

Nationwide Differential GPS (NDGPS) Program Update

**51st Civil GPS Service Interface Committee
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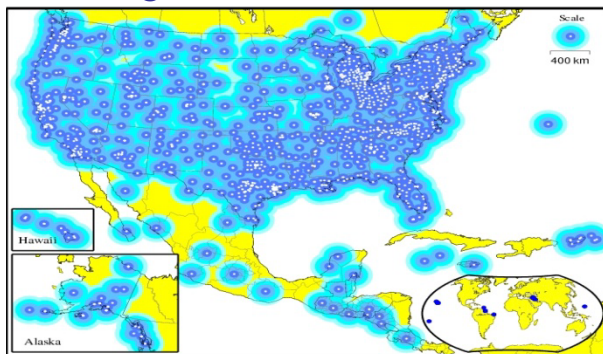
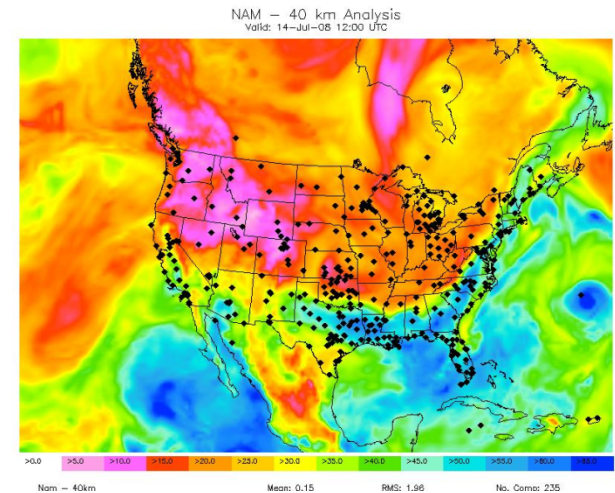
NDGPS Operating Partners

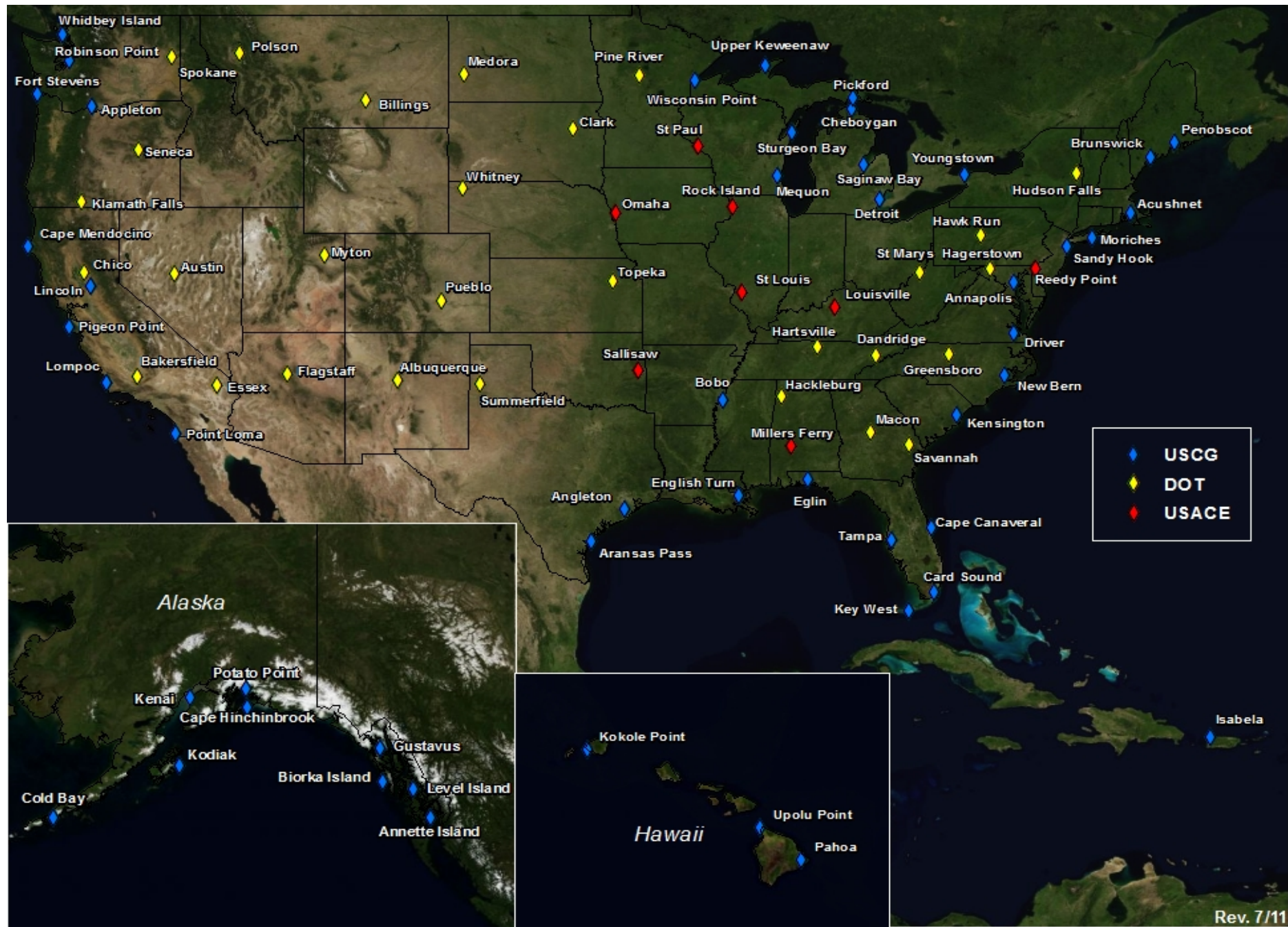
- United States Coast Guard
 - Aids to Navigation (maritime)
 - DGPS systems operations and maintenance
- Army Corps of Engineers
 - Aids to Navigation
 - Dredging and underkeel clearance
 - Underwater survey
- U.S. Department of Transportation
 - Surface transportation applications
 - Safety systems
 - Survey and construction (AMC)
 - Quality assurance
 - Asset and fleet management
 - Structures monitoring
 - Roadside/ROW management
 - Transit bus and rail location and separation
 - St. Lawrence Seaway (with Canada)



