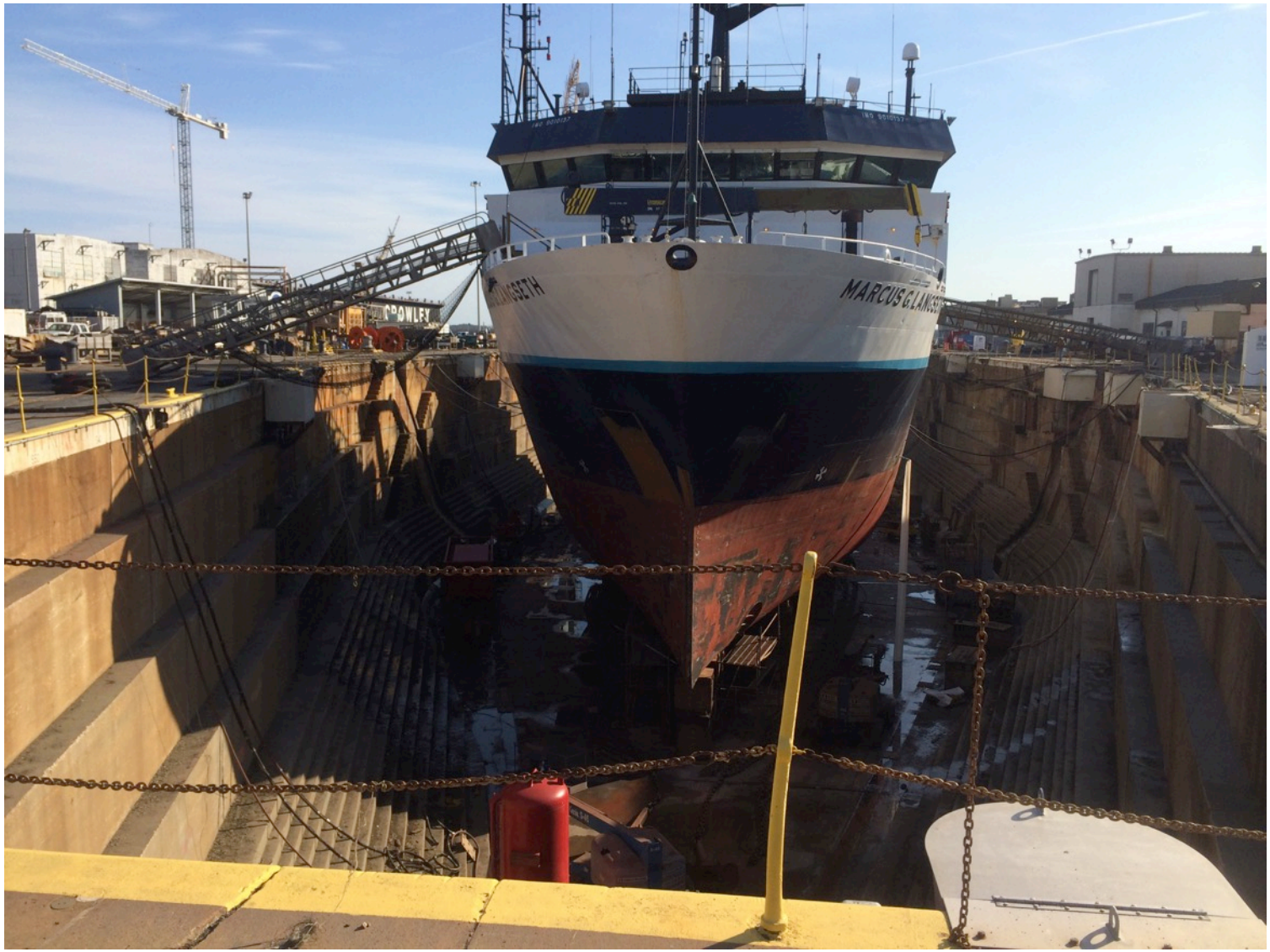
R/V *Marcus G. Langseth*

MLSOC Meeting –San Francisco – December 14, 2014
L-DEO Office of Marine Operations

