



IRS-CRASAR Team
International Rescue Systems (Japan)
Center for Robot-Assisted Search and Rescue (US)





Briefing Outline

- About CRASAR
- Team & Robot Introductions
- Missions & Video
- Summary of Findings for Science
- Questions

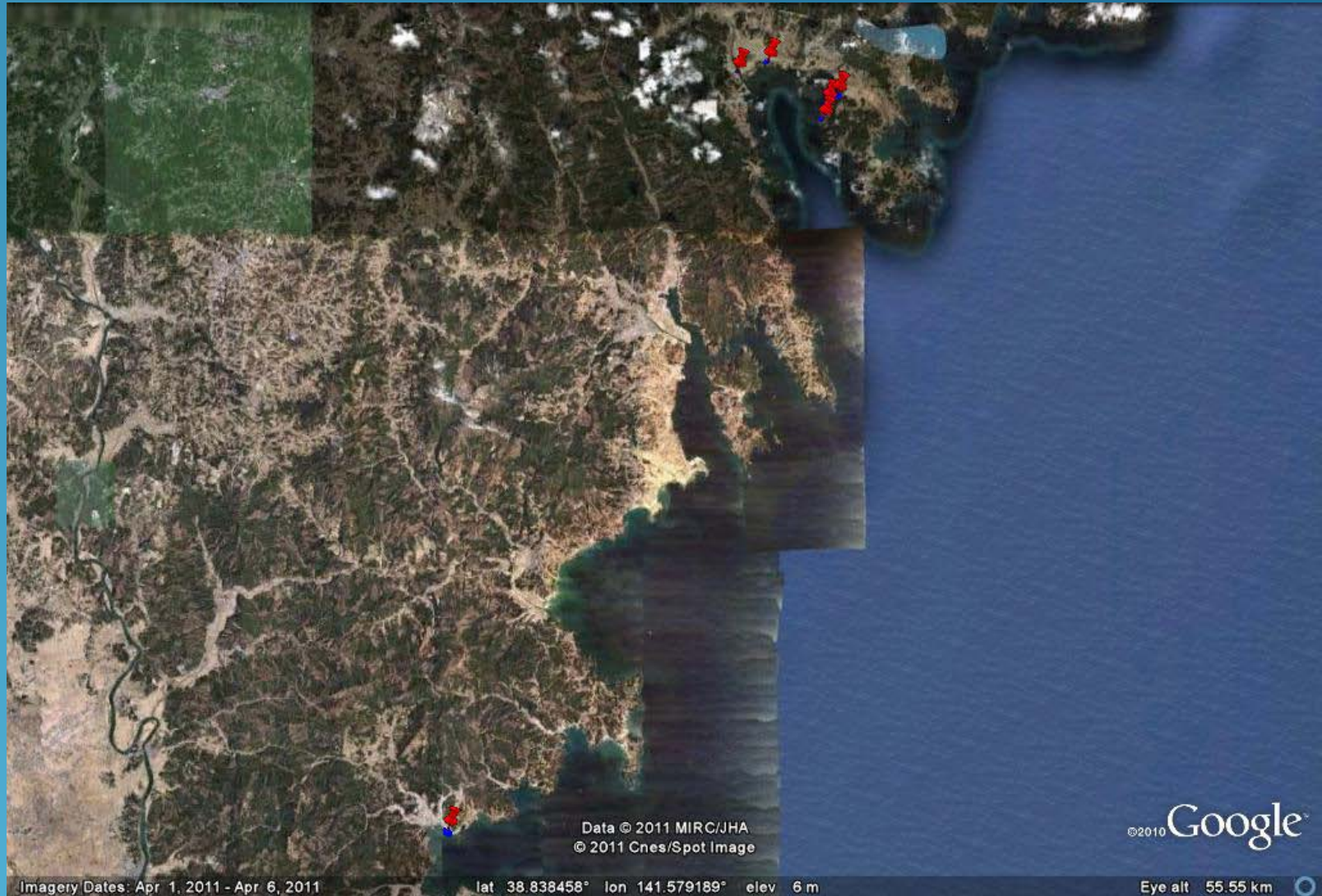


About CRASAR

Center for Robot-Assisted Search and Rescue
Texas A&M University

- Funded by National Science Foundation
- First use of small ground, air, and sea robots at disasters
- 11 disasters including World Trade Center, Hurricane Katrina
- Worked with IRS since 1999, 2 previous joint deployments in USA and Germany





- 6 sites, 3 robots
- Mission: Underwater victim localization, Port area assessment





Team

- **Prof. Robin Murphy, Director and Team Leader**
 - Texas A&M University





Team

- Prof. Robin Murphy, Director and Team Leader
 - Texas A&M University
- **Dr. Eric Steimle, Deputy Team Leader**
 - AEOS Inc.



