

Perspectives on Positioning, Navigation, and Timing and Information Sharing

Munich Satellite Navigation Summit

**Civil GPS Service Interface Committee
International Information Subcommittee**

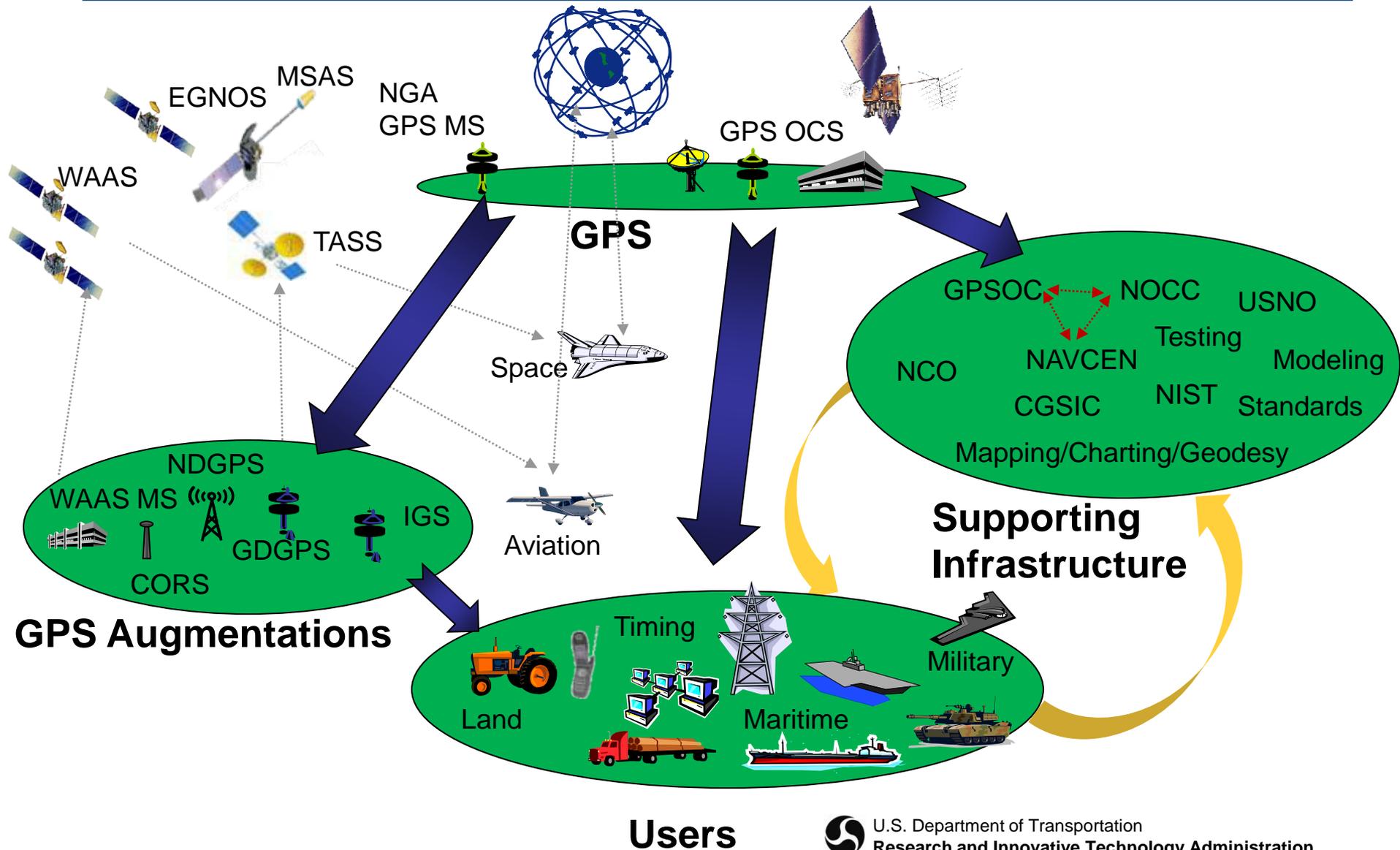
Karen Van Dyke

March 3, 2011

Overview

- Theme of CGSIC Session: GNSS Feedback Loop
- Challenges in Information Dissemination
- Focus for the Future

GPS Feedback Loop

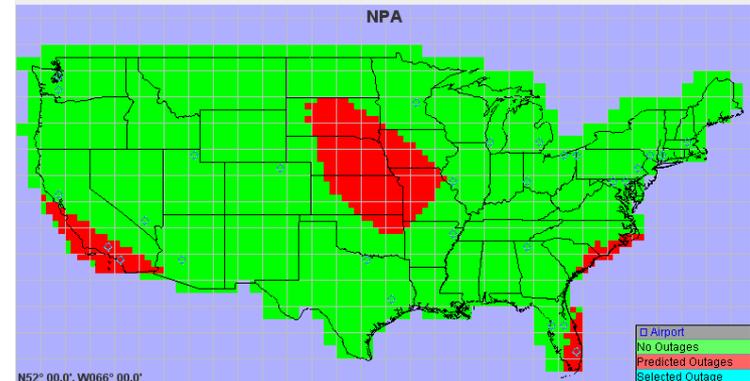


Users

Service Provider Information

GPS

- ICDs /Interface Specifications
- Almanacs
- NANUs/NOTAMs
- SV outages
- Interference Reports
- Testing



