



SPACE-BASED POSITIONING  
NAVIGATION & TIMING  
NATIONAL COORDINATION OFFICE

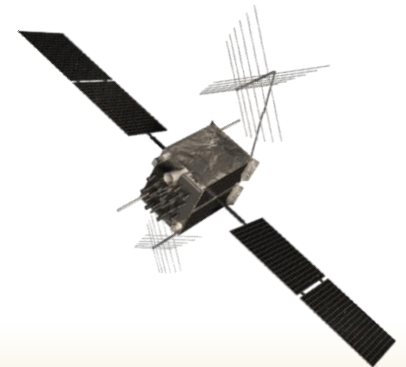
# Space-Based PNT

*Economy Update: USA*

**Anthony J. Russo**  
Director, National Coordination Office

**Asia-Pacific Economic Conference**

**June 15th, 2011**





# U.S. Policy History

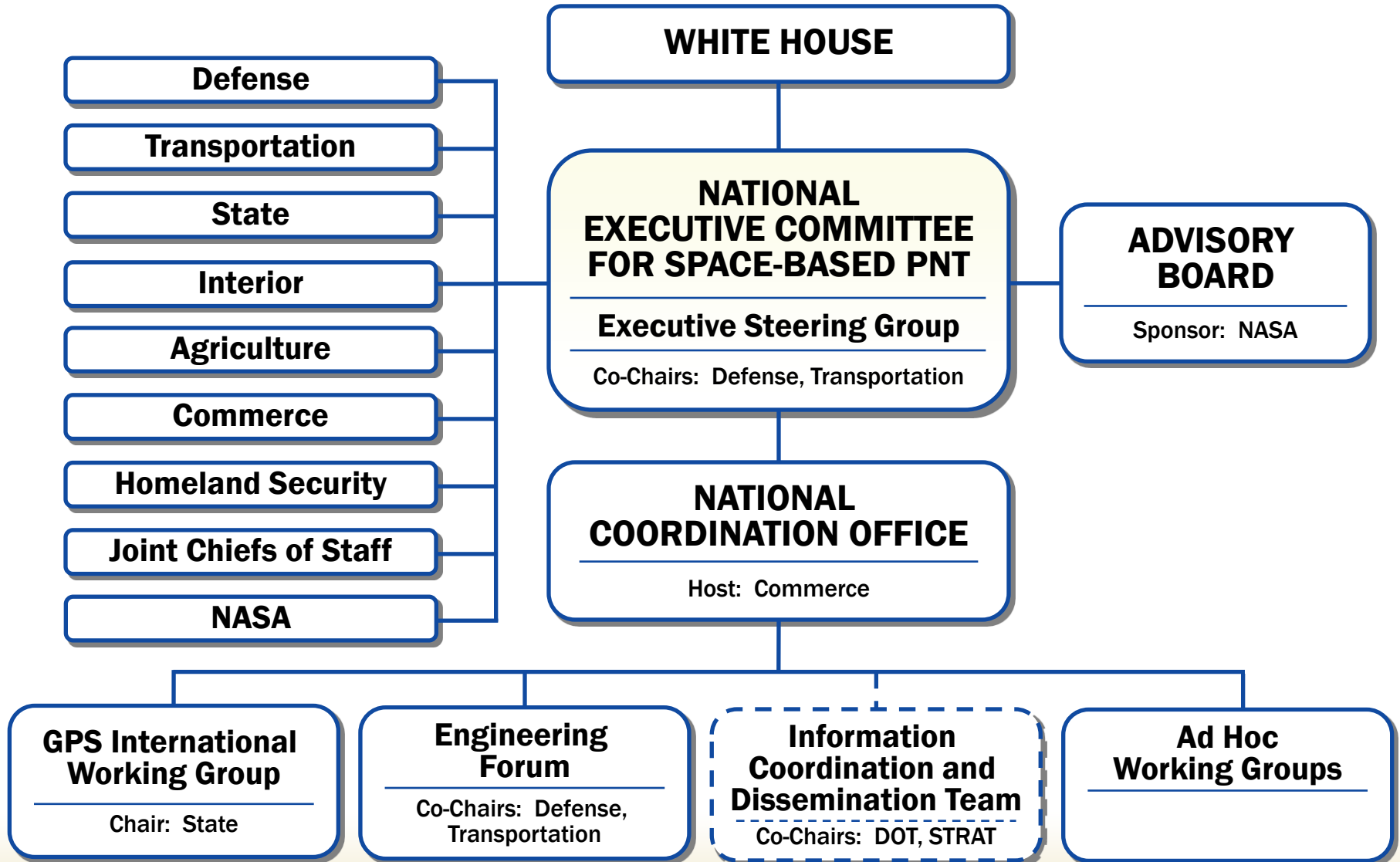


- **1983:** President announces civilian access to GPS following loss of KAL 007
- **1991:** U.S. offers free civil GPS service to the International Community
- **1996:** First U.S. GPS Policy establishes joint civil/military management
- **1997:** U.S. law provides civil GPS access free of direct user fees
- **2000:** President ends use of *Selective Availability*
- **2004:** President issues U.S. Policy on Space-Based PNT
- **2004:** Agreement signed on GPS-Galileo Cooperation
