so before the effort to separate and clarify lines of command, the idea that ATC was out there and somehow different was already present.

In this context the 1981 controllers' strike requires a brief mention in the context of organizational segmentation as it is related to the vertical administration of the FAA. The strike exists today as a real issue. It put ATC into the context of a "them" to a large and influential segment of the FAA and its supporters. To some it appeared to have strengthened the FAA. One subject said it made the FAA look like "John Wayne" in the way it dealt with the controllers. Queried on that expression, the subject explained that a John Wayne image was something admirable in Washington.²³⁶ However, another subject lamented that the FAA had lost a great deal of credibility with the Congress and the public

²³⁵ Interview No. 31, cited previously: Controllers can advance within their first five years to the G-15 grade, at which point they are at their highest pay level. It can take Flight Standards inspectors decades, if ever, to reach this same grade normally, which in Flight Standards is normally held by management personnel or headquarters staff.

²³⁶ Interview No. 23, an FAA manager in the Office of Budget, Operations Division, who was referred to me by Interview No. 21, and agreed to be available as an informant concerning those FAA policies and actions about which some insight could be offered: he stated that on the whole the action taken regarding the controllers was considered admirable in the Washington political structures.

for not having been able to keep its own house in order.²³⁷ Each of these perspectives has been confirmed: numerous subjects commented that the strike caused organizational soul searching and was a catalyst in forcing the FAA into attempting to change its management approach in all of its units, including the establishment of the Center for Management Development in Palm Coast, Florida. Some subjects described traditional FAA management as militaristic, and some said that it still has not changed. This management style had deep roots. Several interviews indicated the following:

- that in the United States aviation in general and the modern FAA in particular had been built in large part around the military experience of World War II;
- that the airlines and the manufacturing industry had grown out of the mass of trained pilots, mechanics, and manufacturers of that era;
- that the FAA had therefore been white males with military backgrounds; and

²³⁷ Interview No. 31, cited previously, who stated that on the whole the action taken regarding the controllers was considered a poor recommendation for agency management policies in that it could not effectively deal with employee relations and thus precipitated a national crisis. This is in contrast to the observations of No. 23. No. 31 was in the agency at the time of the strike, while No. 23 was not in the FAA at that time. This is likely an insider versus outsider perspective of what was perceived.

- that there was a tendency for it to want to stay that way.^{238, 239}

This may be balanced by professional *esprit-de-corps* in units such as Regulation and Certification, as in fact an FAA built around former military personnel in key professions would be framed by their experience.²⁴⁰

However, it may not be balanced in other services. It seems that the FAA still suffers from many of the same problems that existed at the time of the controllers' strike in 1981. These issues only serve to strengthen the senses of individual identities within the separate units.

The continuing legacy of the strike is that it brought to the forefront a legacy of separate identities. This has

²³⁸ As a general rule this sentiment was expressed in one way or another in all interviews. It was expressed especially in Nos. 31 and 36, cited previously, and in No. 29, which included two Service-level management persons in Aircraft Certification, one a woman in the FAA for approximately a decade, the other a man in the FAA for approximately three decades.

²³⁹ The issue of militarism is not merely a negative view of a formally organized and tightly run bureaucracy. In the interviews cited it also was tinged with a vague sense of racism and sexism that had its roots in the military, as in "why is the FAA overwhelming a white male organization?" The makeup of the proto-airlines and the CAA of the pre-war (1930s) and post-war (1945-1960s) era was white male; in the post-war era it was also predominantly military. This characteristic has tended to be reproduced.

²⁴⁰ Although morale is not uniformly high in these units, either. As noted in the previous chapter, there is a sense that the needs of symbolic politics, in the sense of administrative tasks such as answering Congressional inquiries, takes an inordinate toll on staff in Regulation and Certification.

added to the effect of separate units as the agency has been formally restructured to match this traditional functional separation. This dovetailing of form and function -- in what is at best a volatile marriage -- simply augmented the appearance of the dysfunctional form. This functional separation within the organization has been aided by the reorganization process. This may have unique policy implications, but that is not clear, as the formal reorganization has simply exacerbated existing structural elements within the organization.

Another Aggravating Issue: The Continuing Discussion of Separation and/or Privatization

Straightline reporting, vertical segmentation, stovepiping, high *esprit-de-corps* in particular units, all feed into the issue of the FAA as a condominium. The FAA has periodically existed, and continues to exist, under the shadow of disassembly or privatization. This seems to come in part from what was mentioned by one subject as the air traffic control "problem": several subjects indicated a belief that the operational side of FAA (sometimes including Airways Facilities along with A.T.C.) should be separated from the regulatory side of the organization (specifically Flight Standards and Certification). This has also been receiving active consideration and a high profile in the

press.²⁴¹ In Washington, a middle-level FAA manager and a non-FAA subject both suggested privatizing Air Traffic Control and Airways Facilities while maintaining Flight Standards and Certification as the Federal agency.²⁴²

This issue was in fact made public in 1988 at the same time as straightline reporting was announced. On 28 April, The DOT Secretary stated that

Specifically, I believe the air traffic control system and the approximately 30,000 people who operate and maintain it should be freed from governmental red tape that impedes the purchase of new equipment, inhibits the development of modern personnel policies and creates chronic budget uncertainties. To do this effectively requires moving the air traffic control system out of the FAA and this Department. I have expressed reservations about "privatizing" or giving "independence" to the safety regulatory side of the FAA, but the latter is a relatively small percentage of its budget and personnel.²⁴³

There may be real, operational, functional reasons for spinning-off the non-regulatory functions of the FAA. The regulatory apparatus of the FAA has high esteem on Capital

²⁴¹ There have been a number of articles in the 1994 - 1995 period in *The New York Times* about spinning-off of ATC.

²⁴² Interview No. 36, cited previously, felt very strongly about this issue and suggested it was widespread in her field of expertise. Interview No. 21, cited previously, also agreed with this.

²⁴³ Department of Transportation, News Release, Advance Press Copy, 28 April 1988.

Hill.²⁴⁴ One high ranking administrative person referred to Flight Standards and Aircraft Certification as "the real FAA."²⁴⁵ Both internally and externally there were informants and participants who indicated that there is an organization where things work properly and another one where things do not work well. The more dramatic and somewhat less prevalently voiced generalization was that they should not be working together.²⁴⁶

It is not unreasonable to speculate that some part of straightline reporting was that it would make formally discrete units that would be simple to pry apart. Of course, it is also possible that this is a coincidence. Regardless of what intentions existed in this regard prior to the reorganization, now there do exist such discrete units, and it would be easier to pry them apart than it would were the chains of command still firmly centered under region directors. While this may not have a specific visible before/after effect on a decision made in any one

²⁴⁴ Internal and external interviews have cited this: for example, interview Nos. 29 and 31, FAA staff cited previously, and interview No. 36, Congressional staff cited previously, was emphatic about this.

²⁴⁵ Interview No. 31, cited previously.

²⁴⁶ This evidence was developed exclusively at the highest levels of the FAA and from people in oversight positions. Field people appeared to be pretty much oblivious to the political levels at which these issues play out. Most vocal were the people in the FSS & AC chains of command, who were convinced that they did things right. They based this to a large extent on their own perception of their own professional status.

program, it does feed into the sense of separate identities in the FAA as long as people can say "we're the real FAA."

The Role of the Goal Processes

Organization goal processes have had implications in how reorganizations are implemented and played out. Safety has never been the issue in these reorganizations. An issue was always announced in terms of improving function. It was stated and a remedy applied -- a lack of consistent national policies would be remedied by straightline reporting -- on the surface an objective response to the presenting problem. The structures for the remedy were all more or less in place to begin with and the issue was never tied to the key agency function of safety -- program offices existed in Washington and the regions all along and were involved in safety and standardization -- a reorganization with little internal rearranging but strong symbolic meaning to outsiders. Key restructuring took place within geographical or political limits -- aircraft certification functions were localized with respect to key manufacturers and nominal authority was centered on the political apparatus in Washington. The restructuring notwithstanding, key decisions continued to be made without substantive changes to process -- lacking a clear issue related to both formal and functional goals of safety, the agency went through the motions of response without change. These are goals that are clearly symbolic.

Objective Response

The reorganization was ostensibly an objective response to an issue that was publicly stated by the Department of Transportation. This issue was that non-standard policy implementations were a problem to be remedied, and the regional structure was therefore to be modified. The reorganization was a key modification of the chain of command and represented the operationalization of a fairly simple theoretical premise: that hierarchical administration will produce more uniformity of -- and more control over -- decisions than geographic administration.

The regionally-based structure of policy implementation was itself the result of an ostensible objective response to an issue, that of not having sufficient resources in the Washington headquarters to adequately conduct required tasks. The FAA, with the help of the DOT and the industry, identified a different issue, that there was not standardized interpretation of statutes, regulations, and policies at the FAA's regional offices. The objective response to this was to establish a structure to remove the authority to interpret statutes, regulations, and policies from the regions and vest them in Washington.

Central authority does indeed facilitate standard policies and decision making. It prevents idiosyncratic responses to issues based on the availability of multiple individuals making interpretations of the situations to

which rules must be applied or interpreted. To this end, straightline reporting appears to facilitate a more uniform response to issues, and so is a support to the uniform interpretation and attainment of objective goals. However, this can not be reconciled with the lack of an unambiguous issue tied to the formal or operational goals of the agency. Without a safety related issue or an issue detrimental to the health of the industry, restructuring meets other goals than to remedy issues. These cases were never made. Rather, the issues were constructed around the FAA's processes of meeting those goals. Thus, the issue was not did the FAA have an issue that needed to be remedied in order for it to meet its formal mandate: it did that. Rather, the issue was in control and execution of the processes.

A serendipitous, if not objective, outcome of the reorganization is the *de-facto* creation of a loosely coupled structure. The differentiation between functional units such as Flight Standards and Air Traffic Control that now runs through to the headquarters is evidence of a loosely coupled structure, one that is so loosely coupled as to permit the "ten rules" to be promulgated. This is a useful response to the need to perform by statute two different formal goals. Further, within the goals, tasks that could be potentially in conflict are also loosely coupled outside headquarters. Thus, stovepiping may be a useful response to

the vexing problem of both operating the airspace system and regulating it at the same time. Unfortunately, this rationale was never made explicit as a goal in the reorganizations, and if it were to have been so clearly stated may well have come under scrutiny as a preamble to the oft-considered ATC spin-off. Nevertheless, loosely coupling, formally as well as functionally, is not a bad thing for an agency that both operates and regulates the national air space system. It is, in fact, even if by accident, a good response to that issue.

Symbolic Response

This is the most appropriate of the goals. It is almost a pure example of the need for the FAA to appear a rational bureaucracy. The need to create the centralized structure was never stated in terms of safety or supporting the industry, the two formal goals. But at issue was not whether there was a problem or not. The regional decentralization had a history of decades, was itself the response to a problem, and was not static. While there may have been an appearance that having different interpretations was dysfunctional, even when none of the interpretations were in themselves dangerous or erroneous, that case was never proven, and the dangerousness was never an issue. However, once the FAA Administrator announced that this was a problem, a job that needed doing, the agency then had to do something, although, as was argued, the

response created a new problem, which does not have to be publicly remedied because it has not been announced to the public as a problem.

The need to straightline was a need that was inferred by DOT, rather than being something that was the cause of an accident or a part of the airways system. The FAA as a decentralized body did not precipitate the controllers strike, did not precipitate any accidents, did not prevent any airliners from being certificated. Thus, straightline reporting was answering a symbolic need, publicly stated by DOT, to make uniform practices even where a lack of uniformity could not clearly be identified as a problem. What is more, the nature of the reorganization, which was to keep the existing structures intact and simply redirect the paperwork that was following the path from the Regional Program Officer to the Region Director to the path from the Regional Program Officer to the Headquarters Program Office, at the same time leaving the regions in place, was a low cost, high symbol response (see Figures 7.3.1 and 7.3.2).

This structure also facilitates national policies when the perception of symbolic actions emanating from a national authority is desired, and in fact it makes centralized political control of the organization more feasible. Thus, as a pragmatic aid to a symbolic goal structure, this is exactly what is needed: visible central control of the goal-setting mechanisms. Indeed the reorganization did little

than to make a symbolic action with little change in processes or outcomes.

Multiple Patron-Client

The FAA had been criticized for not having uniform national standards, but this was never alleged to have been a problem from the point of view of safe operating practices. In fact, no significant external interest groups had any stake in the outcome, and thus the local industries did not bestir themselves. Even from the point of view of national standards, decentralization had minimal impact as true national standards with respect to local operators were being set at their local level. Although some operators perceived a problem, they -- as an influential group -- were probably not enough to have their voices heard and produce this reorganization. In fact, there is no evidence that industry groups favored the reorganization or even made any opinion at all known to the FAA.

There is some outward appearance of industry patron influence. The establishment of lead regions and directorates in Aircraft Certification, with the offices of Transport Airplane sitting across the street from -- indeed surrounded by -- the Boeing Corporation is not simply a coincidence: it was built that way. So too it is with the other directorates. The influence of these significant industry players is being tacitly acknowledged, but it does not demonstrate, and indeed it is not demonstrated, that

this is used to undue influence. This demonstrates the impact of industry on the fundamental structure of the organization. However, the geographic proximity of the one to the other is not *prima-facia* proof that influence is being exerted, and in fact geographic proximity is no longer as critical to national influence as it used to be, what with air travel and electronic communications.

Garbage Can

Given the context of the symbolic response goal, this is a reasonable secondary goal. In light of the need to produce a symbolic response, a ready fix was fit to the issue announced. The fix was the removal of authority from the regions, bringing the FAA back to the centralized structure that it had had decades previously. That decentralized structure had itself been a garbage-can response to the issue of inadequate central resources to meet an increasing demand for regulatory and operational support. All of this was done within the framework of existing FAA structure, and thus was able to be performed without excessive expense being borne by the agency. In addition, the basic structures exist to continue to vary the agency between decentralized and centralized forms should those needs arise in the future. Thus, one criteria for agencies making garbage-can decisions is apparent: the uncertainty of the long-term requirements of the environment. Goals here are uncertain: that is, the goal

was never to make a permanent fundamental restructuring but instead to respond to an externally perceived crisis.

While the FAA was touting how it had fixed a problem it did not explain how it had planned to avoid another problem. Stovepiping is not an issue of crisis proportions, and will not be until it is constructed in those terms, yet it is viewed as a problem by some in the agency. Without the construction of a concern the issue does not have to be eliminated, thus the organization does not respond. Like decentralization, which the agency also did not construct as a problem, the agency lacks an internal drive to undertake a fundamental review of its structure and processes.

In Summary . . .

Over time, the FAA has dealt with a number of organizational changes. These have included its evolution from being part of the Department of Commerce, to being an independent Federal Agency, and finally the transfer of its oversight to the Department of Transportation with the creation of that entity. Over the course of this century these changes have come and gone, and it is not surprising that the organization should continue to change as we near the year 2000, the end of the first century of powered flight. Several issues are prominent in the FAA's currently evolving history. These include both internal and external restructuring, and they are centered not only in the FAA but also in United States society as a whole. The FAA has

rebuilt its chains of command, has undergone a divisive strike, and now faces the consequences of these developments. In addition, the contemporary political climate questions the role of organizations such as the FAA and this poses additional issues for the FAA and the government as a whole.

Straightline reporting was the transition of the FAA from geographically-based administrative units to hierarchical administration of functional units. This may be conceptualized as horizontal versus vertical administration: horizontal administration is dispersed across a map, while vertical administration goes directly down to local offices. This was a key modification of the chain of command and represented the operationalization of a fairly simple theoretical premise: that hierarchical administration will produce more uniformity of -- and more control over -- decisions than geographic administration. This is especially true if the geographic units are functionally autonomous while the hierarchical restructuring develops strong lines of authority within the functional units.

Ultimately, a standard interpretation of policy was implemented by having the regional offices of the various units of the FAA report directly to their headquarters offices in Washington instead of going through the regional administrators. The internal structure changed from one of

the local offices of the various units reporting to the Regional Director, who reported to Washington, to one of reporting through a hierarchy of unit offices to the unit headquarters (in Washington or elsewhere), which in its turn reported to FAA Headquarters in Washington (see Figures 7.3.1 and 7.3.2). Thus, as a mature policy, this was the culmination of an ongoing process of eliminating areas of inconsistency among the various regional offices by creating single decisionmaking areas within the functional segments of the organization.

There was a progression in the ongoing process of standardization. First, there was a reliance on non-regulatory material and on internal standardization. This relied heavily on such agencies as the FAA's Oklahoma City Center. After straightline reporting, programs in Oklahoma that had previously reported to the Director of the Aeronautical Center were now reporting to their Washington offices. Second, a reliance on formally standardized procedures through decentralized units occurred, producing formal standardization while not locating standardization in the Washington headquarters. This maintained the decentralized regional structure of the agency while remedying the issue of non-standard regional interpretations of policy. Finally, a formalization of structural reform was developed and implemented based on program chains of command. This dismantled the decentralized regional

structure of the agency and placed formal control of field units in functional chain of command to their headquarters program offices.

The contemporary functional restructuring from horizontal administration to vertical administration represents an action that had clearly defined intentions. These were publicly stated as to increase the agency's effectiveness, national standardization, and accountability. But the FAA is not jig-saw puzzle that can be assembled at will by a master puzzle builder: there are more factors at work than can be controlled or foreseen. Its implementation demonstrates the ramifications of the FAA's operationalization of that decision. The organization has developed multiple internal processes that have alternative formal goals and are capable of generating alternative operational goals.

Restructuring has had several consequences. Evidence from interviews has indicated that there has been a lack of integration at headquarters of the organization's units, thus creating the stovepiping phenomenon, an unintended affect. However, for some of these units it has effectively strengthened their internal cohesion (e.g., Aircraft Certification Service, Flight Standards Service). As a result, these units have the power to set their own formal goals and can operationalize agency-wide goals irrespective of the goals established or envisioned by headquarters (see

Figure 7.5). Further, these units may not be successfully integrating themselves into the organization as a whole (intentionally or otherwise). Evidence gathered in the interviews indicates both a high *esprit-de-corps* in units such as Aircraft Certification and Flight Standards and the existence of "we versus them" attitude between these units and other units in the FAA. This leaves the FAA with several possible restructuring options, including remaining as it is (see Figure 7.4).

At the beginning of this chapter several key questions were posited. They were, how were these changes operationalized, met, or evaded; how do they reflect issues such as collegiality and professionalization within the organization; how were internal process, specifically the rule-making process, affected; and how did safety considerations influence the decision to reorganize; and, almost as an afterthought the most important issue, what, if any, was the effect on safety of the changes in authority and structure? The answers to them have been set forth above. It is interesting that to the last two questions, on safety, the answer is that safety was not an issue at all. The symbolic response of doing something that did not in fact change anything was both a symbol to the patrons and an action that did not alter in a fundamental manner the way in which tasks are conducted.

Figure 7.1: Changes in Locus of Authority, CAA era to the present time

DATE	LOCUS OF AUTHORITY	ACTION
1946	Sub-Central	Creation of FAA Academy in Oklahoma City.
1946	Regional	Approving authority for flying schools, repair stations, ground schools, mechanic schools, and parachute lofts transferred to regions from Washington, D.C.
1946	Regional	Authority to issue production certificates transferred to regions from Washington, D.C.
1948	Regional	Authority to issue aircraft type certificates transferred to regions from Washington.
1949	Central	Program Directors in Washington given greater authority over program offices in the field.
1955	Central	Lines of authority officially defined as running through program Directors in Washington to the Regional Directors.
1958	Exex-Sub	Civil Aeronautics Administration, DOC, becomes an independent Federal agency, the Federal Aviation Agency.
1961	Regional	Decentralization of operational responsibilities and broadening of authority of Regional executives.
1964	Regional	Authority to designate airspace in terminal areas transferred to regions.

(continued)

Figure 7.1 (continued)

DATE	LOCUS OF AUTHORITY	ACTION
1965	Sub-Regional	Creation of area offices (within regions) to further decentralize agency structure: goal is to give area managers line responsibility over Air Traffic, Flight Standards, Airway Facilities, and Airports, programs previously in hands of Regional Directors and Regional Program Division Chiefs. (Referred to as the "Agency Long Range Decentralization Program.")
1965	De-Central	FAA Aeronautical Center, NAFEC placed under directors reporting directly to the Administrator.
1966	Exec-Cent	Creation of Department of Transportation, consolidating various Federal units including the FAA [and creating a new entity, the National Transportation Safety Board].
1967	Executive	DOT begins operations: FAA transfers from independent agency (FA-A[gency]) to operating administration (FA-A[dmministratin]).
1970	Regi-Centic	Area Offices program (see 1965) terminated: program oversight returned to Regions.
1980	De-Central	Lead Region initiated: Headquarters staff functions transferred to selected regional locations; key regions to determine national policy
1982	Sub-Central	Creation of directorates under authority of respective Region Directors.

(continued)

Figure 7.1 (continued)

DATE	LOCUS OF AUTHORITY	ACTION
1985	Central	DOT Safety Review Task Force: DOT urges centralized policy interpretation, elimination of regional autonomy.
1986	Central	Units at Oklahoma City begin to be reassigned to reporting to their program heads in Washington instead of to the Director of the Aeronautical Center.
1988	Central	Secretary of Transportation announces centralization of authority over field offices assigned to their program offices in Washington; also, regional and center counsels report to Chief Counsel in Washington (Straightline Reporting).
1988	Central	Separation of directorates from authority of Region Directors.
1988	Central	Region Directors retitled Region Administrators as they are removed from the Chain of Command and become representatives of the Administrator.

EXPLANATION OF TERMS:

Central: Authority moved from lower level to central level.

De-Central: Authority moved from central level to lower level (regional, non-regional, or specified regions).

Sub-Central: Authority placed in level lower than central level (regional, non-regional, or specified regions).

Regional: Authority moved from central level to regional level

(continued)

Figure 7.1 (continued)

Sub-Regional:	Authority moved from regional level to below regional level
Regi-Centric:	Authority moved from below regional level to regional level
Exec-Sub:	Executive Branch reorganization: FAA becomes independent Federal agency
Exec-Cent:	Executive Branch reorganization: FAA becomes part of Department of Transportation

SOURCE: *FAA Historical Fact Book: A Chronology, 1926-1971* and other published records of the FAA and non-FAA sources.

