Office of the Assistant Secretary for Technology and Research (OST-R)

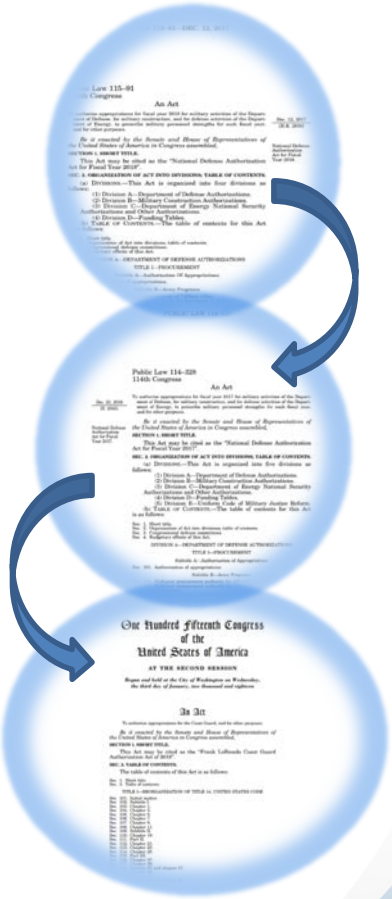
Ensuring Safety for all Modes of Transportation & Civil PNT

Space-Based PNT Advisory Board Meeting

June 6, 2019

Congressional Motivation on GPS Backup

- Sequential Legislation on GPS Backup/Complementary PNT Service
  - Needs Established for PNT: **FY17 NDAA**
  - Demonstrate PNT Technologies: **FY18 NDAA**
  - Procure Alternative [to GPS] Timing System: **National Timing Resilience and Security Act of 2018**
- FY17 & FY18 NDAA joint responsibility for DOT/DOD/DHS
- Joint DOT/DOD/DHS Congressional briefing on NDAA coordination (Nov 2018)
- DOT/OST-R/Volpe Center funded for demonstration (Dec 2018)
- National Timing Resilience and Security Act Assigns Procurement to DOT

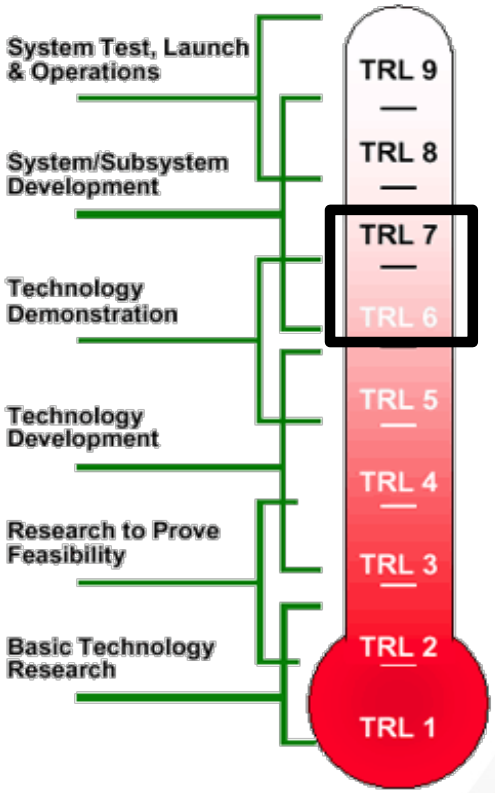


GPS Backup Demonstration Elements

- GPS Backup/Complementary PNT Demonstration
  - $10M appropriated in FY'18 NDAA to carry out GPS backup demonstration
  - Industry roundtables held at DOT in March & April
  - RFI released by DOT May 3, 2019 (30 Day Response)
    - 21 Responses Received

- Scope for GPS Backup Demonstration
  - Technical Readiness Level (TRL) > 6
  - Scenario based demonstration plan
    - Static and dynamic platforms
    - Varied service areas and use-case durations
    - Timing, 2D & 3D positioning