- **2007:** President announces *Selective Availability* eliminated from future GPS III satellites
- **2010:** New National Space Policy provides high-level PNT guidance





# U.S. Space-Based PNT Organizational Structure



# President Obama's Space Policy

## June 2010



- Provide continuous worldwide access for peaceful uses, free of direct user charges
- Encourage compatibility and interoperability with foreign GNSS services
- Operate and maintain constellation to satisfy civil and national security needs
  - *Foreign PNT may be used to strengthen resiliency*
- Invest in domestic capabilities and support international activities to detect, mitigate and increase resiliency to harmful interference



# GPS Constellation Status



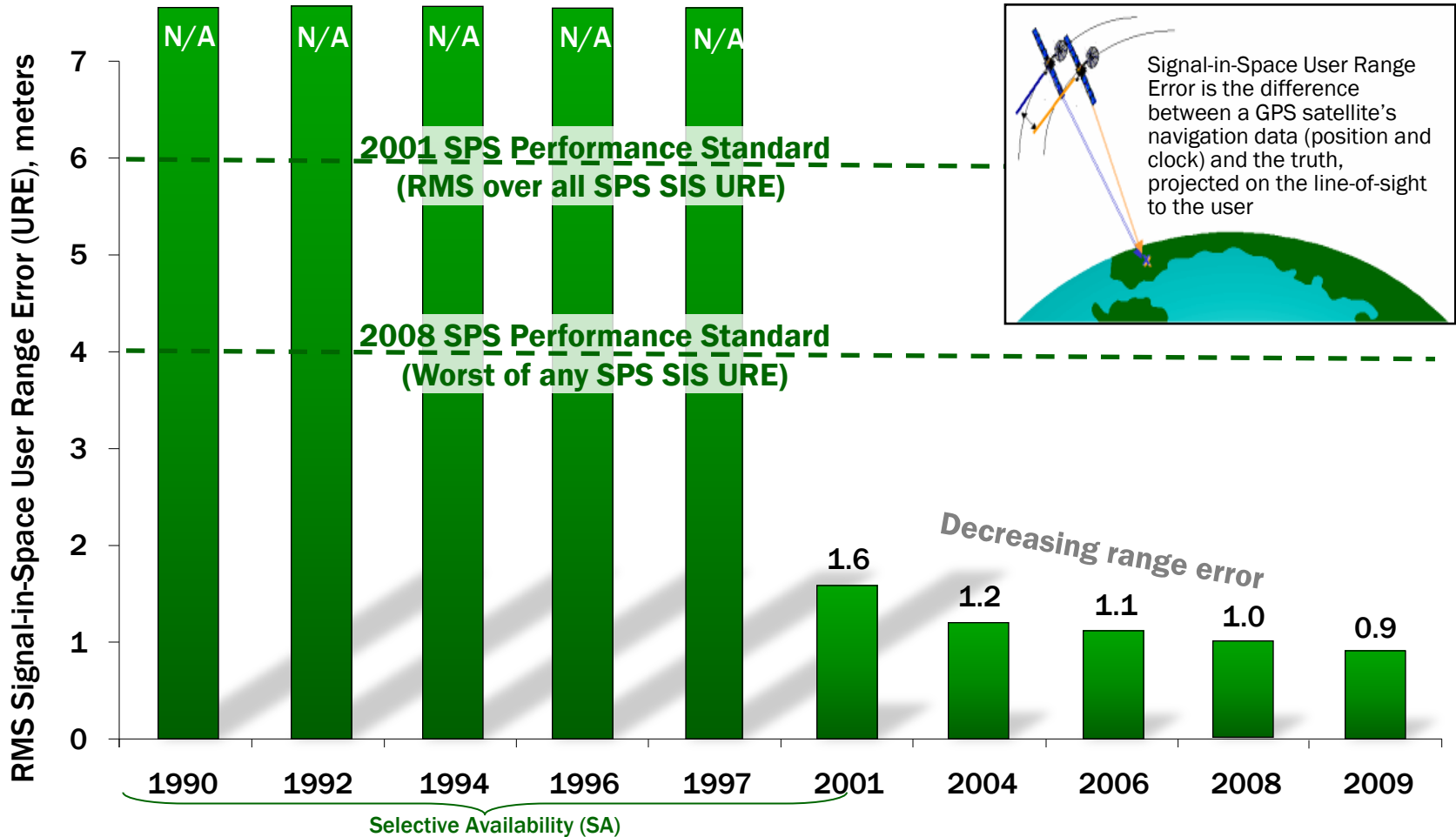
## **30 Operational Satellites** **(Baseline Constellation: Expandable 24)**

