STATEMENT OF AMR A. ELSAWY
BEFORE THE HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE: SUBCOMMITTEE ON AVIATION – HEARING ON JOINT PLANNING AND DEVELOPMENT OFFICE (JPDO) AND THE NEXT GENERATION AIR TRANSPORTATION SYSTEM
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Mr. Chairman, thank you for inviting me to appear before your Committee. My name is Amr ElSawy and I am a Senior Vice President at the MITRE Corporation. I am also the General Manager of MITRE's Center for Advanced Aviation System Development (CAASD), which is the FAA's Federally Funded Research and Development Center (FFRDC). I would ask that my statement be included in the record.

In addressing the committee today, I will focus on the opportunities that lie ahead for the JPDO efforts and how they have the potential for changing the way that air traffic management services are provided in the United States and around the world. Specifically, I want to address how those changes will be reflected in the architecture of today's system and what we must do ***now*** to plan for the ***transition*** to the next-generation air transportation system.

Any modification we make to the architecture of an operational system requires coordination and synchronization of changes that involve people, procedures, and systems. We must also have a clear understanding of the capital and operating costs related to the implementation of the change. Today, in an era of limited resources and increasing demand – we must understand the resultant productivity, cost, safety, capacity, and efficiency benefits from the proposed change.

The changes that are needed to address the projected future demands on the air transportation system cannot all happen at once. History has taught us that "big bang" approaches to the planning and development of systems do not succeed, and that those responsible for the operation must drive the change to the future. History also has shown us that by implementing enabling capabilities, driven by operational needs, we can make great progress. NASA's aviation research programs and results will need to be ready to transition into an FAA development program that is adequately funded to mature the research and work with industry on operational integration. The FAA must have a clear understanding of the readiness of the research results and a serious, funded, plan for the inclusion of the research results into an operational, safety-critical system. Any gaps in the handoff between research and implementation will significantly undermine the success of the JPDO initiative.

I would like to cite two specific examples where the US has created a global market place through 1) the implementation of the global positioning system (GPS), and 2) the pursuit and adoption of internet protocols. The worldwide change that has resulted from the availability of GPS is staggering. The impact of the availability of precise navigation information to aircraft, and the dramatic progress made by airframe manufacturers in

flight management systems and avionics that allow aircraft to fly precise routes are central to the progress we are making towards the next-generation system.

Today, traffic levels and delays have returned to levels seen prior to September 11, 2001 in many areas of the country. These areas include airports in Chicago, Atlanta, the Washington area, the New York area, Las Vegas, and south Florida. There also have been increases in traffic in smaller airports in many areas of the country. Examples include Scottsdale, Teterboro, and West Palm Beach. Traffic in major en route corridors is also generating congestion not just due to higher traffic volume, but also as a result of increasing traffic pattern complexity.

The following factors have created challenges that are different than those experienced in 1999 and 2000. For example:

- Regional jets have replaced larger jets and turboprop aircraft, resulting in different traffic flows and mix which require changes in operational techniques and strategies.
- North/south traffic flows have increased in the winter months changing how traffic flows must be managed around ceiling and visibility constraints. Traffic has grown in south Florida and the Southwest.
- For the coming summer season, traffic growth is expected at Houston, and the NAS will face its usual severe convective weather challenges.
- Traffic increases in areas such as New York and Washington with airports in close proximity to each other has resulted in greater complexity due to traffic climbing, descending, and crossing other traffic in the same airspace.
- Denser overhead traffic streams in areas such as the Chicago/New York corridor have created challenges in merging the departing aircraft into already full traffic streams.
- Also, increased security operations (such as Combat Air Patrol and Temporary Flight Restrictions) have generated challenges in accommodating higher volume and more complex traffic patterns around restricted areas such as within the New York and Washington airspace, as well as during major events.