Figure 7.1a: Changes in Locus of Authority, CAA era to present

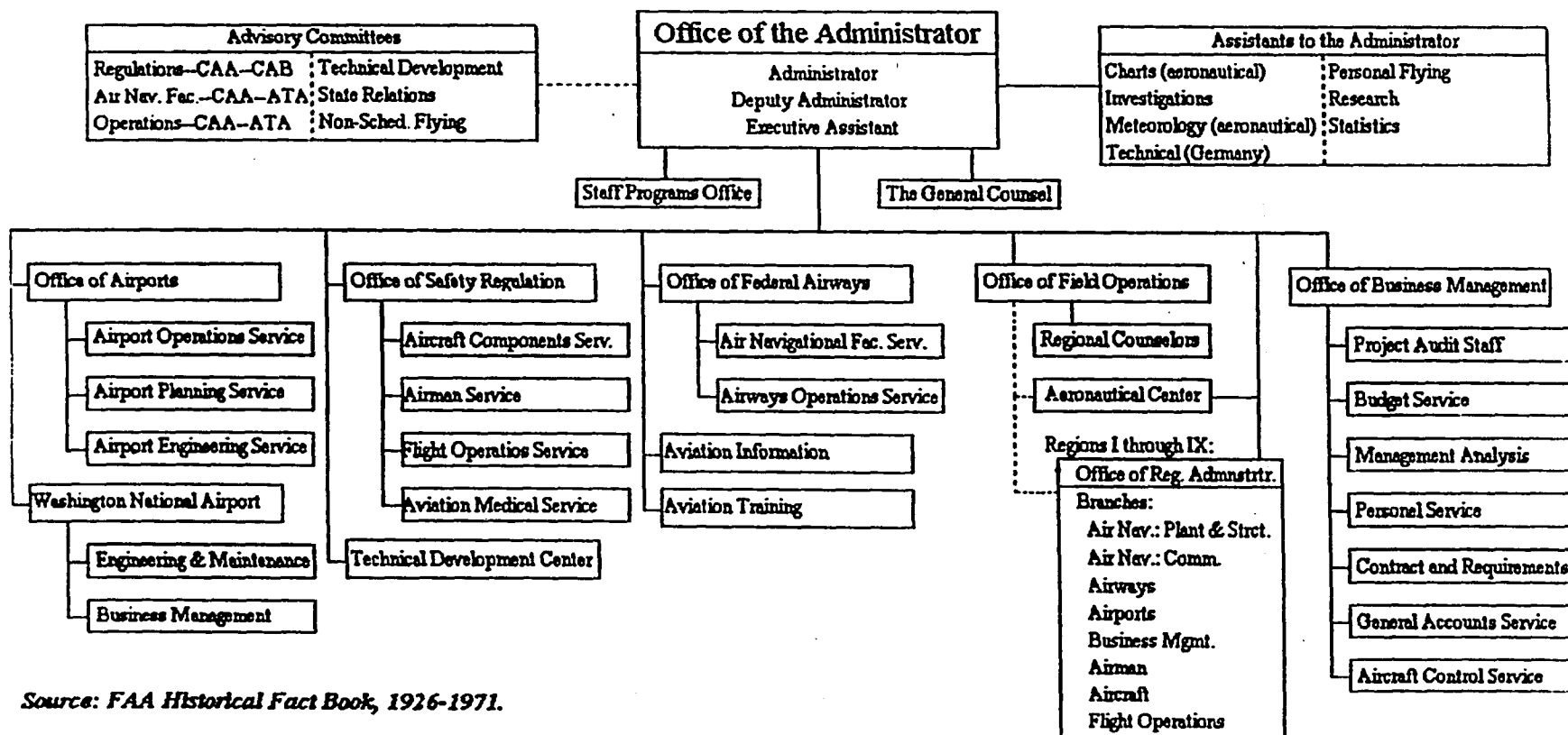
DETAIL: Aircraft Certification Process

DATE	LOCUS OF AUTHORITY	ACTION
1946	Regional	Authority to issue production certificates transferred to regions from Washington, D.C.
1948	Regional	Authority to issue aircraft type certificates transferred to regions from Washington.
1980	De-Central	Lead Region initiated: Headquarters staff functions transferred to selected regional locations; key regions to determine national policy
1982	Sub-Central	Creation of directorates under authority of respective Region Directors.
1988	Central	Secretary of Transportation announces centralization of authority over field offices assigned to their program offices in Washington (Straightline Reporting).
1988	Central	Separation of directorates from authority of Region Directors.

SOURCE: *FAA Historical Fact Book: A Chronology, 1926-1971* and other published records of the FAA and non-FAA sources.

Figure 7.2

Department of Commerce Civil Aeronautics Administration 1947



Source: FAA Historical Fact Book, 1926-1971.

Figure 7.3.1: Changes in the Chains of Command

**Hypothetical chains of command, before and after
lead-region/straightline reporting**

BEFORE

Field Office

- program field staff

Regional Office

- program office
- Region Director

FAA Headquarters

- [○ program office*]
- Office of the
Administrator

AFTER

Field Office

- program field staff

Regional Office

- program office

FAA Headquarters:

- program office
- appropriate Associate
Administrator
- Office of the
Administrator

* not in chain of command from Region Director to Office of the Administrator

Figure 7.3.2: Changes in the Chains of Command

Actual chain of command, transport airplane certification,
before and after lead-region/straightline reporting

BEFORE:

Aircraft Certification Field Office

Regional Office
(Aircraft Certification Program Director)

Regional Office
(Region Director)

FAA Headquarters
(Office of the Administrator)

AFTER:

Aircraft Certification Field Office

Transport Airplane Directorate
(Renton, Washington)

FAA Headquarters
(Aircraft Certification)

FAA Headquarters
(Assoc. Administrator for Regulation and Certification)
(Office of the Administrator)

Figure 7.4: Approaches to Reorganization

Approach	Strength	Limitation
CURRENT:		
Straightline Reporting	Improved communication and cooperation within units Establishment of national standards	Difficulties setting priorities across units (e.g., stovepiping)

(continued)

Figure 7.4: Approaches to Reorganization (continued)

Approach	Strength	Limitation
POTENTIAL:		
Coordination of all units through a central organizational authority (e.g., all Executive Directors report to a Deputy Administrator)	Improved communication and cooperation among the units	Conflict among units below the Headquarters level not necessarily eliminated
	Increased ability to establish organization priorities	Increase depth of hierarchical structure by adding one more layer of administration
	Alignment of agency priorities with overarching organizational goals through a single goal-setting point at Headquarters level	
Coordination from a single lead unit	Improved communication and cooperation among the units	Difficulty selecting single lead unit (i.e., whose goals govern?)
	Increased ability establish organization priorities	Conflict among units below the Headquarters level not necessarily eliminated

Figure 7.4: Approaches to Reorganization (continued)

Approach	Strength	Limitation
POTENTIAL:		
Return to Strong Region Director	Improved ability to set priorities locally across organizational units	Inability to set national priorities without additional structure at Headquarters level
Unit Spin-Off	Removes out-of-place units whose goals conflict with other agency goals, thus improving ability to set goals across remaining units	Creation of separate entities whose activities and goal-setting would still have to be coordinated through an external mechanism

Figure 7.5: Locus of Goal-Setting

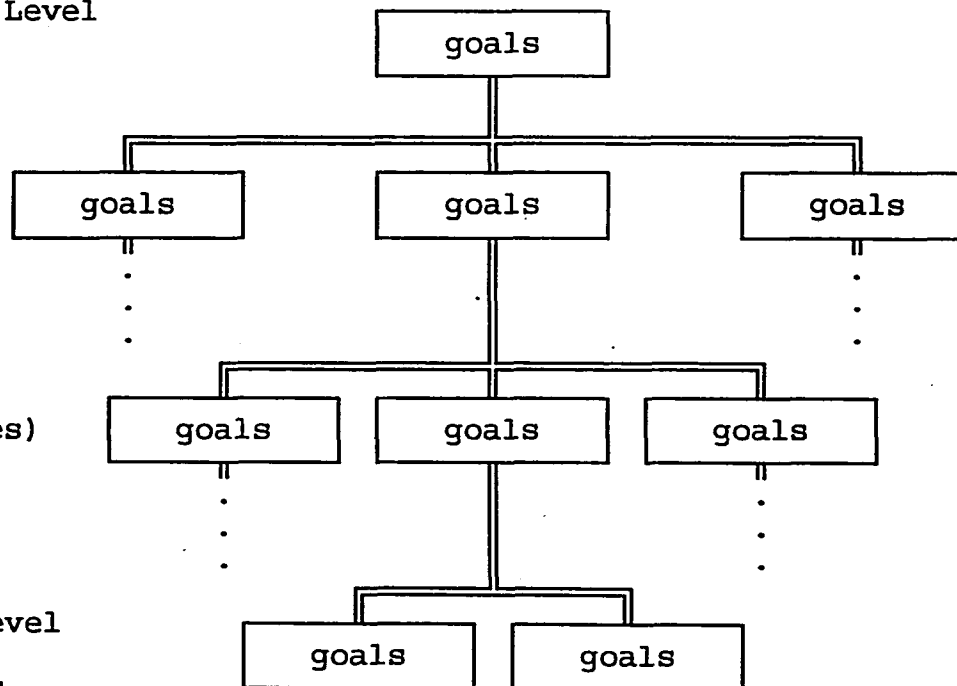
Goals may be set or operationalized at each of these locations in an organization with strong vertical segmentation. Goals established separately by units may differ from those set by other units or by headquarters.

Headquarters Level

Unit Level
(Flight
Standards,
ATC, etc.)

Field Level
(local offices)

Individual Level
(personal
idiosyncratic
differences)



CHAPTER EIGHT, STRUCTURE AND POLICY: EXECUTIVE ORDER 12291 AND THE INTERPRETATION OF OBJECTIVES

Costs in Aviation

Formal structures may contain internal contradictions that lead the organization to develop alternative or compromise methods for decision-making. Other factors such as formal mandates from outside the organization may also create alternative decision-making processes. For example, the FAA has had to comply with an Executive Order to do cost-benefit analyses of proposed rules, an externally generated change to the formal mandate. This externally generated mandate produced conflicts with traditional agency goals, and this conflict had an impact on it was operationalized and evaded. This had a significant formal impact on the regulatory process, but the functional impact is not as significant.

Executive Order 12291

This story starts at the beginning of 1981. It is about an externally generated change that evolved at the beginning of the era of "getting the government off the people's back," one of the early initiatives of the Reagan administration. It came in the form of an Executive Order that was promulgated on 17 February 1981. The intent was to insure that agencies did not initiate rule-making processes that were more costly to implement and manage than the

benefits they produced. The text of Executive Order 12291 reads, in part, that

In promulgating new regulations, reviewing existing regulations, and developing legislative proposals concerning regulations, all agencies, to the extent permitted by law, shall adhere to the following requirements:

(b) Regulatory action shall not be undertaken unless the potential benefits to society for the regulation outweigh the potential costs to society;

(e) Agencies shall set regulatory priorities . . . taking into account the condition of the particular industries affected by regulations [and] the condition of the national economy[.]²⁴⁷

This makes economic conditions, both within a particular industry and nationally, a factor in determining the feasibility of rulemaking.

The History of the Executive Order in the FAA

Under Executive Order 12291, Executive agencies may issue new rules or modify old ones only if the benefits outweigh potential costs, and their formal rule-making processes must reflect this.²⁴⁸ Thus, economic conditions must counter-balance safety. This was not a policy aimed at the FAA: it was aimed at all Executive agencies. The

²⁴⁷ Executive Order 12291, 17 February 1981, in *Federal Register*, Vol. 46, No. 33, Thursday, 19 February 1981, p. 13193.

²⁴⁸ This is actually their legislative function, an issue dealt with as previously noted by placing the FAA outside of the Executive branch at its inception as an independent Federal agency in 1958.

essence of the Executive Order is now a designated part of the formal rule-making process.²⁴⁹

For the FAA, the requirement to meet this mandate brought about, in 1981, the creation of two units to carry out economic impact analysis. Formally, the units were implemented by an Order dated 15 March 1981, and were in operation in September of that year. According to correspondence from the FAA, when questioned on how this was implemented, I was informed that

Implementation of significant structural changes at FAA typically involves oral instructions and written memorandums from the Administrator[.] . . . The changes are made official through orders or notices, and are eventually incorporated into the agency's organizational manuals.

. . . This process doubtless involved consultation and oral instructions, as well as memorandums which are not on file.²⁵⁰

At the time of the Executive Order 12291 the FAA already had units doing analysis and research work. These were under the Assistant Administrator for Policy, Planning, and International Aviation, in the Office of Aviation Policy and Plans: the units included the Planning Analysis Division, the Organizational Analysis Division, and the

²⁴⁹ See Figure 1.2 for the formally defined steps in rule making. The economic review is the forth step listed under the FAA's functions.

²⁵⁰ Written communication from Edmund Preston, FAA Historian, 18 September 1995.

Policy and Systems Analysis Division. The regulatory analysis functions were added to the Organizational Analysis Division, which became the Regulation and Organizational Analysis Division.²⁵¹ Their functions are differentiated based on whether the rule is aimed at an aircraft certification regulation or an operational regulation.

Costs in Aviation: A Personal Case Study

To some extent, of course, flying has always had to weigh cost and safety considerations. For example, the air mail scandal in the earliest days of the airlines demonstrated the difficulties in balancing costs and safety. With a reasonably stable supply of money under government contracts the early mail carriers had a fairly good safety record. But the Federal government intervened because of price rigging, canceled the contracts, and gave air mail transport over to the Army. Unfortunately, there was a rash of accidents as the ill-trained Army pilots were quickly felled by the difficult flying conditions they faced. The cash-short military had not been able to devote the necessary resources to training. The mail contracts were then quickly returned to the carriers, with the proviso that no carrier that had previously had a contract could have one again. Thus, Eastern Airways became -- overnight -- Eastern

²⁵¹ See Figure 8.1 for a detailed organizational chart of the Office of Aviation Policy and Plans.

Airlines, which permitted it to again carry the mail.²⁵² This is but one example of the impact of skimping on training costs up front and paying a heavy price for it later. To this day, tasks such flight training, maintaining flight-crew currency (i.e., legally current experience) in various aircraft, and crew upgrade and transition training (i.e., moving crews from one variety of aircraft to another, meeting legal requirements) remain expensive propositions, especially as the equipment gets larger and more expensive to operate. The military and the aviation industry as a whole have difficult cost-benefit decisions to make on an everyday basis regardless of Executive Order 12291.

I have many personal experiences in the aviation industry. In fact, when I first heard of the Executive Order in 1981 I had already served in two key roles in the aviation industry. One was as a professional pilot in many capacities -- pilot, co-pilot, flight instructor, ground instructor -- at a variety of organizations, including flying schools, cargo and passenger air carriers, and other commercial operators. The second was as the principal of an aviation company with interests in both a flying school and charter operations. I had been exposed to both sides of the cost versus safety argument. As the principal of an aviation company I had actively engaged the FAA in the

²⁵² Ronald E. G. Davies, *Airlines of the United States Since 1914* (London: Putnam, 1972).

debate over cost versus safety: sometimes my company prevailed, sometimes the FAA did. These experiences illustrate several aspects of the cost versus safety issue, demonstrate the FAA's non-regulatory discretion, and show the conflict between being a safe operator and being a cost-conscious operator. Some reflections on them follow.

Maintaining the Fleet One particular process threatened to put the company out of the air taxi business. During a recertification of all Part 135 certificated air taxi/commercial operators, the local FAA office was requiring that companies own all maintenance manuals, including engine overhaul manuals, that were applicable to all of their aircraft. While not an unreasonable request on the face of it, the request seemed to be over-generalized as our company did not do any of its own maintenance, and extremely few companies do their own engine overhauls. We balked at this requirement as being outside the scope of our operations. The FAA maintenance inspector processing our recertification informed us that even when the company did not perform its own maintenance it was still required to ascertain that the maintenance had been done properly, and that that could only be done when the maintenance manuals were in hand. The company was also required to designate an individual as the Director of Maintenance, who was to hold a mechanic's license. Even though I did not hold such a license I ultimately held this position under a waiver, thus

the regulatory requirement of a designated person in the company was met without the expense of hiring a mechanic for that position. However, such a compromise on the purchase of the maintenance manuals was not forthcoming, and we were forced to maintain full maintenance material for the airplanes.

Life Preservers During the same Part 135 recertification the local FAA office insisted that under the then pending Part 135 we would henceforth be required to carry life preservers in all of our aircraft. This was quite an expense in as much as the cost involved not only the immediate expense of purchasing the life preservers but also the costs involved in maintaining them: purchasing maintenance manuals, locating a facility authorized by the FAA to periodically inspect and maintain them, replacing them as needed. We argued that we would never fly one of our aircraft over water, concocting all manner of provisions to be included in our operations manual to insure that company pilots only flew aircraft over land. It should be noted that this argument was somewhat fatuous, in as much as we were located on Long Island, which is, after all, an island, surrounded by water: just flying to Connecticut was an overwater flight, but that is the nature of being in business. The FAA informed us that they had already decided that all operators everywhere would comply with the regulation requiring flotation equipment for overwater

operations.²⁵³ Interestingly, this section is entitled "Extended Overwater Operation." Apparently, as relayed to us through a sympathetic inspector, it had been determined that a landing clearance at certain airports on rivers or bodies of water -- Washington National and John F. Kennedy (New York), among them -- virtually required an aircraft to be out of gliding distance of land at some point in the approach, thus the rule was being operationalized to mandate flotation equipment for any certificated carrier.²⁵⁴ During the course of this renewal process the company was literally threatened with the non-renewal of our certificate if we did not get life preservers. Ultimately, the company agreed that the FAA had the legal ability to enforce its interpretation of the phrase "extended overwater operation" as being applicable to any aircraft operation over water and bought life preservers.²⁵⁵

Role-Strain at the FAA

Conflict in Goals My history of sparring with the FAA over requirements for certification notwithstanding, I

²⁵³ 14 CFR 135.167.

²⁵⁴ This was all relayed to us verbally during the re-certification process.

²⁵⁵ Anecdotally, it seemed that the FAA was more willing to compromise on staffing issues than it was to compromise on documentation or equipment issues. The staffing waiver granted to me was one of several staffing waivers I recall the FAA giving at the time, but I can never recall them waiving a documentation or equipment requirement.

assumed that the agency would be exempt from Executive Order 12291. I assumed that "aviation-safety-related matters are too important to be formally considered with a price tag connected to them." This was me thinking as a pilot, not as an owner. Of course the cost-benefit mandate applied to FAA actions just as much as to any other executive agency.

It is important to reiterate here that the FAA has a clearly defined, formal mandate to insure operational safety of the air system. This written, formal mandate does not consider costs. The mandate is reinforced by the professional standards of the many professional pilots, engineers, and mechanics who find themselves in units such the Aircraft Certification or the Flight Standards Services. The professional standard constitutes an operational goal that corresponds with the formal goal.²⁵⁶ I perceived this as a conflict in goals, and the staff of the FAA with professional standards similar to mine would be expected to likewise perceive this as a conflict. However, the Executive Order has in effect modified the FAA's formal legislative mandate, which does not directly link air safety to the costs incurred in attaining it. The new formal mandate to balance costs presents a structural

²⁵⁶ The foundation for professional standards to be a source of a functional organizational goal -- of pilots generally and of FAA staff (pilots, engineers, etc.) in particular -- was developed in Chapter Two; a detailed organizational analysis, including the FAA's history, its position in DOT, and its relationship with other branches of the government was developed in Chapter One.

contradiction. It contradicts both the pre-existing formal goal and the professional standard, existing in some services, that is operationalizing that mandate, which is to insure safety.

The root of such potential conflict is in fact an element of the hierarchical structure present in the Executive branch. Executive agencies must accept modifications to their formal legislative mandates.²⁵⁷ Further, they are formally required to attempt to carry out these new mandates even when they conflict with standing operational goals. In this case the modification came from the Executive Branch, in fact from the very top of the Executive Branch.

The Pre-Existing Goal. The modification of the formal goal of the organization is inconsistent with the existing operational goal to maintain safety at all costs. Indeed, the goal "to maintain safety at all costs" was made evident through research conducted in the Flight Standards Service. An administrator in the headquarters office told me that they were prepared to carry out their activities regardless of these procedural rules: his statement to me was that options that would bypass the cost-benefit mandate

²⁵⁷ Following a similar line of reasoning on external oversight, an Associate Administrator was questioned on the oversight role that the Congress has over the FAA: his response was that the Congress is an analog for the people; without such oversight the FAA would become elitist organization.

associated with a formal regulatory action regarding 14 CFR would be pursued.²⁵⁸ This was in the context of an extended discussion of the employee culture within Flight Standards. When I queried this person of the effect of the economic review process, I was told that if the economic review prevented Flight Standards' objectives from being met through the formal regulatory process then they would be met through a different process, such as the publication of a practice as a recommended or as an acceptable procedure in an Advisory Circulars (non-regulatory guidance material issued to pilots, mechanics, and other members of the aviation community), internal guidance material variously referred to as FAA Directives, Handbooks, or Orders, or simply to call upon -- in an informal setting, such as field-based safety programs -- the professional standards of pilots generally.²⁵⁹

²⁵⁸ Interview No. 28, who held the position of Manager of a Service under the Associate Administrator for Regulation and Certification. This interview was conducted as part of the research for this project, and this person was selected as a key decision-maker who could offer insight into FAA process.

²⁵⁹ The distinction among FAA Directives, Handbooks, and Orders is somewhat unclear. The FAA says that "The directives . . . depending on their content, are issued either as orders or handbooks." (Federal Aviation Administration, *Guide to Federal Aviation Administration Publications*). Apparently, all publications are directives (handbooks and orders), and there is no apparent legal differentiation between a handbook and an order. However, I have noted that orders are generally documents for internal circulation pertaining to formal FAA structure or policy; handbooks are guidance material for agency staff. Unlike Airworthiness Directives or the Operations Specifications for certificate air carriers, these
(continued...)

