USCG LORAN Support Unit

Our World of Work

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Introduction

- LSU and Loran Today
- Loran Modernization – Achievements
  - Lorsta & Consta Electronics Recapitalization
  - Differential Loran
  - Loran Data Channel (LDC)
- Loran Modernization – Expectations
  - Remaining Recapitalization
  - Differential Loran & Loran Data Channel
  - Loran Timing Test Beds

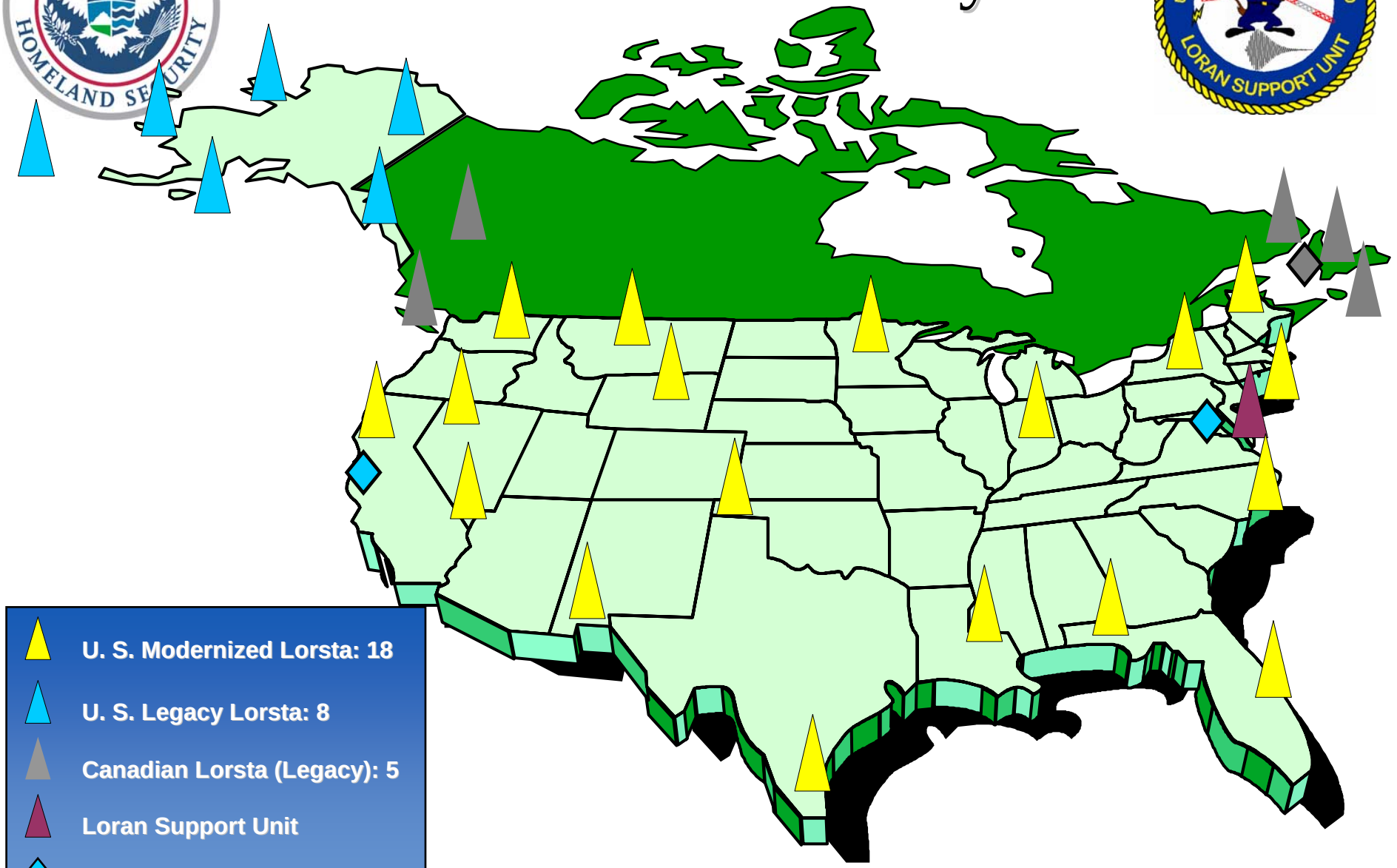
LSU & Loran Today

- 100 kHz, ground wave, high-power (400-1600 kW)
- Delivers timing info & 2-D position
- Affected by propagation path and weather