- Demonstration Products
  - Scenarios exemplifying vendor capabilities
  - Report [coordination with DHS/DOD] to Congress



NASA Technology Readiness Level

Joint EU-US Transportation-Related Initiatives Under WG-C

- Modal efforts to gather information, e.g. pilot reporting, ADS-B (aviation) and AIS (maritime)
- Assessing SBAS authentication schemes and performance attributes for ICAO standards consideration
- Consideration on L5/E5 Demonstration(s)
  - Early use opportunities ahead of safety-of-life operations
  - Observing performance in the pre-op/IOC/FOC
- Rail Initiatives on Multi-Constellation
  - European effort to standardize train location, guidance, and control
  - US FRA Positive Train Location Report & Interoperable Train Control standard

International Committee on GNSS

GNSS Monitoring Development

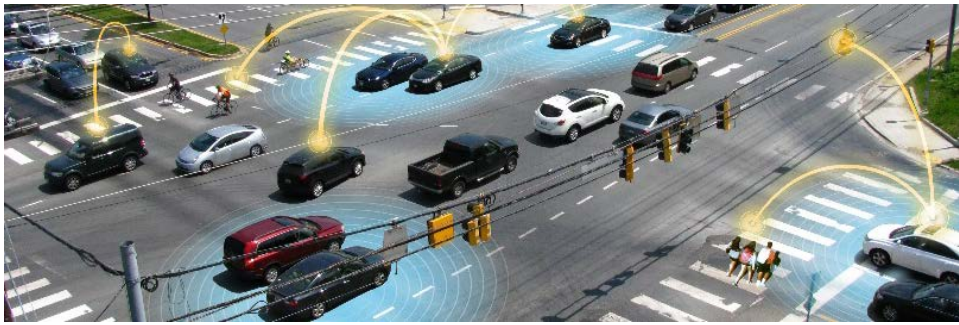
- Joint Project with the Five Service Providers and International GNSS Service (IGS)
- Task Force Bi-Annual Meetings/Workshops
  - Coordinating definitions and methodologies
  - Scoped at modest list of four parameters (URE, UTCOE, PDOP, Orbit Error)
  - Each of the six entities contributing monitoring outputs for their respective and, where available, other GNSS signals

Coordination on Guidelines for GNSS Performance Standards

- Consensus Effort to Form a Guide to Performance Standards Documentation
- Template as a Living Document Held by Working Group S
- Describes Key and Optional Elements in a Standard

CONNECTIVITY AND SAFETY

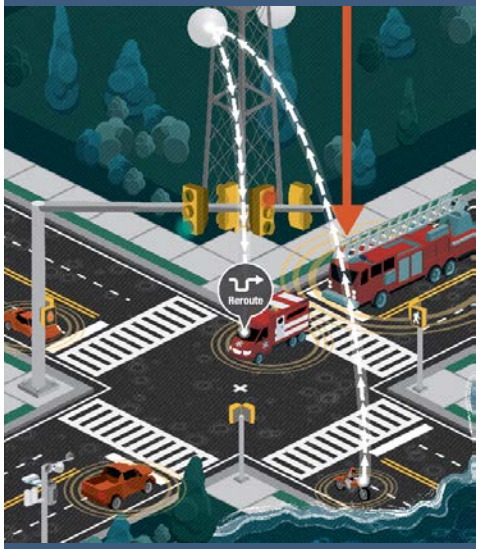
COLLISION AVOIDANCE



Pedestrian with Disability Crossing

Smart Intersections

Information and Routing Support for Emergency Responders



Motorcycle Safety

5.9 GHz Short Range Communications Supporting Transportation Safety

- Roadway Applications:
  - Collision Avoidance
    - Vehicles (V2V), Pedestrians (V2P), Everything (V2X)
  - Signal Phase and Timing

- Commercial Vehicles
  - Trucking
  - Transit

- Railroads
  - Grade Crossing warnings
  - Vehicle to Train Communications

- Use of 5.9 GHz Band Technology Neutral (DSRC, CV2X, or Other)

Questions?