Lamont-Doherty Earth Observatory
COLUMBIA UNIVERSITY | EARTH INSTITUTE

2014 Langseth Shipyard– (Feb -June)
Detyens Shipyard, Charleston, South Carolina



2014 Shipyard/Maintenance Projects

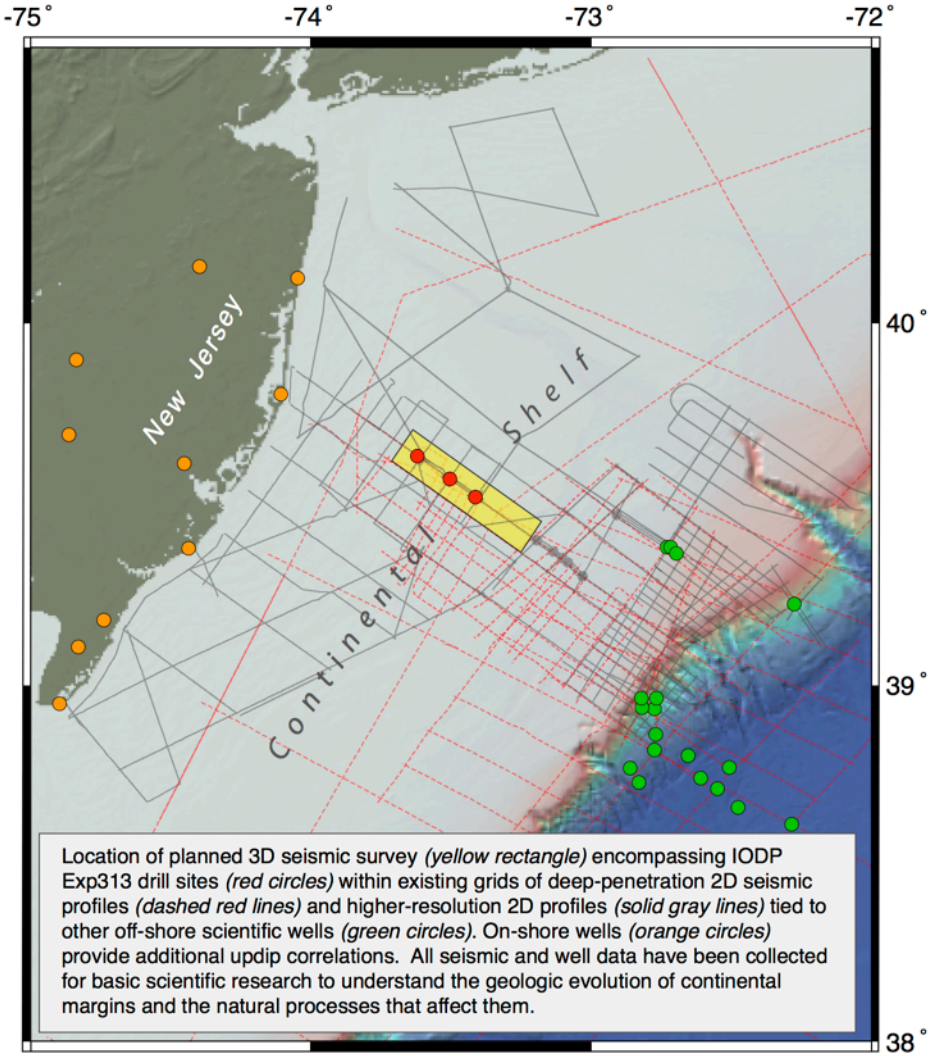
Projects below contains both shipyard and maintenance projects funded by MOSA and SSSE that were addressed in shipyard and dockside in 2014 (February-June). Complete list encompasses about 50 projects with estimated value of ~ $3+M.

PRIORITY PROJECTS:

*Propeller/ Hub Overhaul *Rudders/ Steering Overhaul * Service Science Pod
*20K Hour Engine Overhaul *Anchor windlass Overhaul *Shaft Seals Overhaul
*New Markey Desh 5 Winch installation and structural modifications for new trawl winch install
*Completed Wireless Controls *New Winch Control booth
*Compressor Rm. Bilge preservation *MG sets Overhaul
*Hull and deck paint *Fwd. Ballast tank preservation/rebuild of ballast containment
*Service Source arrays *Shaft Generator Overhaul

*** Denotes Major Projects Completed**

NJ Margin Sea Level 3D Experiment (July 2014)



NJ Margin 3D cruise led by Greg Mountain and others was postponed until 2015 after a series of delays due to environmental permitting, a Federal Lawsuit by State of NJ, and finally ship mechanical issues that resulted in not having further time to complete survey in 2014.

While lawsuit was finally dismissed, it highlighted a challenging year for environmental compliance for seismic cruises along east coast of US in 2014.