- Manual steering to 100-ns of UTC
- Not yet “All that it can be”
  - Discontinuities (time steps)
  - Chains & SAM control (does not enable all-in-view receivers)
  - 500-meter horizontal system
  - Few receiver manufacturers (lack gov’t statement, TOT control)

LSU's Role & Responsibilities

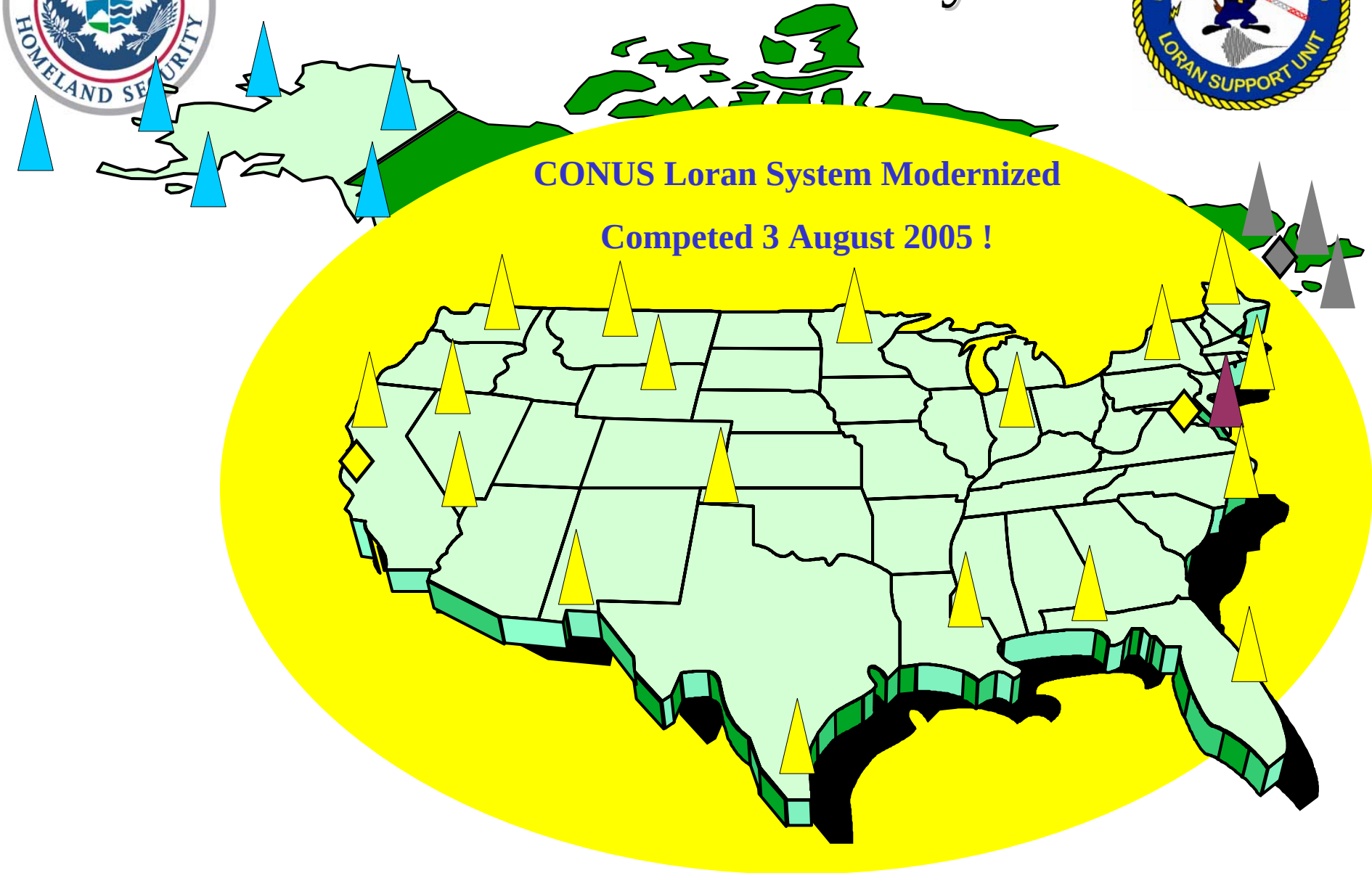
- System Mgmt & Engineering Facility (SMEF)
- Diverse Workforce (65 active duty, civilian, contractor)
- Variety of engineering projects
  - LDC
  - Differential Loran
  - LICOS, LEMS
- System Support Agent (SSA)
  - Configuration Mgmt
  - Help Desk
  - Grooms, on-site CASREP support

