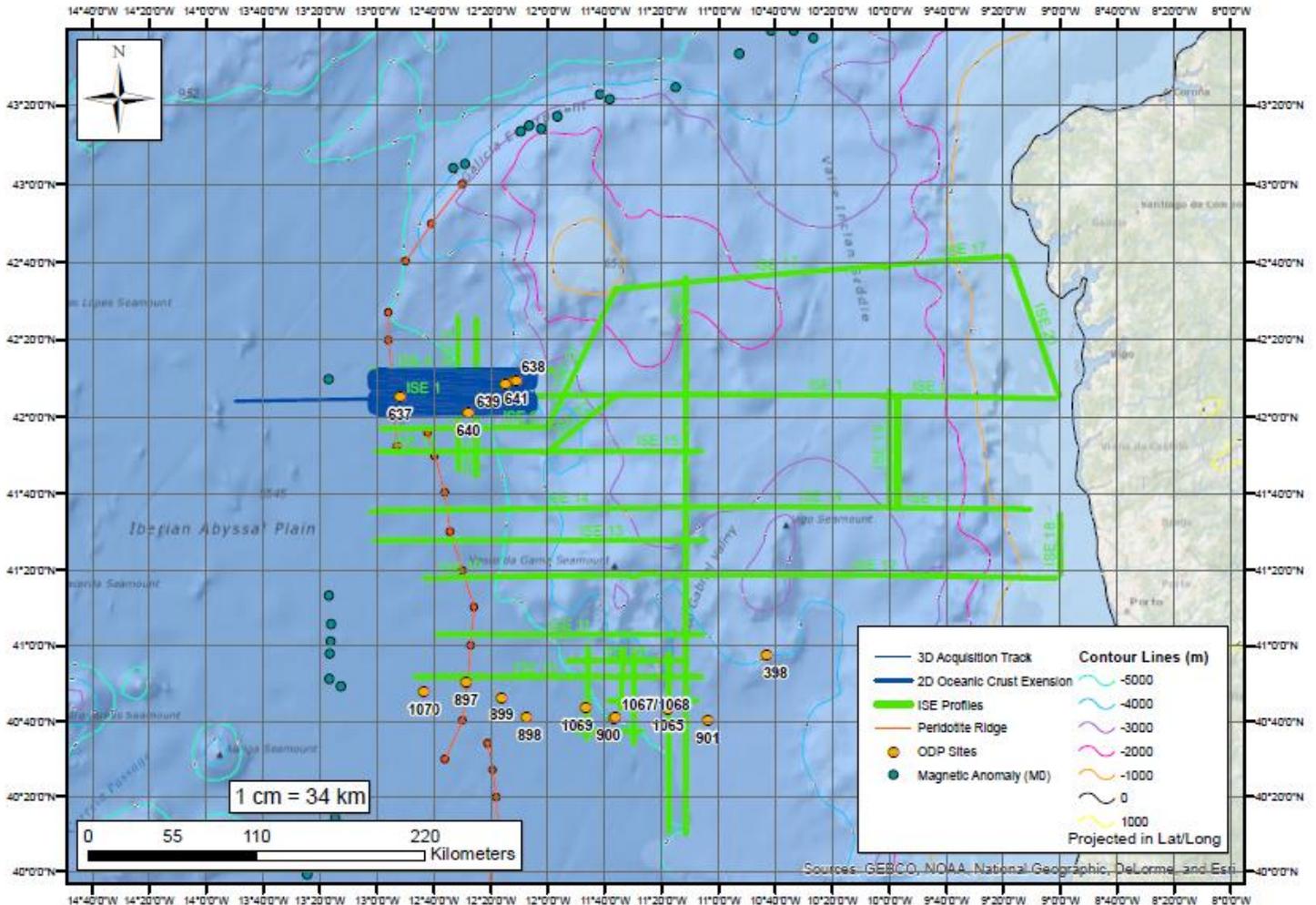


# MGL1307 Cruise Report

## Galicia 3D Seismic Experiment (2013)

Updated on 3-10-2013



## Collaborative Research: Seismic Study of the Galicia S Detachment

Principal Investigator – Dale S. Sawyer, Rice University  
Co-Principal Investigator – Julia K. Morgan, Rice University  
Co-Principal Investigator – Donna J. Shillington, Columbia University

**Preliminary**

## Table of Contents

<b>Intellectual Merit</b>	<b>p.</b>
<b>Broader Impacts of the Proposed Research</b>	<b>p.</b>
<b>Summer Intern Program</b>	<b>p.</b>
<b>Data Dissemination Plan</b>	<b>p.</b>
<b>Collaborative Research: Seismic Study of the Galicia S Detachment</b>	<b>p.</b>
<b>Foreword</b>	<b>p.</b>
<b>Introduction</b>	<b>p.</b>
<b>The Iberia Newfoundland Rift</b>	<b>p.</b>
<b>Galicia margin</b>	<b>p.</b>
<b>The Galicia S Reflector, Mantle Exhumation, and the Peridotite Ridge</b>	<b>p.</b>
<b>Hypothesis 1</b>	<b>p.</b>
<b>Hypothesis 2</b>	<b>p.</b>
<b>Hypothesis 3</b>	<b>p.</b>
<b>Survey Plan</b>	<b>p.</b>
<b>3-D MCS component</b>	<b>p.</b>
<b>Processing of MCS data</b>	<b>p.</b>
<b>Shipboard Processing</b>	<b>p.</b>
<b>Basic Processing</b>	<b>p.</b>
<b>Advanced Processing</b>	<b>p.</b>
<b>3-D Wide-Angle Component</b>	<b>p.</b>
<b>What We Expect to Learn from the 3-D MCS and Wide-Angle Seismic Data</b>	<b>p.</b>
<b>Relationship to Proposed IODP Drilling</b>	<b>p.</b>
<b>Survey Summary</b>	<b>p.</b>
<b>Leg One</b>	<b>p.</b>

**APPENDICES**

<b>Appendix A Daily Narratives</b>	<b>p.</b>
<b>Chief Science Officer -- Robert J. Steinhaus</b>	<b>p.</b>
<b>Protected Species Observers</b>	<b>p.</b>
<b>Appendix B Multi-beam Bathymetry Data</b>	<b>p.</b>
<b>Appendix C XBT Probe Data</b>	<b>p.</b>
<b>Appendix D Gravity Data</b>	<b>p.</b>
<b>Appendix E Magnetism Data</b>	<b>p.</b>
<b>Appendix F Initial Results with Data Examples</b>	<b>p.</b>
<b>Appendix G Personnel</b>	<b>p.</b>
<b>Appendix H Seismic and Navigation Data Merging</b>	<b>p.</b>
<b>Appendix I Miscellaneous</b>	<b>p.</b>
<b>Appendix J Observer's Sheets</b>	<b>p.</b>

## Intellectual Merit

We studied the rifted continental to oceanic crust transition in the Deep Galicia Basin west of Spain. This margin and its conjugate are among the best studied magma poor, rifted margins in the world and the focus of studies of the faulting mechanics and modification of the upper mantle associated with such margins. Over the years, a combination of 2-D seismic reflection profiling, general marine geophysics, and ocean drilling have identified a number of interesting features of the margin. Among these is the S reflector, which has been interpreted to be a detachment fault overlain with fault bounded, rotated, continental crustal blocks and underlain by serpentinitized peridotite, and the Peridotite Ridge, composed of serpentinitized peridotite and thought to be upper mantle exhumed to the seafloor during rifting.

We used the *RV Langseth* to collect a 3-D seismic reflection box, a dense 2-D box, and an OBS long-offset seismic program, 80 km long and 25 km wide over the Deep Galicia Basin, and extending through the crust and S detachment into the upper mantle. As we continue to study these data, we will characterize the last stage of continental breakup and the initiation of seafloor spreading, relate post-rifting subsidence to syn-rifting lithosphere deformation, and learn about the nature of detachment faults.

We collaborated with scientists from the UK, Germany, Spain, and Portugal. For the acquisition, European colleagues contributed commercial basic data processing of the 3-D seismic data, the use of 80 Ocean Bottom Seismographs, the use the *RV Poseidon* to deploy and recover the OBS's, and a ship swap for 20 additional days of *RV Langseth* time. The UK proposal has already been funded at a level of £1,133,000.

The survey will support future IODP drilling in the Deep Galicia Basin as well as in the conjugate Flemish Cap Basin. Conjugate studies involving excellent seismic characterization of stratigraphy and tectonics combined with drilling to determine dates and rates are critical to advancing our understanding of continental breakup processes.

## Broader Impacts of the Proposed Research

**Summer Intern Program:** In the summers of project years 2 and 3, we will conduct a two-month internship program at Rice University for 1 post-doc, 1 grad student, and 1 undergraduate student each summer. At least half the interns will be from underrepresented groups. All of the interns will gain access to these data, will become part of the interpretation team, and will develop projects using these seismic data. All will present results of their work at Fall AGU. They will all participate in a meeting of the full US and European science team. We expect this to be a strong international science experience.

**Data Dissemination Plan:** We will make a 3-D post-stack, depth-migrated seismic volume available two years after this summer's acquisition. The data will be provided in formats to be used with free 3-D seismic viewing software. Early in project year 3, we will conduct a workshop in conjunction with Fall AGU for undergraduate teaching faculty and graduate students. We will introduce our dataset, present the science behind its acquisition, and show how the data may be used in education. Rather than only "archiving" our data, we intend to be proactive in encouraging the dissemination and wide use of our 3-D seismic data.

## Collaborative Research: Seismic Study of the Galicia S Detachment

### Foreword

This project, to carry out a 3-D MCS and wide-angle seismic survey of the Deep Galicia Basin offshore Spain in the Atlantic Ocean, was last proposed to NSF-MGG in August, 2008. That proposal received very strong reviews and panel ranking, but finally was not funded because of the cost of 71 science days on the R/V *Langseth*.

When we were asked by the program to withdraw the proposal, it was suggested by program managers that we resubmit for a 42-day cruise, port to port, on the R/V *Langseth*. This is what we have just finished, this acquisition phase. We believe that this plan will achieve all of the key scientific objectives of the previous proposal at a substantially reduced ship cost. Furthermore, we were encouraged by the program to broaden the participation of US scientists in this international program and to be cognizant of developing promising young investigators who will be the leaders of marine seismic science in the future. We have invited Donna Shillington to join our US team to address the above objectives as well as to gain her seismic expertise and her experience in seismic studies of the conjugate Newfoundland Margin.

We used 3-D seismic methods to study the Galicia S detachment because it is a key feature of the best-observed magma-poor, hyper-extended rifted continental margin in the world. Understanding complex marine tectonic environments requires the combined application of high quality geological and geophysical characterization, and ocean drilling. Existing 2-D seismic work and several academic drilling legs in this vicinity, along with a strong international community of scientists interpreting these data, have laid the essential groundwork for planning the 3-D seismic project we have just concluded. The acquisition by Lamont-Doherty Earth Observatory of a 3-D seismic vessel, the R/V *Langseth*, and its demonstrated success in acquiring 3-D data at the East Pacific Rise (EPR), has made our project possible.

This project is an international scientific collaboration with funding from the NSF, the National Environmental Research Council (NERC) in the UK, and the Deutsche Forschungsgemeinschaft (DFG) in Germany.

In July, 2008, we learned that the UK participants, led by Reston (Birmingham) and Minshull (Southampton), secured funding from NERC of £1.133M (~\$1,765,000 at current rate) for the commercial processing of the resulting 3-D seismic volume, the deployment of 50 ocean bottom seismometers (OBS), as well as all UK personnel and travel costs during data collection and analysis. In addition, their application for 20 days of *Langseth* time has been approved in principle by NERC but awaits scheduling. The proposal for the UK component of our project was rated by the NERC panel as Alpha-5, the highest ranking available in the NERC scientific evaluation.

German colleagues led by Klaeschen (IFM-GEOMAR, Kiel) have been funded by the scientific panel of mid-class research vessels at the Institut fuer Ostseeforschung, Warnemuende (IOW) for 41 days of ship time with R/V *Poseidon* for OBS deployment and recovery. A proposal to the DFG for transportation and consumable costs of 28 OBS/OBH and data analysis is ready to be submitted.

We have described, but not detailed, the OBS experiment in this report as the funding for the OBS experiment is in place, and NSF is not being asked to fund that part of the project.

This project represents a tremendous opportunity for gaining 3-D MCS experience using the *Langseth*, with 1) the costs being broadly shared with international collaborators and 2) the scientific value of an international team of scientists.

We have adopted a processing plan for the 3-D seismic volume that takes advantage of the incredible expertise, efficiency, and computer capability of commercial processing companies to handle the mundane aspects of processing, yet allows scientists and graduate students to take the lead in the scientifically

interesting and important pre-stack time and depth migration processing, where interpretation and processing merge. This approach will ensure that the scientists will obtain an interpretable data volume very quickly, increasing the time spent on scientific investigations rather than processing. The funding for this commercial processing, £200,000 to £250,000 (~\$311,000 to \$390,000), is already funded as part of the NERC grant.

Previous reviewers raised concerns about the amount of prior-shot noise in the water column and the maximum offsets in the OBS part of the project. We acknowledge these concerns, but note that the 3-D MCS experiment is the driving force in determining acquisition parameters for this project. The OBS's are an excellent and scientifically valuable add-on in our view, but do not warrant degrading the 3-D MCS data. Picking arrivals at ranges longer than 30-35 km will be impeded by direct waterborne energy from the previous shot and there will be more dispersed energy in the water column than we would prefer. However, previous OBS studies over the S detachment have shown that upper mantle arrivals are quite strong and become first arrivals at ~15-20 km offset. The S detachment and upper mantle should be well imaged in the bulk of the 3-D box, and the additional profiles outside the box will extend this sampling to its edges.

A reviewer also expressed a valid concern about the limited amount of contingency time we included in our proposal, suggesting that the uncertainties of using the *Langseth* justified additional contingency time. We agree that there are unknowns. Sawyer and Shillington have attended a series of LDEO workshops on 3-D seismic acquisition at which 3-D MCS planning issues for the *Langseth* were discussed, including the successful experience on the *Langseth* acquiring 3-D data at the EPR. We have incorporated that information into this plan and we argue that it is realistic.

## Introduction

Ocean basins and oceanic gateways formed by the breakup of the continents, leaving rifted margins at the trailing edge of the continents preserve a record of the tectonic, magmatic and sedimentological processes accompanying continental extension, thinning and final separation. Two main types of rifted margin have been recognized (Coffin et al., 2006; Sawyer et al., 2007): those dominated by excess magmatism generally associated with hot mantle upwelling, and those where the limited magmatism is consistent with cooler extension (magma-poor margins - MPM). The latter environment is optimal for studying the history and processes of continental rifting, because the tectonic fabric has not been buried by thick sequences of basalt, and thus is accessible to both drilling and seismic imaging techniques.

Although it is generally considered that both types of margins form by faulting, lithospheric extension and thinning, these are complex 3-D processes whose mechanisms and distributions vary with time. As a result we do not understand how the crust is thinned in both space and time from about 30 km at the shelf toward zero in the deep margin and thus how continental breakup actually occurs. Observations of mismatches between estimates of extension, sometimes referred to as the "extension discrepancy" (Reston, et al., 2007), characterize rifted margins (Kusznir and Karner, 2007). Attempts have been made to explain these using depth-dependent extension and lower crustal flow mechanisms (Kusznir and Karner, 2007) and through polyphase faulting (Reston, 2005). The principal objective of our work was to make the 3-D observations necessary to achieve major progress in our understanding of the processes (geodynamic, tectonic, sedimentological, structural) occurring during continental extension and breakup. After processing of all data, this will be achieved through the collection and analysis of a combined 3-D seismic reflection and wide-angle dataset over the type-example MPM west of Iberia. The low magmatism accompanying rifting in this setting means that the deformation approximates a constant-volume process, allowing tectonic reconstructions of rift blocks and stratigraphy to test kinematic and dynamic models for continental extension.

Understanding the rifting process also constrains lithospheric mechanics and strength and the thermal structure of the upper mantle. More specifically the themes addressed (mechanism and geometry of detachment faulting, fault growth and interaction in 4-D, mantle unroofing, crustal structure) variously have implications for other settings such as intracontinental rifting (e.g. the East African Rift and the Aegean region), mountain building (which inherit fabrics generated during rifting) and mid-ocean ridges. The last are not only characterized by similar processes, but the transition from rifting to seafloor spreading remains one of the main puzzles to be addressed in global tectonics.

## The Iberia Newfoundland Rift

The continental lithosphere of Iberia and Newfoundland/Grand Banks (Fig. 1) began rifting in the Triassic, culminating in complete breakup and the generation of new oceanic lithosphere in the Early Cretaceous (Tucholke and Whitmarsh, in press; Manatschal, 2004). From a scientific perspective, this breakup is interesting because it took place without the emplacement of significant amounts of extrusive or intrusive igneous rock. Rather, the pre-breakup extension of the continental lithosphere was accomplished by mechanical means, including the formation of "detachment" faults cutting both continental crust and upper mantle rocks, and the exhumation to the seafloor and serpentinization of continental upper-mantle rocks. From a practical perspective, this particular breakup is interesting because both conjugate margins have been relatively sediment starved and are without evaporites. Thus, the rifted continental crust and upper mantle rocks are buried under less than 2 km of sediment, making them accessible to seismic reflection profiling and to subsurface sampling by ocean drilling. The lack of evaporates means that there has not been substantial post-rifting disturbance of the sedimentary record, and that seismic images are not degraded by the large velocity contrasts associated with salt. This combination of scientific interest and the relative ease of making critical observations on the Iberia and Newfoundland conjugate margins, has made this system a type example of a complete magma-poor rifted margin. It has been studied using a variety of geophysical and geological techniques over the past several decades, and has been the site of 5 legs of the Deep Sea Drilling Program (DSDP; Sibuet and Ryan, 1979) and Ocean Drilling Program (ODP; Boillot et al, 1988; Whitmarsh et al., 1996; Whitmarsh et al, 2001, Tucholke and Sibuet, 2007) and numerous marine multichannel seismic investigations (Groupe Galice 1979; Beslier et al, 1993; Pickup et al., 1996; Discovery 215 Working Group, 1998; Perez-Gussinye et al., 2003, Henning et al., 2004; Hopper et al., 2006; and others).

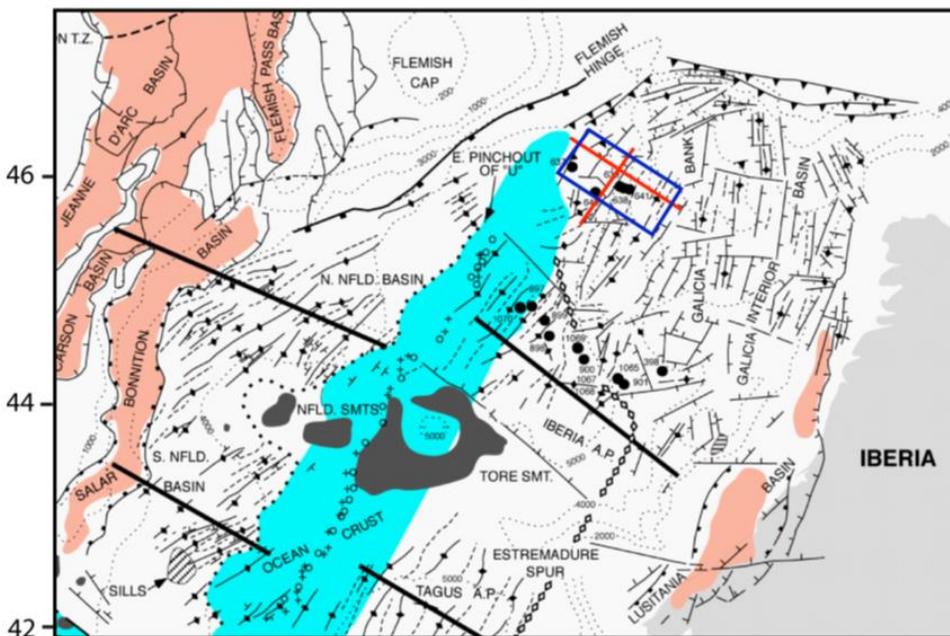


Figure 1. M0-anomaly (121 Ma) reconstruction of proposed study area in N. American reference frame. Pink areas to the west are basins on the Grand Banks of Newfoundland. Blue area is oceanic crust. Longer red line is approximate position of profile ISE-4. Short red line is approximate position of profile ISE-5. Blue box is the approximate location of the proposed 3D MCS and wide-angle OBS/OBH survey. See Fig. 6 for greater detail of survey area.

## Galicia margin

The Galicia rifted margin segment is located in the Atlantic Ocean offshore Spain (Fig. 1). More than 340 km of rifted continental crust and unroofed upper mantle lie between the normal continental crust of Spain and Atlantic oceanic crust (Fig. 1). The rifted margin has experienced at least 3 phases of rifting. The earliest phase of extension, in the late Triassic, formed the Grand Banks basins on the conjugate margin and the Lusitania and Porto basins. Subsequent Valanginian-Hauterivian extension formed the Galicia Interior basin, thinning the crust by a factor of 2 to below 15 km thickness, and also affected the site of later breakup to the west (Figs. 1 and 2). The extension was accommodated by rotation of blocks averaging 25 km in width on normal faults cutting into the lower crust. The third phase of extension, in the Barremian-Aptian, reactivated faults from Phase 2 and cut new, more favorably oriented, faults as the continental crust was thinned from about 15 km thickness

to less than 5 km thickness (Reston, 2005). The extension was again accommodated by the rotation of continental blocks on normal faults, but this time the faults cut through the continental crust to the top of the upper mantle. Faults reaching from the seafloor to the upper mantle became conduits for water, which hydrated upper mantle peridotites to form serpentine (Pérez-Gussinye and Reston, 2001). Serpentine is weaker and shears more easily than unaltered mantle rocks or lower crustal rocks (Escartin et al., 1997). The continental block-bounding normal faults soled into the serpentinized upper mantle, forming a detachment. The S reflector (Fig. 2) is thought to be the seismic signature of this detachment (Reston et al., 1996). The processes by which extension occurred and the localized continental extension evolved into seafloor spreading remain inadequately understood, although recent work, well summarized by Manatschal (2004) and Lavier and Manatschal (2006) have brought new and important insights from the study of analogue exposures in the Alps and from numerical modeling.

### The Galicia S reflector, mantle exhumation, and the Peridotite Ridge

In dip sections (i.e., oriented east-west), the S reflector can be followed over 30 km, cutting down from the east, across the Moho, and flattening to a very bright, generally continuous, roughly horizontal reflector (Fig. 2). West of the intersection with the Moho, the sub-horizontal S reflector represents a step velocity increase with depth (Reston et al., 1996; Leythäuser et al., 2005), corresponding to the boundary deduced from refraction data between crustal rocks above and underlying partially serpentinized peridotites below (Whitmarsh et al., 1996).

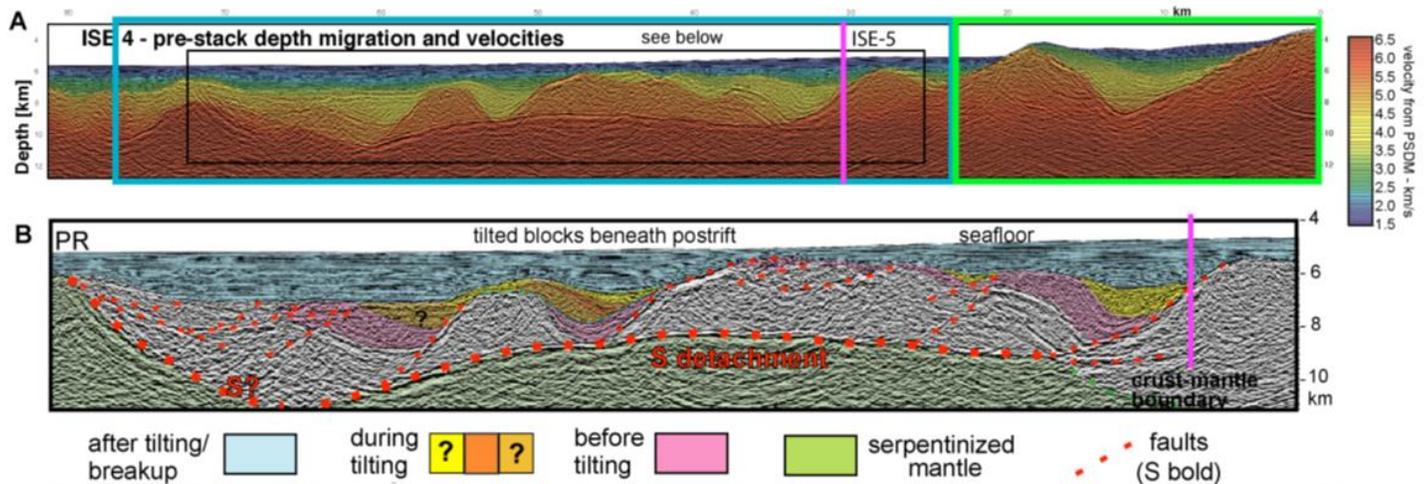


Figure 2. Profile ISE-4. A. Velocity model over pre-stack depth migration. The inline extent of the proposed 3D MCS survey is shown by the blue box. The inline extent of the MCS profiles extended to the east is shown by the green box. A vertical magenta line shows the tie with profile ISE-5 shown in Fig. 3. B. Closeup of the area in the black box in A.

The continental crust above S is broken into a series of fault blocks topped with pre-rift or early syn-rift sediment and bound by west-dipping faults that sole onto the S reflector. As a result, the S reflector is interpreted as an extensional detachment fault cutting down across the crust from a breakaway in the east, localizing along the weak serpentinites at the top of the mantle to form a structural crust-mantle boundary. The western termination of the S reflector is interpreted in different ways. Leythäuser et al (2003) interpreted S to deepen under the basin just landward of the peridotite ridge and then curve smoothly upward toward the top of the Peridotite Ridge (PR).

Henning et al. (2004) interpreted S to be cut by a down-to-the-west, high angle, normal fault that penetrates into the upper mantle and is located to the east of the PR and its adjacent basin. A short segment of S may also be present in the interior of the peridotite ridge on the west side of the mantle penetrating fault. In the first interpretation, the PR is a basement high cut by a detachment fault and may be analogous to the Hobby High drilled (ODP Legs 149 and 173; Manatschal et al., 2001) and imaged in the Iberia Abyssal Plain margin segment to the south. In the second case, the fault that cuts S and the upper mantle may reflect a change in rifting style

as continental rifting ends and the formation of ocean crust begins, and may also be a conduit for water that serpentinizes exhumed upper mantle rock to form the PR. In both cases, the S reflector and the PR are intimately related, and knowing more about the true geometry of faults and fault blocks in this area may help solve the puzzle of when and how the PR was formed. These interpretations can best be tested using 3-D

seismic data. Strong constraint should come from the detailed stratigraphy of the syn faulting sediments and from the 3-D migrated images of the faults on the eastern flank of the PR.

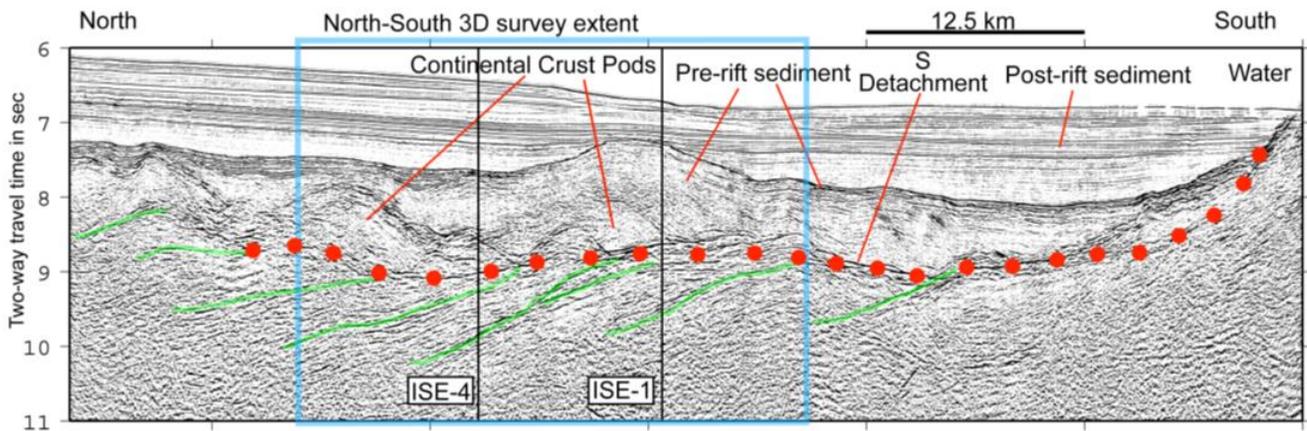


Figure 3. Strike Profile ISE-5. The crossline extent of the proposed 3D MCS survey is shown by the blue box. Red dots are the S detachment. Note the fault-bounded "pods" of continental crust overlying S. These illustrate the scale of along-strike fault bounded blocks of continental crust. The mantle lies below the S detachment. During rifting, the crustal blocks/pods and the pre-rift sediments were transported on the S detachment out of the plane of this section toward the reader. Green lines are faults dipping to the north within the upper mantle. Some mantle faults offset S. The reflection character of S changes significantly along the profile. Note the incredible lateral complexity rarely considered in 2D models for lithospheric structure and evolution.

Based on dip sections alone, the S reflector appears to be a relatively simple low-angle detachment fault. However, strike lines across S (Fig. 3) show a more complex structure. Line ISE-5 crosses line ISE-4 within the part of S that is relatively flat and high amplitude. In the strike lines, we see that 1) S is in places cut and offset by faults in places, 2) shallowly dipping reflectors, interpreted to be faults, dip (mostly) to the north into the upper mantle, 3) the reflection amplitude and thickness of S varies dramatically from north to south, 4) there are fault bounded blocks with apparent rotation down to the south, and 5) the fault-bounded crustal blocks above S are "pod" or lozenge shaped with along-strike extents of up to 15 km in length and up to 2 km in thickness. Together, these characteristics suggest 1) that the formation and movement of the S detachment was not the last act in the breakup of the continent, 2) that the direction of plate movement during breakup may have been different than the apparently east west orientation of the early rifting deformation, and 3) that the breakup is by no means completely characterized in 2-D dip lines. In such an environment, the acquisition of 3-D seismic reflection data is critical if one is to understand the tectonics of continental breakup and the deposition of sediment in the syn- or early post-faulting intervals.

As examples of the value of 3-D MCS and wide-angle seismic data to address important problems, we present three hypotheses that explain aspects of the formation of the Deep Galicia Basin. They are not mutually exclusive and are based on the latest interpretations of the existing 2-D MCS and OBS data. We will describe each in turn and focus on how 3-D seismic data have the potential to constrain each.