- **10 Block IIA**
- **12 Block IIR**
- **7 Block IIR-M**
  - Transmitting new second civil signal
- **IIF-1 launched May 27th, 2010**
  - First of 12 Boeing satellites
  - 2<sup>nd</sup> IIF to launch July 2011
- **4 additional satellites in residual status**
- **Global GPS civil service performance commitment met continuously since December 1993**





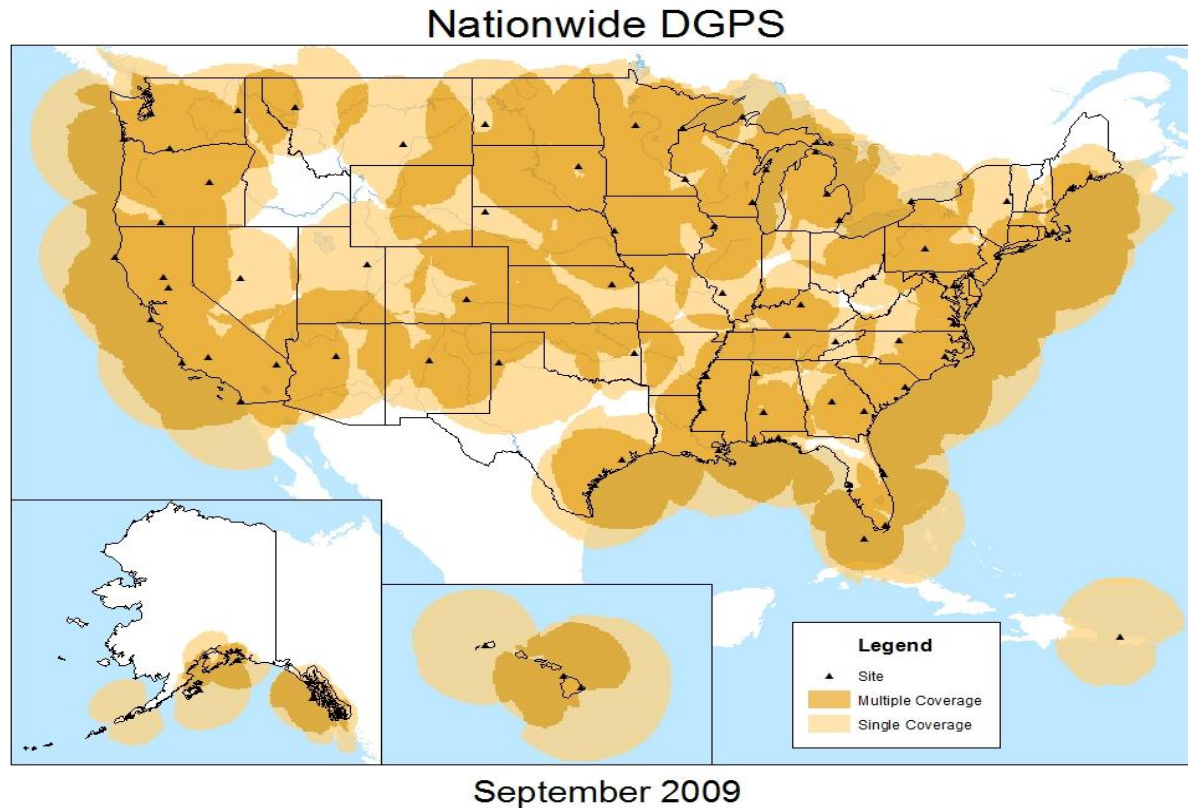
# SPS Signal in Space Performance



**System accuracy exceeds published standard**



# Nationwide Differential GPS



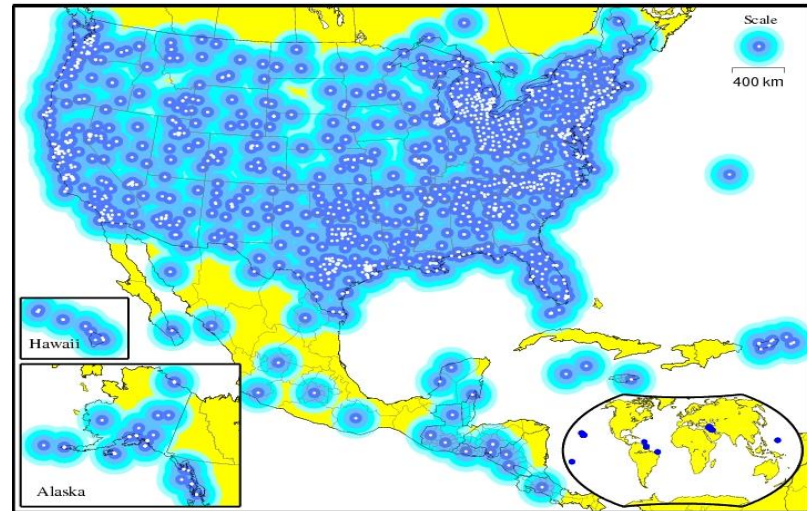
- Expansion of maritime differential GPS (DGPS) network to cover terrestrial United States
- Built to international standard adopted in 50+ countries



# National Continuously Operating Reference Stations (CORS)



- Enables highly accurate, 3-D positioning
  - Centimeter-level accuracy
  - Tied to National Spatial Reference System
- 1,300+ sites operated by 200+ public, private, academic organizations



