SPACE-BASED POSITIONING
NAVIGATION & TIMING
NATIONAL COORDINATION OFFICE

U.S. Space-Based Positioning, Navigation and Timing (PNT)

60th Meeting of the Civil GPS Service Interface Committee

22 September 2020

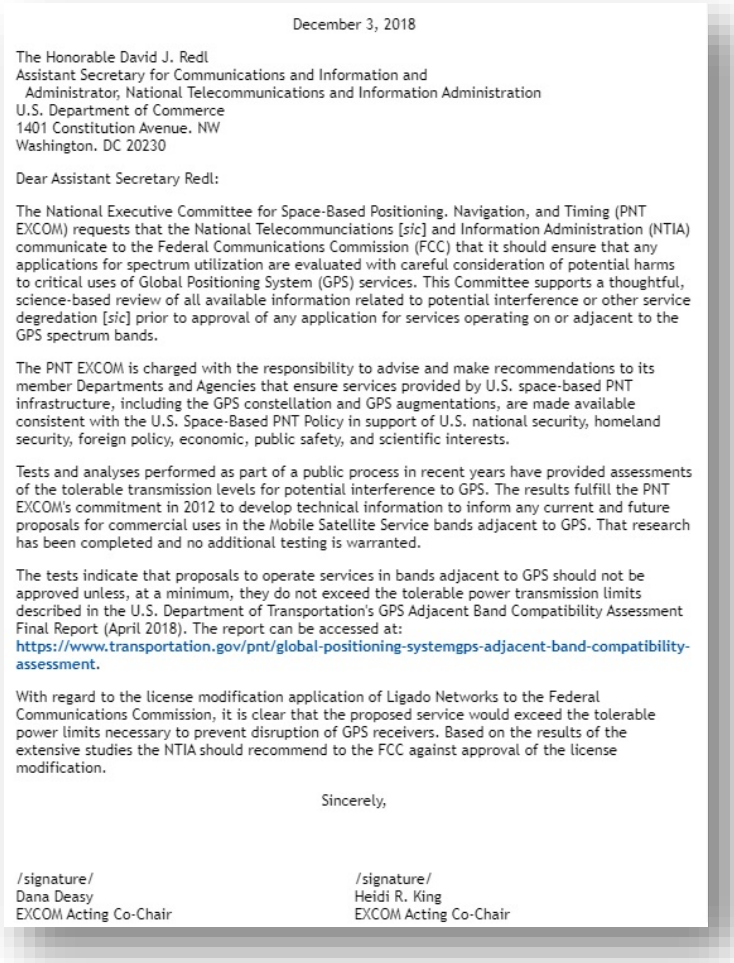
Harold W. Martin III
Director
National Coordination Office

Opposition to FCC Ruling on Ligado

- On April 20, 2020, the Federal Communications Commission (FCC) announced that, "it has approved with conditions Ligado's application to deploy "a low-power terrestrial nationwide network in the L-Band that will primarily support 5G and Internet of Things services."

- The Executive Branch (which is separate from FCC) is concerned because Ligado's proposed transmission power exceeds the thresholds established by the GPS Adjacent Band Compatibility study to protect GPS users from harmful interference.

Opposition to FCC Ruling on Ligado



December 3, 2018

The Honorable David J. Redl
Assistant Secretary for Communications and Information and
Administrator, National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue. NW
Washington. DC 20230

Dear Assistant Secretary Redl:

The National Executive Committee for Space-Based Positioning. Navigation, and Timing (PNT EXCOM) requests that the National Telecommunciations [*sic*] and Information Administration (NTIA) communicate to the Federal Communications Commission (FCC) that it should ensure that any applications for spectrum utilization are evaluated with careful consideration of potential harms to critical uses of Global Positioning System (GPS) services. This Committee supports a thoughtful, science-based review of all available information related to potential interference or other service degredation [*sic*] prior to approval of any application for services operating on or adjacent to the GPS spectrum bands.

The PNT EXCOM is charged with the responsibility to advise and make recommendations to its member Departments and Agencies that ensure services provided by U.S. space-based PNT infrastructure, including the GPS constellation and GPS augmentations, are made available consistent with the U.S. Space-Based PNT Policy in support of U.S. national security, homeland security, foreign policy, economic, public safety, and scientific interests.

Tests and analyses performed as part of a public process in recent years have provided assessments of the tolerable transmission levels for potential interference to GPS. The results fulfill the PNT EXCOM's commitment in 2012 to develop technical information to inform any current and future proposals for commercial uses in the Mobile Satellite Service bands adjacent to GPS. That research has been completed and no additional testing is warranted.