### Hypothesis 1: The S detachment was active at a low angle

If true, this would be a major discovery, because the existence and mechanics of low-angle faults have been extensively debated. The evidence for such activity is found in possible syn-faulting sedimentary wedges observed in 2-D pre-stack depth-migrated profiles over the S detachment (Fig. 4). Previous work has suggested that syn-rift wedges are rare or non-existent over the S detachment (Wilson et al, 1996; Wilson et al., 2001). Reston et al. (2007) attribute their success in identifying them to the power of pre-stack depth migration to properly image complex stratigraphy. They combine observations of the shape of the faults and the configuration of the syn-faulting wedges to argue that the wedges were deposited during low angle fault movement on the S detachment (Fig. 4). This interpretation assumes that the 2-D profile is oriented in the extension and fault movement direction, and that the stratigraphy has no out-of-plane dip. Our data will test this hypothesis by mapping the 3-D geometry of the fault and of the overlying stratigraphy and by determining the extension direction.

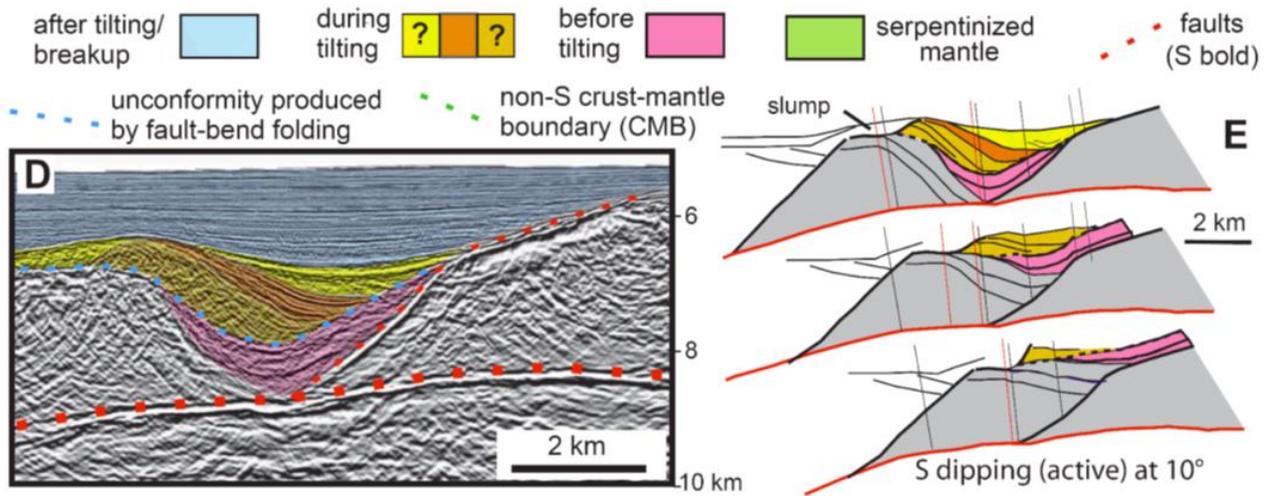


Figure 4. Pre-stack depth migrated image of fault bounded continental crustal blocks over the S reflector. Figure from Reston et al. (2007). Orange stratigraphic interval is interpreted to be syn-faulting. The configuration of pre-, syn-, and post-faulting, and the fault shapes can be used to reconstruct fault movement. With stratigraphic correlation to a drillsite, the timing, and hence rates, of these processes may be obtained. 3D MCS data can provide excellent images of stratigraphy and fault shape in 3D.

**Hypothesis 2: Differences between the degree of extension estimated from fault heaves in the upper crust and whole crustal and lithospheric extension estimated from wide-angle seismic data and subsidence can be explained by polyphase faulting**

Reston's (2005) model suggests that crustal blocks associated with the S detachment were exposed to several cycles of (1) breaking a new set of normal faults, (2) extension on that set of faults, (3) eventually rotating the blocks and the faults until they are no longer properly oriented for further motion, and (4) breaking a new set of normal faults. He then suggests that extension recorded in all but the last cycle of extension is not easily recognizable; thus the observed brittle extension is far less than the total extension. This is particularly true for highly extended crust which will have experienced more cycles of re-faulting. Reston (2005) presents a palinspastic restoration of the fault blocks along profile GP 101 that takes into account the two series of faults that are interpreted to have cut the crust under the Deep Galicia Basin after the continental crust had already been thinned to 15 km during the formation of the Galicia Bank and Interior Basin (Fig. 5). While this restoration lends support to the inferred complex sequence of faulting, a 2-D restoration can only assume that the motion out-of-the-plane of the section is negligible. We will test this hypothesis by 3-D palinspastic restoration of the crustal blocks, and by improved (3-D) imaging of the syn-faulting sediment packages. Conclusive demonstration that polyphase faulting is or is not the cause of the apparent extension discrepancy at this margin will have profound implications for models of rifted margins worldwide.

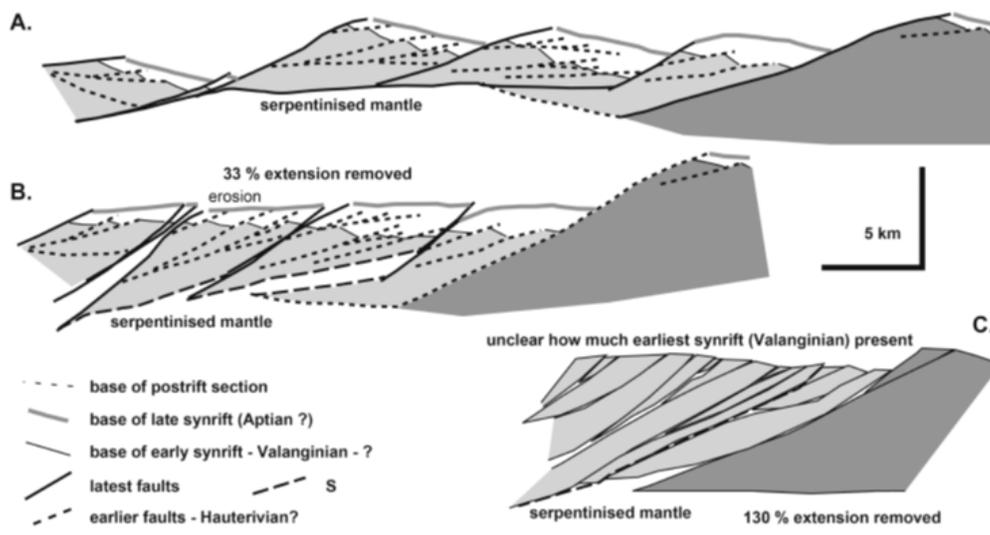


Figure 5. Two stage partial restoration of seismic line GP101 in our 3D box. This is Fig. 10 of Reston (2005). A: current situation. B: restoration after removing movement along latest faults. In the resulting section, various structures align across the restored fault blocks and are interpreted as a network of earlier faults. Note that the rifting of light shaded area postdates that of dark shaded region (Galicia Bank). C: restoration of previous phase of extension along the earlier faults reproduces large-scale tilted block structure reminiscent of the Galicia Interior Basin which Reston (2005) shows probably had already experienced 2 phases of extension. Thus, the Deep Galicia Basin crust may have seen a succession of four superimposed extension phases. Interpreting and reliably reconstructing continental crust cut by multiple phases of extension will require 3D pre-stack depth migrated seismic data.

### Hypothesis 3: The crustal blocks above the S detachment have formed in a “rolling hinge” manner

In this hypothesis, the transition from rifting to seafloor spreading occurred on a concave downward normal fault dipping to the west. The footwall of this fault was pulled progressively out from under the hanging wall. Fault bounded blocks of the hanging wall material were plucked off and transferred to the footwall. This hypothesis requires that the tilted fault blocks overlying the detachment (S reflector) formed and then ceased movement progressively from east to west.

Our processed seismic data will test these models using high-quality imaging of the fault network in the extension direction and perpendicular to it, identifications of fault-motion indicators, detailed stratigraphy over fault bounded blocks of continental crust overlying the S detachment, and the ability to obtain relative timing of the locus of extension by correlating reflectors from basin to basin throughout the area.

Potentially affecting each of these hypotheses are recent interpretations of large scale landsliding affecting the west and south sides of the Galicia Bank (Sawyer et al., 2005; Clark et al, 2007). These interpretations are built upon the relative lack of clear syn-rifting sediment in the basins of the Deep Galicia Basin. This interpretation argues that the S detachment may be the surface of separation of a westward directed landslide from the Galicia Bank down into the Galicia abyssal plain. Reston et al., 2007, presented the best evidence for rotated syn-rift strata in the fault bounded basins of the deep Galicia basin. These observations challenge the landslide interpretation, but because of uncertainty about the 3-D stratigraphy and structure in basins, they do not completely exclude it. The collected 3-D MCS data, when processed and interpreted, would nail this issue one way or the other.

### Survey Plan

#### 3-D MCS component

We set out to obtain 3-D MCS seismic data over a 55 km by 25 km area (referred to as the “3-D box”; Figs. 1, 2, 3, 6) covering the east-west extent of the S-reflector, the peridotite ridge, faulted continental crustal blocks, and overlying pre-, syn-, and post-rift sediment. In addition to the 3-D box, 20 planned sail lines were extended by 25

km beyond the east end of the 3-D box providing longer-offset shooting into the OBH/OBS grid described below as well as 2-D structural and stratigraphic control beyond the 3-D box. We particularly wanted the line extensions to image the important transition from the Galicia Bank to the deep margin and S reflector area. The east west extent of the survey planned to cover the Peridotite Ridge in the west and the S reflector termination in the east. The north-south extent of the survey planned to cover the central part of the deep Galicia margin including ODP Leg 103 drill sites and key existing 2-D MCS profiles.

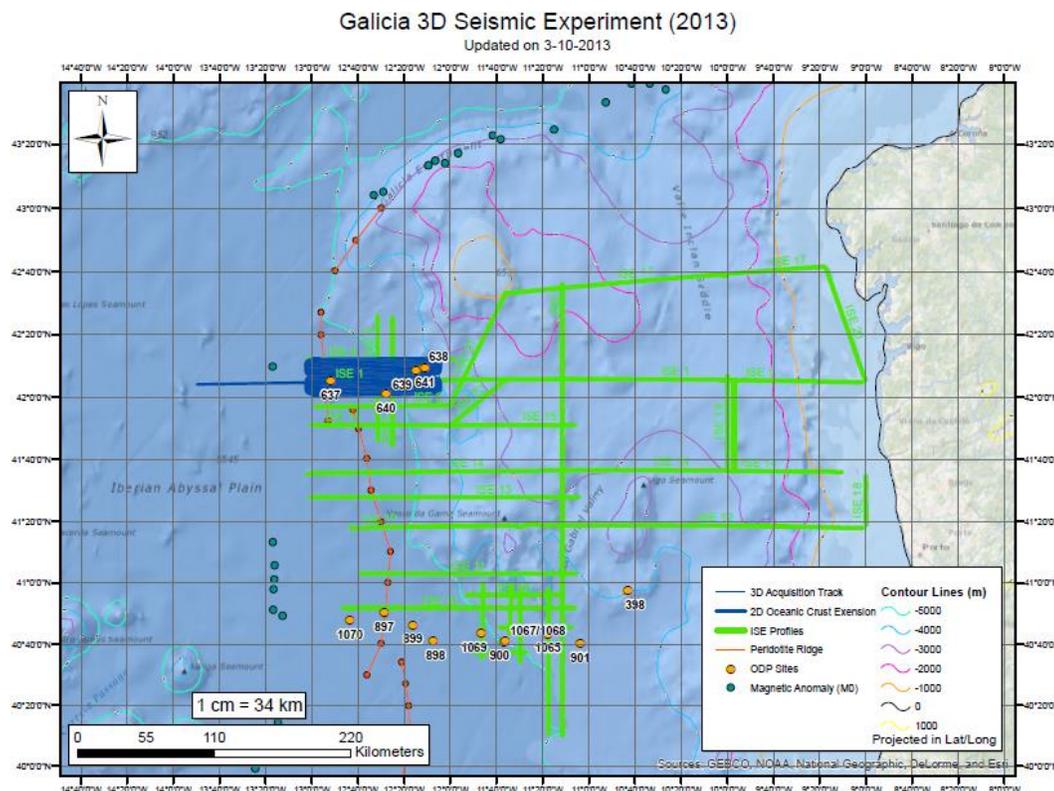
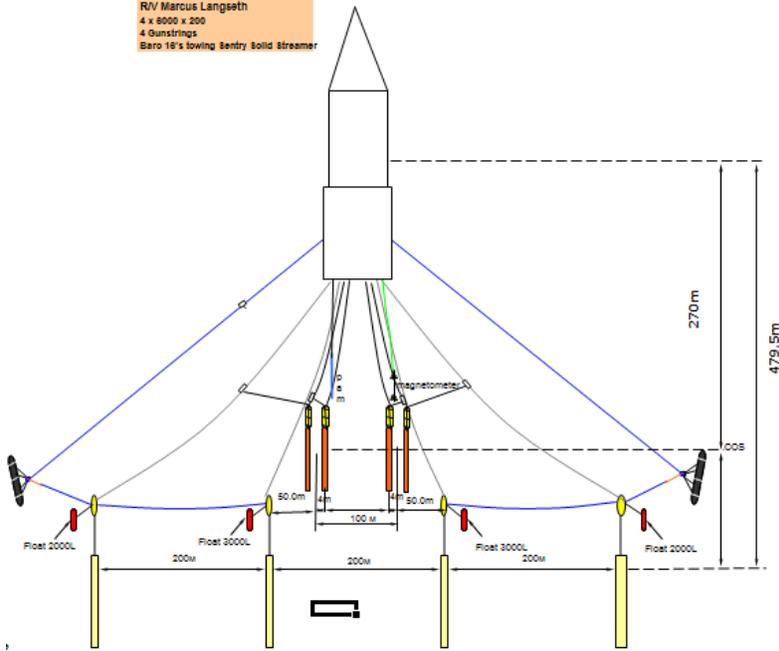


Figure 6 View of the complete planned operations for the MGL 1307 cruise

We acquired these 3-D seismic reflection data using the R/V *Langseth*, a vessel built for the oil industry and acquired by LDEO for academic use. The inline direction of our 3-D grid was east-west, the nominal "dip" direction for the Galicia margin. The CMP line spacing in the crossline direction was 50 m. Four, 6-km streamers, 200 m apart in the crossline direction, were towed behind the Langseth. There were 468 receiver channels spaced 12.5 m apart in each streamer. Two 3300 cu. in. source arrays were towed 100 m apart (in the crossline direction), and alternatively fired with 37.5 m (nominally 17 s) between shots. Adjacent ship tracks (called sail lines) were offset by 400 m in the crossline direction. This geometry was used to provide data with nominal 160 fold into 25 m by 50 m CMP bins. The 3-D data volume pre-plot comprised 504 parallel, east-west, CMP profiles (63 sail lines each producing 8 CMP profiles) with 2200 CMP bins along each (Figure 7).

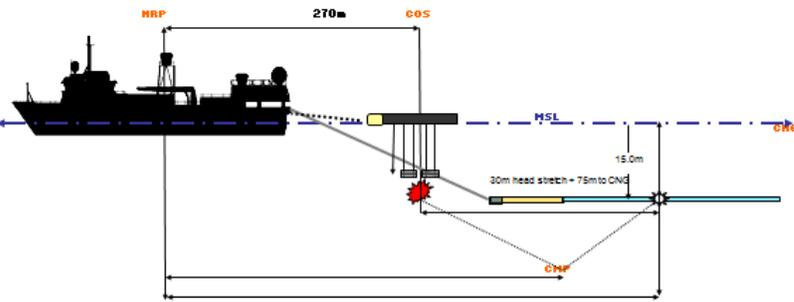
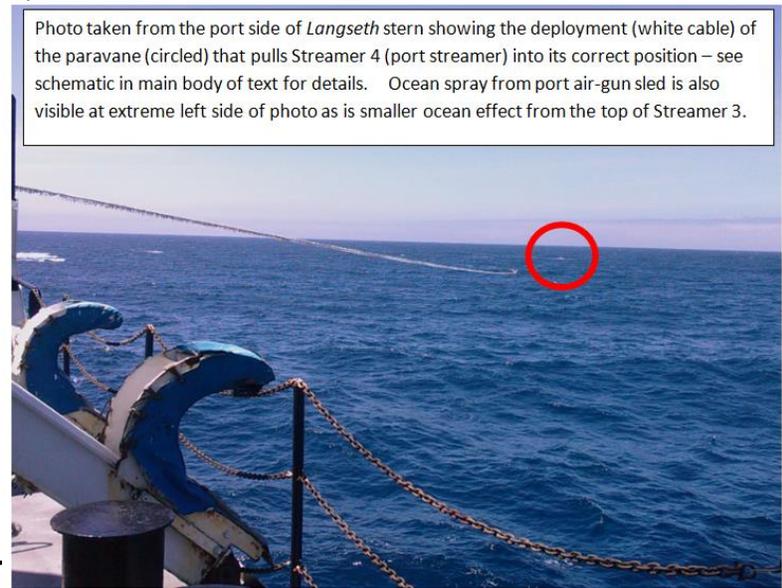
R/V Marcus Langseth  
4 x 6000 x 200  
4 Gunstrings  
Baro 18's towing Sentry solid Streamer



R/V Marcus G. Langseth - Towing Offsets

\*\*\* Offsets used for sequences \*\*\*

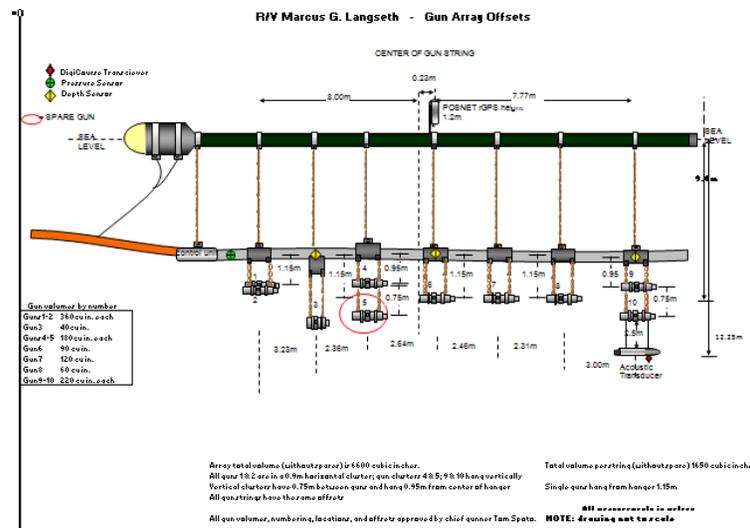
Photo taken from the port side of *Langseth* stern showing the deployment (white cable) of the paravane (circled) that pulls Streamer 4 (port streamer) into its correct position – see schematic in main body of text for details. Ocean spray from port air-gun sled is also visible at extreme left side of photo as is smaller ocean effect from the top of Streamer 3.



MRP	Main Receiver Point
COS	Center of Source
CGS	Center of Gun String (1114.51; 51; 27; 54)
CSP	Center of Ship Point
MSL	Main Sea Level
MRP-St	29.5m
MRP-COS	270m

Seq001-010 Minimal streamer depth 12m

Seq011-End Minimal streamer depth 15m



Gun volumes by number  
Gun#1: 200cu.in. each  
Gun#2: 40cu.in.  
Gun#3: 100cu.in. each  
Gun#4: 80cu.in.  
Gun#5: 120cu.in.  
Gun#6: 80cu.in.  
Gun#7: 120cu.in. each  
Gun#8: 80cu.in.  
Gun#9: 200cu.in. each

Array total volume (with top area) 6460 cubic inches. Total volume per string (with top area) 8650 cubic inches.  
All gun# 1&2 are in a 0.9m horizontal cluster; gun cluster 4&5; 6; 8 hang vertically  
Vertical cluster have 0.75m between gun and hang 0.95m from center of hang  
Single gun hang from hang 1.15m  
All gunstrings have the same offset  
All gun volumes, numbering, location, and offsets approved by chief quartermaster Tom Spata. NOTE: Drawing not to scale

Figure 7 Three schematics extracted from an AutoCAD file showing the R/V *Langseth* towing configuration and one photo to demonstrate the acquisition architecture for MGL1307



that the first water-bottom multiple arrives at about 14 sec, which is at least 20 km below the S detachment. In other words, multiples are not a problem in imaging our targets. In 2-D data in this area, it has proven possible to image geologic structures 10 or more km into the upper mantle (note the northward dipping reflectors below S and within the upper mantle in Fig. 3). Although the ISE data were acquired with a slightly larger source than we will use here, excellent images of the S detachment have been acquired using smaller sources. Furthermore, the source signature of the *Langseth* air gun array is superior to those used for previous seismic acquisition. Depth migration methods for 2-D data (both pre- and post-stack) have been shown to work well in the Galicia basin (Reston et al., 1996; Reston et al., 2007).

## MCS Data Processing

### Shipboard Processing

The primary purpose of shipboard processing is quality control. The “Spectra” system on *Langseth* provides real time binning. LDEO provided a navigator who monitored the binning as the survey progressed and directed the placement of sail lines and infill to so as to distribute the traces evenly across the 3-D box. As the data were acquired, we built a “near-trace” 3-D volume and a series of 2-D brute stack profiles. After the cruise we plan to have produced a 3-D time migration of the near-trace data volume (single fold data) and post-stack time migrations of the 2-D dip-line brute stacks.

### Basic Processing

The oil industry has established centers for the efficient and rapid routine data processing of 3-D MCS data. Processing of our 3-D MCS data is therefore to be carried out commercially through 3-D post-stack time migration, under the supervision of Rob Hardy, who has planned and supervised more than fifty 3-D MCS surveys while working in Industry. The huge volume of the data to be collected requires industry capacity to ensure efficient data throughput. Based on past experience in processing reflection data from this area, the most important steps will be detailed velocity analysis and source-signature deconvolution. Expensive pre-stack multiple suppression will not be required as the targets are shallower than the arrival time of the water-bottom multiple. Basic processing will include editing, binning, source-signature deconvolution, filtering, velocity analysis, and stacking of the 3-D volume, followed by 3-D post-stack time migration. The contract for basic processing of the 3-D MCS data is part of the funded UK contribution to this project.

We plan to archive the field MCS data at the LDEO databank, the stacked MCS data at the UT Austin databank as well as appropriate databanks in the UK, Germany, and Spain, and all other data at NGDC or other appropriate sites.

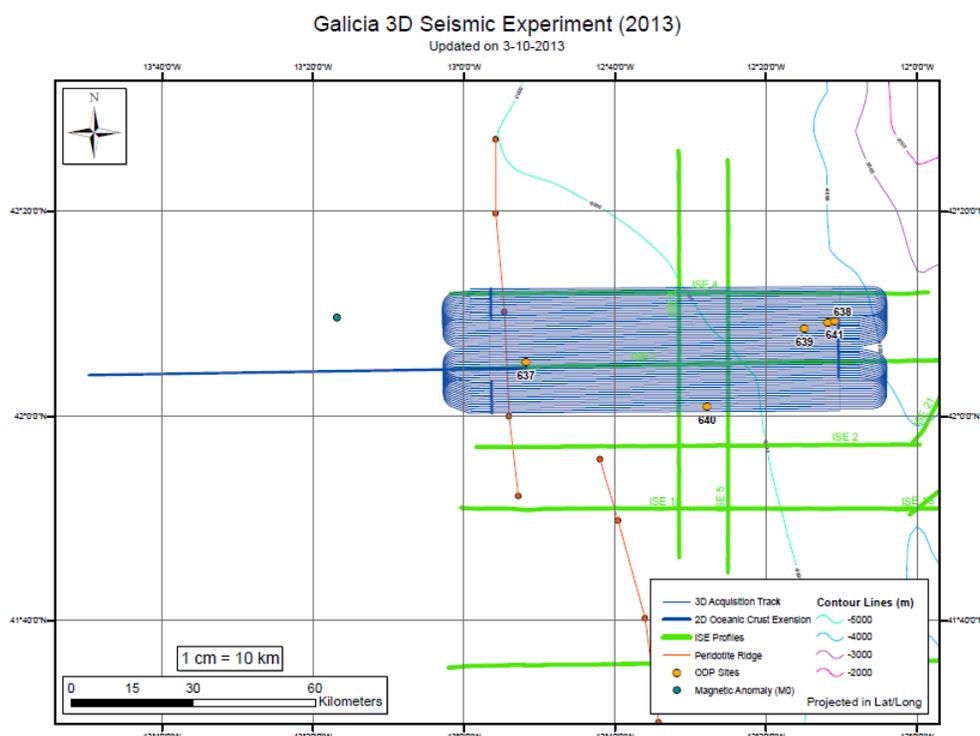


Figure 9 Close up view of the 3-D work area (box) and oceanic crust extension line.

## Advanced Processing

Our experimental plan yields CMP profiles spaced at 50 m, greater spacing than is optimal for avoiding spatial aliasing. We have done migration testing on 2-D data in this area and learned that 37.5 m spacing is adequate and 25 m is better. We plan to use carefully designed trace interpolation to obtain 25-m spaced CMP profiles. The classical trace interpolation works in the frequency-wavenumber domain; it is efficient but cannot prevent spatial aliasing. A more computationally intensive interpolation routine in the frequency-space domain does not have spatial aliasing limitations and uses a prediction error filter designed from interpolated data (consisting of known plus unknown samples). The methodology is to take the prediction error filter of the known data at a lower frequency as the prediction error filter for the known plus unknown data at the original frequency. A combination of both methods (hybrid method) applies the interpolation in the frequency-wavenumber domain for unaliased data and the frequency-space domain in the aliased domain. To apply the efficient hybrid method we need a broad-band source with good low-frequency content, something which the R/V *Langseth* source delivers.

Further pre- and post-stack migrations in time and depth will be carried out at UK, US, German, Spanish, and Portuguese universities. Depth migration in particular is an iterative process and is best performed together with interpretation. The final positions, geometries and relationships of faults are very sensitive to the exact velocities used in the migration. Results from the OBS tomography will aid the construction of an optimum velocity model for migration. Advanced processing including 3-D pre-stack depth migration and modern 3-D workstation interpretation will be performed at Birmingham, Rice, LDEO, IFM-GEOMAR, Southampton, Barcelona, and London. Investigators at each institution will use full 3-D visualization including volume rendering. 3-D faulting reconstructions will be made using commercial software. Investigators at IFM-GEOMAR are also interested in processing the water column to image thermohaline reflectivity.

### 3-D OBS Wide-angle Component (Funding not from NSF)

We deployed 78 ocean-bottom seismometers (OBS) / ocean bottom hydrophones (OBH) to record the shots fired by the *Langseth*. Fifty instruments were provided by the Univ. of Southampton. Twenty-eight instruments were provided by IFM-GEOMAR. Deployment and recovery of the instruments are planned using R/V *Poseidon*, operated by IFM-GEOMAR. Forty-one days of R/V *Poseidon* have been awarded.

a) The first array (bold black line in Fig. 6) is designed to provide a very high resolution model of velocities above and below the S reflector. It consists of a 12-km profile of 25 OBH's spaced 0.5-km apart over a uniform part of the S reflector. The instruments recorded shots fired during the first *Langseth* sail line which passed directly over the array. These OBH and MCS data are used for imaging the S reflector at offsets of zero to 20 km on both sides, giving a large range of angles of incidence suitable for careful amplitude/frequency vs. angle analyses, and for 2-D waveform inversion.

b) The first array of OBH's were recovered and redeployed as part of the second array (black triangles in Fig. 6) a widely-distributed grid of 78 OBS/OBH (13 x 6 pattern) with an instrument spacing of about 6.5 km in both directions. All the instruments in the grid recorded shots fired by *Langseth*: within the 3-D box, during the turns, and during the extended sail lines to the east of the 3-D box. This is about 5.5 million source-receiver pairs. These data are used for tomographic inversion to reveal the 3-D velocity structure of the thinned crust and upper mantle.

We acknowledge that the shooting parameters used of 17 sec between shots, are not optimal for the OBS experiment. However, we consider the 3-D MCS survey to be the primary dataset and the wide-angle data to be secondary, thus we designed the survey to collect the best possible 3-D dataset. Although there will be more residual sound in the water than one would like, we still expect the OBS data to provide a valuable complement to the MCS data.

The primary goal of the wide-angle data analysis is to provide an accurate and detailed 3-D, P-wave velocity model for the entire depth range sampled by the 3-D reflection data. Initially, we will apply automatic travel-time picking and the first-arrival tomography approach of Zelt and Barton (1998). This approach will allow us to rapidly generate a 3-D velocity volume that will be used in interpreting the reflection dataset and as a starting

point for migration. For the full tomographic analysis, we will use data from all instruments and exploit the dense sampling

to automate picking of all arrivals; key reflections will include the top of basement, the S reflector, and the Moho. We plan to identify the main phases by preliminary two-dimensional forward modeling, and then carry out a full 3-D inversion using a code that can model reflected as well as refracted phases, such as the JIVE code of Hobro et al. (2003). We will further constrain depths of the key reflectors by including in the inversion, normal incidence travel times from the unmigrated 3-D reflection volume, thus ensuring correct co-registration of the reflection

and velocity volumes. Particularly high-resolution velocity information will come from the densely sampled 2-D profile (the “first array” described above) in the center of our box; these data will be well suited to wide-angle imaging, AVO inversion and 2-D waveform inversion approaches that will allow us to determine the variation in physical properties of both the crust above S and of the S reflector itself with unprecedented detail.

### **What We Expect to Learn from the 3D MCS and Wide-Angle Seismic Data**

After processing, the 3-D seismic data should reveal the complete 3-D architecture of faulting of the continental blocks overlying the S detachment. We know that the fault-bounded blocks over the S detachment form a system of anastomosing listric faults soling out onto a detachment (Reston et al., 1996) and that these faults have a complicated, utterly 3-D geometry. However, we do not know how the blocks link mechanically, nor can we decipher how much of the total strain is localized on clearly visible faults, how much on older faults, and how much is distributed within the blocks. The relative temporal progression of deformation across strike is also unknown. We have an opportunity with this detachment system to obtain spectacular 3-D images of the architecture of an extensively faulted system, allowing us to determine the complex spatial and temporal strain distribution associated with the blocks, their bounding faults, and fault terminations.

To date, much of the thinking about the S detachment has focused on the faulting of the continental crustal blocks above the detachment ([need a reference here...](#)). The ISE strike lines (Fig. 3) show many dipping reflectors within the upper 5-10 km of the mantle, that appear to merge up into and in places offset the S detachment. These are most easily interpreted to be faults, but their existence is poorly understood in the traditional models for detachment faults. With 3-D seismic imaging, we should be able to trace the full 3-D extents of these faults to test and refine models proposed to explain them.

The 3-D seismic data will image the full 3-D stratigraphy of the pre-, syn-, and post-rift sediment. In particular, we will identify syn-faulting sediment wedges and pre-rift sequences, and use the Reston et al. (2007) techniques to determine kinematics and timing of faulting. We are particularly interested in constraining the orientation and timing of movement on the S detachment. One of the problems of working on the stratigraphy of this area using sparse 2-D data has been the lack of correlation of the pre- and syn-rift strata from one basin to the next (Wilson et al., 2001). These north-south oriented basins are filled with turbidites traveling a circuitous path from Iberia, and were primarily filled by sediment transport along the axes of the basins rather than in the dip direction. Based upon a few strike profiles, we know that the individual fault-bounded blocks are of limited north-south extent and that correlation of strata should be possible by working around the blocks. ODP Leg 103 drilling will give us valuable stratigraphic ties and absolute ages. The 3-D seismic volume should allow us to correlate those ages from basin to basin, making it possible to calculate the rates of faulting and other processes.

