PROFESSIONAL AIRWAYS SYSTEMS SPECIALISTS

1150 17th Street, NW, Suite 702, Washington, D.C. 20036
Telephone: (202) 293-7277 Fax: (202) 293-7727

Founded 1977

STATEMENT OF TOM BRANTLEY
PRESIDENT
PROFESSIONAL AIRWAYS SYSTEMS SPECIALISTS (PASS)
AFL-CIO

BEFORE THE HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE – SUBCOMMITTEE ON AVIATION

ON
NEXTGEN: THE FEDERAL AVIATION ADMINISTRATION'S AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST (ADS-B) CONTRACT

OCTOBER 17, 2007

Chairman Costello, Congressman Petri and members of the subcommittee, thank you for inviting PASS to testify on the Automatic Dependent Surveillance – Broadcast (ADS-B) contract. The Professional Airways Systems Specialists (PASS) represents more than 11,000 Federal Aviation Administration (FAA) employees in five separate bargaining units throughout the United States and in several foreign locations. The largest PASS bargaining unit is the Air Traffic Organization Technical Operations unit, consisting of technical employees (systems specialists, electronics technicians and computer specialists) who install, maintain, repair and certify the radar, navigation and communication systems making up the air traffic control system.

It appears that ADS-B, when fully implemented, could be a very useful tool for pilots and air traffic controllers to use to maintain proper separation of aircraft while allowing more efficient use of our nation's airways. ADS-B will allow aircraft to transmit their exact position, direction of flight and speed to ground stations and other aircraft. According to the FAA, ADS-B is "the future of air traffic control."[1] Changes like those resulting from ADS-B could be extremely beneficial to the aviation industry if they are fully—and safely—realized.

PASS and the employees we represent welcome this advancement in air traffic control technology, but it is critically important that safety be the focus of any modernization efforts. In our view, the approach being used by the FAA to deploy ADS-B is one that discounts decades of responsibly ensuring the safety of the flying public. It is our understanding of the FAA's plans that with the implementation of this system, ADS-B, unlike our current radar systems, will not be certified and all maintenance will be the responsibility of the contractor.

It is PASS's hope that with modernization of the National Airspace System (NAS), new systems will enhance safety and efficiency. However, we are concerned that the newly awarded ADS-B contract may have negative consequences on aviation safety. PASS is especially disturbed by the elimination of FAA certification of the system, the decrease in system redundancy and the FAA's troubled history of contract management.

The ADS-B Technology

ADS-B is a digital alternative to radar designed to provide position and flight information simultaneously to pilots and air traffic control facilities. Instead of using radar data to determine flight position, ADS-B uses signals from the Global Navigation Satellite System. Aircraft transponders receive these signals and transponder transmissions are then used to determine the locations of aircraft. The position is converted into a digital code and combined with other data from the aircraft's flight monitoring system, such as type of aircraft and its speed. The code containing all relevant data is broadcast from the aircraft's transponder once per second; ADS-B-equipped aircraft and ground stations within 200 miles receive these broadcasts. ADS-B ground stations will also add radar-based targets for aircraft not equipped with ADS-B and then send this data, along with graphical information from the National Weather Service and flight information, back to equipped aircraft. As such, for the first time, both pilots and controllers will see the same real-time air traffic displays.

[1] Federal Aviation Administration, "Fact Sheet: Automatic Dependent Surveillance – Broadcast (ADS-B), June 21, 2007.

In 2005, after being used by general aviation pilots in Alaska, the FAA determined that ADS-B was ready to be made operational throughout the NAS. The FAA has indicated that ADS-B is "critical to the agency's Next Generation Air Transportation System plan for meeting the nation's predicted tripling of demand in coming years."[2] According to the agency, since ADS-B will result in more accurate tracking, aircraft will be able to fly safely with less distance between them, thus allowing for an increase in airspace capacity. The FAA predicts that the ADS-B technology will also allow air traffic controllers to better manage the air traffic at congested airports.

The FAA anticipates being able to "commission" ADS-B services for use in the NAS by 2010, and by 2013 to have coverage everywhere there is currently radar coverage. The agency expects full implementation to take approximately 20 years, at which time primary radar will be eliminated and about half of the legacy secondary radars will be maintained to provide a backup in case of an ADS-B outage.

Elimination of Certification

Certification is the process in which a certificated FAA technician checks and tests systems or pieces of equipment on a periodic basis in order to ensure that the systems or pieces of equipment can be safely returned to service and not negatively impact any aspect of the NAS. According to the FAA's own order, "Certification is a quality control method used by the ATO [Air Traffic Organization] to ensure NAS facilities are providing their advertised service. The ATO employee's independent discretionary judgment about the provision of advertised services, the need to separate profit motivations from operational decisions, and the desire to minimize liability, make the regulatory function of certification and oversight of the NAS an inherently governmental function."[3] Since certification is an inherently governmental function,[4] it can *only* be accomplished by FAA employees.

