

## **Rising Risk? Rising Safety? The Millennium and Air Travel\***

Ronald John Lofaro, Ph.D\*\*  
Aviation Psychologist

Captain Kevin M. Smith\*\*\*  
United Air Lines

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\* The views and opinions expressed are solely those of the authors. These views and opinions are NOT to be taken as official policies, positions or beliefs of any private or governmental organization, or organizational units therein.

\*\* Dr. LoFaro is an aviation psychologist and currently teaches aviation psychology and aviation human factors at Embry-Riddle Aeronautical University. He is a member of the Air Transport Association Crew Resource Management and Line Oriented Flight Training groups and serves on their Aviation Maintenance Human Factors sub-committee and the SAE G-10 Behavioral Engineering Technology committee. Dr. LoFaro also is a member of the Aerospace Medical Association/Human Factors, the American Psychological Association, the Association of Aviation Psychologists, and the Human Factors and Ergonomics Society.

\*\*\* Captain Kevin Smith entered Navy flight training immediately after graduating from the State University of New York in 1963. Graduating from the Naval Training command in 1965, Captain Smith entered the fleet and completed numerous tactical assignments amassing over 4000 flight hours and 250 carrier landings in fighter aircraft. After completing twenty four years of Federal service, both active and reserve, Captain Smith recently transferred to the retired ranks in the Naval Air Reserve.

Currently flying as Captain on the 767-600 for United Airlines, Captain Smith's recent assignment was the manager of a special task-force for the 757/767 fleet while he was Chairman of the MEC Training Committee.

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INTRODUCTION

*“The level of safety in commercial airline operations you [the American flying public] have come to depend on no longer exists. It has diminished significantly.”<sup>1</sup>*

The safety of air travel and its challenges has been with us since the first passenger flight. This paper first looks at safety as others have done in the past, but then with a different perspective. While safety is a worthy goal, the term is surprisingly of little operational value. A new set of related concepts will be introduced. With these concepts, we will attempt to get our hands around this elusive subject, focussing on the mission and its risks. All air transport missions have some measure of risk. How well we collectively deal with risk, from the individual pilot to the controlling government agency will, in large part, determine our fate as we approach, then enter, the next millennium.

Today, we are besieged with conflicting data, claims, interpretations and projections on the current and future safety of air travel. Free Flight; new and better automation for the nation’s Air Traffic Control system; a projection of one hull loss worldwide every 7 to 10 days in less than 5 years; enhanced and increased cockpit automation—to the point of pilots flying “hands off” from takeoff to landing; differential GPS; human factors: these are either the problems or the solutions, depending on the authors and organizations to which they may belong. These data and claims and projections come from airplane manufacturing and training companies such as Boeing, the Federal Aviation Administration (FAA),

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1. RALPH NADER & W.J. SMITH, COLLISION COURSE: THE TRUTH ABOUT AIRLINE (1994).

from pundits within and without the aviation world, from just about every point of the compass and every possible source. The commonality? All have a definitive point of view; all are very sure that they are correct; all are somewhat exhortatory and, all are very hard to reconcile—any one with any another. Can there be a view that combines the “best,” throws out the rest and, can be of use to Aviation, at large? For better or worse, and with the clear *caveat* this task may well be not really possible to complete within a lifetime, much less in a short paper, we will follow the Rocky Balboa dictum and “go for it!”

We will pull from a variety of sources, ranging from Scott Adams,<sup>2</sup> to Ralph Nader, to Mary Schiavo and even to the aforementioned Rocky Balboa. Some of what appears in this paper has been said by others, often said far better than we can. However, much of what already has been said is also scattered across books, reports by Government agencies, reports by research firms, Op-ed pieces and the like. We will try to bring these seemingly disparate data together in one place and show what seem to be some patterns across the years. Still, we cannot, in 25 pages or so, go into all the many issues that others have taken 200 to 300 plus pages to lay out.

Yet, some of what is said in this paper has not, to our knowledge, been said before. In particular, an open exposition of what a senior airline captain sees from his cockpit as he “flies the line” every month plus the linkage of the concepts of rising risk, the mission impact area and the risk management necessary for mission completion.

