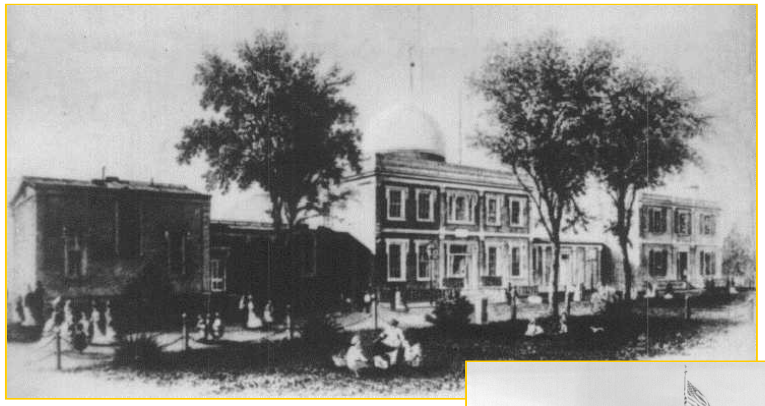
NAVOCEANO Glider Operations
An Update for 2011

Ken Grembowicz
Ocean Sciences Division
2011 European Glider Observatory (EGO) Meeting
17 March 2011

Naval Oceanographic Office

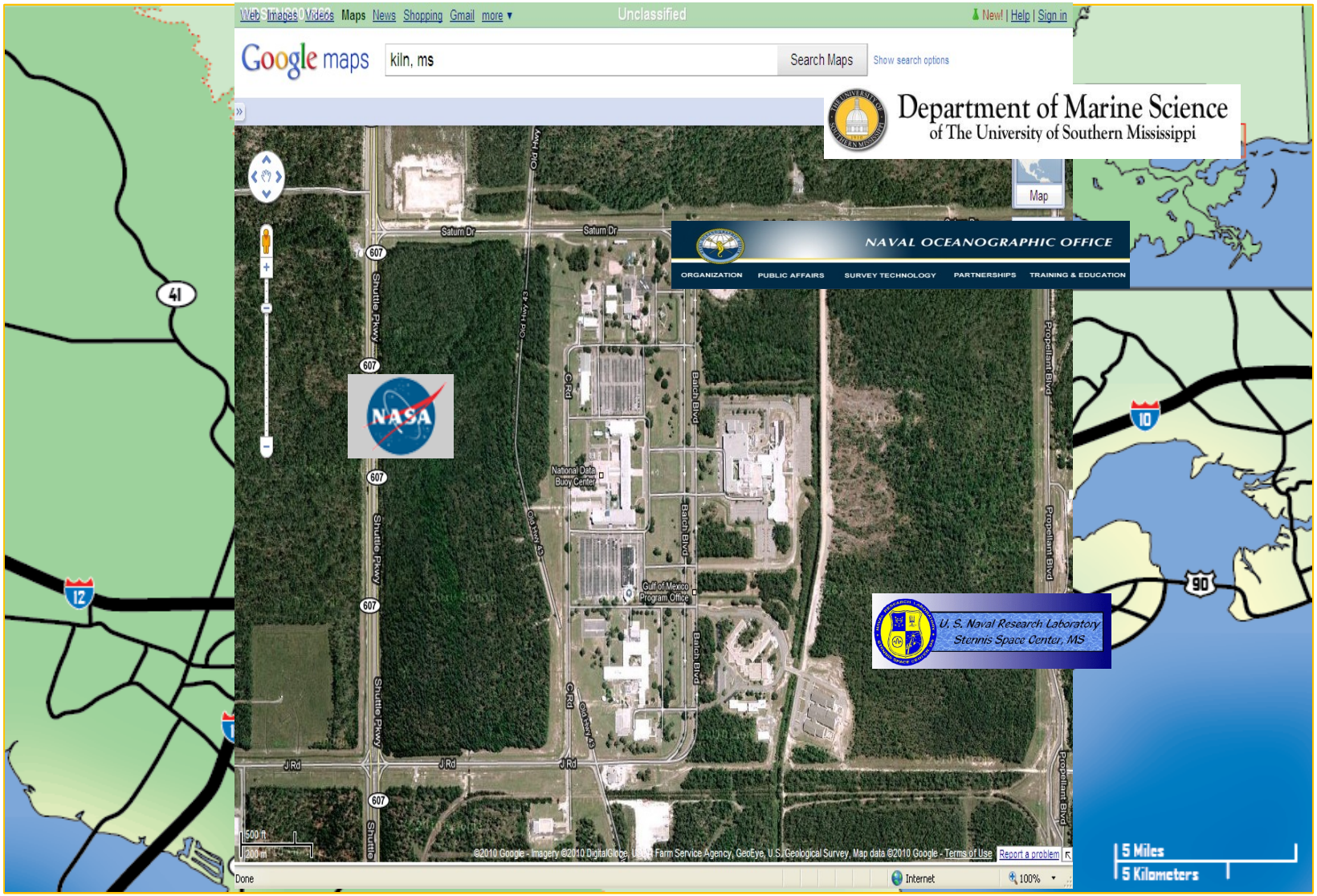
History and Milestones



- 1830 Depot of Charts and Instruments established; later renamed U.S. Hydrographic Office
- 1962 Renamed U.S. Naval Oceanographic Office
- 1977 Relocated from Washington, D.C. to Stennis Space Center
- 1987 Operational Oceanography Center established
- 1991 Supercomputer became operational
- 1994 T-AGS 60 Class military survey ships became operational
- 2005 Restructured as Oceanographic Reach-Back Center to support Naval Operations
- 2008 Began Maritime Homeland Defense surveys of U.S. Military installations