Determining fault motion on the S detachment and related normal faults is critical to accurately reconstructing the 3-D deformation history of the margin. Fault motion indicators include the shapes of faults, and piercing points such as offset sedimentary reflectors. For simplicity and necessity, we often assume that fault-slip paralleled the direction of early seafloor spreading. This is unlikely to be exactly right and may be very wrong. Oblique slip, and regional variations in slip direction associated with non-planar faults can significantly affect calculated extension. We expect to be able to see corrugations in the S detachment surface at wavelengths of 100 m or more. The many faults bounding continental blocks may also show corrugations diagnostic of fault movement direction. 3-D palinspastic restoration of the fault bounded blocks imaged in the 3-D dataset has the potential to provide much stronger constraints on fault movement directions than can be obtained using 2-D data.

We also expect to be able to see spatial variations in reflection character, amplitude and waveform of the S reflector. These properties are controlled by contrasts in velocity and density across S and by the fine structure of S itself. If S is a detachment fault developed at the top of serpentinized mantle, these physical properties should be related to the degree of serpentinization below S, the width and properties of the fault zone, and the degree of alteration and brecciation of the upper plate to S. We will be able to construct amplitude maps and maps of other seismic attributes of the S reflector surface that will show these spatial variations very clearly and allow correlation with faulting and other structural features.

Using the wide-angle seismic data, we should be able to resolve the detailed 3-D velocity structure of the faulted crustal blocks and the serpentinized upper mantle. This result will help to determine the degree of thinning of the various crustal layers (although care has to be taken where alteration and fracturing is intense). This will be critical in evaluating the importance of depth-dependent stretching and by implication, polyphase faulting (Hypothesis 2). The 3-D seismic velocity and density structure of the uppermost mantle will yield the degree of serpentinization and hence the amount of water reaching the mantle, probably along faults. This can help quantify the hydrology of the fractured upper crust and the amount of late displacement along S (leading to an offset between the overlying faults and the underlying serpentinized zone). We currently do not have velocity data for the upper mantle at high enough resolution to compare intensity of serpentinization with the locations of faults that could have been conduits for water. The combination of seismic attribute maps and fault locations from the MCS data and the velocity from tomography should make this possible.

Using the wide-angle data along with the MCS reflection data, we expect to produce a full 3-D reconstruction of the margin at successive time steps, constrained by fault geometries, fault motion indicators, relative age of synrift units, 3-D crustal structure and estimates of the displacement along S. We recognize that it will be difficult to achieve this goal, but believe that the attempt will provide significant insight into the rifting process here and elsewhere.

### **Relationship to Proposed IODP Drilling**

The 3-D reflection data we propose to acquire would serve as an exceptional site survey for proposed drilling of holes tentatively sited along profile ISE-4 (Proposal 740-Full). These holes would be drilled to 1) constrain the ages and rates of sedimentation in two of the syn-rift basins, 2) sample the S detachment, and 3) sample the rocks above and below the bounding fault for the PR and determine the relationship between the S detachment and the PR. The Site Survey Panel of the IODP has indicated that 3-D reflection data will be essential to siting holes in this complex 3-D stratigraphic and tectonic environment. The data we propose to acquire is conjugate to Newfoundland margin seismic data and proposed drilling (692-Pre and 659-Full). Conjugate margin studies are considered a key tool for understanding the tectonics of continental breakup.

### **Survey Summary**

#### **Leg One – (June 1 - June 25)**

*RV Langseth* left Vigo, Spain at 0800 hrs on June 1, 2013 to begin the first leg of the cruise. Figure 10 shows the seismic 3-D coverage obtained (green) in the 25 days that comprise the first leg of operations which ended by making port at Vigo, Spain on June 25<sup>th</sup> for port engine repair.

**Galicia 3D Seismic Acquisition Progress**  
27 Lines Completed (as of June 22, 2013)

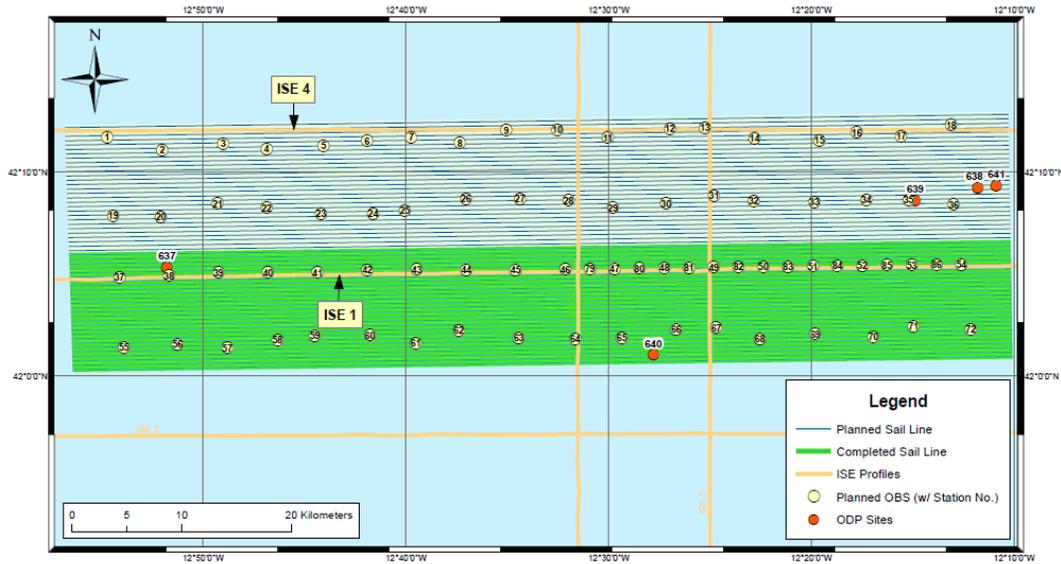


Figure 10 Seismic 3-D coverage (green) obtained during Leg One of the MGL1307 Cruise.

The repair of this engine took **17 days** before the ship departed on the second leg of the cruise. During this first leg, 27 sail lines of the planned 3-D seismic data “box” were accomplished; these data totaled approximately **4.7 terabytes** of information stored on *Langseth* computers as SEG-D files.

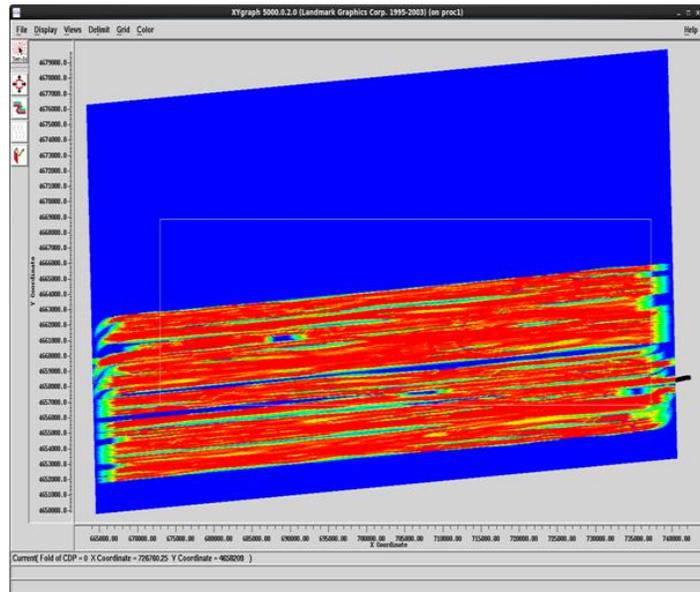


Figure: Fold map of the area computed for half of the survey area. This shows almost uniform fold except few places which is to be healed during the infill.

For a more detailed examination of the coverage shown in Figure 10, Figure 11 shows the actual fold of coverage with red color coding indicating nominal planned fold for the 3-D bins. Essentially, the bottom one-half of the planned 3-D “box” was accomplished on this first leg. During Leg Two, the objective will include some infilling of data for those areas of the coverage that are less than ideal. On Figure 11, these areas would be where the low fold blue occurs within the confines of the “box”.

**Leg Two – (July 11 – July 30)**

The ship resumed MGL1307 on **July 11<sup>th</sup>** and the National Science Foundation awarded a 19-day extension to the cruise such that

remaining project objectives should be met. Both the scientific party and ship’s crew aboard is reduced in size due to individual commitments that did allow all to continue. New personnel have also been added to the scientific staff.

The ship...

Figure 11 Actual details of seismic 3-D coverage obtained during Leg One of the MGL1307 Cruise. Red would indicate nominal planned coverage, and the areas within the “box” not red, will be targets of the infilling program that will be part of Leg Two of the cruise.

## References

- Beslier, M.O., Ask, M., and Boillot, G., 1993. Ocean-continent boundary in the Iberia abyssal plain from multichannel seismic data. *Tectonophysics*, 218:383-393.
- Boillot, G., Girardeau, J., and Kornprobst, J., 1988, Rifting of the Galicia Margin: Crustal thinning and emplacement of mantle rocks on the seafloor, *Proc. Of the Ocean Drilling Program, Scientific Results*, v. 103, p. 741-756.
- Buck, W.R., 1988, Flexural rotation of normal faults, *Tectonics*, v. 7, p.959-973.
- Clark, S.A., D.S. Sawyer, J.A. Austin, G.L. Christeson, and Y. Nakamura, 2007, Characterizing the Galicia Bank-Southern Iberia Abyssal Plain rifted margin segment boundary using multichannel seismic and ocean bottom seismometer data, *J. Geophysics. Res.*, v. 112, B03408, doi:10.1029/2006JB004581.
- Coffin, M.F., Sawyer, D.S., Reston, T.J., and Stock, J.M., 2006, Continental breakup and sedimentary basin formation, *Eos Trans. AGU*, 87 /:528, doi:10.1029/2006EO470006.
- Discovery 215 Working Group, 1998. Deep structure in the vicinity of the ocean continent transition zone under the southern Iberia Abyssal Plain. *Geology*, 8:743-746.
- Escartin, J., G. Hirth, and B. Evans, 1997, Effects of serpentinization on the lithospheric strength and the style of normal faulting at slow-spreading ridges, *Earth Planet. Sci. Lett.*, 151, 181-189.
- Groupe Galice, 1979. The continental margin off Galicia and Portugal: acoustical stratigraphy, dredge stratigraphy, and structural evolution. *In* Sibuet, J.-C., Ryan, W.B.F., et al., *Init. Repts. DSDP*, 47 (Pt. 2): Washington (U.S. Govt. Printing Office), 633-662.
- Henning, A. T., D. S. Sawyer, and D. C. Templeton, 2004, Exhumed upper mantle within the ocean-continent transition on the northern West Iberia margin: Evidence from prestack depth migration and total tectonic subsidence analyses: *Journal of Geophysical Research*, vol. 109, no. B5.
- Hobro JW, Singh SC, Minshull TA, 2003. Three-dimensional tomography inversion of combined reflection and refraction seismic travel time data. *Geophysics. J. Int.*, 152; 79-93.
- Hopper, J.R., Funck, T., Tucholke, B.E., Loudon, K.E., Holbrook, W.S. and Larsen, H.C., 2006, A deep seismic investigation of the Flemish Cap margin: implications for the origin of deep reflectivity and evidence for asymmetric break-up between Newfoundland and Iberia, *Geophysics. J. Int.*, v. 164, p. 501-515.
- Kusznir, N.J. and Karner, G.D., 2007, Continental lithospheric thinning and breakup in response to upwelling divergent mantle flow: application to the Woodlark, Newfoundland, and Iberia margins, in Karner, G.D., Manatschal, G., and Pinheiro, L.M., eds., *Imaging Mapping and Modelling Continental*

Lithosphere Extension and Breakup, The Geological Society, GSL Special Publications, 5 July 2007, 488 p.

Lavier, L.L. and Manatschal, G., 2006, A mechanism to thin the continental lithosphere at magma-poor margins, *Nature*, v. 440, doi:10.1038/nature04608.

Leythaeuser, T., Reston, T.J., Perez-Gussinye, M., Ranero, C.R., Klaeschen, D., and Sawyer, D., 2003, Structural Evolution and rift history leading to breakup at the deep Galicia margin, *EOS Trans., AGU*, v. 84(46), Fall Meet. Suppl., Abstract T12A-0434.

Leythaeuser T, Reston TJ, Minshull TA, 2005. Waveform inversion of the S reflector west of Spain; fine structure of a detachment fault. *Geophysics. Res. Letts*, 32, L22304, doi:10.1029/2005GL024026.

Manatschal G, Froitzheim N, Rubenach MJ, Turrin, B (2001) The role of detachment faulting in the formation of an ocean-continent transition: insights from the Iberia Abyssal Plain. In: Wilson RCL, Whitmarsh RB, Taylor B, Froitzheim N (eds) *Non- Volcanic Rifting of Continental Margins: Evidence from Land and Sea*. Geol Soc (London), Spec Pub 187, pp 405-428.

Manatschal, G., 2004, New models for evolution of magma-poor rifted margins based on a review of data and concepts from West Iberia and the Alps, *International Journal of Earth Sciences*, 93, 432-466.

Perez-Gussinye, M, and Reston, TJ, 2001, Rheological evolution during extension at passive non-volcanic margins: onset of serpentinization and development of detachments to continental break-up. *J. Geophysics. Res.*, 106, 3691-3975.

Perez-Gussinye, M., C.R. Ranero, T.J. Reston, and D. Sawyer, Mechanisms of extension at nonvolcanic margins: Evidence from the Galicia Interior Basin, west of Iberia, *J. Geophysics. Res.*, v. 108, 2003.

Peron-Penvidic, G., Manatschal, G., Minshull, T.A., and Sawyer, D.S., 2007, Tectonosedimentary evolution of the deep Iberia-Newfoundland margins: Evidence for a complex break-up history, *Tectonics*, v. 26, TC2011, doi:10.1029/2006TC001970.

Pickup, S.L.B., R.B. Whitmarsh, C.M.R. Fowler, and T.J. Reston, Insight into the nature of the ocean-continent transition off West Iberia from a deep multichannel seismic reflection profile, *Geology*, 24, 1079-1082, 1996.

Reston, T.J., Krawczyk, C.M., and Klaeschen, D., The S reflector west of Galicia (Spain): Evidence from prestack depth migration for a detachment faulting during continental breakup, *J. Geophysics. Res.* V. 101, p. 8075-8091, 1996.

Reston, TJ, 2005. Polyphase faulting during the development of the west Galicia rifted margin. *Earth and Planet. Sci. Lett.*, 237, 561-576.

Reston, T.J., Leythaeuser, T., Booth-Rea, G., Sawyer, D.S., Klaeschen, D., and Long, C., 2007, Movement along a low-angle normal fault. The S reflector west of Spain, 2007, *Geochem. Geophysics. Geosyst.*, 8, Q06002, doi:10.1029/2006GC001437.

Sawyer, D. S., S. Clark, and J. K. Morgan (2005), Large scale mass wasting as a possible mechanism of formation of highly thinned continental crust and the S reflector on the Galicia rifted margin, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract T43B-1392.

Sawyer, D., M. Coffin, T. Reston, J. Stock, and J. Hopper, 2007, COBBOOM: The Continental Breakup and Birth of Oceans Mission, Scientific Drilling, No. 5, doi:10.2204/iodp.sd.5.02.2007.

Sawyer, D.S., J. Morgan, and S. Clark, Possible Role of Landsliding in Formation of the Galicia Rifted Margin, Geology, in preparation.

Seeber, L., D. J. Shillington, G. Cifci, E. Demirbag, C. C. Sorlien, and M. S. Steckler (2009), Basins Beyond Bends Along Continental Transforms in NW Turkey and Southern California: Rapid, Asymmetric, and Time-Transgressive Growth, EOS Trans. AGU, Fall Meet Suppl., 90(52), Abstract T13C-1880.

Shillington, D. J., D. Dondurur, L. Seeber, M. S. Steckler, C. C. Sorlien, J. B. Diebold, G. Cifci, S. Gurcay, S. Okay, C. Imren, H. Kurt, D. Timur, and E. Demirbag (2009), Gas, slumps and faulting in the Marmara Sea: new results from TAMAM highresolution seismic reflection data, EOS Trans. AGU, Fall Meet Suppl., 90(52), Abstract T13C-1881.

Sibuet, J.C. and Ryan, W.B.F., 1979, Site 398: Evolution of the west Iberian passive continental margin in the framework of the early evolution of the North Atlantic Ocean, Init. Repts. Of the Deep Sea Drilling Project, v. 47, Part 2: Washington (US Govt. Printing Office), p. 761-776.

Tucholke, B.E., and Sibuet, J.C., 2003, ODP Leg 210 Drills the Newfoundland Margin in the Newfoundland-Iberia Non-Volcanic Rift, *Eos Trans. AGU*, 84(46), Fall Meet. Suppl., Abstract T11E-05.

Tucholke, B.E., and Sibuet, J.-C., 2007. Leg 210 synthesis: tectonic, magmatic, and sedimentary evolution of the Newfoundland-Iberia rift: a synthesis based on ocean drilling through ODP Leg 210. In Tucholke, B.E., Sibuet, J.-C., and Klaus, A. (Eds.), Proc. ODP, Sci. Results, 210: College Station, TX (Ocean Drilling Program), 1–56. doi:10.2973/odp.proc.sr.210.101.2007.

Tucholke, B.E., Sawyer, D.S., and Sibuet, J.C., 2007, Breakup of the Newfoundland – Iberia rift, In G. Karnir, G. Manatschal, and L. Pinheiro (Eds.), Imaging, Mapping, and Modelling Continental Lithosphere Extension and Breakup, Geol. Soc., Spec. Publ., 282:9–46.

Tucholke, B.E. and R.B. Whitmarsh, in press, The Newfoundland-Iberia conjugate rifted margins, Principles of Phanerozoic Regional Geology, AW. Bally and D.G. Roberts editors.

Whitmarsh, R.B., Sawyer, D.S., Klaus, A., and Masson, D.G. (Eds.), 1996. *Proc. ODP, Sci. Results*, 149: College Station, TX (Ocean Drilling Program).

Whitmarsh, R. B., White, R. S., Horsefield, S. J., Sibuet, J.-C., Recq, M. & Louvel, V. (1996). The ocean - continent boundary off the western continental margin of Iberia III. Crustal structure west of Galicia Bank. *Journal of Geophysical Research*, **101**, 28,291-28,314.

Whitmarsh, Robert B. ; Wallace, Paul J. ; Ocean Drilling Program, Leg 173, Shipboard Scientific Party, 2001, The rift-to-drift development of the West Iberia nonvolcanic continental margin; a summary and review of the contribution of Ocean Drilling Program Leg 173, Proceedings of the Ocean Drilling Program; scientific results, v. 173.

Wilson, R.C.L., Sawyer, D.S., Whitmarsh, R.B., Zerong, J., and Carbonell, J., 1996, Seismic stratigraphy and tectonic history of the Iberia Abyssal Plain, Proc. Ocean Drilling Program Sci. Results, v. 149, p. 617-633.

Wilson, R.C.L., Manatschal, G., and Wise, S., 2001, Rifting along nonvolcanic passive margins: stratigraphic and seismic evidence from the Mesozoic of the Alps and Western Iberia, Geological Society of London Special Pub. 187, p. 429-452.

Zelt, C. A., and P. J. Barton, Three-dimensional seismic refraction tomography: a comparison of two methods applied to data from the Faeroe Basin, J. Geophysics. Res., 103, 7187-7210, 1998.

Zelt, C.A., K. Sain, J. V. Naumenko, and D. S. Sawyer, 2003, Assessment of crustal velocity models using seismic refraction and reflection tomography, Geophysics. J. International, p. 609, v. 153.

Zelt, C.A., D.S. Sawyer, Y. Nakamura and T. Reston, "Crustal structure of the Iberia margin at 42 degrees N from simultaneous inversion of seismic wide-angle and zero-offset traveltimes data, J. Geophysical Research, in preparation.

# **APPENDICES**

## **Appendix A -- Daily Narrative**

Midnight Position / Info

deg min Speed over Ground: 00.00Kt

Lat: 36° 004.786 N

Heading: 127°

Lon: 33° 019.357 W

Water Depth: 1399.0

Wind: calm

Seas: calm

Midnight Sp: n/a

Current Equipment Deployed  
All equipment on board

Technical Staff Onboard:

- Ch. Science Officer - Robert Steinhaus
- Science Officer - Jay Johnstone
- Science Officer - David Martinson
- Acq. Technician - Clayton Curtis
- Navigation - Mike Marrello
- Navigation - Matt Grey
- NavProc - Alan Thompson

Daily Summary

Vessel was pier-side in Vigo, Spain mobilizing for MGL1307. During the Day removal of spare equipment from OBS Deck to Shore Side Storage took place. Fueling of Vessel, Arrival of Robert Steinhaus. Turnover between Sr. Techs, and Spectra setup continued.

--	--	--	--	--	--

- Sr. Gun Mechanic -
- Gun Mechanic - Robbe Gunn
- Gun Mechanic - Carlos Gutierrez
- Gun Mechanic - Josh Kasinger

Chief Scientist :

- Co-Chief Scientist
- Co-Chief Scientist -
- Co-Chief Scientist -

Science Party:

Plan for Tomorrow

Continue pier-side in Vigo, Spain w/ mobilisation for MGL1307

--	--	--	--	--	--

PSOs:

- Meghan Piercy
- Dara Cameron

Time Analysis

MCS Production:

0.000 Sail km

Infill: 0.000 Sail km

Reshoot: 0.000 Sail km

Total: 0.000 Sail km

Time Breakdown:

- Production 0:00
- Line Change 0:00
- Weather Downtime 0:00
- Technical Downtime 0:00
- External Downtime 0:00
- OBS Rosette Drop Test 0:00
- OBS Deployment 0:00
- OBS Recovery 0:00
- CTD Cast 0:00
- Gravity Core 0:00
- Piston Core 0:00
- Multi Core 0:00
- Sonar Survey 0:00

Technical Downtime:

- Instrument Acquisition 0:00
- Instrument Navigation 0:00
- Hydraulics 0:00
- Source 0:00
- Streamer 0:00
- Air Compressor 0:00

Total: 0:00

External Downtime:

- Mitigation / PAM 0:00
- Maneuvering 0:00
- Ship Repair 0:00
- Fishing Gear 0:00

Total: 0:00

- Port Call 24:00
- Transit 0:00

Total: 24:00















**Cruise:** MGL1307

**Date:** 2/Jun/13

**Reporter:** RJS

**Daily Report**

**Midnight Position / Info**

**deg min**      **Speed over Ground:** 04.40kt  
**Lat:** 41° 05.7.652      **N**      **Heading:** 253°  
**Lon:** 12° 039.327      **W**  
**Wind:** E 20-25 Kts      **Seas:** 2-3m      **Water Depth:** 5283.0  
**Midnight SP:** n/a

**Current Equipment Deployed**  
 Streamer 4 - In Deployment

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern McKernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

Vessel Started the Day Deploying Streamer 4. Once Streamer 4 was out the first time the trim was checked and it was determined that it should be recovered and more trim work done. The Streamer 4 was recovered, weights added and re-deployed. It was observed for a short time after its re-deployment and looked good, so deployment of Streamer 1 started and at ~22:20 GMT both streamers were deployed on their lead-ins directly off the stern of the vessel and the vessel stood by for the WX to drop before the launching of the Barrol6's could take place.


**Chief Scientist : Dale Sawyer**  
 Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Science Party:**  
 Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teisi Slnjuro

Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khennal Shukla  
 Boualem Pereira

**PSOs:**  
 Heidi Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza

**Plan for Tomorrow**

Vessel will start the day standing by for WX. Once the WX has dropped enough both Streamers 1 & 4 will be attached to the Barrol6 and deployed out the side of the ship ~300m to allow for the deployment of Streamer 2 and then 3.


**Time Analysis**

**MCS Production:**      **Time Breakdown:**  
**Prime:** 0.000 Sail km      *Production* 0:00  
    *Line Change* 0:00  
**Infill:** 0.000 Sail km      *Weather Downtime* 0:00  
    *Technical Downtime* 22:20  
**Reshoot:** 0.000 Sail km      *External Downtime* 1:40  
**Total:** 0.000 Sail km      *OBS Rosette Drop Test* 0:00  
    *OBS Deployment* 0:00  
    *OBS Recovery* 0:00  
    *CTD Cast* 0:00  
    *Gravity Core* 0:00  
    *Piston Core* 0:00  
    *Multi Core* 0:00  
    *Sonar Survey* 0:00

**Technical Downtime:**  
*Instrument Acquisition* 0:00  
*Instrument Navigation* 0:00  
*Hydraulics* 0:00  
*Source* 0:00  
*Streamer* 22:20  
*Streamr* 22:20  
*Air Compressor* 0:00  
**Total: 22:20**

**External Downtime:**  
*Mitigation / PAM* 0:00  
*Maneuvering* 0:00  
*Ship Repair* 0:00  
*Fishing Gear* 0:00  
*Weather* 1:40  
**Total: 1:40**

**Total: 24:00**











**Cruise:** MGL1307

**Date:** 5/Jun/13

**Reporter:** RJS

**Daily Report**

**Midnight Position / Info**

deg min  
**Lat:** 42° 03 09.262 N  
**Lon:** 14° 16 08.381 W  
**Wind:** NW 10-15 kts  
**Seas:** 1-2m  
**Water Depth:** 5300.0  
**Midnight SP:** n/a

**Current Equipment Deployed**

Streamer 1, 2, 3, & 4  
 Sbd and Port Barovanes  
 Source Sub-Arrays 1, 2, 3, & 4  
 PAM and Maggie

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern Mckernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

The Day Started with deploying of Streamer 3. At 11:23 all streamers were deployed and out on the Barovanes. We took a short time to check the trim of Streamer 3 before starting to deploy the stud source. At 13:35 GMT the Aft Pinger Pole failed at the pivot pin hub and drifted back and was hitting the sbd prop. The Prop was quickly disengaged. The Pole was recovered via the stay rope. The Prop as re-engaged and tested for vibration and leaks on the shaft seal for ~3.75 Hours. No vibration was notices and not leaks were visible, so the source deployment continued. At 20:30 GMT the Source was deployed and final positioning could take place. There was some configuration issues with spectra and Digicourse which had to be resolved and at 23:31 GMT production on MGL130708S01 started an continued throughout the rest of the day.

**Plan for Tomorrow**

At the start of the day the vessel will continue production on MGL130708S01. It is hoped that we complete MGL130708S02, MGL13071072 and finish the line in Production on MGL13071060. During the Line change between Line 1072 and Line 1060 we plan on picking up Source Sub-Array 4 to do some maintenance on the RGRS and Acoustic Units.


**PSOs:**

Hedli Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza

**Time Analysis**

**MCS Production:**

**Prime:** 0.000 Sail km  
**Infill:** 0.000 Sail km  
**Reshoot:** 0.000 Sail km  
**Total:** 0.000 Sail km

**Time Breakdown:**

Production 0:29  
 Line Change 0:00  
 Weather Downtime 0:00  
 Technical Downtime 23:31  
 External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
 Instrument Navigation 3:01  
 Hydraulics 0:00  
 Source 4:01  
 Streamer 12:10  
 Air Compressor 0:00  
 Other 4:19

**External Downtime:**

Mitigation / PAM 0:00  
 Manoeuvring 0:00  
 Ship Repair 0:00  
 Fishing Gear 0:00  
 Weather 0:00

**Total: 24:00**

**Total: 23:31**

**Total: 0:00**



**Cruise: MGL1307**

**Date: 6/Jun/13**

**Reporter: RJS**

**Daily Report**

**Midnight Position / Info**

**deg min**      **Speed over Ground: 03.50kt**  
**Lat:** 42° 00S-29S      **N**      **Heading: 118°**  
**Lon:** 11° 05S-35W      **W**  
**Wind:** NW 10-15      **Seas:** 1-2m      **Water Depth: 3839.0**  
**Midnight SP:** n/a

**Current Equipment Deployed**

Streamer 1, 2, 3, & 4  
 Sbd and Port Barovanes  
 Source Sub-Arrays 1, 2, 3, & 4  
 Maggie

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern McKernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

The Vessel acquired data on Lines OBS01, OBS02, MCS1072 and at end of the day was on an extended line change to make repairs to the GPS pod and Acoustic on Sub-Arry #4


**Plan for Tomorrow**

The Vessel will acquire data on Lines MCS1060, MCS1064, and start production on MCS1052 before the end of day.


**Time Analysis**

<b>MCS Production:</b>	<b>0.000 Sail km</b>	<b>Time Breakdown:</b>	<b>Production 20:59</b>	<b>Technical Downtime:</b>	<b>Instrument Acquisition 0:00</b>	<b>External Downtime:</b>	<b>Mitigation / PAM 0:00</b>
<b>Prime:</b>	<b>0.000 Sail km</b>		<b>Line Change 2:16</b>		<b>Instrument Navigation 0:45</b>		<b>Maneuvering 0:00</b>
<b>Infill:</b>	<b>0.000 Sail km</b>		<b>Weather Downtime 0:00</b>		<b>Hydraulics 0:00</b>		<b>Ship Repair 0:00</b>
<b>Reshoot:</b>	<b>0.000 Sail km</b>		<b>Technical Downtime 0:45</b>		<b>Source 0:00</b>		<b>Fishing Gear 0:00</b>
			<b>External Downtime 0:00</b>		<b>Streamer 0:00</b>		<b>Weather 0:00</b>
<b>Total:</b>	<b>0.000 Sail km</b>		<b>OBS Rosette Drop Test 0:00</b>		<b>Air Compressor 0:00</b>		<b>Total: 0:45</b>
			<b>OBS Deployment 0:00</b>		<b>Other 0:00</b>		<b>Total: 0:00</b>
			<b>OBS Recovery 0:00</b>				
			<b>CTD Cast 0:00</b>				
			<b>Gravity Core 0:00</b>				
			<b>Piston Core 0:00</b>				
			<b>Multi Core 0:00</b>				
			<b>Sonar Survey 0:00</b>				
			<b>Port Call 0:00</b>				
			<b>Transit 0:00</b>				
			<b>Total: 24:00</b>				

**Chief Scientist : Dale Sawyer**  
 Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Science Party:**  
 Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teai Sulujo  
 Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khemraj Shukla

**PSOs:**  
 Heidi Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza







**Midnight Position / Info**

deg min  
**Lat:** 42° 02 1.637 N  
**Lon:** 12° 009.000 9:30  
**Wind:** NW 10-15  
**Seas:** 1-2m

**Speed over Ground:** 4.4 Kts

**Heading:** 276°

**Water Depth:** 4453.0

**Midnight SP:** n/a

**Current Equipment Deployed**

Streamer 1, 2, 3, & 4  
 Sbd and Port Barovanes  
 Source Sub-Armys 1, 2, 3, & 4  
 Maggie and PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern Mckernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

The Vessel acquired data on Lines 1052, 1052A, and 1156. There was a failure of a Power in the rack room which required a short restart of Spectra during line 1052


**Plan for Tomorrow**

The Vessel will acquire data on Lines 1044. Shortly after day change Streamer 4 developed telemetry error and had to be recovered to trouble shoot this error. It is hoped that this issues can be easily fix and the vessel can return to production before end of day.