### RISING RISK

The initial formulation of rising risk was developed in the early 1990's by Captain Kevin Smith.<sup>3</sup> At this point, rising risk was seen and used as a planning and development tool for Line-Oriented Flight Training (LOFT) scenarios. A LOFT scenario is an aircrew training session done in a flight simulator. In a LOFT, the flightcrew “flies” a typical leg, from point A to point B. During the scenario, the rising risk concept is used to introduce a set of minor problems that are programmed to arise in completing the leg. These problems require good crew awareness, coordination and decisions in order not to place the flight into abnormal or emergency conditions. The rising risk refers to the fact that, if the problems went unnoticed and/or the decisions were not accurate, timely and appropriate, the risk to the successful completion of the flight—and,

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2. SCOTT ADAMS, *THE DILBERT PRINCIPLE* (1996).

3. Ronald Lofaro & Kevin Smith, *The Role of Loft in CRM Integration*, in SEVENTH INT'L SYMP. ON AVIATION PSYCHOLOGY (Jensen & Neumeister, eds, 1993).

to the plane—rose, and could rise to the point where the flight (simulator) might actually “crash”.

Upon receiving the invitation to write for this issue of the *Transportation Law Journal*, we immediately realized that an analogy existed between the rising risk in a LOFT scenario and the rising risk that we, in general, see in airline travel. There were also major differences: (a) In a LOFT, there is no danger to the flightcrew—since it is done in a flight simulator—and, there also are no passengers in danger. This is not true for airline travel since pilots fly their mission (“leg”) in real planes, with real passengers and, (b) The rising risk in a LOFT is a planned training tool. In today’s skies, the rising risk is certainly not planned. Even more to the point, the air travel rising risk seems either unnoticed, ignored or denied, both publicly and internally, at various organizations.

#### WHAT ARE THE RISING RISKS?

We begin this section with a short synopsis of knowledge that is available to the public and well known inside aviation: There is an aging fleet of commercial airliners out there. Since deregulation, there are about 250 regional carriers in the air in any given year. However, only 3 or 4 of these are those that came into being during the first year or so after deregulation. Some of the others are carriers that come and go. There are major and regional carriers in, just out of, or going into severe financial straits—to include Chapter 11. All of these constitute real risk factors.

The July and October 1997 issues of [FAA] *Administrator’s Fact Book*<sup>4</sup> paint a clear picture of the increase in (major carrier) commercial air traffic. Looking at 1996 versus 1995 (the data for ’97 is incomplete at this writing), we see that there are 5,800 planes in service at domestic carriers, up 8% from the previous year. There are also 12,797 planes flown by commuter air carriers and air taxi services—a total of 16,597 planes in revenue service. The total number of aircraft miles flown has gone up almost 10% in the past 2 years and is at 569.6 billion revenue miles. More planes in the air, more often. The major carrier accident rate went up 4% from 1995 to 1996 and went up 10% from 1994 to 1996. The actual number of major carrier accidents is up 8%. Of special concern is a category called NMAC—Near Mid-air Collisions. There were 196 NMAC’s in 1996 and the preliminary 1997 data shows 166 through August, 1997; this projects to 221 for all of 1997. Any of these NMAC’s holds the potential for a loss of 2 airliners and all “souls on board.”

The above synopsis shows this: More planes - more flights - more miles flown. Even at the same accident rate, this projects to more acci-

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4. DEPARTMENT OF TRANSP., THE FAA ADM’R FACT BOOK (July & August 1997).

dents and more NMACs, with their deadly potential. Please note that we refer to the potential for increased *number* of accidents. That is because the accident rate can stay the same, or even decrease but, since there will be more air traffic, the numbers of accidents and fatalities per year still can rise.

Of great importance to this line of thought is what we will term the accident rate plateau. Over the past 25 or so years, the civil aviation accident rate has, with minor peaks and valleys, been almost flat—a plateau. And, this accident rate is very low. Why then do we say this is of importance? Simply put, because of two things: (1) the percentage of accidents due to mechanical and structural malfunctions has plummeted dramatically, beginning in the 1970's. The reliability of engines, airframes and their components became and remains high; the portion of accidents directly attributable to them became, and remains, low. (2) But, even with this great decrease over the past 25 plus years in what were once major causal factors in accidents, the accident rate has stayed fairly constant over this time span.

This chilling fact emerges: Over the past 25 years, with mechanical reliability almost becoming a given, the aviation community turned a large bulk of its attention to reducing the other causal factors in accidents. In spite of a host of efforts and a lot of money spent (for example, in performance and training, both flightcrew and maintenance), there has been little result. The accident rate stays the same. It has not been driven down. If the accident rate stays the same, then increased air traffic will result in more accidents—it is a simple numbers crunch and projection.

