

# Nationwide DGPS

## Coast Guard Update on NDGPS on East Coast of PR

1. Thank you for inviting me to the beautiful Island of St. Croix.
2. I am the Coast Guard Navigation Center's Project Manager for the Nationwide Differential GPS.
3. I was born in Arecibo, Puerto Rico, and now reside in Alexandria, VA.
4. Introduction of the CG Navigation Center.
5. Brief you on the CG's plans for NDGPS expansion in PR.

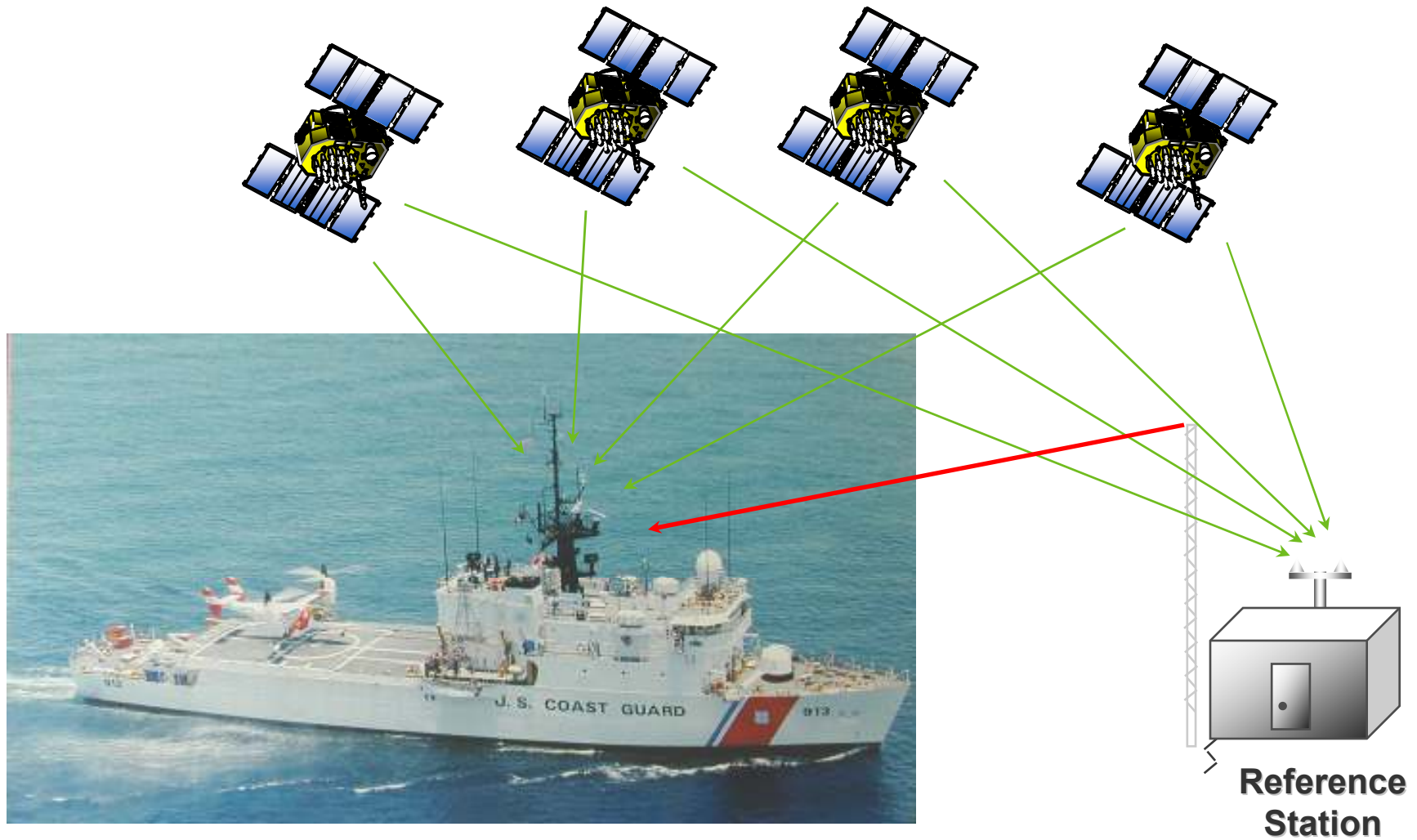


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# Differential GPS (DGPS)