Naval Oceanographic Office

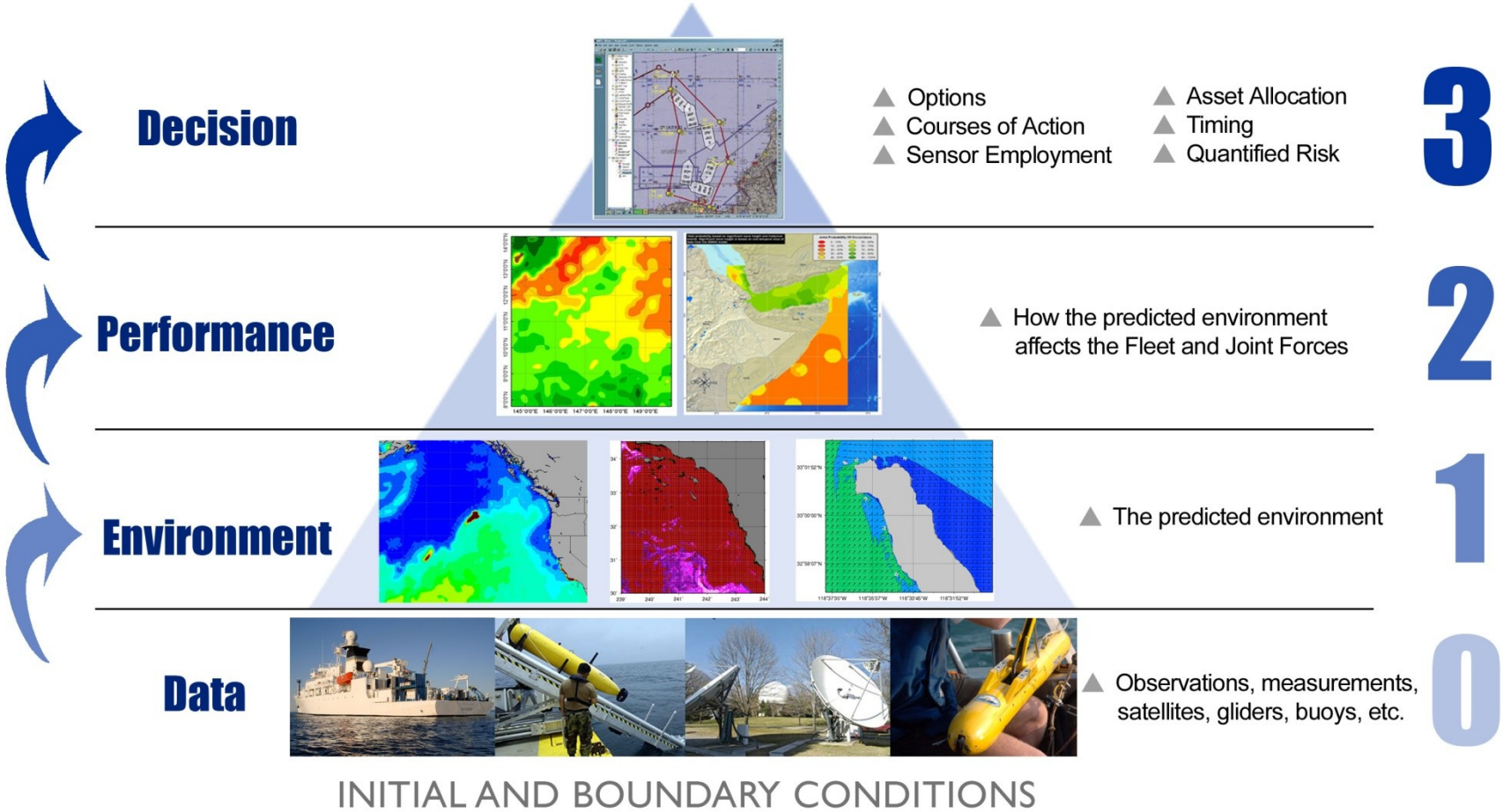
Location



Battlespace On Demand

Linking Data to Decisions

Decision superiority: Making better decisions faster than the adversary

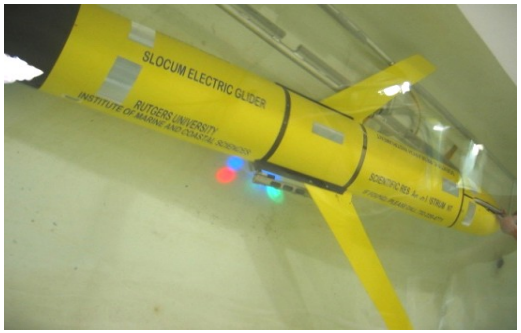


NAVOCEANO Glider Team

NAVOCEANO Glider Systems

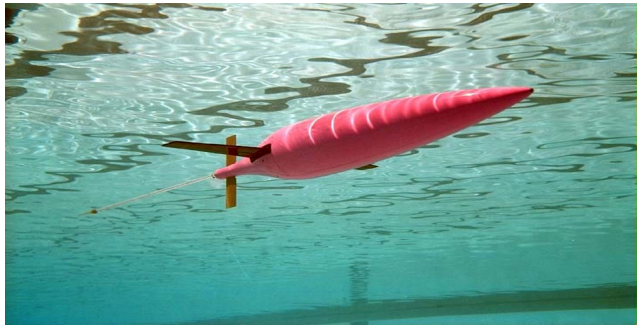
Slocum Glider

Teledyne Webb Research



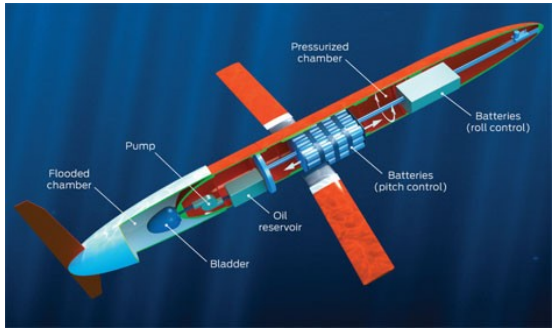
Seaglider

IROBOT / APL-UW



Spray Glider

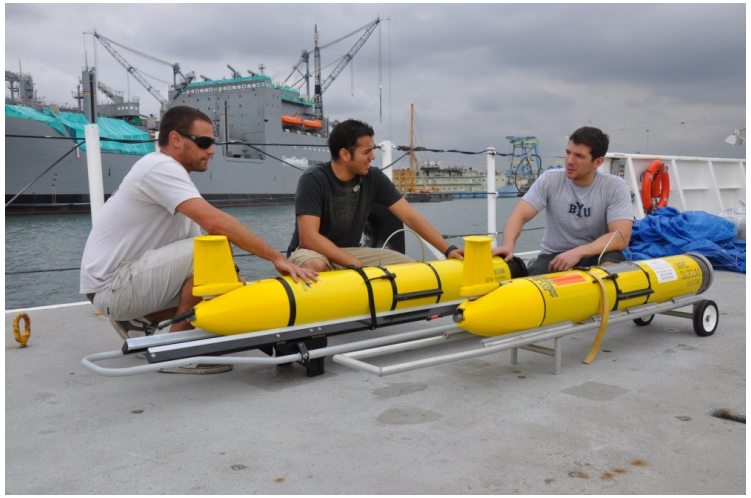
Scripps Institution of Oceanography



	Electric	LBS-G		
Weight	123 lb	132 lb	110 lb	114 lb
Hull Dia.	21 cm	22 cm	30 cm	20 cm
Length	1.5 m	1.5 m	2.8 m (w/1-m antenna)	2.15 m
Speed	0.6 knots	0.6 knots	0.6 knots	0.6 knots
Max Depth	200 m	1000 m	1000 m	1500 m
Endurance	30 days	4-6 months	4 - 6 months	4 - 5 months
Range	1500 km	4000 km	4500 km	4500 km
Energy	Alkaline	Lithium	Lithium	Lithium
Comms (global)	Iridium	Iridium	Iridium	Iridium