NDGPS Applications Partners

- Department of Commerce
 - Continuously Operating Reference Stations
 - Severe Weather Forecasting – water vapor estimates to national weather models
 - Space Weather Monitoring – free electron mapping
- Federal Resource Agencies (USDA, NPS, USGS)
 - One meter real-time positioning and navigation
 - Fire management and safety
 - Survey and mapping; GIS applications
- State, County and Local Governments, Private and Non-Profit Sectors
 - Lands, parks and environmental resources management
 - Precision agriculture
 - Mining and other resource management



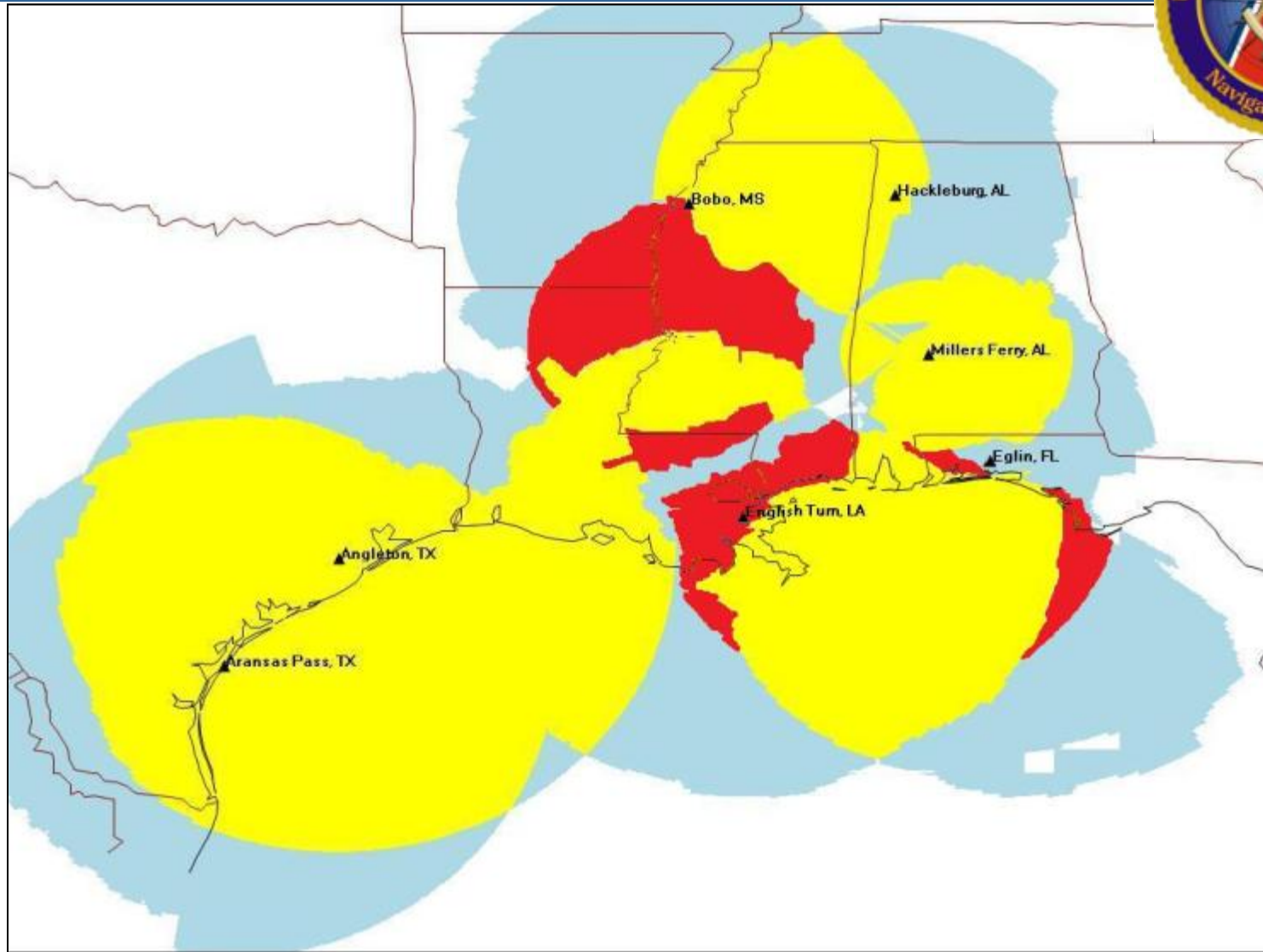


Vicksburg DGPS Site Closure (ACOE)

- Vicksburg Area Saw Significant Flooding in May-June 2011
 - Mississippi River crested at Vicksburg on Wednesday, May 18
 - Crested at a record level of 57 feet; bankfull is 43 feet
 - Flood stage lasted through third week of June
- Vicksburg DGPS Site Underwater
 - Equipment removed/stored by ACOE
 - Facility significantly damaged
- Vicksburg Site Permanently Off Air July 7
 - ACOE requested immediate site decommissioning
 - Bobo, MS and English Turn, LA provide adequate DGPS coverage

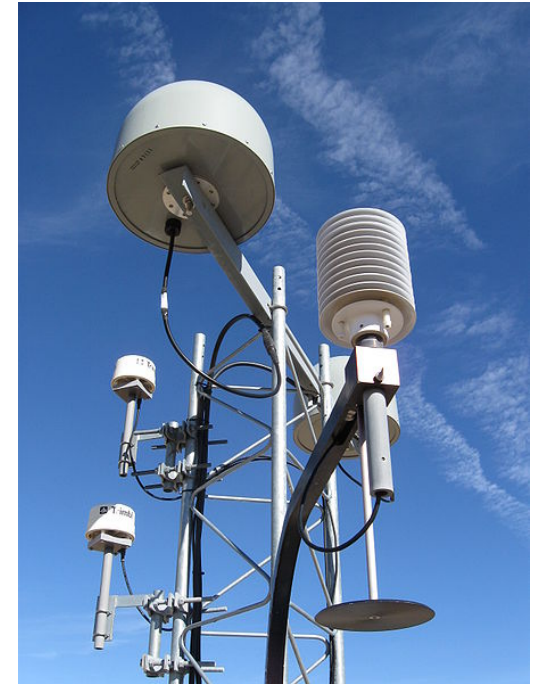


Current Coverage



NDGPS Program Status

- Inland (DOT) Tower Recapitalization
 - Upgrade reference stations/integrity monitors/antenna
 - Install IP-based operations system
 - Upgrade transmitters
 - Depends upon FY12/13 funding
- Buildout Unlikely
 - No budget support for construction funding
 - Strong support for O&M and recap
- USCG/DOT MOA Rewrite
 - Funding
 - Property accountability
 - USCG Billets (FY2016 commitment current)
- USDA NDGPS Study
 - Identified 15 potential new services from existing or new NDGPS infrastructure