**PSOs:**

Hedli Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza

**Chief Scientist : Dale Sawyer**

Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Science Party:**

Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teai Slnjuro  
 Sarah Dean  
 Miguel Andres Martinez  
 Tobias Mery  
 Luke Holroyd  
 Tyler Poppenwimer  
 Khemraj Shukla

**Time Analysis**

**MCS Production:** 0.000 Sail km

**Time Breakdown:**  
 Production 19:06  
 Line Change 4:28  
 Weather Downtime 0:00  
 Technical Downtime 0:26  
 External Downtime 0:00

**Infill:** 0.000 Sail km

**Reshoot:** 0.000 Sail km

**Total:** 0.000 Sail km

**Technical Downtime:**

Instrument Acquisition 0:00  
 Instrument Navigation 0:00  
 Hydraulics 0:00  
 Source 0:00  
 Streamer 0:00  
 Air Compressor 0:00  
 Other 0:26

**External Downtime:**

Mitigation / PAM 0:00  
 Maneuvering 0:00  
 Ship Repair 0:00  
 Fishing Gear 0:00  
 Weather 0:00

**Total: 24:00**

**Total: 0:26**

**Total: 0:00**



**Cruise:** MGL1307

**Date:** 8/Jun/13

**Reporter:** RJS

**Daily Report**

**Midnight Position / Info**

**deg min**      **Speed over Ground:** 04.00kt  
**Lat:** 42° 004.402      **N**      **Heading:** 87°  
**Lon:** 12° 041.291      **W**  
**Wind:** SW-10-15      **Seas:** 1-2m      **Water Depth:** 5287.0  
**Midnight SP:** n/a

**Current Equipment Deployed**

Streamer 1, 2, 3, & 4  
 Sbd and Port Barovanes  
 Source Sub-Arrays 1, 2, 3, & 4  
 Maggie and PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern Mckernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

The Vessel acquired data on Lines 1044. At 03:01 GMT Streamer 4 developed telemetry issues and trouble shooting began. The issues seems to have been some water intrusion into the Le-a-in-Sea End Connector. This was repaired and all towed gear was re-deployed. While the gear was being re-deployed uRTNU (Spectral) had developed a fault and trouble shooting began and continued throughout the rest of the day.


**Plan for Tomorrow**

The Day will start with containing trouble shooting of the uRTUN failure. Once this is completed Production will begin on Line 1148, 1044, and 1140.


**Time Analysis**

<b>MCS Production:</b>	<b>25,200 Sail km</b>	<b>Time Breakdown:</b>	<b>Production 2:38</b>	<b>Technical Downtime:</b>	<b>Instrument Acquisition 0:00</b>	<b>External Downtime:</b>	<b>Mitigation / PAM 0:00</b>
<b>Prime:</b>	<b>0,000 Sail km</b>	<b>Line Change 0:23</b>	<b>Weather Downtime 0:00</b>	<b>Instrument Navigation 5:44</b>	<b>Maneuvering 0:00</b>	<b>Ship Repair 0:00</b>	<b>Fishing Gear 0:00</b>
<b>Infill:</b>	<b>0,000 Sail km</b>	<b>Technical Downtime 20:59</b>	<b>External Downtime 0:00</b>	<b>Hydraulics 0:00</b>	<b>Source 5:14</b>	<b>Weather 0:00</b>	
<b>Reshoot:</b>	<b>0,000 Sail km</b>			<b>Streamer 10:01</b>	<b>Other 0:00</b>		
<b>Total:</b>	<b>25,200 Sail km</b>	<b>OBS Rosette Drop Test 0:00</b>	<b>OBS Deployment 0:00</b>	<b>Air Compressor 0:00</b>			
		<b>OBS Recovery 0:00</b>	<b>CTD Cast 0:00</b>				
		<b>Gravity Core 0:00</b>	<b>Piston Core 0:00</b>				
		<b>Multi Core 0:00</b>	<b>Sonar Survey 0:00</b>				
		<b>Port Call 0:00</b>					
		<b>Transit 0:00</b>					
		<b>Total: 20:59</b>					
		<b>Total: 24:00</b>					

**Chief Scientist : Dale Sawyer**  
 Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Science Party:**  
 Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teai Slnjuro  
 Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khemraj Shukla

**PSOs:**  
 Heidi Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza



**Cruise: MGL1307**

**Date: 10/Jun/13**

**Reporter: RJS**

**Daily Report**

**Midnight Position / Info**

deg min      **Speed over Ground:** 4.4 Kts  
**Lat:** 42° 09 23.40 N      **Heading:** 87°  
**Lon:** 12° 27 43.35 W      **Water Depth:** 5178.0  
**Wind:** SW 10-15      **Seas:** 1-2m      **Midnight SP:** n/a

**Current Equipment Deployed**

Streamer 1, 2, 3, & 4  
 Sbd and Port Barovanes  
 Source Sub-Arrays 1, 2, 3, & 4  
 Maggie and PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern Mckernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

The Vessel started the day continuing to trouble shoot Spectra's uRTN issues. At 01:41 GMT the problem was fixed and the vessel began production on line 1148. Through the remainder of the day the vessel acquired data on 1156 and 1140.


**Plan for Tomorrow**

The Day will start with containing production on Line 1140. Once this is completed Production will begin on Line 1028 and then 1132 at end of day.


**PSOs:**

Hedi Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza

**Science Party:**

Marianne Karplus  
 James Gibson  
 Mari Teai Slnjuro  
 Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewimer  
 Khemraj Shukla

**Chief Scientist : Dale Sawyer**

Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Time Analysis**

**MCS Production:** 153.975 Sail km

**Time Breakdown:**

**Infill:** 0.000 Sail km

Production 19:44  
 Line Change 2:35  
 Weather Downtime 0:00  
 Technical Downtime 1:41  
 External Downtime 0:00

**Reshoot:** 0.000 Sail km

Instrument Acquisition 0:00  
 Instrument Navigation 1:41  
 Hydraulics 0:00  
 Source 0:00  
 Streamer 0:00  
 Air Compressor 0:00  
 Other 0:00

**Total:** 153.975 Sail km

OBS Rosette Drop Test 0:00  
 OBS Deployment 0:00  
 OBS Recovery 0:00  
 CTD Cast 0:00  
 Gravity Core 0:00  
 Piston Core 0:00  
 Multi Core 0:00  
 Santa Survey 0:00

**Total:** 1:41

**Technical Downtime:**

**External Downtime:**

Mitigation / PAM 0:00  
 Maneuvering 0:00  
 Ship Repair 0:00  
 Fishing Gear 0:00  
 Weather 0:00

**Total:** 0:00

Port Call 0:00  
 Transit 0:00

**Total: 24:00**



Cruise: MGL1307

Date: 10/Jun/13

Reporter: RJS

Daily Report

Midnight Position / Info

deg min  
Lat: 42° 04 16.839 N  
Lon: 12° 16 52.361 W  
Wind: SSW 15-20  
Seas: 3-Feb  
Speed over Ground: 4.1 Kts  
Heading: 87°  
Water Depth: 4908.0  
Midnight SP: n/a

Current Equipment Deployed

Streamer 1, 2, 3, & 4  
Sibd and Port Barovanes  
Source Sub-Arrays 1, 2, 3, & 4  
PAM

Technical Staff Onboard:

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mckernan  
Acq. Technician - Klayton Curtis  
Navigation - Mike Martello  
Navigation - Matt Grey  
Navproc - Alan Thompson

Daily Summary

The Vessel started the day continuing production on line 1140. Through the remainder of the day the vessel acquired data on 1028 and 1132. \*\*\* During the Day the Maggie developed communication issues and was recovered. It was found the tow leader was the cause of the failure and it was changed. Shortly after being redeployed the Maggie stopped communicating again and yet again it was recovered to find that the Newly installed tow leaders had failed. The Third spare tow leader was installed and the Maggie was again re-deployed and after ~10 hours it failed again. On recovery it was found that again the third tow leader had failed. The Maggie is towing in close proximity to the Source Hose Bundles and Lead-in #2 an this seems to be causing issues. We will try to return the cable and get the unit back in the water towing in a slightly different location.

Plan for Tomorrow

The Day will start with containing production on Line 1132. Once this is completed Production will begin on Line 1020 and then 1124 at end of day.


Time Analysis

MCS Production:

Prime: 166.050 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 166.050 Sail km

Time Breakdown:

Production 21:14  
Line Change 2:46  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sona Survey 0:00  
Port Call 0:00  
Transit 0:00

Technical Downtime:

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other 0:00

External Downtime:

Mitigation / PAM 0:00  
Maneuvering 0:00  
Ship Repair 0:00  
Fishing Gear 0:00  
Weather 0:00  
Total: 0:00

Total: 24:00

Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Robbie Gunn  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Josh Kasinger

Chief Scientist : Dale Sawyer

Co-Chief Scientist - Donna Shillington  
Co-Chief Scientist - Tim Beston  
Co-Chief Scientist - Cesar Ranero

Science Party:

Steve Danborn  
Marianne Karplus  
James Gibson  
Mari Teisi Slnjuro  
Sarah Dean  
Miguel Andres Martinez  
Tobias Merry  
Luke Holroyd  
Tyler Poppewinner  
Khemraj Shukla

PSOs:

Hedli Ingram  
Meghan Piercy  
Dara Cameron  
Emily Ellis  
Rebecca Garza



**Cruise: MGL1307**

**Date: 11/Jun/13**

**Reporter: RJS**

**Daily Report**

**Midnight Position / Info**

**deg min**      **Speed over Ground: 04.80kt**  
**Lat:** 42° 004.155      **N**      **Heading: 107°**  
**Lon:** 12° 004.825      **W**  
**Wind:** NNW 10 -15      **Seas:** 1-2m      **Water Depth: 3941.0**  
**Midnight SP:** n/a

**Current Equipment Deployed**

Streamer 1, 2, 3, & 4  
 Sbd and Port Barovanes  
 Source Sub-Arrays 1, 2, 3, & 4  
 PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern Mckernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 Navproc - Alan Thompson

**Daily Summary**

Started the day in production on Line 1132 and throughout the day acquired data on 1020 and 1124. At the start of the 1020 there was a minor issues with Spectra which required a restart.


**Plan for Tomorrow**

The Day will start with containing the Line change. Once this is completed Production will begin on Line 1012, 1116, and then 1004 at end of day.


**Time Analysis**

<b>MCS Production:</b>	<b>161.100 Sail km</b>	<b>Time Breakdown:</b>	<b>Production 20:37</b>	<b>Technical Downtime:</b>	<b>Instrument Acquisition 0:00</b>	<b>External Downtime:</b>	<b>Mitigation / PAM 0:00</b>
<b>Prime:</b>	<b>0.000 Sail km</b>	<b>Line Change 3:17</b>	<b>Weather Downtime 0:00</b>	<b>Instrument Navigation 0:06</b>	<b>Hydraulics 0:00</b>	<b>Source 0:00</b>	<b>Maneuvering 0:00</b>
<b>Infill:</b>	<b>0.000 Sail km</b>	<b>Technical Downtime 0:06</b>	<b>External Downtime 0:00</b>	<b>Streamer 0:00</b>	<b>Air Compressor 0:00</b>	<b>Other 0:00</b>	<b>Ship Repair 0:00</b>
<b>Reshoot:</b>	<b>0.000 Sail km</b>	<b>OBS Rosette Drop Test 0:00</b>	<b>OBS Deployment 0:00</b>	<b>OBS Recovery 0:00</b>	<b>CTD Cast 0:00</b>	<b>Gravity Core 0:00</b>	<b>Piston Core 0:00</b>
<b>Total:</b>	<b>161.100 Sail km</b>	<b>OBS Recovery 0:00</b>	<b>CTD Cast 0:00</b>	<b>Gravity Core 0:00</b>	<b>Piston Core 0:00</b>	<b>Multi Core 0:00</b>	<b>Sonar Survey 0:00</b>
		<b>Port Call 0:00</b>	<b>Transit 0:00</b>	<b>Total: 0:06</b>	<b>Total: 0:00</b>		
		<b>Total: 24:00</b>					

**PSOs:**

Hedli Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza

**Science Party:**

Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teisi Sjuurjo  
 Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khennaj Shukla

**Chief Scientist : Dale Sawyer**

Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Gun Mechanic - Josh Kasinger**

St. Gun Mechanic - Tom Spoto  
 Gun Mechanic - Robbie Gunn  
 Gun Mechanic - Carlos Gutierrez



**Cruise: MGL1307**

**Date: 13/Jun/13**

**Reporter: RJS**

**Daily Report**

**Midnight Position / Info**

**deg min**      **Speed over Ground:** 04.20kt  
**Lat:** 42° 00.60791 N      **Heading:** 268°  
**Lon:** 12° 033.703 W      **Water Depth:** 5335.0  
**Wind:** SSW 15-20      **Seas:** 1-2m      **Midnight SP:** n/a

**Current Equipment Deployed**

Streamer 1, 2, 3, & 4  
 Sbd and Port Barovanes  
 Source Sub-Arrays 1, 2, 3, & 4  
 PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern Mckernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

Started the day on Line Change once complete production on Line 1012 and throughout the day acqiered data on 1016 and 1004.


**Plan for Tomorrow**

The Day will start with containing production on Line 1004. Once this is completed Production will begin on Line 1148A, 1044R, and then by 1180 at end of day.


**Time Analysis**

<b>MCS Production:</b>	<b>165.150 Sail km</b>	<b>Time Breakdown:</b>	<b>Production 20:46</b>	<b>Technical Downtime:</b>	<b>Instrument Acquisition 0:00</b>	<b>External Downtime:</b>	<b>Mitigation / PAM 0:00</b>
<b>Prime:</b>	<b>0.000 Sail km</b>	<b>Line Change 3:14</b>	<b>Weather Downtime 0:00</b>	<b>Instrument Navigation 0:00</b>	<b>Hydraulics 0:00</b>	<b>Source 0:00</b>	<b>Maneuvering 0:00</b>
<b>Infill:</b>	<b>0.000 Sail km</b>	<b>Technical Downtime 0:00</b>	<b>External Downtime 0:00</b>	<b>Streamner 0:00</b>	<b>Air Compressor 0:00</b>	<b>Other 0:00</b>	<b>Ship Repair 0:00</b>
<b>Reshoot:</b>	<b>0.000 Sail km</b>	<b>OBS Rosette Drop Test 0:00</b>	<b>OBS Deployment 0:00</b>	<b>OBS Recovery 0:00</b>	<b>CTD Cast 0:00</b>	<b>Gravity Core 0:00</b>	<b>Piston Core 0:00</b>
<b>Total:</b>	<b>165.150 Sail km</b>	<b>OBS Rosette Drop Test 0:00</b>	<b>OBS Deployment 0:00</b>	<b>OBS Recovery 0:00</b>	<b>CTD Cast 0:00</b>	<b>Gravity Core 0:00</b>	<b>Piston Core 0:00</b>
		<b>Port Call 0:00</b>	<b>Transit 0:00</b>	<b>Total: 0:00</b>	<b>Total: 0:00</b>	<b>Total: 0:00</b>	<b>Total: 0:00</b>
		<b>Total: 24:00</b>					

**Chief Scientist : Dale Sawyer**  
 Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero  
**Science Party:**  
 Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teai Slnjuro  
 Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khennaj Shukla  
**PSOs:**  
 Heidi Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza















**Midnight Position / Info**

deg min      **Speed over Ground:** 04.30kt  
**Lat:** 42° 05.33.529 N      **Heading:** 87°  
**Lon:** 12° 46.50.652 W  
**Wind:** NW 20-25      **Seas:** 2-4m      **Water Depth:** 5297.0  
**Midnight SP:** n/a

**Current Equipment Deployed**

Streamer 1, 2, 3, & 4  
 Sbd and Port Barovanes

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern Mckernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 Navproc - Alan Thompson

**Daily Summary**

Started the day in production on Line 1196. At the conclusion of the line the source was recovered and the vessel made a turn to the WNW to put the Bow into the Seas. During the latter part of the day the seas got up to 6-9m and the wind was out WNW 35-45 Kts with Gust to 60 Kts.


**Plan for Tomorrow**

The Day will start with containing down for weather. Once the weather drops we will make a turn back towards the prospect and began repairs on Streamer 1.


**Time Analysis**

<b>MCS Production:</b>	<b>56.813 Sail km</b>	<b>Time Breakdown:</b>	<b>Production 7:18</b>	<b>Technical Downtime:</b>	<b>Instrument Acquisition 0:00</b>	<b>External Downtime:</b>	<b>Mitigation / PAM 0:00</b>
<b>Prime:</b>	<b>0.000 Sail km</b>	<b>Line Change 0:00</b>	<b>Weather Downtime 0:00</b>	<b>Instrument Navigation 0:00</b>	<b>Hydraulics 0:00</b>	<b>Source 0:00</b>	<b>Maneuvering 0:00</b>
<b>Infill:</b>	<b>0.000 Sail km</b>	<b>Technical Downtime 0:00</b>	<b>External Downtime 16:42</b>	<b>Streamer 0:00</b>	<b>Air Compressor 0:00</b>	<b>Other 0:00</b>	<b>Ship Repair 0:00</b>
<b>Reshoot:</b>	<b>0.000 Sail km</b>	<b>OBS Rosette Drop Test 0:00</b>	<b>OBS Deployment 0:00</b>	<b>OBS Recovery 0:00</b>	<b>CTD Cast 0:00</b>	<b>Gravity Core 0:00</b>	<b>Piston Core 0:00</b>
<b>Total:</b>	<b>56.813 Sail km</b>	<b>OBS Recovery 0:00</b>	<b>Port Call 0:00</b>	<b>Transit 0:00</b>	<b>Total: 0:00</b>	<b>Total: 16:42</b>	<b>Total: 24:00</b>

**Chief Scientist : Dale Sawyer**  
 Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero  
**Science Party:**  
 Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teisi Sulujo  
 Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khemraj Shukla  
**PSOs:**  
 Heidi Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza



**Cruise:** MGL1307

**Date:** 18/Jun/13

**Reporter:** RJS

**Daily Report**

**Midnight Position / Info**

**deg min**      **Speed over Ground:** 03.50kt  
**Lat:** 42° 004.384      **N**      **Heading:** 87°  
**Lon:** 12° 039.035      **W**  
**Wind:** N 10-15      **Seas:** 3-Jan      **Water Depth:** ??  
**Midnight SP:** n/a

**Current Equipment Deployed**

Streamers 1, 2, 3, & 4  
 Sbd and Port Barovanes  
 Source Sub-Arrays 1, 2, 3, & 4  
 PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern Mckernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

Started the day continuing standing by for weather. At 08:44 GMT the weather had dropped enough to allow for the recovery of Streamer 1, 2, and the Sbd Barovane to begin trouble shooting Streamer 1's telemetry issues. It was found that the lead-in was the source of the problem and looked to weak fibers. It appeared that the main tow point have moved causing the lead-in to kink at that location. At the end of the day the lead-in was changed, tow point was installed and it was being deployed out on the Barovane.

**Plan for Tomorrow**

The Day will start continuing to deploy the towed equipment. Once all the equipment is in place production will begin on 1084 and finish the day on line 1204.


**PSOs:**

Hedi Ingram  
 Meghan Ptery  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza

**Chief Scientist : Dale Sawyer**  
 Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Science Party:**

Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teai Slnjuro

Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khennaj Shukla

**Time Analysis**

**MCS Production:**

**Prime:** 0.000 Sail km  
**Infill:** 0.000 Sail km  
**Reshoot:** 0.000 Sail km  
**Total:** 0.000 Sail km

**Time Breakdown:**

**Production 0:00**  
 Line Change 0:00  
 Weather Downtime 0:00  
**Technical Downtime 15:16**  
 External Downtime 8:44  
 OBS Rosette Drop Test 0:00  
 OBS Deployment 0:00  
 OBS Recovery 0:00  
 CTD Cast 0:00  
 Gravity Core 0:00  
 Piston Core 0:00  
 Multi Core 0:00  
 Santa Survey 0:00  
 Port Call 0:00  
 Transit 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
 Instrument Navigation 0:00  
 Hydraulics 0:00  
 Source 0:00  
 Streamer 15:16  
 Air Compressor 0:00  
 Other 0:00  
**Total: 15:16**

**External Downtime:**

Mitigation / PAM 0:00  
 Maneuvering 0:00  
 Ship Repair 0:00  
 Fishing Gear 0:00  
 Weather 8:44  
**Total: 8:44**

**Total: 24:00**



**Cruise: MGL1307**

**Date: 19/Jun/13**

**Reporter: RJS**

**Daily Report**

**Midnight Position / Info**

**deg min**      **Speed over Ground:** 04.30kt  
**Lat:** 42° 06 03.887 N      **Heading:** 87°  
**Lon:** 12° 28 05.278 W      **Water Depth:** 5153.0  
**Wind:** NNW 10-15      **Seas:** 1-2m      **Midnight SP:** n/a

**Current Equipment Deployed**

Streamer 1, 2, 3, & 4  
 Sbd and Port Barovanes  
 Source Sub-Arrays 1, 2, 3, & 4  
 PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern McKernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

Started the day continuing to deploy Streamer 1 & 2 out on the Sbd Barovane. Once Completed we made our way towards line while deploying the source. At 07:25 GMT began production on line 1084 and through out the day acquired data on ARC2 and 1204.


**Plan for Tomorrow**

The Day will start continuing production on 1204 and once complete production will begin on 1092 and 12041 by the end of th day.


**Time Analysis**

<b>MCS Production:</b>	<b>130.425 Sail km</b>	<b>Time Breakdown:</b>	<b>Production 16:24</b>	<b>Technical Downtime:</b>	<b>Instrument Acquisition 0:00</b>	<b>External Downtime:</b>	<b>Mitigation / PAM 0:00</b>
<b>Prime:</b>	<b>0.000 Sail km</b>	<b>Line Change 0:11</b>	<b>Weather Downtime 0:00</b>	<b>Instrument Navigation 0:00</b>	<b>Hydraulics 0:00</b>	<b>Source 2:50</b>	<b>Streamers 4:35</b>
<b>Infill:</b>	<b>0.000 Sail km</b>	<b>Technical Downtime 7:25</b>	<b>External Downtime 0:00</b>	<b>Other 0:00</b>	<b>Air Compressor 0:00</b>	<b>Other 0:00</b>	<b>Total: 7:25</b>
<b>Reshoot:</b>	<b>0.000 Sail km</b>	<b>OBS Rosette Drop Test 0:00</b>	<b>OBS Deployment 0:00</b>	<b>OBS Recovery 0:00</b>	<b>CTD Cast 0:00</b>	<b>Gravity Core 0:00</b>	<b>Piston Core 0:00</b>
<b>Total:</b>	<b>130.425 Sail km</b>	<b>OBS Rosette Drop Test 0:00</b>	<b>OBS Deployment 0:00</b>	<b>OBS Recovery 0:00</b>	<b>CTD Cast 0:00</b>	<b>Gravity Core 0:00</b>	<b>Piston Core 0:00</b>
		<b>Multi Core 0:00</b>	<b>Sonar Survey 0:00</b>	<b>Port Call 0:00</b>	<b>Transit 0:00</b>	<b>Total: 7:25</b>	<b>Total: 0:00</b>
		<b>Total: 24:00</b>					

**Chief Scientist : Dale Sawyer**  
 Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Science Party:**  
 Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teasi Slnjuro  
 Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khennaj Shukla

**PSOs:**  
 Heidi Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza



**Midnight Position / Info**

deg min      **Speed over Ground:** 04.30kt  
**Lat:** 42° 06 25.2      N      **Heading:** 87°  
**Lon:** 12° 15 52.988      W  
**Wind:** NNW 10-15      **Seas:** 1-2m      **Water Depth:** 4867.2  
**Midnight SP:** n/a

**Current Equipment Deployed**

Streamer 1, 2, 3, & 4  
 Sbd and Port Barovanes  
 Source Sub-Arrays 1, 2, 3, & 4  
 PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern McKernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

Started the day continuing production on Line 1204 and at the conclusion the line change was extended to complete some maintenance on Source Sub-Array 4. Through out the remainder of the day data was acquired on 1092 and 1204i.


**Plan for Tomorrow**

The Day will start continuing production on 1204i and once complete production will begin on 1000 and 1212 by the end of th day.


**Time Analysis**

**MCS Production:**

**Prime:** 100.163 Sail km  
**Infill:** 60.038 Sail km  
**Reshoot:** 0.000 Sail km  
**Total:** 160.200 Sail km

**Time Breakdown:**

*Production 20:46*  
 Line Change 2:31  
 Weather Downtime 0:00  
 Technical Downtime 0:26  
 External Downtime 0:17

**Technical Downtime:**

Instrument Acquisition 0:00  
 Instrument Navigation 0:00  
 Hydraulics 0:00  
 Source 0:26  
 Streamer 0:00  
 Air Compressor 0:00  
 Other 0:00

**External Downtime:**

Mitigation / PAM 0:17  
 Maneuvering 0:00  
 Ship Repair 0:00  
 Fishing Gear 0:00  
 Weather 0:00

**Total: 24:00**

**Total: 0:26**

**Total: 0:17**

**Chief Scientist : Dale Sawyer**  
 Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Science Party:**

Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teai Slnjuro  
 Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khennaj Shukla

**PSOs:**

Hedi Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza



**Midnight Position / Info**

deg min      **Speed over Ground:** 05.00kt  
**Lat:** 42° 05 10.4      N      **Heading:** 181°  
**Lon:** 12° 03 13.5      W  
**Wind:** NNW 10-15      **Seas:** 1-2m      **Water Depth:** 3865.0  
**Midnight SP:** n/a

**Current Equipment Deployed**

Streamer 1, 2, 3, & 4  
 Sbd and Port Barovanes  
 Source Sub-Arrays 1, 2, 3, & 4  
 PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern Mckernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

Started the day continuing production on Line 1204f and at the conclusion the line data was acquired on 1100, ARCS, 1212 and ARCG.


**Plan for Tomorrow**

The Day will start continuing production on ARCG and once complete production will begin on 1108, 1122R, and 1076R by the end of th day.


**Time Analysis**

**MCS Production:**

**Prime:** 167.550 Sail km  
**Infill:** 0.000 Sail km  
**Reshoot:** 0.000 Sail km  
**Total:** 167.550 Sail km

**Time Breakdown:**

**Production** 22:00  
 Line Change 1:47  
 Weather Downtime 0:00  
 Technical Downtime 0:13  
 External Downtime 0:00  
 OBS Rosette Drop Test 0:00  
 OBS Deployment 0:00  
 OBS Recovery 0:00  
 CTD Cast 0:00  
 Gravity Core 0:00  
 Piston Core 0:00  
 Multi Core 0:00  
 Santa Survey 0:00  
 Port Call 0:00  
 Transit 0:00  
**Total: 24:00**

**Technical Downtime:**

Instrument Acquisition 0:13  
 Instrument Navigation 0:00  
 Hydraulics 0:00  
 Source 0:00  
 Streamer 0:00  
 Air Compressor 0:00  
 Other 0:00  
**Total: 0:13**

**External Downtime:**

Mitigation / PAM 0:00  
 Maneuvering 0:00  
 Ship Repair 0:00  
 Fishing Gear 0:00  
 Weather 0:00  
**Total: 0:00**

**Chief Scientist : Dale Sawyer**

Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Science Party:**

Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teai Slnjuro  
 Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khemraj Shukla

**PSOs:**

Hedli Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza







**Midnight Position / Info**

deg min      **Speed over Ground:** 04.30kt  
**Lat:** 42° 03.7.598      N      **Heading:** 71°  
**Lon:** 12° 01.5.240      W  
**Wind:** NNE 30-35      **Seas:** 4-6m      **Water Depth:** 5047.0  
**Midnight SP:** n/a

**Current Equipment Deployed**  
None - In transit to Vigo, Spain

**Technical Staff Onboard:**  
 Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern Mckernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 Navproc - Alan Thompson

**Daily Summary**

Started the day continuing production on Line 1076R. At 00:06 GMT the Port Main Engine (PME) went offline. At 00:35 GMT Line 1076R was aborted D/T PME failure and the source was recovered. At 04:13 GMT it was decided that the engine was not easily repairable so streamer recovery began. At 15:01 GMT all Towed Equipment was onboard, but the transit to Vigo, Spain did not start until 16:36 d/t discussions with the Office on Options.


**Plan for Tomorrow**

Throughout the day the vessel will be in transit to Vigo, Spain to make engine repairs.


**PSOs:**  
 Heidi Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza

**Chief Scientist : Dale Sawyer**  
 Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Science Party:**  
 Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teisi Sjuurjo

Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khemraj Shukla

**MCS Production:** 0.000 Sail km  
**Prime:** 0.000 Sail km  
**Infill:** 4.500 Sail km  
**Reshoot:** 0.000 Sail km  
**Total:** 4.500 Sail km

**Time Breakdown:**  
 Production 0:35  
 Line Change 0:00  
 Weather Downtime 0:00  
 Technical Downtime 0:00  
 External Downtime 23:25

**Technical Downtime:**  
 Instrument Acquisition 0:00  
 Instrument Navigation 0:00  
 Hydraulics 0:00  
 Source 0:00  
 Streamer 0:00  
 Air Compressor 0:00  
 Other

**External Downtime:**  
 Mitigation / PAM 0:00  
 Maneuvering 0:00  
 Ship Repair 23:25  
 Fishing Gear 0:00  
 Weather 0:00

**Total: 0:00**  
**Total: 23:25**  
**Total: 24:00**



**Cruise: MGL1307**

**Date: 24/Jun/13**

**Reporter: RJS**

**Daily Report**

**Midnight Position / Info**

deg min      **Speed over Ground:** 06.93kt  
**Lat:** 42° 00'2.261" N      **Heading:** 71°  
**Lon:** 12° 03'7.431" W      **Water Depth:** 1900.0  
**Wind:** N 20.25      **Seas:** 3.5m      **Midnight SP:** n/a

**Current Equipment Deployed**  
None - In transit to Vigo, Spain

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern Mckernan  
 Acq. Technician - Klayton Curtis  
 Navigation - Mike Martello  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

Throughout the day the vessel will be in transit to Vigo, Spain to make engine repairs.


**Plan for Tomorrow**

The day will start transiting to Vigo, Spain to make Repairs to Port Main Engine. At ~09:00 the vessel should be along side.