LBS-Glider Specifications

- ***Oceanographic collection performance requirements***
  - ***Sensor sampling throughout water column (surface - 1000m depth)***
  - ***Periodic surfacing for data transmission and platform tasking***
  - ***Long endurance***
- ***Sensors payloads:***
  - ***Conductivity, Temperature, and Depth (CTD)***
  - ***Water clarity (beam attenuation)***
  - ***Acoustic Measurements (Spiral 2)***
  - ***Acoustic Doppler Current Profiler (Spiral 2)***

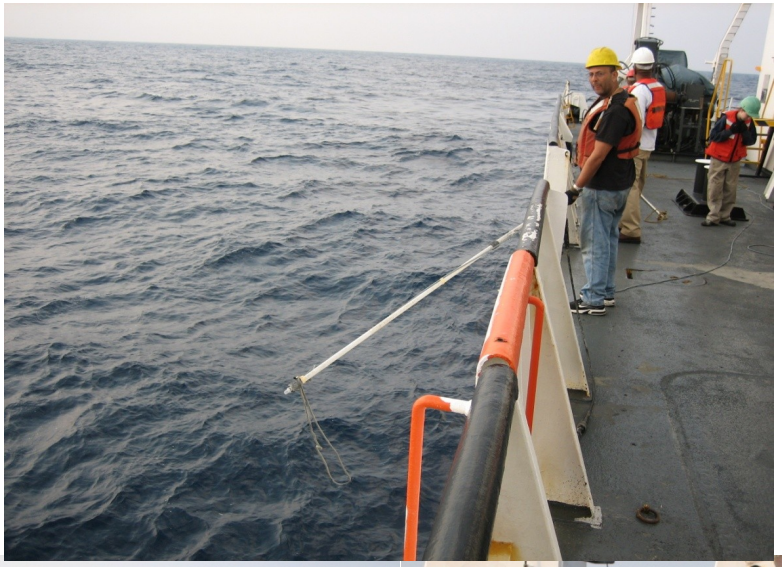


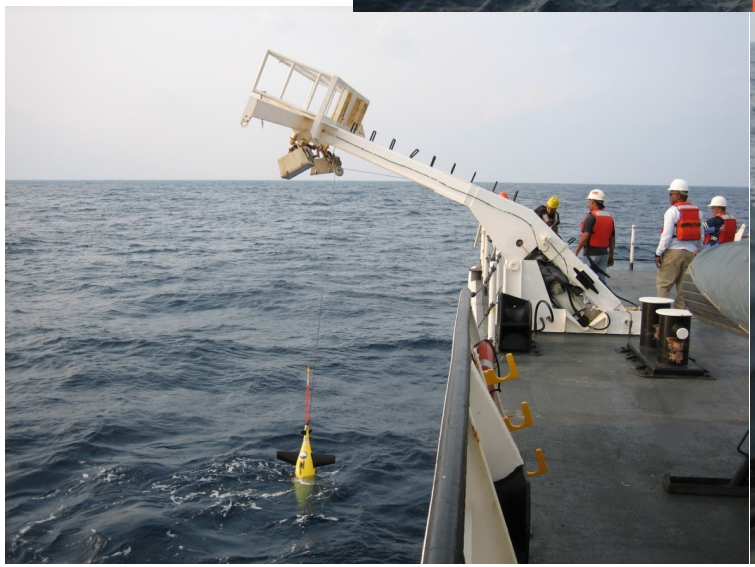
Acquisition Plans

NAVOCEANO Glider Operations

- Glider systems typically launched and recovered from Navy Military Survey Ships.
- Controlled remotely by Glider Operations Center (GOC) pilots located at Stennis Space Center, MS.
- Provides persistent data sampling.
- Optimizes oceanographic feature characterization.
- Produces near real-time
  f
  m