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# Maritime Use



DGPS guides every type of craft from small pleasure boats to large container ships



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# Army Corps of Engineers *DGPS in Dredging*



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# NDGPS Requirements

## *Positive Train Control*

- Provide Situational Awareness
- Prevent accidents, saving over \$60 million per year
- Reduce fuel consumption by better pacing trains
- Increase rail line capacity through closer train spacing, thus reducing the need for additional capital investment in plant and equipment



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# Nationwide DGPS

## *Intelligent Transportation System*

- An integrated vehicle safety system consisting of DGPS & communication links will:
  - Automatically notify emergency personnel when an air bag is deployed, allowing for faster response to the exact location, thus saving some of the 41,000 people who die on U.S. roads each year.
  - Gives drivers Situational Awareness, preventing multi-car pile-ups
  - Automatically reroute traffic around an accident, improving traffic flow.



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# NDGPS use in Surveying

GPS has revolutionized the surveying industry. NDGPS provides survey grade accuracy when used in post processing applications.



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# Precision Agriculture



This grain combine can be outfitted with a GPS receiver, yield monitor, and electronic sensors to track crop production based on location. These data can be transferred to a geographic information system to create a yield map and subsequently used to analyze the field and make site-specific management decisions.

- Maximize use of resources
  - Optimized plowing of crop rows
  - Tailored applications of seeds, fertilizer, water, pesticides
  - Improved management of land, machinery, personnel, time
  - Greater crop yields
  - Net benefit: \$5-14 per acre
- Minimize environmental impacts
  - Localized identification and treatment of distressed crops reduces chemical use
  - Precise leveling of fields prevents fluid runoff



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# NOAA's Forecast Systems Lab

## *Measuring Water Vapor*



Water vapor is the most important component of weather and the least observed. DGPS reference stations continuously measure the water vapor in the atmosphere above the reference station, thus greatly improving short term weather forecasts.



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# NAVCEN Mission Statement

The Navigation Center meets the needs of global navigation by providing quality signals, informational services and technical support, to enable safe navigation



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# Mission Standards

- Meet SOLAS and Titles 14 & 33 CFR
- Operate radionavigation services per Federal Radionavigation Plan (FRP)
- Represent civil interests in GPS
- Disseminate NAV / Safety Marine Information
  - Notices to Mariners
  - Light Lists
- Develop Electronic Navigation Technologies



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# Differential GPS

- USCG developed an augmentation to GPS
- Maritime Differential GPS (DGPS)
- NDGPS expanded DGPS to cover surface areas
- NAVCEN Operates 86 NDGPS sites from 2 Control Centers, East and West Coast.