The tests indicate that proposals to operate services in bands adjacent to GPS should not be approved unless, at a minimum, they do not exceed the tolerable power transmission limits described in the U.S. Department of Transportation's GPS Adjacent Band Compatibility Assessment Final Report (April 2018). The report can be accessed at: https://www.transportation.gov/pnt/global-positioning-systemgps-adjacent-band-compatibility-assessment.

With regard to the license modification application of Ligado Networks to the Federal Communications Commission, it is clear that the proposed service would exceed the tolerable power limits necessary to prevent disruption of GPS receivers. Based on the results of the extensive studies the NTIA should recommend to the FCC against approval of the license modification.

Sincerely,

/signature/
Dana Deasy
EXCOM Acting Co-Chair

/signature/
Heidi R. King
EXCOM Acting Co-Chair

The full letter can be found at GPS.gov

On December 6, 2019, the National Telecommunications and Information Administration (NTIA) released a letter on behalf of the National Executive Committee for Space-Based Positioning, Navigation, and Timing (PNT EXCOM) to the Federal Communications Commission (FCC) transmitting the executive branch's position on a spectrum plan proposed by Ligado Networks.

- ***"The PNT EXCOM is charged with the responsibility to advise and make recommendations to its member Departments and Agencies that ensure services provided by U.S. space-based PNT infrastructure, including the GPS constellation and GPS augmentations, are made available consistent with the U.S. Space-Based PNT Policy in support of U.S. national security, homeland security, foreign policy, economic, public safety, and scientific interests.“***

- ***"With regard to the license modification application of Ligado Networks to the Federal Communications Commission, it is clear that the proposed service would exceed the tolerable power limits necessary to prevent disruption of GPS receivers. Based on the results of the extensive studies the NTIA should recommend to the FCC against approval of the license modification."***

Opposition to FCC Ruling on Ligado

The Defense Department opposes a license the Federal Communications Commission has granted to a private company, Ligado, to deploy a low-power nationwide mobile broadband network. Here's why:

GPS disruptions caused by Ligado interference could have global ramifications to U.S. national security, commercial and civil sectors, the economy, and those who rely on this service in their everyday lives.

There are too many unknowns, and the risks are too great, to allow the proposed Ligado system to proceed. We risk lives and the security of the nation if GPS is interrupted for any amount of time.

There is no need to put GPS at risk. Mid-band spectrum for 5G exists, and DOD is working with industry on a dynamic spectrum sharing framework. Ligado's proposal is unnecessary.

