



SPACE-BASED POSITIONING  
NAVIGATION & TIMING

NATIONAL COORDINATION OFFICE

# *U.S. Space-Based Positioning, Navigation and Timing (PNT) Policy Update*

*61st Meeting of the Civil GPS Service Interface Committee  
21 September 2021*

Harold W. Martin III  
Director  
National Coordination Office



# Overview



- **National Space-Based PNT Organization**
- **U.S. Policy**
  - SPD-7
  - National Space Policy
  - EO-13905
  - SPD-5
- **GPS Spectrum Protection**

# National Space-Based PNT Organization



- Defense
- Transportation
- State
- Treasury
- Justice
- Interior
- Agriculture
- Commerce
- Energy
- Homeland Security
- ODNI
- Joint Chiefs of Staff
- NASA

**WHITE HOUSE**  
National Security Council / National Space Council /  
Office of Science and Technology Policy

**NATIONAL EXECUTIVE COMMITTEE FOR SPACE-BASED PNT**  
Executive Steering Group  
Co-Chairs: Defense, Transportation

**ADVISORY BOARD**  
Sponsor: NASA

**NATIONAL COORDINATION OFFICE**  
Host: Commerce

**Civil GPS Service Interface Committee**  
Chair: Transportation  
Deputy Chair: Coast Guard

**GPS International Working Group**  
Chair: State

**Engineering Forum**  
Co-Chairs: Defense, Transportation

**Ad Hoc Working Groups**

# Space Policy Directive 7 (SPD-7) of 15 January 2021



**Updates and replaces U.S. Space-Based PNT Policy of  
2004**

- **Increased focus on protecting GPS and denying hostile use**
- **Incorporated principles of Responsible Use of GPS**
- **New direction on adding cybersecurity protections for GPS and federal user equipment**
- **Expanded EXCOM Membership**
  - **Added Departments of Treasury, Justice, and Energy**
- **New direction to protect the GPS spectrum environment**



# U.S. Policy



The goal of [SPD-7] is to maintain United States leadership in the service provision, and responsible use of, global navigation satellite systems (GNSS), including GPS and foreign systems.

- Continuous, worldwide, free of direct user fees
- Encourage compatibility and interoperability with like-minded nations, promote transparency in civil service provisioning and enable market access for United States industry
- Operate and maintain constellation to satisfy civil and national security needs and equip and train for the responsible use of GPS
  - Foreign PNT services may augment and strengthen the resiliency of GPS; however, the US Government does not assure the reliability or authenticity of foreign PNT services
- Invest in domestic capabilities and support international activities to detect, mitigate and increase resiliency to harmful interference
- Improve the cybersecurity of GPS, its augmentations, and United States Government-owned GPS-enabled devices, and foster private sector adoption of cyber-secure GPS enabled systems



# SPD-7 Changes to Agency Responsibilities



- ***State***
  - New mention of cooperation with DoD in relations with Allies
- ***Defense***
  - Direction to work with DOT to maintain “safety-of-life backwards compatibility commitments”
  - Direction to provide cost estimates to the GPS program based on DOT’s strategy and future requirements to implement GPS data and signal authentication.
  - New mention of existing role as lead for International Spectrum Coordination
- ***Commerce***
  - Direction to Invest in R&D for enhancing commercial services
  - Direction to develop cybersecurity resilience guidelines



# SPD-7 Changes to Agency Responsibilities



- ***Transportation***

- Direction to ensure the earliest availability of modernized civil signals
- New direction to implement Federal and facilitate State, local and commercial capabilities to monitor, identify, locate, and attribute space-based PNT service disruption and manipulations within the U.S.
- Direction to develop international signal monitoring standards
- New caution on the use of foreign GNSS
- New direction to pursue data and signal authentication

- ***Homeland Security***

- Added reference to E013905 on Responsible Use of PNT
- Direction to develop procedures for notification of disrupted and/or unreliable PNT
- Direction to assist DOT in implementing data and signal authentication

# National Space Policy

## 9 December 2020



**The U.S. must maintain its leadership in the service, provision, and responsible use of global navigation satellite systems (GNSS)**

- **Provide continuous worldwide access for peaceful civil uses free of direct user fees;**
- **Engage with international GNSS providers to ensure compatibility, encourage interoperability with like-minded nations, promote transparency in civil service provision, and enable market access for United States industry;**
- **Operate and maintain the GPS constellation to satisfy civil and national security needs,**
- **Improve the cybersecurity of GPS, its augmentations, and federally-owned GPS enabled devices,**
- **Allow for the continued use of allied and other trusted international PNT services in conjunction with GPS**





# National Space Policy (cont.)



- **Invest in domestic capabilities and support international activities to detect, analyze, mitigate, and increase resilience to harmful interference to GNSS;**
- **Identify and promote, as appropriate, multiple and diverse complementary PNT systems or approaches for critical infrastructure and mission-essential functions; and**
- **Promote the responsible use of United States space-based PNT services and capabilities in civil and commercial sectors at the Federal, State, and local levels, including the utilization of multiple and diverse complementary PNT systems or approaches for national critical functions.**



# Executive Order 13905 of 12 February 2020



## *Strengthening National Resilience Through Responsible Use of Positioning, Navigation, and Timing Services*

**“Responsible use of PNT services” –**

**Means the deliberate, risk-informed use of PNT services, including their acquisition, integration, and deployment, such that disruption or manipulation of PNT services minimally affects national security, the economy, public health, and the critical functions of the Federal Government.**



