

USCG's Electronic Navigation Branch DGPS & LORAN

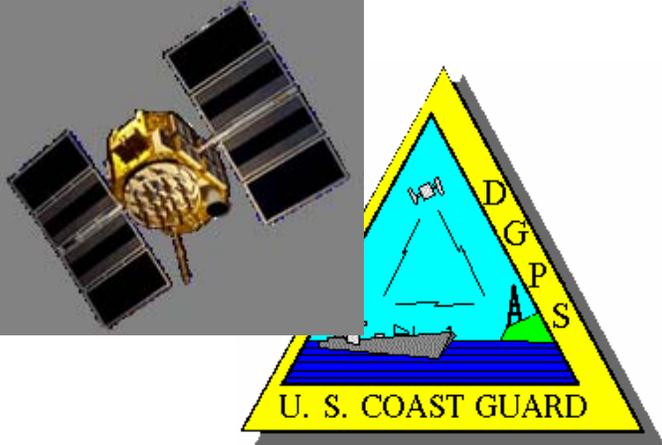


Lieutenant Lee Hartshorn
USCG Headquarters
CG-54132

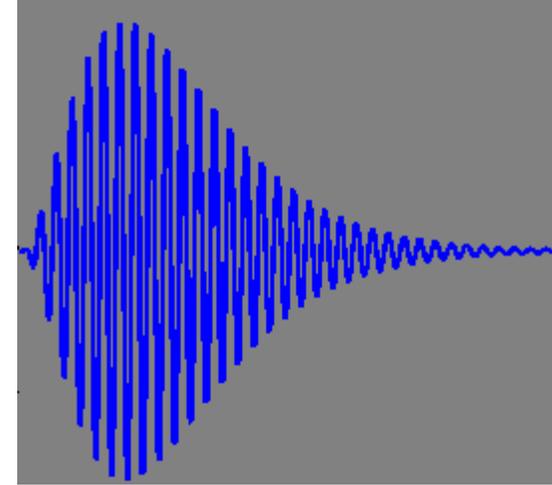


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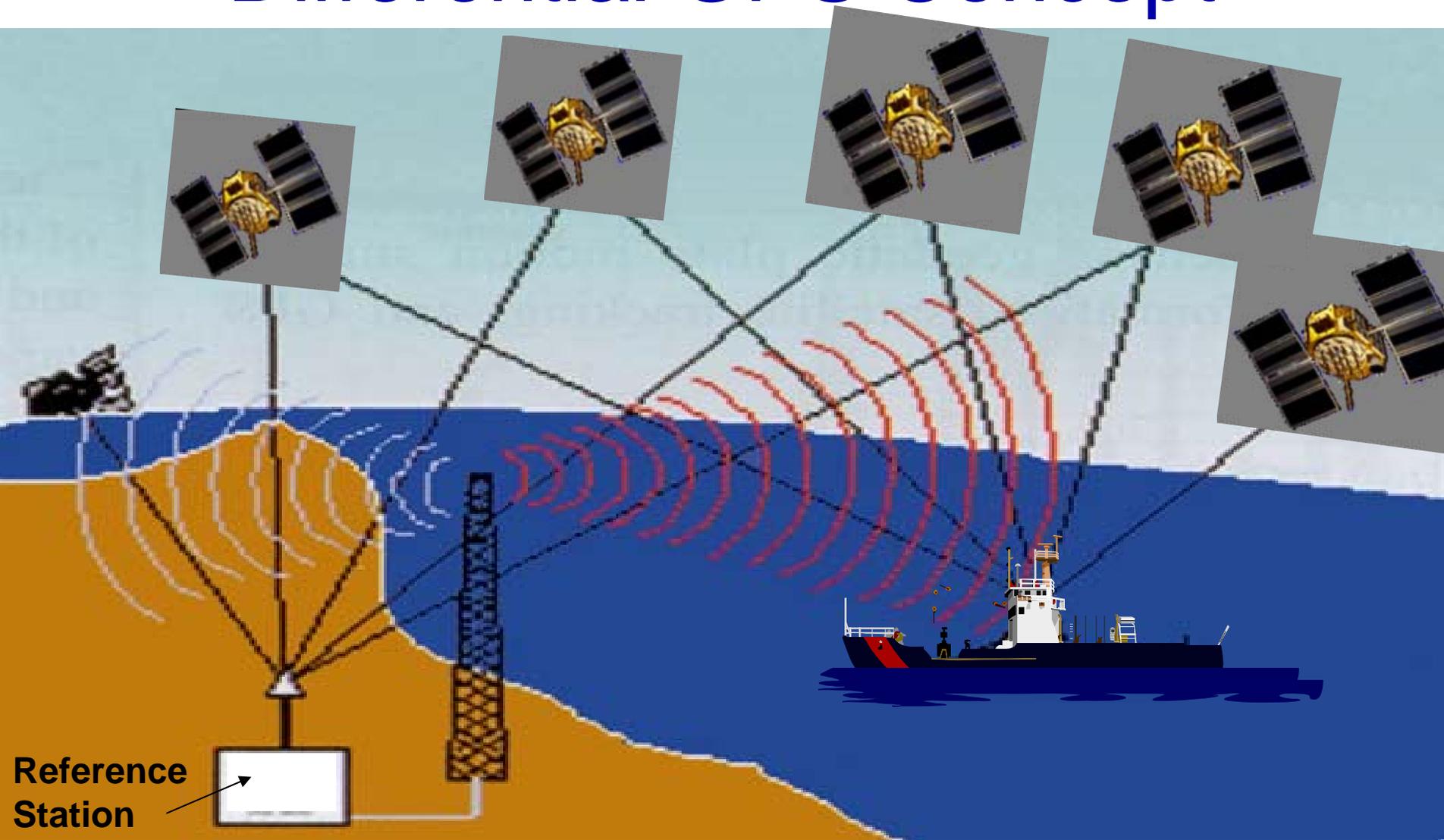