- NOAA's Online Positioning User Service (OPUS) automatically processes coordinates submitted via the web from around the world
- OPUS-RS (Rapid Static) declared operational in 2007
- NOAA considering support for real-time networks

# GNSS is Essential to Our Economies



**Satellite  
Operation**



**Surveying &  
Mapping**



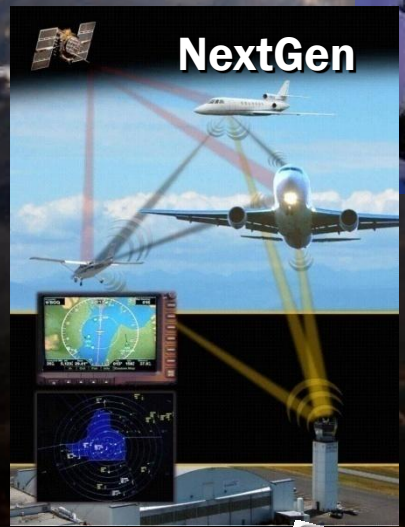
**Power  
Grids**



**Precision Agriculture**



**Transit  
Operations**



**NextGen**



**Trucking &  
Shipping**



**Intelligent Vehicles**



**Telecom**



**Navigation**



**Disease Control**



**Oil Exploration**



**Fishing & Boating**



# Summary



- **GPS performance is better than ever and will continue to improve**
  - Augmentations enable even higher performance
  - New civil GPS signal available now
  - Innovative applications continue to emerge
- **U.S. policy encourages worldwide use of civil GPS and augmentations**
  - Permits U.S use of foreign PNT to increase resiliency
- **International cooperation is a priority**
  - Compatibility and interoperability are critical