NAVOCEANO Glider Operations





Glider Operations Center

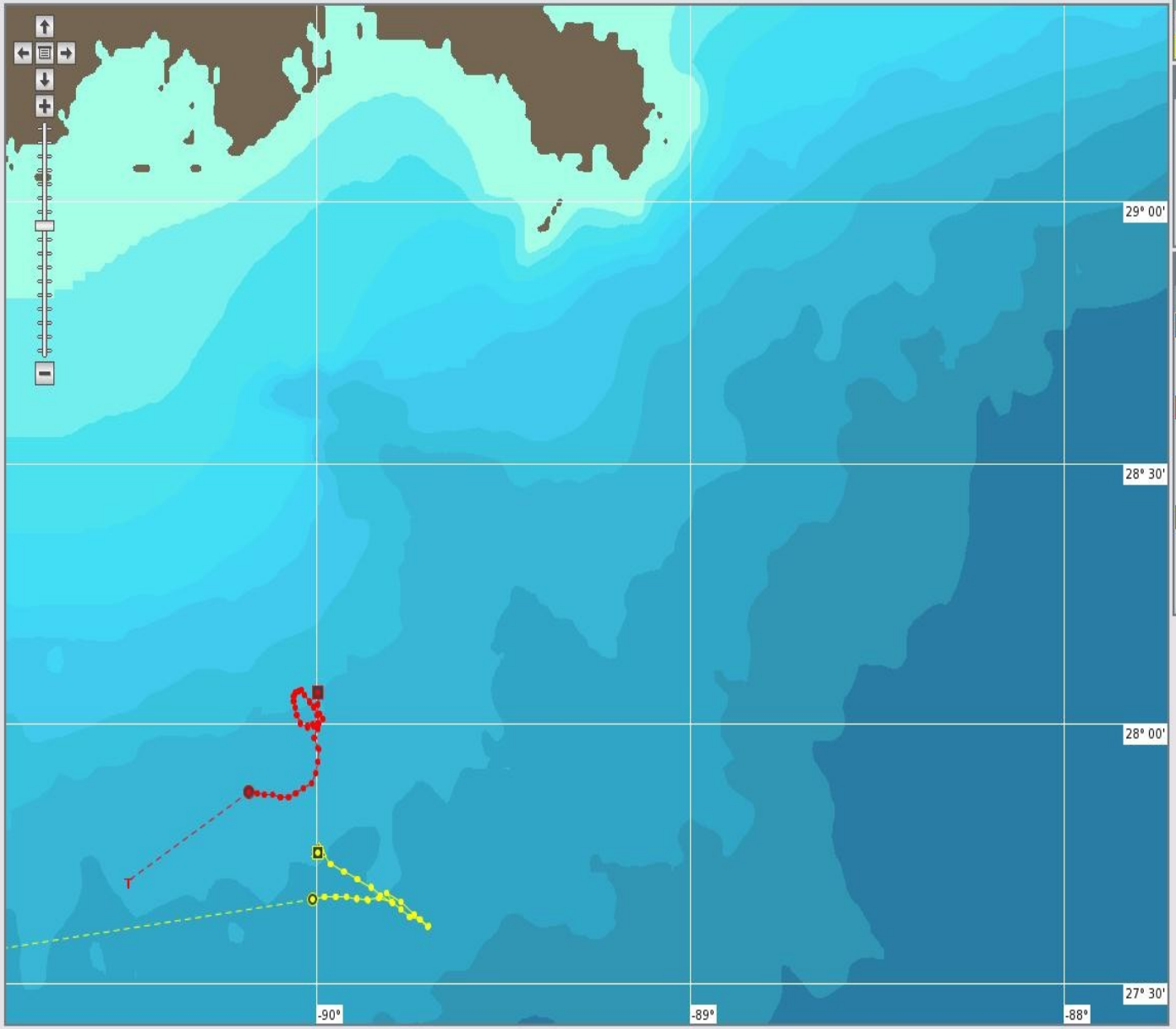
24/7 Operations

Functions:

- **Command & Control (GLMPC)**
- **Data Validation (LAGER)**
- **Data Handling (via RTDHS)**
- **Call center for lost gliders and fleet support.**

Persistent Sampling Mission

No New Messages. Show All (0)



Glider Status

Glider	Menu	Dive	Due	Health
SG135		33	2041Z	
SG137		51	2056Z	

Track Filter

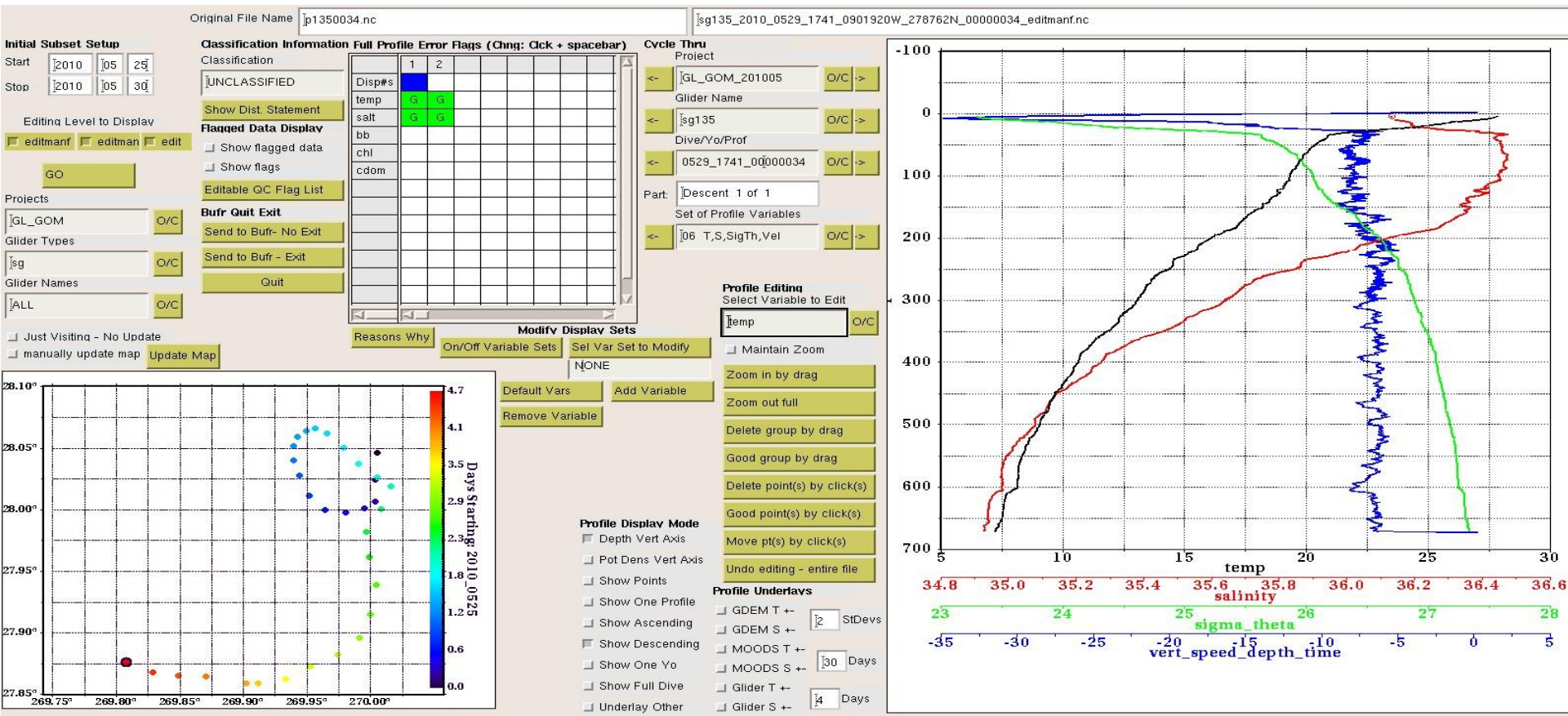
- **Growing:** From dive 28
- **Sliding:** Last 23 dives
- **Fixed:** From dive 28 to 51