Outline

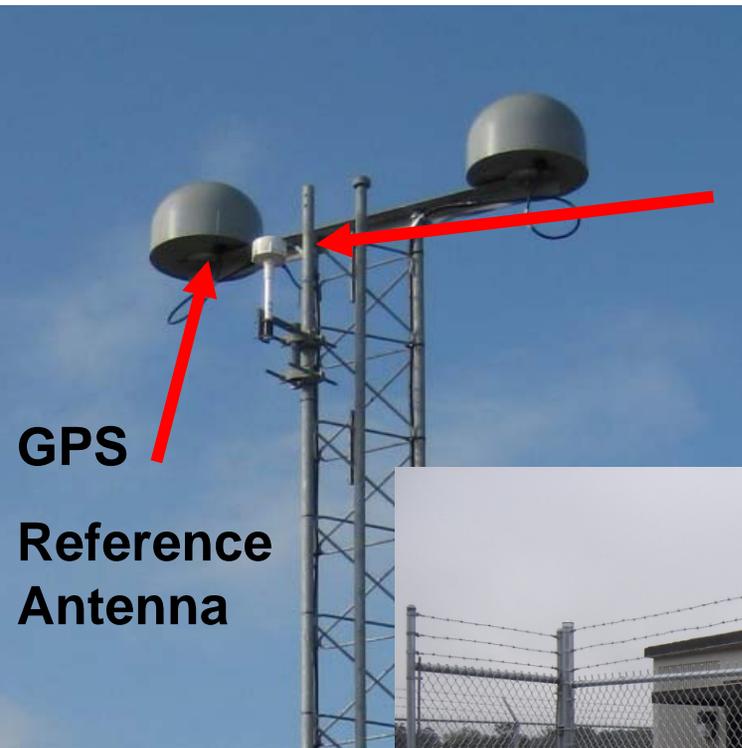


- Differential GPS
 - Overview
 - Signal Coverage
 - Recapitalization Efforts
 - Site Replacements/Additions
- Loran-C
 - Current Status and Future Initiatives