The use of such mechanisms became established as a policy, and as a policy it was communicated down to the field offices.²⁶⁰ Non-regulatory programs of broad scope supplement regulatory programs. For example, even before the AFR became a regulatory issue, there was the Wings program, conducted through Advisor Circulars, that encouraged pilots to take annual flight reviews. The reward for participation in this voluntary program is a little pair of wings, with ten versions (at the inception of the program 15 years ago there were only three versions) designed to see a pilot through ten years worth of annual flight reviews. The wings are presented publicly at pilot seminars held throughout a FSDO's service area.

At the field office level, where the questions of interpreting the formal objective and cost-benefit studies are a more distant issue, the policy of safety enforcement versus costs was less an issue to be addressed or questioned.²⁶¹ Functionally, there is not added cost to the

²⁵⁹ (...continued)
publications do not have the force of executive law. They do have the force of formal agency policy.

²⁶⁰ Interview No. 28, cited previously.

²⁶¹ Interview No. 45, the Manager of a Flight Standards District Office. This person was interviewed as part of the interviews of agency field staff. This interview took place as a prelude to subsequent interviews of FSDO staff at that office. This person seemed unconcerned with the issues of costs as a counter-balance to safety; for this level of the agency, costs were acknowledged as a necessary expense of safe operations, and staff stated that they viewed their roles as simply carrying out policy.

field office to enforce or not to enforce the rule. In the case of the Wings program, the FSDO does not have to buy the wings it distributes itself. Costs are borne only by the certificate holders (in this case, pilots). Here, then, is a long-standing operational objective that, contradicting a (new) formal objective of not having annual flight reviews, is being pursued through the non-regulatory apparatus.

The Premise (in simple terms) The afore-quoted Executive Order places the onus on the agency initiating a rule to determine its projected costs versus its projected benefits. It clearly states that action shall not be taken unless the benefits outweigh the costs. This leaves the agency (e.g., the FAA) with the following question: is a rule cost effective when the likelihood of some such event to be prevented by the rule from occurring and problematically claiming some number of lives is considered. Thus, the Executive Order forces the FAA to make this decision on the cost of prevention based on an economic review of the costs involved in preventing some event versus the costs involved in acting after the event. The question is whether it is more cost effective to (1) prevent the event rather than dealing with its consequences or (2) deal with the consequences of the event when they happen?

This leads to the analysis of risk associated with technology and risk management. It considers the cost of accidents as opposed to the costs of preventing them. Also,

the inherent interactions in complex systems that may lead to accidents regardless of foresight -- accidents being nearly random events -- must be considered as a confounding aspect of trying to prevent accidents.

Perrow argues that in tightly coupled, complex systems even the smallest failure in a seemingly non-substantial unit may cause unforeseen and unpredictable interactions that result in catastrophic failure.²⁶² Aircraft operations are these very tightly coupled, complex systems. Minor failures can have disastrous affects, such as a plane crashing after its autopilot has been accidentally disconnected because the crew is distracted trying to fix a malfunctioning warning light (Eastern Airlines lost a Lockheed 1011 in the Florida Everglades in this manner). Unforeseen failures can appear from "nowhere," as when a high flight time, pressurized aircraft suddenly unzips along a line of rivets after one weak rivet fails (a Hawaiian Airlines 737 came -- literally -- unzipped when a line of rivets failed; this was apparently because flying in the Hawaiian Islands subjected the aircraft to far more stress than ever anticipated by short hops and the resulting high

²⁶² Charles Perrow, *Normal Accidents: living with high-risk technologies* (New York : Basic Books, 1984); also, see Patrick Lagedec, *Major Technological Risk: An Assessment of Industrial Disasters* (Oxford: Pergamon Press, Ltd., 1982).

number of pressurization cycles of the cabin).²⁶³ Another complexity in the industry is when real estate is expensive. In these situations, runways tend to be short (e.g., New York's LaGuardia Airport or Washington National), thus leaving little room for error on take-offs and landings in poor weather (both airports were the scene of aircraft accidents in snow storms in the 1980s) or mechanical problems. Airline accidents -- the few that there are -- continue to happen because certain events in and around an aircraft either cannot be anticipated or cannot be remedied to one hundred percent safety standards.²⁶⁴

Hypothetically, any regulatory action may cost more than it is worth because -- accidents being unpredictable and random -- no amount of regulation is going to be effective. At worst, an accident from a truly idiosyncratic cause (for example, an odd rivet working its way through a hydraulic line) may result in a great deal of regulation (for example, mandated inspections or hydraulic line

²⁶³ Boeing maintained to me that this was an entirely unforeseen type of accident. It led the company to revise its recommendations on painting aircraft. Up to the point of the accident they had recommended that the planes be painted to protect the metal; following the accident their recommendation changed to leaving the plane unpainted to facilitate inspections for corrosion around the rivets (Interview Nos. 39 and 42).

²⁶⁴ It should be noted that there are many accidents in general aviation where the pilot, not instrument rated, continues flight into adverse weather conditions. We all know about that, but factors other than what can be easily be prevented are at work with general aviation pilots who have "get home-itis."

relocations) that does nothing more than prevent this one unique accident but that will not prevent other accidents from happening -- in effect the only accident prevented is the last accident. This difficulty was reflected in an interview with a person from one of the economic review units, who stated that everyone agreed that aviation was terribly safe, and therefore the issue was not preventing accidents (now virtually an irrelevant task) but in implementing rules.²⁶⁵

One aspect of implementing the rules that is never overtly acknowledged is the cost entailed by the FAA (or of other Federal Executive agencies, for that matter) of implementing and maintaining the apparatus to comply with the Executive Order. It has to cost the FAA something to maintain these dedicated units, but that cost is never

²⁶⁵ Interview No. 26, with three analysts in the Regulation and Organization Analysis Division. These interviews were conducted in a joint session. The three analysts were identified through their Division Manager, who provided access to them and to their supervisor. One of these persons was a licensed private pilot, the other two had no flying experience. None of them were career FAA persons but had instead come to the FAA from other agencies when the regulatory analysis units were created with the advent of Executive Order 12291. These persons were participants in the activities at hand and were able to identify specific steps in the processes. They displayed no particular awareness of the at times contradictory role they played. Questions for this group were supplemented by information volunteered by them concerning specific rules on which they had been working. Overall in this research nobody ever mentioned that the existence of the units dedicated to cost-benefit analysis entails costs that are now a part of the regulatory structure, and this is never itself a consideration of the regulatory review process.

considered in any process. The key point here is not what the FAA apparatus costs but in what the marginal costs of implementing specific rules will be, not considering the overall overhead to society that the administrative costs of the FAA and its regulatory procedures entail.

The Premise Reviewed The aforementioned premise, that Federal agencies should not make rules unless they are cost beneficial, creates an institutional logic by which agencies should avoid doing something just to appear busy. Under circumstances in which an organization may wish to set "appearing to govern" as one of its goals, Executive Order 12291 would be a well warranted document, serving the real purpose of halting the errant rule-making of a dysfunctional bureaucracy.

Appearances play a role in FAA decision-making: the FAA must regulate to perpetrate the myth of regulation (i.e., myth as in the usage, "Myth and Ceremony"): this is a fundamental element of government and is as strong a motive for action as the professional ethos that all accidents must be prevented. But I was also told that the industry is extremely safe already: the issues faced now are not regarding the cost of preventing accidents -- there are so few of them that that is not a real reason for making

regulations -- but the cost of implementing rules.²⁶⁶ The rules are not meant to prevent accidents but to document the FAA's activity in preventing accidents (an entirely different task). An analyst in one of the regulatory analysis units told me, "Aviation is overdone [i.e., over-regulated] because of the publicity when there is an accident, but that is the nature of aviation."²⁶⁷ The travelling public demands a strong watchdog over their air travel, and the FAA must appear to be attempting to correct every possible discrepancy. This is consistent with the symbolic response model.

Vagaries of Analysis

The economic review process is not a straight-forward application of procedures to a goal. In some cases it contains internal contradictions. In others it is a more literal approach to explicit issues. It can produce inconsistent or difficult to embrace results. To explore these issues four brief case studies are presented. Three are regulatory actions -- the annual flight review, the traffic alert and collision avoidance system, and child

²⁶⁶ These two persons were jointly interviewed in interview no. 25. One was the Manager of the Operation Regulatory Analysis Branch and the other the Manager of the Aircraft Regulatory Analysis Branch. They were part of the interviews conducted at FAA Headquarters for this research. The interview was facilitated by the cooperation of their supervisor, the Manager of the Regulation and Organizational Analysis Division.

²⁶⁷ Interview No. 26, previously cited.

safety seats. The fourth is an issue of FAA structure -- the organizational separation of economic review from key units that write, interpret, and enforce regulations.

The Annual Flight Review: Analysis Reconsidered

Concerning the previously analyzed annual flight review issues, the AOPA (Aircraft Owner's and Pilots Association) used a statistical analysis of accidents to counter the FAA's contention that pilots with less than 400 hours of air time were in need of closer supervision. (This entire subject was examined at length in Chapter Six on the Recreational Pilot rule-making: it is very briefly summarized here: the conclusions are relevant to discussions of economic review.) The FAA had considered the AFR to be of major importance to maintaining standards among low flight time pilots in order to lower the accident rate. Its justifications were put forth not only in the cost-benefits sections but also in the broader operational background sections of the rule, with estimates of the profiles of pilots having accidents. It had concluded, based on dubious data, that pilots with less than 400 hours were at significant risk. It had also determined that the cost of implementing the rule would be between \$625,000 and \$1.153 million per fatality avoided, and stated -- without further elaboration -- that this was an acceptable cost. The AOPA and the Experimental Aircraft Association (EAA) took the position that the AFR would unduly burden an already

declining general aviation industry. They meant that reducing costs to make general aviation economically healthy was (and is) more important than increasing costs in the name of reducing accidents. By formal process, once it put these justifications forward the FAA had to respond to external input, and in response to this opposition, the FAA extended the compliance deadline for the new rule in increments until 31 August 1993. Faced with an ongoing argument questioning the fundamental reasoning of the rule, which was presented by key industry lobbies, the FAA ultimately reversed itself: it published a new rule on 28 July 1993 revoking the AFR. In the action revoking the AFR the FAA retracted its previous statistical analysis, including its estimates of who are the pilots having accidents and its economic review, to present fresh new justifications for the new rule action.²⁶⁸

By the definition of a legal/rational, bureaucratic system, which is aimed at the regular production of predictable decisions, this should demonstrate the tenuous nature of the cost-benefit process at the FAA. However, I was told that the AFR was traded for the two year mandatory BFR, that the long process produced at least as good -- perhaps a better -- rule, and on the matter of investing political capital (in any action, not just the AFR), a great deal is done in the beginning, but "you don't fall on your

²⁶⁸ *Federal Register*, Docket No. 26927; Amdt. No. 61-93.

sword."²⁶⁹ So what it more correctly demonstrates is that the bureaucratic standard that is the foundation of the economic review process is quantifiable and changeable; that is, and any point a former analysis may be changed, or without being changed it may be subsequently considered correct but irrelevant. With the AFR it is not clear which of these happened: the agency announced that it was unsure of its data (i.e., the former analysis was changed), but as demonstrated previously the data was never clear and indeed may have been considered ultimately irrelevant to the argument. This review process is not a purely internal or rational process, nor is it guided by purely bureaucratic standards or the standards of a single professional cadre (e.g., value-neutral economists); rather, as noted above with the description of the dichotomy between Flight Standards and Regulation and Organizational Analysis it is a process among the professional cadres, who are split between cost and safety, between industry and agency. Accidents can be counted and their costs can be computed or projected, which is in keeping with the logic behind Executive Order 12291; but there is no constant truth to the counts or costs, as was evidenced from the formal action being re-evaluated and reversed. Over the 11 years that began with a

²⁶⁹ Interview No. 31, with the Associate Administrator for Regulation and Certification. These comments were on the record, but in the setting of the interviews for this research.

petition for a rule and ended with the revocation of the of a key part of the regulation, arguments often bargained between safety and cost. A trade was made, and it was apparently made when a perception was generated inside the agency's policy-making apparatus that too much political capital had been invested. I cannot state what person or persons made a specific decision, but on an agency basis, the point was reached where it was decided to give up the AFR, but with something in hand.

Radar for Large Aircraft and Small: Competing Industry Interests

While the thrust of this study is the impact of the Executive Order, the FAA does not otherwise proceed through the regulatory process in a vacuum. Even in cases where the mandate of the Executive Order does not govern, the agency may still be in a position to consider economic factors and be responsive to the industry. In these circumstances, where process is unaffected by the circumstances around the Executive Order, the symbolic politics of the mandate and the continuing need of the FAA to be responsive to industry patrons is apparent.

Separation of traffic is the primary mission of the Air Traffic Control unit of the FAA.²⁷⁰ This is reflected in the FAA's effort to develop new and better collision

²⁷⁰ As opposed to tangential missions such as supplying navigational assistance: to some pilots this point is not at all clear.

avoidance systems. In support of this goal the FAA has continued to refine its ability to locate and separate aircraft. A principal player in this effort is (to be) the mode S transponder, designed to provide interference-free signals between aircraft in flight and ground-based sensors. Installed on the aircraft, the mode S transponder will supplant the current mode C transponder that already provides position and altitude information.

This overall project is formally entitled it the "Traffic Alert and Collision Avoidance Systems" (TCAS). The TCAS system is in part the result of a Congressional action mandating installation of such equipment.²⁷¹ One specific rulemaking action was entitled "Air Traffic Control Radar Beacon System and Mode S Transponder Requirements in the National Airspace System." This constitutes revisions to 14 CFR 91 regarding requirements for non-commercial aircraft to carry radar beacon equipment conforming to the new mode S standard now mandatory on air carriers.²⁷² This case lacks the public political potential that some other aviation cases have, and it never touched the raw nerves that the AFR did. As such, it represents more straight-forward debate and analysis on a rule that has costs and benefits that can

²⁷¹ As cited in *Federal Register*, Docket No. 26886, Amendment No. 91-229. This was Public Law 100-233, which mandated an FAA regulation requiring the TCAS system.

²⁷² Transponder requirements appear in 14 CFR 91.215. This section has been revised according to this proceeding.

be found in a middle ground, free of the feeling on either side that this is a truly critical issue with right on one side or another. The argument developed here is that both sides present their cases, the cases are weighed, and a decision is made apparently based on the facts of the matter.

The FAA established an economic escape on this proceeding. Citing the Airport and Airway Safety and Capacity Expansion Act of 1987 (i.e., Public Law 100-223), the FAA stated that a regulatory evaluation was not necessary in this case as

the Congress may be said to have already determined that this final rule is in the public interest; that is, its collective public benefits outweigh its costs to the public, because Congress has required the rule be promulgated. . . . Nevertheless, the FAA has prepared this conventional regulatory evaluation of the rule. The purpose of this evaluation is not to justify taking this rulemaking action (which has already been done through congressional action), but to estimate dollar costs and benefits to promote understanding of the impact of the rule.²⁷³

By this action, the FAA freed itself of the onus of defending based on economic review the impact of the rule. However, this did not prevent the matter from being raised, and the FAA did indeed prepare "this conventional regulatory evaluation of the rule."²⁷⁴ In the publication of the

²⁷³ 54 *Federal Register* 947.

²⁷⁴ 54 *Federal Register* 947.

"Final Rule," the FAA presented figures ranging from \$710,000 per life saved if seven midair collisions were prevented up to \$6.830 million dollars per life saved if only one midair collision were prevented. The FAA concludes therefore that

. . . this TCAS rule is warranted because it will contribute to an overall enhancement of transport and commuter categories airplane safety and utility which will both promote and enhance public confidence in, and utilization of, the U.S. air transportation system. Although the FAA has not yet quantified the value of public confidence in air transportation, it believes there is a very real cost to the system when public confidence is reduced through media converge of each major midair collision tragedy. The fragility of public confidence is difficult to quantify, but the potential benefits in this regard stemming from avoidance of a major midair collision is very real and substantial. For example, the near-to-midair [sic] term loss of passenger bookings following the publicity of a midair collision is readily acknowledged within the industry. . . . The qualitative nature of this consideration does not render it less significant as a factor in determining to proceed with the TCAS rulemaking action.

The air transport lobby originally objected to the TCAS system as it was defined in the Congressionally-imposed mandate. In fact, an informant with an airline technical organization stated that the FAA itself was not eager to implement TCAS as mandated, but under the force of the Congressional mandate believed that it had no options in the matter, which is consistent with their statement of public

interest already being determined by the Congress.²⁷⁵

Further complicating the FAA's actions was that Public Law 100-223 mandated certification of the TCAS system within 18 months of enactment (30 December 1987), and installation of the TCAS system within 30 months of certification. In January 1989 the FAA enacted a rule whereby they stated in the preamble that they had informed Congress that the 18 month certification deadline was not feasible, and interpreted the law to require standards to be in effect within 48 months of enactment (i.e., the 18 month certification period plus the 30 month installation period). Still, the mandate deadlines were not met on 30 December 1983.

Typical of the delays encountered in the implementation of the program is a modification of the rule requiring mode S transponders. The case, as it played out, demonstrated the interplay among various segments of the industry. Faced with the inability to insure the installation of suitable equipment into both the general aviation aircraft fleet and its own facilities, the FAA initiated an action to eliminate certain requirements for mode S transponders in general aviation aircraft and to instead permit mode C equipment to

²⁷⁵ Interview No. 6, an engineer with Aeronautical Radio, Inc. (ARINC), the aviation communications and technical service consortium owned by the airlines. This informant was contacted through an acquaintance made at a sociological association meeting, and who agreed to provide information concerning the regulatory process.

be manufactured and installed. This was heartily greeted by general aviation interests, but generated strong dissent from two airline lobby groups, the Air Transport Association (ATA) and the Air Line Pilots Association (ALPA).²⁷⁶ While general aviation interests including AOPA and EAA welcomed the elimination of the mode S requirement, airline interests, who previously opposed the rule, were now opposed to this elimination. Central to the airline lobby's argument was a challenge to the FAA's cost-benefit study as overestimating the costs associated with mode S equipment and underestimating the costs of present mode A/C equipment.²⁷⁷ In the case at hand, the airline lobbies were now arguing for keeping a TCAS requirement they viewed as beneficial to their own operations, in contrast to their previous opposition to the TCAS deadlines.

The debate hinged on the argument made by general aviation interests that the new equipment, which the existing air traffic control system would not be ready to utilize, was more costly than equipment currently in use; further, "manufacturers stated that a basic Mode S transponder for general aviation may not be available . . ."²⁷⁸ Thus, operators would be required to spend more

²⁷⁶ As cited in *Federal Register*, Docket No. 26886, Amendment No. 91-229.

²⁷⁷ *Federal Register*, Docket No. 26886, Amendment No. 91-229.

²⁷⁸ 56 *Federal Register* 467.

money to equip their aircraft to do the same thing, but the equipment might not even be available. This was the rationale the FAA ultimately stated in announcing the revocation of the requirement for general aviation aircraft to be equipped with mode S. Two different parts of the industry were in conflict over the proper course of action in this case. The airlines made the argument that this was indeed cost effective because they were using collision avoidance equipment, and the FAA's estimates were in error. This would also be beneficial to airlines as a *bona-fide* safety enhancement: airlines clearly favor of keeping their aircraft from running into small planes (expensive technofixes often fit this bill). Meanwhile, general aviation operators made the argument that they would accrue no benefit from the new equipment.

The FAA's cost-benefit statement stated that equipment was not available to be installed, so supporting the general aviation position would entail no costs. There would be no impact based on the rule: "This rule will not impose any costs, but it is necessary because of the shortage . . ."²⁷⁹ The FAA statement purportedly only expresses a technological reality. In fact, the debate on the installation of this equipment was ongoing, and the FAA itself acknowledged that the problems with supply were in part because there was uncertainty over whether or not it would ultimately

²⁷⁹ 56 Federal Register 468.

implement the rule. When it did implement the rule, there was confusion and the equipment in place was not sufficient to its intended task. The FAA then amended the rule to reflect the actual real-world situation, a situation which itself was in part because of speculation over what the real-world situation would be.

Unfortunately, there can be no control for this "experiment," so it cannot be known if the FAA would have acted in a similar fashion had there not been Executive Order 12291, even if the force of the Executive Order had only been interpreted as moral and not legal in this case. Nor can alternative scenarios be imagined where there was equipment, but it was expensive or did not work. However, in the face of a world situation that did not reflect its rules, the rules were changed.

Child Safety Seats: Defining the Issue

The issue involved in this study concerns what the FAA calls "Child Restraint Systems," and centers on the traditional carriage of children under two years old for free, as they rode in their parent's lap. This case is an example of how a rule was developed in response to a perceived problem, and how a cost-benefit study determined that there were more potential costs than potential benefits for society.

During research interviews, I was told that during take-offs and landings "the only unrestrained projectile in

the aircraft is the child."²⁸⁰ Recall that take-offs and landings are when the seatbelt lights are on, the trays have all been placed in the up position, and all carry-ons are either in the overhead racks or under the seats. Children under two may be sitting in their parent's lap: that is, the parent is belted in, but the child is restrained only by somebody's arms. The case was never made to me nor was it cited in the supporting documentation in the *Federal Register* that any child had ever been injured in this manner; I was only told that this was perceived to be a hazard.²⁸¹ Thus, a need was perceived to place these young children into some sort of restraint. This rule followed the course defined formally for all rule actions in FAA. Some office generates an initial rule (in this case an office concerned with airline regulation, 14 CFR 121). The proposed rule for child seat restraints for children under the age of two reached the economic review phase. During the economic review, the reviewer concluded that if

²⁸⁰ Interview No. 25, previously cited.