Update Track

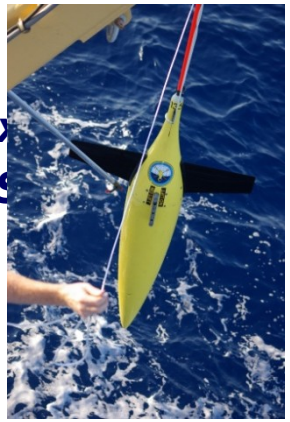
Display Options

Item	Visibility
Graticules	
└ Grid	☑
└ Labels	☑
SG135	
└ DAC	☐
└ Route	☐
└ Track	☑
SG137	
└ DAC	☐
└ Route	☐
└ Track	☑

LAGER



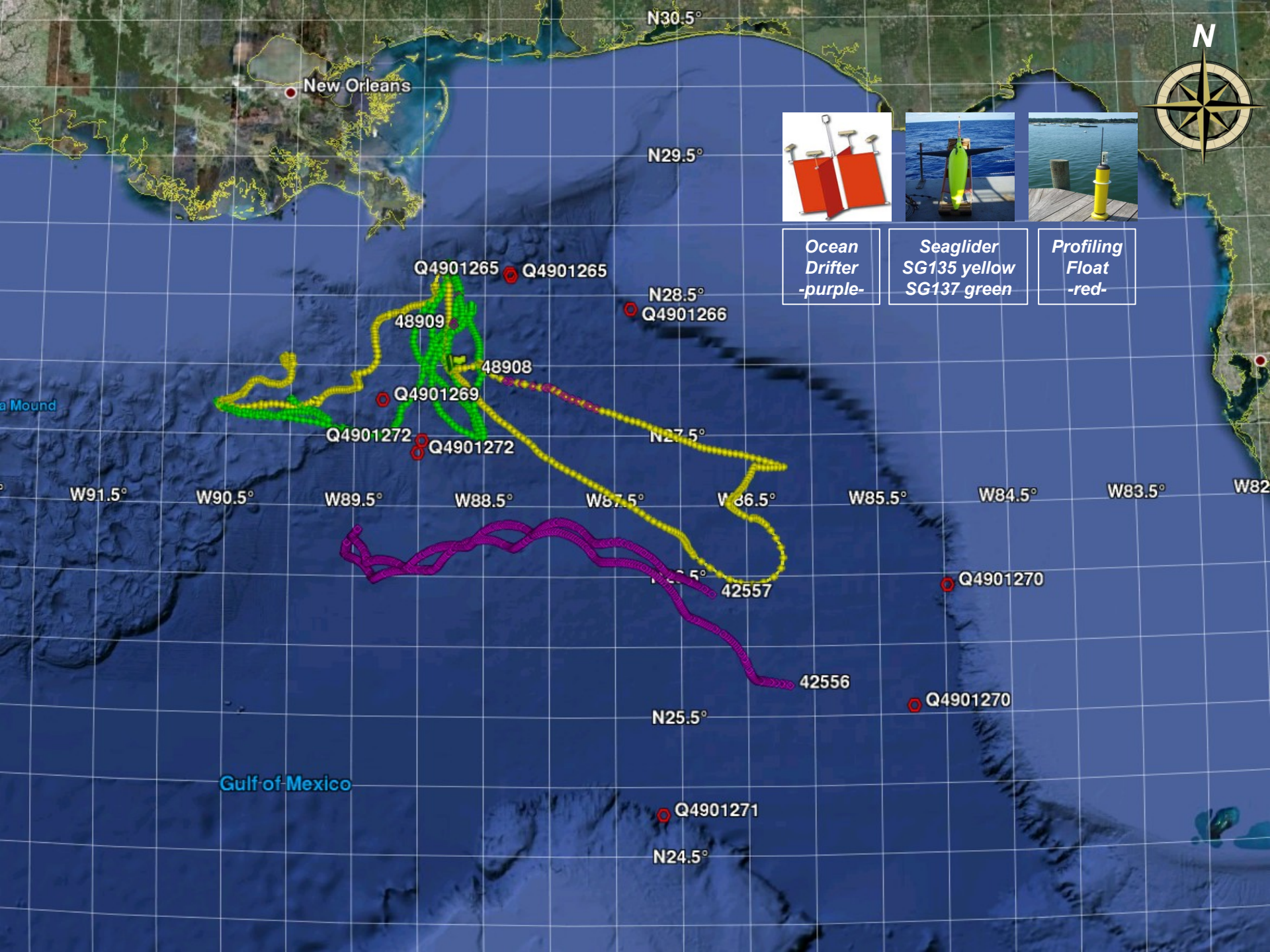
Gulf of Mexico Mission



- **Objectives:**
  - Accelerate implementation of R-NCOM for the Gulf of Mex
  - Provide ocean circulation forecasts NOAA OR&R and IOOS
  - Utilize glider systems to determine the presence of subsurface oil