Differential GPS Concept



Typical DGPS Site Layout

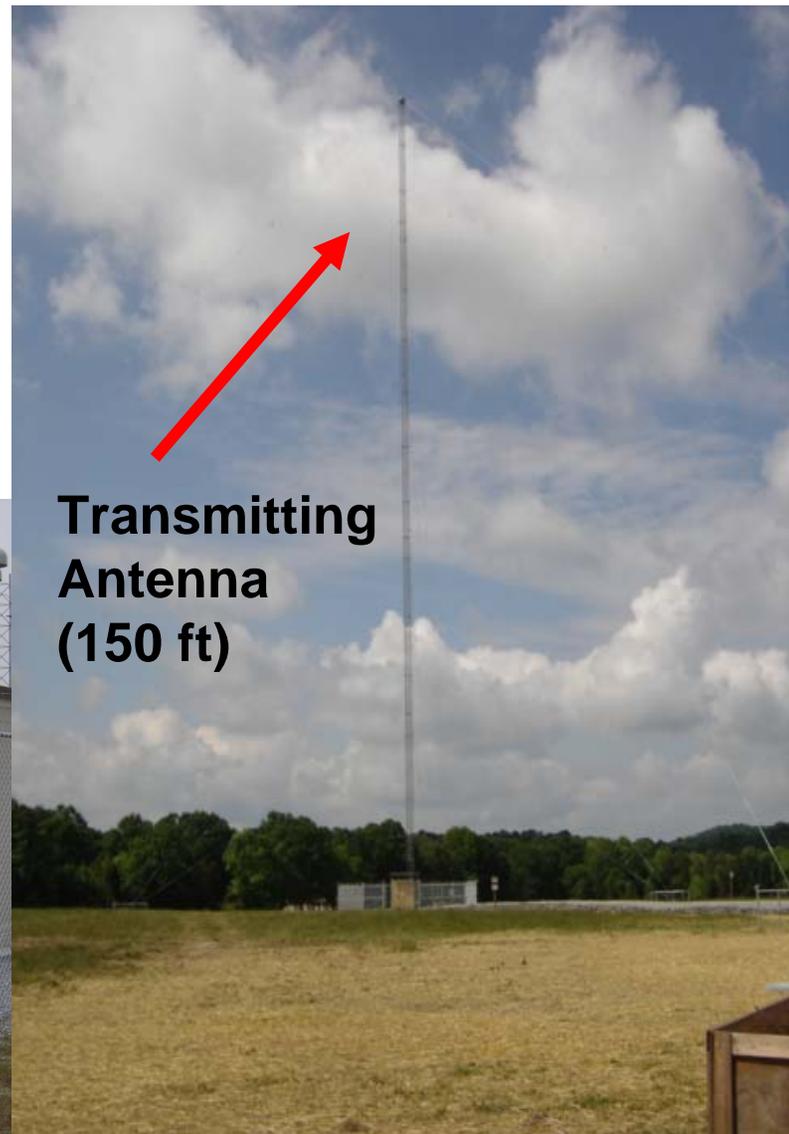


**Beacon
(MSK)
Antenna**

**GPS
Reference
Antenna**



Equipment Hut



**Transmitting
Antenna
(150 ft)**



Homeland
Security

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U.S. Department of
Homeland Security
**United States
Coast Guard**



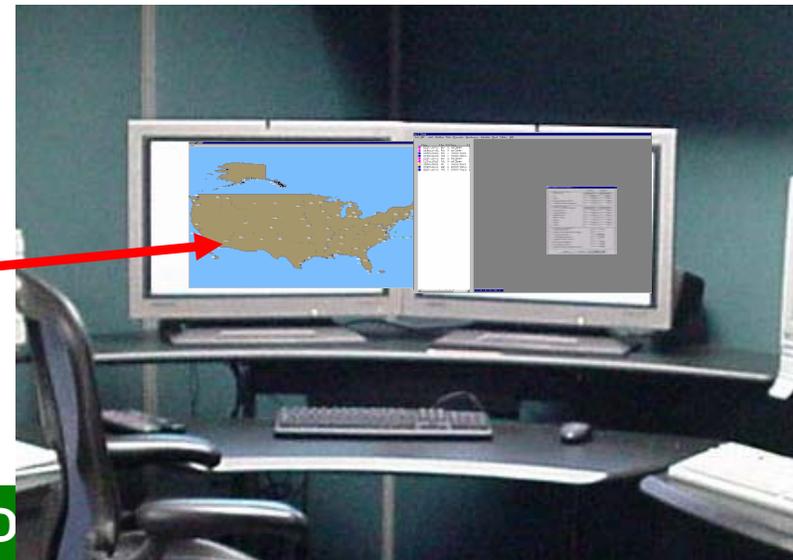
Nationwide DGPS

Combined Differential GPS Partnership (87 Total Sites):

- U.S. Coast Guard → 49 sites
 - U.S. Army Corps of Engineers → 9 sites
 - U.S. Department of Transportation → 29 sites
- Waterways Coverage
- Inland Coverage

NAVCEN is the Operational Control Center for the combined system

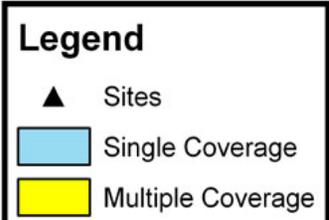
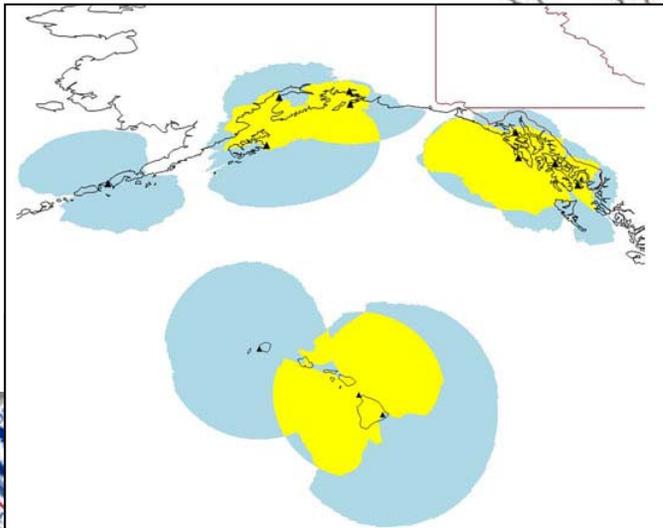
- Maritime Information Operations Center (MIOC)



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Coast Guard (49) + ACOE (9) + DOT (29)

Single coverage - 92% of CONUS
Double coverage - 65% of CONUS



Site Recapitalization

- Reference Stations and Integrity Monitors
 - Upgraded Receivers & Antennas: L1/L2 (L2C) Geodetic Grade
 - Software / Server based system replaces legacy hardware implementation
 - COTS open architecture design
 - Improved integrity monitoring and accuracy
 - 5 of 58 Maritime Sites remain
- Transmitter replacement project commences in FY09.