**PSOs:**

Hedi Ingram  
 Meghan Piercy  
 Dara Cameron  
 Emily Ellis  
 Rebecca Garza

**Science Party:**

Steve Danborn  
 Marianne Karplus  
 James Gibson  
 Mari Teisi Sñurjo  
 Sarah Dean  
 Miguel Andres Martinez  
 Tobias Merry  
 Luke Holroyd  
 Tyler Poppewinner  
 Khennaj Shukla

**Chief Scientist : Dale Sawyer**

Co-Chief Scientist - Donna Shillington  
 Co-Chief Scientist - Tim Beston  
 Co-Chief Scientist - Cesar Ranero

**Time Analysis**

	<b>Time Breakdown:</b>	<b>Technical Downtime:</b>	<b>External Downtime:</b>
<b>MCS Production:</b>	<b>0.000 Sail km</b>	<b>Production 0:00</b>	<b>Instrument Acquisition 0:00</b>
<b>Prime:</b>	<b>0.000 Sail km</b>	<b>Line Change 0:00</b>	<b>Weather Downtime 0:00</b>
<b>Infill:</b>	<b>0.000 Sail km</b>	<b>Weather Downtime 0:00</b>	<b>Technical Downtime 24:00</b>
<b>Reshoot:</b>	<b>0.000 Sail km</b>	<b>External Downtime 0:00</b>	<b>Hydraulics 0:00</b>
<b>Total:</b>	<b>0.000 Sail km</b>	<b>External Downtime 0:00</b>	<b>Source 0:00</b>
		<b>Streamer 0:00</b>	<b>Other</b>
		<b>Air Compressor 0:00</b>	<b>Ship Repair 24:00</b>
		<b>OBS Rosette Drop Test 0:00</b>	<b>OBS Deployment 0:00</b>
		<b>OBS Recovery 0:00</b>	<b>OBS Recovery 0:00</b>
		<b>CTD Cast 0:00</b>	<b>Gravimetry 0:00</b>
		<b>Gravimetry Core 0:00</b>	<b>Piston Core 0:00</b>
		<b>Multi Core 0:00</b>	<b>Multi Core 0:00</b>
		<b>Sonar Survey 0:00</b>	<b>Sonar Survey 0:00</b>
		<b>Port Call 0:00</b>	<b>Port Call 0:00</b>
		<b>Transit 0:00</b>	<b>Transit 0:00</b>
		<b>Total: 24:00</b>	<b>Total: 0:00</b>
		<b>Total: 24:00</b>	







**Midnight Position / Info**

deg min

Lat: 42° 01.3.830 N  
Lon: 08° 04.4.240 W

Speed over Ground: In Port  
Heading: In Port

Current Equipment Deployed  
None - Along Side Vigo, Spain

Wind: In Port Seas: In Port

Water Depth: In Port

**Daily Summary**

The Vessel alongside Vigo, Spain for repairs on Port Main End throughout the rest of the day. Continue to work on Projects from the Work List.

Work List	% Complete	Worklist	% Complete
Workboat Service	100.00%	Lead-in Status update	0.00%
Workboat Testing	100.00%	M/S/T Testing	0.00%
r/TNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720's)	50.00%	CTV Repairs	50.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EM122	100.00%
Ship's Spectra Display	0.00%	Prepare Equipment to be shipped	25.00%
Clean Power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS T8 Pods Cross	0.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Towsports	50.00%
Hose Bundle Status Update	40.00%	Spec'ing out New Source Towpoint	0.00%

Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Robbie Gunn  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Josh Kasilinger

**Chief Scientist : Dale Sawyer**  
Co-Chief Scientist - Donna Shillington  
Co-Chief Scientist - Carlos Gutierrez  
Co-Chief Scientist - Tim Reston

**Science Party:**  
Steve Danborn  
Marianne Karplus  
James Glikson

Mari Tesi Siliurjo  
Sarah Dean  
Miguel Andres Martinez  
Tobias Merry  
Luke Holroyd  
Tyler Poppenwimer  
Khemraj Shukla

**PSOs:**  
Heidi Ingram  
Meghan Henry  
Dara Cameron  
Emily Ellis  
Rebecca Garza

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern McKelman  
Acq. Technician - Klayton Curtis  
Navigation - Mike Martello  
Navigation - Matt Grey  
NavProc - Alan Thompson

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects

	Work List		Worklist	
	% Complete	Worklist	% Complete	Worklist

**Time Analysis**

**MCS Production:** 0.000 Sail km

**Time Breakdown:**

**Technical Downtime:**

**External Downtime:**

Prime: 0.000 Sail km

Production 0:00  
Line Change 0:00

Instrument Acquisition 0:00  
Instrument Navigation 0:00

Mitigation / PAM 0:00  
Maneuvering 0:00

Infill: 0.000 Sail km

Weather Downtime 0:00  
Technical Downtime 0:00

Hydraulics 0:00  
Source 0:00

Fishing Gear 0:00  
Weather 0:00

Reshoot: 0.000 Sail km

External Downtime 0:00

Streamer 0:00  
Air Compressor 0:00

Total: 0.000 Sail km

OBS Rosette Drop Test 0:00  
OBS Deployment 0:00

Other  
Ship Repair 0:00

OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Port Call 0:00  
Transit 0:00

**Total: 0:00**

**Total: 0:00**

**Total: 0:00**



**Midnight Position / Info**

deg min  
Lat: 42° 03.330 N  
Lon: 08° 04.4240 W  
Wind: In Port Seas: In Port

Speed over Ground: In Port

Heading: In Port

Water Depth: In Port

**Current Equipment Deployed**

None - Along Side Vigo, Spain

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemman  
Acq. Technician - Klayton Curtis  
Navigation - Mike Martello  
Navigation - Matt Grey  
NavProc - Alan Thompson

**Daily Summary**

The Vessel alongside Vigo, Spain for repairs on Port Main End throughout the rest of the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Workboat Service	100.00%	Lead-in Status update	0.00%
Workboat Testing	100.00%	MARS Testing	0.00%
rTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720's)	75.00%	CTV Repairs	50.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EMI 22	100.00%
Ship's Spectra Display	0.00%	Prepare equipment to be shipped	75.00%
Clean power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS TB Pods Cross	50.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	50.00%
Host Bundle Status Update	60.00%	Spec'ing out New Source Tow point	0.00%

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	0.00%	Setup of New Captain's PC	0.00%
Reload of all Science Equip	0.00%	Setup of New Chief Mate Laptop	0.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng Laptop	0.00%
Inventory Bolt Part	15.00%	Setup of New Engine Room Laptop	0.00%
Inventory Jumpers	0.00%		
Gun Rebuilds	100.00%		
Trouble Shooting String 2 Comm	100.00%		
Install of Shelves	60.00%		
Unblock Maintenance	90.00%		
Repair Gun Tools	60.00%		
Setup of New Engine Room PC	100.00%		
Setup of New Chief Eng PC	100.00%		

**Time Analysis**

**MCS Production:**

Prime: 0.000 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 0.000 Sail km

**Time Breakdown:**

Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Port Call 0:00  
Transit 0:00  
**Total: 0:00**

**PSOs:**  
Hedli Ingram  
Meghan Perry  
Dara Cameron  
Emily Ellis  
Rebecca Garza

**Science Party:**  
Steve Danborn  
Marianne Karplus  
James Glikson  
Mari Tesi Shurjo  
Sarah Dean  
Miguel Andres Martinez  
Tobias Merry  
Luke Holroyd  
Tyler Popenwiner  
Khemraj Shukla

**Chief Scientist: Dale Sawyer**  
Co-Chief Scientist - Donna Shillington  
Co-Chief Scientist - Tim Reston  
Co-Chief Scientist -

**Science Party:**  
Steve Danborn  
Marianne Karplus  
James Glikson  
Mari Tesi Shurjo  
Sarah Dean  
Miguel Andres Martinez  
Tobias Merry  
Luke Holroyd  
Tyler Popenwiner  
Khemraj Shukla



**Midnight Position / Info**

deg min

Lat: 42° 03.330 N  
Lon: 08° 04.4240 W

Speed over Ground: In Port  
Heading: In Port

Water Depth: In Port

Wind: In Port Seas: In Port

**Current Equipment Deployed**  
None - Along Side Vigo, Spain

**Technical Staff Onboard:**

- Ch. Science Officer - Robert Steinhaus
- Science Officer - Jay Johnstone
- Acq. Technician - Bern Mcklemman
- Navigation - Clayton Curtis
- Navigation - Mike Martello
- NavProc - Alan Thompson

**Daily Summary**

The Vessel alongside Vigo, Spain for repairs on Port Main End throughout the rest of the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Workboat Service	100.00%	Lead-in Status update	0.00%
Workboat Testing	100.00%	MARS Testing	0.00%
rTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720 s)	75.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EM122	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	75.00%
Clean Power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting ROPS T8 Pods Cross	50.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	50.00%
Hose Bundle Status Update	85.00%	Spec'ing out New Source Tow point	0.00%

- Sr. Gun Mechanic - Tom Spoto
- Gun Mechanic - Robbie Gum
- Gun Mechanic - Carlos Gutierrez
- Gun Mechanic - Josh Kasinger

**Chief Scientist : Dale Sawyer**

- Co-Chief Scientist - Donna Shillington
- Co-Chief Scientist - Tim Reston
- Co-Chief Scientist -

**Science Party:**

- Steve Danborn
- Martanne Karplus
- James Glikson

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	75.00%
Reload of all Science Equip	50.00%	Setup of New Chief Mate Laptop	50.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng Laptop	100.00%
Inventory Bolt Part	0.00%	Setup of New Engine Room Laptop	0.00%
Inventory Jumpers	100.00%	Re-Organizing of Port Lab and Jumper	10.00%
Gun Rebuilds	100.00%		
Trouble Shooting String 2 Comm	100.00%		
Install of Shelves	60.00%		
Unblock Maintenance	90.00%		
Repair Gun Tools	60.00%		
Setup of New Engine Room PC	100.00%		
Setup of New Chief Eng PC	100.00%		

- Mari Tesi Silvijo
- Sarah Dean
- Miguel Andres Martinez
- Tobias Merry
- Luke Holroyd
- Tyler Popenwiner
- Khemraj Shukla

**PSOs:**

- Heddi Ingram
- Meghan Perry
- Dara Cameron
- Emily Ellis
- Rebecca Garza

**Time Analysis**

**MCS Production:** 0.000 Sail km

**Time Breakdown:** Production 0:00  
Line Change 0:00

**Technical Downtime:** Instrument Acquisition 0:00  
Weather Navigation 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**External Downtime:** Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

**Infill:** 0.000 Sail km

Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Reshoot:** 0.000 Sail km

OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

**Total:** 0.000 Sail km

Air Compressor 0:00  
Ship Repair 0:00  
Other

Port Call 0:00  
Transit 0:00  
**Total: 0:00**

**Total: 0:00**



Midnight Position / Info

deg min  
Lat: 42° 03.330 N  
Lon: 08° 04.4240 W

Speed over Ground: In Port

Heading: In Port

Water Depth: In Port

Wind: In Port Seas: In Port

Current Equipment Deployed

None - Along Side Vigo, Spain

Technical Staff Onboard:

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemman  
Acq. Technician - Klayton Curtis  
Navigation - Mike Martello  
Navigation - Matt Grey  
NavProc - Alan Thompson

Daily Summary

The Vessel alongside Vigo, Spain for repairs on Port Main End throughout the rest of the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Workboat Service	100.00%	Lead-in Status update	0.00%
Workboat Testing	100.00%	MARS Testing	0.00%
rTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720's)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EMI 22	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	75.00%
Clean Power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting ROPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	50.00%
Hose Bundle Status Update	100.00%	Spec'ing out New Source Tow point	0.00%

Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Robbie Gum  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Josh Kasilinger

Chief Scientist : Dale Sawyer  
Co-Chief Scientist - Donna Shillington  
Co-Chief Scientist - Tim Reston  
Co-Chief Scientist -

Plan for Tomorrow

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	75.00%
Reload of all Science Equip	100.00%	Setup of New Chief Mate Laptop	50.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng Laptop	100.00%
Inventory Bolt Part	15.00%	Setup of New Engine Room Laptop	0.00%
Inventory Jumpers	0.00%	Re-Organizing of Port Lab and Jumper	30.00%
Gun Rebuilds	100.00%		
Trouble Shooting String 2 Comm	100.00%		
Install of Shelves (Half High)	75.00%		
Unblock Maintenance	90.00%		
Repair Gun Tools	60.00%		
Setup of New Engine Room PC	100.00%		
Setup of New Chief Eng PC	100.00%		

PSOs:  
Heddi Ingram  
Meghan Henry  
Dara Cameron  
Emily Ellis

Time Analysis

MCS Production:

0.000 Sail km

Prime: 0.000 Sail km

Production 0:00

Infill: 0.000 Sail km

Line Change 0:00

Reshoot: 0.000 Sail km

Weather Downtime 0:00

Total: 0.000 Sail km

Technical Downtime 0:00

External Downtime 0:00

Source 0:00

Streamer 0:00

Air Compressor 0:00

Other

Ship Repair 0:00

Port Call 0:00

Transit 0:00

Total: 0:00

Technical Downtime:

Instrument Acquisition 0:00

Instrument Navigation 0:00

Hydraulics 0:00

External Downtime 0:00

Source 0:00

Streamer 0:00

Air Compressor 0:00

Other

Ship Repair 0:00

Total: 0:00

External Downtime:

Mitigation / PAM 0:00

Maneuvering 0:00

Fishing Gear 0:00

Weather 0:00

Total: 0:00



**Midnight Position / Info**

deg min

Lat: 42° 03.330 N  
Lon: 08° 04.4240 W

Speed over Ground: In Port  
Heading: In Port

Water Depth: In Port

Wind: In Port Seas: In Port

**Current Equipment Deployed**  
None - Along Side Vigo, Spain

**Technical Staff Onboard:**

- Ch. Science Officer - Robert Steinhaus
- Science Officer - Jay Johnstone
- Acq. Technician - Bern Mcklemman
- Acq. Technician - Klayton Curtis
- Navigation - Mike Martello
- Navigation - Matt Grey
- NavProc - Alan Thompson

**Daily Summary**

The Vessel alongside Vigo, Spain for repairs on Port Main End throughout the rest of the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Workboat Service	100.00%	Lead-in Status update	0.00%
Workboat Testing	100.00%	MARS Testing	0.00%
RTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720's)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EMI 22	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	75.00%
Clean Power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	50.00%
Host Bundle Status Update	100.00%	Spec'ing out New Source Tow point	0.00%

- Sr. Gun Mechanic - Tom Spoto
- Gun Mechanic - Robbie Gum
- Gun Mechanic - Carlos Gutierrez
- Gun Mechanic - Josh Kasinger

**Chief Scientist : Dale Sawyer**

- Co-Chief Scientist - Donna Shillington
- Co-Chief Scientist - Tim Reston
- Co-Chief Scientist -

**Science Party:**

- Steve Danborn
- Martanne Karplus
- James Glikson

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	75.00%
Reload of all Science Equip	100.00%	Setup of New Chief Mate Laptop	50.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng Laptop	100.00%
Inventory Bolt Part	15.00%	Setup of New Engine Room Laptop	0.00%
Inventory Jumpers	0.00%	Re-Organizing of Port Lab and Jumper	30.00%
Gun Rebuilds	100.00%		
Trouble Shooting String 2 Comm	100.00%		
Install of Shelves (Half High)	75.00%		
Unblock Maintenance	90.00%		
Repair Gun Tools	60.00%		
Setup of New Engine Room PC	100.00%		
Setup of New Chief Eng PC	100.00%		

**PSOs:**

- Heddi Ingram
- Meghan Perry
- Dara Cameron
- Emily Ellis
- Rebecca Garza

**Time Analysis**

**MCS Production:** 0.000 Sail km

**Time Breakdown:**

Production 0:00

Line Change 0:00

Weather Downtime 0:00

Technical Downtime 0:00

External Downtime 0:00

Reshoot: 0.000 Sail km

0.000 Sail km

OBS Rosette Drop Test 0:00

OBS Deployment 0:00

OBS Recovery 0:00

CTD Cast 0:00

Gravity Core 0:00

Piston Core 0:00

Multi Core 0:00

Sonar Survey 0:00

Port Call 0:00

Transit 0:00

**Total: 0:00**

**Technical Downtime:**

Instrument Acquisition 0:00

Instrument Navigation 0:00

Hydraulics 0:00

Source 0:00

Streamer 0:00

Air Compressor 0:00

Other

Ship Repair 0:00

**Total: 0:00**

**External Downtime:**

Mitigation / PAM 0:00

Maneuvering 0:00

Fishing Gear 0:00

Weather 0:00

**Total: 0:00**



Cruise: **MGL1307**

Date: **1/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min

Lat: 42° 03.330 N  
Lon: 08° 04.4240 W

Speed over Ground: In Port

Heading: In Port

Water Depth: In Port

Wind: In Port Seas: In Port

Current Equipment Deployed  
None - Along Side Vigo, Spain

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Ben McKelern  
Acq. Technician - Clayton Curtis  
Navigation - Mike Martello  
Navigation - Matt Grey  
NavProc - Alan Thompson

**Daily Summary**

The Vessel alongside Vigo, Spain for repairs on Port Main End throughout the rest of the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Workboat Service	100.00%	Lead-in Status update	15.00%
Workboat Testing	100.00%	MARS Testing	0.00%
rTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720 s)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EM122	100.00%
Ships Spectra Display	100.00%	Prepare Equipment to be shipped	75.00%
Clean Power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS T8 Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Hose Bundle Status Update	100.00%	Spec'ing out New Source Tow point	0.00%

Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Robbie Gum  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Josh Kasinger

**Chief Scientist :**  
Co-Chief Scientist -  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**  
Steve Danborn  
Khemraj Shukla  
James Glikson

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	100.00%
Reload of all Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	0.00%	Setup of New Engine Room Laptop	0.00%
Inventory Jumpers	0.00%	Re-Organizing of Port Lab and Jumper	30.00%
Gun Rebuilds	100.00%	Re-Term Maggie Tow Leaders	33.00%
Trouble Shooting String 2 Comm	100.00%		
Install of Shelves (Half High)	75.00%		
Unblock Maintenance	90.00%		
Repair Gun Tools	60.00%		
Setup of New Engine Room PC	100.00%		
Setup of New Chief Eng. PC	100.00%		

**PSOs:**  
Heddi Ingram  
Meghan Perry  
Dara Cameron  
Emily Ellis

**Time Analysis**

**MCS Production:**

0.000 Sail km  
Prime: 0.000 Sail km

Infill: 0.000 Sail km

Reshoot: 0.000 Sail km

Total: 0.000 Sail km

**Time Breakdown:**

Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00  
Port Call 0:00  
Transit 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Total: 0:00

**Total: 0:00**



Midnight Position / Info

deg min  
Lat: 42° 03.330 N  
Lon: 08° 04.4240 W  
Wind: In Port Seas: In Port

Speed over Ground: In Port

Heading: In Port

Water Depth: In Port

Current Equipment Deployed  
None - Along Side Vigo, Spain

Technical Staff Onboard:

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemman  
Acq. Technician - Klayton Curtis  
Navigation - Mike Martello  
Navigation - Matt Grey  
NavProc - Alan Thompson

Daily Summary

The Vessel alongside Vigo, Spain for repairs on Port Main End throughout the rest of the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Workboat Service	100.00%	Lead-in Status update	75.00%
Workboat Testing	100.00%	MARS Testing	0.00%
rTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720's)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EM122	100.00%
Ships Spectra Display	100.00%	Prepare Equipment to be shipped	75.00%
Clean Power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS T8 Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Host Bundle Status Update	75.00%	Spec'ing out New Source Tow point	0.00%

Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Robbie Gum  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Josh Kasinger

Chief Scientist :  
Co-Chief Scientist -  
Co-Chief Scientist -  
Co-Chief Scientist -

Science Party:  
Steve Danborn  
Khemraj Shukla

James Glikson  
Brian Jordan

Plan for Tomorrow

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	100.00%
Reload of all Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	0.00%	Setup of New Engine Room Laptop	75.00%
Inventory Jumpers	100.00%	Re-Organizing of Port Lab and Jumper	100.00%
Gun Rebuilds	100.00%	Re-Term Maggie Tow Leaders	33.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they b	0.00%
Install of Shelves (Half High)	75.00%		
Unbical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Setup of New Engine Room PC	100.00%		
Setup of New Chief Eng. PC	100.00%		

PSOs:  
Hedli Ingram  
Meghan Perry  
Dara Cameron  
Emily Ellis

Time Analysis

MCS Production:

0.000 Sail km  
Prime: 0.000 Sail km

Infill: 0.000 Sail km

Reshoot: 0.000 Sail km

Total: 0.000 Sail km

Time Breakdown:

Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00  
Port Call 0:00  
Transit 0:00  
**Total: 0:00**

Technical Downtime:

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other  
Ship Repair 0:00

External Downtime:

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
**Total: 0:00**

**Total: 0:00**



**Midnight Position / Info**

deg min

Lat: 42° 01.3.830 N  
Lon: 08° 04.4.240 W

Speed over Ground: In Port  
Heading: In Port

Water Depth: In Port

Wind: In Port Seas: In Port

**Current Equipment Deployed**  
None - Along Side Vigo, Spain

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemman  
Acq. Technician - Klayton Curtis  
Navigation - Mike Martello  
Navigation - Matt Grey  
NavProc - Alan Thompson

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List, however was slowed today by multiple blackouts of the ship, d/t shore power Generator Failures. All but the most critical science system have been secured until the vessel it back on its own Power. Once that occurs restarting and testing of all systems will begin again. It is expected that vessel will be back on its own power on Saturday.

Work List	% Complete	Work List	% Complete
Workboat Service	100.00%	Lead-in Status update	75.00%
Workboat Testing	100.00%	MARS Testing	0.00%
RTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720 s)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EMI 22	100.00%
Ship's Spectra Display	100.00%	Prepare equipment to be shipped	75.00%
Clean Power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting ROPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Hose Bundle Status Update	75.00%	Spec'ing out New Source Tow point	0.00%

Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Robbie Gum  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Josh Kasinger

**Chief Scientist :**  
Co-Chief Scientist -  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**  
Steve Danborn  
Khemraj Shukla  
James Glikson  
Brian Jordan

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	100.00%
Reload of all Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	0.00%	Setup of New Engine Room Laptop	75.00%
Inventory Jumpers	100.00%	Re-Organizing of Port Lab and Jumper	100.00%
Gun Repulids	100.00%	Re-Term Maggie Tow Leaders	33.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	1000.00%
Install of Shelves (Half High)	75.00%	Testing of All Science Equipment	0.00%
Unblock Maintenance	90.00%	Repairs to HSN System	0.00%
Repair Gun Tools	60.00%		
Setup of New Engine Room PC	100.00%		
Setup of New Chief Eng. PC	100.00%		

**PSOs:**  
Heidi Ingram  
Meghan Perry  
Dara Cameron

**Time Analysis**

**MCS Production:** 0.000 Sail km

**Time Breakdown:**

**Technical Downtime:**

**External Downtime:**

Prime: 0.000 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 0.000 Sail km

Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Total: 0:00

Port Call 0:00  
Transit 0:00  
**Total: 0:00**



**Midnight Position / Info**

deg min

Lat: 42° 03.330 N  
Lon: 08° 04.4240 W

Speed over Ground: In Port

Heading: In Port

Water Depth: In Port

Wind: In Port Seas: In Port

Current Equipment Deployed  
None - Along Side Vigo, Spain

**Technical Staff Onboard:**

- Ch. Science Officer - Robert Steinhaus
- Science Officer - Jay Johnstone
- Acq. Technician - Bern McKelernan
- Acq. Technician - Klayton Curtis
- Navigation - Mike Martello
- Navigation - Matt Grey
- NavProc - Alan Thompson

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List. There where no power outages during the day.

Work List	% Complete	Work List	% Complete
Workboat Service	100.00%	Lead-in Status update	0.00%
Workboat Testing	100.00%	MARS Testing	0.00%
rTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720 s)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EM122	100.00%
Ships Spectra Display	100.00%	Prepare Equipment to be shipped	75.00%
Clean Power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS T8 Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Host Bundle Status Update	75.00%	Spec'ing out New Source Tow point	0.00%

- Sr. Gun Mechanic - Tom Spoto
- Gun Mechanic - Robbie Gum
- Gun Mechanic - Carlos Gutierrez
- Gun Mechanic - Josh Kasinger

- Chief Scientist :**
- Co-Chief Scientist -
  - Co-Chief Scientist -
  - Co-Chief Scientist -

- Science Party:**
- Steve Danborn
  - Khemraj Shukla
  - James Glikson
  - Brian Jordan

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	100.00%
Reload of all Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	0.00%	Setup of New Engine Room Laptop	100.00%
Inventory Jumpers	100.00%	Re-Organizing of Port Lab and Jumper	100.00%
Gun Repulids	100.00%	Re-Term Maggie Tow Leaders	33.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	1000.00%
Install of Shelves (Half High)	75.00%	Testing of All Science Equipment	0.00%
Unblock Maintenance	90.00%	Test/Repairs to HSN System	75.00%
Repair Gun Tools	60.00%		
Setup of New Engine Room PC	100.00%		
Setup of New Chief Eng. PC	100.00%		

- PSOs:**
- Heddi Ingram
  - Meghan Perry
  - Data Cameron

**Time Analysis**

MCS Production: 0.000 Sail km

Time Breakdown: Production 0:00

Technical Downtime: Instrument Acquisition 0:00

External Downtime: Mitigation / PAM 0:00

Prime: 0.000 Sail km

Line Change 0:00

Weather Downtime 0:00

Maneuvering 0:00

Infill: 0.000 Sail km

Weather Downtime 0:00

Technical Downtime 0:00

Fishing Gear 0:00

Reshoot: 0.000 Sail km

External Downtime 0:00

Source 0:00

Weather 0:00

Total: 0.000 Sail km

OBS Rosette Drop Test 0:00

Air Compressor 0:00

Weather 0:00

OBS Deployment 0:00

Ship Repair 0:00

Weather 0:00

OBS Recovery 0:00

Other

Weather 0:00

CTD Cast 0:00

Ship Repair 0:00

Weather 0:00

Gravity Core 0:00

Other

Weather 0:00

Piston Core 0:00

Other

Weather 0:00

Multi Core 0:00

Other

Weather 0:00

Sonar Survey 0:00

Other

Weather 0:00

Port Call 0:00

Other

Weather 0:00

Transit 0:00

Other

Weather 0:00

Total: 0:00

Other

Weather 0:00



**Midnight Position / Info**

deg min

Lat: 42° 03.330 N  
Lon: 08° 04.4240 W

Speed over Ground: In Port

Heading: In Port

Water Depth: In Port

Wind: In Port Seas: In Port

**Current Equipment Deployed**  
None - Along Side Vigo, Spain

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemman  
Acq. Technician - Klayton Curtis  
Navigation - Mike Martello  
Navigation - Matt Grey  
NavProc - Alan Thompson

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Workboat Service	100.00%	Lead-in Status update	0.00%
Workboat Testing	100.00%	MARS Testing	0.00%
rTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720's)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EM122	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	75.00%
Clean Power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting ROPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Hose Bundle Status Update	75.00%	Spec'ing out New Source Tow point	0.00%

Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Robbie Gum  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Josh Kasinger

**Chief Scientist : Dale Sawyer**

Co-Chief Scientist -  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**

Steve Danborn  
Khemraj Shukla  
James Glikson  
Brian Jordan

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	100.00%
Reload of all Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	0.00%	Setup of New Engine Room Laptop	100.00%
Inventory Jumpers	100.00%	Re-Organizing of Port Lab and Jumper	100.00%
Gun Repulids	100.00%	Re-Term Maggie Tow Leaders	100.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	0.00%
Install of Shelves (Half High)	75.00%	Testing of All Science Equipment	0.00%
Unblock Maintenance	90.00%	Test/Repairs to HSN System	75.00%
Repair Gun Tools	60.00%	Cleaning and Securing Lab Spaces	50.00%
Setup of New Engine Room PC	100.00%		
Setup of New Chief Eng. PC	100.00%		

**PSOs:**

**Time Analysis**

**MCS Production:**

Prime: 0.000 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 0.000 Sail km

**Time Breakdown:**

Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00  
Port Call 0:00  
Transit 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Total: 0:00

**Total: 0:00**



**Midnight Position / Info**

deg min

Lat: 42° 03.330 N  
Lon: 08° 04.4240 W

Speed over Ground: In Port  
Heading: In Port

Current Equipment Deployed  
None - Along Side Vigo, Spain

Wind: In Port Seas: In Port

Water Depth: In Port

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Workboat Service	100.00%	Lead-in Status update	0.00%
Workboat Testing	100.00%	MARS Testing	0.00%
rTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720's)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EMI 22	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	75.00%
Clean power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Host Bundle Status Update	75.00%	Spec'ing out New Source Tow point	0.00%

**Technical Staff Onboard:**  
Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemman  
Acq. Technician - Klayton Curtis  
Navigation - Mike Martello  
Navigation - Matt Grey  
NavProc - Alan Thompson

Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Robbie Gum  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Josh Kasilger

**Chief Scientist : Dale Sawyer**  
Co-Chief Scientist - Tim Keaton  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**  
Steve Danborn  
Khemraj Shukla  
James Glikson  
Brian Jordan

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	100.00%
Reload of all Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	0.00%	Setup of New Engine Room Laptop	100.00%
Inventory Jumpers	100.00%	Re-Organizing of Port Lab and Jumper	100.00%
Gun Repulids	100.00%	Re-Term Maggie Tow Leaders	100.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	100.00%
Install of Shelves (Half High)	75.00%	Testing of All Science Equipment	50.00%
Unblock Maintenance	90.00%	Test/Repairs to HSN System	100.00%
Repair Gun Tools	60.00%	Cleaning and Securing Lab Spaces	50.00%
Setup of New Engine Room PC	100.00%	E-Power to Server and Switch Rack in	100.00%
Setup of New Chief Eng. PC	100.00%		

**PSOs:**  
Heidi Ingram  
Meghan Perry  
Dara Cameron

**Time Analysis**

MCS Production: 0.000 Sail km

Time Breakdown:  
Production 0:00  
Line Change 0:00

Technical Downtime:  
Instrument Acquisition 0:00  
Instrument Navigation 0:00

External Downtime:  
Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

Infill: 0.000 Sail km

Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

Reshoot: 0.000 Sail km

OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Total: 0.000 Sail km

Air Compressor 0:00  
Ship Repair 0:00  
Other

Port Call 0:00  
Transit 0:00

**Total: 0:00**

**Total: 0:00**

**Total: 0:00**



**Midnight Position / Info**

deg min

Lat: 42° 01.3.830 N  
Lon: 08° 04.4.240 W

Speed over Ground: In Port  
Heading: In Port

Water Depth: In Port

Wind: In Port Seas: In Port

**Current Equipment Deployed**  
None - Along Side Vigo, Spain

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern McKernan  
Acq. Technician - Clayton Curtis  
Navigation - Mike Martello  
Navigation - Matt Grey  
NavProc - Alan Thompson

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Workboat Service	100.00%	Lead-in Status update	0.00%
Workboat Testing	100.00%	MARS Testing	0.00%
RTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720's)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EM122	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	85.00%
Clean power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Hose Bundle Status Update	75.00%	Spec'ing out New Source Tow Point	0.00%

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects. At 08:00 GMT Safety Briefing and vessel tour of ongoing Science Party & New PSO's will take place.

