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Statement of Craig Fuller, President
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Before the
Committee on Transportation and Infrastructure
Subcommittee on Aviation
U.S. House of Representatives
Concerning
A Review of Issues Associated with Protecting and
Improving our Nation's Aviation Satellite-based Global
Positioning System Infrastructure
February 8, 2012

Statement Highlights:

1. GPS is critical to safety of flight for thousands of general aviation pilots and aircraft operating in the United States each day and has become a vital part of our national transportation infrastructure.
2. No viable backup system has been designated in the event that GPS becomes inaccessible to general aviation.
3. Current policy supports the protection of access to GPS for civilian use.
4. PNT's clear and to the point findings on the LightSquared proposals are instructive on the importance of avoiding harmful interference to GPS receivers and GPS-dependent aircraft safety-of-flight systems. Additional

protections are needed to ensure that similar proposals do not advance to the stage that they receive conditional approvals or waivers. The development of such protections will require the collaboration of numerous agencies whose policies and decisions affect the GPS system.

The Aircraft Owners and Pilots Association (AOPA) is a not-for-profit individual membership organization representing approximately 400,000 members. AOPA's mission is to effectively represent the interests of its members as aircraft owners and pilots concerning the economy, safety, utility, and popularity of flight in general aviation (GA) aircraft.

As pilots flying in the United States, we experience firsthand the safest and most efficient air transportation system in the world. This aviation network of 5,200 public use airports, complemented by more than 13,000 privately owned landing facilities, is a unique national resource. Each year, 170 million passengers fly using personal aviation, the equivalent of one of the nation's major airlines. General aviation contributes more than \$150 billion to U.S. economic output, directly or indirectly, and employs nearly 1.3 million people whose collective annual earnings exceed \$53 billion.

Use of GPS by General Aviation

General aviation pilots rely on GPS in all phases of flight. From takeoff through landing, GPS provides navigation information that allows for the safe and efficient operation of general aviation aircraft for business and personal transportation as well as medical, firefighting, law enforcement, humanitarian, and agricultural operations. Approximately 70 percent of AOPA's members rely on GPS as their primary means of navigation while many of the remainder use it as a backup form of navigation.

Overall, approximately 50 percent of the general aviation fleet is equipped with some form of GPS. We can expect that percentage to rise as manufacturers like Cessna make GPS standard equipment on all new aircraft.

In addition, thousands of GPS-based instrument approaches are in use at airports nationwide, with more such approaches being added each year. For general aviation, the availability of GPS and Wide Area Augmentation System (WAAS) precision instrument approaches has allowed all-weather access into more than 2,000 airports nationwide at a fraction of the cost of traditional ground-based

approaches. WAAS represents the world's only satellite-based augmentation system certified for 24-hour per day operations. This system has been embraced by the general aviation community, with more than 74,000 WAAS units sold to date.

As of January 2012, there were 11,541 approaches that rely on GPS operating in the United States, compared to only 6,675 ground-based instrument approaches. Without reliable access to GPS in all areas and at all altitudes, thousands of airports would no longer be accessible in low weather conditions, critically diminishing the utility and safety of general aviation flying.

In addition, the FAA continues to establish GPS-based airways, known as T-routes, that provide more efficient and economical routing while reducing pilot and controller workload in busy terminal areas. T-routes can overcome the limitation of ground-based navigational aids, such as line-of-site requirements and signal reception. And, because of the accuracy of GPS signals, T-routes can offer lower minimum altitudes giving pilots more options for avoiding icing conditions, a major safety consideration for general aviation.

In the decades since GPS was first made available for civilian use, it has become a critical part of our national transportation infrastructure. Just as surface highways provide for commercial and personal transportation around the nation, so GPS "highways" in the sky allow for the efficient movement of people and goods via general aviation aircraft. And just as the integrity and access to our surface infrastructure must be protected, so must the reliability and accessibility of our airborne infrastructure.

GPS is also a foundational technology in the FAA's ongoing efforts to modernize the air traffic system, an effort known as NextGen. As the FAA continues to move away from a ground-based system and toward a satellite-based system, pilot and air traffic controller reliance on GPS will necessarily continue to increase.

Vulnerability of GPS

The general aviation community depends upon the federal government to ensure civilian access to the GPS system is stable and protected.

While thousands of flights in U.S. airspace rely on GPS daily, there is currently no designated alternative to GPS in the event the system becomes inaccessible for any reason. In March 2007, the Department of Homeland Security (DHS) designated

eLORAN as the official backup for the GPS system. However, beginning in 2009, DHS began dismantling that system. While many of the towers required for eLORAN transmissions have since been destroyed, no replacement backup system has been designated.

While recognizing that the FAA is studying the possible alternate options for position, navigation, and timing, with no formal backup in place at present GPS users are vulnerable in the event of a system shutdown or interference. The designation of an official backup would allow equipment manufacturers to begin creating products that incorporate whatever technology might be needed to access that backup. It is important to note, however, that sufficient lead time will be required to develop and implement any necessary equipment changes to accommodate a backup system.

Access to the GPS system is also vulnerable to interference from changing uses of the broadcast spectrum. As recent events showed, powerful ground-based transmitters using spectrum adjacent to that designated for GPS are one potential source of interference. But as the demand for bandwidth continues to grow and new technologies are developed, the potential for interference will also continue to expand. Because it is impossible to determine how yet-to-be-designed technologies may operate, it is essential to protect the GPS system not only from existing threats but from potential new ones as well.

Recognition of GPS as a Critical Safety Technology

Current policy and practice recognize the importance of reliable access to the GPS system for general aviation and other users.

As far back as 2004, the White House established a national policy that set guidance and implementation actions for space-based positioning, navigation, and timing programs, augmentations, and activities for U.S. national and homeland security, civil, scientific, and commercial purposes.

This policy made it clear that the government is to “provide uninterrupted availability of positioning, navigation, and timing services” to domestic users. New to the policy was the coordination of multiple agencies to protect the domestic GPS signal from accidental or intentional jamming.

In the years since this policy was first established, GPS has become exponentially more central to the safety and efficiency of general aviation operations, suggesting that any new guidance should expand existing protections for GPS.

Establishing New Protections for GPS

While the concerns and protections set forth in the 2004 policy remain valid, new concerns continue to arise with changing technology and the expanded use of GPS. Because of the increasingly heavy reliance on the GPS system, new protections are needed to ensure the long-term availability of the system. These protections must take into account not only existing threats to the GPS system but also address anticipated future threats.

Given the importance of GPS, a clear statement of the need and intent to protect the system from a wide range of harmful actions would be an effective starting point. In addition, the creation and enforcement of new protections will require extensive cross-agency and user collaboration, to include input from FAA, FCC, DOD, DHS, the Department of Agriculture, and others whose policies and decisions impact the viability of the GPS system. For example, to avoid a repetition of the very substantial risks to GPS that were posed by the LightSquared proposals, Congress could require the FCC to obtain concurrence from both DOT and DOD before approving any similar applications, regardless of the entity making the proposal.

Conclusion

On behalf of the 400,000 members of AOPA, thank you for your leadership in protecting the integrity of the GPS system that forms a critical safety component of the national air transportation system. GPS is a vital part of our national transportation infrastructure that must be protected with the same vigor as other forms of infrastructure. By acting now to preserve GPS from both present and future threats, you can help ensure the continued safety and efficacy of general aviation.