13 Jul 2020

RFI Response

Executive Order 13905, Profile of Responsible Use of Positioning, Navigation, and Timing Services

For:
National Institute of Standards and Technology
U.S. Department of Commerce
100 Bureau Drive
Gaithersburg, MD 20899
James McCarthy
James.M.McCarthy@nist.gov
(P) (301) 975-2762

From:
L3Harris Technologies, Inc. (L3Harris)
2235 Monroe Street
Herndon, VA 20171
Kathleen W. Taylor
Kathy.Taylor@L3Harris.com
(M) (703) 439-7977

TABLE OF CONTENTS

Question **Page**

NIST is seeking the following information from PNT technology vendors, users of PNT services and other key stakeholders for the purpose of gathering information to foster the responsible use of PNT services.

1. **Describe any public or private sector need for and/or dependency on the use of positioning, navigation, and timing, or any combination of these, services.**

L3Harris Response:

L3Harris (formerly ITT → Exelis → Harris) is the primary contractor for the FAA's Surveillance Broadcast Services (SBS) Program, which provides real-time aircraft surveillance data to the nation's Air Traffic Control (ATC) systems. The key technology that enables this system is called Automatic Dependent Surveillance Broadcast (ADS-B). ADS-B technology incorporates GPS receivers into aircraft transponders, allowing them to independently derive accurate state vector information (GPS position, altitude, time of applicability, etc.) and broadcast the information to other aircraft and to the SBS ground system during all phases of flight. L3Harris designed, deployed, operates and maintains this nationwide network of SBS ground stations and data processing applications that facilitate surveillance services for the FAA. While the aircraft clearly depend on PNT, the SBS ground system also relies on PNT for proper operation.

Precise timing at SBS ground stations is critical to proper operation of the SBS ground system. As examples, the SBS ground system provides Wide Area Multilateration (WAM) services and the ADS-B position validation function, which are both reliant upon accurate timestamping of aircraft transmissions. The ADS-B position validation function provides FAA ATC confidence in the integrity of the ADS-B data that reaches the ATC display. When ground station timing is impacted, validation techniques reliant upon timing (e.g. Time Difference of Arrival, Passive Ranging, etc.) can degrade.

2. **Identify and describe any impacts to public or private sector operations if PNT services are disrupted or manipulated.**

L3Harris Response:

As indicated above, interruptions to GPS can cause minor to severe degradation of surveillance services that are critical to FAA ATC operations.

3. **Identify any standards, guidance, industry practices and sector specific requirements referenced in association with managing public or private sector cybersecurity risk to PNT services.**

L3Harris Response:

The FAA requires that the ADS-B airborne segment and SBS ground system comply with ADS-B Minimum Operational Performance Standards (MOPS) defined in RTCA DO-260B and DO-282B. Both MOPS documents are undergoing revisions to their next iteration through formal RTCA specification development. The next iteration of the 1090 Extended Squitter MOPS (DO-260C) includes a new data channel (a.k.a. Phase Overlay), which allows ADS-B transponders to encode additional information into the phase of the transmitted waveform on top of the baseline pulse position modulation. This new data channel offers a significant increase in capacity, allowing users to incorporate additional integrity and authentication mechanisms that could be leveraged for APNT.

4. Identify and describe any processes or procedures employed by the public or private sector to manage cybersecurity risks to PNT services.

L3Harris Response:

L3Harris has made numerous enhancements over the years to make the SBS ground system more robust to GPS disruptions.

5. Identify and describe any approaches or technologies employed by the public or private sector to detect disruption or manipulation of PNT services.

L3Harris Response:

The SBS Program has historical data to show the impacts of DoD GPS jamming and spoofing exercises. Additionally, FAA issues Notices to Airmen (NOTAMS) when GPS events are detected. NOTAMS are one of many meteorological and aeronautical information products uplinked to pilots as part of the Flight Information Services Broadcast (FIS-B) service offered by the SBS ground system. A UAT-IN capable ADS-B transponder is required to receive FIS-B broadcasts.

6. Identify any processes or procedures employed in the public or private sector to manage the risk that disruption or manipulation to PNT services pose.

L3Harris Response:

Aside from monitoring GPS health in the airborne and ground system segments, the SBS ground system also employs atomic clocks for GPS holdover. This allows the SBS ground system to continue to meet surveillance performance requirements during GPS disruptions.

7. Identify and describe any approaches, practices, and/or technologies used by the public or private sector to recover or respond to PNT disruptions.

L3Harris Response:

Currently, in lieu of a nationwide, wireless GPS backup service or a dark fiber PTP network, commercially available frequency standards are the most practical solution to maintain precise timing during GPS disruption.

8. Any other comments or suggestions related to the responsible use of PNT services.

L3Harris Response:

L3Harris believes that the SBS system could benefit from broader availability of APNT services. L3Harris would be happy to discuss specific details around our vision of APNT with NIST.