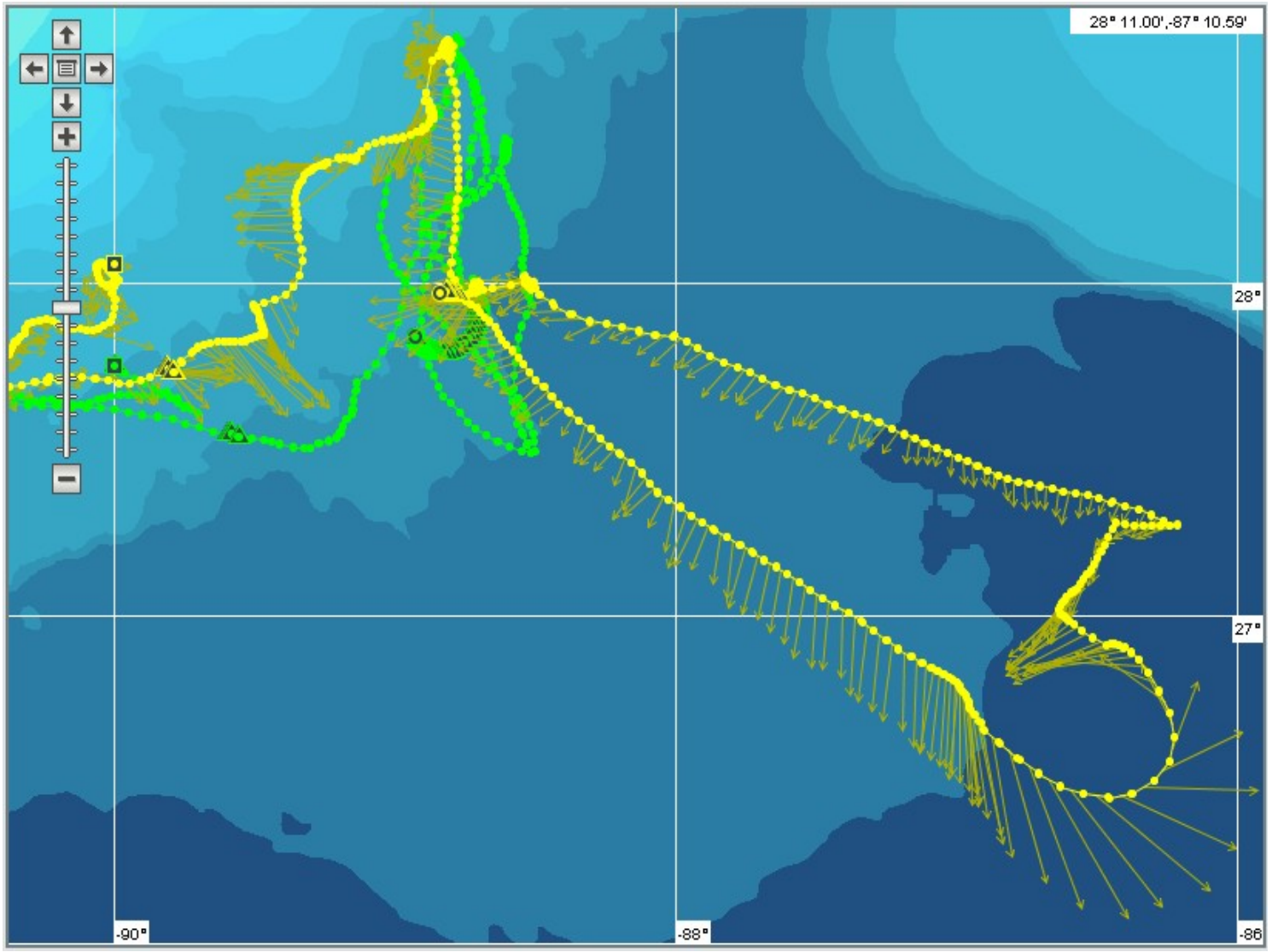
- **Oceanographic Instrumentation:**
  - Two (2) iRobot Seagliders rapidly ou
    with WET Labs ECO pucks (CDOM)
  - Eleven (11) Teledyne Webb Researc
    APEX floats
  - Eighteen (18) MetOcean surface dri

- **Deployment and Recovery Vessels:**
  - R/V Thomas Jefferson (25 May 2010)
  - R/V Henry B. Bigelow (19 Aug 2010)


N30.5°
New Orleans
N29.5°
N
Ocean Drifter -purple-
Seaglider SG135 yellow SG137 green
Profiling Float -red-
Q4901265
Q4901265
N28.5°
Q4901266
48909
48908
Q4901269
Q4901272
Q4901272
N27.5°
W91.5°
W90.5°
W89.5°
W88.5°
W85.5°
W84.5°
W83.5°
42557
Q4901270
42556
Q4901270
N25.5°
Gulf of Mexico
Q4901271
N24.5°