North American Loran System



- U. S. Modernized Lorsta: 18
- U. S. Legacy Lorsta: 8
- Canadian Lorsta (Legacy): 5
- Loran Support Unit
- Control Station: 2 US, 1 Can.

North American Loran System



New Loran-Station Electronics

New Solid State Transmitter (NSSX)

New Timing & Frequency Equipment (NTFE)

NSSX Building Construction

Facilities Installation

Building HVAC

Exterior fuel tank/GENSET

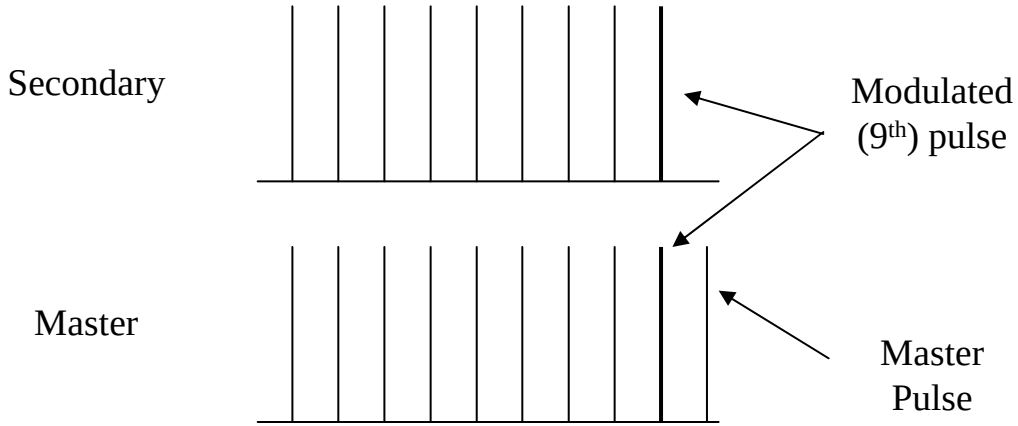
Finished Product (Lorsta George)