2014 USGS Atlantic ECS Project

From August 21- Sept.13- USGS Atlantic Extended Continental Shelf project completed ~2700 km of 2D seismic survey along US Atlantic Coast

Debbie Hutchinston –Chief Scientist

"The initial 2014 Atlantic ECS Langseth cruise report will give a sense of the breadth and quality of the data and is not exhaustive…… Despite some adversity in the beginning of the cruise, overall it was a complete success, satisfying the primary purposes and ancillary science, as well. ""

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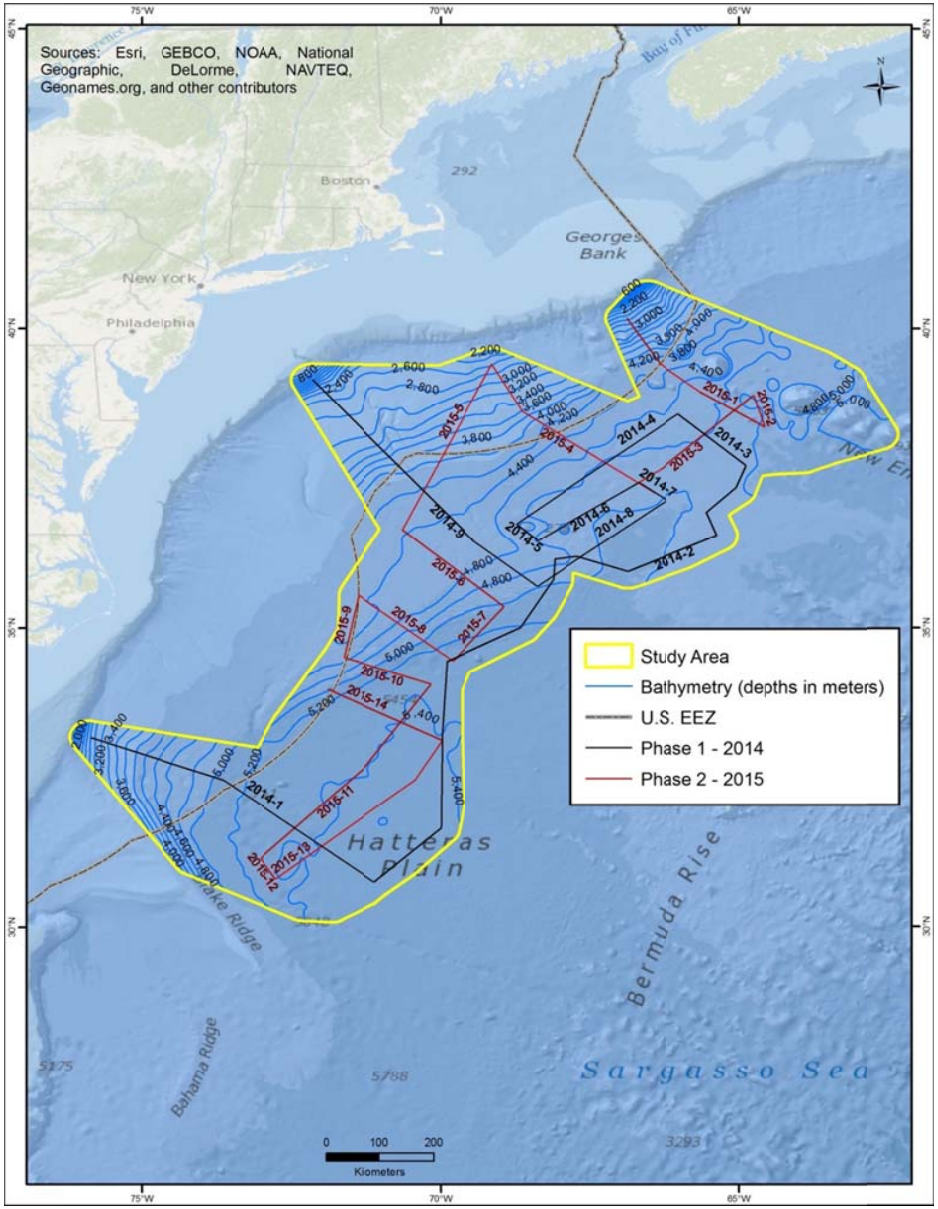
USGS Atlantic ECS Cruise Plan 2014-15)