# For Additional Information...



[GPS.gov](http://GPS.gov)

[PNT.gov](http://PNT.gov)



# Contact Information



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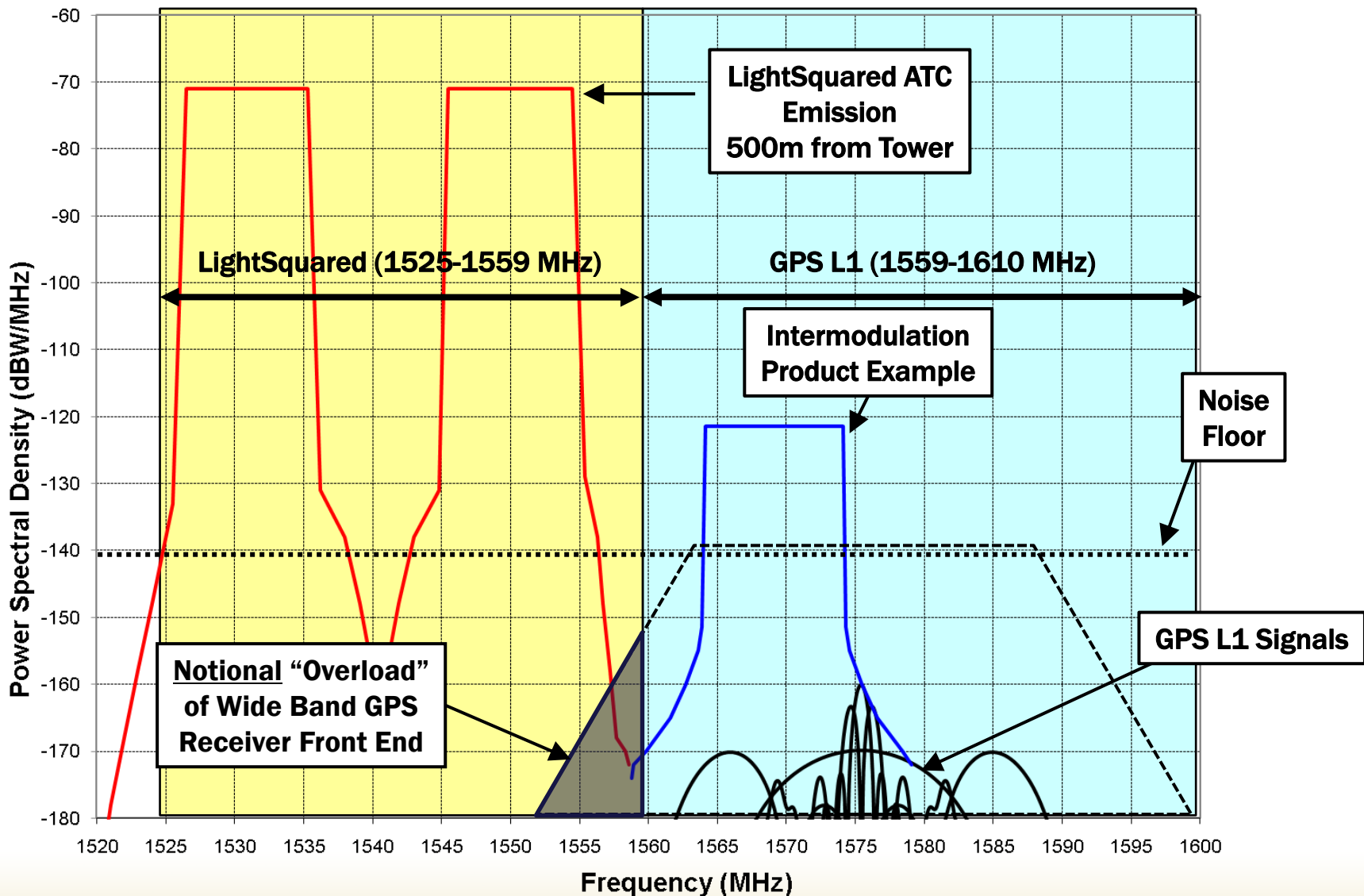
LIGHTSQUARED



