

California's use of GIS Technology for Oil Spill Planning and Response

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THE LEMPERT-KEENE-SEASTRAND OIL SPILL PREVENTION AND RESPONSE ACT

(GOVERNMENT CODE 8670.3.)

"Best achievable technology"

**"...that are being developed, could
feasibly be developed, or are currently in
use anywhere in the world"**



OSPR GIS Applications Discussed Herein

- Contingency Planning
- Emergency Response
- Resource at Risk Assessment
- Public Relations
- Remote Sensing Research

Area Contingency Plans

North Coast

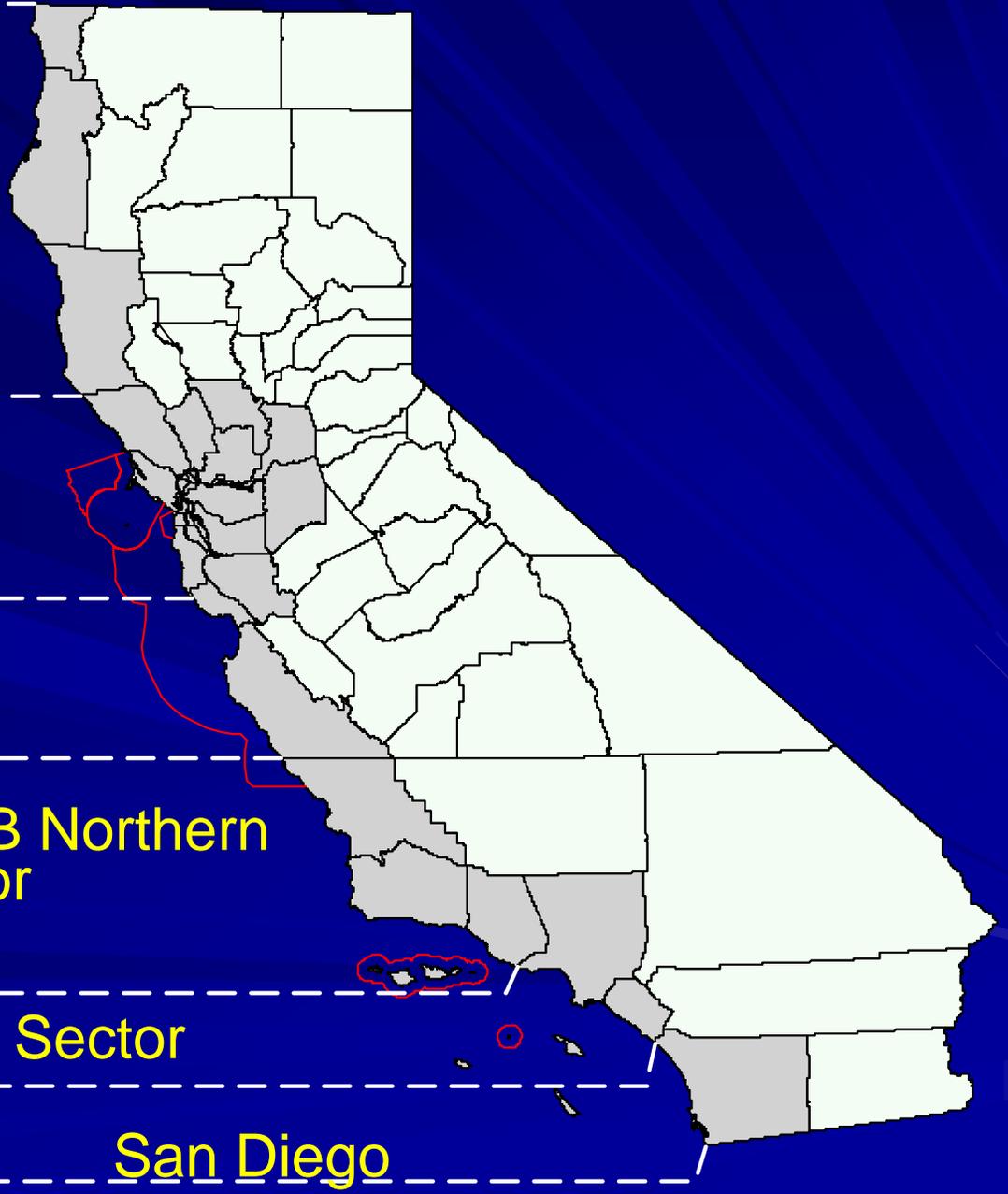
San Francisco
Bay & Delta

Central Coast

LA/LB Northern
Sector

LA/LB Southern Sector

San Diego



Contingency Planning



San Pablo Bay Sensitive Sites



Site Protection Strategy (Napa Slough)



Contingency Planning

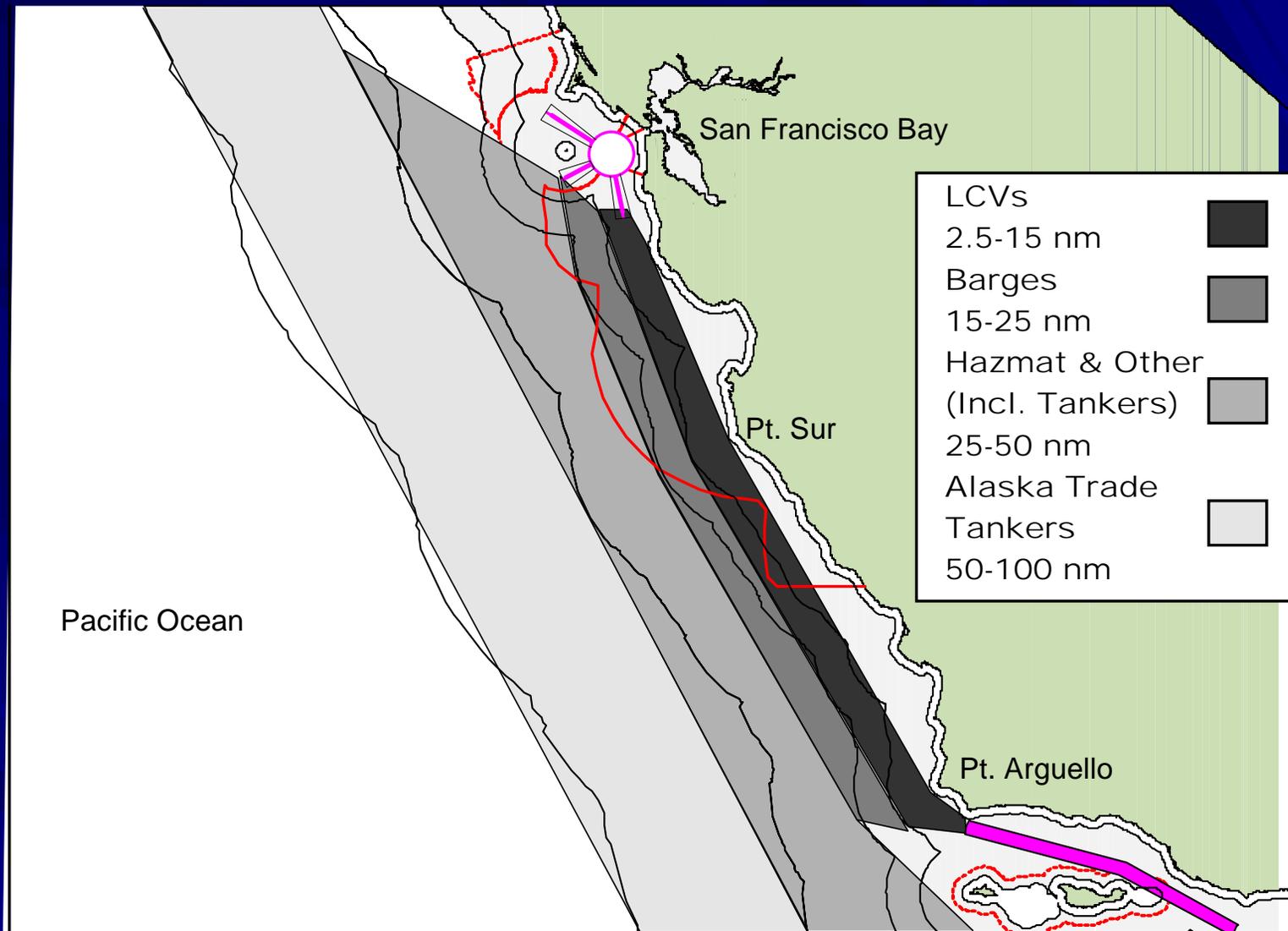
MBNMS Vessel Traffic Safety Public Workshop