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	100.00%
Rebuild of All Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	15.00%	Setup of New Engine Room Laptop	100.00%
Inventory Jumpers	0.00%	Re-Organizing of Port Lab and Jumps	100.00%
Gun Rebuilds	100.00%	Re-Term Maggie Tow Leaders	100.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	100.00%
Install of Shelves (Half High)	75.00%	Testing of All Science Equipment	50.00%
Unblock Maintenance	90.00%	Test/Repairs to HSN System	100.00%
Repair Gun Tools	60.00%	Cleaning and Securing Lab Spaces	75.00%
Setup of New Engine Room PC	100.00%	E-Power to Server and Switch Rack in	100.00%
Setup of New Chief Eng. PC	100.00%		

**Science Party:**  
Brian Jordan (Rice)  
Khemraj Shukla (Oklahoma State Univ.)  
James Glikson (Lamont)  
Isafo Pedro Tauscheck Zelinisli (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayraktar (Southampton, new post-doc moving from Ifremer)  
Mellina Marjnovic (Lamont graduate)

**PSOs:**  
Heidi Ingram  
Meghan Phery  
Dara Cameron

**Time Analysis**

**MCS Production:**

Prime: 0.000 Sail km

Infill: 0.000 Sail km

Reshoot: 0.000 Sail km

Total: 0.000 Sail km

**Time Breakdown:**

Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

**Total: 0:00**

**Total: 0:00**

**Total: 0:00**

Port Call 0:00  
Transit 0:00



**Midnight Position / Info**

deg min

Lat: 42° 01.3.830 N  
Lon: 08° 04.4.240 W

Speed over Ground: In Port  
Heading: In Port

Water Depth: In Port

Wind: In Port Seas: In Port

Current Equipment Deployed  
None - Along Side Vigo, Spain

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern McKelern  
Acq. Technician - Klayton Curtis  
Marine Tech -  
Navigation - Mike Martello  
Navigation - Matt Grey  
NavProc - Alan Thompson

Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Robbie Gunn  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic -

**Chief Scientist : Dale Sawyer (RICE)**  
Co-Chief Scientist - Tim Keaton (Southampton)  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**  
Brian Jordan (Rice)  
Khemraj Shukla (Oklahoma State Univ.)  
James Glikson (Lamont)

Isafo Pedro Tauschek Zelinshi (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayraktar (Southampton, new post-doc moving from Ifremer)  
Milena Marjnovic (Lamont graduate)

**PSOs:**  
Heidi Ingram  
Meghan Perry  
Dara Cameron

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Change Section Str 1	40.00%	Lead-in Status update	0.00%
Transfer 6k of Rope to Spider Re	0.00%	MARS Testing	0.00%
RTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720 s)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EMI 22	100.00%
Ship's Spectra Display	100.00%	Prepare equipment to be shipped	85.00%
Clean power-re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Hose Bundle Status Update	75.00%	Spec'ing out New Source Tow Point	0.00%

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects. At 08:00 GMT Safety Briefing and vessel tour of ongoing Science Party & New PSOs will take place.

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	100.00%
Relead of All Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	15.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	15.00%	Setup of New Engine Room Laptop	100.00%
Inventory Jumpers	0.00%	Re-Organizing of Port Lab and Jumpers	100.00%
Gun Rebuilds	100.00%	Re-Term Maggie Tow Leaders	100.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	100.00%
Install of Shelves (Half High)	75.00%	Testing of All Science Equipment	50.00%
Unblock Maintenance	90.00%	Test/Repairs to HSN System	100.00%
Repair Gun Tools	60.00%	Cleaning and Securing Lab Spaces	75.00%
Setup of New Engine Room PC	100.00%	E-Power to Server and Switch Rack in	100.00%
Setup of New Chief Eng. PC	100.00%		

**Time Analysis**

**MCS Production:**

Production 0:00  
Line Change 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Weather Navigation 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
Source 0:00  
Hydraulics 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

Prime: 0.000 Sail km

Infill: 0.000 Sail km

Reshoot: 0.000 Sail km

Total: 0.000 Sail km

OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Port Call 0:00  
Transit 0:00  
**Total: 0:00**

**Total: 0:00**



**Midnight Position / Info**

deg min

Lat: 42° 01.3.830 N  
Lon: 08° 04.4.240 W

Speed over Ground: In Port  
Heading: In Port

Wind: In Port Seas: In Port

Water Depth: In Port

Current Equipment Deployed  
None - Along Side Vigo, Spain

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Klayton Curtis  
Marine Tech -  
Navigation - Mike Martello  
Navigation - Matt Grey  
NavProc - Alan Thompson

Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Robbie Gum  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic -

**Chief Scientist : Dale Sawyer (RICE)**  
Co-Chief Scientist - Tim Keaton (Southampton)  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**

Brian Jordan (Rice)  
Khemraj Shukla (Oklahoma State Univ.)  
James Glikson (Lamont)

Isafo Pedro Tauschek Zelinshi (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayraktar (Southampton, new post-doc, moving from Firenze)  
Milena Marjnovic (Lamont graduate)

**PSOs:**

Heddi Ingram  
Meghan Perry  
Dara Cameron

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Change Section SRT 1	100.00%	Lead-in Status update	0.00%
Traffer 6k of Rope to Spider Re	100.00%	MARS Testing	0.00%
RTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720 s)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EMI 22	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	85.00%
Clean power-re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Hose Bundle Status Update	75.00%	Spec'ing out New Source Tow Point	0.00%

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects. At 08:00 GMT Safety Briefing and vessel tour of ongoing Science Party & New PSOs will take place.

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	100.00%
Rebuild of All Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	20.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	15.00%	Setup of New Engine Room Laptop	100.00%
Inventory Jumpers	0.00%	Re-Organizing of Port Lab and Jumper	100.00%
Gun Rebuilds	100.00%	Re-Term Maggie Tow Leaders	100.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	100.00%
Install of Shelves (Half High)	75.00%	Testing of All Science Equipment	50.00%
Unblock Maintenance	90.00%	Test/Repairs to HSN System	100.00%
Repair Gun Tools	60.00%	Cleaning and Securing Lab Spaces	75.00%
Setup of New Engine Room PC	100.00%	E-Power to Server and Switch Rack in	100.00%
Setup of New Chief Eng. PC	100.00%		

**Time Analysis**

**Time Breakdown:**

MCS Production: 0.000 Sail km

Production 0:00

Infill: 0.000 Sail km

Line Change 0:00

Reshoot: 0.000 Sail km

Weather Downtime 0:00

Total: 0.000 Sail km

Technical Downtime 0:00

Weather Downtime 0:00

External Downtime 0:00

Source 0:00

Streamer 0:00

Air Compressor 0:00

Other

OBS Rosette Drop Test 0:00

OBS Deployment 0:00

OBS Recovery 0:00

CTD Cast 0:00

Gravity Core 0:00

Piston Core 0:00

Multi Core 0:00

Sonar Survey 0:00

Port Call 0:00

Transit 0:00

**Technical Downtime:**

Instrument Acquisition 0:00

Instrument Navigation 0:00

Hydraulics 0:00

Ship Repair 0:00

Other

OBS Deployment 0:00

OBS Recovery 0:00

CTD Cast 0:00

Gravity Core 0:00

Piston Core 0:00

Multi Core 0:00

Sonar Survey 0:00

**External Downtime:**

Mitigation / PAM 0:00

Maneuvering 0:00

Fishing Gear 0:00

Weather 0:00

Other

OBS Deployment 0:00

OBS Recovery 0:00

CTD Cast 0:00

Gravity Core 0:00

Piston Core 0:00

Multi Core 0:00

Sonar Survey 0:00

**Total: 0:00**

**Total: 0:00**

**Total: 0:00**



**Midnight Position / Info**

deg min

Lat: 42° 01.3.830 N  
Lon: 08° 04.4.240 W

Speed over Ground: In Port

Heading: In Port

Water Depth: In Port

Wind: In Port Seas: In Port

**Current Equipment Deployed**  
None - Along Side Vigo, Spain

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Klayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Change Section Str 1	100.00%	Lead-in Status update	0.00%
Transfer 6k of Rope to Spider R	100.00%	MARS Testing	0.00%
RTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720's)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EMI 22	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	85.00%
Clean power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Hose Bundle Status Update	75.00%	Spec'ing out New Source Tow point	0.00%

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects.

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	100.00%
Reload of all Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	20.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	15.00%	Setup of New Engine Room Laptop	100.00%
Inventory Jumpers	0.00%	Re-Organizing of Port Lab and Jumper	100.00%
Gun Repulids	100.00%	Re-Term Maggie Tow Leaders	100.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	100.00%
Install of Shelves (Half High)	75.00%	Testing of All Science Equipment	50.00%
Unblock Maintenance	90.00%	Test/Repairs to HSN System	100.00%
Repair Gun Tools	60.00%	Cleaning and Securing Lab Spaces	75.00%
Setup of New Engine Room PC	100.00%	E-Power to Server and Switch Rack in	100.00%
Setup of New Chief Eng. PC	100.00%	Update Sensor Inventory	0.00%

**Science Party:**  
Brian Jordan (Rice)  
Khemraj Shukla (Oklahoma State Univ.)  
James Glikson (Lamont)  
Jiao Pedro Tauschek Zeliniski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acarido (Lamont)  
Gayle Bayraktar (Southampton, new post-doc moving from Firenze)  
Milena Marjionovic (Lamont graduate)

**PSOs:**  
Heidi Ingram  
Meghan Henry  
Dara Cameron

**Time Analysis**

**MCS Production:**

Prime: 0.000 Sail km

Infill: 0.000 Sail km

Reshoot: 0.000 Sail km

Total: 0.000 Sail km

**Time Breakdown:**

Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Port Call 0:00  
Transit 0:00  
**Total: 0:00**

**Total: 0:00**



**Midnight Position / Info**

deg min

Lat: 42° 01.3.830 N  
Lon: 08° 04.4.240 W

Speed over Ground: In Port

Heading: In Port

Water Depth: In Port

Wind: In Port Seas: In Port

**Current Equipment Deployed**  
None - Along Side Vigo, Spain

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern McKernan  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Change Section Str 1	100.00%	Lead-in Status update	0.00%
Transfer 6k of Rope to Spider R	100.00%	MARS Testing	0.00%
RTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720 s)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EMI 22	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	90.00%
Clean power-re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Hose Bundle Status Update	75.00%	Spec'ing out New Source Tow point	0.00%

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects.

Work List	% Complete	Work List	% Complete
Clean Wax Core Head	100.00%	Setup of New Captain's PC	100.00%
Reload of all Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	20.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	15.00%	Setup of New Engine Room Laptop	100.00%
Inventory Jumpers	50.00%	Re-Organizing of Port Lab and Jumper	100.00%
Gun Repulids	100.00%	Re-Term Maggie Tow Leaders	100.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	100.00%
Install of Shelves (Half High)	100.00%	Testing of All Science Equipment	50.00%
Unblock Maintenance	90.00%	Test/Repairs to HSN System	100.00%
Repair Gun Tools	60.00%	Cleaning and Securing Lab Spaces	80.00%
Setup of New Engine Room PC	100.00%	E-Power to Server and Switch Rack in	100.00%
Setup of New Chief Eng. PC	100.00%	Update Sensor Inventory	100.00%

**Science Party:**  
Brian Jordan (Rice)  
Khemraj Shukla (Oklahoma State Univ.)  
James Glikson (Lamont)  
Jiao Pedro Tauschek Zeliniski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acarado (Lamont)  
Gayle Bayraktar (Southampton, new post-doc moving from (Fremet))  
Milena Marjnovic (Lamont graduate)

**PSOs:**  
Heidi Ingram  
Meghan Perry  
Dara Cameron

**Time Analysis**

**MCS Production:**

0.000 Sail km  
Prime: 0.000 Sail km

Infill: 0.000 Sail km

Reshoot: 0.000 Sail km

Total: 0.000 Sail km

**Time Breakdown:**

Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Port Call 0:00  
Transit 0:00  
**Total: 0:00**

**Total: 0:00**



**Midnight Position / Info**

deg min

Lat: 42° 01.3.830 N  
Lon: 08° 04.4.240 W

Speed over Ground: In Port  
Heading: In Port

Current Equipment Deployed  
None - Along Side Vigo, Spain

Wind: In Port Seas: In Port

Water Depth: In Port

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Change Section Str 1	100.00%	Lead-in Status update	0.00%
Transfer 6k of Rope to Spider R	100.00%	MARS Testing	0.00%
RTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720 s)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EM122	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	90.00%
Clean power-re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Hose Bundle Status Update	75.00%	Spec'ing out New Source Tow point	0.00%

**Plan for Tomorrow**

Throughout the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. Continue to work on Work List Projects.

Work List	% Complete	Work List	% Complete
Repair Sys 3 Hyd Port Side	0.00%	Setup of New Captain's PC	100.00%
Reload of all Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	20.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	100.00%	Setup of New Engine Room Laptop	100.00%
Inventory Jumpers	100.00%	Re-Organizing of Port Lab and Jumps	100.00%
Gun Repulids	100.00%	Re-Term Maggie Tow Leaders	100.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	100.00%
Install of Shelves (Half High)	100.00%	Testing of All Science Equipment	50.00%
Unblock Maintenance	90.00%	Test/Repairs to HSN System	100.00%
Repair Gun Tools	60.00%	Cleaning and Securing Lab Spaces	80.00%
Setup of New Engine Room PC	100.00%	E-Power to Server and Switch Rack in	100.00%
Setup of New Chief Eng. PC	100.00%	Update Sensor Inventory	100.00%

- Technical Staff Onboard:**  
 Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern McKernan  
 Acq. Technician - Klayton Curtis  
 Marine Tech - Robert (Bobby) Koprowski  
 Navigation - Mike Marellio  
 Navigation - Matt Grey  
 NavProc - Alan Thompson  
 Sr. Gun Mechanic - Tom Spoto  
 Gun Mechanic - Robbie Gunn  
 Gun Mechanic - Carlos Gutierrez  
 Gun Mechanic - Mike Tatro
- Chief Scientist : Dale Sawyer (RICE)**  
 Co-Chief Scientist - Tim Keaton (Southampton)  
 Co-Chief Scientist -  
 Co-Chief Scientist -
- Science Party:**  
 Brian Jordan (Rice)  
 Khennai Shukla (Oklahoma State Univ.)  
 James Glikson (Lamont)  
 Jiao Pedro Tauschek Zielinski (Universidad Complutense de Madrid)  
 Sarah Dean (Rice)  
 Tessa Gregory (Southampton)  
 Katherine Coates (Southampton)  
 Natalie Acardo (Lamont)  
 Gaye Bayraktal (Southampton, new post-doc moving from Firenze)  
 Milena Marjnovic (Lamont graduate)
- PSOs:**  
 Heidi Ingram  
 Meghan Perry  
 Dara Cameron

**Time Analysis**

MCS Production: 0.000 Sail km

Time Breakdown: Production 0:00  
Line Change 0:00

Technical Downtime: Instrument Acquisition 0:00  
Instrument Navigation 0:00

External Downtime: Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

Infill: 0.000 Sail km

Reshoot: 0.000 Sail km

Total: 0.000 Sail km

- Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other  
Port Call 0:00  
Transit 0:00  
**Total: 0:00**

- Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other  
Port Call 0:00  
Transit 0:00  
**Total: 0:00**



Cruise: **MGL1307**

Date: **13/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min

Lat: 42° 01.3.830 N

Speed over Ground: In Port  
Heading: In Port

Current Equipment Deployed  
None - Along Side Vigo, Spain

Technical Staff Onboard:  
Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern McKernan  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson

Lon: 08° 04.4.240 W

Water Depth: In Port

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Change Section Str 1	100.00%	Lead-in Status update	0.00%
Transfer 6k of Rope to Spider R	100.00%	MARS Testing	0.00%
RTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720 s)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EMI 22	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	90.00%
Clean power re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting ROPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Host Bundle Status Update	75.00%	Spec'ing out New Source Tow point	0.00%

**Plan for Tomorrow**

At the beginning of the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. At ~09:00 GMT it is expected the repairs will be complete and the vessel to get underway for the mission. At ~19:00 GMT Deployment of the towed Streamer Gear will start and should continue throughout the day.

Work List	% Complete	Work List	% Complete
Repair Sys 3 Hyd Port Side	0.00%	Setup of New Captain's PC	100.00%
Relead of all Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	20.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	100.00%	Setup of New Engine Room Laptop	100.00%
Inventory Jumpers	100.00%	Re-Organizing of Port Lab and Jumper	100.00%
Gun Rebuilds	100.00%	Re-Term Maggie Tow Leaders	100.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	100.00%
Install of Shelves (Half High)	100.00%	Testing of All Science Equipment	50.00%
Unblock Maintenance	90.00%	Test/Repairs to HSN System	100.00%
Repair Gun Tools	60.00%	Cleaning and Securing Lab Spaces	80.00%
Setup of New Engine Room PC	100.00%	E-Power to Server and Switch Rack in	100.00%
Setup of New Chief Eng. PC	100.00%	Update Sensor Inventory	100.00%

**Science Party:**  
Brian Jordan (RICE)  
Khemraj Shukla (Oklahoma State Univ.)  
James Glikson (Lamont)  
Jiao Pedro Tauschek Zeliniski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayraktar (Southampton, new post-doc moving from Ifremer)  
Milena Marjnovic (Lamont graduate)

**PSOs:**  
Heidi Ingram  
Meghan Perry  
Dara Cameron

**MCS Production:**  
Prime: 0.000 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 0.000 Sail km

**Time Breakdown:**  
Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Technical Downtime:**  
Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**External Downtime:**  
Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

**Total: 0:00**

**MCS Production:**  
Prime: 0.000 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 0.000 Sail km

**Time Breakdown:**  
Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Technical Downtime:**  
Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**External Downtime:**  
Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

**Total: 0:00**

**MCS Production:**  
Prime: 0.000 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 0.000 Sail km

**Time Breakdown:**  
Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Technical Downtime:**  
Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**External Downtime:**  
Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

**Total: 0:00**



**Midnight Position / Info**

deg min      **Speed over Ground:** In Port  
 Lat: 42° 01.3.830      N      Heading: In Port  
 Lon: 08° 04.4.240      W      Water Depth: In Port

**Current Equipment Deployed**  
 None - Along Side Vigo, Spain

**Technical Staff Onboard:**

- Ch. Science Officer - Robert Steinhaus
- Science Officer - Jay Johnstone
- Acq. Technician - Bern McKernan
- Acq. Technician - Clayton Curtis
- Marine Tech - Robert (Bobby) Koprowski
- Navigation - Mike Marellio
- Navigation - Matt Grey
- NavProc - Alan Thompson

**Daily Summary**

The Vessel is alongside Vigo, Spain for repairs on Port Main Engine throughout the day. Continue to work on Projects from the Work List.

Work List	% Complete	Work List	% Complete
Change Section Str 1	100.00%	Lead-in Status update	0.00%
Transfer 6k of Rope to Spider R	100.00%	MARS Testing	0.00%
RTNU Repairs / Testing	100.00%	MSTP Testing	100.00%
Config New Spectra (720 s)	100.00%	CTV Repairs	100.00%
Bridge Spectra Display	100.00%	Diver Ops to Clean EMI 22	100.00%
Ships Spectra Display	100.00%	Prepare equipment to be shipped	90.00%
Clean Power-re-distribution	100.00%	Repair Streamer 2 Tailbuoy CMX	100.00%
Cleaning of A-Deck Lab	100.00%	Bird Repairs/Service	100.00%
Cleaning of Bird Lab	100.00%	CMX Repairs/Service	100.00%
Test of Gun String CTV's	100.00%	Trouble Shooting RGPS TB Pods Cross	100.00%
Inventory of Streamer Modules	100.00%	Spec'ing out New Lead-in Tow points	100.00%
Hose Bundle Status Update	75.00%	Spec'ing out New Source Tow point	0.00%

**Plan for Tomorrow**

At the beginning of the day the vessel will be alongside Vigo, Spain to make Repairs to Port Main Engine. At ~09:00 GMT it is expected the repairs will be complete and the vessel to get underway for the mission. At ~19:00 GMT Deployment of the towed Streamer Gear will start and should continue throughout the day.

Work List	% Complete	Work List	% Complete
Repair Sys 3 Hyd Port Side	100.00%	Setup of New Captain's PC	100.00%
Relead of all Science Equip	100.00%	Setup of New Chief Mate Laptop	100.00%
Machine Shop Floor Painting	20.00%	Setup of New 1st Eng. Laptop	100.00%
Inventory Bolt Part	100.00%	Setup of New Engine Room Laptop	100.00%
Inventory Jumpers	100.00%	Re-Organizing of Port Lab and Jumpers	100.00%
Gun Rebuilds	100.00%	Re-Term Maggie Tow Leaders	100.00%
Trouble Shooting String 2 Comm	100.00%	Label Monitors to what Rack they be	100.00%
Install of Shelves (Half High)	100.00%	Testing of All Science Equipment	50.00%
Unblock Maintenance	90.00%	Test/Repairs to HSN System	100.00%
Repair Gun Tools	60.00%	Cleaning and Securing Lab Spaces	80.00%
Setup of New Engine Room PC	100.00%	E-Power to Server and Switch Rack in	100.00%
Setup of New Chief Eng. PC	100.00%	Update Sensor Inventory	100.00%

- Science Party:**  
 Brian Jordan (Rice)  
 Khemraj Shukla (Oklahoma State Univ.)  
 James Glikson (Lamont)  
 Jiao Pedro Tauschek Zeliniski (Universidad Complutense de Madrid)  
 Sarah Dean (Rice)  
 Tessa Gregory (Southampton)  
 Katherine Coates (Southampton)  
 Natalie Acardo (Lamont)  
 Gayle Bayraktar (Southampton, new post-doc moving from Ifremer)  
 Milena Marjnovic (Lamont graduate)
- PSOs:**  
 Heidi Ingram  
 Meghan Perry  
 Dara Cameron  
 Rebecca Garza  
 Vanessa Brunet Coiras

**MCS Production:**  
 Prime: 0.000 Sail km  
 Infill: 0.000 Sail km  
 Reshoot: 0.000 Sail km  
 Total: 0.000 Sail km

**Time Breakdown:**  
 Production 0:00  
 Line Change 0:00  
 Weather Downtime 0:00  
 Technical Downtime 0:00  
 External Downtime 0:00

**Technical Downtime:**  
 Instrument Acquisition 0:00  
 Instrument Navigation 0:00  
 Hydraulics 0:00  
 Source 0:00  
 Streamer 0:00  
 Air Compressor 0:00  
 Other  
 Ship Repair 0:00

**External Downtime:**  
 Mitigation / PAM 0:00  
 Maneuvering 0:00  
 Fishing Gear 0:00  
 Weather 0:00

**Total: 0:00**

**Time Breakdown:**  
 Production 0:00  
 Line Change 0:00  
 Weather Downtime 0:00  
 Technical Downtime 0:00  
 External Downtime 0:00

**Technical Downtime:**  
 Instrument Acquisition 0:00  
 Instrument Navigation 0:00  
 Hydraulics 0:00  
 Source 0:00  
 Streamer 0:00  
 Air Compressor 0:00  
 Other  
 Ship Repair 0:00

**External Downtime:**  
 Mitigation / PAM 0:00  
 Maneuvering 0:00  
 Fishing Gear 0:00  
 Weather 0:00

**Total: 0:00**

**MCS Production:**  
 Prime: 0.000 Sail km  
 Infill: 0.000 Sail km  
 Reshoot: 0.000 Sail km  
 Total: 0.000 Sail km

**Time Breakdown:**  
 Production 0:00  
 Line Change 0:00  
 Weather Downtime 0:00  
 Technical Downtime 0:00  
 External Downtime 0:00

**Technical Downtime:**  
 Instrument Acquisition 0:00  
 Instrument Navigation 0:00  
 Hydraulics 0:00  
 Source 0:00  
 Streamer 0:00  
 Air Compressor 0:00  
 Other  
 Ship Repair 0:00

**External Downtime:**  
 Mitigation / PAM 0:00  
 Maneuvering 0:00  
 Fishing Gear 0:00  
 Weather 0:00

**Total: 0:00**



Cruise: MGL1307

Date: 15/Jul/13

Reporter: RJS

Daily Report

Midnight Position / Info

deg min

Lat: 42° 01.3 829 N

Speed over Ground: 04.00kt

Heading: 268 Deg

Lon: 08° 04.4 224 W

Water Depth: 3200.0

Wind: NW 5 Kts

Seas: 0-1m

Current Equipment Deployed

Streamers 4 and 3/4 of Streamer 1

Technical Staff Onboard:

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mckkeman  
Acq. Technician - Klayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson

Sr. Gun Mechanic - Tom Spoto

Gun Mechanic - Weston Groves

Gun Mechanic - Carlos Gutierrez

Gun Mechanic - Mike Tatro

Chief Scientist : Dale Sawyer (RICE)

Co-Chief Scientist - Tim Keaton (Southampton)

Co-Chief Scientist -

Co-Chief Scientist -

Science Party:

Brian Jordan (Rice)

Khemraj Shukla (Oklahoma State Univ.)

James Glikson (Lamont)

Jiao Pedro Tauschek Zielinski (Universidad Complutense de Madrid)

Sarah Dean (Rice)

Tessa Gregory (Southampton)

Katherine Coates (Southampton)

Natalie Acardo (Lamont)

Gaye Bayraktar (Southampton, new post-doc, moving from Firenze)

Milena Marjonovic (Lamont graduate)

PSOs:

Heddi Ingram

Meghan Henry

Dara Cameron

Rebecka Galiza

Vanessa Brunet Corras

Daily Summary

The Vessels started the day alongside Vigo, Spain for repairs on Port Main Engine. At 05:06 GMT got underway for the Restart of MGL1307. At 15:44 GMT the vessel slow to 3.5 Kts to begin the Deployment of Streamer 4. At 22:53 GMT Streamer 4 was deployed out on the Port Barovane and the deployment of Streamer 1 began. Streamer 1's deployment continued throughout the day.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

Plan for Tomorrow

At the beginning of the day the vessel was continuing to Deploy Streamer 1. After Streamer 1 is deployed out on the Barovane, the deployment of Streamer 2 will begin. Once that is complete Streamer 3 deployment will take place, followed by the Energy Sources.

Work List	% Complete	Work List	% Complete

MCS Production:

Prime: 0.000 Sail km

Infill: 0.000 Sail km

Reshoot: 0.000 Sail km

Total: 0.000 Sail km

Time Breakdown:

Production 0:00

Line Change 0:00

Weather Downtime 0:00

Technical Downtime 24:00

External Downtime 0:00

OBS Rosette Drop Test 0:00

OBS Deployment 0:00

OBS Recovery 0:00

CTD Cast 0:00

Gravity Core 0:00

Piston Core 0:00

Multi Core 0:00

Sonar Survey 0:00

OBS Deployment 0:00

OBS Recovery 0:00

CTD Cast 0:00

Gravity Core 0:00

Piston Core 0:00

Multi Core 0:00

Sonar Survey 0:00

OBS Deployment 0:00

OBS Recovery 0:00

CTD Cast 0:00

Gravity Core 0:00

Piston Core 0:00

Multi Core 0:00

Technical Downtime:

Instrument Acquisition 0:00

Instrument Navigation 0:00

Hydraulics 0:00

Source 0:00

Streamer 0:00

Air Compressor 0:00

Ship Repair 24:00

Other

Streamers 4 and 3/4 of Streamer 1

Other

External Downtime:

Mitigation / PAM 0:00

Maneuvering 0:00

Fishing Gear 0:00

Weather 0:00

Other

Streamers 4 and 3/4 of Streamer 1

Total: 24:00

Total: 0:00



**Cruise:** MGL1307

**Date:** 16/Jul/13

**Reporter:** RJS

**Daily Report**

**Midnight Position / Info**

deg min  
**Lat:** 42° 06 01.5 N  
**Lon:** 13° 11 14.8 W  
**Wind:** NE 10-15  
**Seas:** 1-2m

**Speed over Ground:** 04.60kt

**Heading:** 87°

**Water Depth:** 5335.3

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
 Source Sub-Arrays - 1, 2, 3, & 4  
 PAM  
 MargRe

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
 Science Officer - Jay Johnstone  
 Acq. Technician - Bern McKernan  
 Acq. Technician - Klayton Curtis  
 Marine Tech - Robert (Bobby) Koprowski  
 Navigation - Mike Marellio  
 Navigation - Matt Grey  
 NavProc - Alan Thompson

**Daily Summary**

The Vessels started the day deploying Streamer. At 18:53 GMT all Streamers were in place and vessel began a turn back towards the mission area. Deploying the Source along the way. At 20:11 GMT the vessel started production on Line 1220, but due to Nav issues with location relative to the mission area the line was aborted and a Transit line was started. At 20:35 GMT the Transit line was started and continued through the rest of the day.

Work List	% Complete	Work List	% Complete
Lead-in Status update	0.00%		
MARS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Spac	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day production will continue on MGL1307T1. At ~01:00 GMT this line will be ended and production will begin on Line 1220A. Throughout the rest of the day production will take place on Line Arc08 and 1324.

