Journal of Air Law and Commerce

Volume 62 | Issue 3 Article 6

1997

U.S. Airlines on Course for Free Flight

R. Colin Keel

Kyle B. Levine

U.S. AIRLINES ON COURSE FOR FREE FLIGHT

R. COLIN KEEL*
KYLE B. LEVINE**

TABLE OF CONTENTS

THE FEDERAL GOVERNMENT and the aviation community have worked together for more than a year to rebuild the U.S. air traffic management system around a new core of advanced technologies, and for the first time, U.S. air carriers are poised to drive the development of new and improved navigational services and operational benefits.[1] This partnership between the FAA and other members of the aviation community indicates that the airline industry will be able to insure against rising operating costs and to continue a present trend of economic health into the next century.

Although currently operating at record profit levels, U.S. air carriers must continually strive to ensure future profitability by

* R. Colin Keel is a corporate attorney at American Airlines. Mr. Keel previously practiced aviation law in Washington, D.C. and London. He received his J.D. in 1989 from the University of Pennsylvania Law School. The views expressed in this Article are the author's own and are not necessarily those of American Airlines.

** Kyle B. Levine is a 1997 J.D. candidate at Southern Methodist University and has been a law clerk in the corporate group of the American Airlines Legal Department since January 1995. The views expressed in this Article are the author's own and are not necessarily those of American Airlines.

[1] Bruce D. Nordwall, *'Cultural' Shift Key to New Concept*, AVIATION WK. & SPACE TECH., July 31, 1995, at 40.

cutting superfluous operating costs.[2] One element of the airlines' cost structure, however, is largely beyond the control of the airlines: the air traffic control system (ATC). The current ATC, administered by the FAA, has proven to be a burdensome component of the carriers' operating costs, accounting for losses, in some estimates, of up to $5 billion annually.[3] One aviation consulting firm estimated that United Airlines alone loses $2 billion per year as a result of current ATC inefficiencies.[4] United Airlines itself cites annual costs of $670 million stemming from circling airports, holding at gates, flying at inefficient altitudes, and taking indirect routes—all ATC by-products.[5]

As air traffic levels rise, ATC-related loss of income becomes particularly acute. Industry analysts estimate that the total number of flights in the U.S. (including commercial, general aviation, and military flights) will increase eighteen percent over the next several years, amounting to twenty-eight million annual flights by the turn of the century.[6] At this level, U.S. carriers will accommodate approximately 800 million passengers per year, up 60% from 1995 figures.[7] Such predictions have compelled major U.S. airlines to find more efficient ways of regulating U.S. airspace without compromising flight safety.[8]

I. THE NATIONAL AIRSPACE PLAN

Instrument-guided flights within the contiguous United States currently operate under the National Airspace Plan (NAP), a navigational scheme incorporating restricted airways and active control by ground-based ATC personnel.[9] Under this system, "controllers direct pilots as to when they take off, what altitudes and routes they will fly and what speed adjustments must be

---

[2] Anthonly L. Velocci, Jr., *Fuel Prices Fail to Ground Soaring Airline Profits*, AVIATION WK. & SPACE TECH., Sept. 23, 1996, at 33. One analyst stated, "'On an operating basis, this will be the most profitable quarterly period the [U.S.] airline industry has ever experienced' [earning profits of] $2.8 billion, up from $2.4 billion for the same period a year ago." *Id.*

[3] Bill Sweetman, *Accelerating the ATC Revolution*, AIR TRANSPORT WORLD, May 1, 1995, at 57.

[4] Arnold Lewis, *The Economics of Free Flight*, BUS. & COM. AVIATION, May 1995, at C10.

[5] *FAA May Let Airlines Set Own Flight Paths*, TAMPA TRIB., Aug. 8, 1995, at 1.

[6] *Cockpit Automation: The Promise and Pitfalls*, AIR SAFETY WK., Apr. 1, 1996, at 1.

[7] *FAA May Let Airlines Set Own Flight Paths*, *supra* note 5, at 1.