For a time, let us shift gears and go to a more micro level. Airline captains “fly the line” monthly. They confront the rising risk problems as a part of their job. What follows is what a senior Captain, at the largest air carrier in the US, sees from his cockpit.

#### A VIEW FROM THE COCKPIT

As I crisscross North America in my large, twin engine, high technology airplane, I am struck by the painfully slow progress we have made since the introduction of these “more capable” aircraft. This, coupled with some major misconceptions, has brought us to the door of the twenty-first century largely ill-prepared for its challenges

First: The navigation technology embedded in my airplane is being under-utilized by the present air traffic control system. With very little effort, I can save literally thousands of pounds of fuel per month, but because of the inflexibility of the ATC system, I cannot.

Second: While much of technology is good, more is *not* better. As Captain Cecil Ewell of American Airlines, 1980, points out; pilots need to

“get over” automation dependency and get back into the proficiency of hands-on flying again. This should be a wake-up call for both training organizations and cockpit/cockpit display designers. Here, I observe an interesting paradox: Simultaneously with the large scale usage of high technology airplanes comes the realization that we may indeed need to fly at the edge of the aircraft’s performance envelope (windshear, upset recovery), thus demanding a high degree of basic, hands-on piloting skills. We will return to the degrading, or non-currency of certain piloting skills later.

Lastly, our ability to support the airline captain in the recognition and management of risk has advanced somewhat, but is still sub-optimal. Risk management is critical to the retention of the flying public customer base and the long-term viability of the industry. This we have discussed in some detail. When risk rises on the risk continuum, effective risk reduction strategies need to be employed to keep risk within manageable limits. Our system of certifying pilots and aircraft, airlines and training organizations is not predicated on the employment of risk management skills; neither is it supportive of organizations that desire to do this. Windshear recovery training is a case in point. For many years, my airline has been training pilots in windshear recovery techniques (risk reduction strategies), so that when encountered in actual line operations, successful recovery can be assured. Simultaneously with this, the FAA has begun to install windshear advisory systems at certain airports. Here we begin to see a system that can actually work together to reduce risk, although it took a number of accidents to get this far. But, it has not gone far enough. The airlines that conduct this training receive no credit for doing so and pilots receive no special certification. We can thus see the built-in bias against risk management because incentives are not there and the likelihood of further innovations is diminished. Clearly organizations that work at risk management are, ultimately, working in the public interest. That this should be encouraged is self-evident, but it also seems that we (aviation) have not yet arrived at this point.

All that we have presented above are grounds for the existence of a rising risk for an increased number of accidents and fatalities. The risk is driven by the constant increase in the volume of commercial air traffic (more planes aloft; aloft more often—and, in the same air space); by the decreases in the lateral and vertical separation standards between commercial airliners; by the loss of highly qualified commercial pilots due to an age restriction which is moot; by the loss to the air carriers of the formerly large pool of highly trained and experienced military pilots. Although new data say that, at least in the USAF, more pilots are leaving to go to air lines, the number of pilots produced by the military, i.e., the pool available to air carriers, is going down as the military, collectively, is

producing smaller numbers of pilots each year. Finally, there is the lack of both developing and implementing needed risk management strategies.

Some of the above aspects of the rising risk are difficult to come to grips. We will look at how this rising risk is fueled by other factors, which, hopefully, be dealt with. We will also outline both a new view of "safety" and a new set of related concepts on which we can attempt to build future air safety.

#### RISING RISK FACTORS, AS SEEN BY OTHERS

We certainly are not the first to publicly call out what seem to be risk factors to safe skies. The authors of the quotes that follow bring an impressive set of credentials: Mr. Nader is so well known that we need not introduce him nor give his *bona fides*. Ms. Schiavo is a lawyer who was, for 6 years, the Inspector General (IG) of the Department of Transportation (DOT) of which the FAA is a part; and is now a professor at a major State University, teaching about ethics in government. Mr. Nance is a lawyer, a former airline captain and former USAF (reserve) colonel. All have produced texts that document many problems and suggest solutions. To date, their recommendations generally have been ignored or attacked by an entrenched bureaucracy.

What follows also contains quotes from GAO (Government Accounting Office)—a "watchdog" agency of other governmental agencies, from a Congressman on the House Appropriations Committee and from research companies. What we will cite spans findings over the past 11 years. All essentially say the same thing. One object lesson that can be drawn is this: The truth seems to be known, but nothing seems to have changed.