NOTE: Nationwide (DOT Sponsored) sites are not currently funded for RSIM or Transmitter Recap.



Performance Enhancements

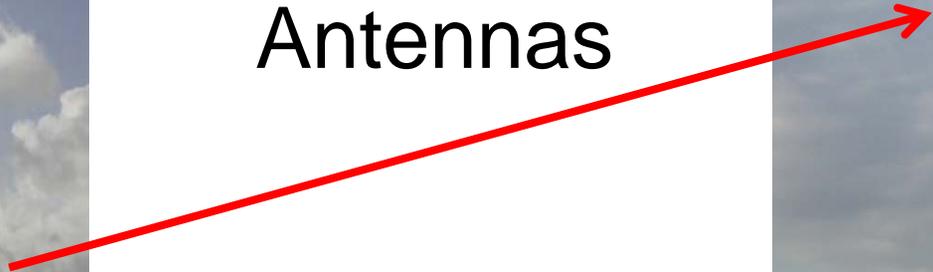
- RSIM (EC-03)
 - Increased Processor Power
 - Open architecture simplifies & reduces cost of future upgrades
 - Simplified installation and support
 - Increased remote management and configuration capabilities (reduced travel delay/cost)
 - Unified Software (RS & IM in single application)
- Transmitter Replacement
 - Legacy Transmitter responsible for ~17% of current downtime

Legacy Site Replacements

- New sites designed for better reliability in heavy weather.
- Increase dual coverage in hurricane regions.
- Miami site has been replaced with a new site in Card Sound, FL
 - Verification testing completed on April 9th, 2009.
 - Operational status in mid-June
- Mobile Point, AL site has been replaced with a new site at Eglin AFB, FL
 - System verification testing completed on March 27th, 2009.
 - Operational status in late May.