Work Group Composition

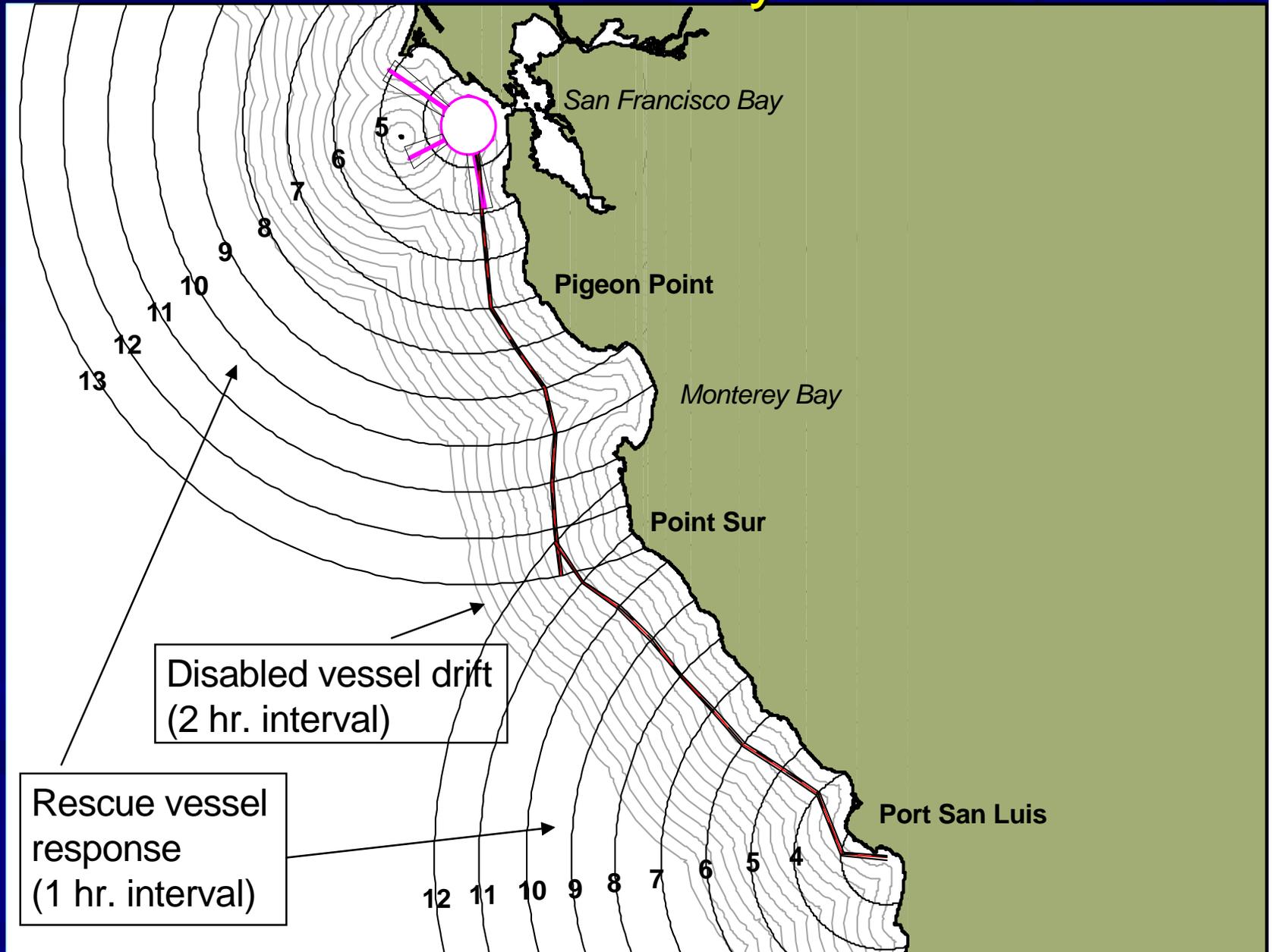


Contingency Planning

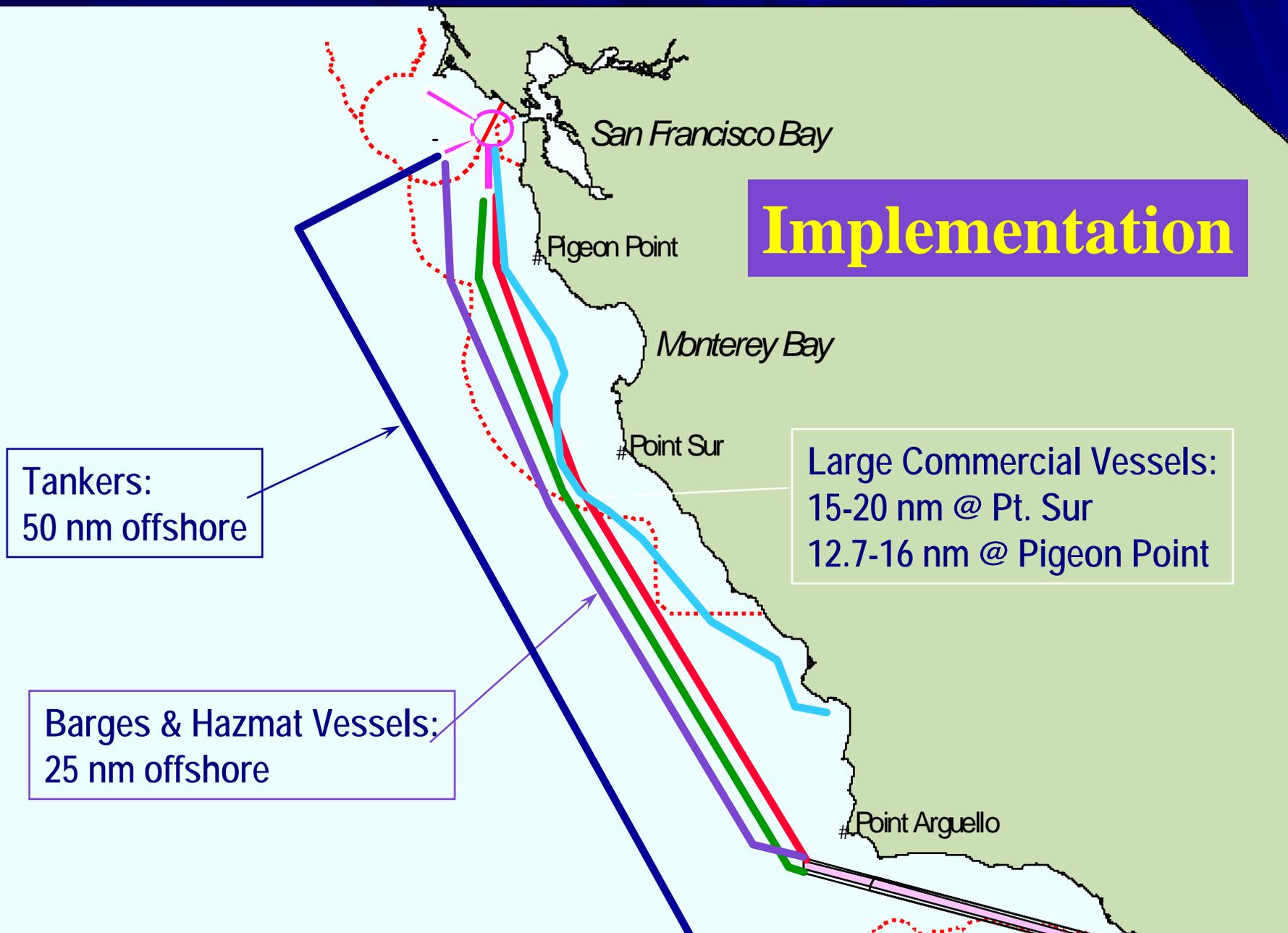
Current Vessel Traffic



Contingency Planning Drift Analysis



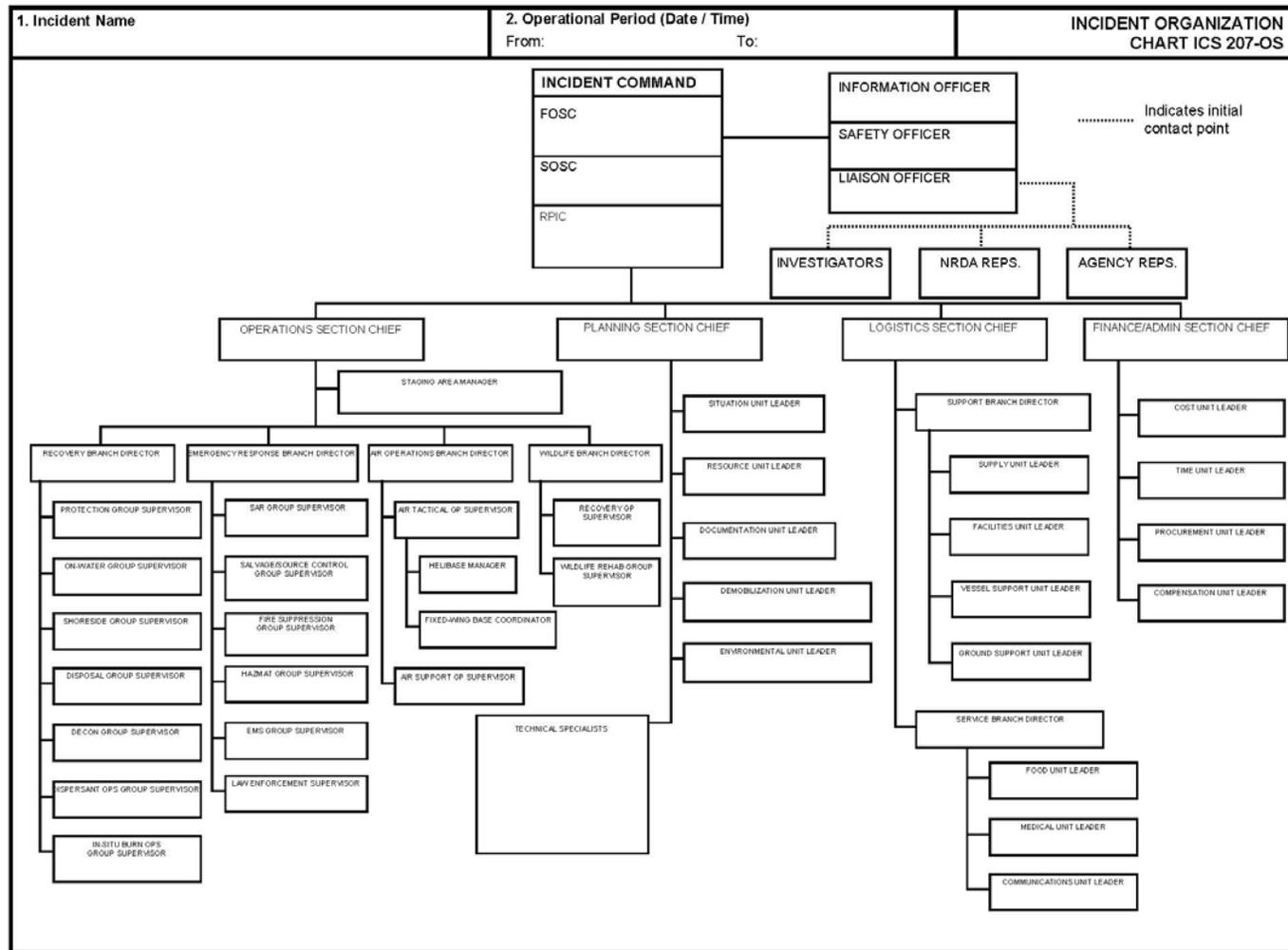
Contingency Planning

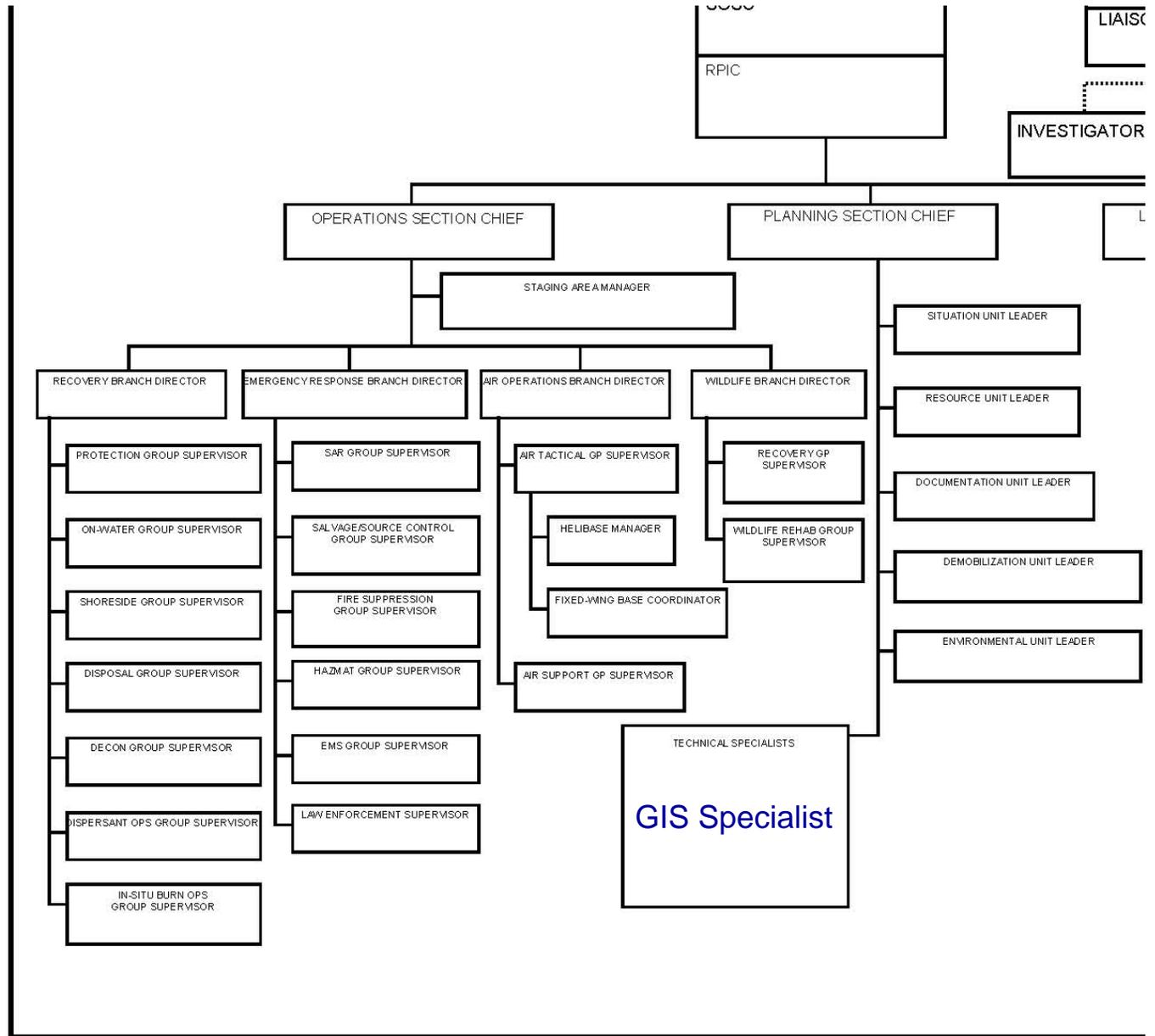


EMERGENCY RESPONSE



The Incident Command System (ICS)





1. Incident Name

2. Operational Period (Date / Time)

From:

To:

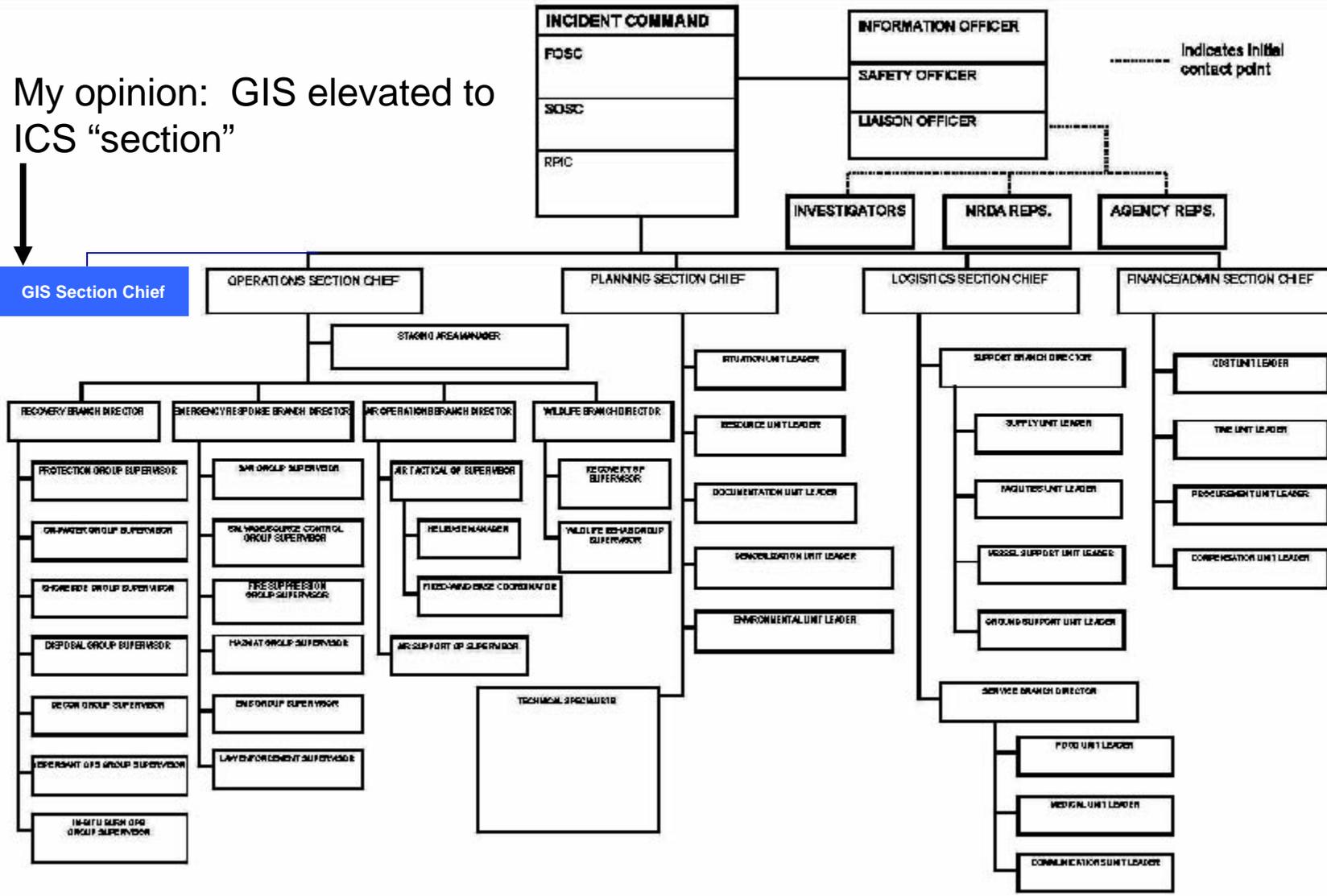
INCIDENT ORGANIZATION

CHART ICS 207-03

My opinion: GIS elevated to ICS "section"

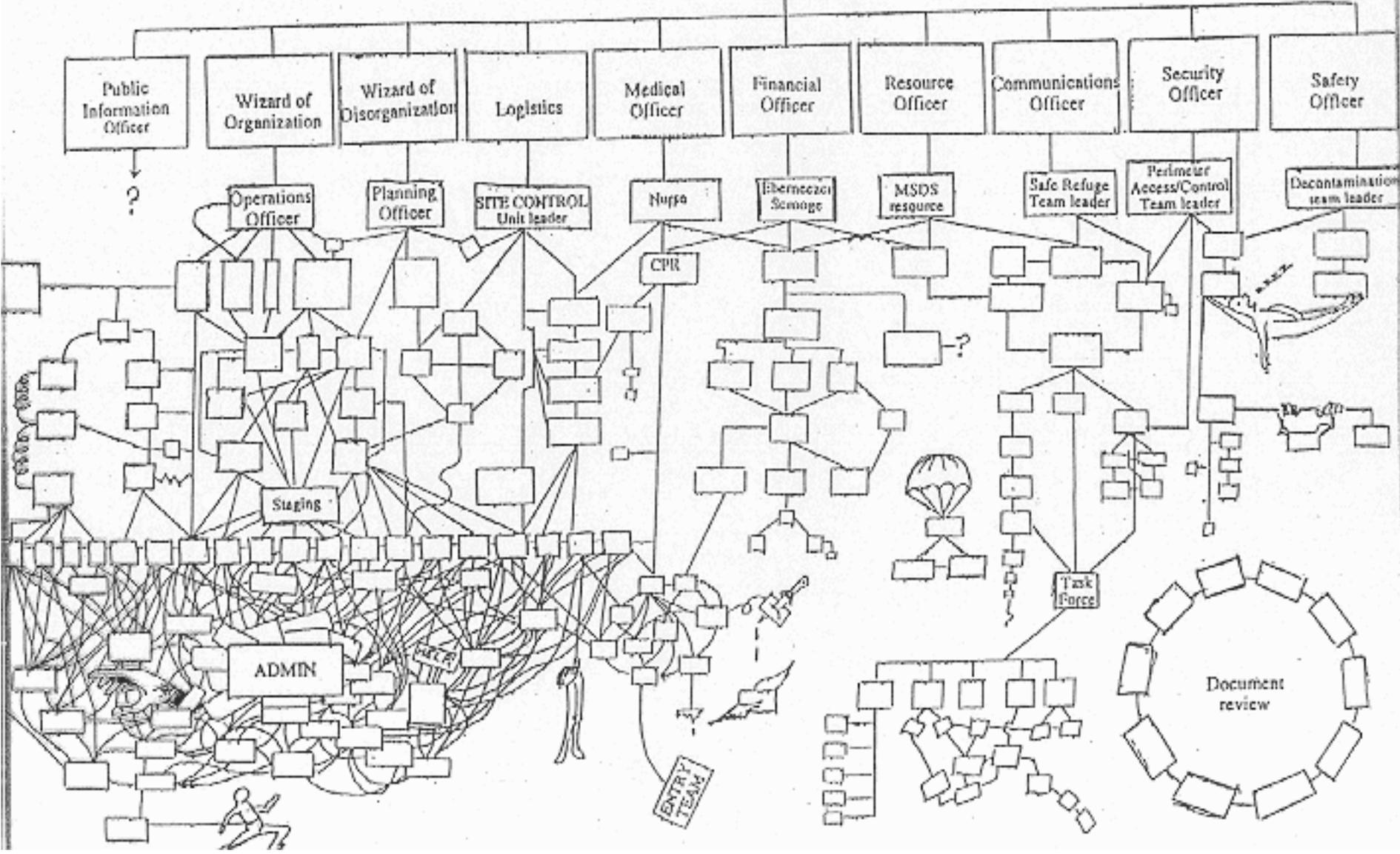


GIS Section Chief



ICS

INCIDENT
COMMANDER



Emergency Response GIS SUPPORT

- **Base Maps** (Operational Divisions, SCAT Segments, Beach Access)
- **Sample Location maps**
- **Wildlife Stranding**
- **Resources at Risk**
- **Shoreline Cleanup Assessment Team (SCAT) Updates (oil stranding)**

Base Maps

Division "Z"