²⁸¹ From personal experience, I was a passenger in a Boeing 767 (Martinair, August 1993) that had landing gear problems. After an uneventful emergency landing the aircraft made a very hard stop at the gate. A young child was catapulted into the bulkhead at the forward end of the seating section. This demonstrated to me how it is not inconceivable that a child may be hurled about precipitously under abnormal conditions. I was not able to ascertain the age of the child, and he may well have been over two, with a seat, who had simply gotten out of his seat before it was safe to do so, but even if that is so this incident is generalizable to the case of children under two as well.

young families had to pay for an additional seat for these children the rule might result in putting the costs of flying beyond their reach. In fact, his cost analysis produced the clearly mind-numbing figure of \$3 billion dollars in added costs due to this rule through the year 2000! Since flying would be too expensive, these young families would drive. With this deduction in mind, the analysis further concluded that requiring child seats would increase transportation-related fatalities overall by diverting traffic from the really very safe airways to the less safe highways.²⁸² Oddly enough, the FAA appeared to be in the position of evaluating highway as well as air safety, a seemingly odd construction of the agency's formal goal.²⁸³ In any case, citing this in the docket, and faced with this quandary of potential costs outweighing potential benefits, the FAA withdrew the proposed rule.²⁸⁴ This was described to me with by the regulatory analysis staff with absolute conviction: they did not perceive anything unusual in their

²⁸² Interview No. 26, previously cited; this was also cited in the FAA's withdrawal of the rule, *Federal Register*, Docket No. 26142; Amendment Nos. 91-231, 121-230, 125-17 and 135-44). I had the opportunity to speak with the person who told me that he had thought of this himself. I found this justification surreal, and although I had known about the analysis before it appeared in the *Federal Register*, I still read it with the sense of living an unreal experience.

²⁸³ As in, "shouldn't the FAA make the airways as safe as possible, and if traffic diverts to the highways shouldn't it be up to the National Highway Traffic Safety Administration to make car travel as safe as air travel?"

²⁸⁴ *Federal Register*, Docket No. 26142.

process or finding. At the same time, the flight standards staff said it would be evaded: a real issue existed and the failure of the rule process was only the end of that one process, but not of all the available FAA processes. As was noted above, there are available non-regulatory mechanisms.

The FAA ultimately did act on the issue of child safety seats, but the rule as implemented actually requires very little. It permits a child to be placed in a child safety seat (i.e., it requires a carrier to permit a child to be placed in a seat) if such a seat complies with DOT standards for automobile child safety seats. The FAA reserved for the future some additional study and regulatory action on the matter. In this case the final economic review states that if nothing is required there is no required cost (zero cost means no impediment to implementation!). The analysis goes on to state that this will, in fact, present a benefit because the ability to use a child seat will be a further enhancement.²⁸⁵

In fact, there was already an Advisory Circular covering child safety seats, which, together with the stronger wording of the rule now unambiguously permitting child-safety seats to be used, I was told, would be the basis for insuring that parents who so desired could have

²⁸⁵ *Federal Register*, Docket No. 26142; the statement on zero costs is from Interview No. 26, previously cited.

their children in such a device. Airlines were unambiguously compelled to permit the use of child safety seats. A more strongly worded rule, together with the advisory circular, strengthened procedures around such seats, although a real effect of the economic review was that the use of seats remained at the parents' option. While it is obvious that the economic review was not without effect, procedures were developed that clearly strengthened passengers' rights. However, this non-regulatory approach was not able to close the one loop-hole that permitted parents who did not desire such a restraint to hold their children.

Differing Unit Objectives: Defeating the System

Not surprisingly, certain factions within the FAA had strong reservations about Executive Order 12291. These parties felt the Order was not in the best interests of safety (it was never intended to be), and not in the interests of flying. This represents one area of conflict in the organizational objectives and demonstrates an area of conflict between the traditional formal objective and the professional standards of Flight Standards on the one hand and the revised formal objective resulting from Executive Order 12291 on the other hand. Further, the division in the organization that was previously considered in straightlining may become manifest even within otherwise presumably coherent units, as the cadre of pilots and the

cadre of rule writers within Certification and Regulation, under the similar goal group of safety regulation, determine differing objectives.

In the economic review process, key units of the FAA fall under different chains of command. The economic review functions come from the Office of Aviation Policy, Plans, and Management Analysis, which is under the Assistant Administrator for Policy, Planning, and International Aviation, who reports to the Administrator. The Office of Rulemaking, along with Flight Standards and Aircraft Certification, fall under the Associate Administrator for Regulation and Certification. This Associate Administrator reports to the Executive Director for System Operations, who reports to the Administrator. I have even heard this called "the real FAA."²⁸⁶ Thus, the Office of Rulemaking, under Regulation and Certification, is conducting a process that undergoes a review process with significant input from elsewhere in the organization. This same overall unit (Regulation and Certification; that is, the Flight Standards and Aircraft Certification units) then are interpreting and implementing rules and their associated procedures that have been evaluated by a unit that has no role in how the rule will be implemented. What follows is the story of how the

²⁸⁶ See Figure 8.2 for a chart of these relationships. During an interview (No. 31), the Associate Administrator for Regulation and Certification referred to his units as "the real FAA."

Flight Standards unit of the organization set about subverting the new goal of cost-benefit.

There is the lingering ideal within "the real FAA," and Flight Standards in particular, that all flights should be accident-free. In contrast with the now formal mandate to balance costs against benefits, there is still an ideology that urges action to prevent all accidents. It is important in understanding this case to note that Flight Standards is one of the most professionalized of the FAA's various units. This is because Flight Standards is composed of what has been defined as aviation professionals. To be a Flight Standards inspector one must be an airline or general aviation pilot or airline or general aviation mechanic of long standing. These professionals make up the bulk of this small but pivotal unit. Out of a staff of 3500 persons, there are 2600 inspectors in 90 field offices, nine regional offices, and four international offices.²⁸⁷ These are the people who have the most contact with the industry, as they are the ones conducting inspections of pilots, operators, and aircraft. The inspectors come into Flight Standards from professional careers as pilots or mechanics, and it has an applicant list of 8000 names. Flight Standards is replete with slogans such as (the now obsolete) "accident free in 93" and the classic "a safe flight is no

²⁸⁷ Interview No. 28, previously cited.

accident."²⁸⁸ It generates a copious number of the FAA's publications aimed at flight safety, and gives much of this material away free of charge. Individual inspectors doggedly pursue items they consider matters of flight safety, especially when these matters concern flight instructors and how new pilots are brought into the system. Flight Standards considers transgressions by flight instructors to be among the most serious of errors.²⁸⁹ This does not mean that Flight Standards inspectors are hopelessly out of step with the current literature in risk management. It may mean, though, that in a relatively small unit, with a coherent professional workforce, a driving ideology develops that is more closely related to professionalization than to formal mandates. In this case the ideology is to prevent all accidents. Not insignificantly, this corresponds with the legislatively defined formal objective.

²⁸⁸ Flight Standards Service, safety slogan for 1993.

²⁸⁹ Flight Standards has -- within the past five years -- required all initial flight tests for flight instructors to be done with a Flight Standards Inspector rather than with an FAA designated examiner, who is not an employee of the FAA but instead a person working as an examiner, often affiliated with a pilot school. This provides Flight Standards with greater control over the process of flight instructor certification. Flight Standards field offices now keep a record of student deficiencies that are tied to their instructors, and an instructor with a record of deficiencies will be questioned on them. If a student has an accident, the instructor has been known to be examined personally and at great length over his or her entire flying career.

Flight Standards specifically, and its parent unit Certification and Regulation, less clearly so, appear to be the units of the FAA where there is not a clear buy-in of the concept of regulatory analysis. Aircraft Certification, a second unit under Certification and Regulation, is made of similar professionals, but in several interviews I conducted at both the field offices and in Washington I was told that their operational guidelines are very stringent, not open to interpretation, not open to questions. I was told that Flight Standards has more leeway with its affairs and, in the words of one Aircraft Certification field office manager, "I just don't know how they get away with those things: we never could."²⁹⁰

A ranking person in Flight Standards, when questioned on the apparent conflict between the need for economic review and preventing all accidents, came down squarely on the side of preventing all accidents. He stated that if a formal rule could not be issued to enforce a safety position due to economically determined "high costs" then some other action would be taken instead to achieve the same end.²⁹¹

²⁹⁰ The manager of an Aircraft Certification Field Office commenting on how Flight Standards had delayed the final certification of a large aircraft when it was discovered that an inspector riding in the jump seat could not see the instruments. Flight Standards blocked certification until the cockpit was rearranged, even though there was no regulatory requirement for the inspector in the jump seat to be able to see the instruments. It was this action in the absence of regulatory support that the office manager found astounding.

²⁹¹ Interview No. 28, previously cited.

This could include publishing guidance material to the industry such as an "Advisory Circular" or guidance to Flight Standards field personnel such as the *General Aviation Inspector's Handbook*. These would then be the guiding procedures for interpreting rules, establishing compliance with rules, or expanding an existing rule into a previously undefined sphere. While the respondent did not give any specific examples of an action in progress during the interview, examples do come to mind.

For example, Advisory Circulars that are designed to explain how to establish compliance with a rule begin with the phrase, "This is one way, but not the only way" However, it is not uncommon for Flight Standards inspectors to effectively make this the only way of establishing compliance. From an organizational point of view, this is not an unexpected action. For instance, an operator who intends to establish compliance with a rule may develop a novel approach, but, being outside the formal guidance, the inspector in the field may be uncertain if the unique approach actually conforms with the rule.²⁹² The previously cited example of over-water operations is a case in point. Although this example preceded the Executive Order, the case

²⁹² In my experience as the manager of several certificated air agencies (air taxi operators and flying schools) I certainly found that this was the case; the guidance material often describes the only means of conformance that the inspector knows has been determined to conform to the rule, so interpreting it as the only demonstrable means of conformance seems not unreasonable.

has already been made that even in the absence of the executive order the FAA has had to face the concerns of cost of implementation of its rules. In the above example, even without a regulatory foundation, the Flight Standards was able to implement a procedure costly to the industry. Even if Flight Standards never says there is only one option, it seems likely -- in the absence of other obvious alternatives -- it will easily become the only way. This can effect *de-facto* regulatory change without the necessity of the full economic review required by the rule. And, in fact, in the case of the child safety seat, Flight Standards had issued an advisory circular, AC 91-62, in 1985, before the regulatory action had even begun, this in response to a report of an FAA Safety Council recommendation in 1979. The advisory circular was revised and reissued as AC 91-62A in October 1992, while the regulatory action was still in progress.

The Role of the Goal Processes

The FAA has, with Executive Order 12291, a formally unambiguous addendum to its formal goals. Where the Agency Charter does not state how the two goals are to be mediated, Executive Order 12291, does: it states that regulation shall not be undertaken unless potential benefits to society for the regulation outweigh the potential costs to society, and that agencies shall set regulatory priorities that take into account the condition of the particular industries affected

by regulations and the condition of the national economy.²⁹³ However, within the wording of the Executive Order, there is room to interpret what are costs to society and what are benefits, and this interpretation will be operationalized based on what goals the individuals in the agency are determined to meet.

The FAA was always in a position to consider these very economic conditions as a part of public response. Indeed, the need to publish a rule in the *Federal Register* with an explanation of what the rule was intended to do was always a part of the Executive branch. Even when the FAA was not or is not formally obligated to undertake such an economic review, such factors have been and may be prominently considered.

The genesis of the Executive Order itself is a question of goals. It could be seen as the symbolic politics of the new administration, a manifestation of the patron-client relationships that brought the new administration to office, a garbage-can response of "what can we do right now to show we are different," and an objective response to an economy that had developed a pattern of not growing. Regardless of these factors, the Executive Order arrived at the FAA.

Objective Response

²⁹³ Executive Order 12291, 17 February 1981, in *Federal Register*, Vol. 46, No. 33, Thursday, 19 February 1981, p. 13193.

Implementing the Executive Order through the creation of dedicated units is itself in keeping with a goal based on an objective response to the Executive Order. This is a rational way of building the organizational structure necessary to carry-out the specified functions. These units were staffed by persons with relevant experience brought from outside the organization, which is an objective way to have expertise on hand.

Within the units doing the economic review, the analysis itself is an objective response to the to the issues they, as staffed by non-aviation-, non-FAA-career staff, determine to be the relevant issues. This was the publicly stated intent of the Executive Order, and it is in keeping with the FAA's formal need to explain in a rational manner the grounds for its rule-making actions.

From the opposite perspective, trends in the organization to evade the economic review process constitute equally objective responses to issues they perceive to be in need of resolution. In fact, based on professional standards, the goal of evading economic review is a very objective response. If one believes that there should be no accidents as ones departure point, then economic issues are only impediments to be avoided, along with such other issues as convincing pilots that fatigue and weather are also impediments to safety. Thus, based on ones goal-setting

location, both complying with the intent of the Executive Order and evading it are objective responses.

Symbolic Response

This entire subject is ripe for symbolic politics, and indeed, from several perspectives, the goal of symbolic politics has the most overall credibility in this process. The Executive Order itself may be viewed as a symbol of Republican resolve to remake the Federal government. The point of ceasing excessive regulation is itself a symbolic action, and interpreting this into the FAA's rule process is part of that action. Further, industry groups utilize the syntax of the rule, such as when the AFR debate considers the unduly-burdened industry. The FAA introduces its own symbolism, with the obligatory section in each rule action on economic review. The FAA's goal is to comply with the symbolism mandated by the President. The same symbolic response is equally plausible as a goal mechanism when the FAA reconsiders the rule because its data was not sufficient, thus leaving a face-saving avenue out of the former symbolic analysis. While the objective goal of making a good, safety-conscious rule remains, the acknowledgment to symbolic politics is kept present in the actions.

By establishing units outside the conventional rule-making body, the FAA has been able to take a symbolic action without fundamentally restructuring the units that are

primarily responsible for rule-making. By establishing these units they are insulated from the traditional rule-making bodies, but those bodies are equally insulated from them. Also, the economic review does not occur until a rule is written. There may be revisions to the rule, as was the case with the child safety seats, but the impetus is by that time to make a determination of an existing proposal rather than having these bodies take an active role in making the rule. Thus, they may send a rule back for revision, but they do not have a role in the formative stages. This seems to be a significant insulation: the units exist, but their input, while at times critical, is quite circumscribed. This allows the symbolic politics of establishing the units but limiting their input.

The units went into already existing units with dedicated analysis functions. This had the effect of creating a loosely-coupled structure, with the Office of Rulemaking and the Associate Administrator for Regulation and Certification out of their chain of command. The loose coupling between these units provides the appearance that they are independent of the other units. They certainly prove that with some of their outcome in the child safety seat, but was the analysis of the AFR anything more than a rubber-stamp of policy issues already resolved? AFR, which became a high-profile issue, provides evidence that the function of the analysis units is irrelevant to objective

findings and that their symbolic findings will change as policy dictates.

Multiple Patron-Client

As was noted above the whole undertaking of issuing the Executive Order was evidence of the Executive coming under the influence of external patrons. At the same time, the FAA's relationship to its patrons is formalized with the existence of the Executive Order. Executive agencies are charged with considering the industries affected. They must consider these interests when implementing rules, thus patrons who may have wielded only indirect influence in the past now have their interests brought formally into the regulatory process. This strengthens the patron network, as the patrons can now seek recourse through some legal means based on an agency's failure to consider an affected industry. This is not codified, so the patron-client network remains an informal one. It does mean the FAA must operationalize this as a goal to avoid breaching what may be key supportive relationships, and now that there is a formal process involved it must do so with even greater awareness than it may previously have done.

As has been noted not only in this chapter but also in the preceding chapters, the FAA is responsive to external patrons. This may be evidenced through some informal mechanism such as public and private meetings with representatives of key lobbies. It may also be in a more

formal venue, such as through the public comment and response to NPRMs or through Congressional inquiries and hearings. In this context, the agency plays the role of fiscal responsibility, but there is still a tension between the fiscal responsibility and the need to implement safety-related regulations. These two forces both have patrons, as the need to play the role of safety-responsibility is viewed by the public, and the FAA indeed considers the fiscal value of public confidence in the air transport system.

Garbage Can

Given the strong explanatory power of the symbolic goals, the garbage-can has only limited applicability here. One aspect that is present here is that the FAA does not have a clear sense of mission with respect to the costs of implementing rules, whereas it does have such a clear sense of mission with respect to promoting safety. This sense of mission rendered compliance with the Executive Order outside the traditional scope of FAA objectives. It also created uncertainty within key units as to whether or not they would be able to implement their policies by rule-making, forcing them to consider alternative actions. The previously cited AFR/mandatory-BFR compromise is an example of the FAA having a collection of procedures that may work to resolve an issue. Part of the FAA continues to use non-regulatory methods to reach its traditional goals. This creates confusion of goals and processes within the organization.

Desired outcomes become unpredictable or in conflict across the organization, and processes for reaching those outcomes are equally so. When costs become part of the equation along with accidents, many things become available for bargaining and compromise.

Which means that . . .

That the FAA -- or any organization -- should find itself in the position of interpreting and evading an objective not to its liking is not surprising. However, in this study of the FAA, it specifically permits inference regarding critical organizational issues, some of which were noted before: multiple goal setting apparatus, professionals operating non-hierarchically (and operating by their own professionally defined goals instead of the bureaucratically derived goals), and the position of the organization with respect to outside agents (in this case the specific relationship to the Executive branch through the Department of Transportation). While the FAA is part of the Executive Branch and must follow the President's Executive Orders, it is in the position to interpret and operationalize those Orders. Thus it can internally define circumstances under which those Orders will be evaded. This provides evidence of how the organization actually functions -- what its operational goals are.

In the previous chapter, it was demonstrated that the agency adapt an external mandate to its own structure. The

outcome may be quite different from what had been anticipated. The organization exists as an entity that itself can shape its own destiny. Symbolic politics can be shaken aside with minimal if any impact on the organization.

The study of the Executive Order, essentially an economic review, is presented after the study of rulemaking ("Recreational Pilot/AFR") and the study of organizational restructuring ("Straightline Reporting") because it contains many of the issues raised in the preceding chapters. This presents examples of the FAA in actions that develop conflicting goals and an identification of a functional goal that is pursued regardless of an external mandate. Multiple agency goals, separate lines of authority with differentiated goals, and operationalization of goals based on differing standards are all evident. Prior to Executive Order 12291, the FAA was able to generate a rule without an economic review of regulatory costs. Since 1981 it has to justify a rule before it completes the rule-making process. As was the case all along, it has great discretion in what it does. This discretion exists at the headquarters level, where issues of how to interpret the legislative mandate go hand in hand with how to issue guidance to the field on how to interpret rules. In fact, at least one unit at the headquarters level has given evidence of subverting, evading, and reinterpreting the goals that its sister units establish or conduct in a more literal manner.

But this is not quite the point: one unit of the organization at FAA headquarters makes the formal goal as dictated by executive mandate -- do economic review -- but another unit determines whether to operationalize that goal to the letter or evade it in part or whole, and may even do so formally. "Accident free in 93" was not an underground campaign but something done out in the open. How this objective could be reconciled with what could amount to the formal inability of the organization to take regulatory action in pursuit of that goal (given the need to explain why it is cost effective to be accident free), and the clear statement that that inability would be subverted, is no mere point of speculation: within parts of the FAA the real operational goal is still accident free flight, with the existence of the cost-benefit units being a way to pay lip service to the Executive mandate. What is happening in Flight Standards -- in such a public way -- is not explainable in any other manner.

Figure 9.1 Detail: Location of Regulatory Analysis Units

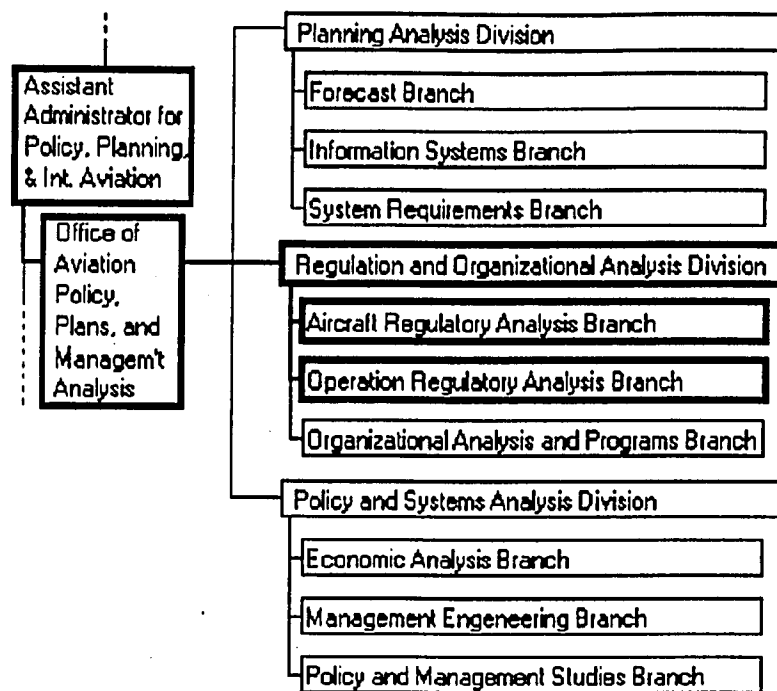
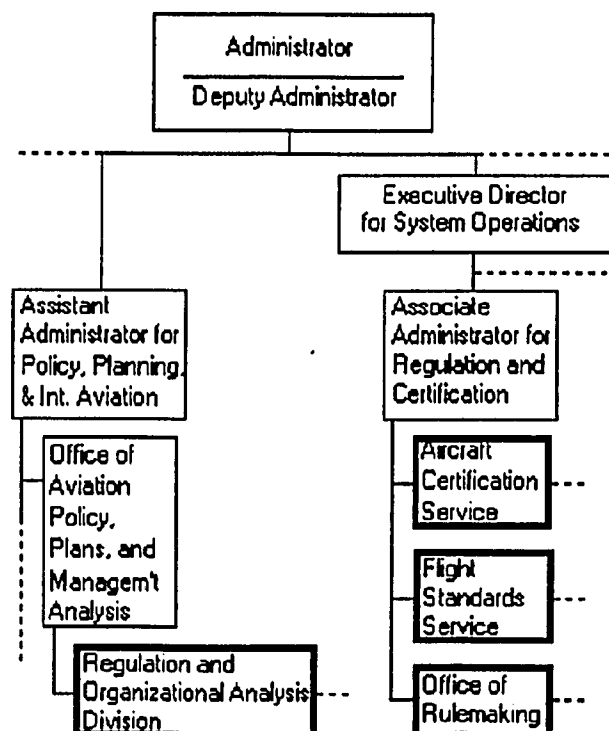


Figure 9.2 Detail: Key Relationships in Regulatory Analysis



CHAPTER NINE, A FOOTNOTE TO REGULATION: THE SAGA OF THE DC-10

It is a strong temptation to state that no analysis that studies the issues around the regulation of aviation and related topics would be complete without at least a passing notice of the DC-10. Even though the hey-day of this debate seems to have passed, key issues around this airplane are not resolved even today. A string of Congressional hearings paced the development of this troubled airplane through a series of disastrous in-flight failures and its transition to military service.²⁹⁴ It has

²⁹⁴ For example, the following in chronological order, which includes Congressional hearings on a cargo door failure (House of Representatives), an engine/pylon failure (House and Senate), and an engine failure (House and Senate), and a report of the Comptroller General to the Congress on conversion of this civilian aircraft to military use:

United States Congress, House Committee on Interstate and Foreign Commerce: *Special Subcommittee on Investigations, Review of procedures and policies of the FAA and NTSB with respect to the DC-10 cargo doors: hearings before the Special Subcommittee on Investigations of the Committee on Interstate and Foreign Commerce, House of Representatives, Ninety-third Congress, second session, March 27, April 9, 1974* (Washington, D.C.: U.S. G.P.O., 1974);

Comptroller General of the United States. *Issues Concerning Air Force KC-10A Advanced Tanker/Cargo Aircraft: Report to the Congress by the Comptroller General of the United States* (Washington, D.C.: General Accounting Office, 1979).