Access AC-ROV



- Small, battery powered
- Video only





Team

- Prof. Robin Murphy, Director and Team Leader
 - Texas A&M University
- Dr. Eric Steimle, Deputy Team Leader
 - AEOS Inc.
- **Mr. Jesse Rodocker & Mr. Sean Newsome**
 - **SeaBotix, Inc**



SeaBotix SARbot & LBV-300



- Can see with sonar over long distances
- Accurate GPS location
- Enhanced color video
- Grasper and cutter





Team

- Prof. Robin Murphy, Director and Team Leader
 - Texas A&M University
- Dr. Eric Steimle, Deputy Team Leader
 - AEOS Inc.
- Mr. Jesse Rodocker & Mr. Sean Newsome
 - SeaBotix, Inc
- **Ms. Karen Dreger**
 - **University of South Florida Center for Ocean Technology**



Seamor



- Can see with sonar shorter distances but better resolution
- No enhanced video
- Grasper

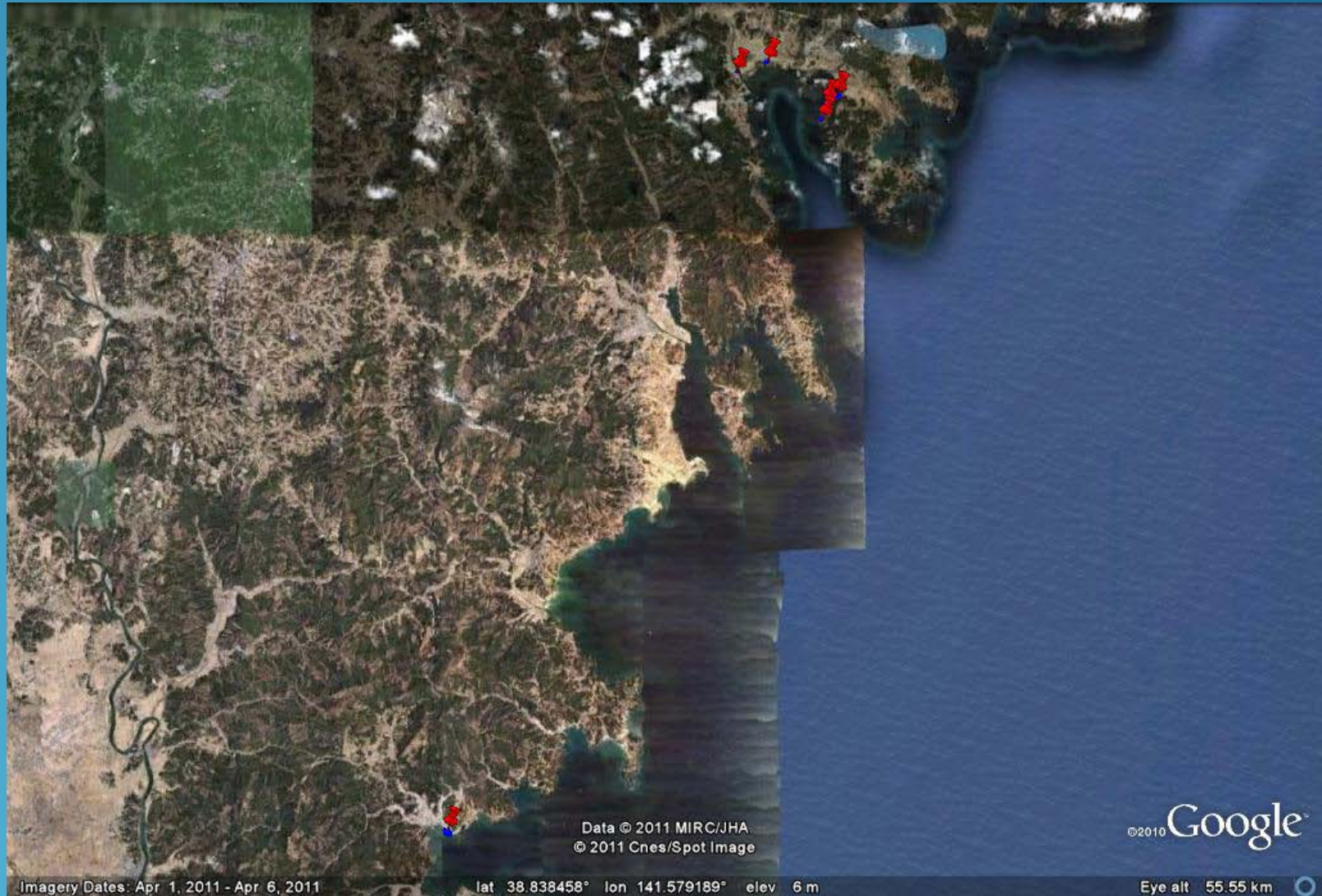




Team

- Prof. Robin Murphy, Director and Team Leader
 - Texas A&M University
- Dr. Eric Steimle, Deputy Team Leader
 - AEOS Inc.
- Mr. Jesse Rodocker & Mr. Sean Newsome
 - SeaBotix, Inc
- Ms. Karen Dreger
 - University of South Florida Center for Ocean Technology





- 6 sites, 3 robots
- Mission: Underwater victim localization, Port area assessment



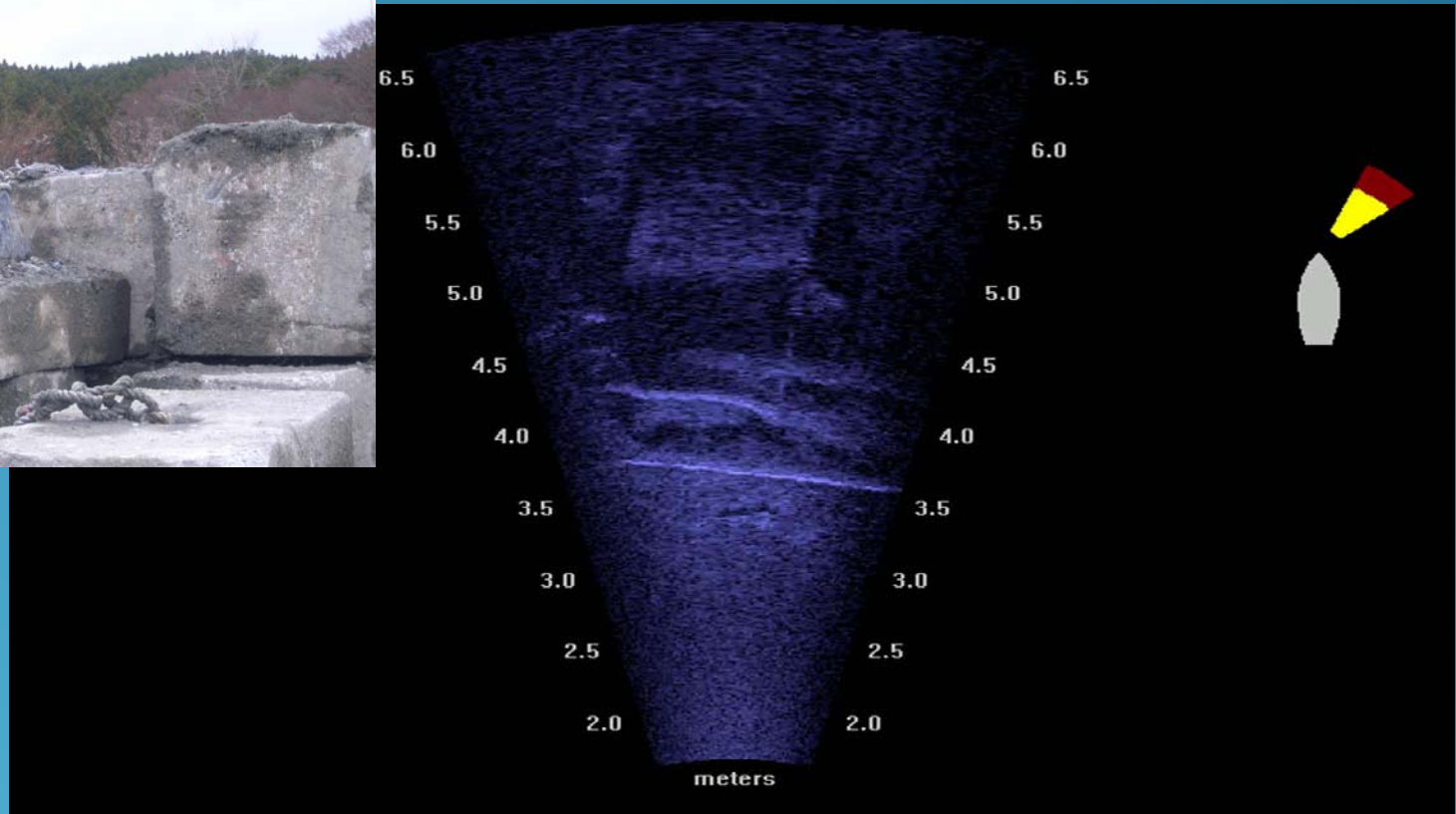
Minamisanriku-Choy (1)