[8] *Alaska Starts GPS Trials*, AVIATION WK. & SPACE TECH., June 3, 1996, at 31.

[9] *See* Sweetman, *supra* note 3, at 57.

made to ensure the flow of traffic."[10] The air traffic management scheme under NAP is generally considered one of the safest in the world. Nonetheless, the federal government is striving to make U.S. airspace even safer. In early 1995, the Department of Transportation and the FAA teamed with over 1000 aviation executives to develop initiatives aimed at an ultimate goal of zero aviation accidents by the year 2000.[11]

In spite of these high safety standards, NAP navigation has proven expensive for commercial airlines. Costs begin to mount from the moment of take-off in this highly-regulated system.[12] ATC restrictions can result in an aircraft being held at low levels after take-off, rather than being allowed to climb to optimal cruising altitudes. Likewise, ATC may require aircraft to reduce speeds to accommodate airway congestion and slower traffic.[13] En route, pilots follow indirect flight paths assigned by ATC personnel, transferring from one control facility to the next, until reaching a final destination where lengthy holding patterns can delay traffic even longer.[14]

Combining these factors with the rapidly increasing number of flights, ATC inefficiencies are frustrating airlines. Indeed, two of the industry's greatest plagues—increased gate-to-gate times and burgeoning fuel consumption—are direct by-products of ATC deficiencies.[15] One study reported an eight to ten percent decrease in ground speed (aircraft speed measured in relation to ground miles) from 1980 to 1992 as a result of congested airspace in some areas of the country.[16]

In the Northeast corridor, an area which encompasses several of the nation's busiest airports, delays are especially commonplace. Continental Airlines' Boeing 737s, for example, cover the 160 miles between Providence, Rhode Island, and Newark, New Jersey, in 72 minutes gate-to-gate.[17] Absent ATC delays, a single-engine Cessna 172 covers the same distance in roughly the same amount of time.[18] Although delays are worse in some areas than

---

[10] Edward H. Phillips, *Free Flight Poses Multiple Challenges*, AVIATION WK. & SPACE TECH., Mar. 25, 1996, at 27.

[11] 1995 FAA ANN. REP. i (1996) [hereinafter FAA].

[12] Perry Bradley, *Freeflight*, BUS. & COM. AVIATION, June 1995, at 90.

[13] *See* Sweetman, *supra* note 3, at 57.

[14] Fred George, *Enhanced TCAS*, BUS. & COM. AVIATION, Oct. 1996, at 60.

[15] William J. McGee, *Getting There Faster and Cheaper*, AIR TRANSPORT WORLD, Sept. 1, 1995, at 46.

[16] Lewis, *supra* note 4, at C10.

[17] *Id.*

[18] *See id.*

others, airlines have gradually adjusted their flight schedules system-wide to reflect the ATC delays affecting gate-to-gate travel time.[19] So, as any frequent flier knows, the travel time displayed in airline timetables is padded to reflect total travel time, including both flight time and nearly unavoidable ground and en route delays.[20]

In spite of such precautions, however, the costs associated with ATC delays are especially familiar to large air carriers operating out of "hub" airports, where ATC problems are exacerbated by the vast number of aircraft required to transport passengers to and from outlying "spokes."[21] As hub airports become saturated with traffic, stressing ATC capabilities to their limit, additional costs to the airline multiply: delayed passengers must be accommodated on other flights, luggage must be re-routed and delivered to displaced passengers, and airline personnel must log overtime to orchestrate solutions.[22]

In addition to the indirect costs mentioned, fuel cost remains one of the greatest concerns to air carriers. Because fuel constitutes the largest single component of operating a commercial flight, indirect flight paths and en route delays under ATC cost airlines, and passengers, millions of dollars each year.[23] Substantial potential fuel savings, predicted in studies by the federal government, consulting firms, and by the airlines, have made the replacement of ATC navigation with a more flexible and efficient national navigation system a top priority, and indeed, a necessity, for the airline industry.[24]

II. FREE FLIGHT

Faced with the prospect of increasingly congested airspace and mounting operational costs under the outdated National Airspace Plan, U.S. airlines, in alliance with the Air Transport Association (ATA), the National Business Aircraft Association, the Aircraft Owners and Pilots Association, the Allied Pilots Association, and the National Air Traffic Controllers Association,

---

[19] *Id.*

[20] *Id.*

[21] *See id.*

[22] Sweetman, *supra* note 3, at 57.