Beyond this year, commercial and general aviation will continue to see changes. The NAS will likely continue to see traffic growth, changes in the traffic patterns between major airports and metropolitan areas, and changes in the mix of aircraft that make up the traffic. In addition, unmanned aerial vehicles (UAV), very light jets (VLJ), and commercial space launches will need to be accommodated in the NAS, each bringing its own challenges for the operation of airspace, controller workload, and system complexity. Projections developed by DOT, FAA and MITRE (and documented in the *Capacity Needs in the National Airspace System)* indicate that by 2013, 16 airports and 7 metropolitan areas will need additional capacity to meet the expected demand.

In order to meet the needs of a dynamic marketplace, the FAA and the aviation community need to reach ***rapid*** consensus on the key enabling capabilities and to ***implement*** changes in technology, procedures, avionics, and policy that can - together - increase operational efficiency and productivity. We believe that the following actions are the foundation for the next-generation system, and should be funded and started ***now***, not in 25 years:

- **Take advantage of aircraft capabilities and avionics to implement the FAA's *Roadmap for Performance-based Navigation***. This is a significant change because it is equivalent to **adding** precise navigation lanes in the sky without requiring additional ground-based equipment. Moving to a performance-based system will transform the way the National Airspace System (NAS) operates. By taking advantage of the aircraft's flight management systems and avionics, Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures lead to safety, efficiency and capacity improvements, especially in complex and congested airspace such as Atlanta and the eastern United States. This will provide direct operating benefits to customers and will enable the FAA to reduce the size, complexity, and cost of its infrastructure through selective divestments of ground-based navigation aids.

- **Accelerate the implementation of airspace changes** to be more flexible, and to accommodate the expected growth in traffic and new airspace users such as unmanned aerial vehicles (UAV). Again this has the real effect of streamlining traffic flows into congested areas and providing more efficient arrival and departure paths for all users. Small investments by the FAA, result in a significant benefit for the users and the system as a whole.
- **Emphasize enhancement of automation and decision support tools** to enable controllers to handle more traffic by presenting them with automated conflict-free problem resolutions, thereby increasing system capacity and productivity and improving safety and the quality of service provided to customers. With the on-schedule completion of the software development of the En route Automation System (ERAM), **now** is the time to plan and fund the next increment of automation capabilities and NGATS extensions.
- **Develop a firm plan for the implementation of air/ground data link** that will enable controllers and pilots, and their respective ground and onboard aircraft automation systems, to exchange digital messages that yield efficiency, productivity, and safety improvements. A digital link between the aircraft and the ground is a central element of the System Wide Information (SWIM) architecture; without it, we will be unable to exchange aircraft intent or trajectory information. Without data link we will be unable to realize the benefits of efficient rerouting of aircraft during severe weather events. Without data link we will be unable to reduce the complexity of the controllers' tasks.
- **Improve traffic flow management capabilities**, such as access to more timely and accurate information (especially for unscheduled flights), will permit the FAA and the

user community to identify and solve congestion problems more quickly and efficiently.

- **Transition to Automatic Dependent Surveillance–Broadcast**. This is equivalent to providing pilots with electronic eyes in the sky and will permit the FAA to migrate to a less costly and more accurate surveillance system. By relying on aircraft avionics and the power of satellite navigation, we can improve situational awareness for pilots, allowing better access and effective communication about weather and traffic. We also can achieve capacity and performance under instrument flight rules (IFR) that are only possible today under visual flight rules (VFR).
- **Use advanced simulation technologies to train the new controller workforce.** This will reduce the time and cost needed to train controllers, and will improve trainee proficiency and readiness to implement advanced concepts of operation.
- **Maintain a strategic view of investments in airport infrastructure and runways**, by continuing to build runways and improve taxiways to stay ahead of the increasing demand.
- **Develop and implement policies that enable enhanced access to airports through the use of modern and improved avionics and procedures instead of ground-based infrastructure.**

These actions will position us to meet increasing demands and have the potential for improving overall productivity between 20 and 40 percent while reducing future operating costs by several hundred million dollars per year. Over the next year, MITRE will be working with FAA's ATO and JPDO to simulate and validate the productivity and cost saving estimates.

Implementing these changes will keep the United States as innovators and leaders of the global aviation community. We have a lot of opportunities ahead.

Thank you Mr. Chairman. I would be happy to answer any questions.