- Task: see if “New Port” area is clear



Anchor Capstone



Minamisanriku-Choy Findings

- Task: see if “New Port” area is clear
- *All debris, nets at least 5m deep, except 1 structure visible above water, no victims*



Rikuzentakada (5)



- Task: search for victims where divers are not allowed to go



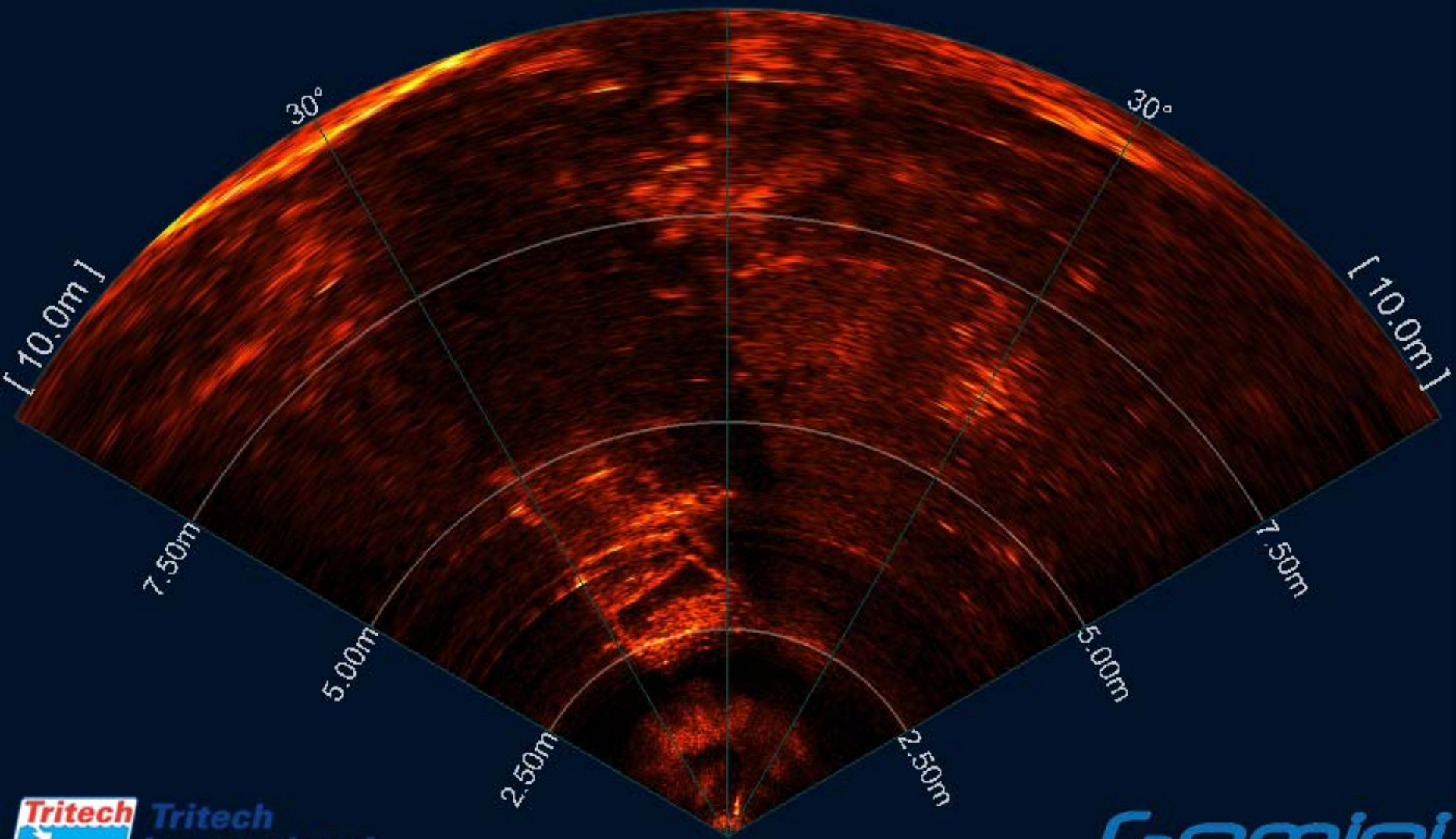


House in Flotsam





Friday, April 22, 2011 05:57:50 Gain: 70.0% Range: 10.0m Sound Velocity: 1483.2m/s



Gemini
sonar









Rikuzentakada Findings

- Task: search for victims where divers are not allowed to go
- *No victims found*



Scientific Findings: Research Needed

- **Simulation and Geographical Information Systems**
 - project location of victims, then update models
- **Cyber-physical systems**
 - Station-keeping, accurate control
- **Computer vision & cognitive engineering**
 - Object cueing, sensor fusion
- **Human-robot interaction**
 - Visualization of surrounding clutter, multi-modal interfaces