New Control-Station

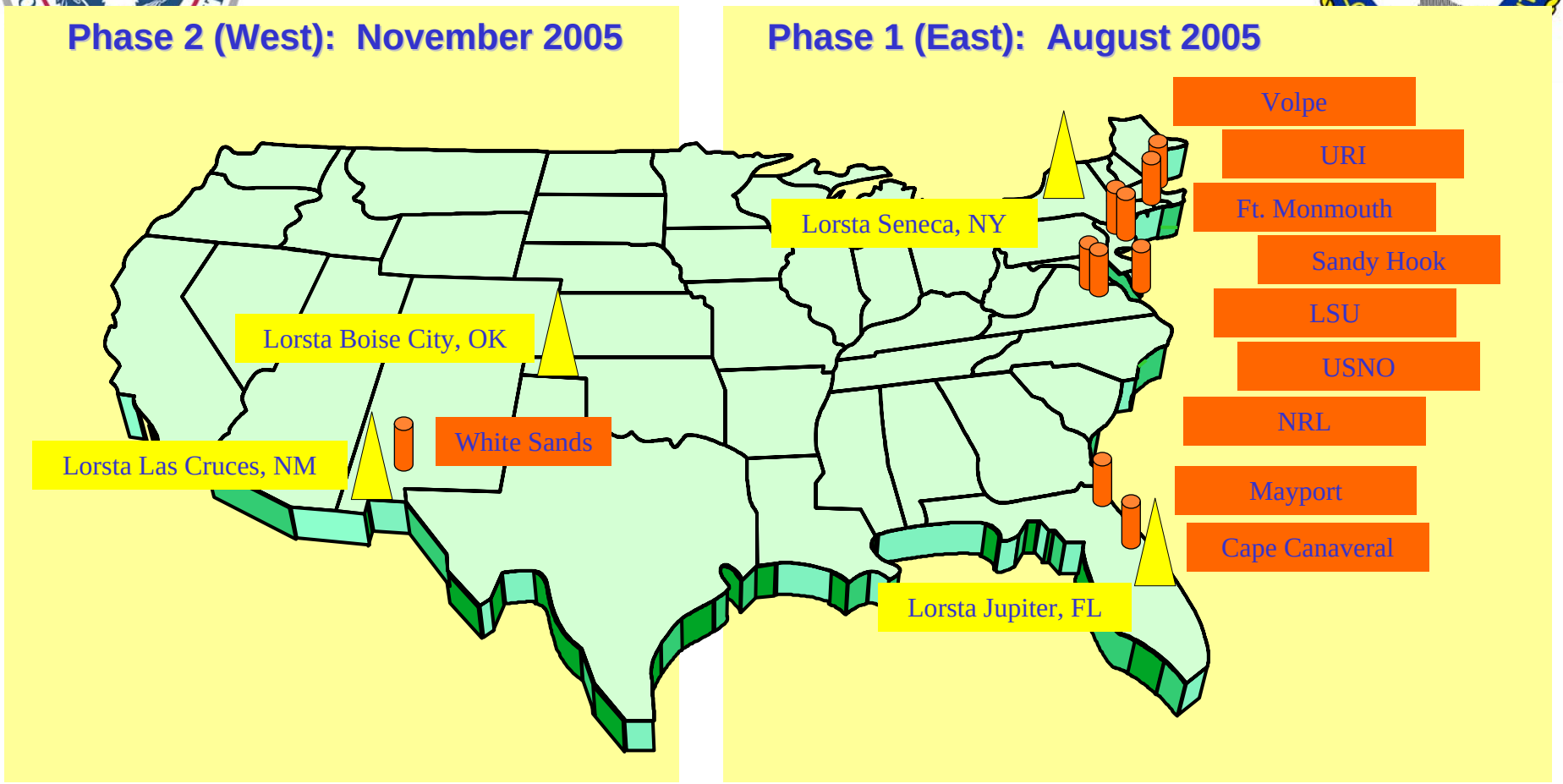
New Loran Consolidated Control System
(NLCCS)