Summaries		
Phase-of-flight	With Baro-Aiding	Without Baro-Aiding
En Route		
Terminal		
NPA*		

Emphasis on “service interface” – interpret what the GPS service provider information means to the end user

Many GPS Users – How Many are “In the Loop”?



Satellite Operations



Surveying & Mapping



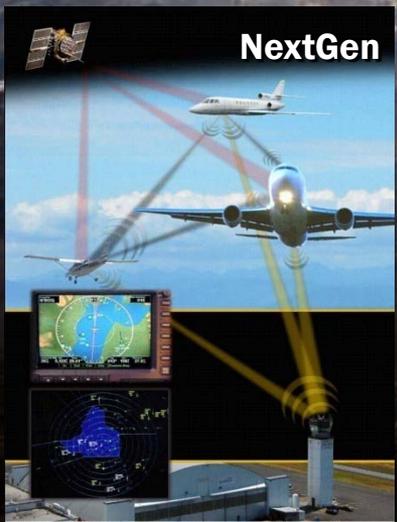
Power Grids



Precision Agriculture



Transit Operations



NextGen



Trucking & Shipping



Intelligent Transportation Systems



TeleComm



Disease Control



Personal Navigation



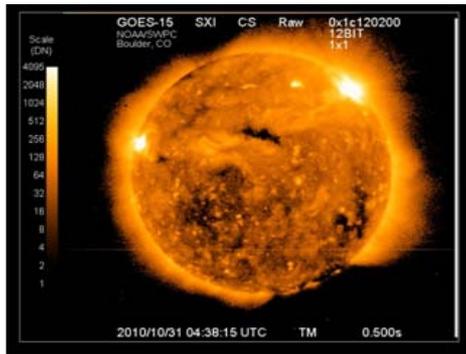
Oil Exploration



Fishing & Boating

GPS Challenged Environments

Ionospheric Disturbances



Underground/Indoors



Dense Canopy



Urban Environment



Inaccurate/Out-of-Date Maps



Electromagnetic Disturbances



Easy to Purchase GPS Jamming Devices

- Growing market for low-cost GPS jammers
 - Concern over being tracked using GPS, particularly among those driving a company or fleet vehicle
- Many devices are battery-operated or can be plugged into a cigarette lighter
- Sold as “privacy protectors”