# Space Policy Directive 5 (SPD-5) of 4 September 2020

## *Establishing space cybersecurity policy, standards, and risk management practices*

**“...the United States considers unfettered freedom to operate in space vital to advancing the security, economic prosperity, and scientific knowledge of the Nation...Therefore, it is essential to protect space systems from cyber incidents in order to prevent disruptions to their ability to provide reliable and efficient contributions to the operations of the Nation’s critical infrastructure.”**



# Spectrum Protection: Opposition to FCC Ruling on Ligado

- **SPD-7 states, “The United States Government shall:… Protect the spectrum environment that is currently used by GPS and its augmentations.”**
- **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."**
- **Executive Branch (which is separate from FCC, an independent agency) concerns include that 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



- **DOD opposed the FCC ruling and shares their concerns in an online spotlight: Protecting America's Global Positioning System**

## GPS AT RISK

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.

<https://www.defense.gov/explore/spotlight/protecting-gps/>



# 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:



## Summary of DOT Concerns

- ❖ The DOT GPS Adjacent Band Compatibility (ABC) test results clearly demonstrate there will be widespread disruption to GPS receivers.
- ❖ DOT serves as the Civil Lead for GPS and is concerned about the millions of receivers that will experience interference
  - The majority of civil GPS receivers are not U.S. Government devices and will not qualify for repair or replacement paid for by Ligado.
- ❖ FCC should thoroughly assess and account for the economic costs and burdens that will result.
  - Many GPS/GNSS receivers are hermetically sealed so it is not possible to retrofit them with new antennas.
  - Furthermore, many receivers are integrated into end-user applications making adversely affected GPS users unable to retrofit or replace their GPS receivers.

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# Opposition to FCC Ruling on Ligado



UNITED STATES DEPARTMENT OF COMMERCE  
The Secretary of Commerce  
Washington, D.C. 20230

June 22, 2021

The Honorable James M. Inhofe  
Ranking Member  
Committee on Armed Services  
United States Senate  
Washington, DC 20510

Dear Senator Inhofe:

Thank you for your letter expressing support for efforts by the National Telecommunications and Information Administration (NTIA) on behalf of the Executive Branch to oppose the Federal Communications Commission's (FCC) approval last year of Ligado Network LLC's license modification applications for ancillary terrestrial service.

I write to assure you that there has been no change in the Department of Commerce's or NTIA's opposition to the FCC's Ligado Order. NTIA will continue its efforts on behalf of the Executive Branch to oppose it, including continuing to actively pursue its Petition for Reconsideration, which remains pending before the FCC. Congress – in the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (FY 2021 NDAA) – acted “in a bipartisan manner in its opposition to [the FCC's] decision.” The FY 2021 NDAA directs the Department of Defense to enter into an agreement with the National Academies of Sciences to conduct an independent technical review of the Ligado Order and submit a report to the Armed Services Committee this year. NTIA stands ready to support the Department of Defense with this review.

As you may be aware, President Biden has advised the heads of all Executive Departments and Agencies to make evidence-based policy decisions guided by the best available science and data. You can be confident that I am committed to President Biden's guidance and will adhere to it in addressing this particular matter.

I appreciate your viewpoint and look forward to working with you on this and other important matters. Should you have any questions, please contact Christopher Day, Acting Assistant Secretary for Legislative and Intergovernmental Affairs, at 202-230-0470 or cday@doc.gov.

Sincerely,

Gina M. Raimondo

- On June 22, 2021, the Secretary of Commerce sent a letter in response to Senator Inhofe's letter, stating that there was “no change” in the Department of Commerce or NTIA opposition to the FCC's Ligado order... “including continuing to actively pursue it's Petition for Reconsideration”
- *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.*

The full letter can be found at [GPS.gov](https://gps.gov)

## Opposition to FCC Ruling Continues



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A global public service brought to you by the U.S. government

INFORMATION FOR THE GENERAL PUBLIC

### How to Correct Your Address in GPS Devices, Apps, & Online Maps



Do GPS devices show your home or business in the wrong place? The problem is not GPS! It's the mapping software.

[Report your issue to the software providers](#)

#### Common Questions ➔

- NEW Is the COVID-19 outbreak affecting GPS operations?
- How do I add or correct my address in GPS devices, apps, and maps?
- What can I do about trucks driving through my neighborhood?
- How do I report GPS service outages?
- Can GPS help me find my lost phone?
- How does GPS work?
- How accurate is GPS?
- How vulnerable is GPS to malicious jamming?

FOR GPS PROFESSIONALS

### What's HOT for Pros

- [Ligado Networks and GPS](#)
  - [FCC order denying motion for stay](#)
- [U.S. Space-Based PNT Policy of 2021](#)
- [National Space Policy of 2020](#)
- DOT reports to Congress:
  - [National Timing Resilience and Security Act](#)
  - [Complementary PNT and GPS backup tech demo](#)
- [Technical documentation](#)
  - [Interface specifications](#)
  - [SPS performance standard](#)
  - [Civil monitoring performance specification](#)
- [Recent presentations](#)
- [Funding & legislation](#)
  - [Final FY 2021 appropriations and NDAA provisions](#)

#### News Items ➔

- [Jan 19: FCC denies petition to stay Ligado order and authorization](#)
- [Jan 15: New U.S. space-based PNT policy released](#)
- [Jan 15: DOT report to Congress on National Timing Resilience and](#)