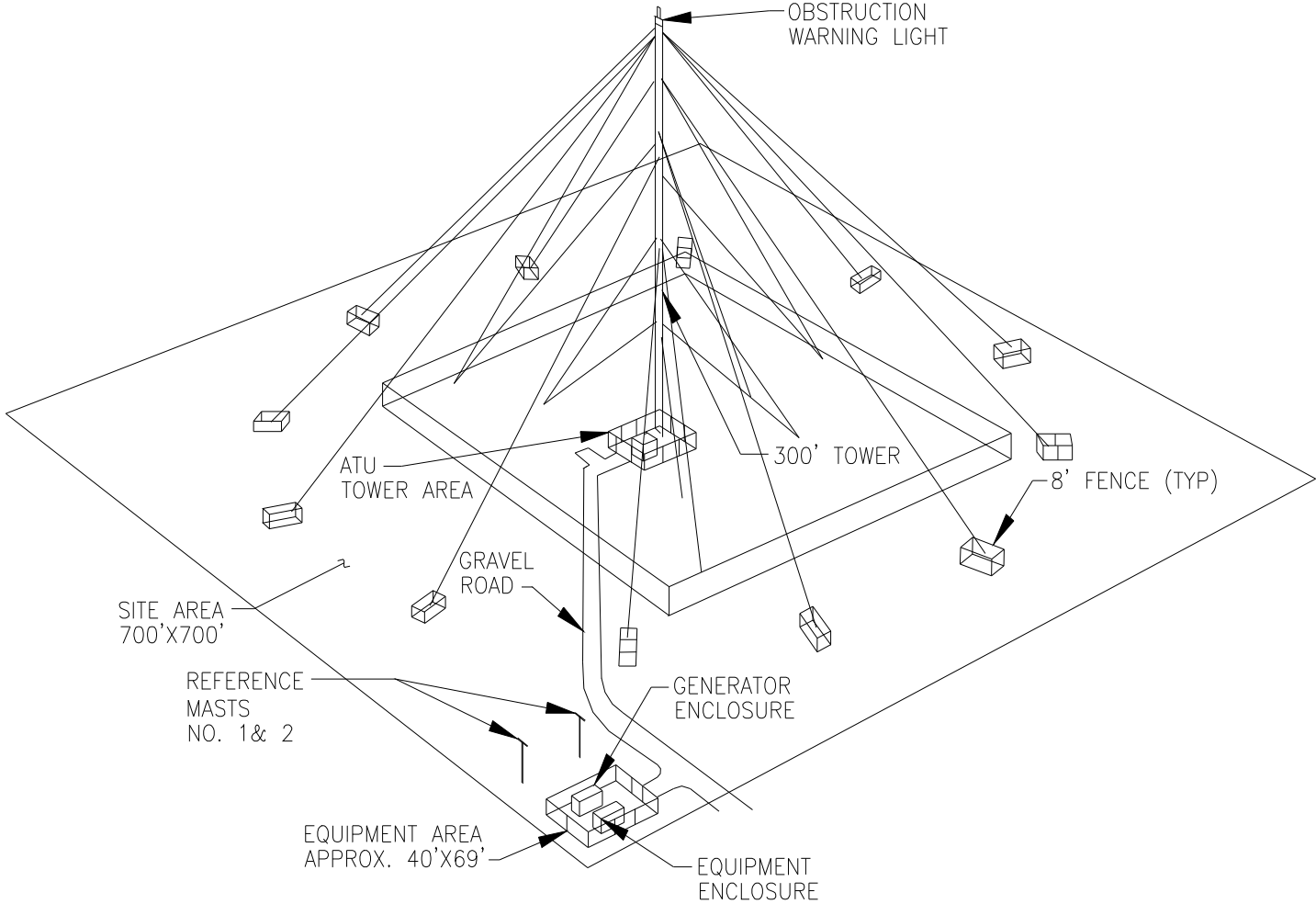


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# Typical NDGPS Site



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# Nationwide DGPS



- ◆ ACOE Maritime Sites