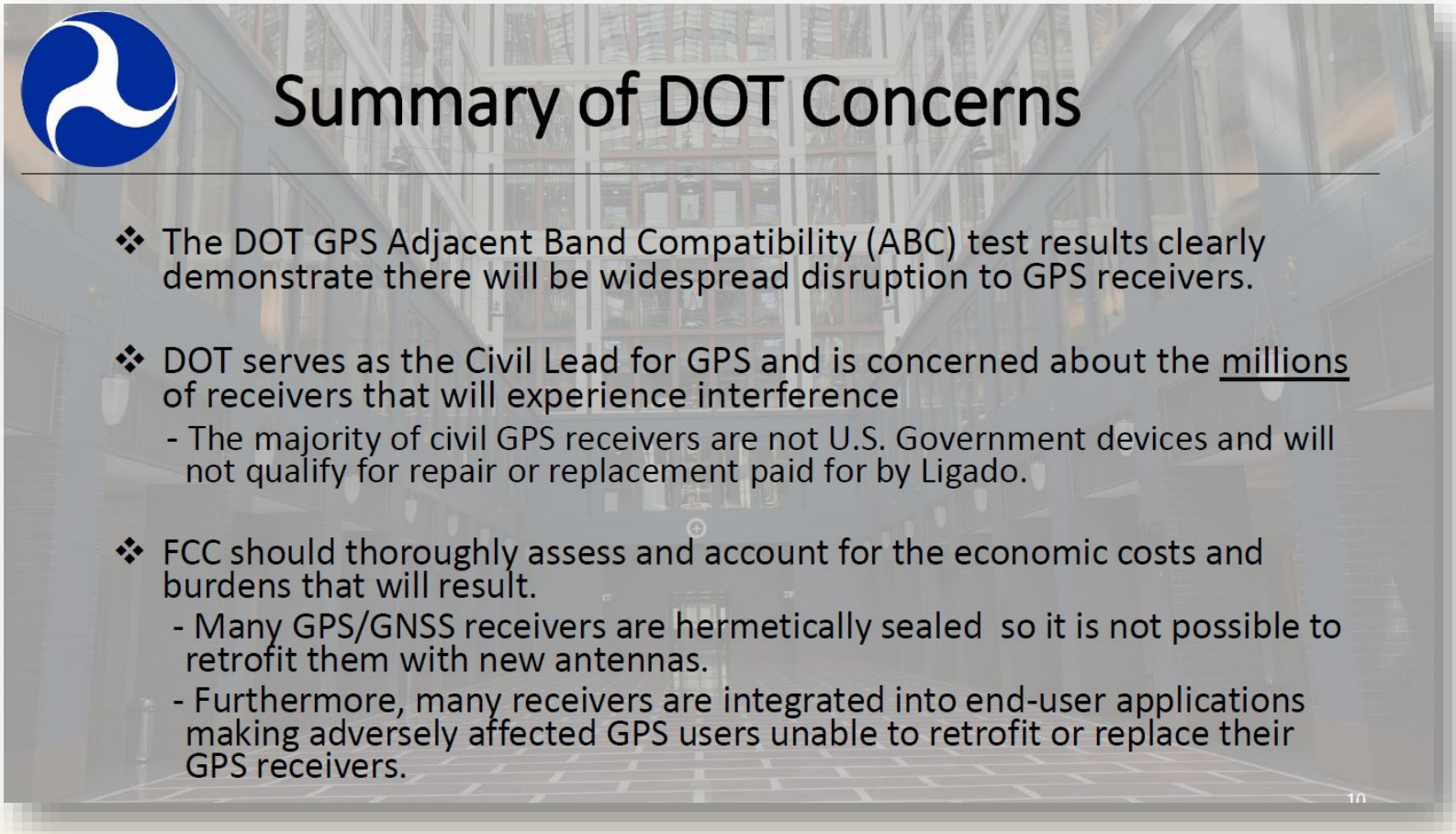
Ligado's proposed network lacks the bandwidth, power or global ecosystem to deliver robust 5G services. The only beneficiaries are Ligado shareholders.

"The Global Positioning System signal and service need to be protected based on the importance of GPS to national security, civil services and the economic benefits to the nation."

— Defense Secretary Dr. Mark T. Esper

Opposition to FCC Ruling on Ligado

- **DOT opposed the FCC decision to allow Ligado to deploy a nation-wide mobile broadband network and has multiple concerns:**



Opposition to FCC Ruling on Ligado

Statement from the Department of Homeland Security on Ligado

Release Date: April 21, 2020

"The Department of Homeland Security recommended the FCC deny the Ligado license and remains concerned that an approval creates a high degree of uncertainty for our public and private sector partners, many of whom- along with the Departments of Homeland Security, Defense and Transportation, rely on precise and uninterrupted Positioning, Navigation and Timing (PNT) data from the Global Positioning System (GPS) to ensure the security and resilience of their infrastructure. Our critical infrastructure partners across the public and private sectors have similar dependence on PNT and GPS for the security and resilience of their operations.