#### #1 THE INTERNAL CULTURE OF THE FAA

The first risk factor is an on-going FAA internal culture that "does not recognize or serve any other client but itself." A culture which makes it impossible for the FAA to, "learn and actually change" because the FAA is described as being, "in a time warp which reproduces itself every year the same as the previous year"; "The FAA goes on in a loop, never able to learn from it past mistakes".<sup>5</sup> This is even more strongly put by a House Appropriations Committee Issue Paper and "report language" to the Transportation Appropriations Bill; 1997, that says the FAA has, "an agency culture which is resistant to change, defensive and turf-conscious . . ."; an organizational culture which is ". . . secretive rather than open; self-interested rather than public spirited and highly resistant to change

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5. REPORT BY THE AVIATION FOUNDATION OF FALLS CHURCH AND THE INSTITUTE OF PUBLIC POLICY OF GEORGE MASON UNIVERSITY,(1992).

. . .”; “when poor decisions are made, attempts are often made to cover up the problems or ignore them.”

A General Accounting Office Report of 1996 said that the FAA has an internal culture characterized by dysfunctional management where managers “emphasized self-interest over agency mission . . .”; “established unrealistic cost and estimate schedules in order to sell programs . . .” and “did not cooperate with other FAA employees.” Scott Adams has said, as a corollary to his Dilbert Principle, “We [bureaucracies] systematically identify and promote the people who have the least skills.”<sup>6</sup>

In more blunt terms, the former IG of DOT, Mary Schiavo<sup>7</sup> said that “Within the closed culture of the FAA, fear and intimidation dominated a top-down management style that expected workers to play along to get along. Change was not wanted, challenges were not welcome and workers who exhibited either trait were quickly broken down.” She characterizes the FAA as an agency of crisis management, who sees “no reason to change its bureaucratic culture” and whose “goal was to control what news gets out and how the public reacted.” As Dilbert’s alter ego would note, “A good way . . . to cling to power in an organization is by creating a monopoly on information.” Then, withhold it!

Ralph Nader, in his text on aviation safety, included a chapter entitled “They [FAA] Have Those Mismanagement Blues.”<sup>8</sup> Mr. Nader makes too many telling points to even provide a listing here but, two of his basic points are that the FAA management is weak and inadequate and the FAA culture is a self-perpetuating bureaucratic morass of inaction and self-protection. The second risk factor is that the actual margin of safety comes, not from the FAA, but from air carriers and the aviation industry.

## #2 THE SAFETY MARGIN

The margin of safety, which seems to be endangered by a rising risk, exists mainly on the aircarrier side. This is because of “minimums”; because of profit and loss; because of the FAA’s funding problems and internal structure/function.

The CFR 14 FAR’s, (the part of the Code of Federal Regulations that contain the Federal Aviation Regulations; the FAR’s under which all U.S. pilots, planes, aircarriers repair stations, etc. are certified, licensed and operate), set minimum standards for flight operations, for flightcrew, for maintenance. It is, and has been for years, a well-known fact that the

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6. SCOTT ADAMS, *THE DILBERT PRINCIPLE* (1996).

7. MARY SCHIAVO WITH SABRA CHANTBRAND *FLYING BLIND, FLYING SAFE*, (1996).

8. RALPH NADER & W.J SMITH, *COLLISION COURSE: THE TRUTH ABOUT AIRLINE SAFETY* (1994).



major carriers (almost) always exceed the FAR minimums—because they are only minimums. Carriers have a commitment to safety based on enlightened self-interest (profit and loss) and a reluctance on the part of flightcrew and mechanics to put their passengers and themselves at risk. Many, if not all, of the middle and higher level executives in an air carrier were pilots, so this safety culture usually permeates carriers. But, not always, and not every carrier.

Profit and loss cuts two ways in airline safety. The first way is the enlightened self-interest mode: air carriers know that a wide-body hull loss costs them about one billion dollars in litigation, lost revenue and the lost crew and airplane. Not all of this, by far, is recoverable from insurance, most especially, the lost revenue due to publicity about the crash. So, carriers stress safety for this reason. The cut in the other direction, where safety may not be foremost and can be compromised, again occurs from profit and loss. As we know, some major carriers have gone under after de-regulation; Pan Am and Eastern come to mind. Other carriers have been in and out of Chapter 11. There are, every year, start-up airlines whose viability depends on passenger revenue—often generated by cut-rate fares.