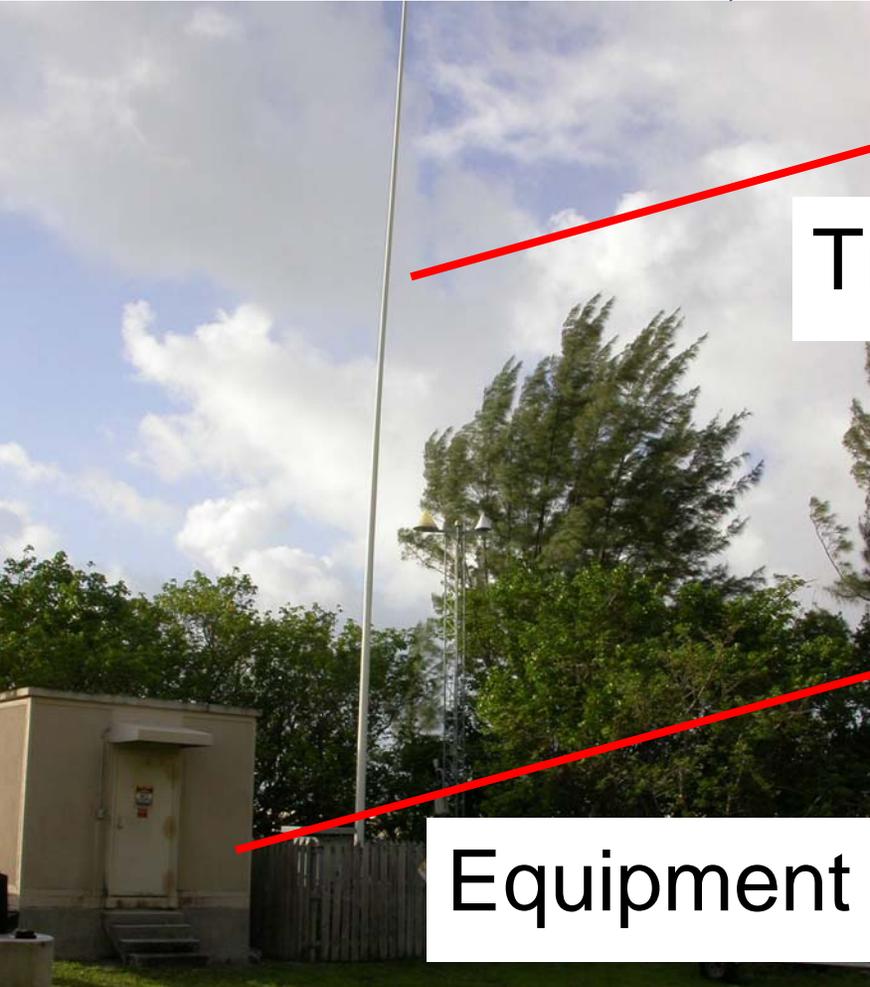
Miami, FL → Card Sound, FL

GPS & Beacon
Antennas



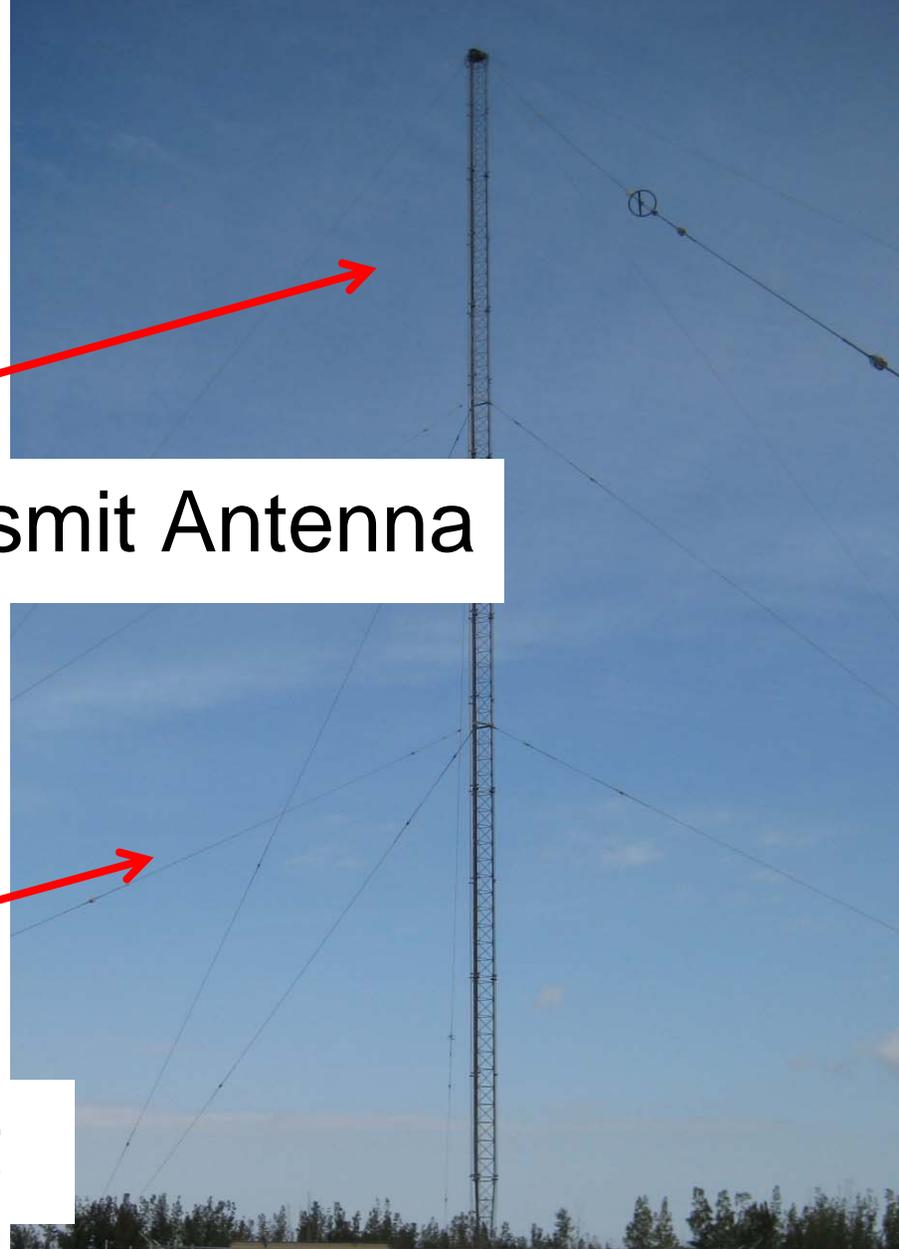
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Miami, FL → Card Sound, FL