Trinidad Head to Sharp Point

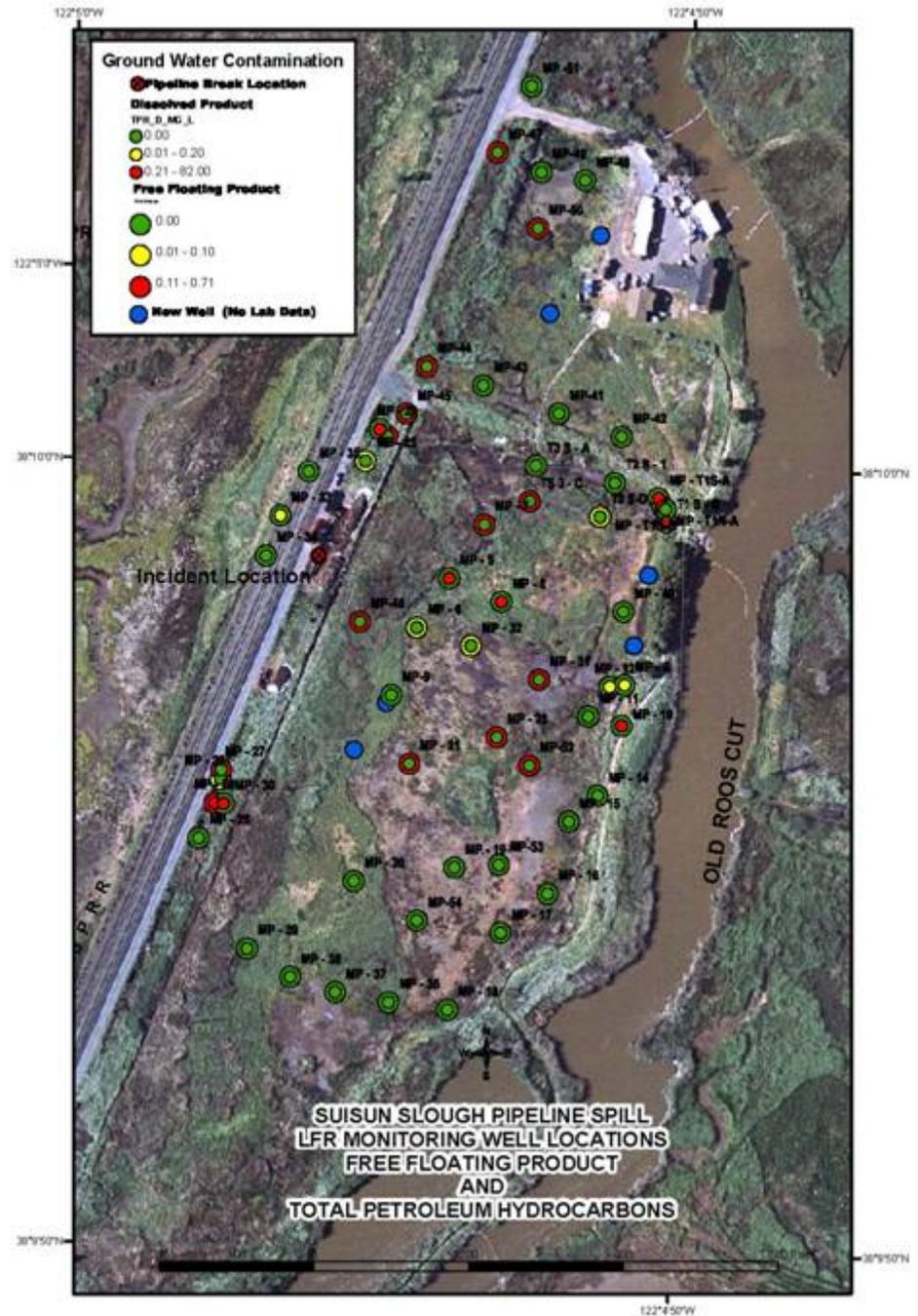
Z



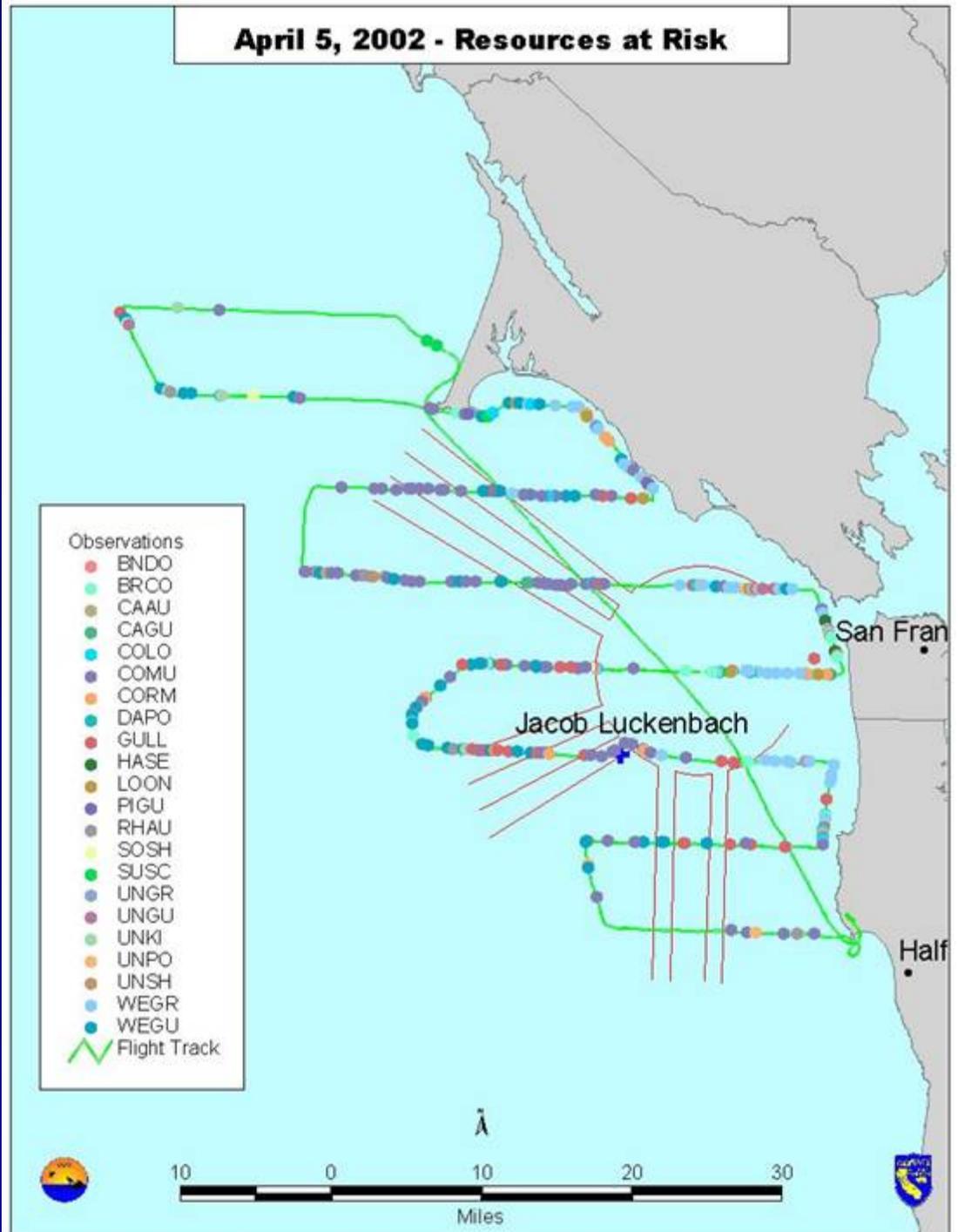


Pipeline Break
Origin

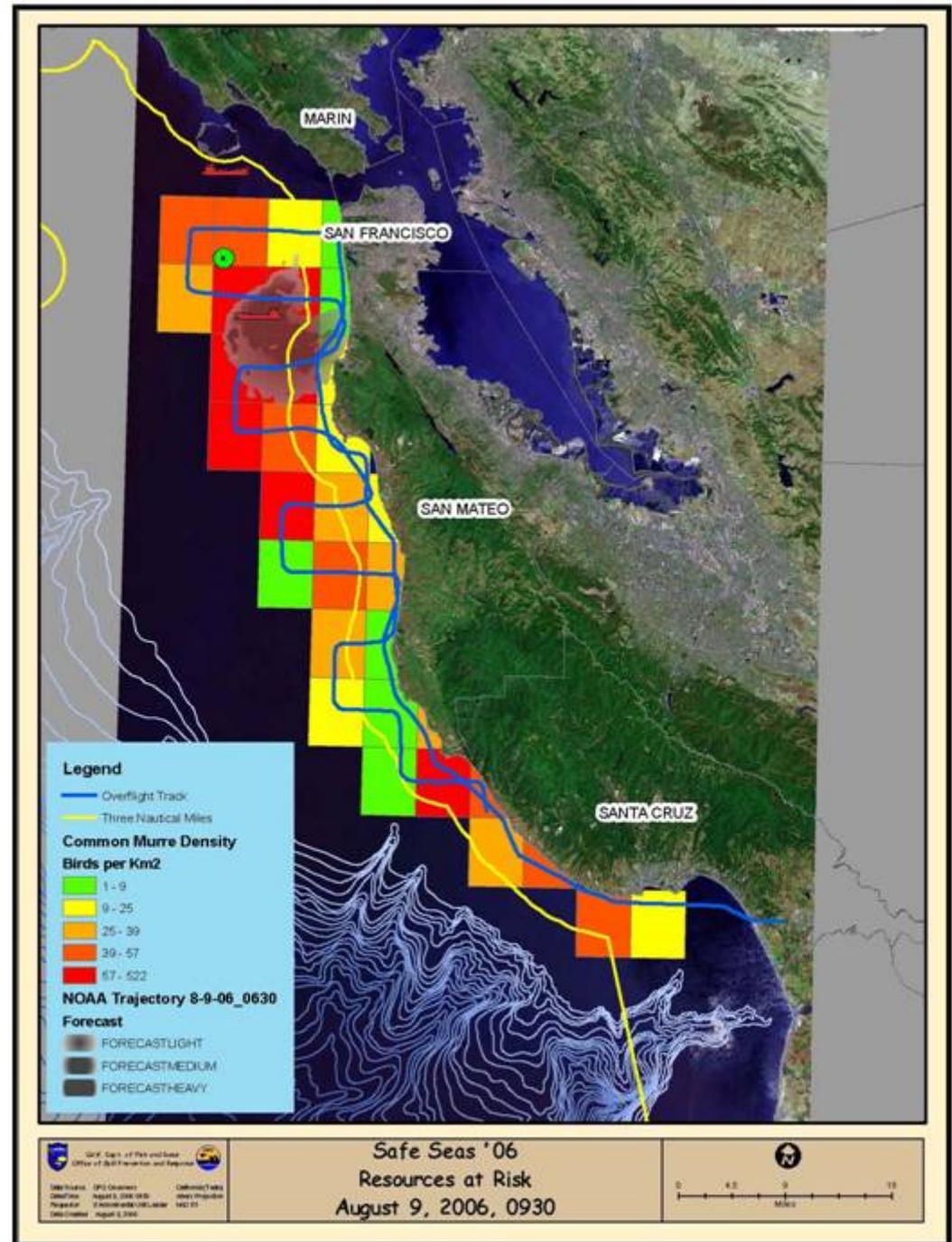
Sampling Locations



Resources at Risk



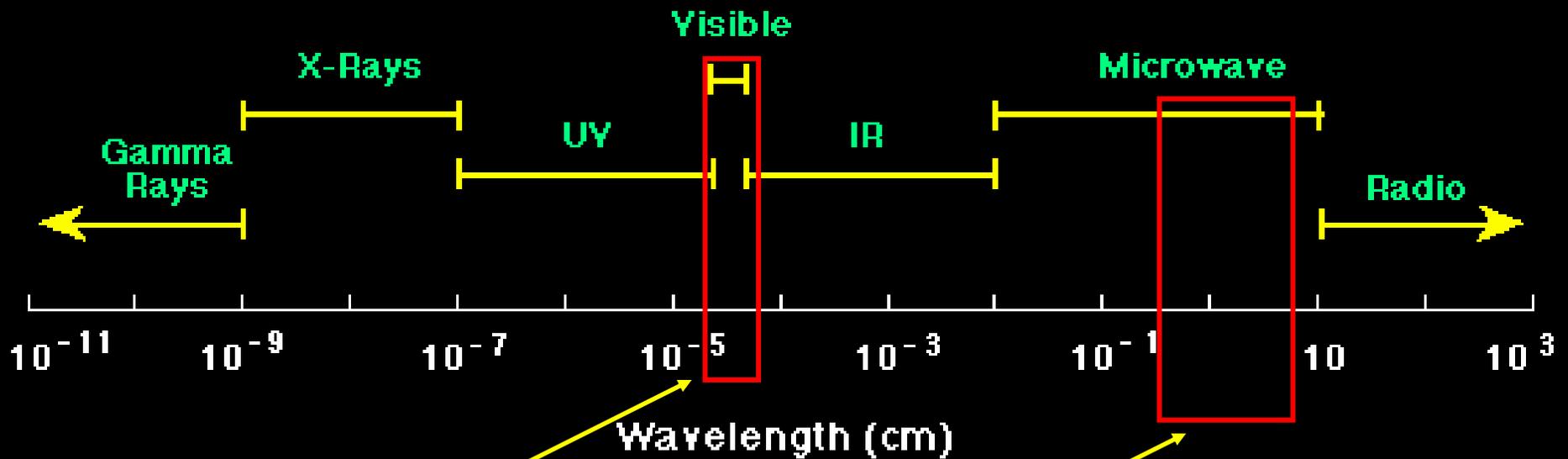
Resources at Risk



Public Relations



RESEARCH



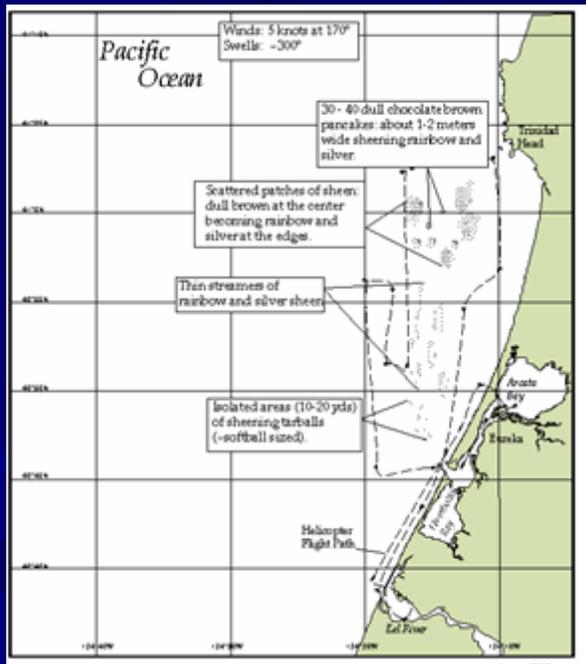
Multispectral

Radar

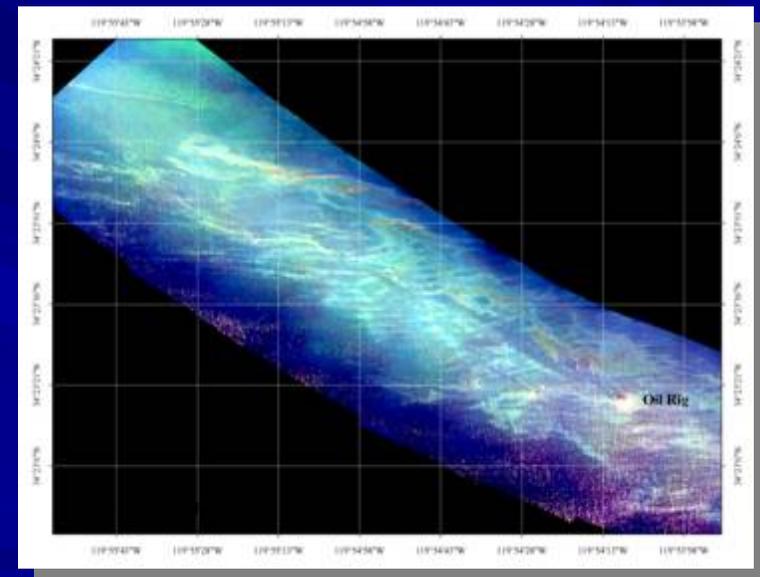
The Electromagnetic Spectrum

Project Objective:

Develop operational aerial imaging technology that would enable real-time oil spill mapping.