Work List	% Complete	Work List	% Complete

**MCS Production:**

**Prime:** 27713 Sail km  
**Infill:** 0.000 Sail km  
**Reshoot:** 0.000 Sail km  
**Total:** 27713 Sail km

**Time Breakdown:**

Production 3:42  
 Line Change 0:07  
 Weather Downtime 0:00  
 Technical Downtime 20:11  
 External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
 Instrument Navigation 0:00  
 Hydraulics 0:00  
 Source 0:00  
 Streamer 0:00  
 Air Compressor 0:00  
 Ship Repair 20:11  
 Other

**External Downtime:**

Mitigation / PAM 0:00  
 Maneuvering 0:00  
 Fishing Gear 0:00  
 Weather 0:00

**Total: 24:00**

**Total: 20:11**

**Total: 0:00**

**PSOs:**  
 Heidi Ingram  
 Meghan Henry  
 Dara Cameron  
 Rebekka Galiza  
 Vanesa Brunet Corras



Cruise: **MGL1307**

Date: **17/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 06 39.168 N  
Lon: 12° 47 07.1 W  
Wind: NE 10-15 Seas: 1-2m

Speed over Ground: 04.40Kt

Heading: 87°

Water Depth: 5302.3

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern McKernan  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson

**Daily Summary**

The day started in production on Line MGL1307T1, which ended at 01:12. After a short line change line 1220A was started and through out the rest of the production was completed on Line 1220A, ACR8, 1234, ACR9. At 21:56 GMT Production was started on line 1228 which continued throughout the rest of the day. \*\*\*NOTE - Throughout the Day there was intermittent Telemetry Error on Streamer 3 which caused data to be lost. Also during line 1324 the Maggie stopped working and was recovered onboard for trouble shooting, where it still currently remains.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Spac	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day production will continue on line 1228. It is hoped that through out the day production will take place on 1228, ACR10, 1332, ACR11, & 1226.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CN3050	Operational
Syntac	Operational	EM122	Operational
Dig/course	Operational	Krindsen SBP	Non-Operational
Dig/SHOT	Operational	BGM-3 Grammeter	Operational
Sea Path	Operational	882 Magnetometer	Non-Operational
Pos/W	Operational	TS6	Operational
Pos/W	Operational	P-CO2	Operational
Pos/W	Operational	HSN	Operational
Ses/WET 1	Operational	FBB	Operational
Ses/WET 2	Operational	Micosv (USS WET LAB)	Operational
PROC 1	Operational	WETA (Weather)	Operational
PROC 2	Operational		
CN2000	Operational		

**Science Party:**  
Brian Jordan (Rice)  
Khennel Shukla (Oklahoma State Univ.)  
James Glikson (Lamont)  
Jiao Pedro Tauschek Zeliniski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayraktar (Southampton, new post-doc moving from (fremet)  
Milena Marjnovic (Lamont graduate)

**PSOs:**  
Hedil Ingram  
Meghan Henry  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Coiras

**MCS Production:**

Prime: 193.125 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 193.125 Sail km

**Time Breakdown:**

Production 23:10  
Line Change 0:50  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

**Total: 24:00**

**Total: 0:00**

**Total: 0:00**



Cruise: **MGL1307**

Date: **17/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 06 39.168 N  
Lon: 12° 47 07.1 W  
Wind: NE 10-15 Seas: 1-2m

Speed over Ground: 04.40Kt

Heading: 87°

Water Depth: 5302.3

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern McKernan  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson

**Daily Summary**

The day started in production on Line MGL1307T1, which ended at 01:12. After a short line change line 1220A was started and throughout the rest of the production was completed on Line 1220A, ACR8, 1234, ACR9. At 21:56 GMT Production was started on line 1228 which continued throughout the rest of the day. \*\*\*NOTE - Throughout the Day there was intermittent Telemetry Error on Streamer 3 which caused data to be lost. Also during line 1324 the Maggie stopped working and was recovered onboard for trouble shooting, where it still currently remains.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day production will continue on line 1228. It is hoped that through out the day production will take place on 1228, ACR10, 1332, ACR11, & 1226.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CN3050	Operational
Syntac	Operational	EM122	Operational
Dig/course	Operational	Krindsen SBP	Non-Operational
Dig/SHOT	Operational	BGM-3 Grammeter	Operational
Sea Path	Operational	882 Magnetometer	Non-Operational
Pos/W	Operational	TS6	Operational
Pos/W	Operational	P-CO2	Non-Operational
Pos/W	Operational	HSN	Operational
Ses/WET 1	Operational	FBB	Operational
Ses/WET 2	Operational	Micosv (USS WET LAB)	Operational
PROC 1	Operational	WETA (Weather)	Operational
PROC 2	Operational		
CN2000	Operational		

**Science Party:**  
Brian Jordan (Rice)  
Khennel Shukla (Oklahoma State Univ.)  
James Glikson (Lamont)  
Jiao Pedro Tauschek Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayraktar (Southampton, new post-doc moving from Ifremer)  
Milena Marjnovic (Lamont graduate)

**PSOs:**  
Hedil Ingram  
Meghan Henry  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Coiras

**MCS Production:**

Prime: 193.125 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 193.125 Sail km

**Time Breakdown:**

Production 23:10  
Line Change 0:50  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

**Total: 24:00**

**Total: 0:00**

**Total: 0:00**



Cruise: **MGL1307**

Date: **18/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 07' 58" N  
Lon: 12° 01' 25" 05.55" W  
Wind: N 10 -15 Seas: 1-2m

Speed over Ground: 04.10kt

Heading: 87°

Water Depth: 5019.6

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern McKernan  
Acq. Technician - Klayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Chief Scientist : Dale Sawyer (RCE)**

Co-Chief Scientist - Tim Keaton (Southampton)  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**

Brian Jordan (Rice)  
Khennel Shukla (Oklahoma State Univ.)  
James Glikson (Lamont)

Jiao Pedro Tauschek Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayraktar (Southampton, new post-doc moving from Ifremer)  
Milena Marjnovic (Lamont graduate)

**PSOs:**

Heddi Ingram  
Meghan Henry  
Dara Cameron  
Rebecka Galiza  
Vanessa Brunet Corras

**Daily Summary**

The day started in production on Line 1228. Throughout the day production was completed on Lines 1228, ARCI0, 1307, ARCI1, and at end of day production was underway on Line 1236. \*\*\* NOTE \*\*\* Streamer 3 continued to have intermittent Telemetry issues throughout the day.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day production will continue on line 1236. It is hoped that through out the day production will take place on ARCI1, 1307, ARC 12, 1244, & ARCI3.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CN3050	Operational
Syntak	Operational	EM122	Operational
DigCourse	Operational	Krindsen SBP	Non-Operational
DigiSHOT	Operational	BGM-3 Gravimeter	Operational
Sea Path	Operational	882 Magnetometer	Operational
PosNW	Operational	TS6	Operational
PosNet	Operational	P-CO2	Operational
SesNET 1	Operational	HSN	Non-Operational
SesNET 2	Operational	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Operational
PROC 2	Operational	META (Weather)	Operational
CN2000	Operational		

**Time Breakdown:**

MCS Production: 190.913 Sail km  
Prime: 190.913 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 190.913 Sail km

Production 23:26  
Line Change 0:34  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

Production 23:26  
Line Change 0:34  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

Total: 24:00

Total: 0:00

Total: 0:00



**Cruise: MGL1307**

**Date: 19/Jul/13**

**Reporter: RJS**

**Daily Report**

**Midnight Position / Info**

deg min  
Lat: 42° 08.50.49 N  
Lon: 12° 04.32.185 W  
Wind: NNE 5-10 Seas: 0-1m

Speed over Ground: 05.10kt

Heading: 00°

Water Depth: 3964.4

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Klayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson

**Daily Summary**

The day started in production on Line 1236. Throughout the day production was completed on Lines ARCI2, 1307, ARC 13, & 1244, and at end of day production was underway on Line ARCI4. \*\*\* NOTE \*\*\* Streamer 3 continued to have intermittent Telemetry issues throughout the day.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day production will continue on line ARCI4. It is hoped that through out the day production will take place on 1348, ARCI5, 1252, ARCI6, & 1356.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CN3050	Operational
Syntac	Operational	EM112	Operational
Digicourse	Operational	Krindsen SBP	Non-Operational
DigsHOT	Operational	BGM-3 Grammeter	Operational
Sea Path	Operational	882 Magnetometer	Operational
PosNW	Operational	TS6	Operational
PosNet	Operational	P-CO2	Operational
SesNET 1	Operational	HSN	Non-Operational
SesNET 2	Operational	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Operational
PROC 2	Operational	META (Weather)	Operational
CN2000	Operational		

**Science Party:**  
Brian Jordan (Rice)  
Khennel Shukla (Oklahoma State Univ.)  
James Glikson (Lamont)  
Jiao Pedro Tauschek Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayraktar (Southampton, new post-doc moving from Ifremer)  
Milena Marjnovic (Lamont graduate)

**PSOs:**  
Hedli Ingram  
Meghan Henry  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Coiras

**MCS Production:** 189,750 Sail km  
Prime: 0.000 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 189,750 Sail km

**Time Breakdown:**  
Production 23:13  
Line Change 0:47  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**External Downtime:**  
Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

**Technical Downtime:**  
Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**Total: 0:00**

**External Downtime:**  
Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00

**Total: 0:00**

**Total: 24:00**



**Midnight Position / Info**

deg min  
Lat: 42° 10.08.019 N  
Lon: 12° 33.21.506 W  
Wind: WNW 5-10 Seas: 0-1m

Speed over Ground: 04.60Kt  
Heading: 268°

Water Depth: 4902.2

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Chief Scientist : Dale Sawyer (RCE)**

Co-Chief Scientist - Milena Maronovic (lamont graduate)  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**

Brian Jordan (rice)  
Khennel Shukla (Oklahoma State Univ.)  
James Glikson (Lamont)

Jiao Pedro Tauschek Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gaye Bayraktar (Southampton, new post-doc moving from Firenze)

**PSOs:**

Heddi Ingram  
Meghan Perry  
Dara Cameron  
Rebecka Galiza  
Vanessa Brunet Coiras

**Daily Summary**

The day started in production on Line ARCL14. Throughout the day production was completed on Lines 1348, ARCL15, 1252, & ARCL6 and at end of day production was underway on Line 1356. During Line ARCL6 Sub-Array 2 was recovered for maintenance.  
\*\*\* NOTE \*\*\* Streamer 3 continued to have intermittent Telemetry issues throughout the day.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day production will continue on line 1356. It is hoped that through out the day production will take place on ARCL17, 1260, ARCL8, and 1364.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CN3050	Operational
Syntek	Operational	EM122	Operational
Dig/course	Operational	Krindsen SBP	Non-Operational
Dig/SHOT	Operational	BGM-3 Gravimeter	Operational
Sea Path	Operational	882 Magnetometer	Operational
Pos/W	Operational	TS6	Operational
Pos/W	Operational	P-CO2	Operational
Pos/W	Operational	HSN	Non-Operational
SesNET 1	Operational	FBB	Operational
SesNET 2	Operational	Micosv (USS WET LAB)	Operational
PROC 1	Operational	META (Weather)	Operational
PROC 2	Operational		
CN2000	Operational		

**MCS Production:**

Prime: 200.288 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 200.288 Sail km

**Time Breakdown:**

Production 23:21  
Line Change 0:39  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Total: 0:00  
Port Call 0:00  
Transit 0:00  
Total: 24:00



Cruise: **MGL1307**

Date: **21/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 09.56.711 N  
Lon: 12° 58.52.454 W  
Wind: SSW 5 Seas: 0-1m

Speed over Ground: 05.00kt

Heading: 268°

Water Depth: 5323.1

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Daily Summary**

The day started in production on Line 1356. Throughout the day production was completed on Lines ARC17, 1260, & ARC18 and at end of day production was underway on Line 1364. During Line ARC18 Sub-Array 1 was recovered for maintenance.  
\*\*\* NOTE \*\*\* Streamer 3 continued to have intermittent Telemetry issues throughout the day.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day production will continue on line 1364. It is hoped that through out the day production will take place on ARC19, 1268, 1316, and 1316I.  
\*\*\*NOTE\*\*\* Due to continued Telemetry issues with streamer 3, the shooting plan will be adjusted to account for missing data.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CN3050	Operational
Syntax	Operational	EM122	Operational
Digicourse	Operational	Krindsen SBP	Non-Operational
DigiSHOT	Operational	BGM-3 Gravimeter	Operational
Sea Path	Operational	882 Magnetometer	Operational
PosNW	Operational	TS6	Operational
PosNet	Operational	P-CO2	Non-Operational
SesNET 1	Operational	HSN	Operational
SesNET 2	Operational	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Operational
PROC 2	Operational	META (Weather)	Operational
CN2000	Operational		

**Science Party:**  
Kinemal Shukla (Oklahoma State Univ.)  
James Gibson (Lamont)  
Jiao Pedro Tauschbeck Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayrakli (Southampton, new post-doc, moving from Ifremer)

**PSOs:**  
Heddi Ingram  
Meghan Henry  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Coiras

**MCS Production:**

Prime: 206.509 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 206.509 Sail km

**Time Breakdown:**

Production 23:32  
Line Change 0:28  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00  
Port Call 0:00  
Transit 0:00  
**Total: 24:00**

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
**Total: 0:00**

Time Breakdown

Time	Amount of Time	Event	PRIME			INFILL			RESHOOT			
			FSP	LSP	Total SP	FSP	LSP	Total	FSP	LSP	Total	
0:00	4:17	4:17	5866	4871	995	37,313						
4:17	4:23	0:06										
		Line Change										
4:23	5:08	0:45	5001	5046	45	6,667						
		Line Change										
5:08	5:16	0:08										
		Line Change										
5:16	13:33	8:17	4872	6802	1930	72,375						
		Line Change										
13:33	13:39	0:06	5001	5239	238	17,779						
		Line Change										
13:39	15:38	1:59										
		Line Change										
15:38	15:46	0:08										
		Line Change										
15:46	0:00	8:14	6860	4930	1930	72,375						
		Line Change										
0:00	0:00	#####										
		#####										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										
		0:00										
0:00	0:00	0:00										

Cruise: **MGL1307**

Date: **22/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 07' 46.938 N  
Lon: 12° 49' 49.181 W  
Wind: SSW 5-10 Seas: 0-1m

Speed over Ground: 04.70kt

Heading: 87°

Water Depth: 5331.4

**Current Equipment Deployed**

Steamer 1, 2, 3, 8, 4  
Source Sub-Arrays - 1, 2, 3, 8, 4  
PAM

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Daily Summary**

The day started in production on Line 1364. Throughout the day production was completed on Lines ARC19, 1268, 1316 and at end of day production was underway on Line 1276.  
\*\*\* NOTE \*\*\* At the end of line 1268 some more trouble shooting of Streamer 3 Telemetry issue was done and the problem has been correct. However during line 1268 Streamer 1 developed Telemetry issues and then failed at module 10. It currently only has 4350m (348 Ch) active.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day production will continue on line 1268. It is hoped that through out the day production will take place on ARC20, 1364i, ARC21, and 1284.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CN3050	Operational
Syntax	Operational	EM122	Operational
Dig/course	Operational	Krindsen SBP	Operational
Dig/SHOT	Operational	BGM-3 Grammeter	Operational
Sea Path	Operational	882 Magnetometer	Operational
Pos/W	Operational	TS6	Operational
PosNet	Operational	P-CO2	Operational
SesNET 1	Operational	HSN	Non-Operational
SesNET 2	Operational	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Operational
PROC 2	Operational	META (Weather)	Operational
CN2000	Operational		

**Science Party:**  
Kimeria Shukla (Oklahoma State Univ.)  
James Gibson (Lamont)  
Jiao Pedro Tauschick Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gaye Bayrakci (Southampton, new post-doc, moving from Ifremer)

**PSOs:**  
Heidi Ingram  
Meghan Henry  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Coiras

**MCS Production:**

Prime: 172.350 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 172.350 Sail km

**Time Breakdown:**

Production 19:34  
Line Change 3:10  
Weather Downtime 0:00  
Technical Downtime 1:16  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 1:16  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Total: 1:16

Total: 24:00



Cruise: **MGL1307**

Date: **23/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 08.24.36 N  
Lon: 12° 08.20.949 W  
Wind: SW-10-15 Seas: 1-2m

Speed over Ground: 04.50Kt

Heading: 87°

Water Depth: 4855.4

**Current Equipment Deployed**

Steamer 1, 2, 3, 8, 4  
Source Sub-Arrays - 1, 2, 3, 8, 4  
PAM - Maggie

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Chief Scientist : Dale Sawyer (RCE)**

Co-Chief Scientist - Milena Maronovic (Lamont graduate)  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**

Kimeraa Shukla (Oklahoma State Univ.)  
James Gibson (Lamont)  
Jiao Pedro Tauschbeck Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayrakci (Southampton, new post-doc, moving from Ifremer)

**PSOs:**

Heddi Ingram  
Meghan Henry  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Corras

**Plan for Tomorrow**

At the beginning of the day production will continue on line 1284. It is hoped that through out the day production will take place on ARC22, 1356f, ARC23, and 1244f.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		
Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CNA3050	Operational
Syntak	Operational	EM122	Operational
DigCourse	Operational	Krindsen SBP	Operational
DigiSHOT	Operational	BGM-3 Grammeter	Operational
Sea Path	Operational	882 Magnetometer	Operational
PosNW	Operational	TS6	Operational
PosNet	Operational	P-CO2	Operational
SesNET 1	Operational	HSN	Non-Operational
SesNET 2	Operational	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Operational
PROC 2	Operational	META (Weather)	Operational
CNA2000	Operational	ADCP	Operational Issues

**MCS Production:**

Prime: 125.475 Sail km  
Infill: 69.263 Sail km  
Reshoot: 0.000 Sail km  
Total: 194.738 Sail km

**Time Breakdown:**

Production 22:56  
Line Change 0:50  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:14

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:14  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Port Call 0:00  
Transit 0:00  
**Total: 24:00**

**Total: 0:00**

**Total: 0:14**



**Midnight Position / Info**

deg min

Lat: 42° 09 06.857 N  
Lon: 12° 09 27.779 W

Speed over Ground: 04.60Kt  
Heading: 268°

Water Depth: 4402.0

Wind: WSW 5-10 Seas: 0-1m

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM - Maggie

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Daily Summary**

The day started in production on Line 1284. Throughout the day production was completed on Lines ARC22, 1356i ARC23, & 1244i, and at end of day production was underway on Line 1308.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day production will continue on line 1308. It is hoped that throughout the day production will take place on 1236i, ARC24, and 1340i.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CNAV3050	Operational
Syntak	Operational	EM122	Operational
DigCourse	Operational	Krindsen SBP	Operational
DigiSHOT	Operational	BGM-3 Grammeter	Operational
Sea Path	Operational	882 Magnetometer	Operational
PosNW	Operational	TS6	Operational
PosNet	Operational	P-CO2	Operational
SesNET 1	Operational	HSN	Non-Operational
SesNET 2	Operational	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Operational
PROC 2	Operational	META (Weather)	Operational
CNAV2000	Operational	ADCP	Issues

**Science Party:**

Kimeria Shukla (Oklahoma State Univ.)  
James Gibson (Lamont)  
Jiao Pedro Tauschick Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayrakci (Southampton, new post-doc, moving from Ifremer)

**PSOs:**

Heddi Ingram  
Meghan Henry  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Corras

**Time Breakdown:**

MCS Production: 41,775 Sail km  
Prime: 41,775 Sail km

Production 21:33  
Line Change 2:10

Infill: 144,900 Sail km

Weather Downtime 0:00  
Technical Downtime 0:17

Reshoot: 0,000 Sail km

External Downtime 0:00

Total: 186,675 Sail km

OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0:00  
Other

Total: 186,675 Sail km

OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

Air Compressor 0:00  
Ship Repair 0



Cruise: **MGL1307**

Date: **25/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 09 46.353 N  
Lon: 12° 33 58.716 W  
Wind: W -15-20 Seas: 1-2m

Speed over Ground: 04.80KT

Heading: 268°

Water Depth: 4946.2

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM -

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Clayton Curtis  
Marine Tech. - Robert (Bobby) Koprowski  
Navigation - Mike Marelli  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Daily Summary**

The day started in production on Line1308. Throughout the day production was completed on Lines 1236L, & ARC24, and at end of day production was underway on Line 1340L.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day production will continue on line 1340L. It is hoped that throughout the day production will take place on 1292, ARC25, & 1052R

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CNA3050	Operational
Syntax	Operational	EM122	Operational
Dig/course	Operational	Krindsen SBP	Operational
DigiSHOT	Operational	BGM-3 grammer	Operational
Sea Path	Operational	882 Magnetometer	Operational
PosNW	Operational	TS6	Operational
PosNet	Operational	P-CO2	Operational
SesNET 1	Operational	HSN	Non-Operational
SesNET 2	Operational	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Operational
PROC 2	Operational	META (Weather)	Operational
CNA2000	Operational	ADCP	Issues

**PSOs:**

Heddi Ingram  
Meghan Phery  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Cortas

**MCS Production:**

Prime: **76,800** Sail km  
Infill: **110,100** Sail km  
Reshoot: **0,000** Sail km  
Total: **186,900** Sail km

**Time Breakdown:**

Production #####  
Line Change 15:33  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Weather Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Total: 0:00

Total: 0:00



Cruise: **MGL1307**

Date: **26/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 02' 15.768" N  
Lon: 12° 43' 00.122" W  
Wind: SW 15-20 Seas: 1-3m

Speed over Ground: 04.80Kt

Heading: 268°

Water Depth: 289.6

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM -

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Clayton Curtis  
Marine Tech. - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Chief Scientist : Dale Sawyer (RICE)**

Co-Chief Scientist - Milena Maronovic (Lamont graduate)  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**

Kimeraa Shukla (Oklahoma State Univ.)  
James Gibson (Lamont)  
Jiao Pedro Tauschbeck Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayrakci (Southampton, new post-doc, moving from Ifremer)

**PSOs:**

Heddi Ingram  
Meghan Henry  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Coiras

**Plan for Tomorrow**

At the beginning of the day production will continue on line1052ZR. It is hoped that throughout the day production will take place on ARC26, 1300, & 13481.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		
Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CNA3050	Operational
Syntak	Operational	EM122	Operational
Dig/course	Operational	Krindsen SBP	Operational
DigsHOT	Operational	BGM-3 grammer	Operational
Sea Path	Operational	882 Magnetometer	Operational
PosNW	Operational	TS6	Operational
PosNet	Operational	P-CO2	Operational
SesNET 1	Operational	HSN	Non-Operational
SesNET 2	Operational	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Operational
PROC 2	Operational	META (Weather)	Operational
CNA2000	Operational	ADCP	Operational Issues

**MCS Production:**

Prime: 95.081 Sail km  
Infill: 78.075 Sail km  
Reshoot: 7.088 Sail km  
Total: 180.243 Sail km

**Time Breakdown:**

Production 20:37  
Line Change 1:46  
Weather Downtime 0:00  
Technical Downtime 1:37  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:59  
Hydraulics 0:00  
Source 0:00  
Streamer 0:38  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Port Call 0:00  
Transit 0:00  
**Total: 24:00**

**Total: 1:37**

**Total: 0:00**



Cruise: **MGL1307**

Date: **27/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 09 43.735 N  
Lon: 12° 46 33.957 W  
Wind: WSW 15-20 Seas: 2-3m

Speed over Ground: 04.50KT

Heading: 268°

Water Depth: 5296.0

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM -

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Clayton Curtis  
Marine Tech. - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Daily Summary**

The day started in production on Line 1052R. During the first part of the day production was completed on 1052R, ARC26, & 1300. Shortly after starting 13481 it was observed that the S1bd Streamers where not towing in their correct location. The Source was recovered, followed shortly by the Streamers 1, 2, and S1bd Door. The Separation Rope that connected Streamer 1 & 2 had failed. It was replaced and all equipment was re-deployed. At the end of the day the S1bd Source was being deployed and it was expected that Production on line 13481 would start shortly.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day the S1bd Source will continue to be re-deployed after the Streamer Separation Rope failure. Shortly after that Production will begin on 13481. It is hoped that throughout the day production will take place on ARC27, 1252J, ARC28, and 1348K.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CNA3050	Operational
Syntax	Operational	EM122	Operational
Dig/course	Operational	Krindsen SBP	Operational
DigsHOT	Operational	BGM-3 Gravimeter	Operational
Sea Path	Operational	882 Magnetometer	Operational
Pos/W	Operational	TS6	Operational
Pos/W	Operational	P-CO2	Operational
Pos/W	Operational	HSN	Non-Operational
SesNET 1	Operational	FBB	Operational
SesNET 2	Operational	Micosv (USS WET LAB)	Operational
PROC 1	Operational	META (Weather)	Operational
PROC 2	Operational	META (Weather)	Operational
CNA2000	Operational	ADCP	Issues

**PSOs:**

Heddi Ingram  
Meghan Perry  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Coiras

**MCS Production:**

Prime: 78,600 Sail km  
Infill: 20,063 Sail km  
Reshoot: 0,000 Sail km  
Total: 98,663 Sail km

**Time Breakdown:**

Production 12:33  
Line Change 2:04  
Weather Downtime 0:00  
Technical Downtime 9:23  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 9:23  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Total: 9:23  
Total: 0:00

Total: 24:00



Cruise: **MGL1307**

Date: **28/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 07' 16.06" N  
Lon: 12° 01' 23.547" W  
Wind: WSW 15-20 Seas: 1-3m

Speed over Ground: 04.90Kt

Heading: 87°

Water Depth: 5326.0

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM -

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Clayton Curtis  
Marine Tech. - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Chief Scientist : Dale Sawyer (RICE)**

Co-Chief Scientist - Milena Maronovic (Lamont graduate)  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**

Kimeraa Shukla (Oklahoma State Univ.)  
James Gibson (Lamont)  
Jiao Pedro Tauschbeck Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayrakli (Southampton, new post-doc, moving from Ifremer)

**PSOs:**

Heddi Ingram  
Meghan Henry  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Cortes

**Plan for Tomorrow**

The day started we were just finishing the deployment of the Source. At 00:28 GMT Production started on line 1348K. During the rest of the day production was completed on ARC27, 1258I, ARC28, & 1348K. At the end of the day the vessel was in production on line 1260I.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MARS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

At the beginning of the day the we will continue be continuing production on 1260I it is hoped that throughout the day production will take place on ARC29, 137Z, and 1332I.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CNA3050	Operational
Syntak	Operational	EM122	Operational
DigCourse	Operational	Krindsen SBP	Operational
DigSHOT	Operational	BGM-3 Grammeter	Operational
Sea Path	Operational	882 Magnetometer	Operational
PosNW	Operational	TS6	Operational
PosNet	Operational	P-CO2	Operational
SesNET 1	Operational	HSN	Non-Operational
SesNET 2	Operational	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Operational
PROC 2	Operational	META (Weather)	Operational
CNA2000	Operational	ADCP	Operational Issues

**MCS Production:**

Prime: 15,900 Sail km  
Infill: 173,813 Sail km  
Reshoot: 0,000 Sail km  
Total: 189,713 Sail km

**Time Breakdown:**

Production 21:23  
Line Change 2:09  
Weather Downtime 0:00  
Technical Downtime 0:28  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:28  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Port Call 0:00  
Transit 0:00  
**Total: 24:00**

**Total: 0:28**

**Total: 0:00**



Cruise: **MGL1307**

Date: **29/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 09' 21.963 N  
Lon: 12° 37' 58.040 W  
Wind: SW-10-15 Seas: 1-2m

Speed over Ground: 04.80Kt  
Heading: 87°

Water Depth: 5261.4

**Current Equipment Deployed**

Steamer 1, 2, 3, & 4  
Source Sub-Arrays - 1, 2, 3, & 4  
PAM -

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Clayton Curtis  
Marine Tech. - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Daily Summary**

The day started with us in production on Line 12601. During the rest of the day production was completed on ARC29, & 1372. At the end of the day the vessel was in production on line 13321.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day the we will continue production on 13321. It is hoped that throughout the day production will take place on 1380 and 1388.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CNA3050	Operational
Syntak	Operational	EM122	Operational
Dig/course	Operational	Krindsen SBP	Operational
DigsHOT	Operational	BGM-3 grammer	Operational
Sea Path	Operational	882 Magnetometer	Operational
PosNW	Operational	TS6	Operational
PosNet	Operational	P-CO2	Operational
SesNET 1	Operational	HSN	Non-Operational
SesNET 2	Operational	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Operational
PROC 2	Operational	META (Weather)	Operational
CNA2000	Operational	ADCP	Issues

**Science Party:**  
Kimeria Shukla (Oklahoma State Univ.)  
James Gibson (Lamont)  
Jiao Pedro Tauschbeck Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayrakci (Southampton, new post-doc, moving from Ifremer)

**PSOs:**  
Heidi Ingram  
Meghan Henry  
Dara Cameron  
Rebecka Garza  
Vanessa Brunet Corras

**Time Breakdown:**

Production 21:58  
Line Change 2:02

**Technical Downtime:**

Instrument Acquisition 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00  
Source 0:00  
Hydraulics 0:00  
Streamer 0:00  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00  
Port Call 0:00  
Transit 0:00  
**Total: 24:00**

**Total: 24:00**



Cruise: **MGL1307**

Date: **30/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 10 53.106 N  
Lon: 12° 45 08.622 W  
Wind: SW-5-10 Seas: <1m

Speed over Ground: 04.80KT

Heading: 87°

Water Depth: 5292.0

**Current Equipment Deployed**

Steamer 1, 2, 3, 8, 4  
Source Sub-Arrays - 1, 2, 3, 8, 4  
PAM -

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemm  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Chief Scientist : Dale Sawyer (RCE)**

Co-Chief Scientist - Milena Maronovic (Lamont graduate)  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**

Kimeraa Shukla (Oklahoma State Univ.)  
James Gibson (Lamont)  
Jiao Pedro Tauschick Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayraki (Southampton, new post-doc, moving from Ifremer)

**PSOs:**

Hedli Ingram  
Meghan Piery  
Dara Cameron  
Reduca Garza  
Vanessa Brunet Costas

**Daily Summary**

The day started with us in production on Line 13321.. During the rest of the day production was completed on 1380 and ARC30. At the end of the day the vessel was in production on line 1388. After line 1380 the Port Main Engine (PME) had to be shut down for a hour or so to complete a repair to a coolant leak.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day the we will continue production on 1388. Once 1388 is complete a line change to 1396 will take place. Either at the end of 1396 or 20:00 GMT production will stop an all towed equipment recovery will start and will continue through the remainder of the day.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CNA3050	Operational
Syntax	Operational	EM122	Operational
Digicourse	Operational	Krindsen SBP	Operational
DigiSHOT	Operational	BGM-3 Gravimeter	Operational
Sea Path	Operational	TS6	Operational
PosMV	Operational	P-CO2	Operational
PosNet	Operational	HSN	Non-Operational
SesNET 1	Operational	FBB	Operational
SesNET 2	Operational	Micosv (USS WET LAB)	Operational
PROC 1	Operational	META (Weather)	Operational
PROC 2	Operational	ADCP	Non-Operational

**MCS Production:**

Prime: 116.663 Sail km  
Infill: 41.963 Sail km  
Reshoot: 0.000 Sail km  
Total: 158.625 Sail km

**Time Breakdown:**

Production 18:52  
Line Change 4:04  
Weather Downtime 0:00  
Technical Downtime 1:04  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Steamer 0:00  
Air Compressor 0:00  
Other  
Ship Repair 1:04

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Total: 1:04  
Total: 0:00

Total: 24:00



Cruise: **MGL1307**

Date: **30/Jul/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 20.49'260 N  
Lon: 12° 39.41391 W  
Wind: SSW 15-20 Seas: 1-2m

Speed over Ground: 03.60Kt

Heading: 51°

Water Depth: EMI122 secured

Current Equipment Deployed  
Steamer 1, 3 (Half) & 4

**Daily Summary**

The day started with us in production on Line 1388. Once 1388 was completed a line change to 1396 took place. At 17:50 GMT production was stop recovery of all towed equipment was started and continue through the remainder of the day.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAAS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day the we will continue recovery of all towed equipment. Once onboard the vessel will be transiting to Vigo, Spain which will continue throughout the day.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Operational	CNA3050	Operational
Syntak	Operational	EMI122	Operational
Digicourse	Operational	Krindsen SBP	Operational
DigiSHOT	Operational	BGM-3 Grammeter	Operational
Sea Path	Operational	882 Magnetometer	Operational
PosNW	Operational	TSG	Operational
PosNet	Operational	P-CO2	Operational
SesNET 1	Operational	HSN	Non-Operational
SesNET 2	Operational	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Operational
PROC 2	Operational	META (Weather)	Operational
CNA2000	Operational	ADCP	Non-Operational

**MCS Production:**

Prime: **118.425 Sail km**  
Infill: **0.000 Sail km**  
Reshoot: **0.000 Sail km**  
Total: **118.425 Sail km**

**Time Breakdown:**

Production 13:52  
Line Change 2:12  
Weather Downtime 0:00  
Technical Downtime 6:10  
External Downtime 1:46  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00  
Port Call 0:00  
Transit 0:00  
**Total: 24:00**

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 1:17  
Streamer 4:53  
Air Compressor 0:00  
Ship Repair 0:00  
Other

**External Downtime:**

Mitigation / PAM 1:46  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
**Total: 1:46**

**Technical Staff Onboard:**

Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern Mcklemann  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Chief Scientist : Dale Sawyer (RICE)**

Co-Chief Scientist - Milena Maronovic (Lamont graduate)  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**

Kimeraa Shukla (Oklahoma State Univ.)  
James Gibson (Lamont)  
Jiao Pedro Tauschick Zielinski (Universidad Complutense de Madrid)  
Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayraki (Southampton, new post-doc, moving from Ifremer)  
**PSOs:**  
Hedli Ingram  
Meghan Piery  
Dara Cameron  
Reduca Garza  
Vanessa Brunet Costas



**Midnight Position / Info**

deg min  
Lat: 42° 14.10.630 N  
Lon: 09° 36.01.031 W  
Wind: W 5-10 Seas: 1-2m

Speed over Ground: 06.70kt

Heading: 104°

Current Equipment Deployed  
Steamer 1, 3 (Half) & 4

Water Depth: EMI122 secured

**Daily Summary**

The day started with us continuing to recover steamers. At 06:05 GMT all towed equipment was onboard and the vessel was underway for Vigo, Spain. The Transit continued throughout the rest of the day.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	0.00%		
MAES Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	90.00%		
Repair Gun Tools	60.00%		
Testing of All Science Equipment	50.00%		
Cleaning and Securing Lab Space	80.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day we will continue transiting to Vigo, Spain. At ~06:00 GMT the vessel will arrive in Vigo, Spain where it will remain throughout the rest of the day.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Off-Line	CNA3050	Operational
Syntak	Off-Line	EMI122	Off-Line
DigCourse	Off-Line	Krindsen SBP	Off-Line
DigSHOT	Off-Line	BGM-3 gravimeter	Operational
Sea Path	Operational	882 Magnetometer	Off-Line
PosMV	Operational	TSG	Off-Line
PosNet	Off-Line	P-CO2	Non-Operational
SesNET 1	Off-Line	HSN	Operational
SesNET 2	Off-Line	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Off-Line
PROC 2	Operational	META (Weather)	Operational
CNA2000	Operational	ADCP	Non-Operational

**Technical Staff Onboard:**  
Ch. Science Officer - Robert Steinhaus  
Science Officer - Jay Johnstone  
Acq. Technician - Bern McKelman  
Acq. Technician - Clayton Curtis  
Marine Tech - Robert (Bobby) Koprowski  
Navigation - Mike Marellio  
Navigation - Matt Grey  
NavProc - Alan Thompson  
Sr. Gun Mechanic - Tom Spoto  
Gun Mechanic - Weston Groves  
Gun Mechanic - Carlos Gutierrez  
Gun Mechanic - Mike Tatro

**Chief Scientist : Dale Sawyer (RICE)**  
Co-Chief Scientist - Milena Maronovic (Lamont graduate)  
Co-Chief Scientist -  
Co-Chief Scientist -

**Science Party:**  
Kimeria Shukla (Oklahoma State Univ.)  
James Gibson (Lamont)  
Jiao Pedro Tauschick Zielinski (Universidad Complutense de Madrid)

Sarah Dean (Rice)  
Tessa Gregory (Southampton)  
Katherine Coates (Southampton)  
Natalie Acardo (Lamont)  
Gayle Bayraki (Southampton, new post-doc, moving from Ifremer)

**PSOs:**  
Hedli Ingram  
Meghan Piery  
Dara Cameron  
Rebecca Garza  
Vanessa Brunet Costas

**MCS Production:**

Prime: 0.000 Sail km  
Infill: 0.000 Sail km  
Reshoot: 0.000 Sail km  
Total: 0.000 Sail km

**Time Breakdown:**

Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 6:05  
External Downtime 0:00  
OBS Rosette Drop Test 0:00  
OBS Deployment 0:00  
OBS Recovery 0:00  
CTD Cast 0:00  
Gravity Core 0:00  
Piston Core 0:00  
Multi Core 0:00  
Sonar Survey 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 6:05  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Port Call 0:00  
Transit 17:55  
**Total: 24:00**

**Total: 6:05**

**Total: 0:00**



Cruise: **MGL1307**

Date: **2/Aug/13**

Reporter: **RJS**

Daily Report

**Midnight Position / Info**

deg min  
Lat: 42° 01.4.529 N  
Lon: 08° 04.3.667 W

Speed over Ground: 00.00kt  
Heading: 53°

Current Equipment Deployed  
None

Technical Staff Onboard:  
Ch. Science Officer - Robert Steinhaus  
Marine Tech - Robert (Bobby) Koprowski

Wind: At Dock Seas: At Dock

Water Depth: At Dock

**Daily Summary**

The day started with us continuing the 'Trast to Vigo, Spain. At 06:30 GMT the vessel arrived along side and remained there throughout the day. Today will end reporting on MGL1307.