GeoPrisms ENAM Experiment

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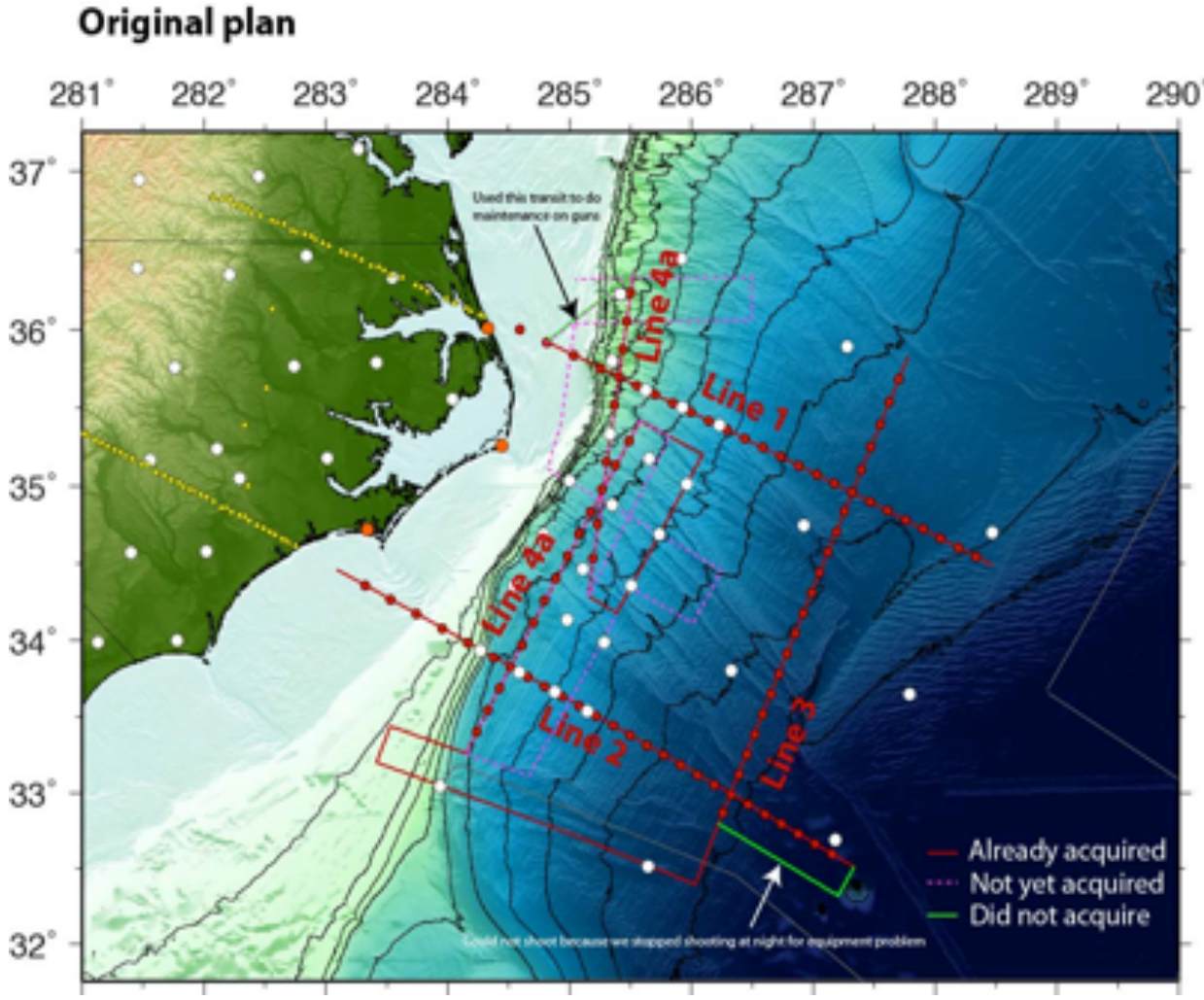
From September 12- October 18- GeoPrisms Eastern North American Margin Seismic Experiment completed ~4800km of 2D Seismic Survey and ~100 active OBS deployments (R/V Endeavor) along with deployment of passive OBS deployments at sea and on land.

Donna Shillington: (Langseth Chief Scientist):

" The R/V Langseth finished the Eastern North American Margin Community Seismic Experiment offshore North Carolina. Onboard analysis of the data has already revealed a number of exciting observations, from anomalously deep Moho reflections beneath the old oceanic crust formed during the early opening of the Atlantic Ocean to intriguing structures associated with relatively recent major submarine landslides. This community experiment brought 9 young scientists and graduate students to sea to collect seismic reflection data for the first time, and resulted in a very dynamic training and research environment on the ship."