United States Congress, House Committee on Public Works and Transportation: *Subcommittee on Aviation, Aviation safety, DC-10 crash of May 25, 1979: joint hearings before the Subcommittee on Aviation and the Subcommittee on Oversight and Review of the Committee on Public Works and Transportation, House of Representatives, Ninety-sixth Congress, first session, June 19 and 20, 1979* (Washington, D.C.: U.S. G.P.O., 1979);

(continued...)

been used as a case study in the ethics of risk and regulation.²⁹⁵ The fundamental issue for this study is what were the consequences of the DC-10 problems for the internal rule making procedures of the FAA, and what rule-making actions came from them? Overall, in its various guises, it can be seen as well intentioned efforts of cooperation between the FAA and the industry, at self-regulation or

²⁹⁴ (...continued)

United States Congress, Senate Committee on Commerce, Science, and Transportation: Subcommittee on Aviation, *DC-10 certification and inspection process: hearings, before the Subcommittee on Aviation of the Committee on Commerce, Science, and Transportation, United States Senate, Ninety-sixth Congress, first session, July 11 and 12, 1979* (Washington, D.C.: U.S. G.P.O., 1979);

United States Congress, House Committee on Science and Technology: Subcommittee on Investigations and Oversight, *Design analysis of wide-body aircraft: hearings before the Subcommittee on Investigations and Oversight of the Committee on Science and Technology, U.S. House of Representatives, ninety-sixth Congress, first session, July 17-Oct. 4, 1979* (Washington, D.C.: U.S. G.P.O., 1980);

United States Congress, Senate Committee on Commerce, Science, and Transportation: Subcommittee on Aviation, *Airworthiness of the DC-10: hearing before the Subcommittee on Aviation of the Committee on Commerce, Science, and Transportation, United States Senate, One Hundred First Congress, first session, September 19, 1989* (Washington, D.C.: U.S. G.P.O., 1989);

United States Congress, House Committee on Science, Space, and Technology: Subcommittee on Transportation, Aviation, and Materials; *DC-10 engine failure, FAA Research and Development needs: hearing before the Subcommittee on Transportation, Aviation, and Materials of the Committee on Science, Space, and Technology, U.S. House of Representatives, One Hundred First Congress, first session, November 9, 1989* (Washington, D.C.: U.S. G.P.O., 1990).

²⁹⁵ See, for example, *The DC-10 Case: A Study In Applied Ethics, Technology, and Society*, edited John H. Fielder and Douglas Birsch (Albany, N.Y.: State University of New York Press, 1992).

regulation by aviation experts; it can be seen as a case of regulatory failure, of a regulatory agency captured by a regulated company, a strong patron with the ability to influence the decision-making process of the agency; it can be seen as a public demonstration of agency vigilance during a period of a public crisis of confidence and a media feeding frenzy. It ought not to be ignored, so here follows a brief mention of this lamentable story.

The Long, Sad History of the DC-10

The Story of a Plane in Crisis

Three decades ago, the McDonnell Douglas company requested type-certification for its new wide-body aircraft, the DC-10. The FAA ultimately approved the aircraft, and the DC-10 joined the industry's ranks of aerial vessels. Since that time, the DC-10 has become a symbol of the uncertainty that surrounds the safeguards applied to the industry. There have been at least three devastating accidents attributed to structural failure of the aircraft, something that should have been rendered impossible through the certification process. To this day, the DC-10 is a source of pain and embarrassment to the FAA and a symbol of the FAA's problems to those outside the agency.

The aircraft certification process dates to the earliest days of the CAA. Federal oversight of the design and certification of aircraft has proceeded from the earliest days of the airlines through today. As noted in

the chapter on straight-line reporting, the center of those functions was transferred after the Second World War from the FAA headquarters to the regional offices, and is now based in various directorates. The applicable regulations are in 14 CFR Subchapter C, various Parts (see Figure 1.1). Under these regulations, an aircraft must receive certification before it may fly in the national airspace system. Receiving such certification means that the design -- and each aircraft manufactured under that design specification -- meets the regulatory requirements in effect as of the date that the design received certification. One of the things this means is that changes in regulations are not backward enforceable on existing designs. Unless there is a major flaw in the design (e.g., the tail falls off in normal flight) or the design did not meet the then-existing regulations (*implicit in the design* the tail would eventually fall off) modifications to the certificated design cannot be mandated by the FAA. As an overall concept, aircraft that meet the applicable requirements of Subchapter C ought to be airworthy, and all aircraft carry an Airworthiness Certificate to attest to that fact. As an overall concept, aircraft with implicit design flaws ought not to slip through the cracks.

The problems with the DC-10 first became apparent publicly on the 12th of June, 1972, when American Airlines suffered an incident involving a DC-10. A cargo door blew

out in flight, and there was a partial floor collapse. The aircraft safely returned to Detroit. An investigation revealed a problem with the door mechanism that could allow the door to appear to be locked when it actually was not. An NTSB recommendation that a modification be made to the door mechanism was not acted upon at that time by the FAA, nor did the agency even respond to it -- under regulations at that time regulating agencies were not required to act upon or even to respond to NTSB recommendations. Service information was supplied to operators by McDonnell Douglas in a timely fashion, but the warnings were less binding than another possible remedy that is at the FAA's disposal. The FAA's failure to act in the most assertive manner became tragic when, on March, 3rd, 1974, over 300 people lost their lives outside of Paris when a Turkish Airlines DC-10 lost a cargo door due to the same locking problem that had affected the American Airlines aircraft.

The NTSB felt that the FAA should have immediately issued an airworthiness directive requiring modification of the cargo door.²⁹⁶ An airworthiness directive, commonly referred to as an AD, is an integral part of the FAA's regulations, comprising 14 CFR 39. Such a directive in this

²⁹⁶ Interview No. 3, with an inspector at the NTSB regional office in New York City, a person selected because of the position in an organization that had had prominent interaction with the FAA during the DC-10 incidents, which was conducted during previous research into the DC-10 processes at the FAA; and Interview No. 31, cited previously, an FAA Associate Administrator.

DC-10 case would have required the modification of the aircraft. While the manufacturer did issue servicing information regarding the door, it was left to the carriers to comply. This is as would be expected in professionalized organizations with *bona-fide* concerns for their operations; however, it was not followed through by all the operators, at least not by Turkish Airlines. Following the Paris accident, the AD was issued. While it cannot be known for certain, it is presumed that by now all DC-10s have been modified, although aircraft operated exclusively outside the United States cannot be vouched for.

Aviation experts have raised several questions about these events. One question centered on the comprehensiveness of the FAA's examination the cargo door mechanism prior to the final certification of the aircraft. The issuance of the AD presents anecdotal evidence that there was a non-compliance issue, but given the clear safety-of-flight and public relations debacle, the issuance of the AD may well have been a symbolic and pragmatic response to a crisis. A far more important question, and one posed during the course of interviews with NTSB and FAA officials, concerns the FAA's lack of response following the American Airlines incident in 1972 and the role that played in the 1974 accident. The NTSB official interviewed felt that the NTSB recommendations were ignored and, thus, by omission, caused an accident that resulted in the loss of

300 lives. The NTSB official further stated that, as a result of this incident, a rule was enacted requiring the FAA's response to an NTSB recommendation in a specified time frame (a response, not necessarily an action on the recommendation, only a "yes, we heard them").

In this incident, it would appear that the airline did not comply with the manufacturer's recommendations, but an AD would not necessarily have been binding either, for the aircraft was being operated by a foreign carrier outside the United States. It is also not illegal for an airline not to comply with the manufacturer's recommendations, although it is probably extremely poor judgement and may violate the airline's own rules that often require compliance with such recommendations. In any case, there was severe criticism of the FAA following the Paris accident for not having acted forcefully enough following the American Airlines incident over Detroit, including a Congressional hearing that made its way into the media.²⁹⁷

While it is often difficult to solicit information from the FAA on the DC-10 -- personnel sometimes become uncomfortable at the mention of the aircraft -- the NTSB source was more than willing to discuss this particular aspect of the DC-10 story, and mentioned dissatisfaction

²⁹⁷ *The New York Times*, 24 June 1979; U. S. Congress, House Subcommittee on Investigations, *Review of procedures and policies of the FAA and NTSB with respect to the DC-10 cargo doors* (this is in the wake of the Chicago accident).

with the FAA and the subsequent procedural change requiring FAA response. The procedural change is in fact merely a bureaucratic one, merely requiring a response within a certain time. The NTSB still cannot mandate a corrective action.²⁹⁸ The FAA response has been that the manufacturer had taken the appropriate action. Interviewees reported that they had done what they had been required by statute and regulation to do, and that the actions taken were appropriate.²⁹⁹ Service information is a normal transmittal from manufacturers to operators. It is not clear that other scenarios would have played better: had the FAA issued an AD immediately it could have been legally challenged and the accident still could have resulted.³⁰⁰

Perhaps the FAA's continuing discomfort with the DC-10 stems from one later embarrassment. On the 25th of May, 1979, a DC-10 crashed shortly following take-off from O'Hare Airport in Chicago. Subsequent investigations revealed that an engine mount on the left wing had failed, and that with

²⁹⁸ The NTSB recommendations may be used to justify rule-making, such as was the case with the AFR.

²⁹⁹ Interviews Nos. 2 and 31, previously cited. No. 2 took the stated simply that what was done was what was legally required; No. 31 stated that (1) what was done was actually appropriate; and (2) the FAA was never clear whether it had legal justification for an AD, given it was not clear that the aircraft did not meet its certification standards when initially certificated.

³⁰⁰ This is similar to an automobile manufacturer challenging a recall ordered by the National Highway Traffic Safety Administration (NHTSA).

the loss of the engine from the wing, the hydraulic systems also failed. The aircraft became virtually uncontrollable. Ultimately, it was reported that the cause of the accident was the use of a

controversial maintenance procedure during removal and reinstallation of the pylon [and engine]. . . . [In the accident] the pylon was torn off the plane . . . as it ripped over the wing, the pylon caused so much damage to hydraulics and their devices that the craft became uncontrollable.³⁰¹

In an intra-industry debate on the problem with the pylon, *The New York Times* reported that "McDonnell Douglas says the technique was contrary to its recommended procedure, but American Airlines denies that the builder recommended any different procedure from the one the airline was using."³⁰² What was happening was that the engine/pylon assembly was being removed from the wing as a unit rather than in two separate operations as was recommended by the manufacturer, causing cracks in the attach points.

Perhaps this DC-10 saga would have taken a different, more tragic course had not, following the American Airlines accident, a suspicious United Airlines mechanic gone beyond a recommended inspection and discovered that the cracks that were occurring in the engine/pylon/wing structure were more extensive than had been previously thought. McDonnell

³⁰¹ *The New York Times*, 25 June 1979.

³⁰² *The New York Times*, 21 June 1979.

Douglas at this point had issued an "alert bulletin" which "recommended that the inspection be completed within 50 flight hours or seven days."³⁰³ The mechanic, who had decided on his own to conduct a more extensive inspection on one of the company's DC-10s than was required by the McDonnell Douglas inspection instructions, discovered the crack in a reinforcement panel in the wing. This was reported to the FAA, and the FAA administrator, Langhorne Bond, immediately announced the grounding of all United States DC-10 aircraft on the 29th of May for further inspection prior to resuming flights. The procedures for this inspection were prepared by the FAA's Western Region, the office originally responsible for certifying the DC-10, and it was noted that

At the F.A.A. regional offices in Los Angeles, documents on the DC-10 fill 97 cubic feet of file drawers and 18 thick rolls of microfilm. The files contain reports from McDonnell Douglas purporting to justify the integrity of its design for the wing pylon . . .³⁰⁴

Of note is the decentralized nature of the FAA, which has already been analyzed in depth in a previous chapter. The specifications of the DC-10 had been approved at the regional level, in this case at Western Region, which no longer exists as a discrete entity, having since been merged

³⁰³ *The New York Times*, 28 May 1979.

³⁰⁴ *The New York Times*, 10 June 1979.

with Pacific Region to form Western-Pacific Region, and was before the Transport Airplane Directorate or Lead Region. Even in this case of an accident attracting national attention, the specifications of the DC-10 inspections were formulated at the regional level. In addition, it was done with information provided by the manufacturer, further evidence of sharing professional expertise. Of course, at this point, the manufacturer has other real interests as well, such as in getting its aircraft back into the air and shielding itself from damaging information about its design work becoming public.

More problems were found during these inspections, and as the airlines reported them to the FAA, it became evident that "the discovery of flaws in still more planes had strengthened fear of a design defect . . . "³⁰⁵ The FAA revoked the aircraft's type certificate, the authorization that any aircraft manufacturer must have to produce and market an aircraft for flight in the national airspace system, with these discoveries.

Concerning this revocation, it was mentioned to me that the FAA was on weak ground: to revoke an aircraft's certification the FAA must argue that the aircraft did not meet the airworthiness requirements in effect at the time of

³⁰⁵ *The New York Times*, 7 June 1979.

certification.³⁰⁶ The FAA never made this argument, and in the public relations debacle the industry was facing, the point was not contested. Still, the revocation was described to me as being technically illegal, although symbolically powerful, as the DC-10 did indeed meet the airworthiness requirements it was required to meet. Of course, if the certification requirements permitted the design and certification of an aircraft that could have its engines (and cargo doors) fall off in flight, there might be underlying problems with the certification process, such as the standards themselves. As expressed to me, this was never the focus of the FAA's self-criticism; rather, the issue was how the problems were not dealt with once they had become known, which was well before lives were lost. Of course, the FAA's discomfort over the whole affair was compounded by the Congressional hearings that followed.³⁰⁷

Following this revocation, the FAA and the manufacturer joined to examine the aircraft: "The agency had assigned more than 100 special investigators to help McDonnell Douglas find the cause of cracks and other defects in the assembly anchoring the plane's four-ton engines to the

³⁰⁶ Interview No. 36, an analyst in a Congressional agency, previously cited.

³⁰⁷ United States Congress, House Subcommittee on Aviation. *Aviation safety, DC-10 crash of May 25, 1979*; United States Congress, House Subcommittee on Investigations and Oversight. *Design Analysis of Wide-Body Aircraft*.

wings."³⁰⁸ Engineering corrections were made and the aircraft was legally returned to service.

In this case, the FAA again was working with the manufacturer to remedy the problems with the aircraft. It may be noted that the McDonnell Douglas was the only place where the specific knowledge of the aircraft existed. With the information centered in a core of professional aircraft designers at the manufacturer, there was little the FAA could do than to turn to the very professionals who were to be investigated. This is in itself a corruption of bureaucratic oversight and raises serious questions about conflicts of interest for McDonnell Douglas officials. However, in such a field, a system reflecting a reliance on professional standards would seem to be the only viable course of action. The FAA itself does not do any engineering in design oversight, merely confirm that the manufacturer has properly documented compliance with the applicable standards. This places certification somewhere between a rationally-based determination that the aircraft is airworthy and a symbolic legitimation of the manufacturer's decisions without any independent professional standards of airworthiness being applied.

During the course of this project, the person who wrote the FAA's final report on the Chicago accident was

³⁰⁸ *The New York Times*, 9 June 1979.

interviewed for a subject unrelated to DC-10s.³⁰⁹ He had an informative critique of the interaction between McDonnell Douglas and American Airlines. In particular he spoke about whether American Airlines was at fault in damaging the wing of the aircraft during maintenance the manufacturer had indicated would do just that. McDonnell Douglas had indeed sent out service information concerning removing the engines from the pylons. However, he stated that the information that arrived from McDonnell Douglas on the shop floor at American Airlines was not understandable. Thus, it was not American Airlines's fault that the procedure was not followed, because they could not figure out what McDonnell Douglas was talking about. This seems to implicate McDonnell Douglas for botching a crucial job that the FAA had relied on them to accomplish.

Interestingly, McDonnell Douglas also had a take on the cause of the DC-10 accident in Chicago. I was informed that the problem was with how American Airlines taught its pilots to fly the airplane.³¹⁰ In the McDonnell Douglas view, American Airlines precipitated the crash by instructing flight crews to maintain a positive rate of climb in the

³⁰⁹ Interview No. 36, previously cited.

³¹⁰ Interview No. 38, a person at McDonnell Douglas, who held a position in their corporate communications department. This person was contacted through a referral from FAA Aircraft Certification and a person with a similar position at Boeing Aircraft. The interview was conducted in a formal atmosphere, although the formal questionnaire was not used; rather, a discussion of industry and company issues was followed.

event of an engine failure on take-off. This procedure may precipitate a loss of airspeed in order to maintain the climb (i.e., the energy in the system is going into gaining height instead of into maintaining speed). I was told that American Airlines should have instead instructed flight crews to maintain directional control. This procedure may precipitate a loss of altitude in order to maintain an airspeed that would provide sufficient airflow over the control surfaces (specifically the rudder) to maintain control. There is a point here.³¹¹ Unfortunately, on take-off, and in particular that take-off in Chicago, the aircraft has precious little altitude to exchange for airspeed, and is likely to hit the ground at speed. However, even if it does hit the ground, the idea is that an aircraft that is under control is in a better condition when it hits the ground than one that hits the ground inverted. It is not clear that McDonnell Douglas's suggested technique would have had a better chance of providing a survivable accident in Chicago than the one used. However, had directional control been maintained an accident (in the form of a non-survivable off-airport crash) may not have

³¹¹ As a multiengine flight instructor, I had told my students to maintain control and sacrifice the climb in this type of emergency. In fact, losing directional control of a multiengine aircraft because of insufficient airspeed is a true beginner's mistake, one that will generally be that beginner's last mistake!

occurred, and this is their key point. The finger-pointing continues.

But regardless of any fingerprinting that may have occurred in the course of the investigations, and to this day, the uselessness of it all is made clear in an article which quotes an aviation consultant who said that "Whatever role improper maintenance played in the crash, a plane should be designed so that such maintenance errors, which are always possible, could not lead to fatal damage to a plane's structure."³¹² This is the real smoking gun in the failure of regulatory process. The process, including existing Subchapter C regulations, revisions to procedural regulations as prompted by the NTSB, conformance to those regulations by the manufacturer, and agency oversight permitted just such a plane to be designed and -- for all appearances -- legally certificated, and nobody did anything wrong or had to take remedial action before the crisis was at hand.

In fact, there were several failures in the overall system of safe flight. The manufacturer failed to fool-proof a critical system. The operator failed to safely maintain the aircraft. The FAA failed to find these problems in the certification process and during continued operation of the aircraft. The above cited quote makes an interesting point: although the airline should not have been

³¹² *The New York Times*, 25 June 1979.

engaging in improper maintenance to begin with, the manufacturer should have seen fit to develop, and the FAA should have required, an aircraft capable of withstanding the abuses of improper maintenance. Each of these "shoulds" was a failure of safety of flight.

In the wake of the Chicago accident there was again an attack on the bifurcated nature of the FAA's role: "J. J. O'Donnel, president of the Airline Pilots' Association, has said the F.A.A. cannot long continue as it is chartered by Congress to be -- a promoter of civil aviation while at the same time serving as its watchdog."³¹³ The articles that appeared in the media following the Chicago accident were clearly challenging to the industry and to the FAA. The questions included accusations of the FAA not properly certifying the aircraft, the manufacturer of concealing design flaws, and the operators of using unsafe maintenance procedures. These questions are valid, but as noted before, there is little the FAA can know about an aircraft as complex as the DC-10 that the manufacturer probably does not know better. There is little the manufacturer can do to require specific procedures when safety is not perceived as immediately threatened; and, in the absence of such an immediate threat to safety, there is little motivation for the operator to perform circuitous procedures that are not perceived as crucial to safe operations.

³¹³ *The New York Times*, 10 June 1979.