- 4G Wireless Broadband Network
- 40,000+ towers; 15 kW
- Continental U.S.
- Initial Deployment 2011
- Wholesale commercial ops 2012



# LightSquared ATC Mask & GPS L1 Signals

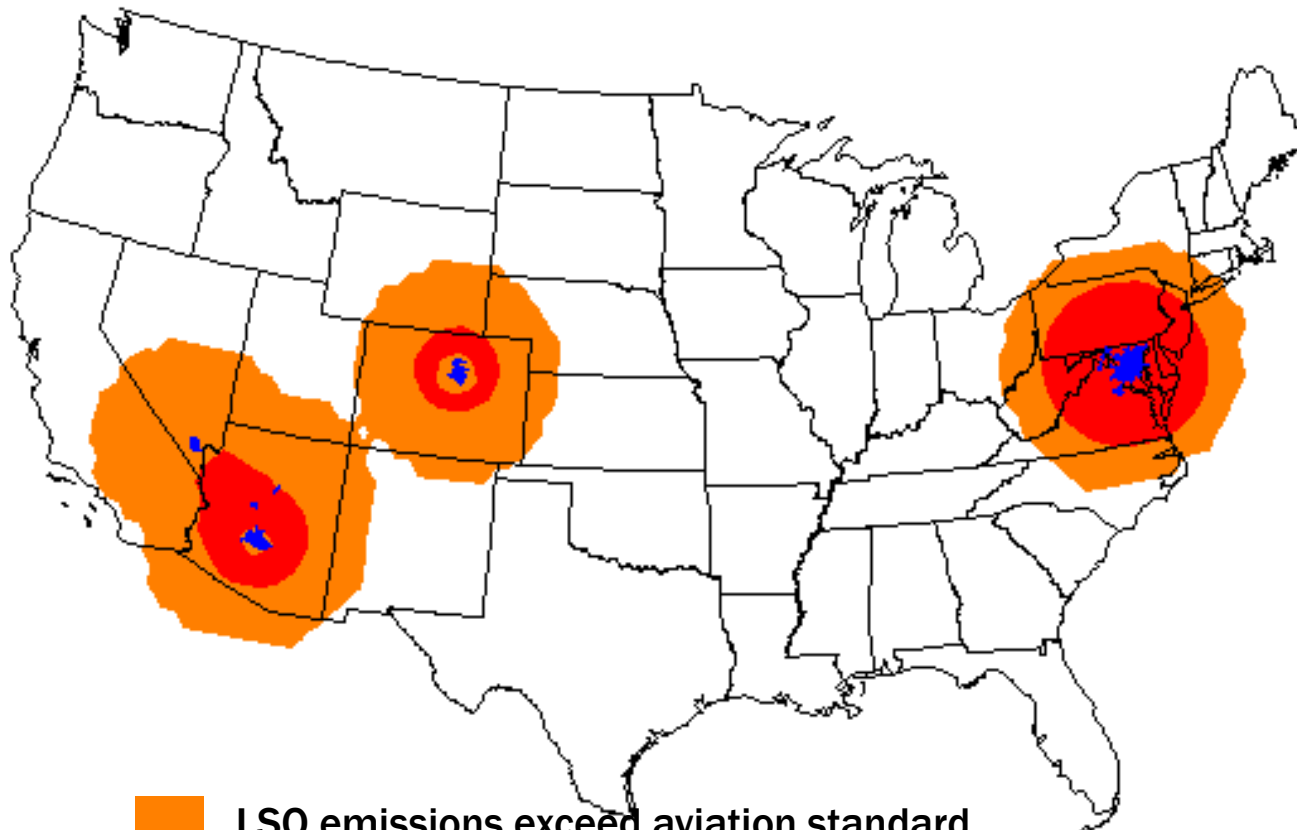




# Aviation Impact (Initial Deployment)



## Aircraft at 20,000'



LSQ emissions exceed aviation standard



1<sup>st</sup> indication of GPS degradation (common aviation receiver)