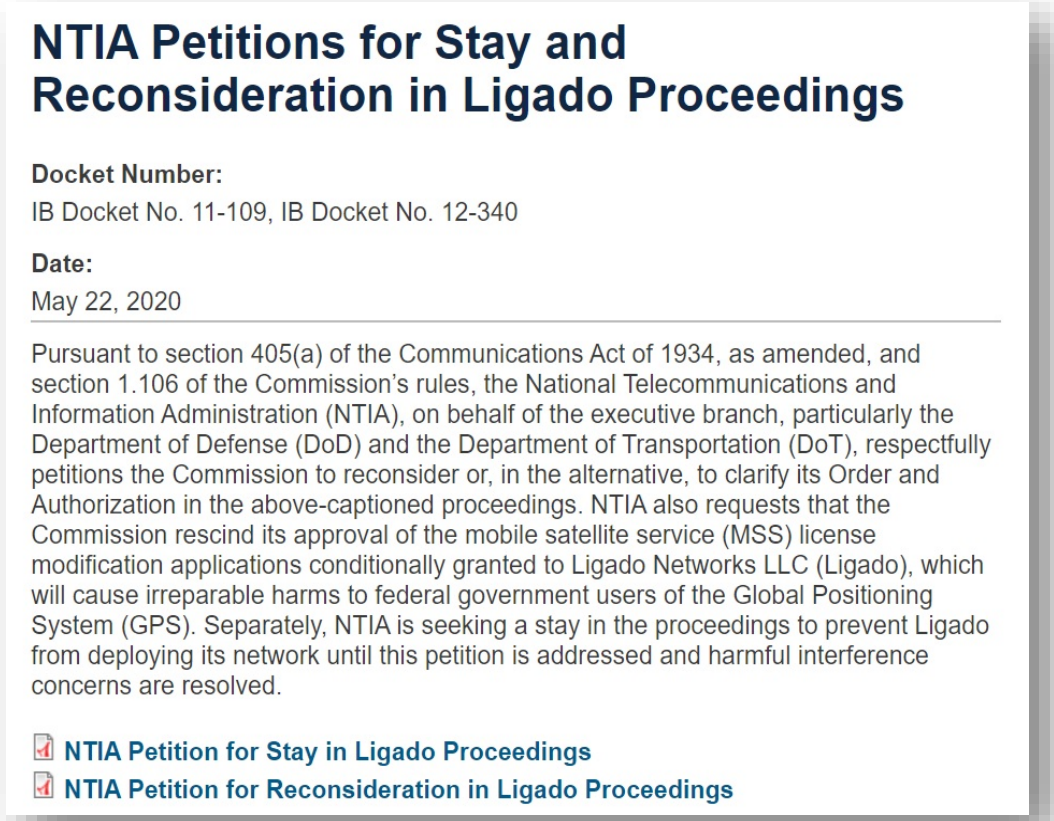
If the FCC moves forward with its proposed action on Ligado, we will work with our partners to ensure procedures are in place to identify interference with GPS and rapidly implement mitigation measures while supporting the domestic deployment of 5G.

DHS will continue to work to manage risk to GPS receivers and promote the responsible use of PNT, in accordance with the President's Executive Order"

Opposition to FCC Ruling on Ligado

On behalf of the Executive Branch, the NTIA petitioned the Federal Communications Commission (FCC) :

- The petition asks the FCC to rescind the grant, or to reconsider and modify the conditions it imposed on the grant in a number of critical respects. NTIA also petitioned the FCC to stay the effective date of the Order and Authorization while it considers NTIA's reconsideration request.
- NTIA previously transmitted filings on behalf of the Executive Branch in December 2019 and April 2020 opposing the applications filed by Ligado to modify its licenses.



NTIA Petitions for Stay and Reconsideration in Ligado Proceedings

Docket Number:

IB Docket No. 11-109, IB Docket No. 12-340

Date:

May 22, 2020

Pursuant to section 405(a) of the Communications Act of 1934, as amended, and section 1.106 of the Commission's rules, the National Telecommunications and Information Administration (NTIA), on behalf of the executive branch, particularly the Department of Defense (DoD) and the Department of Transportation (DoT), respectfully petitions the Commission to reconsider or, in the alternative, to clarify its Order and Authorization in the above-captioned proceedings. NTIA also requests that the Commission rescind its approval of the mobile satellite service (MSS) license modification applications conditionally granted to Ligado Networks LLC (Ligado), which will cause irreparable harms to federal government users of the Global Positioning System (GPS). Separately, NTIA is seeking a stay in the proceedings to prevent Ligado from deploying its network until this petition is addressed and harmful interference concerns are resolved.