[23] *See Fuel Cost Rise Hurts Smaller Airlines More Than Larger Ones*, AVIATION DAILY, Sept. 20, 1996, at 471.

[24] *Airlines Urge Liberalization of FAA's National Route Program*, AVIATION DAILY, Aug. 10, 1994, at 230.

have endorsed the concept of "free flight."[25] In a free flight environment, "pilots would file a flight plan that includes the most efficient and expeditious routing, altitudes and speeds between two points."[26] In effect, free flight would change the FAA's role in air traffic management from an active regulator to a monitor and intervenor.[27] Instead of actively directing flights as they currently do, air traffic controllers will monitor automated equipment and interfere with pilots' decisions only when a safety conflict arises or equipment fails. "Pilots would have the flexibility to alter their flight plans as necessary to avoid bad weather or take advantage of more favorable routing or altitudes."[28]

The FAA estimates that free flight may be implemented as early as 2010.[29] Although much of the technology required to implement the program is currently available, the transition to free flight is viewed as a monumental change and, therefore, is slated for gradual, incremental implementation.[30] According to David Hinson, former Administrator of the FAA, "Safety is never a static concept. It evolves with technology and the changing structure of the industry."[31] Thus, the FAA views free flight not only as compatible with its zero-accident goal but also as an integral element of air safety in the near future.

Of all the contributors to the free flight concept, the RTCA (originally known as the Radio Technical Commission for Aeronautics) (a company charged by the federal government and transportation industry to develop navigation, control, and communications standards) has been perhaps the most instrumental. The RTCA, along with representatives from the U.S. airline industry, the federal government, and the transportation agency, formed a task force last year to formulate a free flight implementation plan.[32] The RTCA Task Force produced a draft containing forty-five recommendations lauded as "a unanimous, concise mandate for free flight."[33] In response, the FAA endorsed the recommendations and asked RTCA to organize an

---

[25] *FAA Promises Quick Action on Free Flight Steering Committee*, AVIATION DAILY, Mar. 18, 1996, at 434.

[26] Phillips, *supra* note 10, at 27.

[27] James Ott, *Airlines, General Aviation Weigh Time/Cost Issues*, AVIATION WK. & SPACE TECH., July 31, 1995, at 41.

[28] Phillips, *supra* note 10, at 27.

[29] FAA, *supra* note 11, at 66.

[30] *See* Nordwall, *supra* note 1, at 40.

[31] FAA, *supra* note 11, at ii.

[32] *Id.* at 66.

[33] Sweetman, *supra* note 3, at 57.

executive committee to plan the transition from ATC-based navigation to free flight.[34]

III. THE NATIONAL ROUTE PROGRAM

A critical step towards the implementation of domestic free flight occurred when the FAA introduced the National Route Program (NRP) in 1994. The NRP was designed to free commercial aircraft from the ATC airway system at altitudes above 29,000 feet, allowing pilots to fly any route an airline or pilot may designate.[35] Although the NRP was originally restricted to flights above 39,000 feet and more than 200 miles from arrival or departure airports, the program's initial success prompted the FAA to reduce altitude restrictions to 29,000 and eliminate the 200-mile exclusion by October 1996.[36] By the end of 1995, NRP options were available to approximately 12,000 flights per day.[37]

Airlines are the beneficiaries of many efficiencies associated with NRP. The ATA estimates that NRP will result in savings of up to $40 million a year for its members.[38] Likewise, one major carrier cited almost 500,000 pounds of fuel per month as "savings not realized" because new routes available under NRP were not fully implemented.[39] In response to the program, American and Delta have both created permanent dispatching positions whose primary task is to find shorter, more efficient routes.[40]

IV. U.S. AIRLINES MOVING TOWARD FREE FLIGHT

Although intended to benefit the entire aviation community,[41] free flight holds particular benefits for the major U.S. airlines. Free flight promises airlines the ability to use their resources more efficiently by reducing gate-to-gate time on most flights and enabling them to utilize aircraft and hub airports to their maximum operating capacity. Reductions in travel time, in turn, directly eliminate fuel and other operating costs. Amer-

---

[34] *See* Ramon Lopez & Julian Moxon, *Flight of Fancy?*, FLIGHT INT'L, Nov. 15, 1995, at 28.