 - All high-accuracy/high-integrity applications



High Accuracy NDGPS Work in Progress/To Do

- Two Small Business Innovation Research (SBIR) Projects in Progress
 - Ranging
 - Phase I complete; achieved better than 10 meters
 - Results indicate standalone range of <100 miles
 - Compression
 - Compress data stream, ionosphere, troposphere, to < 1000 bits per epoch
 - Awardee willing to make algorithm open source
- Still To Do
 - Integrity
 - Algorithms available; need to determine parameters
 - Lots of testing
 - Multi-site integration
 - Used brute force for earlier testing
 - Interpolation between sites is theoretically feasible
 - 3 epoch sub-decimeter solution
 - System testing



Where are New Applications in Transportation?

- GPS Enforcement of Designated Truck Routes
 - Illinois State Legislature required study
 - Illinois DOT study makes eight recommendations for truck GPS systems
 - Vertical clearance
 - Weight restrictions
 - Communications and enforcement of truck GPS systems
- Automated Vehicle Location (AVL) Systems for Data Collection
 - 2011 VDOT Survey
 - Road weather management systems
 - Near-real-time road conditions
 - Mapping noxious weed control
 - Tracking incarcerated workers



What Are We Trying to Get to?

- Intelligent Transportation Systems (ITS) Safety Applications for all Surface Modes of Transportation
 - Leverage technology to make vehicles discoverable to other vehicles, infrastructure, and pedestrians
 - Enable 360° situational awareness to the vehicle and driver
- Intelligent Railroad Systems
 - Assessing HA-NDGPS for meeting requirements
 - Positive Train Control
 - Track Defect Location
 - Automated Asset Mapping/Surveying