NTIA Petition for Stay in Ligado Proceedings

NTIA Petition for Reconsideration in Ligado Proceedings

You can find the documents on GPS.gov

U.S. Policy

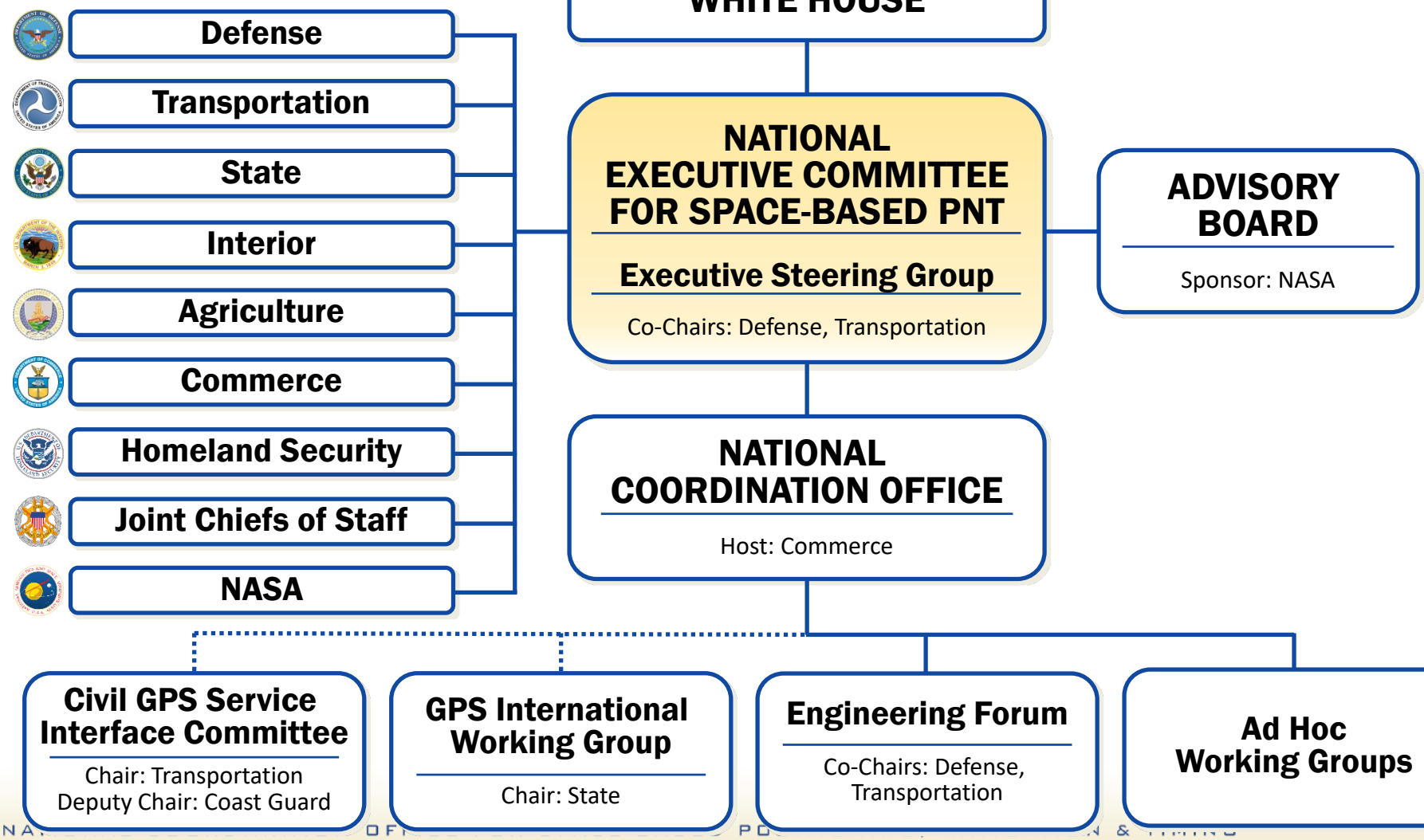
The U.S. must maintain its leadership in the service, provision, and use of Global Navigation Satellite Systems (GNSS)

- Continuous, worldwide, free of direct user fees
- Encourage compatibility and interoperability with foreign GNSS services and promote transparency in civil service provisioning
- Operate and maintain constellation to satisfy civil and national security needs
  - Foreign PNT services may be used to augment and strengthen the resiliency of GPS
- Invest in domestic capabilities and support international activities to detect, mitigate and increase resiliency to harmful interference