Equipment Hut

Valcom Whip
Efficiency = 0.03

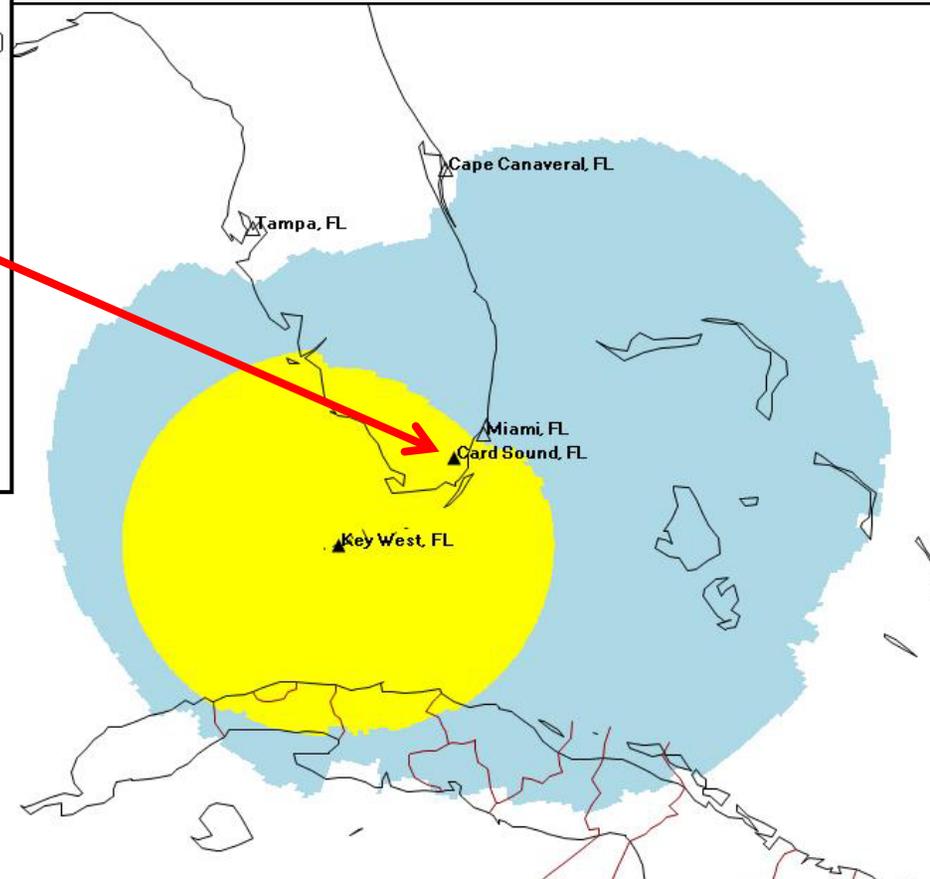
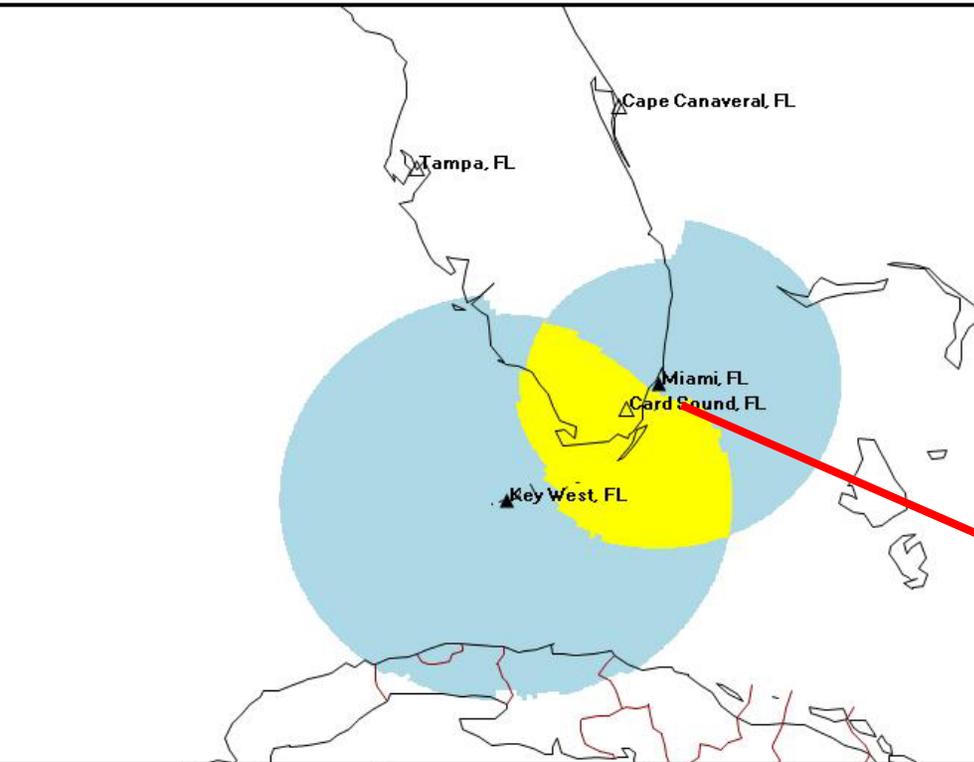