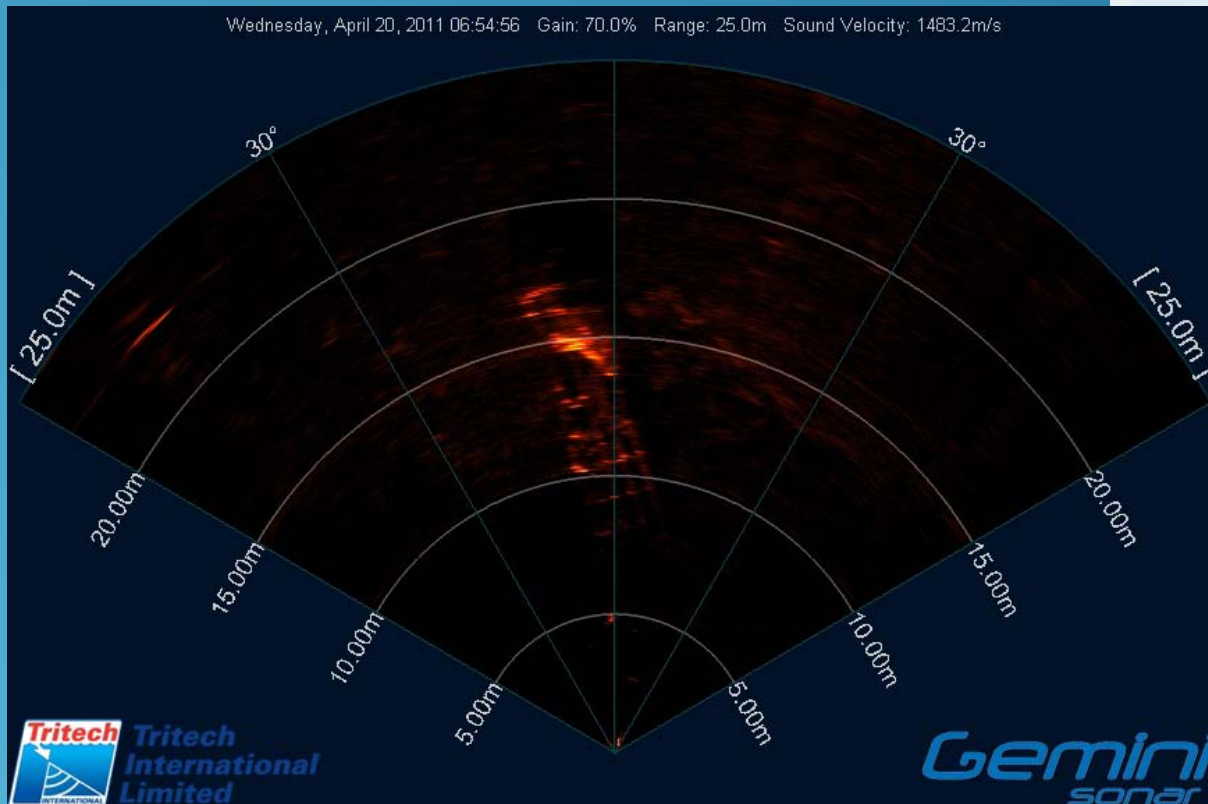
IRS (Japan)-CRASAR (US) Team



“New Port” Area Covered in ~3 Hours



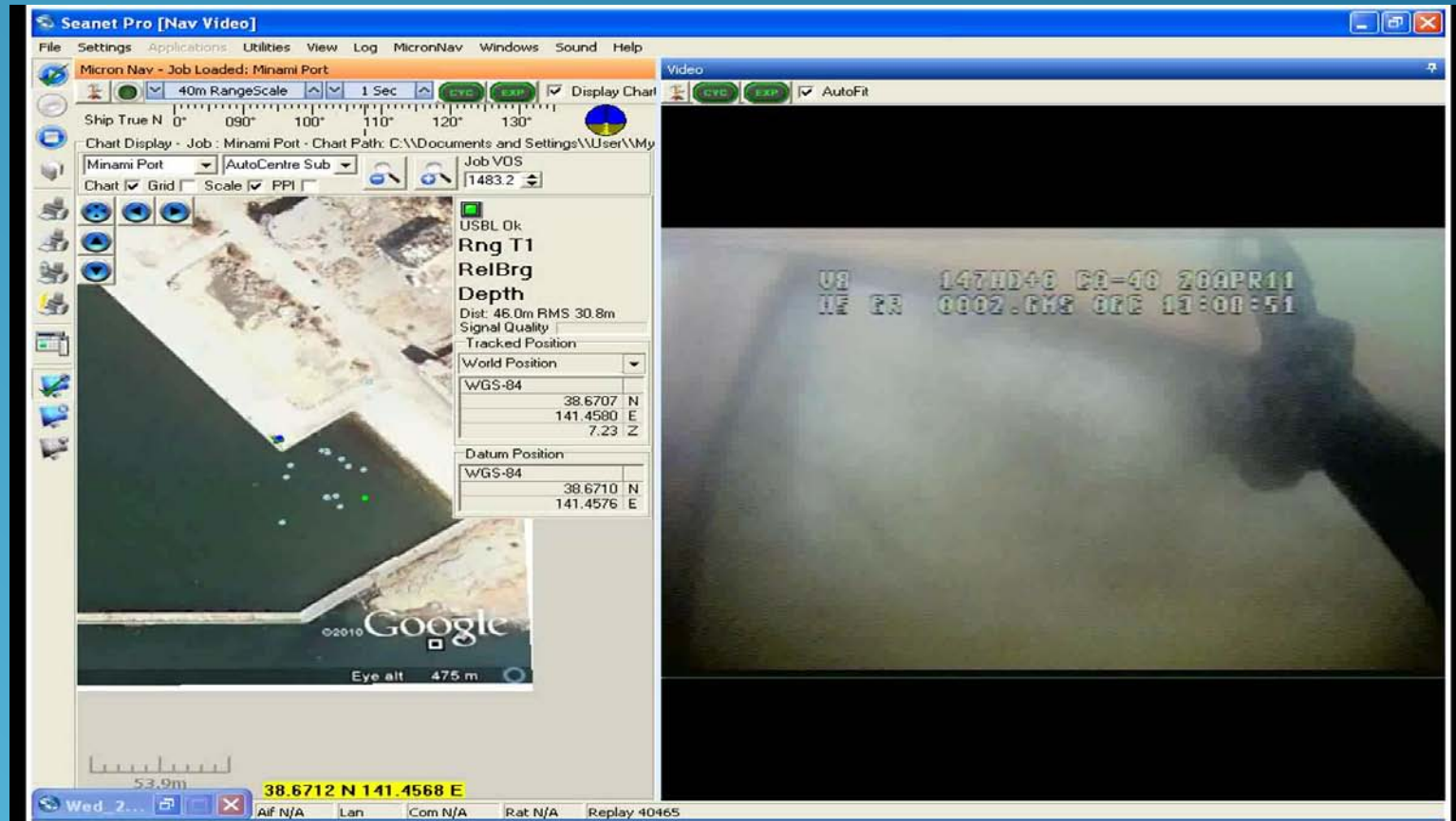
Example: 15m long Structure (sonar)



15m Structure video



Can Also Grasp



Objectives

- To resume using port, access-> map the debris field:
 - location and depth
 - 5m
 - 10m



Time in Water

- Tuesday (demo, assessment of situation and water)
 - SARbot: 38minutes
- Wednesday
 - SARbot: 3h9m
 - Seamore: 178 minutes