[35] *FAA Taking Several Steps to Move Air Traffic More Efficiently*, AVIATION DAILY, Oct. 4, 1996, at 25.

[36] *Id.*

[37] FAA, *supra* note 11, at 66.

[38] McGee, *supra* note 15, at 46.

[39] *Id.*

[40] *Id.*

[41] *Id.*

ican considers crew and fuel costs as two of its greatest concerns from a cost perspective.[42] A typical two-person flight crew, such as those used on many domestic flights, costs most airlines about ten dollars per minute.[43] At this rate, every minute shaved from flight time can contribute towards bottom-line profits.

In terms of fuel, an ATA study showed that point-to-point direct flights envisioned under free flight resulted in a two to three percent improvement in fuel consumption on the average flight of five hundred miles.[44] At current fuel rates (approximately .73¢ per gallon), a Boeing 767 flying from San Francisco to Newark on the most direct flight path would save 1300 pounds of fuel, for a total operating savings of $950 per segment.[45] When examined on a total annual cost basis, airlines cannot ignore these seemingly insignificant figures.

American Airlines, for example, operates sixteen daily round trips between New York-JFK and three major California airports: San Francisco, Los Angeles, and San Diego.[46] Operating in a free flight environment, American's savings on these routes would total nearly $30,000 per day, or $11 million per year. An additional benefit of carrying less fuel on transcontinental routes is that American would also be able to load more revenue-generating cargo and passengers on each flight.

Although American Airlines estimates that retrofitting its fleet for free flight capabilities may cost as much as $1 billion, studies by the airline have emphasized the operational benefits of a free flight environment.[47] An American Airlines operations representative asserts that the airlines' primary attraction to free flight is its potential to maximize operational efficiencies of the airlines' current resources, from increased route capacity to more efficient use of airport facilities. On highly traveled routes, where planes are now confined to federal airways, faster aircraft are frequently routed behind slower planes for thousands of miles.[48] Free flight technology would enable separation stan-

---

[42] J. Lynn Lunsford, *FAA Plan May Extend Pilot Control, But Routing Proposal Raises Safety Questions*, DALLAS MORNING NEWS, Sept. 24, 1995, at 1A, 30A.

[43] McGee, *supra* note 15, at 46.

[44] Ott, *supra* note 27, at 41.

[45] Lewis, *supra* note 4, at C10. This savings is calculated in comparison to a typical ATC route.

[46] Based on flights listed in American Airlines' system timetable dated November 1, 1996.

[47] Lopez & Moxon, *supra* note 34, at 28.

[48] *Morning Edition: Airlines Call for More Efficient Use of Airspace* (NPR radio broadcast, Aug. 22, 1995) (transcript on file with authors).

dards to be safely decreased from five miles to one mile horizontally.[49] Greater density will not only help to accommodate the increasing number of flights, but will also allow airlines to maximize aircraft use.[50]

Free flight would also enable airlines to maximize the operating capacities of the nation's busiest airports by reducing the traffic delays which plague the ATC system. For example, aircraft currently enter Dallas/Fort Worth International Airport airspace over one of four points, each about forty miles from the airport.[51] Planes arriving from the Northeast are often placed into line and required to slow down to fuel-inefficient speeds as far away as the Mississippi River.[52] Under free flight, aircraft arriving at busy hub airports could be sequenced in directly from any heading based on speed and altitude.[53] As a result, traffic pattern delays would be drastically reduced and hub traffic would be less likely to affect traffic flow in other parts of the country.