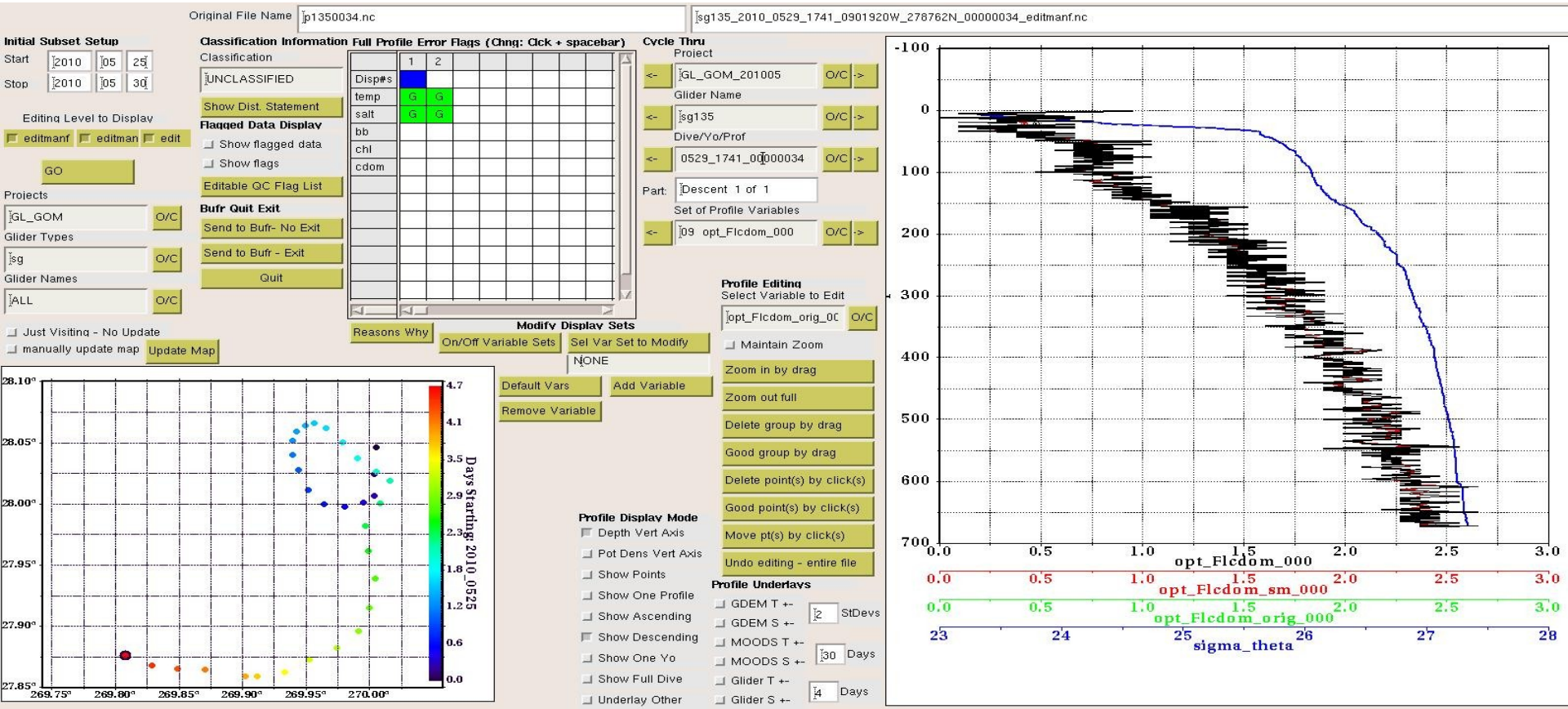
Gulf of Mexico Mission

Depth Averaged Currents



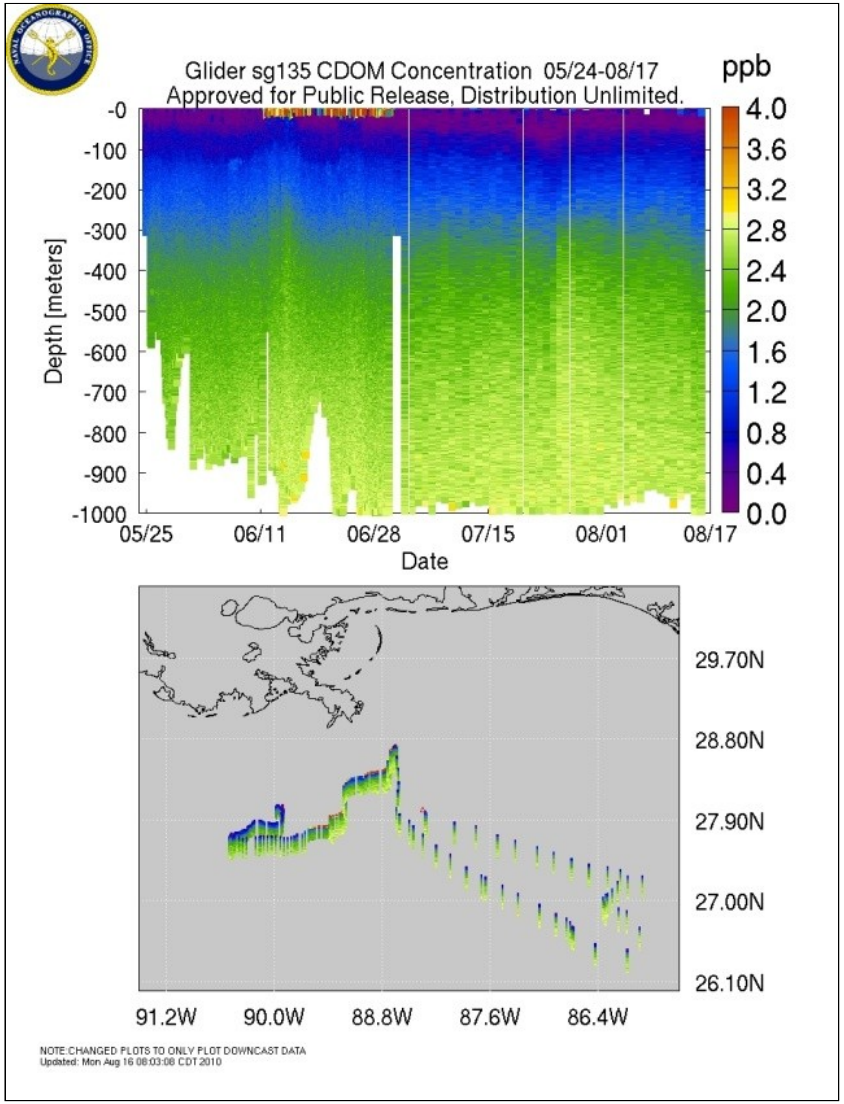
Gulf of Mexico Mission

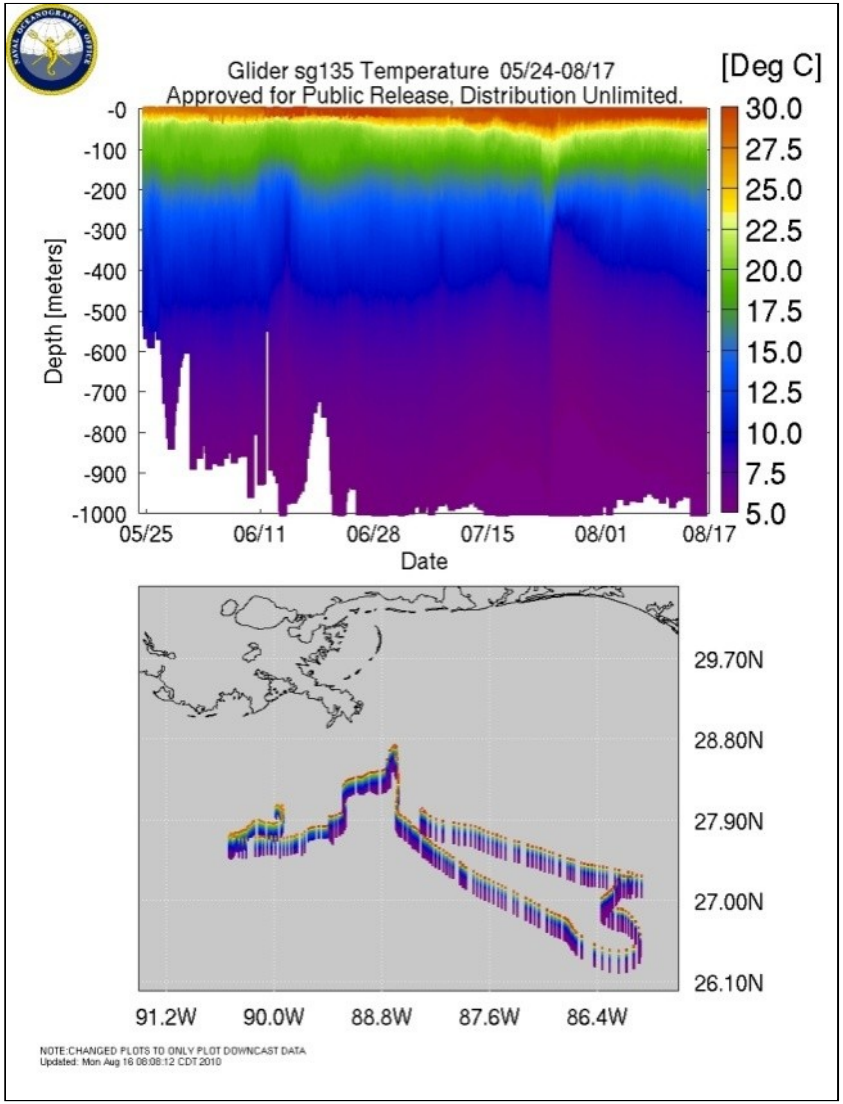
Typical CDOM Profile



Gulf of Mexico Mission

SG135 – CDOM and Temperature Profiles





Gulf of Mexico Mission

SG135 – Recovery Photos

Fleet Support Mission

Fleet Support Mission

NAVOCEANO Glider Operations

- 2008 Philippine Sea 6014
- 2008 Clear Horizon 238
- 2009 South China Sea 1728
- 2008 SHAMALEX 09-1 2682
- 2009 Arabian Gauntlet 2810
- 2009 SHAMALEX 09-2 1280
- 2009 Arctic 1366
- 2009 Philippine Sea 5234
- 2010 Arctic 888
- 2010 Gulf of Mexico 1700
- 2010 Valiant Shield 2010 618
- 2010 Arctic 182
- 2010 Philippine Sea 192