A bureaucratic system is a poor fit for a field where the regulators are relatively unsophisticated about the issues involved, as was, unfortunately, the situation with the DC-10 pylon. Even the rule change concerning the interaction between the FAA and the NTSB was only a bureaucratic remedy and did not address operational issues. The professional and the bureaucrat are at two poles in the development of the aircraft. There is an intrinsic difficulty in the relations between expert knowledge at every level of aircraft operation (design, inspection, maintenance, etc.) and the need to coordinate the complex organizational tasks involved in designing, producing, and maintaining airworthy aircraft, which requires bureaucratic hierarchy. There is a constant and inevitable tension between these two principles of organization. Professionals want and need to erect barriers that protect their autonomy to train and evaluate their colleagues; bureaucrats need to be able to penetrate those barriers to insure that there is a coordination of the necessary division of labor. How the regulatory structure addresses this tension indicates how the tension is being addressed. In this tension, the professionals seem to have control over the process. Even given professional goals and the ideal of compliance with advisory rather than regulatory material (i.e., the service bulletin rather than the AD), there is still a need for bureaucratic oversight to coordinate adherence: the

bureaucratic remedy is the AD, which was not forthcoming until the professional remedies failed.³¹⁴

It is noteworthy that in July of 1989 a United Airlines DC-10 suffered an explosion in the tail engine which severed the aircraft's three hydraulic systems (all next to each other in the tail). The aircraft was rendered uncontrollable except for the application of differential thrust to one of the two remaining engines on the wings. The flight crew was able to bring the aircraft into the immediate vicinity of the Sioux City airport where a crash landing was made. Approximately half the passengers and crew survived this accident.³¹⁵ Congressional hearings were again held, and the DC-10 as an aircraft was not found to be structurally unsound.³¹⁶ However, this accident bears a striking resemblance to the 1979 accident, something that was not touched upon in the media. However, it was mentioned in an interview I had with an airline engineer, who said the following:

³¹⁴ Compounding these issues was the need of the manufacturer to present to the world the appearance of having designed an aircraft not needing an AD. The lower the profile of the remedy, the lower the level of bad publicity for McDonnell Douglas. More planes may be sold, and more travellers will feel comfortable on them. This economic reality simply adds one more layer to the complexities and difficulties of these relationships.

³¹⁵ By odd coincidence, I was in Washington that day at FAA Headquarters reading the rules docket on the Recreational Pilot/Annual Flight Review proposal.

³¹⁶ United States Congress, Senate Subcommittee on Aviation, *Airworthiness of the DC-10*.

his airline had ordered Lockheed L-1011s instead of DC-10s because, after evaluating both airplanes, the DC-10 was determined to be not well designed. Both McDonnell Douglas and Lockheed perceived that they were competing in a two-plane niche (3 or 4 engine wide-body, along with the Boeing 747), and the one who failed in marketing their plane in that niche would probably lose the commercial aircraft market. McDonnell Douglas had made many design compromises with the DC-10 in order to bring its costs down, and this made the plane effectively unsafe. [N.B., Lockheed lost the battle for the niche and stopped all commercial aircraft production.]³¹⁷

If the DC-10 is, in fact, unsafe, then this plane demonstrates the intrinsic vulnerability of the FAA's regulatory processes concerning certification of aircraft as they existed at the time of the DC-10's certification. Except for the procedural change concerning the NTSB, that is also substantively how they now stand. The only change was procedural, and that with little effect other than to provide an acknowledgement.

A Final Word on Rules, Goals, and Structures

As it unfolded, the DC-10 history was a case study of the FAA working with the industry to insure the reliability of an aircraft. Operating in a decentralized manner and in cooperation with the manufacturer is not classic

³¹⁷ Interview No. 9, an engineer at Pan American World Airways, who was known to me through his flying activities at a local airport, who agreed to be an informant for this research. His comments were in an informal discussion concerning FAA procedures as visible to a person in the industry, and included his observations on why his airline had purchased the Lockheed-1011 aircraft instead of the DC-10.

bureaucratic functioning. It may demonstrate a haziness of the boundary between the FAA and other organizations in its environment, a distinct structural feature from paradigms of organizations having distinct and maintained boundaries. It remains debatable whether such functioning did or did not have a bearing on the DC-10 crashes, and there are so many factors in the DC-10 crashes that the debate is probably not resolvable.

The FAA's patron client network was certainly a part of the issue when decisions were made on how to proceed with regulating a problem aircraft. American Airlines and McDonnell Douglas are both large corporations, leading players in their fields, especially with the industry shake-outs of the past two decades leaving few major airlines and fewer manufacturers in the United States. However, the uncertainty over the circumstances surrounding the accidents is also evidence of the difficulties intrinsic in building such a complicated piece of machinery and expecting it to work every time. Finger pointing is not just done to point the blame at others: it may mean that the issues are not easily resolved. The need to guard patron relationships only deepens the FAA's dilemma over how to proceed in such uncharitable airs.

The reaction of the FAA to the Chicago accident is another study in goals. The goal in grounding the aircraft was not to prevent further accidents: it was to prevent

further erosion of public confidence in both the air transport system and in the agency itself. The symbolism of grounding the aircraft -- while on weak legal grounds -- was full of the symbolism of the government at work for the people. Thus, this was a symbolic goal that had to be addressed, and was addressed with the aid of the industry, no part of which contested this action. In light of these issues, grounding the airplane answered an immediate, crisis driven need to offer symbolic reassurance. There were other options -- an AD, for example -- but perhaps none with the power of symbolism to match grounding.

As an objective goal, the DC-10 did and continues to provide vexing problems in the design and operation of a large airplane. Whether or not the DC-10 met its design specifications, the operation of such a complex and -- compared to like aircraft such as the Boeing 747 -- problem prone airplane provides the need to manage a complex system that is prone to breakdown, and which has technical issues that require the broad cooperation of the regulatory body, the operators, and the manufacturer. It is unfortunate that the DC-10 does create such issues, but as a pragmatic issue they require a broad and objective addressing if to do no more than to sustain public confidence in the air transport system.

The DC-10 represents a case where issues of fact are simply not possible to establish, and establishing those

facts is not the point here. The ambiguousness of facts is in itself an important issue for the FAA. The issue is of the FAA functioning where facts are not easily established and remedies are uncertain. Indeed, the FAA and its industry colleagues may well have done the very best they could, but there continues to be a residue of unease. This is in part because there were warnings that there were problems with the DC-10s. These warnings were acted-upon by the FAA, by the manufacturer, and by the operators in one manner or another, and still over nearly two decade's time DC-10s continued to come-down in pieces. This is an airplane where everything seems to have been done more or less correctly, if perhaps at times somewhat casually but it still turns-out to be not quite right.

While the FAA did require changes in the aircraft following the crashes, there were not substantive changes made in the certification process. This is not entirely unreasonable as it was not just the certification process that allowed the accidents to happen. The complex processes involved in designing, manufacturing, and operating these aircraft proved, in this case, beyond the ability of the FAA to control to the point of eliminating the accidents. It is difficult to even begin to conceive of how Subchapter C could be revised to cover every eventuality of flight, and as was cited in the previous chapter, the agency may be in the position of only preventing the last accident. However,

this was not the case with the DC-10: there was a pattern. The continued lack of action to revise rules may be indicative of the FAA's internal decision to maintain the current balance in both the internal and external tensions that exist around aircraft certification.

CHAPTER TEN, CONCLUSION

Specific Concepts of Goals and Decisions

Although decisions can be made and policies implemented with a clear understanding of what is intended, the organization does not always have the ability to accomplish the intended task or result. Various factors may intervene and render the result at great odds with what was intended. The functional goal that determines any particular decision may always have been at odds with the formal goal. The tool for examining decisions has been the application of the model of functional goals that an organization may have, which in turn will determine how the organization operationalizes its responses to issues it faces. These goals have been objective response, symbolic politics, patron-client, and garbage can. Each of these goals may have unique or complementary roles, and key decisions have been critiqued according to them. The goals may appear and disappear according to some logic, or they may exist and persist in specific localized circumstances.

Taken As A Whole

The FAA is an organization with a formal goal that is comprehensible. Everyone agrees the FAA is formally about flight safety. However, the case studies show how forces both inside and outside the organization have worked to promote alternative goal-setting and decision-making rationales. These are situations where alternative

rationales are perceived as legitimate operationalizations of the FAA's formal goals, and these may be at odds within the organization. These alternative rationales may be based on the FAA's objective evaluation of an issue, on its needs to satisfy organizational and governmental symbolic needs, on its needs to satisfy influential patrons, or on an uncertainty of objectives, desired outcomes, and processes.

The cost benefit and straightline reporting studies especially lead to conclusions concerning organizational segmentation and *esprit de corps*. These prompt the general conclusion that, while the economists in the Office of Aviation Policy and Plans are cognizant of a formal goal and are implementing it to the best of their abilities, the pilots in Flight Standards Service have evaded and reconstructed the goal on which the economists are working. Further, some units in support roles (i.e., not the direct regulatory or operational units such as Flight Standards or ATC but, for example, the aforementioned Policy and Plans) may not realize this is going on elsewhere in the organization. So Flight Standards can actually say that it is up to them to evade the formal goal, which they do. Meanwhile, Policy and Plans will be quite pleased with determining that a rule is not cost worthy. While cost benefits and straightline reporting consider the internal dynamics of the organization, the recreational pilot/AFR process has more to say about the dynamics of the external

environment. It was in that external environment that recreational pilot and the AFR came to grief, as the FAA did not establish an external support network for what it considered a critical initiative. Finally, the DC-10 remains a vexing cipher filled with objectives, symbols, and relationships, all of which have failed to prevent a horrendous series of accidents; and while the DC-10 history is filled with smoking guns, many are aimed squarely at their holders feet.

Internal Contradictions

During the research, I found that different units in the FAA would compare their decision making to that of other units. For example, Aircraft Certification has a very formal -- even plodding -- approach. That unit requires the manufacturer to complete very clearly delineated steps, with the FAA doing no more than verifying compliance. Flight Standards was specifically contrasted with Aircraft Certification, where staff have set their own standards for objectives. The head of an Aircraft Certification Field Office specifically said that he did not know how Flight Standards could make the decisions they made without written regulations and procedures. He said Aircraft Certification could never do that because everything that had to go through Aircraft Certification for compliance was written down and unambiguous. Thus, routine decisionmaking -- very structured and complying with formal objectives -- is

evident in Aircraft Certification. However, it was from Flight Standards that I was told that regardless of the mandate for cost benefit reviews, policies would be implemented if they were considered needed for flight safety.

Some Lingerin Empirical Issues

It was difficult during this fieldwork to know how much stock to put in what informants reported. While it is unlikely that all informants tell the truth in response to all questions, and while a great deal of manipulation may be taking place when answers are framed, some baseline for believability is necessary. And while one high-ranking administrator told me that when the patrons on Capitol Hill want something different than what the FAA wants "you don't fall on your sword," not all informants are so forthcoming.³¹⁸ Serious questions still exist concerning the information gathered. For example, is Flight Standards staff correct in saying that they will develop policies no matter what the cost-benefit study says? After much consideration -- specifically taking the likely alternatives for goal setting that exist within Flight Standards -- I have concluded that that is probably a truthful statement. I have also considered why that piece of information might be shared with me (i.e., the public) if it were for

³¹⁸ Interview No. 31.

manipulative and not simply academic purposes. I cannot develop a plausible explanation for wanting the public to believe that Flight Standards will violate the spirit of the Executive Order on rule making, as there seems to be no particular reason for telling the public that there exist alternative goal setting mechanisms in the FAA. But this is an issue about which I do not feel totally at ease.

In terms of interest groups, one must consider who has access and who wields power. Boeing's power in the days of Senator Henry Jackson was legendary. The State of Washington lacks such powerful proponents in the City of Washington these days, but when Boeing sells an airplane (or -- better -- a few airplanes) it still makes news -- even headlines -- around the country. General aviation lobbies are not as spectacular, but they have access as well, particularly through well developed grass-roots networks of organizations (e.g., EAA, AOPA). These groups have access to power, even if they do not wield it directly, but their trails and motivations are not always clear. But while the EAA and AOPA may think that the general aviation industry is overregulated (c.f. the AFR), their declaiming overregulation is in contrast to other allegations that the FAA is not doing enough regulating. No interviewees said that the large companies could get away with things that individuals would be crucified for, but this would not be an unreasonable critique. Large companies have lawyers on

staff, and American Airlines does seem to have survived mishandling maintenance (or even mistraining its pilots) with its operating certificate intact.

Some Closing Thoughts on the Case Studies

Rethinking Licensing If the recreational pilot proposal had included nothing but provisions for licensing recreational pilots, I believe that the rule would have been approved and there would be many recreational pilots now. That did not happen. The issue was clouded by its inclusion in what the FAA promulgated as a general revision to Part 61. Even after this omnibus rule-making action was challenged during the comment period of the regulatory process, and the FAA agreed to separate regulatory actions on most of the issues, it did not separate the AFR from recreational pilots. The revision of flight review rules -- the AFR -- remained tied to the recreational pilot license. I could not uncover anyone who said that this was horse trading right from the start, right from the NAFI proposal. However, I was as much as told that the "mandatory" BFR was horse traded for the AFR. It is not an unreasonable conclusion that some would-be policy-makers at NAFI believed they could offer the AFR in exchange for recreational pilot, and that policy-makers in the FAA believed they could offer recreational pilot in exchange for the AFR. This constitutes a plausible explanation for the persistence in linking the two actions.

General aviation pilots -- specifically two key lobbies -- reacted negatively to that revision. The FAA was never able to establish this as a consensus issue. The issue of flight reviews raises questions about pilots' sense of professionalism. Honing one's skills should be part of professionalism, but perhaps even doctors and lawyers do not like others looking over their shoulders. The annual reviews could have been taken as a mark of pilots' unique and privileged status, and would have given them another instrument for controlling access to this status. Special responsibilities dictate special training and testing burdens, and can be exercised only by those judged by their peers. Their objections are inconsistent with a model of pilot professionalism.

All this action produced was the formal strengthening of a procedure already at hand. What the FAA finally got from this process was only slightly different than what it had started with a decade earlier. The recreational pilot license has not become a real alternative to the private pilot license, while the mandatory flight review is still only every two years. Even with formal recreational pilot licensing and the mandatory flight review, the entire idea had somehow become discredited: student pilot starts have continued to drop, and virtually none are electing recreational pilot as a low-cost alternative to private

pilot. After all the effort, it somehow did not work, and that seems sad.

Restructuring My investigation of the organizational change has raised many questions concerning the nature, intent, and ultimate success or failure of the restructuring. Prior to the change, there were issues of lack of central direction in the FAA, an issue that extends to other Federal agencies with similar regional structures (e.g., the Health Care Finance Administration, the Social Security Administration). Taking the reorganization at face value, there is an issue of unintended consequences, the creation of a new organizational structure that is every bit beyond the reach of the DOT as the old structure was. If DOT had been intent on eliminating separate fiefdoms -- the autonomy of the FAA's regional offices -- why allow a new set to develop along the different lines of authority of functional units?

More malevolent, or at least less acknowledged reasons, are imaginable. Was the restructuring intended to enable the easy dismembering of the organization by having functional units already administratively separated? It could look suspiciously like that in view of recent calls to spin-off ATC.³¹⁹ Whether or not that was the case, there

³¹⁹ Admittedly, taken together, these two issues fuel the conspiracy theory that Republican robber-barons want to loot the FAA to line their own pockets! Of course, the same
(continued...)

are far-reaching ramifications throughout the organization. These were not necessarily predictable at the outset. But the fact is that key decisions remained in the same location after the reorganization as they were in before, so the reorganization was either for purely symbolic purposes, for alternative purposes, or for the stated purposes but without effect. Of the three possibilities, it is clear that with fundamental reorganization (i.e., spinning-off ATC, which simply has not happened) not at hand, and no effective efforts eliminating stove-piping, straightline reporting served symbolic purposes.

The Executive Order and Cost Study Mandates I found cost-benefit studies to be the most disturbing of my research areas. On the face of it, the regulatory analysis mandated by the Executive Order requires the lives of air crews and their passengers to be evaluated in terms of their financial worth, clearly a painful evaluation. It was reassuring to find that personnel in Flight Standards also found this to be a conflict, one that they might not be willing to abide. This provided evidence of professional standards dictating policy decisions rather than the formal guiding mechanisms (in this case, the bureaucratic mechanism of cost-benefit studies). Additionally, it provided

³¹⁹(...continued)
conspiracy theorists also think the ATF is out to get their last gun, that there is a world zionist government behind the U.N. . . .

evidence of professional standards being used to operationalize the organization's formal goal, producing a functional goal that is clearly at variance with what is operationalized as the symbolic goal of complying with the Executive Order. This provided evidence of the working hypothesis that the FAA will have an objective goal process -- in this case based on professional standards. Further, the situation exists where an element of the formal goal is set forth in extremely strong circumstances: an Executive Order which enjoys strong public approval issued by a popular chief executive. The subversion of this goal shows equally strong and conscious intent to interpret the formal goal in accordance with a pre-existing objective standard, and to do so at the highest organizational level.

The turn of screw here is that the Executive Order may not be truly binding, but the FAA may still be considering costs in implementing a rule. The Executive Order itself entailed only a symbolic formal response from the FAA, for like the decisions inherent in restructuring, there was not any evident change in process.

The DC-10 What made the retelling of this story important is that the issues that were raised about the FAA at the time of the DC-10 accidents are still being raised today. Who makes the decisions, the FAA or the industry players? Does the FAA play its proper oversight role, or is it captured or otherwise compromised? Do the FAA and the

industry bargain with safety? (Formally by Executive Order 12291 it appears it is required to do just that.) What about the structure of the FAA: it was decentralized -- was it too much so, and did this have anything to do with the FAA's inability to prevent the DC-10 accidents? Was this a case of regulatory failure? If not, why does it still bother people at the FAA and in the industry?

I do not want to second-guess other critiques of this saga, but with respect to the goal processes outlined in this study, there is not a clear case of FAA culpability in permitting the DC-10 situation to get out of hand. While the FAA did act in ways that ultimately resulted in accidents, these decisions (i.e., no AD at critical times) were not made in vacuums: there were actions taken by the manufacturer that reasonably should have prevented the accidents. And while the FAA critique of the McDonnell Douglas/American Airlines miscommunication -- that it was lamentable but not intentional -- is disingenuous and ignores the part the FAA played in permitting that to happen, internally that failure is understood. Still, if that critique is taken at face value it is evident that nobody was intentionally playing with circumstances that created the conditions for the American Airlines/Chicago plane to crash. What is unquestionable is that the systems that make a DC-10 or a Boeing 747 or Lockheed Tristar are so complex that unintentional, unknowable lapses create the

circumstances for unpredictable disaster. Even with the FAA's, the manufacturers', and the airlines' efforts to prevent other DC-10s, that a system as complex as a 747 and even the DC-10 itself flies at all may be viewed as the real accomplishment (somewhat paraphrasing James Q. Wilson).

The Research Hypothesis Revisited

Again, The Hypothesis

In Chapter Two, the research hypothesis was formulated as the following:

A key function of the FAA is its pursual of rule-making actions. This can demonstrate how its functional goals differ from the formal goals specified in the formal legal mandate of the organization. These goals may be categorized according to the following models:

- (1) goals are based on objective demands for action *vis-a-vis* either the organization's formal (legal/bureaucratic) mandate or the individual objective determinations (professional/non-bureaucratic) standards of its members;
- (2) goals respond to symbolic, legitimating needs of either the organization or its parent or oversight bodies -- including the Federal government as a whole;
- (3) goals are based on an interaction among various competing interests that have control over or receive from the FAA resources, and which in turn attempt to influence other resources; and
- (4) goals are chaotic with little relationship between cause and effect.

These goals may be operationalized individually or concurrently, and in specific issues may dovetail or be contradictory and difficult to reconcile.

And the null hypothesis was stated as the following:

The specific multiple goal typologies model is inapplicable in this case, that operational goals do not differ from the formal goals in these fundamental manners, and that there is no corresponding contradiction in goals.

The case studies presented have indeed revealed the presence of the goals corresponding to the above in the FAA. In some cases these goals may be visible only within a certain unit of the FAA, while in others they may be present in various units. One or the other of these goals may be dominant, or they may all be present, offering contradictory objectives that the organization then may or may not be able to reconcile. It is, therefore, appropriate to reject the null hypothesis.

Beyond the Hypothesis: A Premise

This work indicates the presence of multiple and potentially contradictory goals in the FAA. Given this, take the following four statements (of mine) as a premise for the operationalization of those goals:

The reason why the Federal Aviation Administration makes a rule should be found in its capacity as safety regulator of aviation, which dovetails with its alternative capacity of fostering the aviation industry. These tasks are clearly defined organizational goals. Therefore, everything that the FAA does is a clear, objective strike at safety of flight, and wherever issues of safety may lie the FAA is in pursuit of them, ready to make another rule or implement another procedure to eliminate one more source of danger to the flying public.

This of course is not the case. The FAA does not clearly identify safety of flight issues and act on them in a vacuum. The FAA faces the issue that its twin formal goals may not be congruent. Cost-benefit studies (in all agencies and industries) explicitly assume that some fixes may cost more than their underlying problems. In the AFR it was in effect argued that a relentless pursuit of safety could harm the industry, especially since there was some doubt as to the accuracy of the fix. The FAA exists, as does any government agency, as part of a larger Federal bureaucracy. This suggests this second premise:

The FAA exists as a response to a public perception that the Federal government ought to be regulating aviation as it regulates other forms of commerce, using the Interstate Commerce Clause as its justification. This perception extends to everyday action, and a principal force in determining agency action is an operationalization of these perceptual needs. Thus, the FAA acts as it perceives that there is an external perception of need to act.

Within this bureaucracy, an agency's organizational location may make it more or less insulated from external forces that may tend to functionally displace or formally change its goals (i.e., its decision-making processes). An agency under a Cabinet member (e.g., the FAA, which as part of the DOT, is under the Secretary of Transportation) may be in more direct control from political interests than an agency constituted essentially outside of the government (e.g., the Federal Reserve Board, which has an entirely

separate funding stream from the governmental apparatus, but whose members are still appointed -- with long tenure -- by the President). And, of course, the Executive agencies must follow explicit directions from the President. So, the FAA may follow the next premise:

The FAA responds to political and other interests, either directly, through the formal mechanism of its organizational location as being under the control of an external political apparatus, or indirectly through the more informal interactions it has with organizations that directly or indirectly control critical resources. Thus, the FAA is in a matrix of organizations over which it has influence or that have influence over it, and must respect the power that those organizations have over it. Decisions are therefore made with attention to these interests.

The FAA interaction with its politically powerful aviation hanger-mates is of course subject to question, and it has been questioned extensively. In fact, the need to respond to external interests, and the corresponding lack of ability to rely solely on objectively ambiguous responses to safety, foster confusion to the agency:

The FAA exists in such a confusing matrix of organizational goals that at any given time objectives are uncertain and required actions are correspondingly uncertain. Thus, under these conditions, where goals and actions are unclear, organizational action is chaotic, ill focused, and unpredictable.