ENAM Experiment (Sept-Oct 2014)



The ENAM experiment is a major onshore-offshore active-passive seismic investigation to understand the formation and evolution of the Eastern North American Margin. It involves collecting data to image the geology under the seafloor with the R/V Marcus G. Langseth as well as placing seismic stations onshore and on the seafloor to record the Langseth's air gun array and distant and local earthquakes.

Winter Maintenance at WHOI Pier

PA/Phone System Installation
Compressor Maintenance
Caterpillar Diesels Overhaul
Auxiliary Generator –Cummins Diesel Overhaul
Workboat Davit Installation
Gun Rails
ECDIS Installation
Other General Repairs

Partial 2015 Schedule

- USGS ATLANTIC ECS –Part 2- (April-May)
- NJ Margin (June)
- Chief Scientist Training Cruise –TBD
- TBD
- TBD

Seal Sentinel Streamer Systems
Lamont Doherty Earth Observatory

Seal Sentinel RD System 4 x 6km + 20% Spare:

- Delivery Requirements; 13 weeks ARO

- Sercel Proposal DWR/12/H/17345/A
  - List Price $18,102,218
  - Discount $ 3,743,160
  - Offer Price $14,359,058

Option A – Sentinel Standard:

- Approx $500K less than the Sentinel Reduced Diameter offer above (- $1,900 per section after discount)

Option B – Sentinel Exportable:

- Approx. $450K more than the Sentinel Reduced Diameter offer above (+ $1,700 per section after discount)

Option C – Sentinel RD Exportable:

- Approx. $940K more than the Sentinel Reduced Diameter offer above (+ $3,600 per section after discount)

Seal Sentinel Streamer Systems
Lamont Doherty Earth Observatory

Seal Sentinel RD System 4 x 6km + 20% Spare:

- Rental Option from Mitcham / Seismic Equipment Solutions
- Rental Companies require exportable sections to increase their rental opportunities
- Minimum 12 month rental commitment
  - monthly rental of $ 750,000 on $15M system price

Potential Sercel SEAL 408 Seismic Instrumentation Upgrade

Science and Operational Benefits:

- Longer Offset Streamers – 12km (possibly 15km) streamer vs 8km that allows for better visualization of sub-surface features
- Larger dynamic range of signal being recorded with higher sensitivity.
- Shorter Sample Rates - 1ms at 8km vs 2ms as 8km for current streamer, which allows for better visualization of sub-surface features.
- Shorter Deployment Times due to more robust equipmentCompatibility with new Seisnet System that allows for direct data streaming (on a parallel feed) to the Science workspace as well as "near real time" brute stacks and other functionality.
- System is new technology that is currently manufactured and supported.
- Control workstations in *Langseth* computer lab would interface with current technology.
- Less Down time during mission for both streamer and equipment failures
- Smaller diameter streamer –
    - Less drag and would help fuel economy of vessel.
    - Allow for wider spreads
    - Allow for down sizing of towing and handling hardware.
- 3Hz Seismic Streamer is not export controlled
- Streamers and equipment are repairable and upgradeable
- Sentinel Streamer has ability to use new Sercel “QuietSea” Technology and replace PAM

Potential Sercel SEAL 408 Seismic Instrumentation Upgrade

SSAS – Sentinel Solid Acquisition Section

■ 150 m length, solid, 12.5 m typical group spacing

■ 12 channels acquisition

■ available in 6.25 m and 3.125 m group intervals ■ designed for up to 15.7 km streamers

■ 59.5 mm diameter

■ distributed electronics

■ 2 coils per section

SEAL 408 Equipment List

Proposed Items included for SEAL 408 System and Associated Gear. Highlighted in yellow are particularly significant items

EQUIPMENT	QUANTITY
3HZ SECTIONS	192
HESE	7
SHS FLUID	14
HESA FLUID	7
TES	7
HAU408	7
HAPU TYPE G	4
LAUM	38
TAPU	7
TSW	7
BIRD	106
SRD500S	105.6
CMX	39
CTX	9
VELO	3
LEAD-INS	5
SEAL 408 RECORDING SYSTEM	2
PCS DIGICOURSE	1
SLIP RINGS	6
DECK CABLE	6
STREAMER WEIGHTS	400
STREAMER COLLARS	160
STREAMER PROTECTION	160
QUICK LATCHES	250
HEAD BUOY	2
Tail Buoy body	6
TB electronics	6
Fairlead	6