Loran Data Channel

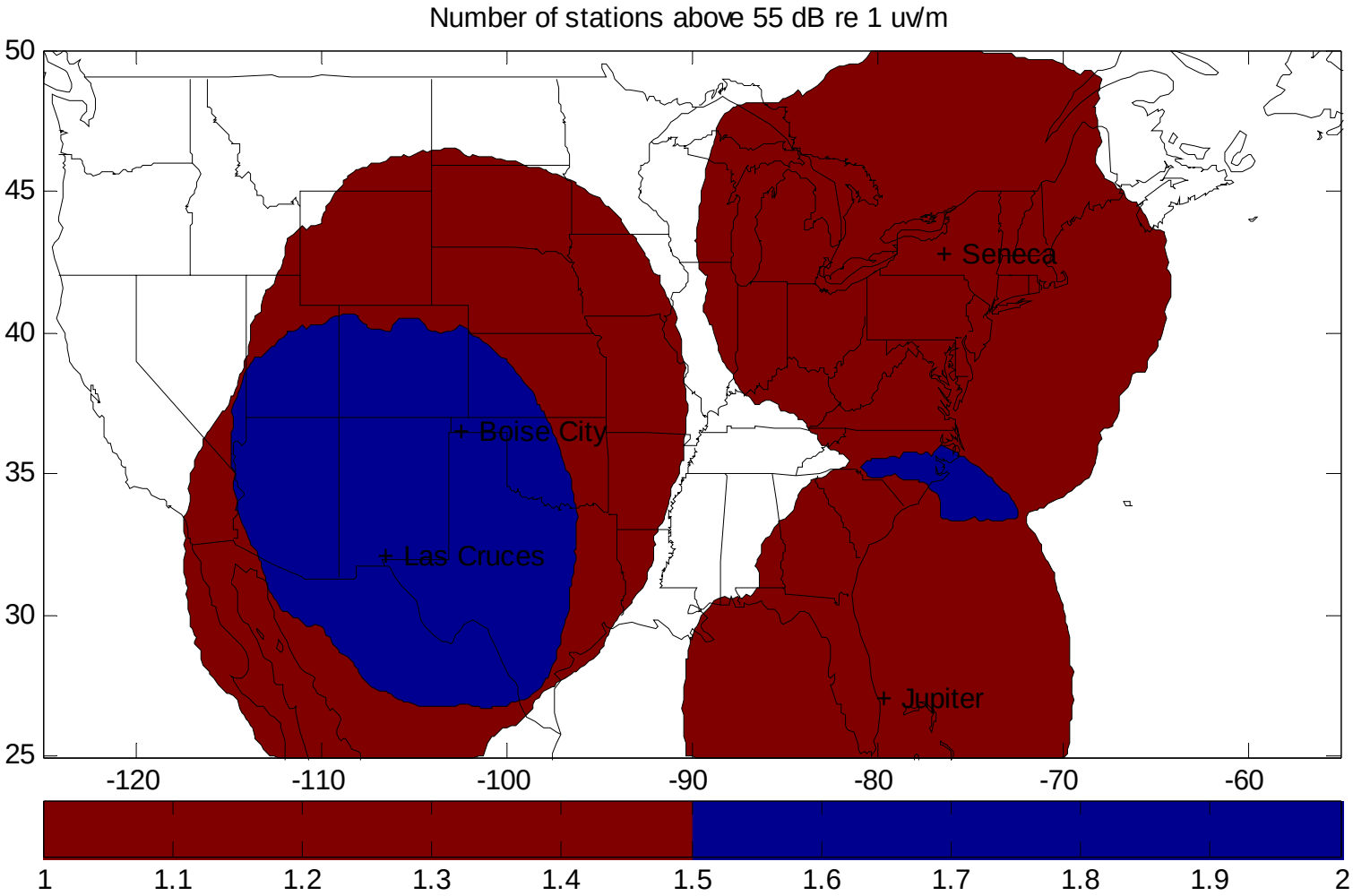
- Information modulated on a 9th Pulse
- Preserves navigation information on pulses 1-8
- Feasibility proven with solid-state transmitters
- Demo'd early Oct for DOD Range Commanders
- Plans to install at Lorsta's Jupiter, Las Cruces, & Seneca
- Differential corrections from stakeholders' monitors