Transmit Antenna

150 ft
Efficiency = 0.4

CLASS

Miami, FL → Card Sound, FL



Legend

- ▲ Sites
- Light Blue Circle Single Coverage
- Yellow Circle Multiple Coverage

Mobile Point, AL → Eglin AFB, FL



Equipment Hut



Mobile Point, AL →
Eglin AFB, FL

Transmit Antenna



150 ft

Efficiency = 0.17

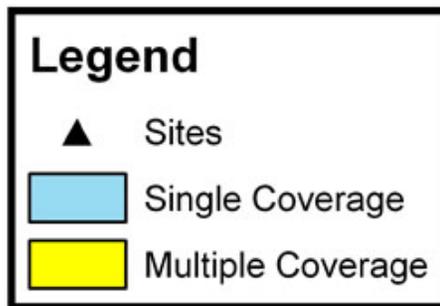
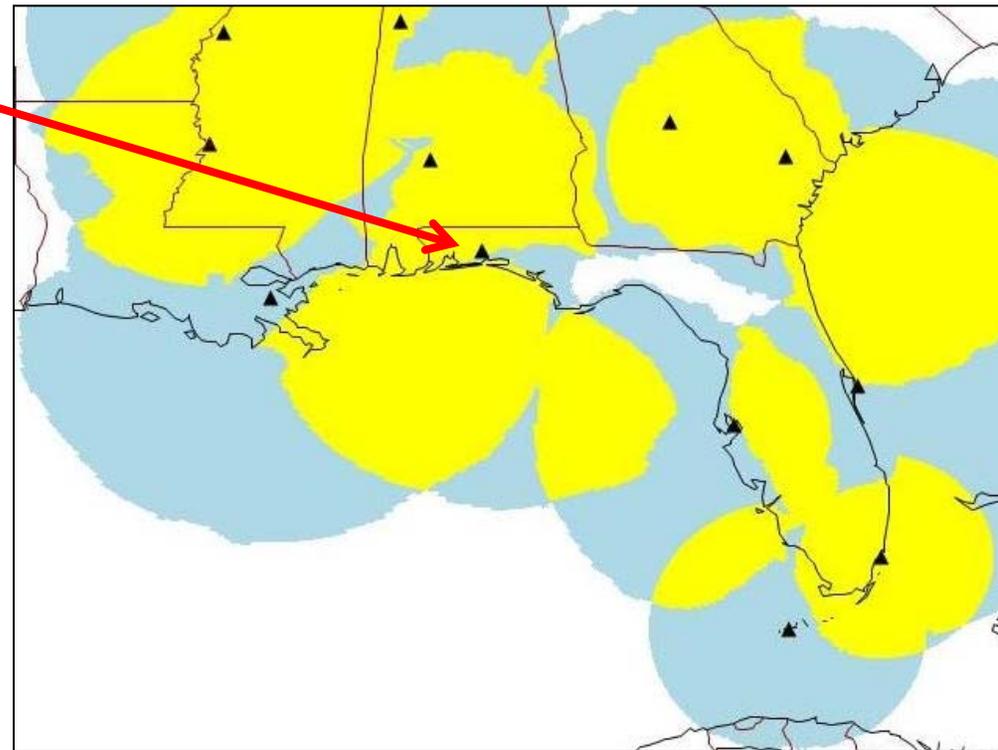