- ◆ Maritime Sites
- ◆ NDGPS Sites
- Planned NDGPS Sites



OCTOBER2005



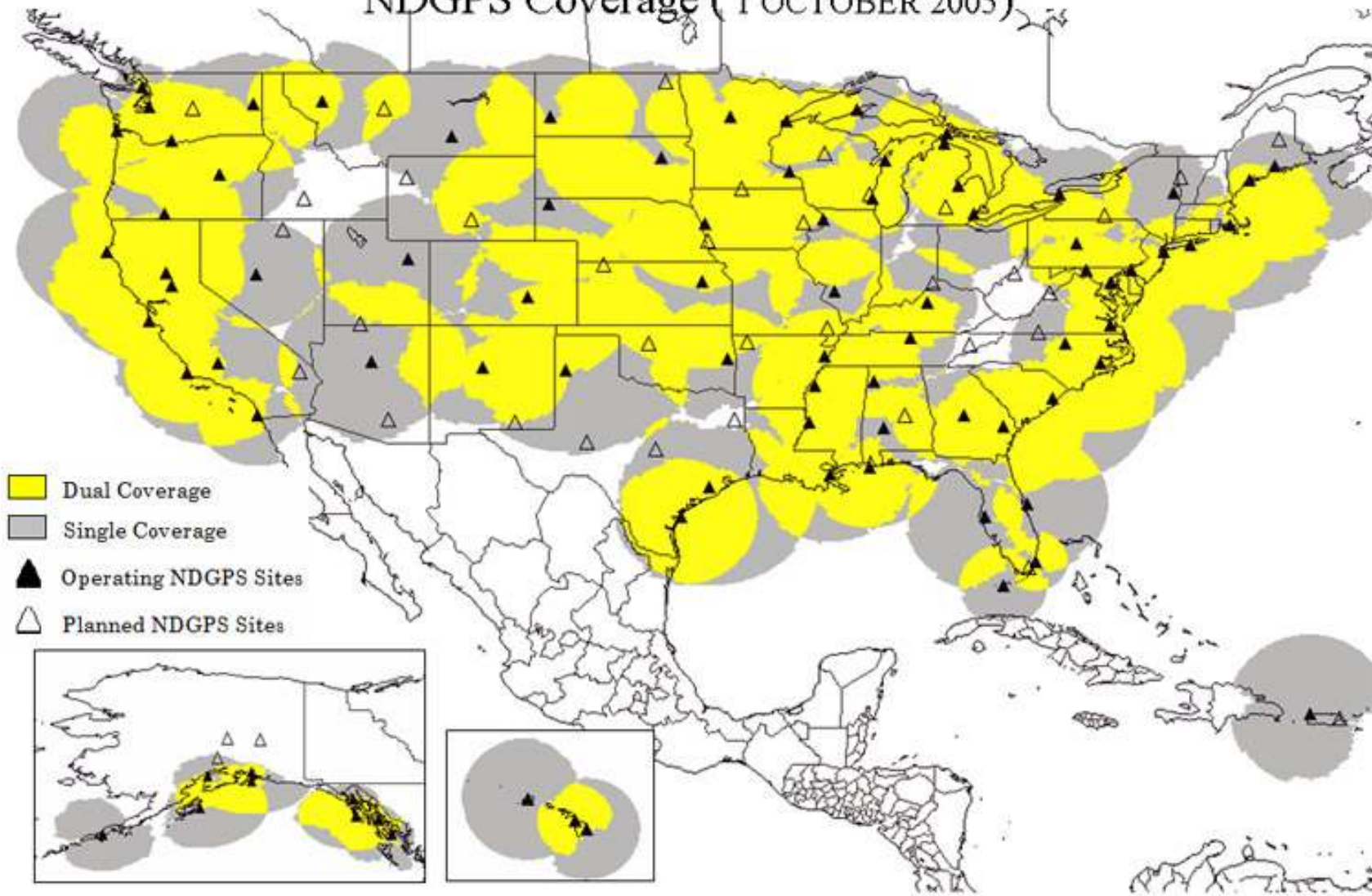
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# NDGPS Coverage ( 1 OCTOBER 2005)