When any air carrier is in financial trouble, or wants to maximize that bottom line, there are only a few ways open to cut costs: Reduce the “quality” and training of both flightcrew and mechanics, reduce the “quality” of the maintenance and outsource all you can. These cost-cutting modes are open all carriers, both major and “low-fare/cut-rate.” Consider the former Eastern Airline maintenance (“pencil-whipping”) incidents of the mid-80’s and ValuJet as some examples of what has been done to save a dollar. When carriers need to save money, they may try to operate at or below minimums. Result? The safety margin evaporates and is replaced by a rising risk.

If a carrier operates at the (bare) minimums, they are “legal” so, nothing can be done by the FAA. If there is the suspicion that a carrier is under minimums, the FAA is, sadly, under funded, understaffed and now, quite possibly not as qualified and experienced as necessary to deal with the number of carriers and problems out there. There are over 250 regional carriers and approximately 10 major carriers. There are tens of thousands of aircraft and flightcrew and mechanics. The FAA is neither funded nor staffed at a level to deal, hands-on, with these numbers.

Are all or any of these new problems? Listen to John Nance, former airline captain. More than 11 years ago, he wrote that “Over the years, what the agency [FAA] regarded as beyond its control, it tended to ignore. What was politically troublesome or costly to the airline industry, it

tended to set aside or study to infinity.”<sup>9</sup>

We have just seen a remarkably integrated and similar set of observations come from a remarkably diverse set of organizations and persons. The situation is exacerbated by the unstable FAA budget—in particular, the erratic, less than requested and falling FAA R&D budget and by the instability created by “personnel reform.” The FAA’s current, major effort in “personnel reform” may increase the rate of loss in technical competency as it goes forward and, social engineering policies continue to replace competence, qualifications and expertise as guidelines for hiring, promoting or letting go of personnel. In the past, it was true that, if the FAA was able to, and did, achieve advances in the level of aviation safety. Now, it seems that the FAA may be losing—or, have already lost—a significant aspect of this ability.<sup>10</sup>

#### RISING SAFETY

Over the past 10 to 15 years, there have been enormous technological advances focused on increasing aviation safety. These advances include GPWS (Ground Proximity Warning Systems), E (enhanced) GPWS and now, advanced GPWS, TCAS II (Traffic Alert and Collision Avoidance System, Version II), GPS and D-GPS (Global Positioning System, Differential-Global Positioning System), Doppler Radar Systems to identify avoid dangerous wind shears on landing/takeoff; cockpit automation and displays of many types which positively impact navigation, flight control, flight planning and more.

Hence, there are many new technologies out there that effectively increase safety, thereby lower the rising risks associated with modern aviation. The practicality of the use of these technologies depends on whether or not these safety features can be approved and implemented in a reasonable time frame and whether or not the safety concern outweighs the economic burdens imposed by them.

A rising concern among pilots and human performance experts that the increased level cockpit automation may create a generation of pilots whose basic flying skills (“stick and rudder”) will deteriorate from lack of practice. A fact that reinforces this concern is that, from “1991-1995, the leading cause of air carrier accidents as loss of control of the aircraft and controlled flight into terrain (CFIT). These types of accidents account for 85% of large hull losses worldwide, but 70% could have been averted had

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9. JOHN J. NANCE, *BLIND TRUST* (1986).

10. Before going further, we would be remiss if we did not state that, within the FAA, there are still a large number of both skilled and dedicated people. The FAA needs to both maintain and (re-) build on this core. We will return to this later.

the pilots known how to respond to the situation.”<sup>11</sup> If manual skills ever become needed because of automation failure/degradation, or unusual plane attitudes and conditions that automation cannot handle, the pilot may not be up to it the challenge. Manual piloting skills may have degraded due to the (over-) use of automated flight systems in lieu of hand flying and/or because of the lack of training and practice on certain maneuvers and skills.

This problem has been exhaustively studied (the bureaucratic “paralysis by analysis” mode). No changes such as mandating that pilots have these skills via new training, has yet occurred. Such changes were anticipated to be challenged by carriers as having an “adverse economic impact”. No changes were made until 1997, when some carriers decided that the need for pilots to have certain specialized hands-on flying skills was paramount. To date, at least 2 of the “Big Seven” air carriers have developed such a program. Thus recently there has been “an industry call for more leadership plus fresh initiatives by the FAA and NTSB.” The responses? The FAA said that “each airline should take the initiative to ‘institutionalize’ its own specialized training.” The NTSB said that about one-third of its investigators have attended such training program. These hardly seem to be a response that embodies increased leadership and new initiatives. We now shift gears. Rather than continue to detail roadblocks, we will now look at what can be done to enhance safety on the operational level.