\$99



\$99



\$320



\$129



\$145



\$30



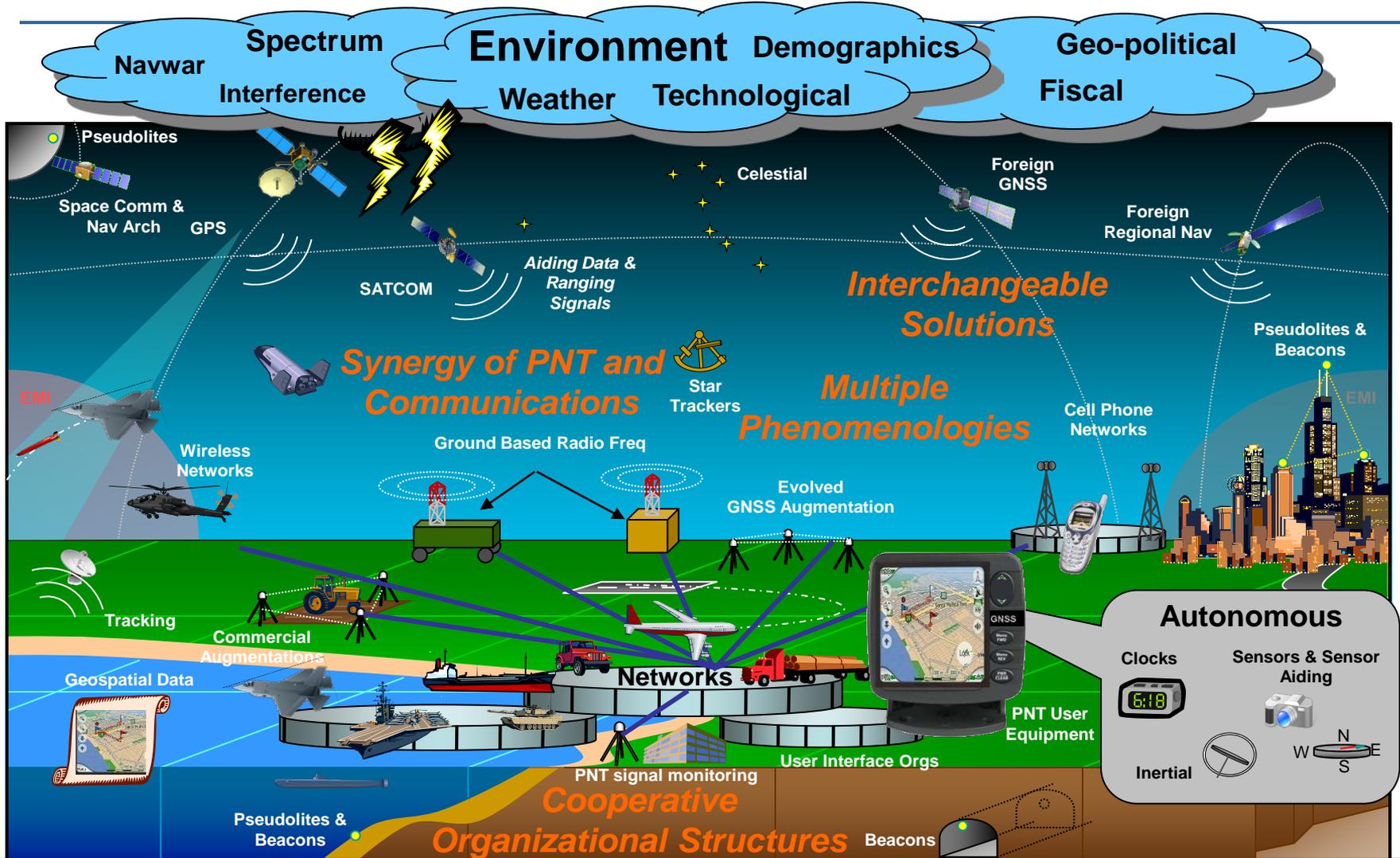
\$430



\$79



PNT Architecture Graphic (2025)



Standards	Reference Frames	Cryptography	Science & Technology	USNO	NIST	NGA	NGS
Star Catalogs	Launch	ENABLERS & INFRASTRUCTURE		NSA	Industrial Base		
Electro Optical Info.	Modeling	Mapping/Charting/Geodesy	Laser Ranging Network		Policies	Testing	

DOT/RITA PNT Collaboration Website

www.transportationresearch.gov

Launched at January 2011 Transportation Research Board Meeting

PNT is one of 14 Research Clusters

Focus is on PNT Capability Gaps

User Audience:

- Open to the public - emphasis on Research Centers and Universities
- Users may request sign-on privileges to upload documents and to join in on discussions

The screenshot displays the RITA PNT Collaboration Website interface. At the top, the RITA logo and "U.S. Department of Transportation Research and Innovative Technology Administration" are visible. The main content area is divided into several sections:

- What is PNT?**: A section explaining Positioning, Navigation, and Timing (PNT) and listing technologies like Space Based (GPS, GLONASS), Terrestrial (VOR, DME), and Autonomous navigation systems.
- People Sharing Research**: A section with sub-sections for "Challenges & Capability Gaps" (listing Physical Impediments, Electromagnetically Impeded Environments, High Accuracy with Integrity, and Timely Notification of Missing Information) and "National PNT Architecture" (discussing National PNT Architecture and the resulting Implementation Plan).
- Shared Research**: A table listing research items with columns for Type, Name, Date Addressed, and Published/Current Date.
- Documents of Interest**: A section for sharing documents, currently showing no items.
- Discussion Board**: A section for user questions and answers, currently showing no items.
- Activities, Publications, and Products**: A calendar of events including the International Committee on Global Navigation Satellite Systems (ICG) Workshop on GNSS Capabilities, International Interdisciplinary COGATA Workshop on Risk Models and Applications, and the 3rd Royal Institute of Navigation (RIN) GNSS Vulnerabilities and Solutions Conference.
- Public releases at PNT.gov**: A list of recent press releases and presentations.
- Publications and Products**: Links to the RITA PNT Website and Space-Based PNT Coordination Office Website.
- Search the Web for PNT Resources**: A search bar with filters for System/Services, Augmentation System/Services, and Foreign System/Services.

The footer contains the RITA address (1200 New Jersey Avenue SE, Washington DC 20590) and accessibility information.

Summary

- Information Dissemination is a challenge when there isn't a means to interface with the user community already established
- Users will continue to expect the GPS/GNSS capability to work anywhere and everywhere
 - Including physically and electromagnetically impeded environments
 - Most will not know the difference between GPS, GNSS, Augmentation Systems, Terrestrial, and Autonomous PNT Sources
- Information Dissemination will become more challenging in a multi-constellation GNSS environment and integration with other PNT sources