Enhanced Loran Timing Test Beds



Coverage of Loran Data Channel Testing

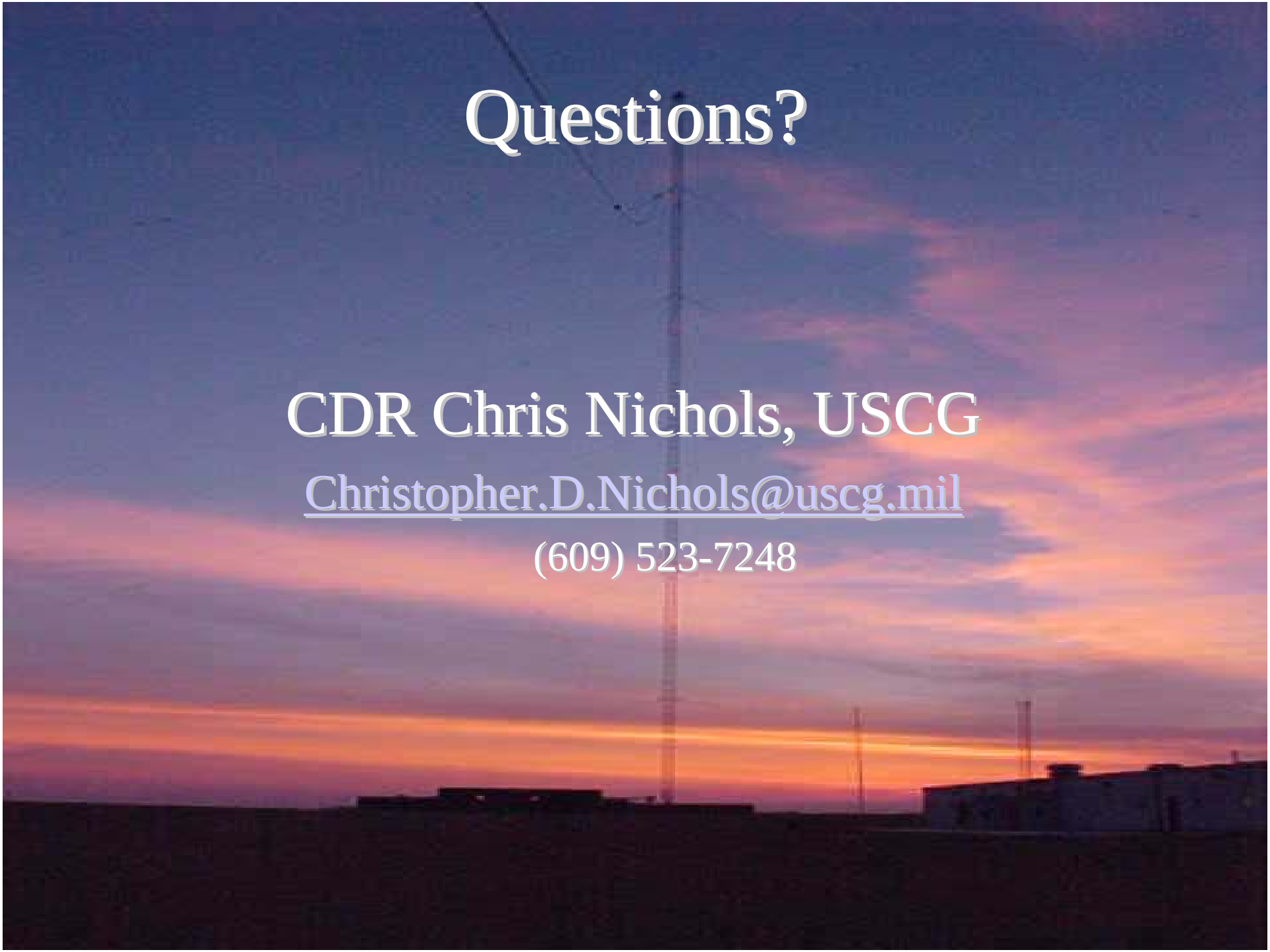


Differential Loran

- Land-path signal delays (spatial)
  - Land propagation path introduces signal delays called “additional secondary factors (ASF)”
  - Provider needs to survey each waterway for ASFs beforehand
  - User receiver stores waterway’s spatial ASFs beforehand
- Weather-path signal delays (temporal)
  - Provider’s shore-side monitor calculates corrections in real-time
- Loran Data Channel “9th Pulse Comms”
  - Provider modulates monitor info onto Loran signal & sends to user
- Differential-Loran user receiver
  - User’s receiver applies spatial ASFs
  - User’s receiver demodulates & applies temporal corrections
  - Differential-Loran improves position accuracy significantly
- It works!

Summary

- Achievements
  - All CONUS Lorstas modernized
  - New Timing & Frequency Equipment at 10 Lorstas
  - The New Loran Consolidated Control System installed & operational at the CG's two control stations.
  - Differential Loran & 9th Pulse have been proven in real time
- Expectations
  - First Alaska recapitalization complete by Jan 2006
  - LDC Broadcasts this fall (southeast & southwest)
  - TOT control by Dec 2005


Questions?
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