#### A NEW VIEW OF SAFETY

As a vehicle of public transportation, the civilian air transportation industry needs to not only to function safely, but enjoy the confidence and admiration of the traveling public. The commonly used term “safe” is surprisingly of little operational value. As opposed to those who subscribe to the “more is better” theory that more safety is, in fact, not better. Taking this theory to the extreme, an organization would never fly or fly very little content to keep planes on the ground and thereby be completely “safe.” Clearly, this is ridiculous. In late 1997, the military shut-down a significant portion of their flying in response to a spate of accidents and close calls, such as an F-117 falling apart at an air show and two F-16’s colliding off of the Jersey coast. However, while civil aviation wants to be safe, they *must also fly*, passengers and generate revenue. So with this in mind, we need to look for a more operationally useful term than “safe”.

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11. *Aviation Week & Space Technology*, June 9, 1997.

## MISSION COMPLETION AND RISK MANAGEMENT

To avoid ambiguity inherent in the term "safety," we propose the term "mission completion and risk management". This term is more operationally useful. Here, the goal is to complete the mission of flying the public, because of its economic benefits, but do so in a way that does not place people or equipment at undue risk. Consequently, risk management becomes a key operational activity that works hand in glove with mission execution skills.

Central to safety is the concept of the pilot as risk manager.<sup>12</sup> By risk, we mean specific risk or danger to the aircraft, passengers and crew, and the corporation. High risk is defined as the likelihood or high probability of injury, damage or death. Moderate risk, if left unchecked, could continue to rise and/or likely result in significant flight trajectory deviations. Low risk, finally, is a normal situation where routine, normal procedures are sufficient.

The operational application of these ideas can be seen by using the risk continuum depicted below. (Fig. 1)

## MISSION IMPACT AREAS

- 
- **Delay of the Operation**
    - Hold Over
    - Holding
    - Windshear
    - Wake Turbulence
  - **Adverse Weather**
    - Slippery
    - Clutter
    - Contamination
    - Icing Aloft
    - Convective Activity
    - Freezing Precipitation
    - (Volcanic Ash)
  - **Adverse Wind**
    - Windshear
    - Crosswind/Tailwind/Braking Action
    - Turbulence
    - High Winds Aloft
  - **Performance Limited Operations**
    - Clutter
    - Takeoff Data
    - Cruise Data
    - Landing
    - MEL

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12. Kevin Smith & Hastie, *Airworthiness as a Design Strategy*, in Flight Safety International Air Safety Symposium (1992).

- **Approach Operations**
  - Non-Precision
  - Precision
  - Low Visibility
  - VFR
  - Approach in Adverse Conditions
  - Raw Data
  - Non-Precision Hand Flown
- **Landing Maneuver**
  - From Non-Precision
  - No G/S
  - Crosswind
  - Abnormal Flaps
  - Engine Out (50%)
- **Departure Operations**
  - RW Change
- **Single Engine Operations**
  - Take Off Alternate Selection
  - "t" Procedure
  - V-1 Cut
  - V-2 Cut
  - Divert from Cruise (ETOPS)
  - SE Hand Flown Precision
  - SE Auto Pilot Flown Precision
  - SE Non-Precision Approach
  - SE Landing Maneuver
  - SE Missed Approach
  - Engine Fail on Missed
  - Engine Fail on Final
  - SE Visual
- **Divert/Reject/Abandon**
  - RTO
  - Rejected Landing
  - Missed Approach (Auto Manual)
  - Emergency Descent
  - Divert Take Off Alternate
  - Divert to Destination Alternate
- **Emergency/High Risk**
  - Controllability (Upset)
  - Windshear
  - Fire (Engine, Cargo, Cabin)
  - Bomb Threat
  - Sick PAX
  - Decompression
  - Evacuation
  - Ditching
  - Partial Gear
  - Dual Engine Flameout
  - Traffic Conflict-TCAS
  - Runway Incursion
  - Terrain

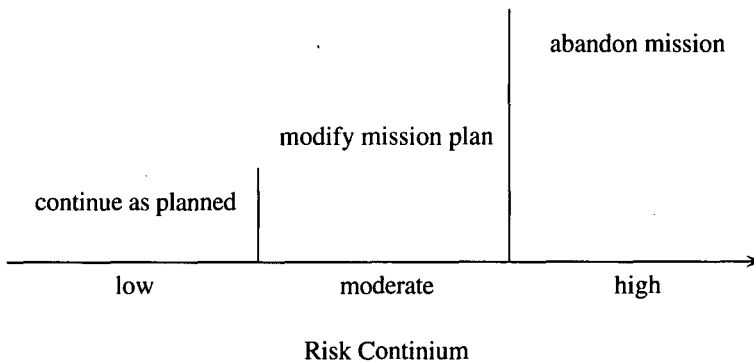
- **International**
  - Class II
  - Area
  - ETOPS
  - Redispatch
  - Supervised EntryRoute Mod
  - Noise Abatement
- 