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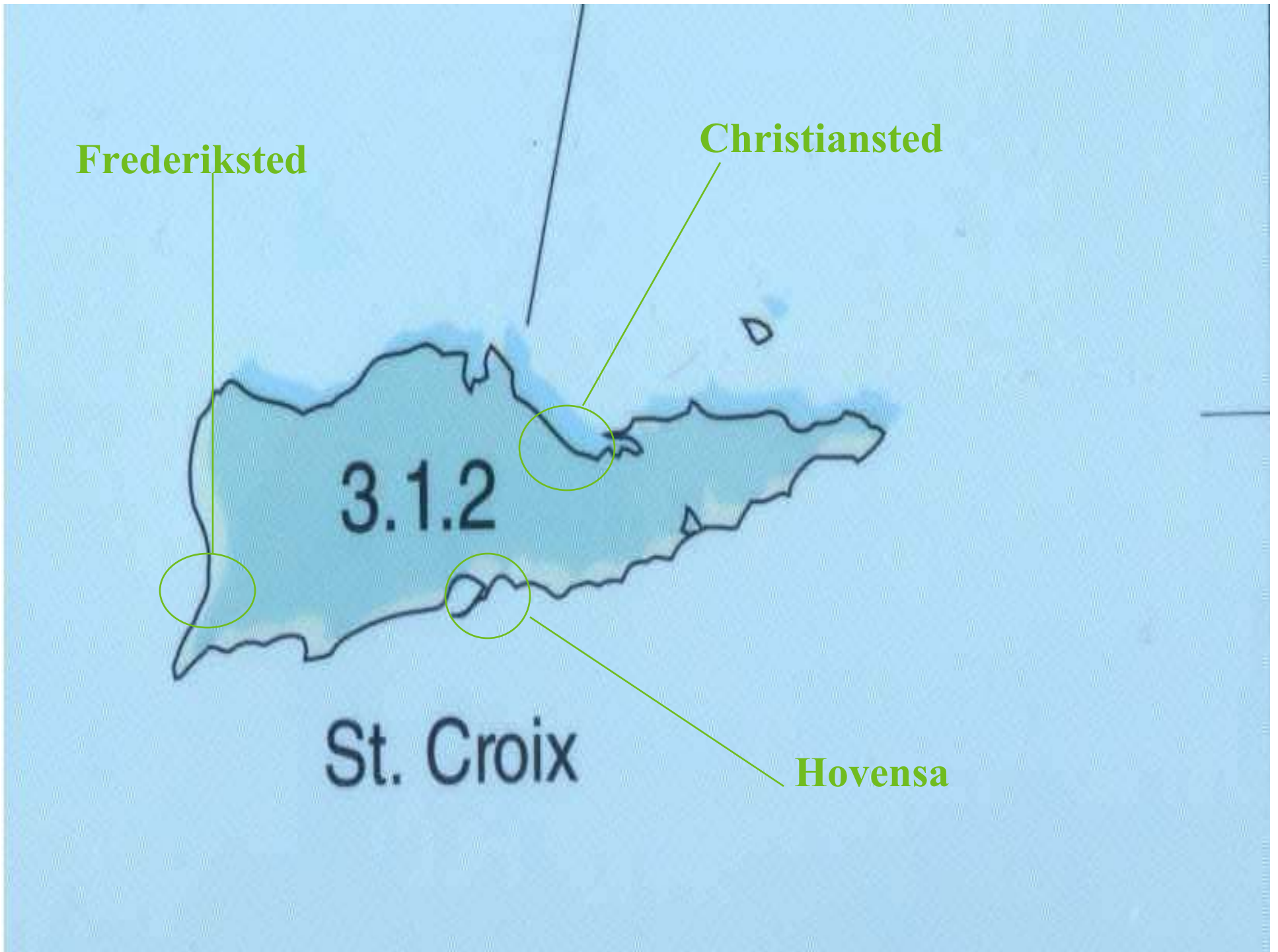
**Frederiksted**

**Christiansted**

**3.1.2**

**St. Croix**

**Hovenså**



# Hovensa / Krausse Lagoon St. Croix

- Largest refinery in AOR.
- Crude, #2, #6, gasoline & naphtha.
- Container facility on western pier face.



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# Findings of Feb 2003

ANT PR articulated with certainty that the Isabela site does not provide a constant and reliable signal to the U.S. Virgin Islands (St. Thomas and St. Croix)

During the performance of the ANT's (Aids to Navigation Team) primary mission, they have experienced the loss of the DGPS signal for hours and on some occasion even days. During these periods where the signal became indiscernible and unusable, the ANT team could not and did not position ATON

After signal verifications, we found the signal to be less than 34 micro volts in some of the South East regions of Puerto Rico, and St Thomas.

(75 micro volts per meter).