23/03/2009

150 ft

Efficiency = 0.5

Mobile Point, AL → Eglin AFB, FL

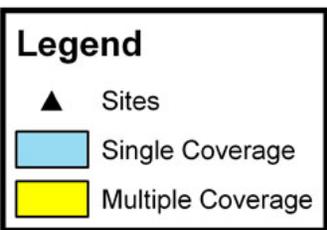
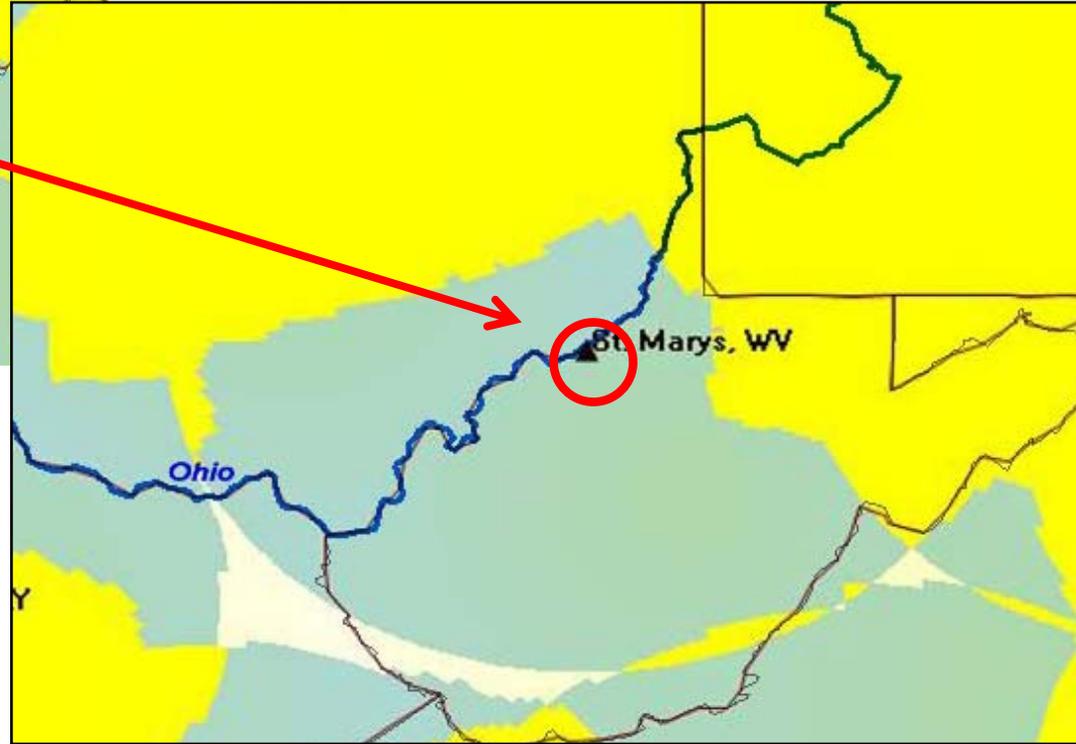
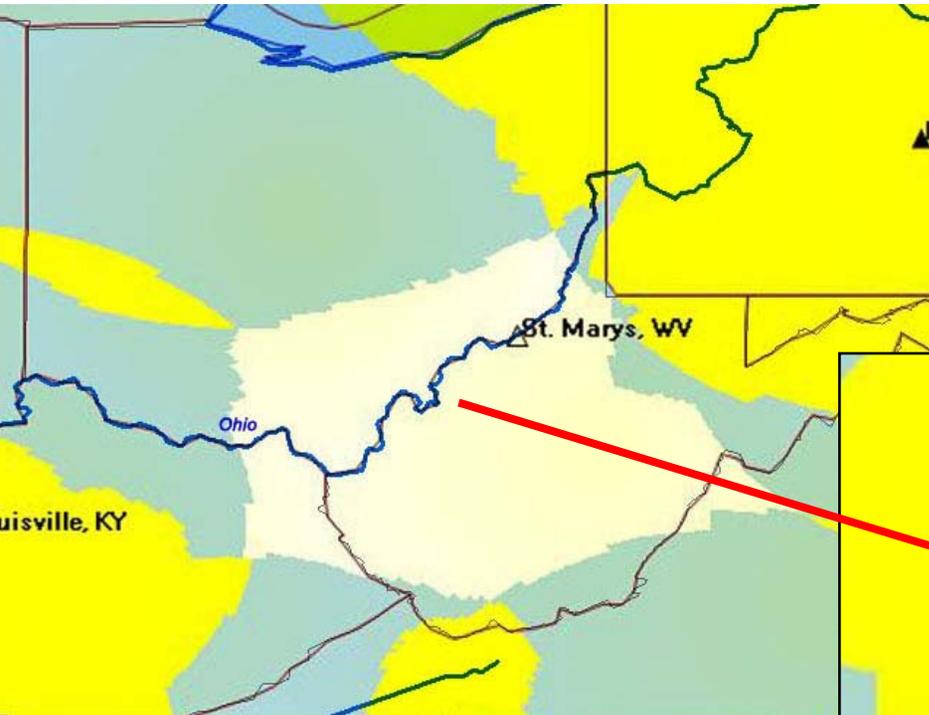


Site Addition – St. Mary's, WV

- Fills large coverage gap on Ohio River
- Operational on December 10th, 2008
 - Has exceeded availability requirements since commissioning.



Site Addition – St. Mary's, WV



Loran-C

- 2010 Budget Proposal
- Status of eLoran Development & Testing
- Current/Future Initiatives

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2010 Budget Proposal

- The President's ***Proposed*** 2010 budget identifies potential savings across the federal government to reduce the Nation's deficit and to discontinue outdated programs. Included therein is termination of the Loran-C program.
- Loran operations will continue 'business as usual' pending Congressional approval of FY10 proposed budget.

eLoran Development & Testing

- eLoran does not exist in an operational state in the U.S.
- Time-of-Transmission (TOT) control is being tested by LSU in the Northeast U.S and Great Lakes Chains
- Loran Data Channel (LDC) is being tested by LSU at multiple stations.

Current/Future Initiatives

- Automated Loran Station (ALS)
 - ALS evaluations underway at Loran Stations Carolina Beach, NC, Jupiter Inlet, FL, and Kodiak, AK.
 - Lorsta personnel are temporarily assigned to a co-located ESU or ESD.
 - The eventual goal is to unman all SSX Loran Stations by 2012.

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DHS Integrated Common Analytical Viewer (iCAV)

- DGPS plays a key role in GPS Interference detection and mitigation (IDM).
- DGPS and Loran sites included as a infrastructure protection layer in the iCAV data.