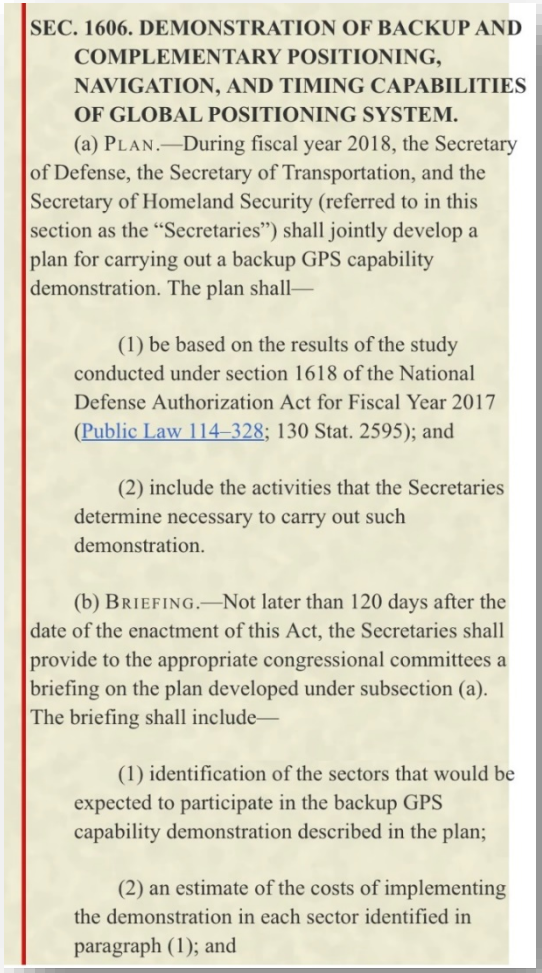
U.S. Policy

- NSPD-39, the Space-Based Positioning, Navigation, and Timing Policy from 2004, is in the process of being updated
- Space Policy Directive–X is currently in draft by the White House

National Space-Based PNT Organization



Demonstration of Backup and Complementary PNT



SEC. 1606. DEMONSTRATION OF BACKUP AND COMPLEMENTARY POSITIONING, NAVIGATION, AND TIMING CAPABILITIES OF GLOBAL POSITIONING SYSTEM.

(a) PLAN.—During fiscal year 2018, the Secretary of Defense, the Secretary of Transportation, and the Secretary of Homeland Security (referred to in this section as the "Secretaries") shall jointly develop a plan for carrying out a backup GPS capability demonstration. The plan shall—

(1) be based on the results of the study conducted under section 1618 of the National Defense Authorization Act for Fiscal Year 2017 (Public Law 114–328; 130 Stat. 2595); and

(2) include the activities that the Secretaries determine necessary to carry out such demonstration.

(b) BRIEFING.—Not later than 120 days after the date of the enactment of this Act, the Secretaries shall provide to the appropriate congressional committees a briefing on the plan developed under subsection (a). The briefing shall include—

(1) identification of the sectors that would be expected to participate in the backup GPS capability demonstration described in the plan;

(2) an estimate of the costs of implementing the demonstration in each sector identified in paragraph (1); and

- Section 1606 requires, during FY 2018, the Secretary of Defense, the Secretary of Transportation, and the Secretary of Homeland Security to jointly develop a plan for carrying out a backup GPS capability demonstration for the Global Positioning System.

- This section further states that, subject to the availability of appropriations, the Secretaries are required to jointly initiate the backup GPS capability demonstration and the Secretaries are required to submit a report on the demonstration.

Executive Order 13905: Strengthening National Resilience through Responsible Use of PNT Services

- On February 12, 2020, the President signed an Executive Order on Strengthening National Resilience through Responsible Use of Positioning, Navigation, and Timing (PNT) Services.

- The order seeks to strengthen national resilience by identifying and promoting the responsible use of PNT services by the Federal Government and critical infrastructure owners and operators.

EXECUTIVE ORDERS

Executive Order on Strengthening National Resilience through Responsible Use of Positioning, Navigation, and Timing Services

INFRASTRUCTURE & TECHNOLOGY

Issued on: February 12, 2020

ALL NEWS

By the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered as follows:

Section 1. Purpose. The national and economic security of the United States depends on the reliable and efficient functioning of critical

The Airwaves Are Not Safe

- Computers and the Internet: Once Upon a Time…
  - A GPS receiver is more computer than radio…
- GPS relies on spectrum – no longer a safe haven
- 900 Million U.S. GPS enabled devices require Cybersecurity
- U.S. Policy directs PNT resiliency (NSPD-39, PPD-4, PPD-21, EO 13800, National Cyber Strategy)
- SPD-5, Cybersecurity Principles for Space Systems is issued Sept 4, 2020

"Known but unmitigated vulnerabilities are among the highest cybersecurity risks…"

(EO 13800: Strengthening the Cybersecurity of Federal Networks and Critical Infrastructure)

What Can You Do Now?

- CIOs: Include GPS enabled devices in Cybersecurity plans
- Be a demanding customer - toughen GPS devices:
  - Incorporate valid range checking and other elements of latest GPS Interface Specification (IS-GPS-200K *)
  - Incorporate DHS Best Practices (*Improving the Operation and Development of Global Positioning System (GPS) Equipment Used by Critical Infrastructure, Jan 2017 *)*

* Documents available on www.gps.gov

Protect GPS and Critical Infrastructure that Relies on GPS

Thank You

Stay in touch: www.gps.gov

Contact Information:

National Coordination Office for Space-Based PNT

1401 Constitution Ave, NW – Room 62028

Washington, DC 20230

Phone: (202) 482-5809

www.gps.gov

GPS: Accessible, Accurate, Interoperable