For decades, the FAA has had in place criteria for determining which NAS systems and services require certification. Among the criteria used are the following:

a. FAA NAS systems, subsystems, and services directly affecting the flying public shall be certified when they do any of the following:
- **(1)** Provide moment-by-moment positional information to pilots or air traffic operations personnel during aircraft operations.
- **(2)** Provide necessary communication or communication control among pilots and air traffic operations personnel during the above aircraft operations.
- **(3)** Provide decision support information that directly affects aircraft heading, altitude, routing, control, or conflict awareness.
- **(4)** Provide essential meteorological information for takeoff and landing aircraft at airports.

[2] Id.
[3] FAA Order 6000.15E – *General Maintenance Handbook for National Airspace System (NAS) Facilities.*
[4] Manager, General Law Branch, AGC-110, memorandum to Manager, Maintenance Engineering Division, ASM-100, "Contractor Certification of Navigational Systems in National Airspace System (NAS)," June 18, 1991.

(5) Provide short term, long term, continuous, and conditioned power to NAS systems requiring certification at a Service Delivery Point (SDP)…. These [elements necessary to require certification] are characterized as follows:

(a) Short term power source; e.g., batteries, or flywheel capable of carrying the load during the transfer.

(b) Long term power source; e.g., an engine generator, or fuel cell.

(c) Continuous indicates capability for transparent transfer between power sources; e.g., an automatic transfer switch.

(d) Conditioned power; e.g., voltage regulation and filtering of the waveform.[5]

As you can see, based on its design, ADS-B unmistakably meets criteria a.(1) and a.(3); therefore, ADS-B should no doubt be certified in order to ensure that the system is providing its advertised service and, more importantly, that it is doing so in a *safe* manner. In fact, the long-standing criteria for certification stated that "FAA NAS systems, subsystems, and services directly affecting the flying public shall be certified."[6] However, the agency has been very creative in finding a way to circumvent its own certification program, even making changes to this time-tested order. In a recent update to the order, effective October 1, 2007, the agency has "clarified" the text to read, "*FAA owned* NAS systems, subsystems, and services directly affecting the flying public shall be certified" (emphasis added)[7]. In other words, the FAA has not only re-interpreted the criteria to allow ADS-B to be deployed without requiring certification but actually *prohibits* full and appropriate certification of all systems it does not own.

In addition, PASS has learned that the FAA intends to perform "service certification" on ADS-B in order to give the pretense that the agency can oversee the safety and performance of the system. Further changes the agency has made to its own orders reveal the agency's true intentions of taking FAA employees out of the process. Until recently, FAA orders described the criteria for service certification as follows:

b. Service certification is based upon several fundamental characteristics of NAS service such as:

(1) Constituent systems and subsystems are certified.

(2) Indications on monitor and control consoles are normal.

(3) Customer activity reports contain no complaints.[8]

In the update to the order, the following guidelines are now provided on service certification:

b. ATO personnel with certification authority must certify NAS infrastructure services listed in Appendix 3.

c. Service certification is based upon several fundamental characteristics of NAS Infrastructure Service provision, such as:

---

[5] FAA Order 6000.15D – *General Maintenance Handbook for National Airspace System (NAS) Facilities.*

[6] Id.

[7] FAA Order 6000.15E – *General Maintenance Handbook for National Airspace System (NAS) Facilities*, draft dated February 13, 2007, effective October 1, 2007.

[8] FAA Order 6000.15D – *General Maintenance Handbook for National Airspace System (NAS) Facilities.*

(1) Constituent systems and subsystems are certified.
(2) Indications on monitor and control consoles are normal.
(3) Customer activity reports contain no complaints.
(4) Observation or knowledge of customers using the NAS Infrastructure Service.[9]

Since ADS-B is not a system owned by the FAA, and will therefore not be listed in Appendix 3, FAA employees will not be performing system certification; thus, the first two criteria above will no longer apply. The agency will then fall back to the newly added fourth criteria, "Observation or knowledge of customers using the NAS Infrastructure Service." In essence, without a true certification of ADS-B, the controllers will have to rely on the users, i.e., pilots or the vendor, to tell the FAA that the service is wrong. Even the smallest inaccuracy will only be addressed if the "users" report a problem. There will be no internal FAA quality checks as there are today.

PASS is certain that ADS-B must be appropriately and fully certified to ensure its safe operation. Radar has always been certified by the FAA, and the FAA's own documents state that ADS-B is an alternative to radar, providing similar service with advanced technology. Yet, the agency has made changes that will allow private contractors to be fully responsible for its safe operation and eradicate the role of FAA employees in the maintenance and use of the system. In other words, certification for systems not owned by the FAA will be totally eliminated and, in the opinion of the experts, technicians in the field, there will be no way to independently determine if the system is safe.