From This → To This



DMSC-MK2 Four Channel Aerial Sensor



Technical Approach:

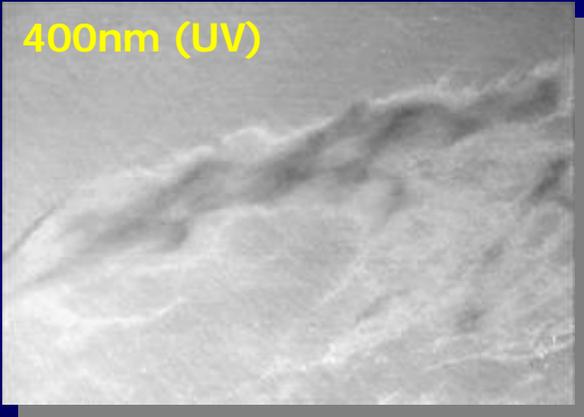
Determine best wavelength combination for oil detection

False target elimination

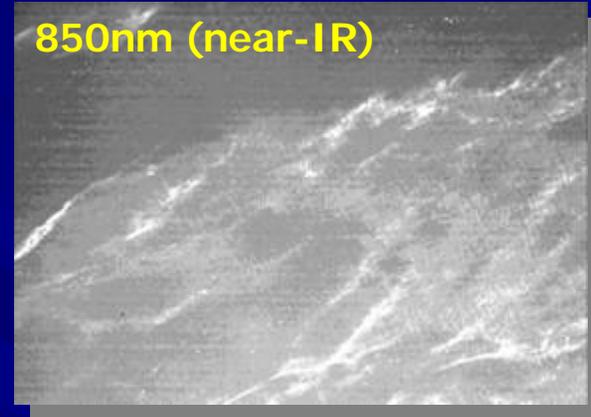


Oil on Water Detection

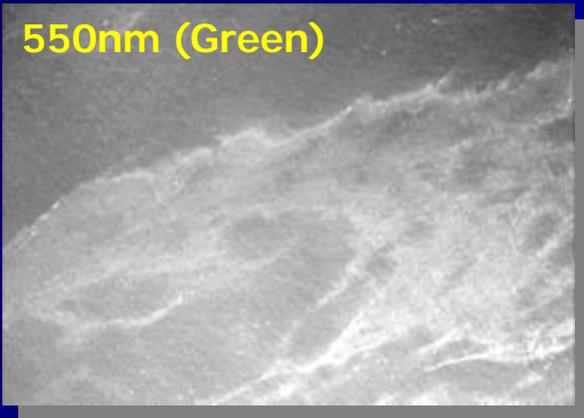
400nm (UV)



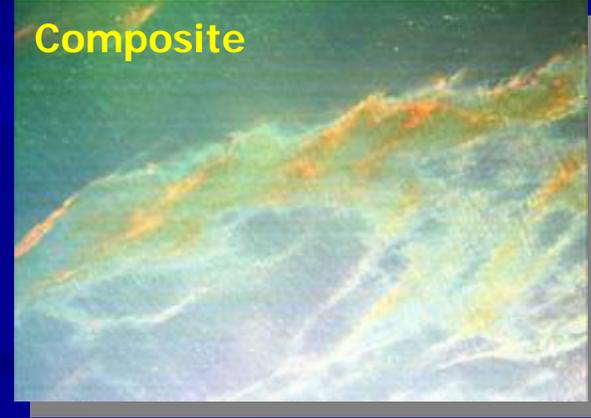
850nm (near-IR)



550nm (Green)

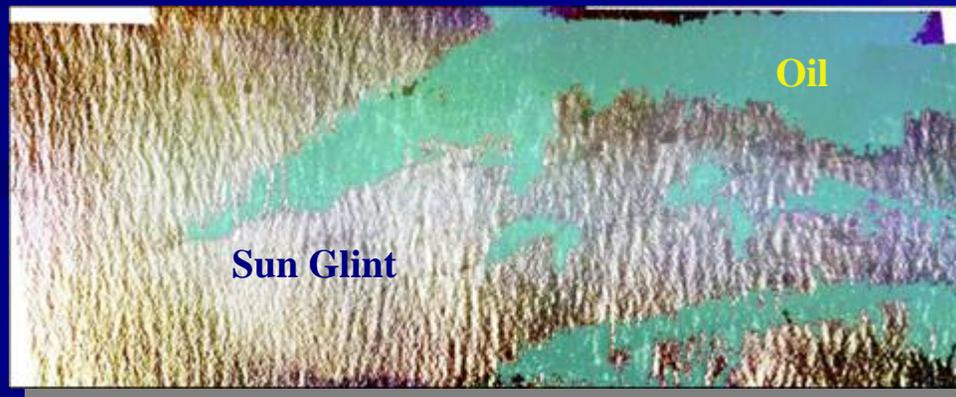
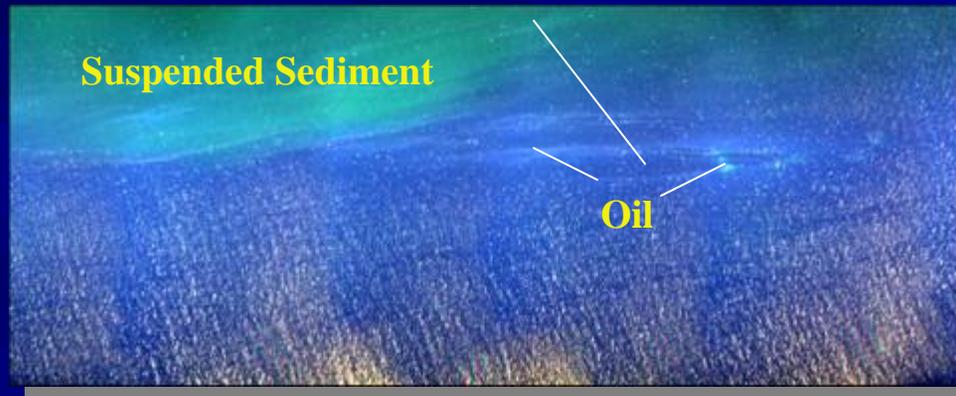
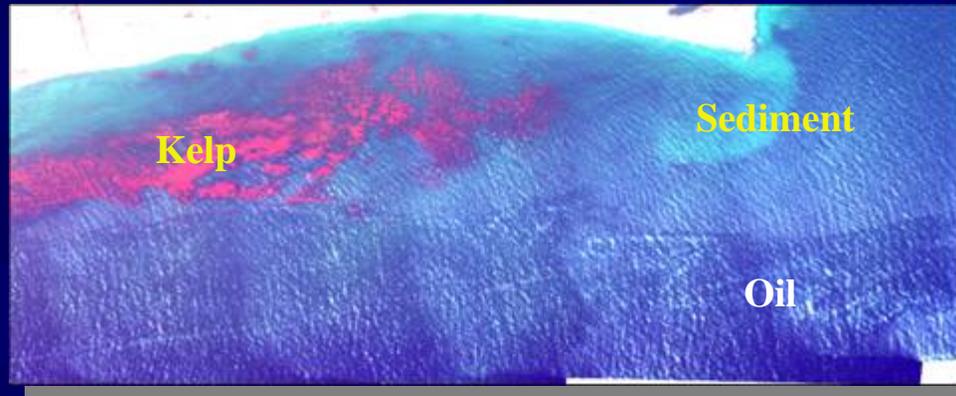


Composite



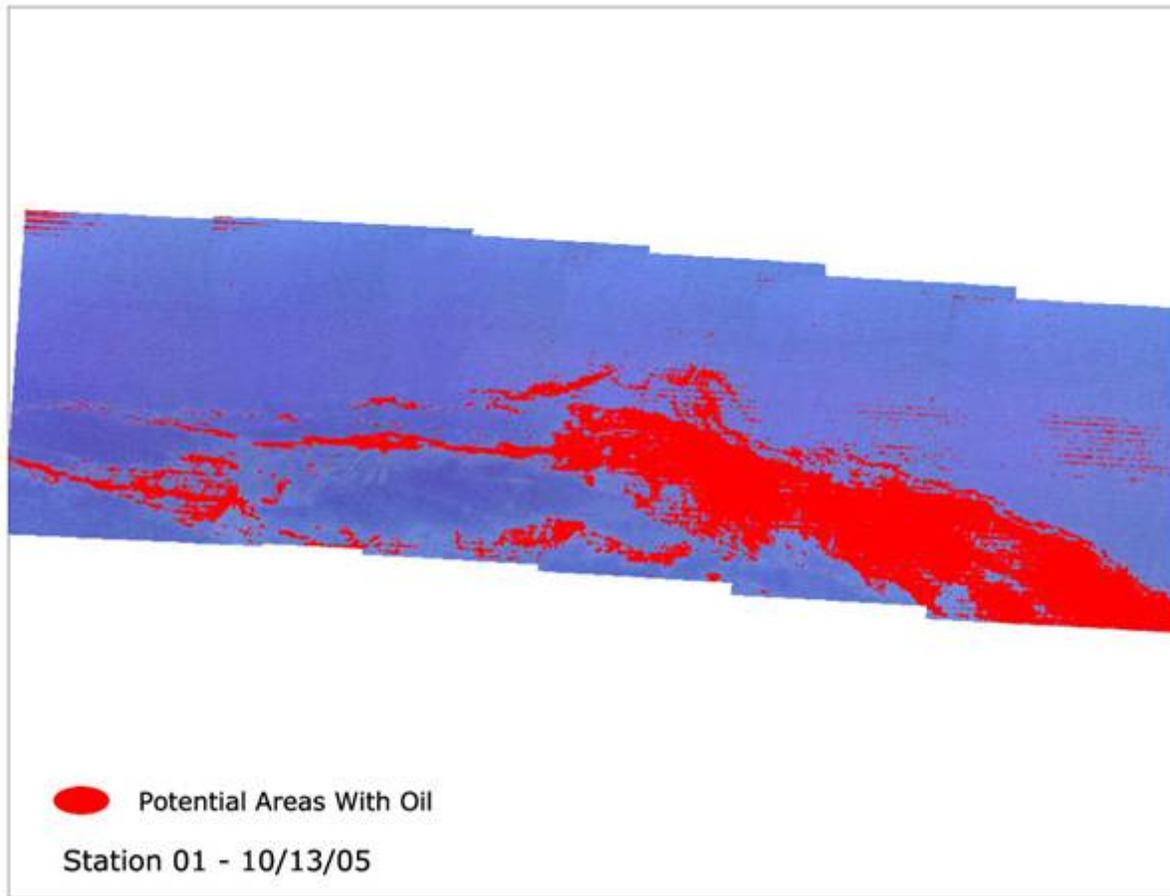
Two test flights over Santa Barbara Channel seeps were conducted in mid-2004