As the risk rises on the risk continuum, the captain, working with dispatch and other crew members, either (1) continues with the mission as originally planned for low risk situations; (2) modifies the mission plans as needed in moderate risk situations; or (3) abandons the mission altogether for high risk situations.

THE MISSION

We previously discussed the pilot as risk manager and what is needed when the risk rises on the risk continuum. But this left unanswered what actually causes a rising risk profile. The answer can be found in defining and understanding the key mission impact areas. A mission impact area, if encountered, will likely cause the risk to rise and will demand certain actions be taken. These mission impact areas are presented in Table 1.

TABLE 1: MISSION IMPACT AREAS



Notice, first, that the mission is relatively complex. This has in itself caused many to avoid this level of specificity. But, our position here is that one cannot and must not succumb to this if we truly want a viable air transportation system for the next millennium.

Critical to mission success is the ability of flightcrews to operate in adverse conditions while, simultaneously, executing the mission plan and managing risk. The need to have this ability to operate under adverse

conditions and thus provide reliable transportation is self-evident. What is not so obvious, however is the need to “manage” a rising risk profile. The risk WILL rise under virtually all adverse conditions. This risk management activity demands that the crew execute in a timely fashion specific risk mitigation procedures to prevent “risk migration to the right”.

#### WHAT NOW?

Our primary sources all have published books, each of which contains recommendations for changes which the authors believed would truly ensure the safety of the flying public. We thank such people as Nance for blazing a trail. Sad to say, none of their recommendations have been truly implemented. While we hope that our recommendations, and those of the others cited, will be implemented, we are less than sanguine.

#### SQUARE ONE: THE MICRO AND THE MACRO

Our premise is that unless one understands the micro, one cannot deal effectively at the macro. More specifically, if one does not understand the air transport mission, then how can one generate policies and programs that support, benefit and render viable the air carrier certificate holder thereby providing effective and efficient public air transportation

This micro to macro understanding must be the bedrock and starting point—at air carriers, at the FAA, in Congress. The carriers, FAA, legislators must come together with a cadre of air transport and mission analysis experts (some from within these self-same organizations). This cadre should run the gamut from pilots who fly the line to the persons who study the pilots to those who study the cultures of the cockpit, the carriers and the FAA

This cannot be done by a ballyhooed conference where 900 persons descend on Washington, D.C. for a few days. Rather, small groups, each from a geographical region covering 3 to 6 States, would meet for in a week-long Workshop, then send one or 2 persons to the next (larger area and level) Workshop—where 2 to 5 of the geographical regions would be combined and represented. Finally, one meeting of 20 to 25 persons from the combined regional meetings would come together. This can be done in 6 months to 8 months.

This is how, and where, valid mission statements and valid goals and measurable objectives can be developed. This is how and where the plans and agreements necessary to give commercial aviation rising safety can become a reality.

## SQUARE TWO

Along with fully developing the mission risk-mission risk management-mission success concepts—and, the ways to make them into operational reality, some thought must be given to the bureaucratic and bureaucratic culture issues.