We recommended a site at Naval Station Roosevelt Roads PR.

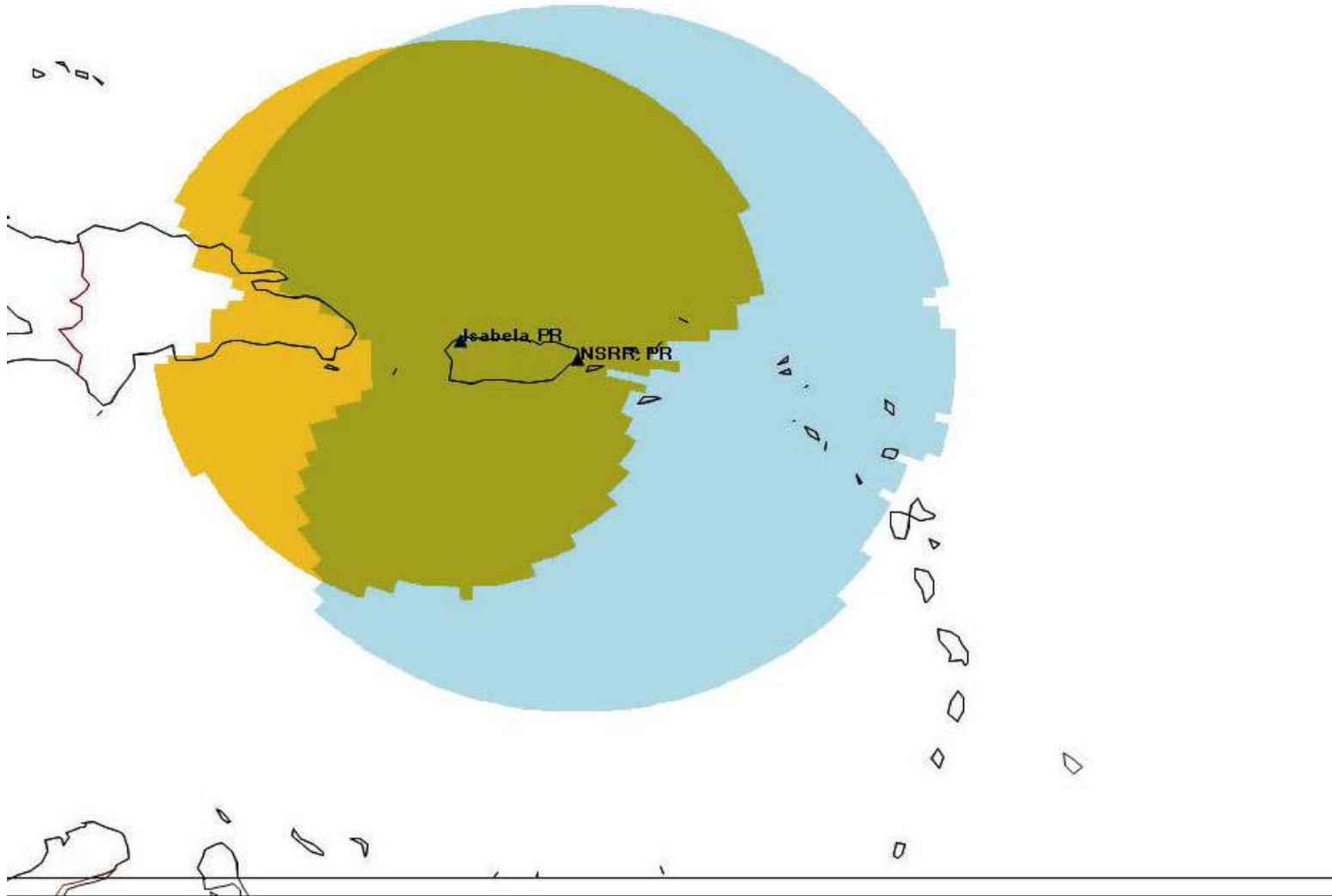


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# Isabela and New PR location



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