Elimination of False Targets





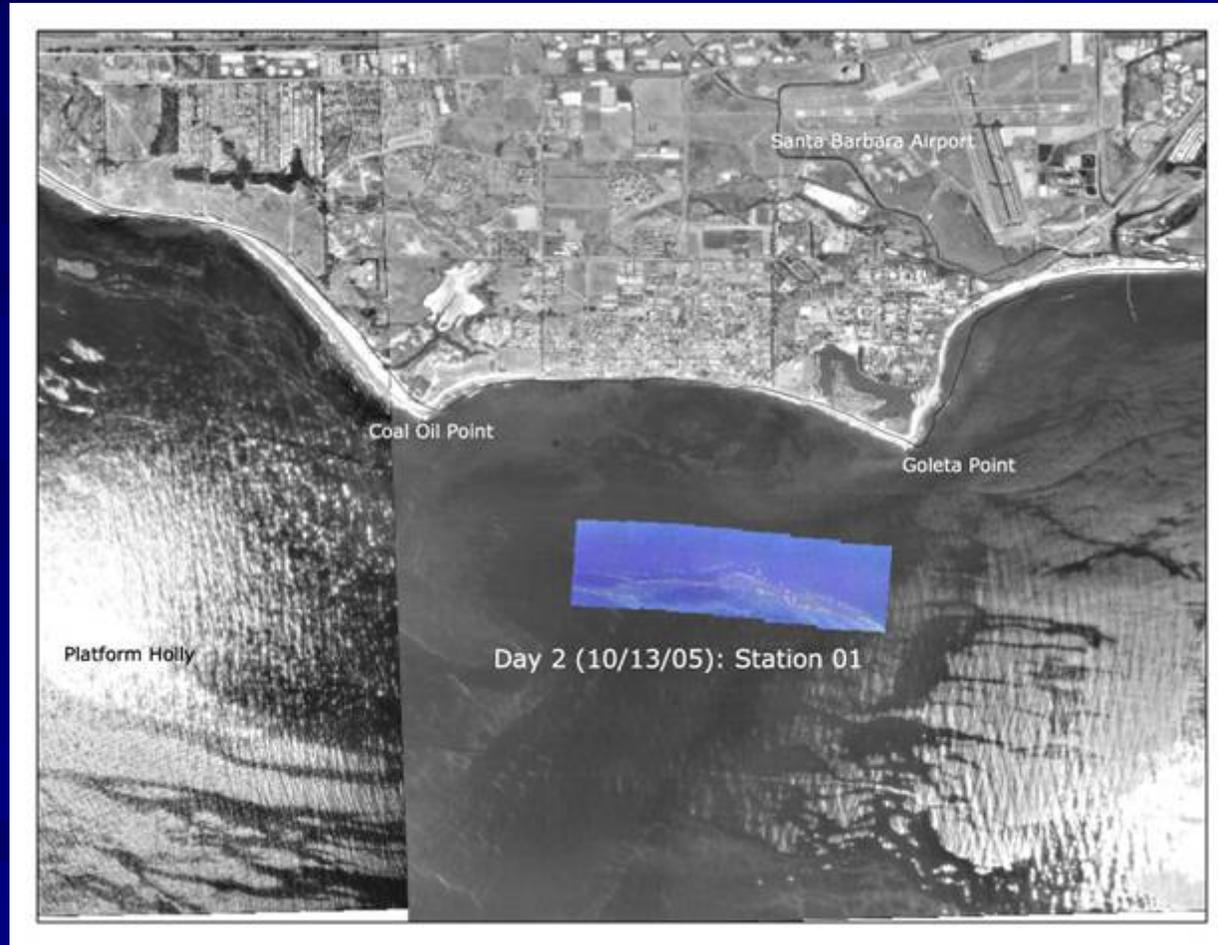
Station 01 - 10/13/05



● Potential Areas With Oil

Station 01 - 10/13/05

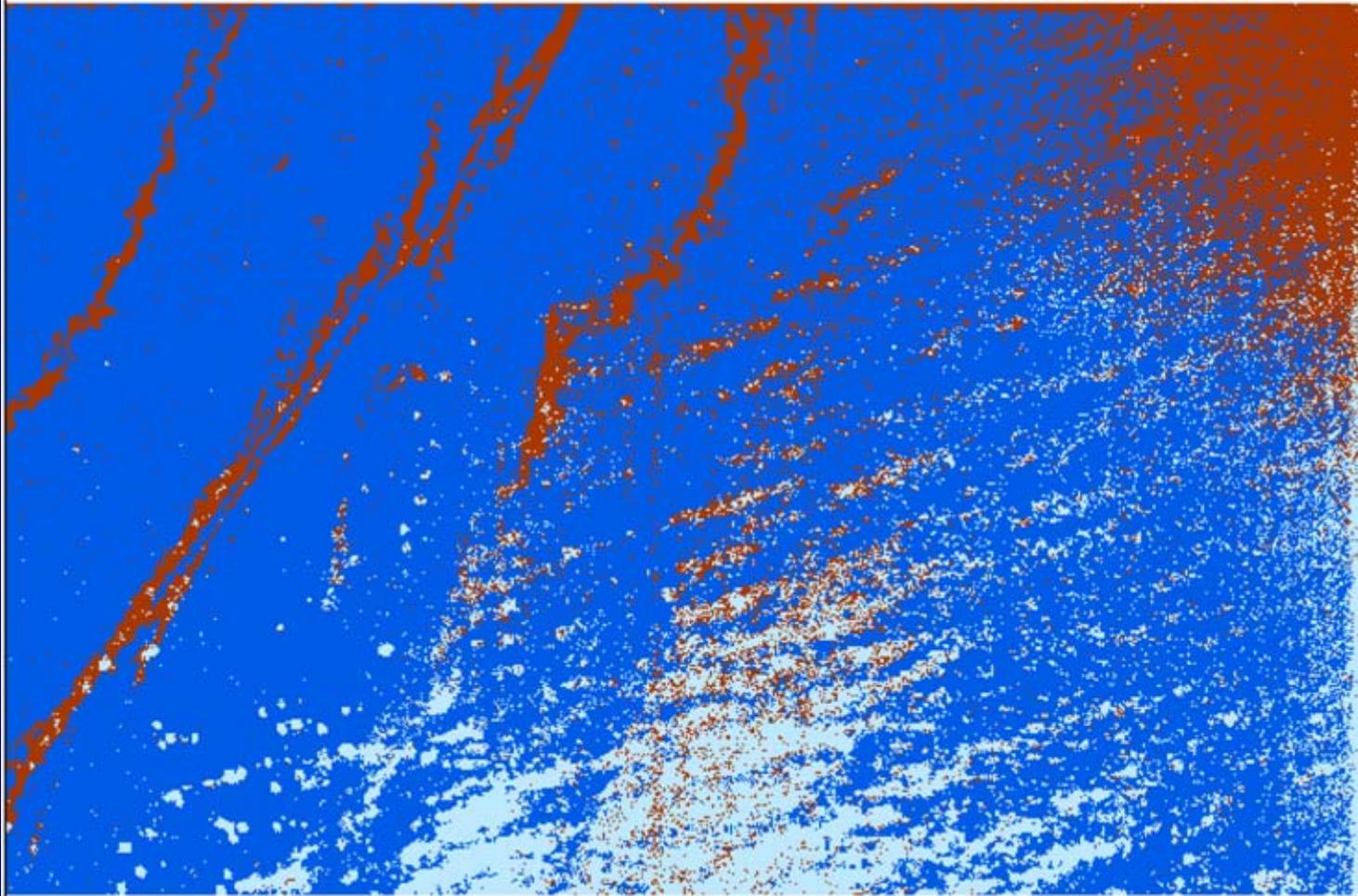
Coal Oil Point



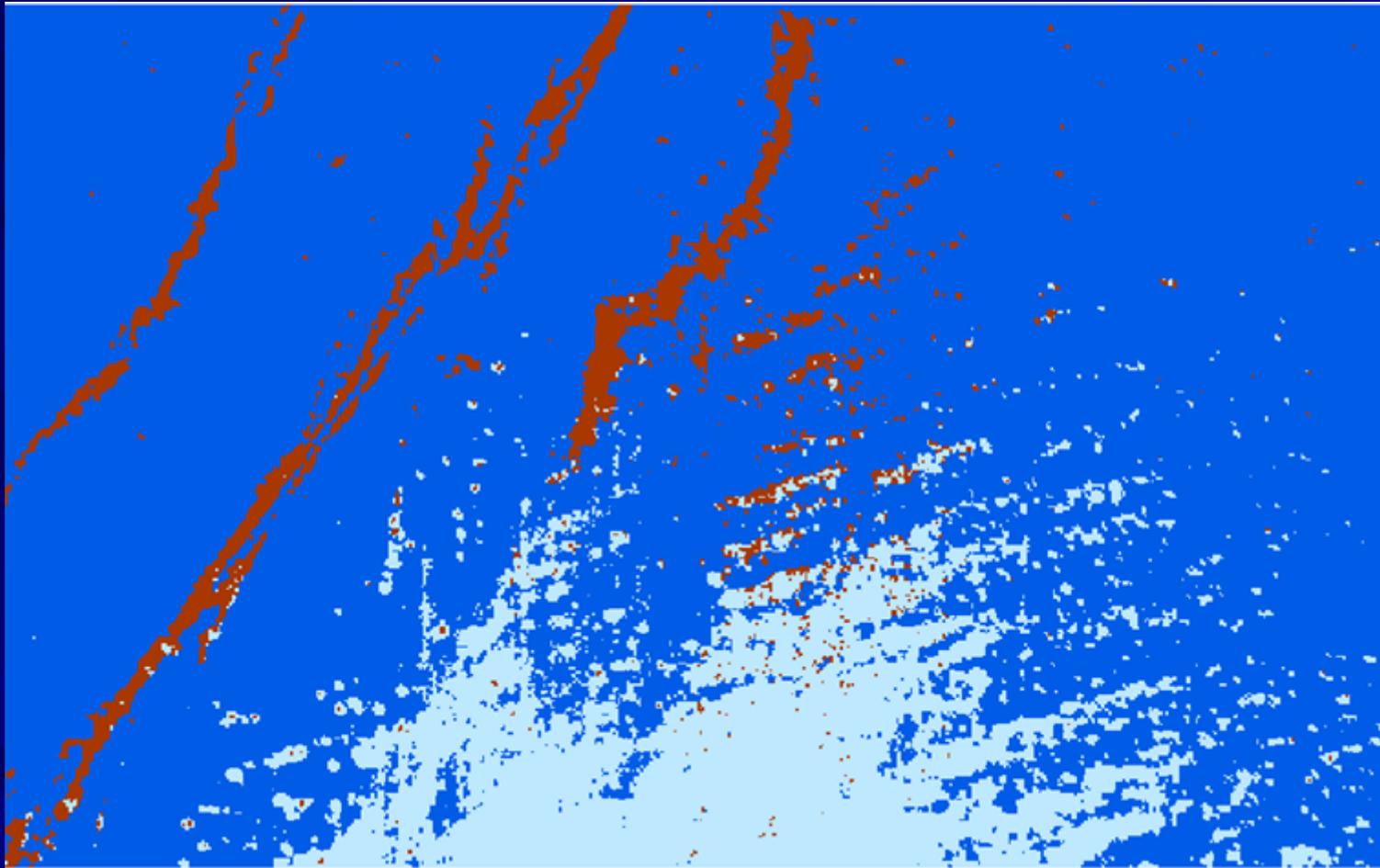
Composite Image



Initial Processing

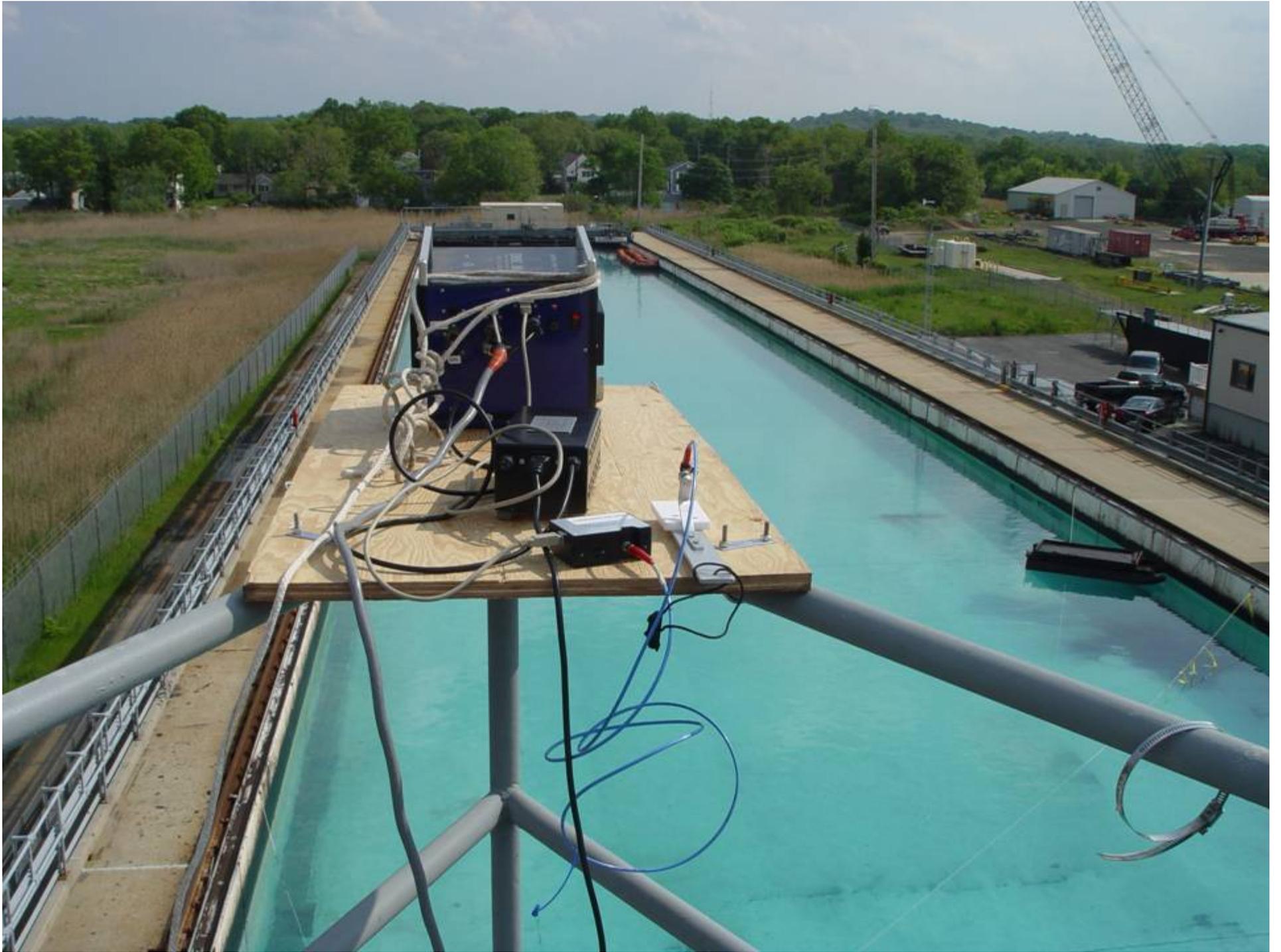


Neural Result



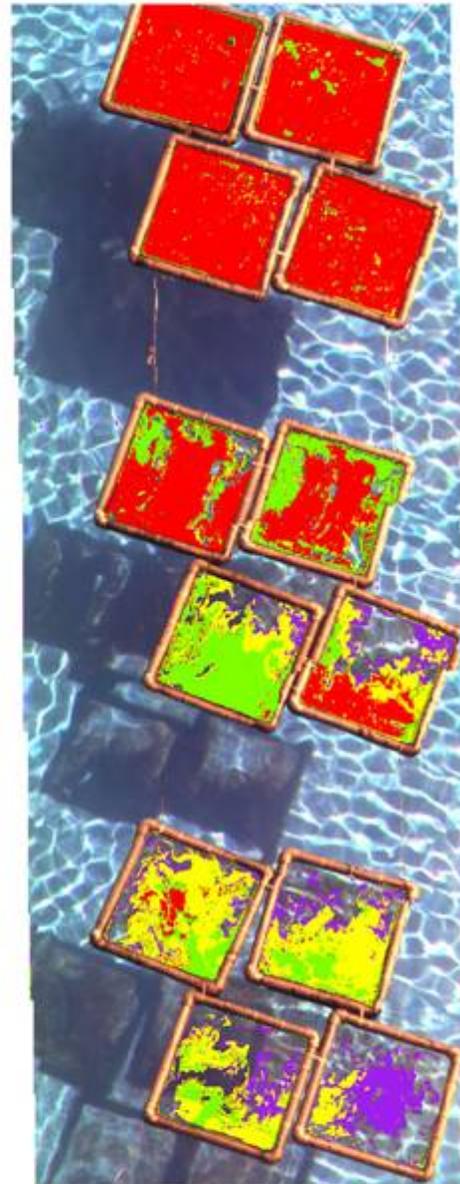
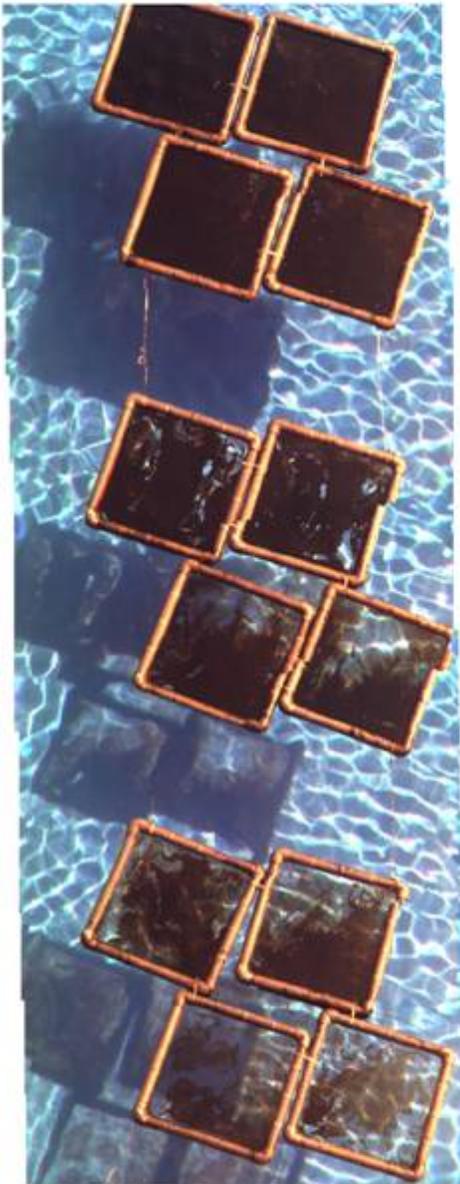
MMS Ohmsett Test Facility







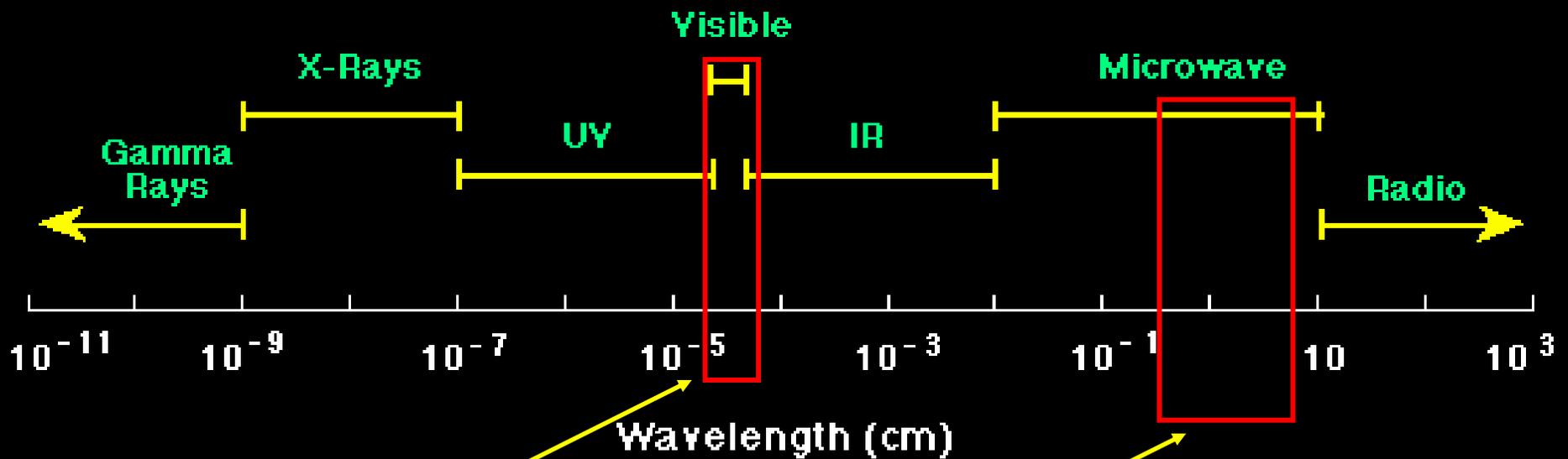




Ohmsett - 05/18/06

- Thinnest ~ 0.01 - 0.05 mm
- Thin ~ 0.05 - 0.20 mm
- Medium ~ 0.20 - 0.40 mm
- Thickness ~ > 0.40mm

RESEARCH



Multispectral

Radar

The Electromagnetic Spectrum

Circulation Tracking and Prediction using High Frequency Radar (CODAR)



HF Radar Coverage Will be Greatly Expanded.