1. Make the aviation safety function of the FAA part of a tripartite group with the DOD Safety Centers and NASA. This new group would report to, and be truly accountable to (To whom? This is a good question! We have no real answer here. We do not believe that any accountability, in today's world, exists in a political, or politicized, body).
2. Re-vamp the FAA by:
  - a) Commissioning an immediate assessment of the FAA's internal and external environment—current and (projected) future. This is sometimes referred to as a "gap analysis" and is done when goals, personnel and functioning require clarification and change. Of course, this assessment must not be done by the FAA itself. And, whomever does it must be free from former FAA personnel and current FAA connections.
  - b) Moving FAA HQ as far from the Washington, D.C. miasma as possible. In this way, inroads can be made in relieving the FAA from the political pressures of Congress and special interest groups; most of which are in DC. This external de-politicization of the FAA also would involve removing it from DOT.
  - c) Cutting the size of FAA HQ by 50 to 75%—and, thus decentralizing the FAA. There are 10 FAA regional offices in the USA and Alaska. Each of these replicates the HQ structure; enough said.<sup>13</sup>
3. Fund this "new" FAA at a level where it actually can do its job. Truly adequate funding should be easier with the FAA out of DOT and not annually fighting several other DOT agencies for a part of the DOT "pot of money".
4. Ensure the FAA *has the capability to do its work in-house* by:
  - a) Rebuilding the technical knowledge and skill base of the FAA. We already said that there exists a diminishing but competent and dedicated core of personnel within the FAA who can be the bedrock for this. To rebuild, keep the truly technically competent personnel left in the FAA and bring in new, qualified ones—posthaste.
  - b) Adequately funding R&D to a level that both enables the FAA to be a proactive leader in aviation and provides quality data on which to base guidance, policy and regulations. However, the FAA's R&D funding usually has been insufficient, meager and, in general, has been steadily reduced over the past 10 years.
  - c) Mandating that the FAA *actually does* its own R&D (and other safety-related aspects of its mission) in-house rather than farm it out to the same

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13. Remember that FAA management is very good at identifying those who they want to become their replacements; those who can be counted on to keep it "business as usual." In this way, The FAA culture is re-created ceaselessly and resists all efforts at real change.



contractors and companies that have become an unofficially “official” part of the FAA. All too many of these companies and contractors are replete with former FAA personnel leading to potential problems as to “insider” status and connections within the FAA.

5) Do not forget Square One

#### WHAT IS NOT NEEDED

What aviation safety does not need is yet another Blue Ribbon panel composed of the “connected,” the politically correct, those who can be counted on to espouse the party line. We have had a plethora of such panels over the years. Anyone care to hazard a guess at the real effect they have?

Neither does aviation need new slogans such as *Zero Accidents*. To hold up zero accidents as a goal (a laudable one, to be sure) or to say that we will reduce the accident rate by 80% in ten years—when we have spent over 20 years working on the same safety issues, without success, which we propose to now work again—these confuse rhetoric with reality. And, rather than trumpeting the goals as if they were already achieved, them, the FAA, the aviation industry and Congress should be providing an infra-structure, money, cooperative agreements and projects in an effort to attain the goals. Rather one seems to see a belief that problems can be solved by rhetoric alone.

#### CONCLUSION

We are at a volatile point in terms of safe skies in the millennium. There are forces and factors which seem to have placed the flying public on a flight path of rising risk. There are technological and training developments that hold the possibility of a course correction from rising risk to a route of rising safety. However, this will not happen unless, and until, the negative forces and factors are recognized and counteracted. Even this, difficult as it is, will not be enough.

What is also needed is a set of positive actions; actions whereby the aviation industry, the regulatory agencies, DOD and academia truly work together to develop and implement risk management tools. Such development must include the procedures, initial/recurrent training and recurrent “practice” that encompass operation decision-making, risk recognition techniques and risk management.

#### POSTSCRIPT

At the risk of seeming defensive or gun-shy, David Gelenter, Ph.D and Yale professor who was maimed by the Unabomber, has said that, “we’ve become a culture of propaganda, and a culture of lying, and a

culture of official statements which even the officials don't believe. An official culture in which statements are made . . . which everyone knows are lies. And, nobody's allowed to discuss them as lies."<sup>14</sup> Since we have questioned and critiqued the party line, the designated "hit men" and "attack dogs" in our organizations will produce a set of criticisms that should be familiar to all who work in, or study, bureaucracies. These public attacks will be on our professional credentials and acumen. There may well be personal attacks and punitive actions. Any attacks stem from the bureaucratic dictum that, when the content of a message is a "danger" to the organization, the first order of business is to discredit—and, punish as an example to others—the bearer. This is called "Killing the messenger." In this way, the dangerous (i.e., truthful or embarrassing) content of the message can be disregarded and all will understand the real cost of eschewing the party line. Any punitive actions are based on sending a clear message to the workforce: This is the price you pay!

From Aristotle through DeMorgan and now Quine, experts have pointed out the fallacy of arguing *ad hominem*. Nowadays such an assault, designed to obscure, hide or simply deny the truth, has become the standard ploy when confronted. Attacks *ad hominem* have achieved the status of now being accepted as a valid proof. Well, Aristotle *et al* never had to deal with spin-meisters, so we can assume they could not foresee the bastardization of the rules of elementary logic, thought and truth seeking.

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14. DAVID GELETER, *DRAWING LIFE* (1997).