So the question remains of how does the organization actually make a decision? Given that there are competing potential courses of action that the organization may take,

how does it choose one? This project has developed alternative goal rationales, has given case studies of action, has shown how the goals can pose -- at one time -- contradictory yet potentially complementary rationales for reaching a decision.

Commentary on the Answer to the Above Premises

The overt ideologically based rationale of the FAA is that it is unaffected by outside forces. Decisions should be unaffected by competing interests that are external to what are operationalized as core issues concerning advancing safety or the overall good of the industry. Even overt political and economic interests do not want the FAA seen as a ping-pong ball. Interviews with agency personnel and in the industry have consistently reflected this ideal: that the FAA should appear to operate professionally and competently and be unaffected by outside forces. An argument may be made that this is in large part a manifestation of the "professional" half of the objective response model. Aviation professionals both inside and outside the agency, while not completely refusing to entertain the possibility that their roles are coerced or coopted by spurious influences, downplay those forces. This is especially strong within the FAA itself.³²⁰ They are

³²⁰ Although at least one person, whom I interviewed, found that the tension between objective responses to safety and symbolic responses to Congress was too much to reconcile.

wrong (but generally diligent and genuinely well intentioned nevertheless).

The reasons the FAA cannot always meet objective goals lies in areas outside the agency's control, which produce constraints on the agency's objective rationality. One area is the agency's need to seek legitimacy, either for itself through its own formal structure or for the role it plays in government as a whole. The symbolic response model correctly predicts that the FAA will respond to outside forces calling for action where the agency's objective processes do not necessarily produce anything. The second area is the agency's need to conform to a political reality of interest groups seeking to avoid unfavorable action. The agency may be unable to act because of political opposition from powerful patrons, or it may have to act to provide a secure environment for those patrons, such as continuing to maintain and run the national airspace system and air traffic control system at taxpayer expense. Each of these situations makes objective action, whether bureaucratically or professionally based, difficult to attain. However, this is not to say that a rational choice is not made, for, under conditions of constraint, the agency produces action based on its bounded rationality. The rational choice is the choice that best meets functional goals.

These findings suggest an analogy like a see-saw. In a deadlock, one of two things can happen. One possibility is

that nothing happens: for example, the organization cannot produce an outcome that is at once socially reassuring, politically practicable, and technically effective. This is the situation that existed with the DC-10 while McDonnell Douglas was working on a non-regulatory fix to the cargo-door and engine-pylon issues. After accidents the public perception of a problem made further delay of a regulatory action impossible. The second possibility in the case of a see-saw deadlock is the garbage-can response. In this situation, the organization makes two more or less identifiable decisions: one is that it cannot decide what to do, while the other is that it has to decide to do something. This produces the forced mating of issue and answer of the garbage can. The DC-10s are crashing, so -- legal or not -- their certification is revoked, a handy and very spectacular procedure at hand. Must the organization produce a unique response to all contingencies? Not necessarily, but there has to be some obvious relationship and utility between the issue and the response. While off-the-shelf responses are not necessarily wrong responses, the need to force a fit is an obvious problem. What if McDonnell Douglas or the operators had tried to force the issue and continued to fly the airplane? With some legal grounds they may have won: would more planes have crashed?

Organizationally, problems may develop when objective decision making becomes symbolic or patron-client guided,

and these problems may result in outright chaotic decision making. Under the conditions described above, where external interests become elements of the process, the processes that result from the formal or objective goals are defined in conjunction with the outside interests: the AD is not issued because McDonnell Douglas says that one is not necessary to correct the problems. What does this say for organizations? First, since the bureaucratic structure cannot provide a better set of outcomes than the professional standards alone can provide, the bureaucratic structure is also irrelevant. This is not to say that the bureaucratic structure can be dismissed lightly: it plays too important a role in providing public legitimacy and providing the organization with internal consistency. Second, the organization will potentially face deadlock with any controversial issue it faces, unable to make a firm decision for or against action. Under such conditions of deadlock, the organization may do nothing or it may produce a chaotic response from the garbage can. That being the case, one suggestion that may be made is that the organization must be insulated as totally as possible from both public demands for legitimacy and corporate demands for leniency.

Another issue for the FAA is an element of the United States government itself. The Federal government is designed around a separation of powers. This is a classic

issue for political scientists concerned with the United States form of government: where does the Legislative Branch end and the Executive Branch begin (or the other way around, if you will). Should the Executive Branch be free to run an agency or a department? If not, how much influence should the Legislative Branch have? What if that Executive agency maintains Legislative as well as Executive functions? What if Congressional oversight seems to be Congress's attempt to micro-manage an Executive agency? And relating this to the previous issues of form and technology, should Congress passively stand-by and watch -- or should it ordain, for that matter -- an organization that is minimally or not at all accountable to any political agency or branch of the government?³²¹ And governmentally, the FAA's ultimate fate is out of its own hands. The Executive or Legislative Branch may see fit to consider privatizing Air Traffic Control or in some other way implementing a dismemberment. The FAA may lobby for or against the policy, senior administrators may even be called before Congress in their official, organizational capacities and be asked to testify as expert witnesses, but all must ultimately follow these commands. This may be a source of goal displacement: does the FAA develop a goal of dismemberment or of staving off

³²¹ This paradigm of an organization "minimally or not at all accountable" is along the line as the Federal Reserve Board, which even has its own funding stream. The FAA does not have this level of autonomy, but has developed certain defense mechanisms against Congressional oversight.

dismemberment? Do the FAA people who consider Flight Standards and Aircraft Certification to be the "real FAA" operationalize a goal of shedding ATC? Some FAA outsiders consider the latter to be an appropriate goal, and some insiders do not talk of it as heresy.

The issue of separating the various units of the FAA was, in all likelihood, accelerated by vertical restructuring. No conclusions are made on that point here, this may be an unintended consequence of straightline reporting, or it may be an intended consequence. There is a strong ideology in the 1980s and 1990s to privatize. It is impossible to know whether Elizabeth Dole decided to implement a program that would feed upon internal tensions in order to provide entrepreneurs the opportunity to privatize ATC. It is also not possible to state that this consequence was never considered. Finding such a paper trail presents a task far beyond what this research is meant to probe. While it is possible that a plan to separate the units of the FAA may have had its genesis in the idea of privatization, it is certain that formally segmenting the agency has facilitated such functional spinoffs.

A Pathway for Decisions

The above analysis indicates that decisions follow a specific path through the goal processes. This path may be represented as a flow chart, and is depicted in Figure 10.1. The goals that are considered on the way to the decision may

be broken into two phases, the formal stage and the interpretive stage. The formal stage represents the formal goals of the organization, and is a prelude to the operative goals that are interpreted from them. The interpretive goals are those goals that have been described and identified in this study. As indicated in Figure 10.1, before reaching the action phase the issue goes through the objective response goal, then may proceed through one or more of the other goals processes, although issues of substantive enough symbolic nature may, for example, go directly to the symbolic response goal.

A specific action may be influenced by the goals in the following order: the first goal that is developed is the objective response. The issue then goes through a reality check of sorts as symbolic or patron needs goals are operationalized. Finally, if this mix produces uncertainty over goals or methods, the issue slips into a chaos mode.

Although the flow chart is one directional, the actual interplay among the goals is not so structured. For example, while the flow chart indicates that the processes become effective at specific locations along a time line, there is actually feedback among the goals when they are all operative at once. Alternatively, objective response may not be the first goal process to develop in an issue: symbolic response may become be the first process evident, for example in the time immediately following an accident;

also, objective response may actually determine action after other processes have occurred.

An Ideal Type For A Government Agency

The case studies in this research clearly demonstrate, among other things, the prevalence of symbolic action as a driving goal of the FAA. It also shows how the organization can find itself facing uncertainty, making inappropriate or ultimately dysfunctional decisions. If there are going to be dysfunctional decisions made by an organization, they are more likely to occur when the organization is functioning in a chaos mode than in an objective mode. If an organization employs a professional staff, even up to the policy level, but their decisions are influenced by external considerations, that may also be dysfunctional, although it may be altogether functional if they successfully make decisions that safeguard organization resources in a political environment. Dysfunction is in the eye of the beholder. Nevertheless, if in an idealized sense an organization ought to be doing something closer to the outcomes produced by objective response than by symbolic politics or patron-client relationships then non-objective goal processes are dysfunctional.

What a government agency should look like in order to be free of such dysfunctions is an uncomfortable issue. The alternative goal processes may come into effect as the result of the prescribed oversight of Executive agencies,

which is Constitutionally ordained and a fundamental part of the balance of powers. A different problem is when these agencies become beyond the control of the President: the FBI under J. Edgar Hoover is an idiosyncratic and now notorious example of this happening under a charismatic leader.

There are alternative types that may be postulated without excessive tinkering with the Constitution or unleashing an uncontrollable agency. As noted above, the agency may get into trouble when its processes move from objective, on the one hand, to symbolic or patron oriented on the other hand, with chaos being a not unlikely outcome of such a conflict. As a result of this, the ideal is to keep the organization as close to objective as possible while still maintaining Constitutionally prescribed oversight. One model would be to make the agency like the Federal Judicial branch of the government, with top officers appointed by the President for life subject to Congressional confirmation. That is not a realistic proposition, but there are similar, less drastic approaches that have precedents.

The Federal Reserve Board is one example of a quasi-governmental agency which has a minimum of direct oversight by the Executive and the Legislative Branches. It is buffered from public and interest-group pressure and beyond direct Presidential and Congressional tinkering (although the affects of its banking patrons are not so easily

dismissed). The officers have long tenures in their positions. Funding for the organization's operation is removed from the day-to-day scrutiny of the Congress. This gives the Federal Reserve Board some insulation from the buffeting of immediate political expediency.

So one solution is to build an FAA on the same principles as the Federal Reserve Board, with an administrator analogous to the chairperson and regional managers analogous to the Federal Reserve Governors. In fact, this is a solution that should not be dismissed out of hand. While the likelihood of its implementation is remote, it would provide the agency with the structural support it requires to meet its formal objectives free of spurious influences. That it would not be a unique structure could be another argument in favor of it. However, such radical change seems unlikely, as is the likelihood of designing an intentionally chaotic system robust enough to support the deliberate implementation of the organizational garbage can.

Assuming that such change, while having a certain institutional logic, is simply too radical, one point of such a concept is to place before the organization an ideal type. This has some usefulness. If the organization does not require formal structure to "function properly" then that formal structure is operationally superfluous if ceremonially necessary. This suggests that the formal structure must somehow complement the organization's ability

to function by objective standards. Designing an organization from anew to do such a thing may be wholly feasible; however, for a pre-existing organization this poses certain immediate contradictions. For example, the pre-existing bureaucracy (rule structure, for example) does not simply disappear. It needs to be massively changed, and this change must be unlike any other change that the rule structure has undergone.

A decentralization process, with less codification rather than more, seems to be suggested, yet the organization, facing increasingly complex environments, generally responds by increased codification and specificity rather than less. This is a contradiction in the organization's perception of its environment. Yet professional standards should make it clear to those inside the organization that the "rule book" is superfluous, and that abolishing it will provide them with increased autonomy and personal responsibility. They ought not to object to such change.

A greater challenge would be faced in selling such change to those outside the organization. For example, how would the public react to decentralizing the agency? Having within the past decade been told that centralization was required, there might be confusion caused by such mixed signals, and there could be some objection. Of course, decentralization could always be framed as reducing the size

of the "bloated Federal government," which might play very well. Structural change may be accomplished without substantial changes to the basic rule structure. Much of the FAA's structure is established not in 14 CFR but by agency policy. This can be changed, who reports to whom may be changed, and the rules as a whole may be left intact. By this method, the agency could be immediately changed from its current post-straightlining structure into some other structure that is less responsive to political issues. Of course, this type of organization would fail if the agency as a whole were not likewise insulated from political issues.

What would any attempt at reforming the agency's structure accomplish? Aside from arguments about its formal structure or efficiency relating to shrinking its headquarters staff, the main point in such change would be to make the formal decision structure correspond to the operational decision structure. This assumes the acceptance of an assumption that given a choice between formal rules and professional standards, given the likelihood that either form will provide a correct response, the choice could be made to go with the professional standards; further, given this choice of equal responses, and accepting professional standards as the method of choice, organizational structure ought to reflect professional standards.

To implement such a structure would require two things. First, the hierarchical lines of authority should be centered on functional tasks and, where appropriate, on professional cadres sharing common values and goals. This already exists in large part through straightline reporting. Second, the formal rules of process should specifically vest in the lowest field offices the highest level of authority. It has been demonstrated that in practice this already exists. In order to retain both the formal and the unintended advantages of straightlining -- more or less predictable national standards and the development of vertically organized functional units -- the organizational structure could also be mandated to insure that (1) the higher organizational structure develops and coordinates national policies and (2) functional units maintain their functional identities through discrete chains of command. This could be done while still leaving in local and individual hands the authority for interpreting and implementing policies based on their best professional judgement.

To establish a truly independent FAA, it would be necessary to have it free to set policy on its own without Executive or Legislative micro-management. The manner in which to assure that independence would be to insulate its policy-making officials and its budget. Insulating officials might imply long tenures and a difficult removal

process (as with academics). Having an FAA administrator who could set policy without fear of Congressional or Executive reprisal would free the administrator from concern that interest groups would demand his or her removal. Insulating the budget would imply a source of funding off the Federal budget. A special fund to finance the FAA, like airport aid funds that the FAA already administers, would meet that requirement. The Congress would not be able to punish the agency by removing its funding, although only a Constitutional amendment could prevent Congress from legislating an organization out of existence.

I argue that this approach would preserve the FAA's established model of objective goals, enable it to develop and maintain national standards, while not encumber it with a needlessly complex -- and ultimately ineffectual -- administrative structure. By not addressing these issues the agency has failed to establish national standards or function smoothly or coherently. This should improve its function and certainly will not hinder it.

This leaves open the related issue that organizations can outlive their usefulness. They may become obsolete by changing technology, for example. They may become trapped in changing economic conditions that lead to potential disaster (the Federal Savings and Loan Insurance Corporation may be a good example of that). Those cases show the need for some oversight, some recognition that an organization

may legitimately require oversight, face mortality, or require modification.

Ramifications For Process in the FAA and Other Agencies

What does this mean for how governmental agencies function in the real world? It appears necessary to understand that an individual agency does not exist in a vacuum. It also does not exist solely within the sphere of its own regulatory space, the industry that it regulates, but within a larger environment with many players and many interests. These interests can be translated into pressure from the organization's most important group, Congress.

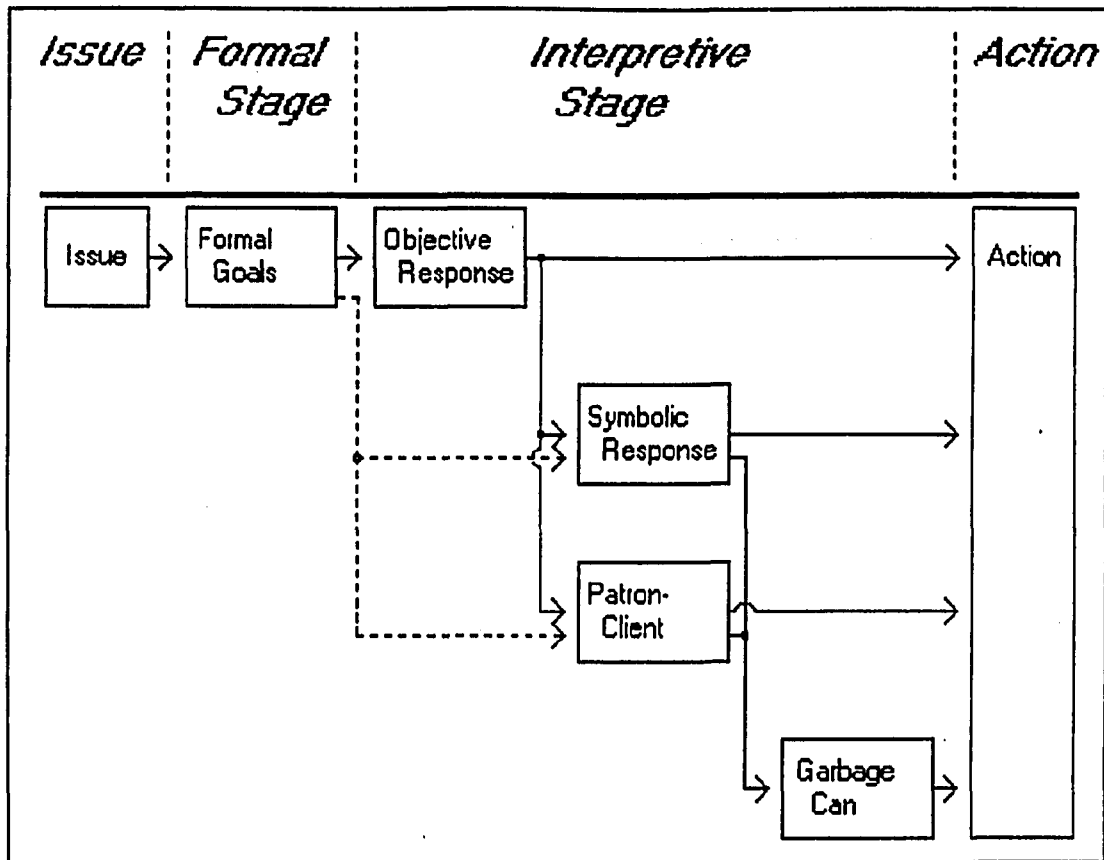
While the ideal model presented here is only an exercise, it demonstrates the extremes that would be necessary to insure complete autonomy for an organization. That autonomy would seem to be a prerequisite for the organization to make solely operationally-based policy. To hire experts to make decisions, and then to co-opt their decision making by individual or organizational-wide pressure, is counter-productive. Administration by experts can only work if the experts are free to administer. However, the problem with that model is also evident, that without oversight of any sort and with unlimited funding obsolete bureaucracies or collegials are free to creak through history unimpeded by progress. Striking the balance between these issues is vital if organizations are to base their function on the legitimate operational objectives

defined for them. Without striking such a balance, the organization may well seek to maximize its resources by going outside of its stated operational objectives and instead conducting its business in such a manner that will meet political goals -- and through those political goals, resource goals. The result of this will be an organization which follows a course of action that is not at all what the ostensible operational objectives of the organization suggest that it ought to be doing. Assuming that the formal goals are reasonable goals for an organization to have and have some legitimacy both internally and externally, deviations from those goals are likely dysfunctional and a problem to be remedied.

The FAA, as the case in point, sits at the juncture of the various goals outlined here. In fact its formal goals are seen as legitimate both in the industry and in the nation as a whole. The tension that exists between meeting formal and objective goals and meeting alternative goals is a critical force the agency faces.

Figure 10.1: Interplay of Goal Processes

Given an issue, goals will come into play as follows:



GLOSSARY

accident -- as defined by the NTSB, an "aircraft accident" is "an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in in which any person suffers death or serious injury or in which the aircraft receives substantial damage." (See also "substantial damage.")

ACS -- Aircraft Certification Service: a unit of the FAA under the Associate Administrator for Regulation and Certification.

AFR -- annual flight review: now defunct requirement for some pilots to receive a flight check annually.

agl -- above ground level, the altitude above terrain (sometimes abbreviated QFE).

AOPA -- Aircraft Owners and Pilots Association, the major national general aviation lobby representing light aircraft owners and light aircraft pilots generally.

ATC -- Air Traffic Control: generically, a function, to separate aircraft; specifically, the units of the FAA dedicated to that task.

BFR -- biennial flight review: requirement for all pilots to receive a flight check at least every two years (the name is now officially defunct, but the requirement stands simply as a "flight review").

CAA -- (1) The Civil Aeronautics Agency, direct ancestor of the FAA

CAA -- (2) The Civil Aeronautics Authority, the parent body in the DOC of the CAA and CAB (but this is not the body to which this abbreviation refers to generally: see definition one above).

CAB -- The Civil Aeronautics Board, sister agency to the CAA (see CAA definition one above), which had authority to make rules and set airline routes and rates; abolished with "deregulation of the airlines."

CFR -- Code of Federal Regulations: rules as enacted by the Executive branch of the Federal government.

cross-country flight -- variously defined as a flight to another airport, a flight of more than 25 nautical miles landing at another airport, or a flight of more than 50 nautical miles landing at another airport, depending on the certification to which the flight is to be put or the limitations on the license; at its most basic, any flight to another airport.

DOC -- The Department of Commerce, the CAA's parent agency until the reorganization of the CAA into the FAA in 1958, at which time the FAA became an independent Federal agency.

DOT -- The Department of Transportation, parent agency of the FAA following the creation of the DOT in 1967.

EAA -- The Experimental Aircraft Association, an organization of general aviation pilots specifically geared to those with interests in building their own aircraft.

FAA -- The Federal Aviation Administration

FSS -- (1) Flight Standards Service: a unit of the FAA under the Associate Administrator for Regulation and Certification.

FSS -- (2) Flight Service Station: field office providing flight-planning and in-flight services, primarily weather information but also other airway and airport related information.

general aviation -- generally, the non-commercial segment of the industry, although flying schools are traditionally included in this segment; these are operations under Part 91, including pilot schools under Part 141. It specifically does not include airline or other commercial operators certificated under Parts 121 or 135, but does include corporations that own and operate their own large aircraft under Part 125.

ICAO -- International Civil Aviation Organization (pronounced eye-kay-oe).

ICC -- (1) the Interstate Commerce Commission

icc -- (2) instrument competency check, required for a pilot to fly under IFR if a pilot has not maintained instrument currency within the preceeding six months.

ifr -- instrument flight rules.

imc -- instrument meteorological conditions (i.e., actually being in a cloud or an area of restricted visibility)

msl -- mean sea level, the altitude above sea level -- actually above the "standard datum plane," which measures relative altitude the same regardless of terrain (sometimes abbreviated QNH).

NPRM -- Notice of Proposed Rulemaking -- a formal notice published in the *Federal Register* indicating the intention of an Executive agency to make a rule, part of the Code of Federal Regulations.

OST -- Office of the Secretary of Transportation, the office in the DOT to whom the FAA Administrator reports.