Safe Seas 2006

Gulf of the Farallones and Monterey Bay National Marine Sanctuaries

Situation map with near-real-time ocean observations

Created by NOAA (tim.reed@noaa.gov, 415-561-6622 x237, SIMoN/GFNMS)

USE ONLY AS A GENERAL REFERENCE

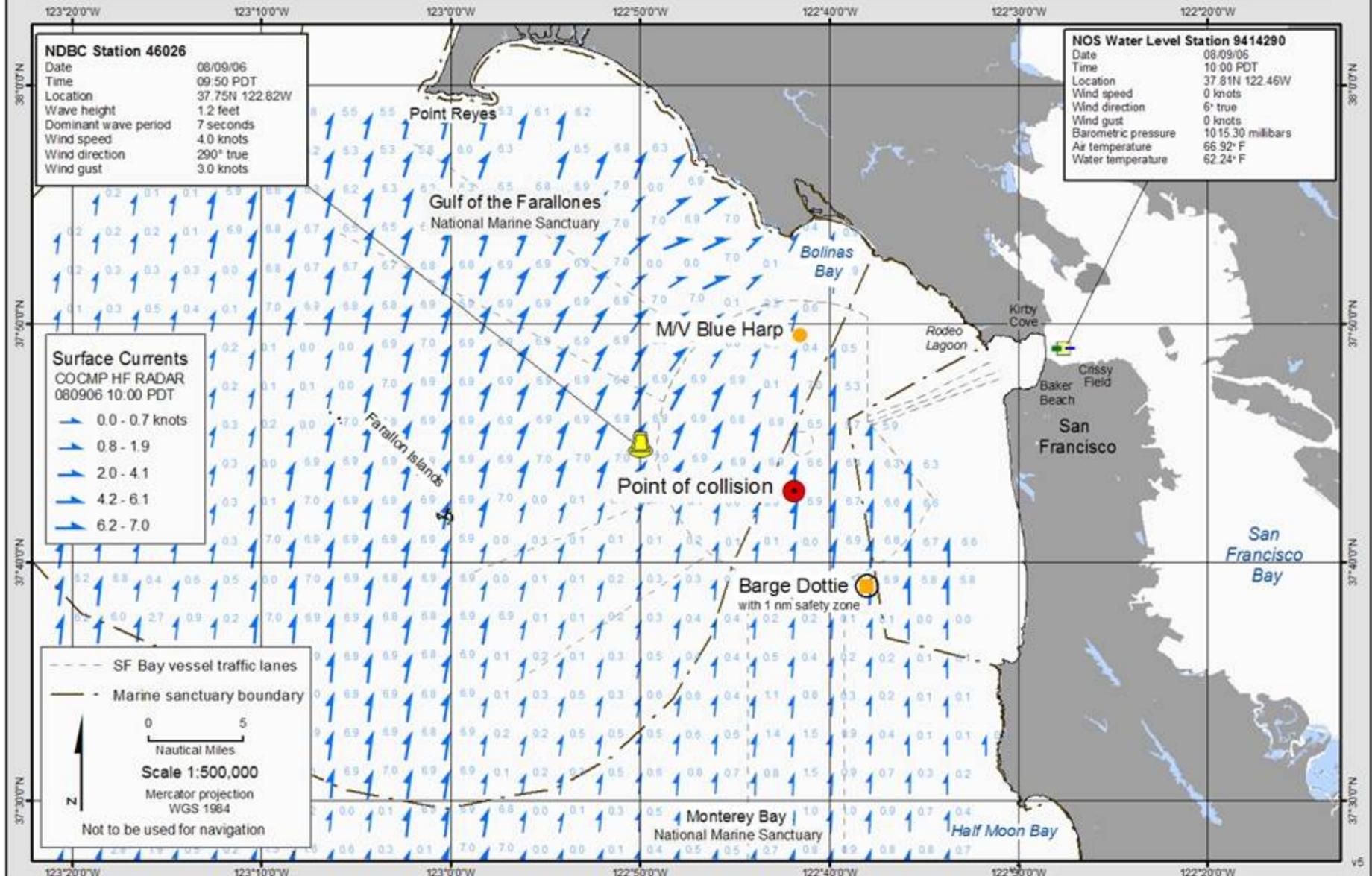
Date/Time: 08/09/06 13:00 PDT

Platform:

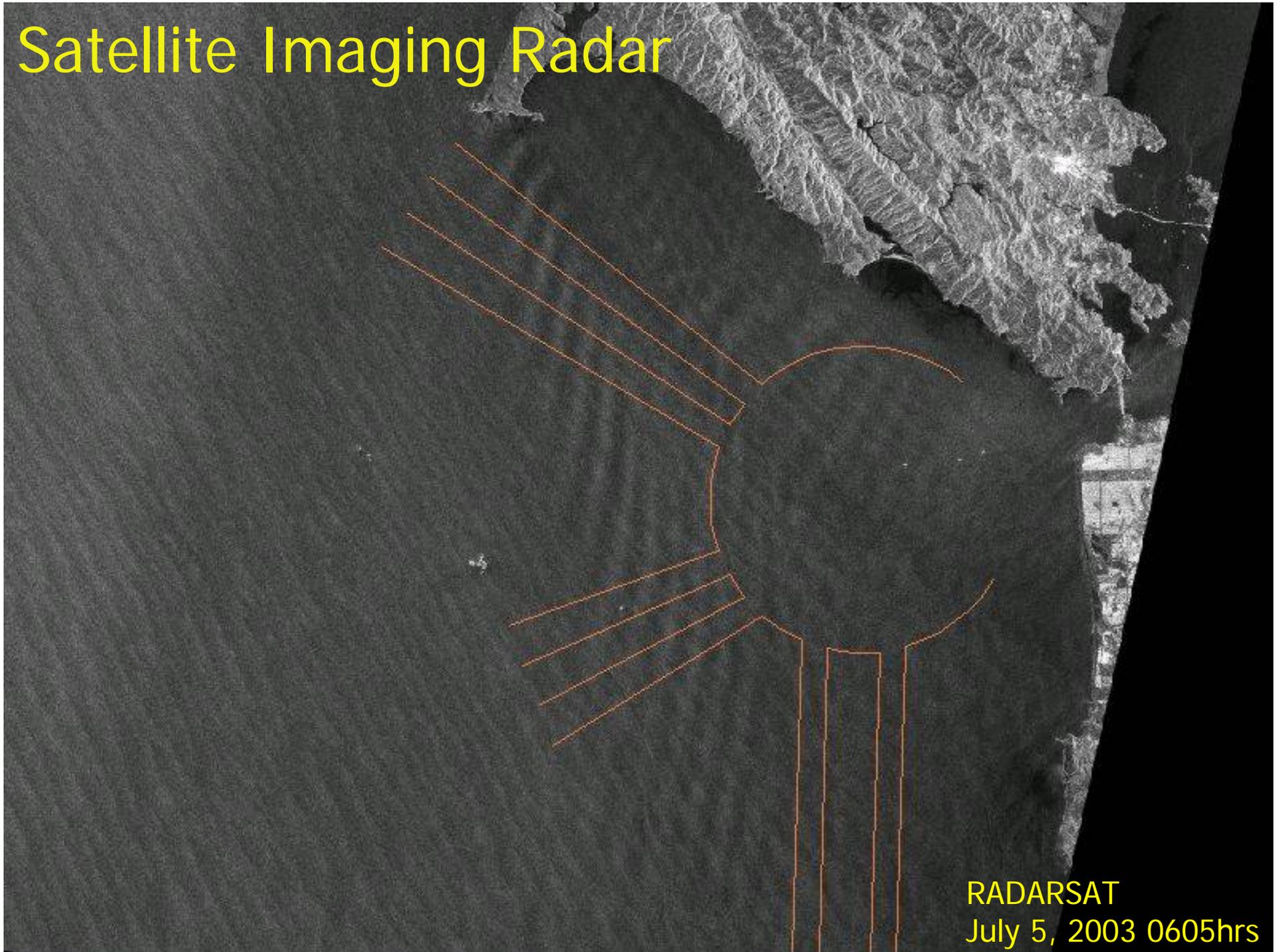
Observers:

DRAFT

Observations may not be concurrent.



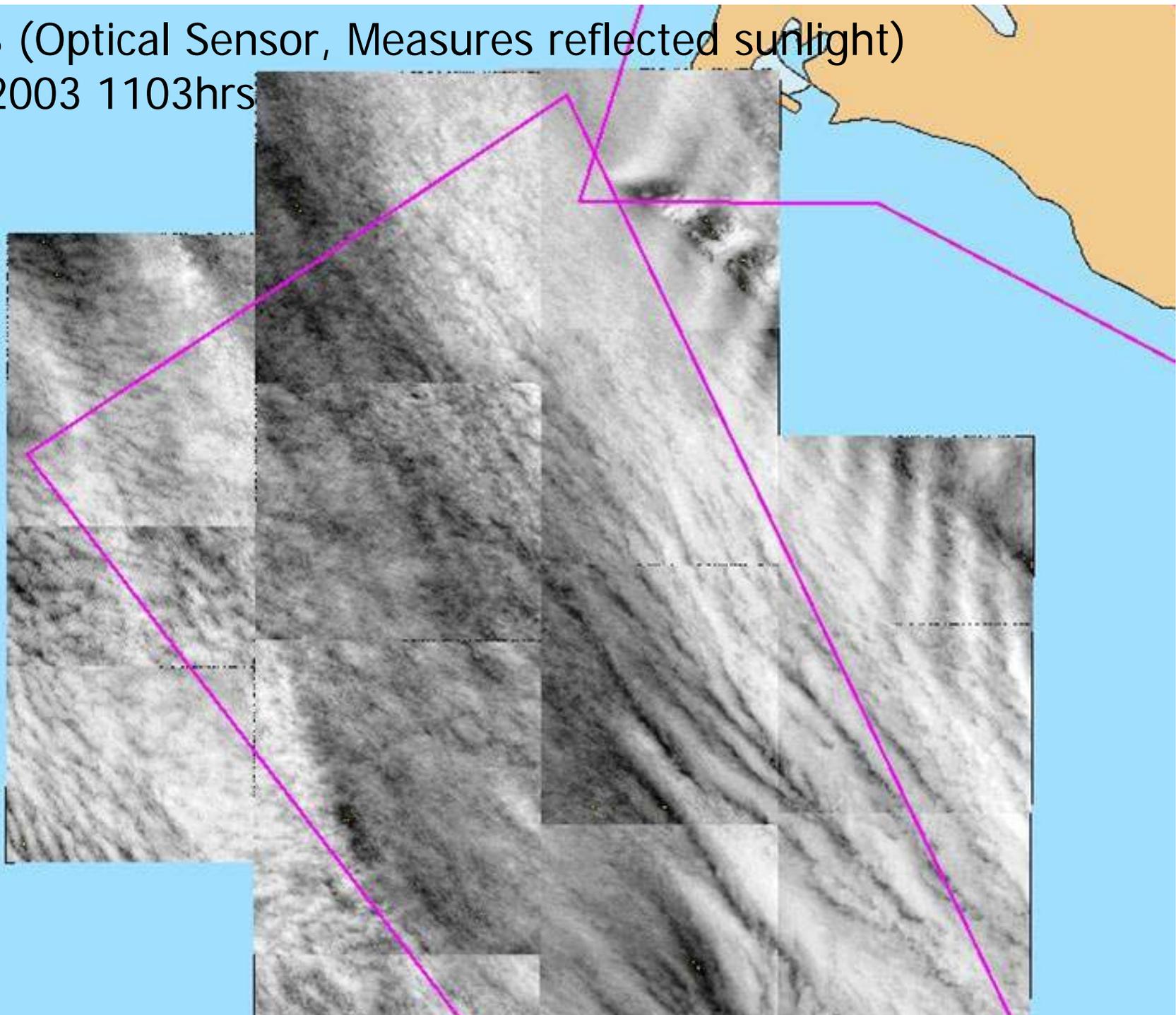
Satellite Imaging Radar



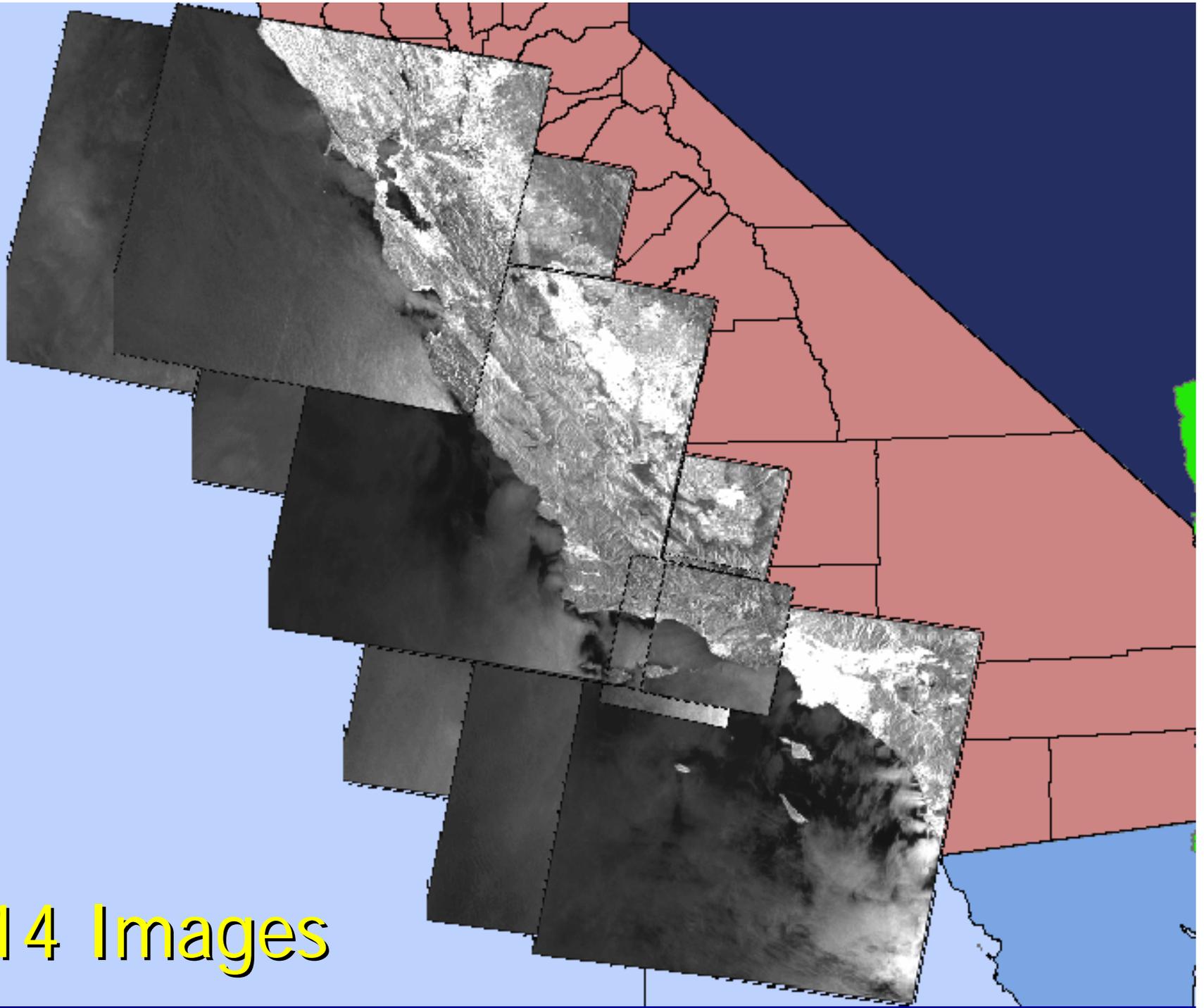
RADARSAT
July 5, 2003 0605hrs

IKONOS (Optical Sensor, Measures reflected sunlight)

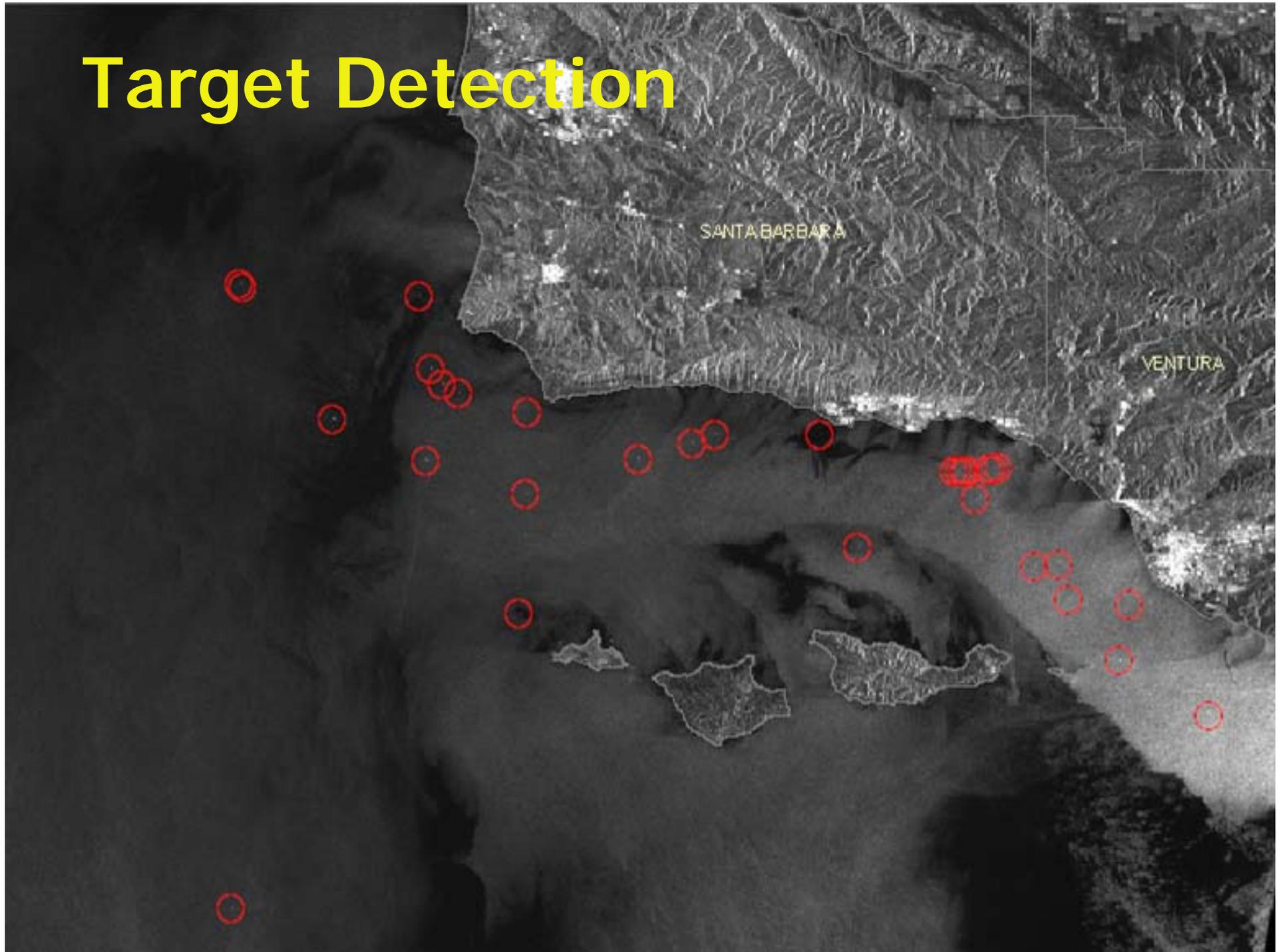
July 5, 2003 1103hrs



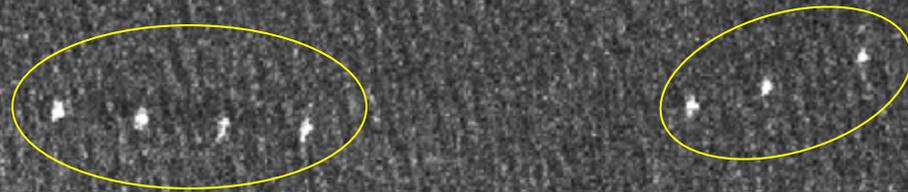
14 Images



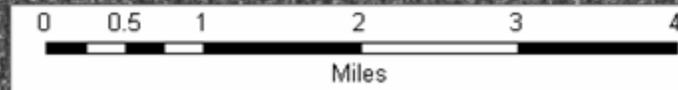
Target Detection



Target Detection Classification 4:

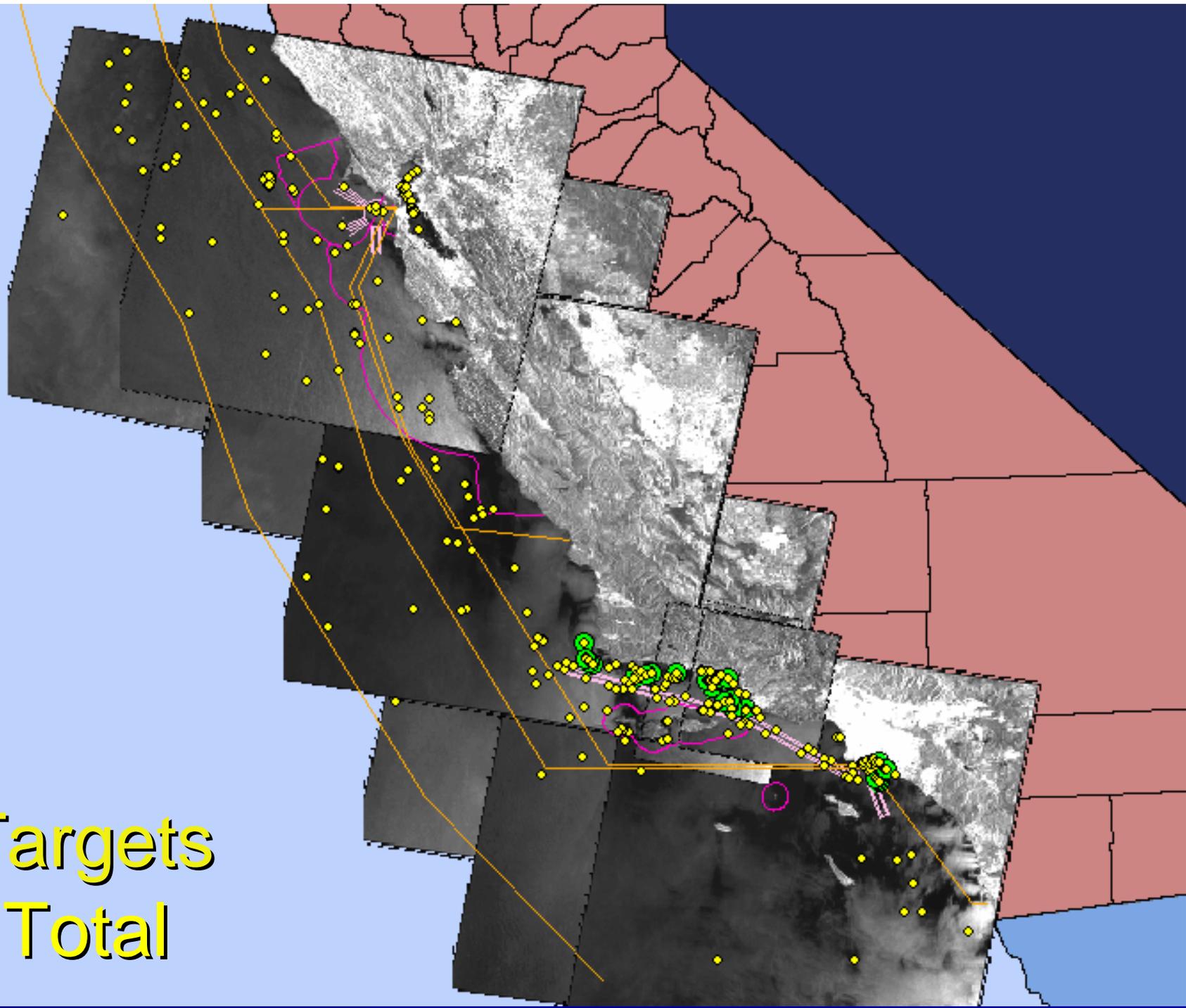


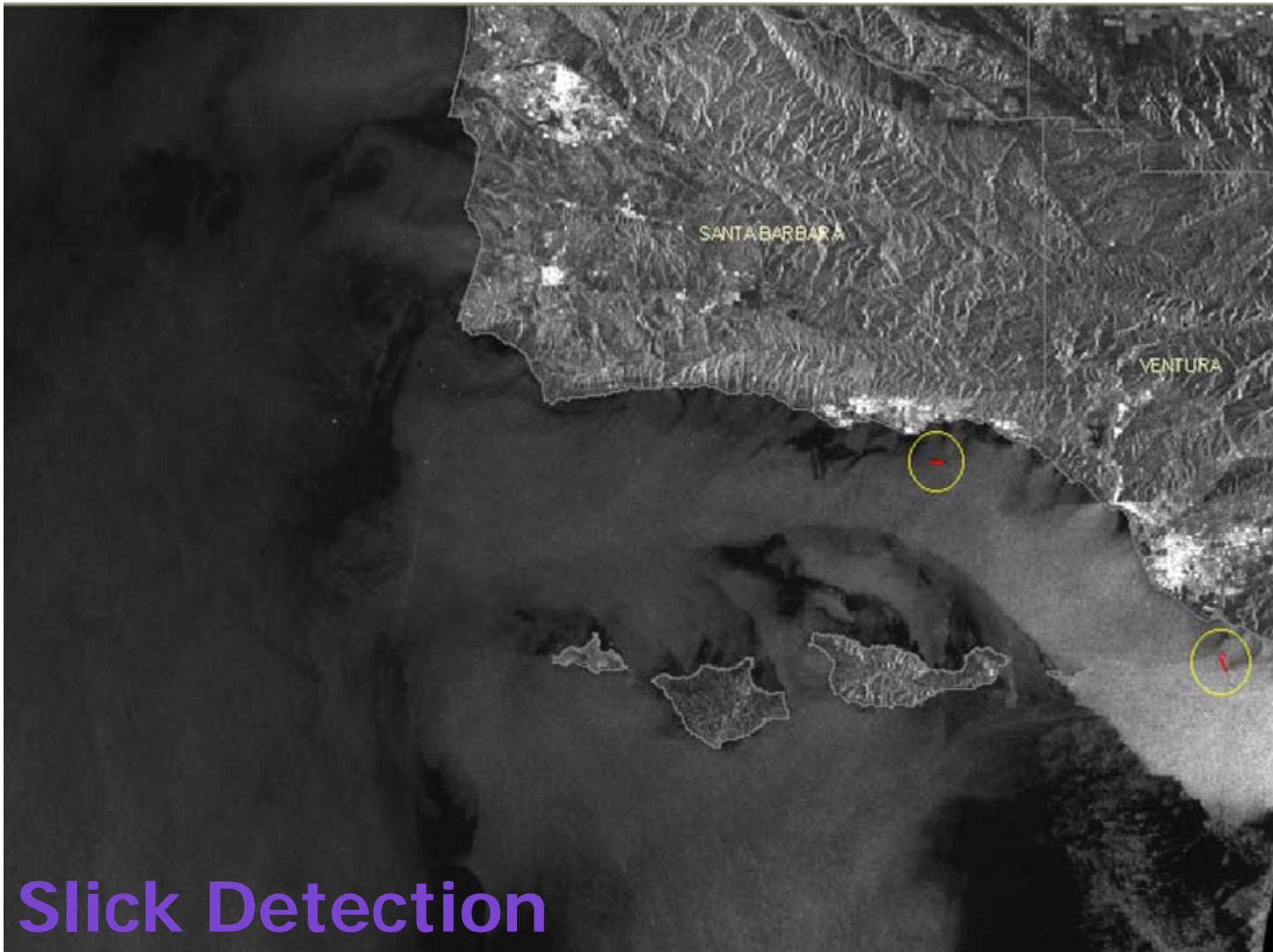
Confirmed Stationary Target



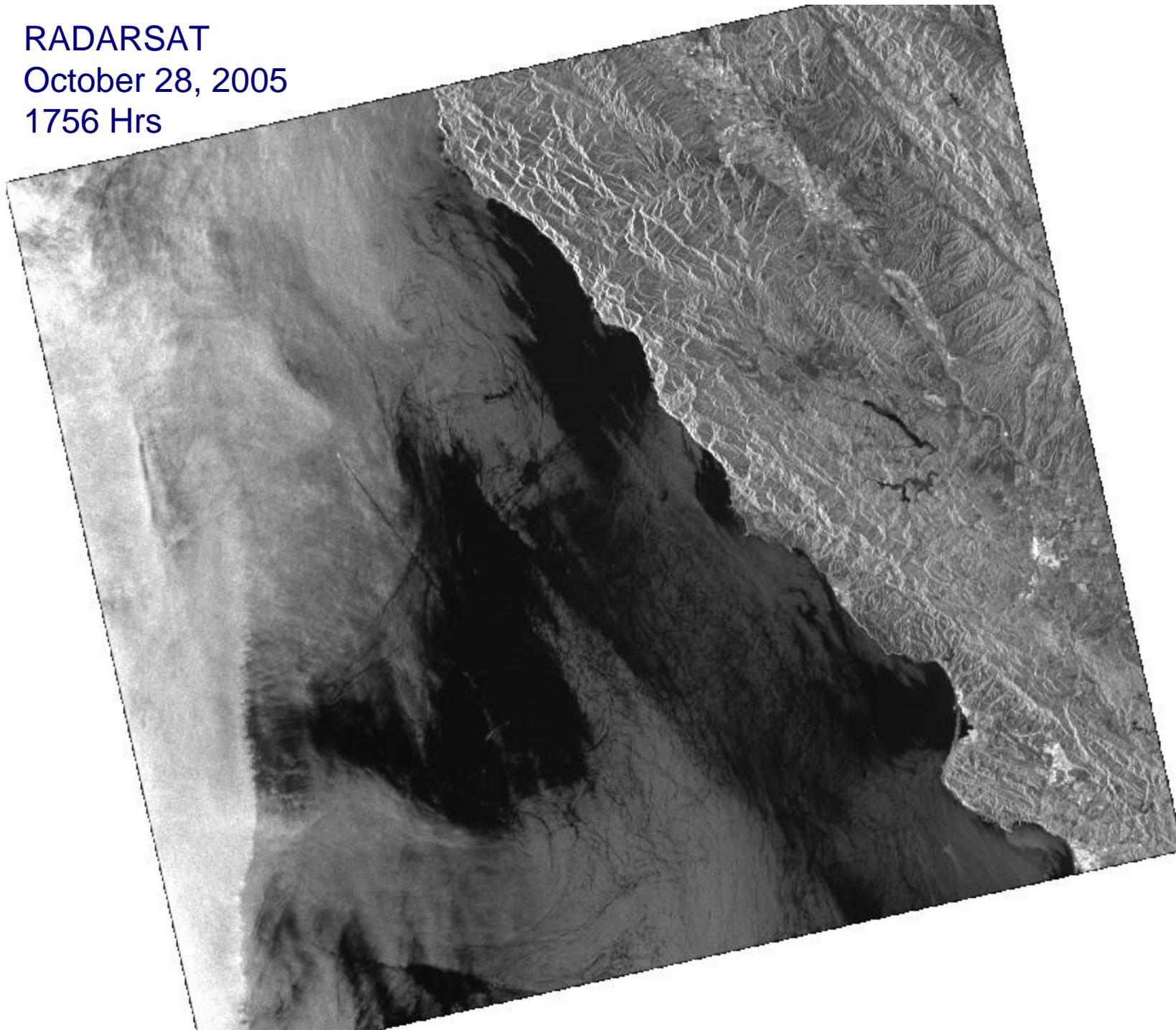
January 28, 2005

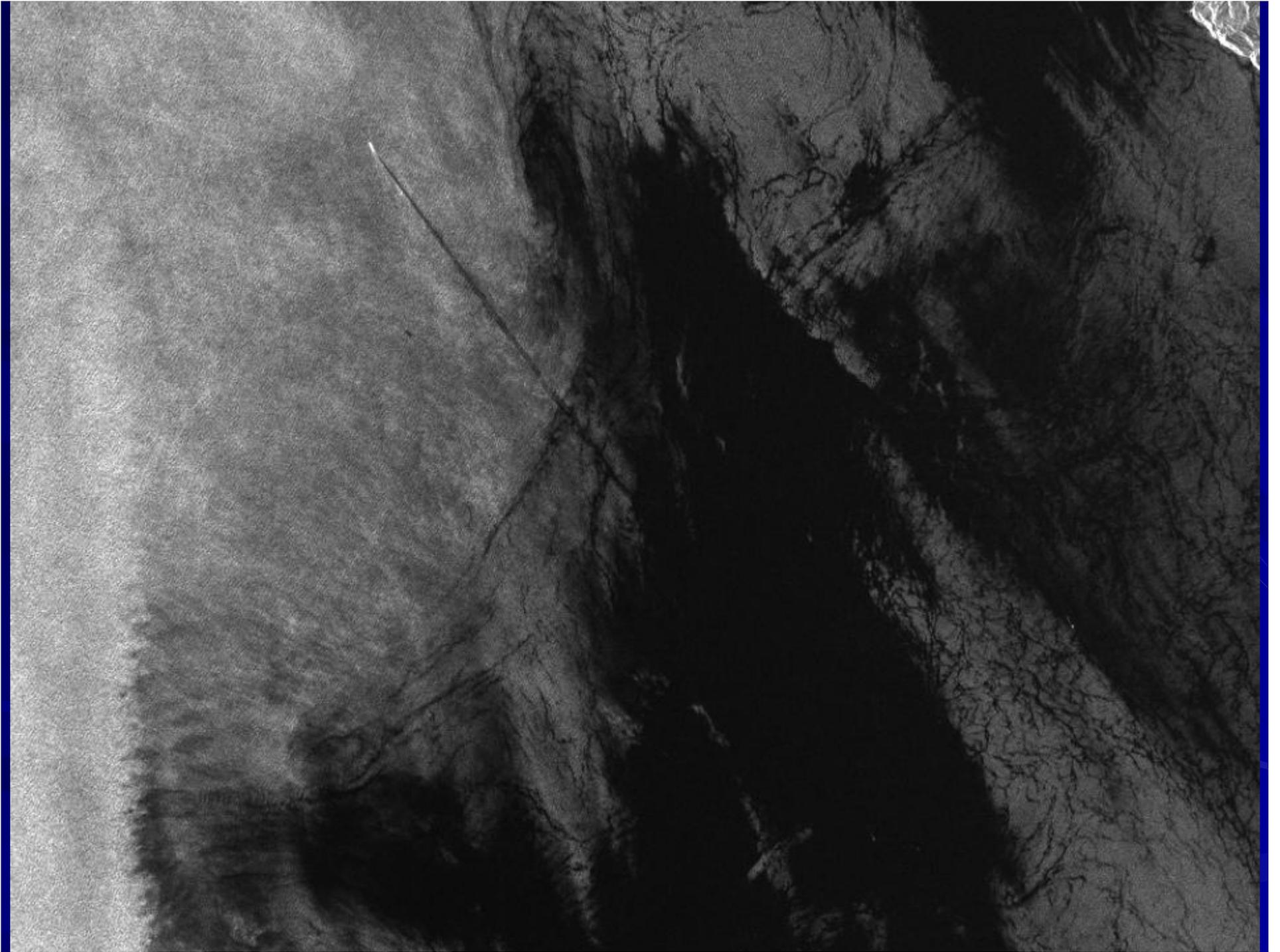
All Targets
420 Total

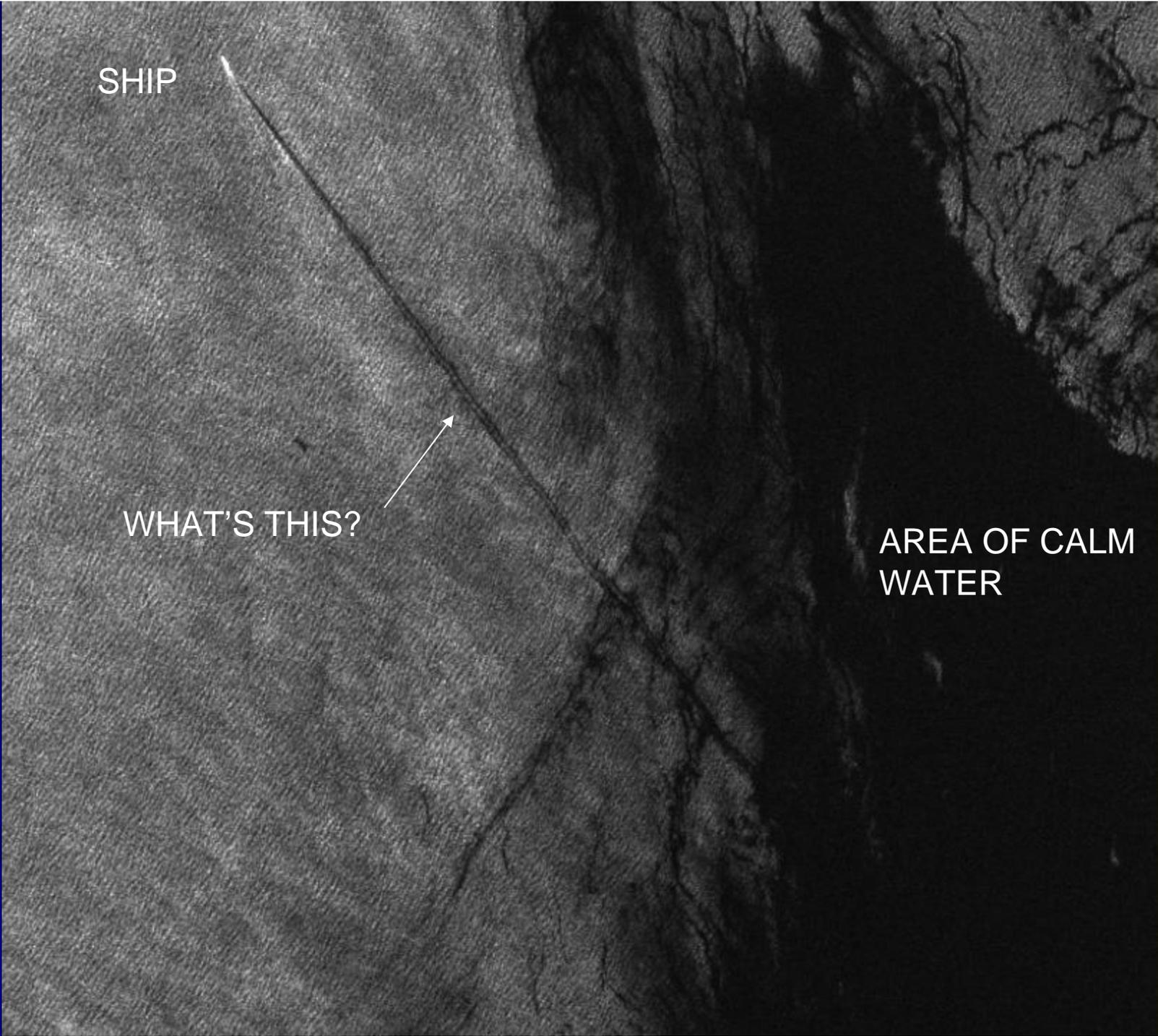




RADARSAT
October 28, 2005
1756 Hrs



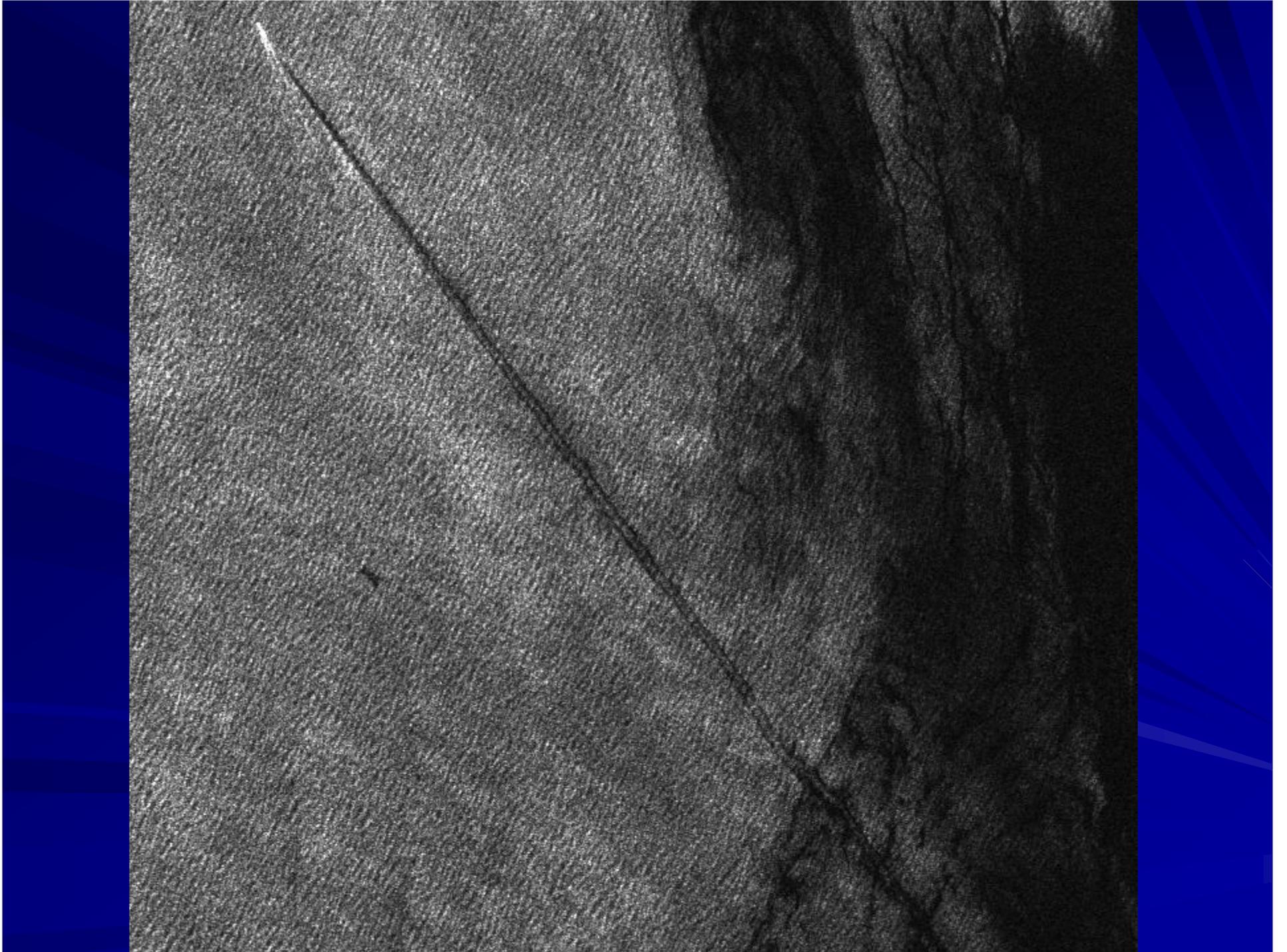


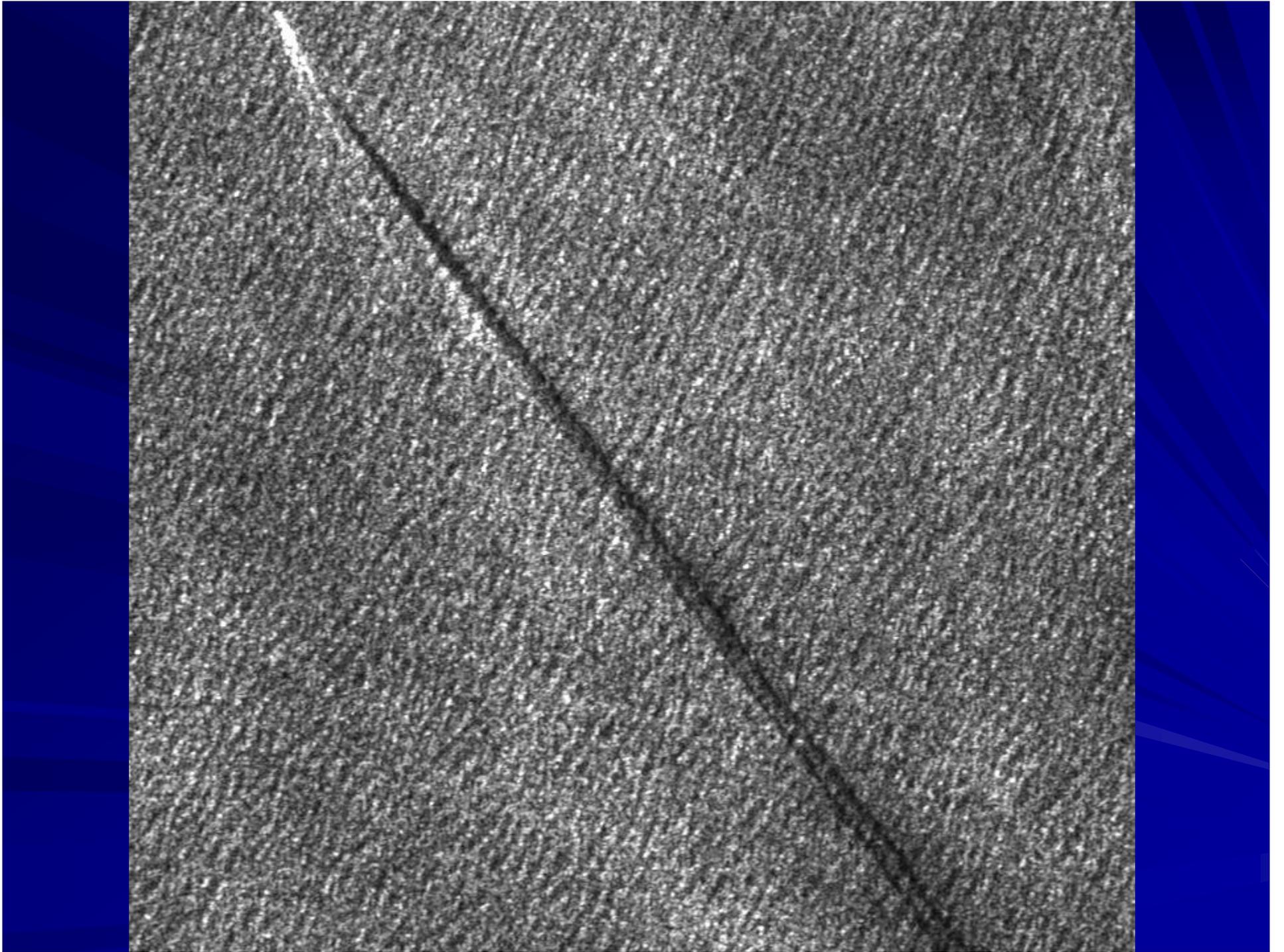
An aerial photograph of a ship's wake in the ocean. The image is dark and grainy, showing a prominent V-shaped