39,872 profiles as of Dec 2010

Transition Partnerships

" a successful story of cooperation and collaboration with the R&D community"

ONR
Revolutionary Research . . . Relevant Results

PEO C4I
Program Executive Office
Command, Control, Communications, Computers & Intelligence

The Office of the Oceanographer & Navigator of the Navy
3450 Massachusetts Avenue, NW, Bldg 1, Washington, DC 20392-5421

NAVAL METEOROLOGY AND OCEANOGRAPHY COMMAND

SCRIPPS INSTITUTION OF OCEANOGRAPHY UCSD

APL

UNIVERSITY OF WASHINGTON

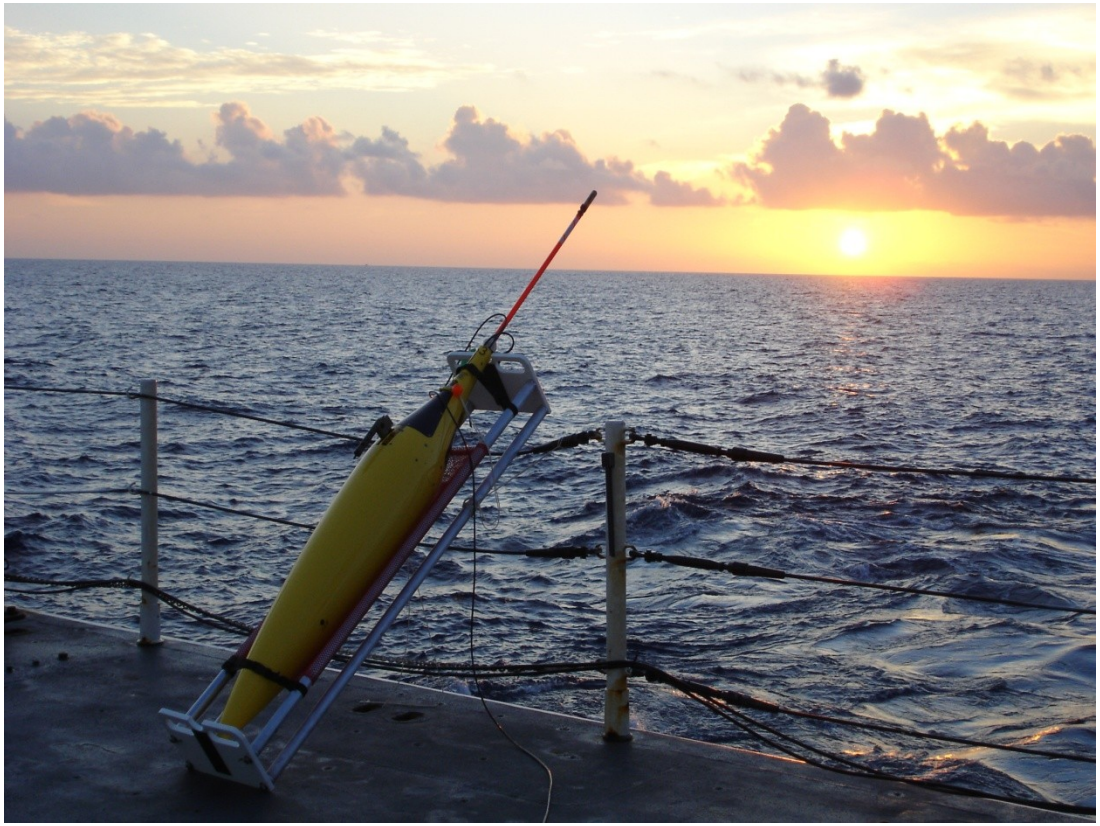
RUTGERS
MARINE & COASTAL SCIENCES

OASIS

TELEDYNE WEBB RESEARCH
A Teledyne Technologies Company

WOODS HOLE OCEANOGRAPHIC INSTITUTION
1930

Ocean Glider Program



Questions?