In addition to being a requirement for years that the FAA certify systems and services that are crucial to safe air travel, FAA involvement often provides that necessary margin of safety when it is most needed. As anyone who studies risk management will agree, it is during transitions that the greatest vulnerability occurs. The transition from our current ground-based means of separation to a satellite-based means of separating air traffic will be a huge transition. It may take many years for the changeover to occur, but the transition is nonetheless an enormous undertaking. The added safety provided by having FAA employees certify that the NAS, whether ADS-B or legacy systems, is safe for use will be very important to a successful change.

It should also be noted that this new interpretation of the agency's certification criteria would apply not only to ADS-B but also to any system or service that is not owned by the FAA—any future contract awarded by the FAA that provides for vendor-owned equipment or services would be barred from the FAA certification program. In addition, the pilot programs contained in the Senate's version of the reauthorization bill that would turn over ownership, maintenance and operation of airports to entities other than the FAA would also place the systems and services used or provided by those airports in a category of being prohibited from the FAA's certification program.

Clearly, the agency's ill-advised goal is to turn over as much of the NAS as possible to the private sector. This means that anything requiring work of FAA employees, such as certification, is now looked upon by the FAA as an obstacle that must be overcome. In effect, the agency is saying that its own certification program, which is the key factor in our country's air traffic

[9] FAA Order 6000.15E – *General Maintenance Handbook for National Airspace System (NAS) Facilities*, draft dated February 13, 2007, effective October 1, 2007.

control system being the world's safest, is now a roadblock to an ideological choice that supersedes the agency's mission "to provide the safest, most efficient aerospace system in the world." PASS finds the agency's actions to avoid the certification of ADS-B systems and services to be misguided and irresponsible. Aside from it being a legal requirement for FAA employees to be the ones who certify NAS systems, FAA employees are the only people anywhere with such a detailed knowledge of the intricacies associated with NAS systems and operations and are the only individuals trained to deal specifically with equipment failures and the complex intricacies associated with such a vast network of systems and equipment. Private contractors simply lack the skills, training and knowledge of federal employees. They are not acutely familiar with the delicate balance that makes up the NAS. The NAS is not just one piece of equipment, but rather a complex, integrated system that includes thousands of distinct smaller systems, all of which interface with one another, and aviation safety depends on oversight of the entire system. The NAS cannot be divided into individual components, just as the work of those responsible for maintaining it cannot be contracted out as independent functions. Placing responsibility for a system as vital to air travel as ADS-B entirely in the hands of the private sector threatens the safety of the flying public. PASS strongly supports modernization of the NAS, but *never* in a manner that compromises the very foundation of safety upon which our current system is based.

Lack of Redundancy

Redundancy in the aviation system allows for disturbances to the system without corresponding disturbances to air travel. In other words, the safety and efficiency of the NAS relies not only on the proper operation of major systems but on the presence and availability of a sufficient backup system as well. Although the FAA is claiming that it will maintain about half of the current network of secondary radars as a backup system in case of a GPS outage, the plan nonetheless results in a severe cut in redundancy.

According to the Government Accountability Office (GAO), the "the ADS-B rollout will allow the agency to remove 50 percent of its current secondary radars, saving money in the program's baseline." Full implementation of ADS-B would mean that the primary radar would be eliminated and 50 percent of secondary radars would also be removed. The FAA considers providing backup for half of ADS-B users sufficient, but PASS questions the consequences of such a drastic cut in redundancy, literally moving almost entirely to a satellite-based system. Furthermore, if the ADS-B technology truly allows for the reduction of space between aircraft, what happens if ADS-B fails and aircraft are forced to switch to secondary radar, which requires more space between aircraft in order to ensure safety? PASS believes that the FAA must seriously examine such possibilities before considering 50 percent of secondary radar a safe backup. In fact, the FAA *Aeronautical Information Manual* specifically states that "ADS-B alone does not ensure safe separation."[10] If this is indeed the case, a sufficient level of redundancy must be maintained to ensure that the airways are safely populated. Relying on half of the secondary radar is simply not adequate.

[10] Federal Aviation Administration, *Aeronautical Information Manual: Official Guide to Basic Flight Information and ATC Procedures*, February 16, 2006, Section 4-4-18.b.

Furthermore, in order to have sufficient redundancy to avoid service disruptions, there also must be employees present who fully comprehend the different types of service. Under the current contract, ADS-B would exist as an entirely vendor-run operation. In other words, FAA involvement would be nearly eliminated. If FAA employees are not familiar with the workings of the system, the agency will be held hostage to the vendor's response time, which will, at the very least, increase restoration times and result in delays. Plus, if FAA employees are not working with ADS-B and secondary radar has been cut by half, it stands to reason that there will be fewer technicians employed by the FAA. Fewer FAA employees will also increase delays and risk the safety of the system, especially if the FAA is forced to switch to backup radar.