PATCO -- Professional Air Traffic Controllers' Organization, the union that struck the FAA in 1980 and as a result is now defunct (pronounced pat-coe).

pilot-in-command -- the pilot responsible for the operation and safety of an aircraft; also, the sole-manipulator of the controls (it is possible to have two pilots log pic time -- for example, a flight instructor and a student who is a licensed pilot: the flight instructor is pic, but the student, if rated to fly that aircraft and for that period the student is the sole-manipulator of the controls, may also log pic time.

second-in-command -- a pilot so designated to be sic of an aircraft.

solo flight -- when the pilot is the sole occupant of the aircraft.

substantial damage -- as defined by the NTSB, "substantial damage" is "damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowlings, dented skin, small puncture holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wing tips are not considered 'substantial damage'." (See also "accident".)

transponder -- part of the ATC radar system, a transponder is carried on the aircraft and replies to interrogations from ground-based radar.

USC -- United States Code: laws as passed by the U.S. Congress.

vfr -- visual flight rules: basic weather minimums for visual flight -- visibility in miles and distance from clouds in feet above, below, and horizontal (basic VFR in controlled airspace is 3 miles visibility, 500 feet below clouds, 2000 feet horizontal separation, and 1000 feet above).

INTERVIEW DETAILS

(see also descriptions in footnotes in text)

Date and Location of Interviews

no. date persons location

1	01JUL85	1	telephone interview
2	01JUL85	1	telephone interview
3	01JUL85	1	telephone interview
4	01JUL85	1	telephone interview
5	20MAR89	1	Washington, D.C. (various agencies as noted)
6	21MAR89	1	Annapolis, Maryland
7	29JUN89	2	Washington, D.C. (various agencies as noted)
8	01JUL89	1	Republic Airport, Farmingdale, New York
9	22JUL89	1	J. F. Kennedy Airport, Jamaica, New York
10	15JAN90	1	Kobelt Airport, Wallkill, New York
11	15JAN90	3	Kobelt Airport, Wallkill, New York
12	15JUL90	1	Washington, D.C. (various agencies as noted)
13	24MAY91	1	Republic Airport, Farmingdale, New York
14	24MAY91	1	Republic Airport, Farmingdale, New York
15	04JAN92	2	Republic Airport, Farmingdale, New York
16	15JAN92	1	Kobelt Airport, Wallkill, New York
17	15JAN92	1	Kobelt Airport, Wallkill, New York
18	24MAY92	3	Kobelt Airport, Wallkill, New York
19	15JUL92	2	Republic Airport, Farmingdale, New York
20	19OCT92	3	Dutchess County Airport, Poughkeepsie (Wappingers Falls), New York
21	04JAN93	1	Washington, D.C. (various agencies as noted)
22	24MAY93	1	Washington, D.C. (various agencies as noted)
23	24MAY93	1	Washington, D.C. (various agencies as noted)
24	24MAY93	1	Washington, D.C. (various agencies as noted)

(continued)

no. date persons location

25	25MAY93	2	Washington, D.C. (various agencies as noted)
26	25MAY93	3	Washington, D.C. (various agencies as noted)
27	25MAY93	1	Washington, D.C. (various agencies as noted)
28	26MAY93	1	Washington, D.C. (various agencies as noted)
29	26MAY93	2	Washington, D.C. (various agencies as noted)
30	26MAY93	1	Washington, D.C. (various agencies as noted)
31	26MAY93	1	Washington, D.C. (various agencies as noted)
32	07JUN93	1	J. F. Kennedy Airport, Jamaica, New York
33	14JUL93	2	Teterboro Airport, Teterboro, New Jersey
34	14JUL93	1	Teterboro Airport, Teterboro, New Jersey
35	14JUL93	1	Teterboro Airport, Teterboro, New Jersey
36	15JUL93	1	Washington, D.C. (various agencies as noted)
37	15JUL93	1	Washington, D.C. (various agencies as noted)
38	18JUL93	1	Long Beach, California
39	26JUL93	1	Seattle (Renton/Everett), Washington
40	26JUL93	1	Seattle (Renton/Everett), Washington
41	26JUL93	1	Seattle (Renton/Everett), Washington
42	26JUL93	1	Seattle (Renton/Everett), Washington
43	27JUL93	1	Seattle (Renton/Everett), Washington
44	27JUL93	1	Seattle (Renton/Everett), Washington
45	28JUL93	1	Albany County Airport, Albany, New York
46	28JUL93	1	Albany County Airport, Albany, New York
47	28JUL93	1	Albany County Airport, Albany, New York
48	13OCT93	1	Kingston Airport, Lake Katrine, New York

Total Number of Interviews: 48

Total Number of Subjects: 62

no. FAA? brief description of subject(s)

1	n	associate editor at Flying Magazine
2	y	staff, Regulations Branch, Gen. Av. & Comm. Div., Flt. Stnd. Serv.
3	n	inspector, NTSB NYC office
4	n	attorney, Office of General Counsel, NTSB
5	y	staff, Regulations Division, Office of the Chief Counsel's
6	n	engineer @ AIRINC
7	y	(a) branch manager, (b) specialist, Forecast Branch
8	n	pilot at 135 operator
9	n	engineer at Pan American World Airways
10	n	owner, pilot school
11	n	general aviation pilots at local airport
12	y	staff, Regulations Division, Office of the Chief Counsel's
13	y	manager, Republic Airport Control Tower
14	y	union representative, Republic Airport C/T
15	n	general aviation pilots at local airport
16	n	mechanic at local airport
17	n	mechanic at local airport
18	n	student pilots at local airport
19	n	general aviation pilots at local airport
20	y	specialist, FAA Flight Service Station
21	n	manager, aviation section of federal agency (not FAA)
22	y	dep. dir, Office of Aviation Policy, Plans and Management Analysis
23	y	div. manager, Office of Budget, Operations Division
24	y	ex-controller
25	y	branch managers in Regulation and Organizational Analysis Div.
26	y	economic analysts in Regulation and Organizational Analysis Div.
27	y	division manager, Regulation and Organizational Analysis Div.
28	y	division manager, Flight Standards Service
29	y	(a) division manager, (b) special assistant to Director, A/C Cert
30	y	division manager, Office of Rule Making
31	y	assoc. administrator, Certification and Regulation
32	y	regional manager, Eastern Region, Flight Standards Service
33	y	(a) ass't. manager, (b) manager for maintenance, Teterboro FSDO
34	y	airworthiness inspector, Teterboro FSDO

(continued) 441

no. FAA? brief description of subject(s)

35	y	operations inspector, Teterboro FSDO
36	n	aviation analyst, Office of Technology Assessment
37	y	spec. ass't. for environmental affairs, Off. of Env. and Energy
38	n	communications director at McDonnell Douglas
39	n	manager in regulations compliance section at Boeing
40	n	specialist in regulations compliance section, Boeing (former FAA)
41	n	specialist in regulations compliance section, Boeing
42	n	v.p., Communications and Technical Information, Boeing.
43	y	manager, System Standards, Large Aircraft Directorate
44	y	manager, Aircraft Certification Field Office, Seattle
45	y	manager, Albany FSDO
46	y	operations inspector, Albany FSDO
47	y	avionics inspector, Albany FSDO
48	n	flight instructor, local airport

BIBLIOGRAPHY

Adams, Gordon. *The Politics of Defense Contracting: The Iron Triangle*. New Brunswick, N.J.: Transaction Books, 1982.

A.O.P.A. Air Safety Foundation. *AOPA Air Safety Foundation Handbook for Pilots 1993*. Frederick, Maryland: AOPA Air Safety Foundation, 1993.

A.O.P.A. Air Safety Foundation. *General Aviation Accident Analysis Book, 1991 Edition*. Frederick, Md.: AOPA Air Safety Foundation, 1991.

Albany Flight Standards District Office. *The Albany FSDO Copilot*, Vol. 2, No. 3, Fall, 1994.

Aldrich, Howard. *Organizations and Environments*. Englewood Cliffs, N.J.: Prentice-Hall, 1979).

Barnard, Chester I. *The Functions of the Executive*. Cambridge, Mass.: Harvard University Press, 1938.

Bidwell, Charles E., and John D. Kasarda. *The Organization and its Ecosystem: A Theory of Structuring in Organizations*. Greenwich, Conn.: JAI Press, 1985.

Blau, Peter M., and W. Richard Scott. *Formal Organizations*. San Francisco: Chandler, 1962.

Blau, Peter Michael. *On the Nature of Organizations*. New York: Wiley, 1974.

Bookchin, Murray. *The Ecology of Freedom: The Emergence and Dissolution of Hierarchy*. Palo Alto, Calif.: Cheshire Books, 1982.

Bookchin, Murray. *Post-Scarcity Anarchism*. Berkely, Calif.: Ramparts Press, 1971.

Briddon, Arnold E., Ellmore A. Champie, and Peter A. Marraine. *FAA Historical Fact Book: A Chronology, 1926-1971*. Washington, D.C.: Department of Transportation, Federal Aviation Administration, Office of Information Services, 1974.

Britan, Gerald M., and Ronald Cohen, Editors. *Hierarchy and Society: Anthropological Perspectives on Bureaucracy*. Philadelphia: Institute for the Study of Human Issues, 1980.

Burkhardt, Robert. *The Federal Aviation Administration*. New York, F. A. Praeger, 1967.

Burkhardt, Robert. *The Federal Aviation Administration*. New York: Chelsea House Publishers, 1989.

Burrell, Gibson and Gareth Morgan. *Sociological Paradigms and Organizational Analysis*. London: Heinemann, 1979.

Carroll, Glenn R. "Concentration and Specialization: Dynamics of Niche Width in Populations of Organizations." In *American Journal of Sociology*. No. 90 (May 1985), pp. 1262-1283.

Casamayou, Maureen Hogan. *Bureaucracy in Crisis: Three Mile Island, the Shuttle Challenger, and Risk Assessment*. Boulder, Colo.: Westview Press, 1993.

Cohen, M. D., J. G. March, and J. P. Olsen. "A Garbage Can Model of Organizational Choice." In *Administrative Science Quarterly* 17, 1972.

Comptroller General of the United States. *Issues Concerning Air Force KC-10A Advanced Tanker/Cargo Aircraft: Report to the Congress by the Comptroller General of the United States*. Washington, D.C.: General Accounting Office, 1979.

Daughen, Joseph R. *The Wreck of the Penn Central*. Boston: Little, Brown, 1971.

Davies, Ronald Edward George. *Airlines of the United States since 1914*. London: Putnam, 1972.

Domhoff, G. William. *The Powers That Be: Processes of Ruling-Class Domination in America*. New York: Random House, 1978.

Durkheim, Emile. *The Division of Labor in Society*. New York: The Free Press, 1984.

Edelman, Murray Jacob. *Constructing the Political Spectacle*. Chicago: University of Chicago Press, 1988.

Edelman, Murray Jacob. *The Symbolic Uses of Politics*. Urbana: University of Illinois Press, 1964.

Federal Aviation Administration. *Aeronautical Information Manual, The*. Washington, D.C.: Superintendent of Documents.

Federal Aviation Administration. *Aircraft Certification Directory*. Federal Aviation Administration, March 1992.

Federal Aviation Administration. *Aviation Instructors Handbook, The*, AC 60-14. Washington, D.C.: Superintendent of Documents.

Federal Aviation Administration. *Bonfires to Beacons: Federal Civil Aviation Policy Under the Air Commerce Act, 1926-1938*. Washington, D.C.: Superintendent of Documents.

Federal Aviation Administration. *FAA Aviation Forecasts, Fiscal Years 1993-2004*. Washington, D.C.: Superintendent of Documents, 1993.

Federal Aviation Administration. *Flight Training Handbook, The*, AC 61-21A. Washington, D.C.: Superintendent of Documents, 1980.

Federal Aviation Administration. *Guide to Federal Aviation Administration Publications*. Washington, D.C.: U.S. Dept. of Transportation, Federal Aviation Administration, 1991.

Federal Aviation Administration. *Pilot's Handbook of Aeronautical Knowledge, The*. Washington, D.C.: Superintendent of Documents, 1969.

Federal Aviation Administration. *Safe, Separated and Soaring: A History of Federal Civil Aviation Policy, 1961-1972*. Washington, D.C.: Superintendent of Documents.

Federal Aviation Administration. *Takeoff at Mid-Century: Federal Aviation Policy in the Eisenhower Years, 1953-1961*. Washington, D.C.: Superintendent of Documents.

Federal Aviation Administration. *The Cutting Air Crash*. Washington, D.C.: Superintendent of Documents.

Federal Aviation Administration. *The Third Man: A History of the Airline Crew Complement Controversy, 1947-1981*. Washington, D.C.: Superintendent of Documents.

Federal Aviation Administration. *Turbulence Aloft: The Civil Aeronautics Administration Amid Wars and rumors of Wars*. Washington, D.C.: Superintendent of Documents.

Freeman, John, and Michael Hannan. "Niche Width and the Dynamics of Organizational Populations." In *American Journal of Sociology*. No. 88 (May 1983), pp. 1116-1145.

Galbraith, John Kenneth. *The New Industrial State*. Boston: Houghton Mifflin, 1967.

Garfinkel, Harold. *Studies in Ethnomethodology*. Cambridge, U.K.: Polity Press in association with Basil Blackwell, Oxford, England, 1984, 1967.

Gouldner, Alvin Ward. *Patterns of Industrial Bureaucracy*. Glencoe, Ill.: Free Press, 1954.

Hall, Richard H. "Professionalization and Bureaucratization." In *American Sociological Review*. Vol. 33, No. 2 (February 1967), pp. 94-104.

Hall, Richard H. *Organizations: Structures, Process, and Outcomes*, fourth edition. Englewood Cliffs, N.J.: Prentice-Hall, 1987.

Hannan, Michael and John Freeman. "Structural Inertia and Organizational Change." In *American Sociological Review*. No. 49 (April 1984), pp. 149-164.

Hannan, Michael and John Freeman. "The Ecology of Organizational Mortality: American Labor Unions, 1836-1985." In *American Journal of Sociology*, No. 94 (July 1988) pp. 25-52.

Hannan, Micheal, and John Freeman. "The Population Ecology of Organizations." In *American Journal of Sociology*. No. 82 (March 1977), pp. 929-964.

Hannan, Micheal and John Freeman. *Organizational Ecology* Cambridge, Mass.: Harvard University Press, 1989.

John H. Fielder and Douglas Birsch, Ed. *The DC-10 Case: A Study In Applied Ethics, Technology, and Society*. Albany, N.Y.: State University of New York Press, 1992.

Kaeuper, Richard W. *Bankers to the Crown; the Riccardi of Lucca and Edward I*. Princeton, N.J.: Princeton University Press, 1973.

Kershner, William. *The Advanced Pilot's Flight Manual*. Ames, Iowa: Iowa University Press, 1972.

Kershner, William. *The Student Pilot's Handbook*. Ames, Iowa: Iowa University Press, 1970.

Komons, Nick. *Draft Material for updted FAA History, 1978-1986*. FAA unpublished draft.

Kropotkin, Petr Alexyevich. *Mutual Aid: A Factor of Evolution*. Boston: Extending Horizons Books, 1955.

Lagedec, Patrick. *Major Technological Risk: An Assessment of Industrial Accidents*. Oxford: Pergamon Press, Ltd., 1982.

Lawrence, Paul R. and Jay W. Lorsch. *Organization and Environment: Managing Differentiation and Integration*. Boston: Graduate School of Business Administration, Harvard University, 1967.

March, J.G., and J.P. Olsen, Editors. *Ambiguity and Choice in Organizations*. Bergen, Norway: Universitetsforlaget, 1976.

Meyer, John W. and Brian Rowan. "Institutionalized Organizations: Formal Structure As Myth and Ceremony." In *American Journal of Sociology*. No. 83, No. 2 (September, 1977), pp. 340-363.

Meyer, Marshall. "Organizational Structure as Signaling." In *Pacific Sociological Review*. No. 22 (October, 1979), pp. 481-500.

Newman, Katherine and Paul Attewell. "A Compliance-Resource Theory of Regulatory Failure: the Case of OSHA." In *The International Journal of Sociology and Social Policy*. Vol. 5, No. 1, March-April, 1985, pp. 29-53.

Parsons, Talcott, and Neil J. Smelser. *Economy and Society: A Study in the Integration of Economic and Social Theory*. Glencoe, Ill.: Free Press, 1956.

Perrow, Charles. *Normal Accidents: Living with High-Risk Technologies*. New York: Basic Books, 1984.

Powell, Walter W. and Paul J. DiMaggio. "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields." In *The American Sociological Review*. No. 48 (April, 1983), pp. 147-160.

Powell, Walter W. and Paul J. DiMaggio. *The New Institutionalism in Organizational Analysis*. Chicago: University of Chicago Press, 1991.

Ripley, Randall B. *Policy Implementation and Bureaucracy*, 2nd edition. Chicago: Dorsey Press, 1986.

Roethlisberger, F. J. and William J. Dickson. "Formal and Informal Status." In *Reader in Bureaucracy*. Eds. Robert K. Merton, et. al. New York: The Free Press, 1952.

Rourke, Francis I. *Bureaucracy, Politics, and Public Policy*. Boston: Little Brown, 1969.

- Salsbury, Stephen. *No Way to Run a Railroad: The Untold Story of the Penn Central Crisis*. New York: McGraw-Hill, 1982.
- Saunders, Richard. *The Railroad Mergers and the Coming of Conrail*. Westport, Conn.: Greenwood Press, 1978.
- Sconfienza, Steve. *The Deemphasis of Formal Hierarchy in the Regulation of the Aviation Industry*. Thesis, S.U.N.Y. College at New Paltz, 1985.
- Scott, W. Richard. *Organizations: Rational, Natural, and Open Systems*, 2nd edition. Englewood Cliffs, N.J.: Prentice Hall, 1987.
- Selznick, Phillip. *TVA and the Grass Roots: A Study in the Sociology of Formal Organizations*. Berkeley: University of California Press, 1949.
- Sharp, Walter Rice. *International Technical Assistance: Programs and Organization*. Chicago: Public Administration Service, 1952.
- Simon, Herbert. *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organization*. New York: Macmillan, 1947.
- Sobel, Robert. *The Fallen Colossus*. New York: Weybright and Talley, 1977.
- Stinchcombe, Arthur. "Organizations and Social Structure." In *Handbook of Organizations*. Ed. James G. March. Chicago: Rand-McNally, 1965.
- Stryker, Robin. "A Tale of Two Agencies: Class, Political-Institutional, and Organizational Factors Affecting State Reliance on Social Science." In *Politics and Society* Vol. 18, No. 1, March 1990, pp. 101-141.
- United States Congress, House Committee on Interstate and Foreign Commerce: Special Subcommittee on Investigations. *Review of procedures and policies of the FAA and NTSB with respect to the DC-10 cargo doors: hearings before the Special Subcommittee on Investigations of the Committee on Interstate and Foreign Commerce, House of Representatives, Ninety-third Congress, second session, March 27, April 9, 1974*. Washington, D.C.: U.S. G.P.O., 1974.
- United States Congress, House Committee on Public Works and Transportation: Subcommittee on Aviation. *Aviation safety, DC-10 crash of May 25, 1979: joint hearings before the Subcommittee on Aviation and the Subcommittee on Oversight*

and Review of the Committee on Public Works and Transportation, House of Representatives, Ninety-sixth Congress, first session, June 19 and 20, 1979. Washington : U.S. G.P.O., 1979.

United States Congress, House Committee on Science and Technology: Subcommittee on Investigations and Oversight. *Design analysis of wide-body aircraft: hearings before the Subcommittee on Investigations and Oversight of the Committee on Science and Technology, U.S. House of Representatives, ninety-sixth Congress, first session, July 17-Oct. 4, 1979. Washington, D.C.: U.S. G.P.O., 1980.*

United States Congress, House Committee on Science, Space, and Technology: Subcommittee on Transportation, Aviation, and Materials. *DC-10 engine failure, FAA Research and Development needs: hearing before the Subcommittee on Transportation, Aviation, and Materials of the Committee on Science, Space, and Technology, U.S. House of Representatives, One Hundred First Congress, first session, November 9, 1989. Washington, D.C.: U.S. G.P.O., 1990.*

United States Congress, Senate Committee on Commerce, Science, and Transportation: Subcommittee on Aviation. *Airworthiness of the DC-10: hearing before the Subcommittee on Aviation of the Committee on Commerce, Science, and Transportation, United States Senate, One Hundred First Congress, first session, September 19, 1989. Washington, D.C.: U.S. G.P.O., 1989.*

United States Congress, Senate Committee on Commerce, Science, and Transportation: Subcommittee on Aviation. *DC-10 certification and inspection process: hearings, before the Subcommittee on Aviation of the Committee on Commerce, Science, and Transportation, United States Senate, Ninety-sixth Congress, first session, July 11 and 12, 1979. Washington, D.C.: U.S. G.P.O., 1979.*

"United States Railroad Administration." In *Trains*. April 1991.

Waters, Malcolm. "Collegiality, Bureaucratization, and Professionalization: A Weberian Analysis." In *American Journal of Sociology*. No. 94 (March 1989), pp. 945-972; Discussion. In *American Journal of Sociology*. No. 96 (July 1990), pp. 186-200.

Weber, Max. "Bureaucracy." In *From Max Weber: Essays in Sociology*. Translated & edited C. W. Mills and H. H. Gerth. New York: Oxford University Press, 1946.

Weber, Max. "Politics as a Vocation." In *From Max Weber: Essays in Sociology*. Translated & edited C. W. Mills and H. H. Gerth. New York: Oxford University Press, 1946.

Wilson, James Q. *Bureaucracy: What Government Agencies Do and Why They Do It*. New York: Basic Books, 1989.

Wolfe, Alan. *The Limits of Legitimacy: Political Contradictions of Contemporary Capitalism*. New York: The Free Press, 1977.

Young, Ruth C. "Is Population Ecology a Useful Paradigm for the Study of Organizations?" In *American Journal of Sociology*. No. 94 (July 1988), pp. 1-24; Discussion. In *American Journal of Sociology*. No. 95 (September 1989), pp. 425-446.