wake. A white arrow points to the leading edge of the wake, labeled 'SHIP'. Another white arrow points to a smaller, secondary wake line branching off from the main one, labeled 'WHAT'S THIS?'. On the right side of the image, there is a darker, smoother area of water labeled 'AREA OF CALM WATER'. The entire image is framed by a dark blue border with some lighter blue geometric patterns on the right side.

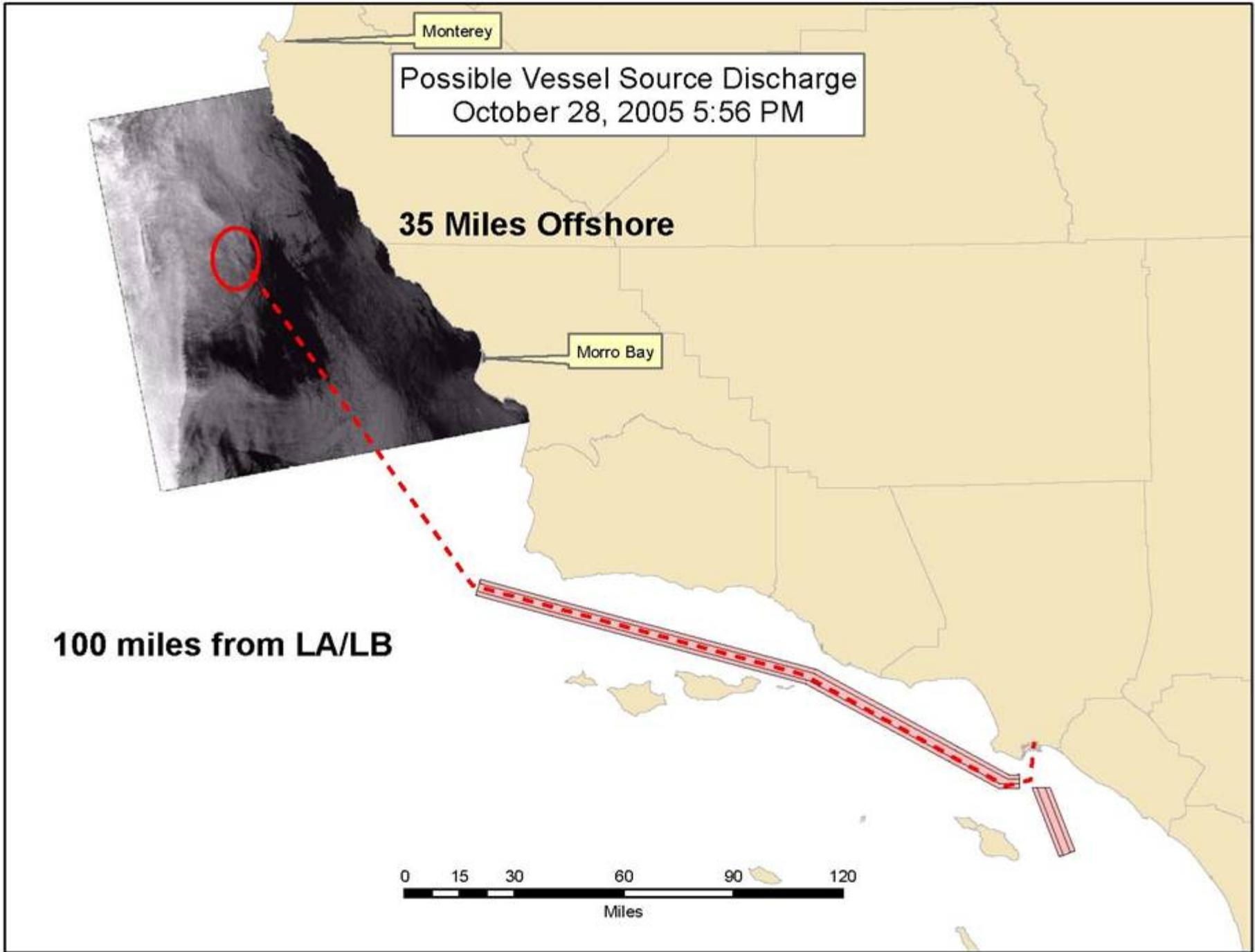
SHIP

WHAT'S THIS?

AREA OF CALM
WATER







Questions?