Greater hub efficiencies for major U.S. airlines give rise to additional consumer benefits under free flight. "[I]f an airline can cut 5-10 min[utes] off a high-frequency city-pairing consistently—say, at least 80% of the time—then, the schedule times can be changed."[54] By repeatedly eliminating unnecessary flight and ground time, airlines can increase aircraft utilization and, thus, achieve even greater profit levels. Alaska Airlines, for example, saved an estimated $700 to $800 million in capital costs—representing 18 aircraft the airline did not have to purchase—by flying each aircraft more efficiently, increasing utilization from an average of 8.5 block hours per day to a minimum of 10.7 block hours per day.[55] Likewise, Delta Express, Delta's new low-cost spin-off carrier, expects to reach a block

---

[49] Lunsford, *supra* note 42, at 30A.

[50] *See* Nordwall, *supra* note 1, at 40. Aviation consultants Michael Boyd and Michael Baiada contend that the greatest benefit of free flight is the placement of asset management with the airlines, rather than with ATC. Lewis, *supra* note 4, at C10. "The free flight focus so far has been on saving fuel, but fuel is just one resource. Sometimes time is more important to an airline. It might elect to fly a route faster to maintain its schedule, if it had the choice, particularly to a hub with many connections." Nordwall, *supra* note 1, at 41.

[51] Lunsford, *supra* note 42, at 30A.

[52] *Id.*

[53] *Id.*

[54] McGee, *supra* note 15, at 46.

[55] *Alaska Airlines' Kelly Sees 1995 Profit, Better Utilization*, WORLD AIRLINE NEWS, Aug. 7, 1995, at 10.

hour cost forty percent lower than Delta's by flying its 737s twelve hours per day, compared with seven hours of daily flight time for the same aircraft at Delta.[56] For consumers, these increases in airline efficiency translate into lower airfares, more convenient and true-to-fact schedules, and greater frequency on popular routes.

V. IMPLEMENTING FREE FLIGHT TECHNOLOGY

Aviation Week and Space Technology reports that "[t]he FAA and airlines in the U.S. are strongly behind the concept of 'Free Flight,' but the idea will go nowhere unless certain key technologies are fielded . . . ."[57] Although many of the major carriers, including American, Delta, and United, have already installed free flight-compatible equipment on certain aircraft, smaller carriers are more reluctant to undertake the costly retrofitting of their fleets to facilitate the transfer to free flight.[58] In fact, the airlines may consider in their cost-benefit analysis of their ability to compete in a free flight environment the possibility that the FAA may, in the future, impose penalties, operational or financial, on carriers that are not free flight-equipped. At present, the FAA treats all passenger carriers alike, provided they have met minimum operational requirements; there is no additional government incentive for airlines to modernize fleets.

The basic architecture of the transition to free flight has been termed Future Air Navigation System equipment (FANS). FANS systems combine Global Positioning Systems (GPS), Traffic-Alert and Collision-Avoidance Systems (TCAS), and data link technology to provide, via a network of twenty-four satellites, accurate and direct aircraft-to-controller and aircraft-to-aircraft information exchange over oceans and other areas generally out of range of ground-based navigational stations.[59] Utilizing FANS-equipped aircraft, some carriers have taken advantage of less congested airspace in other parts of the world to test the free flight operational concept on long-haul flights. European carriers have inaugurated FANS routes across Russia, China, North

---

[56] *Delta Express Structured for Seat Mile Costs Below 7.5 Cents*, AVIATION DAILY, Sept. 30, 1996, at 523.

[57] Bruce D. Nordwall, *Free Flight Could Stall Without Key Data Link*, AVIATION WK. & SPACE TECH., June 3, 1996, at 28.

[58] *See* McGee, *supra* note 15, at 46.

[59] FAA, *supra* note 11, at 56; Lopez & Moxon, *supra* note 34, at 28; Nordwall, *supra* note 57, at 28-29.