Contract Management

The FAA's problems with management of its contracts are well documented. PASS is extremely concerned that the elimination of FAA involvement related to such an important system places far too much reliance on the corporate vendor and the terms of the contract. Most disquieting is the fact that the contract places control of the system entirely in the hands of the vendor. As briefly mentioned above, if there is a problem with ADS-B, the agency is completely reliant on the vendor to address the problem. In fact, the FAA must even rely on the vendor to report any problems. However, what a contractor who could lose profit considers a problem and what an FAA employee whose only concern is safety and who has detailed knowledge of the NAS considers a problem may be drastically different. In other words, the contractor may not address a problem in time to avoid a disruption to the system, which would then force the FAA to rely on its limited backup radar. Furthermore, once a problem has been detected, the FAA will be forced to wait for the vendor to correct the issue. There is no way to determine what type of restoration time may be involved if the contractor is not located within convenient traveling distance of all ADS-B ground stations.

In addition, there are also no safeguards in place in the event that the vendor enters bankruptcy or is acquired by another firm. While PASS appreciates the language regarding ADS-B contract requirements in the House version of the reauthorization bill, the most effective way to reduce problems is to involve FAA employees. If FAA employees are certifying the system, they will be knowledgeable in the operations of the technology and able to provide assistance in the case that vendors are changed. This is also extremely important when considering that ITT is only the primary contractor with a team of several other vendors, including AT&T, Thales and PriceWaterhouseCoopers. If the agency is completely reliant on the contractor, any problem at any of these companies could result in a disruption to ADS-B service. With a knowledgeable and adequate FAA technical workforce, there would indeed be more of a safeguard in place to protect against service disruptions.

The FAA makes an apples-to-oranges comparison when it relates the current ADS-B contracting efforts to the telecommunications services the FAA is currently contracting through Harris Corporation.[11] Even though comparing telecommunications services to vital air traffic equipment is unrealistic, examining the performance of the telecommunications contract does shed additional light on the FAA's problems with contract management. The FAA is currently

[11] Federal Aviation Administration, "Follow Up Contract Award ADS-B Q&As," August 30, 2007.

working with a private corporation to provide communications services for air traffic control and consolidate multiple networks under the FAA Telecommunications Infrastructure (FTI). The chronic scheduling and cost problems and inept contractor performance involved with the transition have resulted in scrutiny of the process from members of Congress, the Government Accountability Board and the Department of Transportation Inspector General.

For example, in its April 2006 report, the IG indicated that a major problem with the FTI program is a lack of contractor understanding.[12] Only trained FAA technicians are fully aware of the way in which every interconnected unit affects the entire NAS system and thus the aviation system as a whole. Neither the FTI Program Office nor Harris fully comprehend the requirements of site installation and the potential problems, and Harris contractors tasked with maintaining FTI are not properly supervised. This lack of knowledge has resulted in numerous outages and delays throughout the country. If turning over a communications system to a private entity has resulted in such a level of problems and criticism, should the FAA risk a similar move with the safety-critical work performed by FAA technicians?

In addition, poor management of FTI implementation is also leading to an increase in cost and a corresponding decrease in benefits. As with ADS-B, the FAA has touted the cost savings associated with FTI; however, according to the IG, acquisition costs have increased while cost savings have decreased by over $400 million—more than half of the FAA's original estimated savings. Since the FAA has not independently validated the FTI cost and benefits estimates, despite recommendations from the IG to do so, the actual costs and benefits remain unknown. Rising cost should be a major concern regarding the current ADS-B contract and the FAA's management of the contract. When factoring in the incredible complexity that will be involved in making a prototype ADS-B system work throughout the NAS, PASS is very concerned that the FAA's ability to manage the development of such a system is lacking.

Conclusion

Since the current FAA administration seems to have abandoned its responsibility for ensuring the safety of our nation's air traffic control system, PASS strongly urges Congress to take the lead in keeping the agency focused on its true duty, maintaining the safest air traffic control system possible. PASS asks that Congress direct the FAA to fully and appropriately certify all NAS systems and services, including ADS-B, that meet the criteria for certification as defined by the agency prior to October 1, 2007, without regard for ownership of such systems and services. Additionally, Congress should require the agency to notify the appropriate congressional committees before making such a fundamental change in its safety philosophy. Only by maintaining the integrity of the highly successful certification system can such a leap in technology as that envisioned with ADS-B be accomplished safely.

[12] Department of Transportation Inspector General, *FAA Telecommunications Infrastructure Program: FAA Needs to Take Steps to Improve Management Controls and Reduce Schedule Risks*, AV-2006-047 (Washington, D.C.: April 27, 2006), p. 18.