Korea, and India; in some cases, they have reduced flight times on these routes by as much as two hours.[60] United Airlines, in cooperation with Qantas, is the only U.S. carrier currently operating international FANS flights; it implemented "first-stage" FANS flights on Boeing 747-400 South Pacific routes in 1995.[61] United realizes fuel savings of $2500 per leg on these flights, excluding the additional revenue from carrying more cargo and less fuel.[62] In light of these benefits and because the retrofit pays for itself in less than a year, United is retrofitting its entire 747-400 fleet with FANS.[63]

United's success on overseas routes has shown U.S. aircraft producers their instrumental role in the transition to free flight in the domestic U.S. arena. However, Boeing has recognized that the airlines play the preeminent role in free flight implementation. David Allen, Boeing's CNS/ATM Manager, has remarked that "the people who hold the final sway over practical implementation of [free flight technology] are not engineers or flight operators, but airline financial officers."[64] In response to anticipated orders by U.S carriers, Boeing plans to integrate FANS as standard equipment on long-range 777 models this year and will offer FANS retrofits on the 757/767 family in early 1998.[65] McDonnell Douglas says that it will install FANS as standard equipment on MD-11 and MD-90 models in 1997.[66]

In December 1995, American led the way towards domestic free flight by placing an order of $44 million for more than 500 GPS-based navigation management systems for use on 340 Boeing 727, MD-80, and DC-10 aircraft.[67] The systems, labelled ADS-B (automatic dependent surveillance broadcast), will allow controllers to pinpoint the location of an aircraft carrier within the area of a 747 and will be the technological standard for do-

---

[60] J. A. Donoghue, *Equipping for FANS*, AIR TRANSPORT WORLD, Sept. 1, 1996, at 92; McGee, *supra* note 15, at 46.

[61] Michael A. Dornheim, *Equipment Will Not Prevent Free Flight*, AVIATION WK. & SPACE TECH., July 31, 1995, at 46.

[62] McGee, *supra* note 15, at 46.

[63] Sweetman, *supra* note 3, at 57.

[64] Julian Moxon & Kevin O'Toole, *The Tangled Web*, FLIGHT INT'L, Oct. 30, 1996.

[65] Donoghue, *supra* note 60, at 92.

[66] Moxon & O'Toole, *supra* note 64. Following the December 1996 announcement that Boeing would acquire McDonnell Douglas, the company stated that its "products and programs" would remain intact and would be marketed by the new Boeing G. *Id.*

[67] *Civil Avionics: Global Navigation*, FLIGHT INT'L, Feb. 14, 1996.

mestic free flight integration.[68] The airline claims that the retrofits will "fit nicely with new ground and aircraft technology that will completely change the air-traffic-control system over the next 15 years."[69] United and other carriers also plan to retrofit their fleets with GPS equipment for domestic operations.[70]

In a step towards applying this advanced navigation equipment throughout its system, Alaska Airlines commenced scheduled passenger flights between Seattle and Juneau using a GPS-equipped Boeing 737-400 on May 28, 1996.[71] The aircraft is one of two specially equipped aircraft that rely on the GPS system as their primary navigation source. The airline expects to yield both reduced flight times and fuel burn in relation to non-GPS flights.[72]

VI. CONCLUSION

The successes of the collaborative effort between the airlines and the FAA indicate that the transition to free flight is inevitable in light of the aging ATC infrastructure and airline cost management. Nonetheless, significant hurdles remain for the entire aviation industry before all of the benefits of this monumental transition may be wholly realized. Through this collaborative effort, however, the change to free flight promises to streamline airline operations and promote aviation safety. For the nation's airlines, technology presents the largest barrier to attractive operational savings and a safer air traffic control system. Nevertheless, given the current financial strength of the industry and the incentive to maintain this trend, the implementation of free flight architecture promises to progress at a steady pace.

---

[68] *Alaska Starts GPS Trials*, *supra* note 8, at 31.
[69] *Tulsa AA Crews to Upgrade Jets*, TULSA WORLD, Apr. 11, 1996, at E1.
[70] *Civil Avionics: Global Navigation*, *supra* note 67.
[71] *Alaska Starts GPS Trials*, *supra* note 8, at 31.
[72] *Id.*