Work List	% Complete	Work List	% Complete
Lead-in Status Update	100.00%		
MARS Testing	0.00%		
Prepare Equipment to be shipped	90.00%		
Spec'ing out New Source Tow P	0.00%		
Machine Shop Floor Painting	20.00%		
Umbilical Maintenance	100.00%		
Repair Gun Tools	100.00%		
Testing of All Science Equipment	100.00%		
Cleaning and Securing Lab Space	100.00%		
Hose Bundle Status Update	75.00%		

**Plan for Tomorrow**

At the beginning of the day the we will continue alongside Vigo, Spain. At ~08:00 GMT the vessel will get underway for Reykjavik, Iceland and will continue in transit throughout the day.

Major Science Equipment	Status	Major Science Equipment	Status
SPECTRA	Off-Line	CNA3050	Operational
Syntak	Off-Line	EM122	Off-Line
DigCourse	Off-Line	Krindsen SBP	Off-Line
DigISHOT	Off-Line	BGM-3 Gravimeter	Operational
Sea Path	Operational	882 Magnetometer	Off-Line
PosNW	Operational	TS6	Off-Line
PosSW	Off-Line	P-Co2	Non-Operational
SesNET 1	Off-Line	HSN	Operational
SesNET 2	Off-Line	FBB	Operational
PROC 1	Operational	Micosv (USS WET LAB)	Off-Line
PROC 2	Operational	META (Weather)	Operational
CNA2000	Operational	ADCP	Non-Operational

**MCS Production:**

Prime: **0.000 Sail km**  
Infill: **0.000 Sail km**  
Reshoot: **0.000 Sail km**  
Total: **0.000 Sail km**

**Time Breakdown:**

Production 0:00  
Line Change 0:00  
Weather Downtime 0:00  
Technical Downtime 0:00  
External Downtime 0:00

**Technical Downtime:**

Instrument Acquisition 0:00  
Instrument Navigation 0:00  
Hydraulics 0:00  
Source 0:00  
Streamer 0:00  
Air Compressor 0:00  
Other  
Ship Repair 0:00

**External Downtime:**

Mitigation / PAM 0:00  
Maneuvering 0:00  
Fishing Gear 0:00  
Weather 0:00  
Total: 0:00

Port Call 17:30  
Transit 6:30  
Total: 24:00



## Protected Species Observers

# L-DEO Galicia 3D Seismic Survey - *Langseth* PSO & PAM Weekly Summary Report 1 June - 8 June 2013

Cameron, D.; Ellis, E.; Ingram, H.; Lago Garza, R.; Piercy, M.

---

## 1. GENERAL SUMMARY

The *R/V Marcus G. Langseth* departed Vigo, Spain for the Galicia 3D seismic survey site on 1 June at 6:16 UTC. The Protected Species Observers (PSOs) began visual observations immediately upon departure and while in transit to the survey site. This was done to collect baseline data about protected species abundance in the area, as well as let new PSOs become accustomed to the data collection and entry required for protected species detections. On the afternoon of 1 June the four hydrophone streamers began to be deployed. Once all the streamers had been successfully deployed the air gun strings were deployed and use of the acoustic source began at 14:16 UTC on 5 June.

The acoustic source was ramped up once this week to begin operations at the beginning of the survey; it was then active throughout the remainder of the week. The acoustic source was active for a total of 79 hours 37 minutes throughout the reporting period.

PSOs completed a total of 124 hours 44 minutes of visual observation this reporting period. Additionally, PSOs completed 44 hours 59 minutes of acoustic monitoring using the passive acoustic monitoring (PAM) system. The acoustic source was active during 41% (51 hours 34 minutes) of visual observations and during all acoustic monitoring this reporting period.

The PSOs observation effort this week resulted in 32 visual detections of a protected species. No detections were made this week using the PAM system. Protected species sightings included mysticetes, small odontocetes, and unidentified large whales; totaling 76 animals.

Protected species detections resulted in the implementation of one mitigation action this reporting period. A power down of the acoustic source due to an unidentified baleen whale observed within the 180 dB safety radius. This resulted in a total of 50 minutes of mitigation downtime.

A total of 11 unidentified whales and three fin whales were observed to be exposed to sound pressure levels equal or greater than 160 dB; constituting level-B takes this week.

### 1.1. WEEKLY PROJECT HIGHLIGHTS

- Passive acoustic monitoring training began for PSOs with less experience with the PAM system. So they may become more familiar with the electronics system and the software used to detect marine mammals.
- Six different protected species were positively identified this week.

### 1.2. WEEKLY PROJECT LOWLIGHTS / AREAS FOR IMPROVEMENT

- There were no areas identified for improvement during this week.

# **L-DEO Galicia 3D Seismic Survey - *Langseth* PSO & PAM Weekly Summary Report 9 June - 15 June 2013**

**Cameron, D.; Ellis, E.; Ingram, H.; Lago Garza, R.; Piercy, M.**

---

## **2. GENERAL SUMMARY**

At the beginning of this reporting period the *Langseth* continued acquisition of survey lines. At 4:06 UTC on 9 June the air guns were disabled and retrieved to perform repairs on a streamer. The air guns were silent for 13 hours 11 minutes before production was resumed. The *Langseth* completed 14 survey lines and a couple reshoots. The air guns were silent again on 11 June for 1 hour 26 minutes during a line change. Otherwise the acoustic source was active continuously throughout the week.

The acoustic source was ramped up twice during daytime this week to begin operations; once after streamer repairs and once after air gun silence during a line change. The acoustic source was active for a total of 153 hours 23 minutes throughout the reporting period.

PSOs completed a total of 110 hours 59 minutes of visual observation this reporting period. Additionally, PSOs completed 152 hours 33 minutes of acoustic monitoring using the passive acoustic monitoring (PAM) system. The acoustic source was active during 89% (98 hours 17 minutes) of visual observations and during 99% (150 hours 29 minutes) of acoustic monitoring this reporting period.

The PSOs observation effort this week resulted in 40 visual detections of protected species. One detection was made this week using the PAM system, which correlated with a visual detection. Protected species sightings included mysticetes, and one large odontocete; totaling 96 animals.

Protected species detections resulted in the implementation of five mitigation actions this reporting period; all power downs of the acoustic source. Four power downs were implemented for concentrations of three or more fin whales that were observed lunge feeding within the 160 dB safety radius while the acoustic source was at full volume. One power down was implemented for two fin whales immediately prior to their entering the 180 dB safety radius. Mitigation actions resulted in a total of 1 hour 43 minutes of mitigation downtime.

A total of 10 unidentified baleen whales, 58 fin whales, and one sperm whale were observed to be exposed to sound pressure levels equal or greater than 160 dB; constituting level-B takes this week. No animals were observed to be exposed to sound pressure levels equal or greater than 180 dB.

### **2.1. WEEKLY PROJECT HIGHLIGHTS**

- The first acoustic detection of the survey occurred this week. The detection was of a sperm whale which also correlated with a visual detection.

### **2.2. WEEKLY PROJECT LOWLIGHTS / AREAS FOR IMPROVEMENT**

- There were no areas identified for improvement during this week.

# L-DEO Galicia 3D Seismic Survey - *Langseth* PSO & PAM Weekly Summary Report 16 June - 22 June 2013

Cameron, D.; Ellis, E.; Ingram, H.; Lago Garza, R.; Piercy, M.

---

## 3. GENERAL SUMMARY

At the beginning of this reporting period the *Langseth* continued acquisition of survey lines. On 17 June use of the acoustic source ceased at 7:38 UTC and the air guns were retrieved in anticipation of an approaching storm. The *Langseth* then moved away from the survey area, returning on 19 June, resulting in 46 hours 10 minutes of air gun silence. After some hydrophone streamer repairs use of the acoustic source resumed at 5:32 UTC on 19 June and was active continuously throughout the remainder of the week. The *Langseth* completed nine survey lines, a couple reshoots, and an infill.

The acoustic source was ramped up once during the daytime this week to begin operations after a period of bad weather. The acoustic source was active for a total of 121 hours 50 minutes throughout the reporting period.

PSOs completed a total of 95 hours 40 minutes of visual observation this reporting period. Additionally, PSOs completed 106 hours 44 minutes of acoustic monitoring using the passive acoustic monitoring (PAM) system. Visual monitoring was suspended from 9:55 UTC on 17 June until 10:02 UTC on 18 June, due to very rough weather. During this period the air guns were on board and the vessel was away from the survey area. The acoustic source was active during 85% (81 hours 37 minutes) of visual observations and during all acoustic monitoring this reporting period.

The PSOs observation effort this week resulted in 30 visual detections of protected species. No detections were made this week using the PAM system. Protected species sightings included mysticetes, and unidentified large whales; totaling 44 animals.

Protected species detections resulted in the implementation of two mitigation actions this reporting period; both power downs of the acoustic source. Both power downs were implemented for fin whales immediately prior to their entering the 180 dB safety radius. Mitigation actions resulted in a total of 15 minutes of mitigation downtime.

A total of 16 unidentified baleen whales, 12 fin whales, and four unidentified whales were observed to be exposed to sound pressure levels equal or greater than 160 dB; constituting level-B takes this week. No animals were observed to be exposed to sound pressure levels equal or greater than 180 dB.

### 3.1. WEEKLY PROJECT HIGHLIGHTS

- During both mitigation actions this week the PSOs were able to request a power down of the acoustic source just prior to the animals entering the 180 dB safety radius, avoiding exposure of the animals to received sound pressure levels of 180 dB.

# L-DEO Galicia 3D Seismic Survey - *Langseth* PSO & PAM Weekly Summary Report 23 June - 29 June 2013

Cameron, D.; Ellis, E.; Ingram, H.; Lago Garza, R.; Piercy, M.

---

## 1. GENERAL SUMMARY

At the beginning of this reporting period the *Langseth's* portside engine failed, resulting in the acoustic source being disabled and all seismic gear being retrieved. All gear was on board by 16:00 UTC on 23 June and the *Langseth* began transit to Vigo to repair the engine. The *Langseth* arrived in port at 9:05 UTC on 25 June and remained in port at the end of the week.

At the beginning of the reporting period the acoustic source was at full volume while on a survey line. Shortly after the engine problems were discovered the airguns were disabled and brought on board. The acoustic source was active for a total of 36 minutes throughout the reporting period.

PSOs completed a total of 37 hours 47 minutes of visual observation this reporting period. Additionally, PSOs completed 12 minutes of acoustic monitoring using the passive acoustic monitoring (PAM) system. Visual monitoring was suspended at 9:05 UTC on 25 June when the *Langseth* arrived back into the port of Vigo. Visual observation was held while all seismic gear was recovered and during the transit back to port. The acoustic source was active during the 12 minutes of acoustic monitoring and not active during all visual observations this reporting period.

The PSOs observation effort this week resulted in nine visual detections of protected species. No detections were made this week using the PAM system. Protected species sightings included mysticetes, unidentified large whales, and small odontocetes; totaling 16 animals.

Protected species detections did not result in any mitigation actions reporting period. All detections occurred while the acoustic source was on board.

No animals were observed to be exposed to sound pressure levels equal to or greater than 160 dB this week.

## Appendix B --- Multi-beam Bathymetric Data

## **Appendix C – XBT Probe Data**

The expendable bathythermograph (XBT) probe, manufactured by Lockheed Martin Sippican, Inc., measures water temperature versus depth. In regions of known and constant salinity, the software associated with the probe can calculate and display sound velocity versus depth from these temperature data. The probe contains a temperature sensing thermistor connected to a two-conductor insulated wire that is wound on two spools, a spool inside the probe, and spool outside the canister with the probe. The nose of the probe is a seawater electrode which provides an electrical ground path to the software interface board, which enables the probe to detect when it enters the water.

Product types T-5 (good to 6000 ft with vessel speed under 6 knots) and T-7 (for shallow depths and larger vessel speeds) were used during the cruise.

## Appendix D – Gravity Data

### RV Langseth Gravity Tie Form

CruiseID	MGL1307	<input checked="" type="checkbox"/> PRE	<input type="checkbox"/> POST
Date	30 May 2013		
Port	Vigo, Spain		
Operator	Klayton Curtis		

### Pier side Reading #1

Ship's position (C-Nav)	LAT 42° 14.51309'N LONG 008° 42.84600'W		
Shipboard BGM	Shipboard BGM reading (meters)	Height of port over main deck (m)	
	980298	1	
Portable GPS Time	TIME 07:53		
Portable GPS Position	LAT 42° 14.510'	LONG 008° 42.833'	ALT 82 ft.
L&R Readings	Reading 1 37069.6	Reading 2 37048.4	Reading 3 37081.8

### Tie Point

Tie Point Description (also include relevant documentation/maps/pictures)	Muelle de Guixar (container ship dock) 1 meter South of ballard #6.		
Portable GPS Time	TIME 08:30		
Portable GPS Position	LAT 42° 14.694'	LONG 008° 42.626'	ALT 35 ft.
L&R Readings	Reading 1 39150.2	Reading 2 39154.0	Reading 3 39222.1

### Pier side L&R reading #3

Shipboard BGM	Shipboard BGM reading (meters)	Height of port over main deck (m)	
	980298	1.5m	
Portable GPS Time	TIME 09:00		
Portable GPS Position	LAT 42° 14.572'	LONG 008° 42.833'	ALT 6.4 ft.
L&R Readings	Reading 1 39140.1	Reading 2 39229.3	Reading 3 39298.1

### Notes

Portable gravity meter seems to have a problem becoming fully unlocked, and the optics are out of focus and dirty. This technician has doubts of the reliability of the above data. No photos could be taken due to security issues on the tie point.

1. Height of port over main deck should be entered in meters. Use a negative value to indicate port is below main deck.  
Form v1.1 2008-06-18

# SHIP GRAVITY TRANSFER STATION

HI 839  
Leg B

Country/State : SPAIN *SP*  
City/Town : VIGO  
Station Name : MUELLE DE GUIXAR

Latitude : 42° 14.0' N *42.2333*  
Longitude : 008° 42.0' W *-8.7000*  
(Referenced to WGS datum)

Transfer reference stations:  
SP-02-03, DoD 5401-1  
Transfer date : 10 September 1999

*DoD# 5404-0*

ISGN 71 g = 980,381.07 ± 0.6 mGal

*net 279*

## LOCATION DIAGRAM



Description ref. HMS Scott Dated September 1999

## DESCRIPTION

The station lies 30cm from the edge of the solid jetty, 1 metre to the south of No 6 bollard.

Description ref. HMS Scott Dated September 1999

**Appendix E – Magnetic Data**

## Appendix F – Initial Results with Data Examples

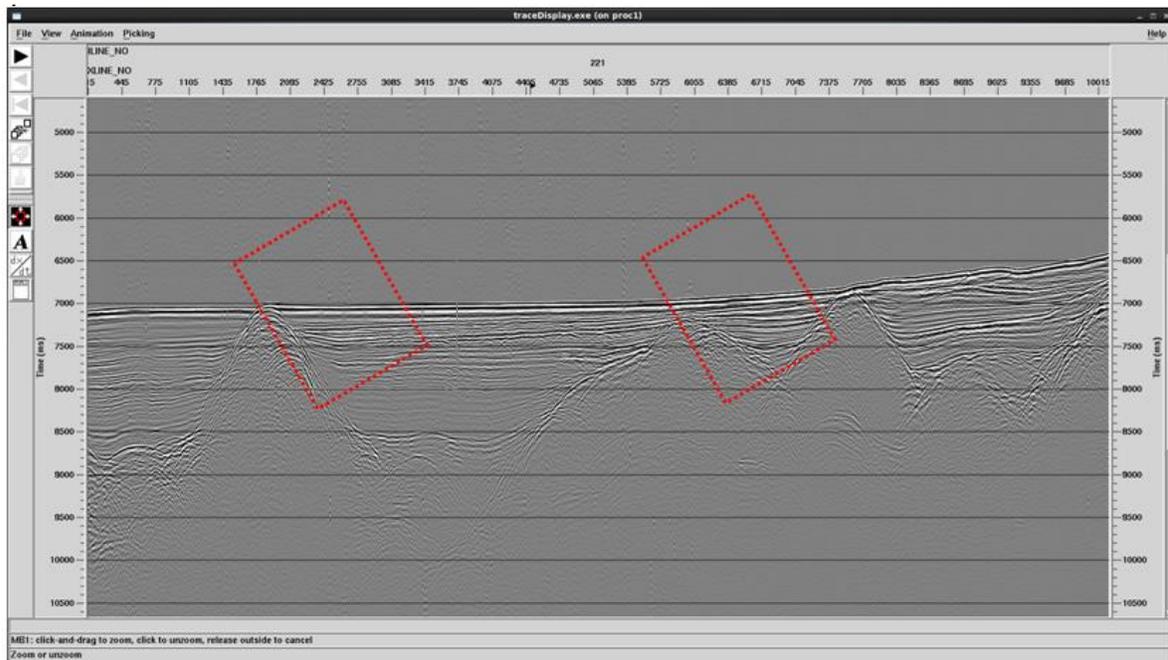


Figure: Brute Stack along a SAIL LINE 1180 processed with basic flow of processing including Data Transcription, re-sampling to 4ms, Filter, Geometry merging, Velocity Picking at every 2km and Stack.

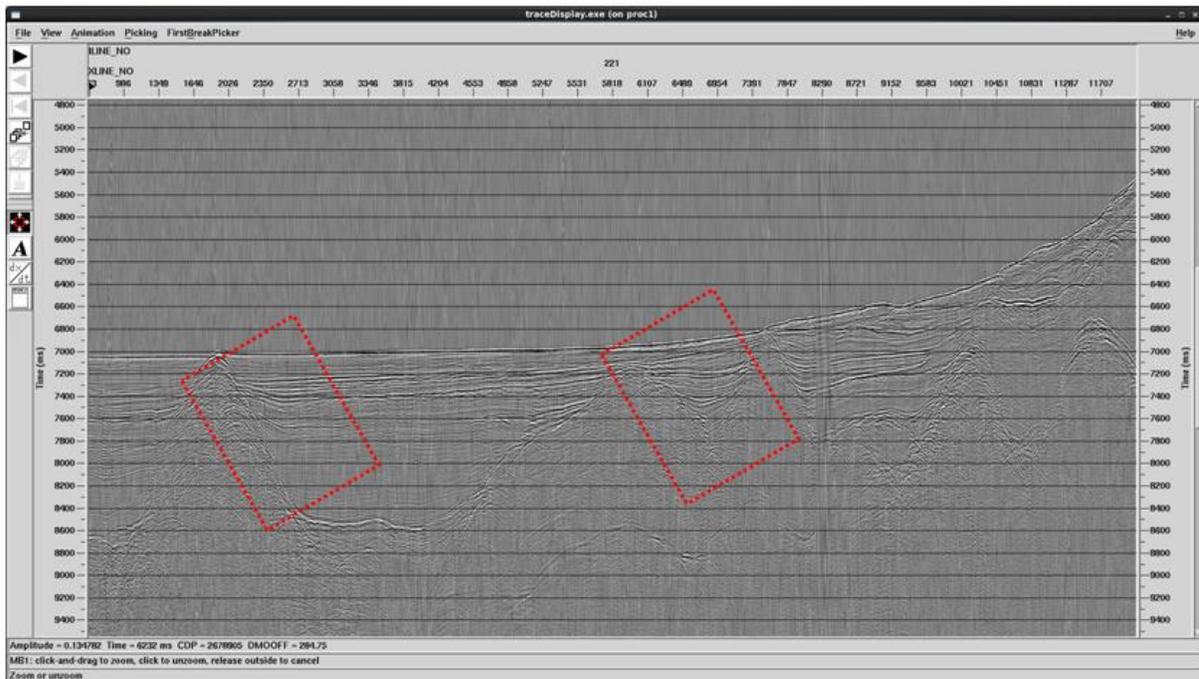


Figure: Brute Stack along a SAIL LINE 1180 processed with basic flow of processing described in above figure including the DMO. DMO was performed to eliminate the effect of conflicting dip

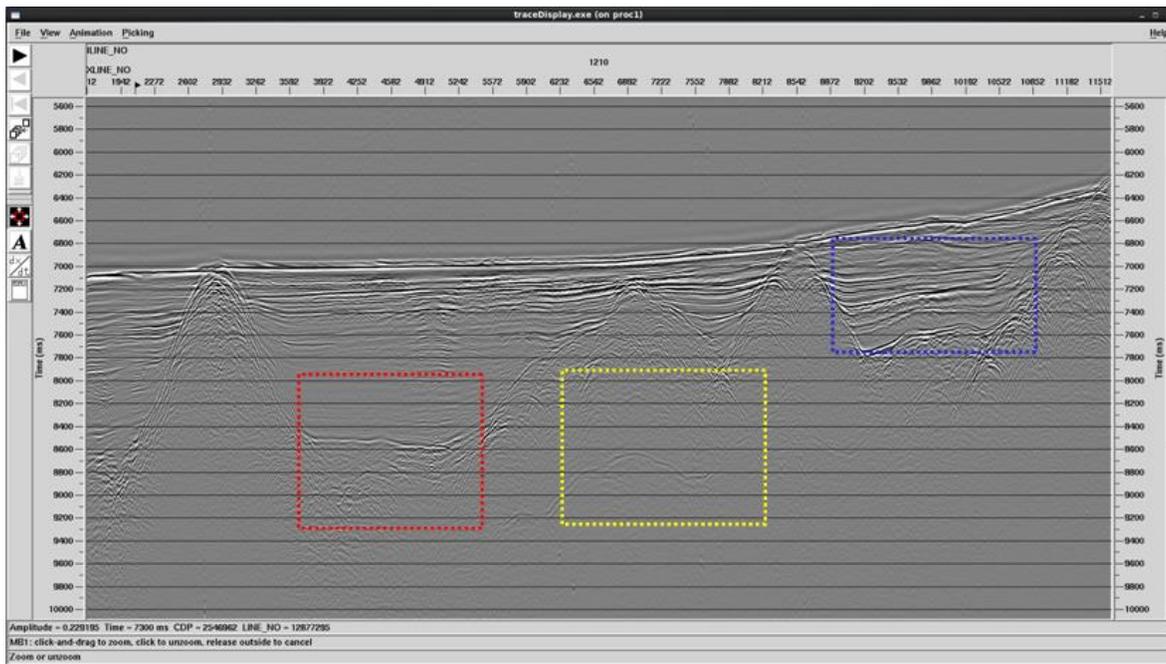


Figure: Stack without Deconvolution

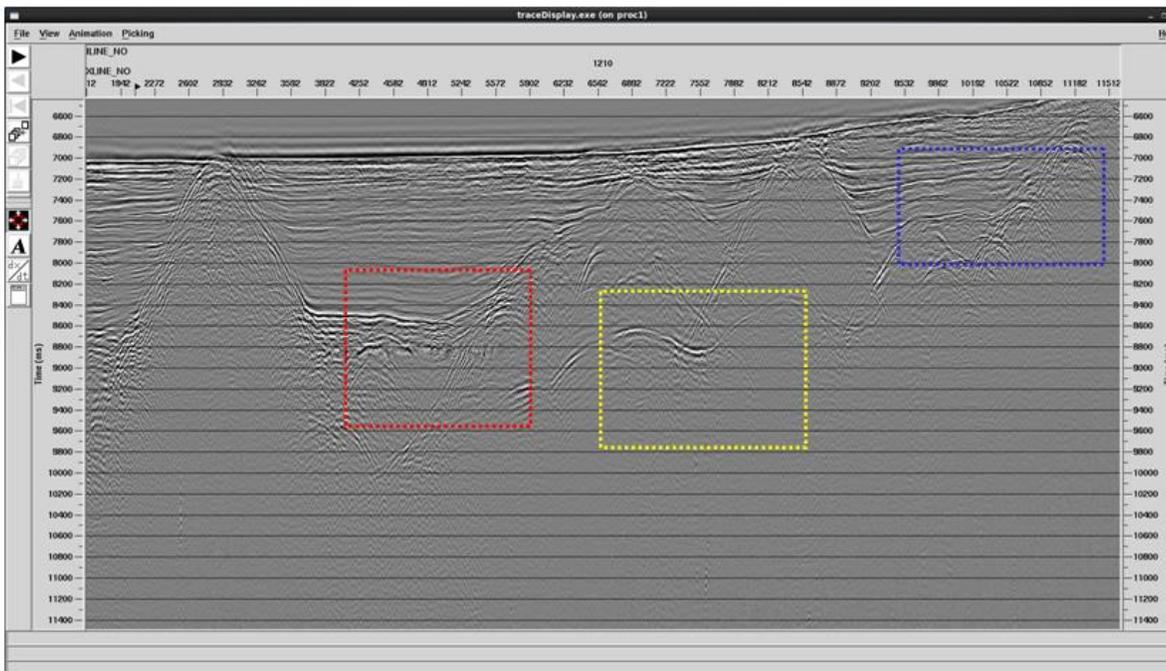


Figure: Stack with spiking Deconvolution of 240ms operator length-Improvement is shown by variegated boxes

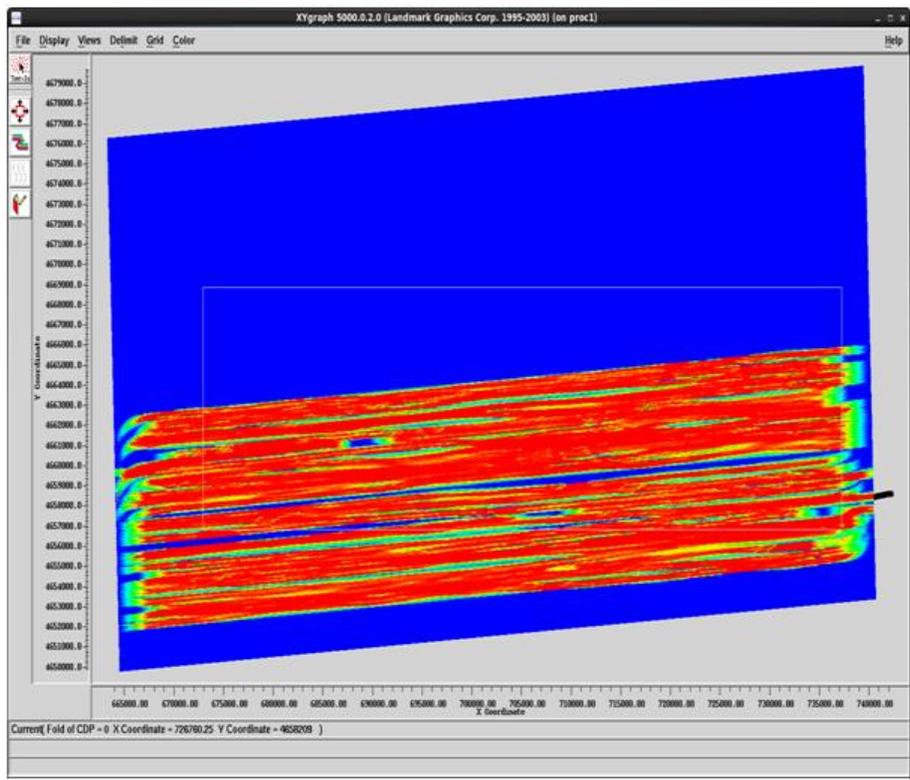


Figure: Fold map of the area computed for half of the survey area. This shows almost uniform fold except few places which is to be healed during the infill.

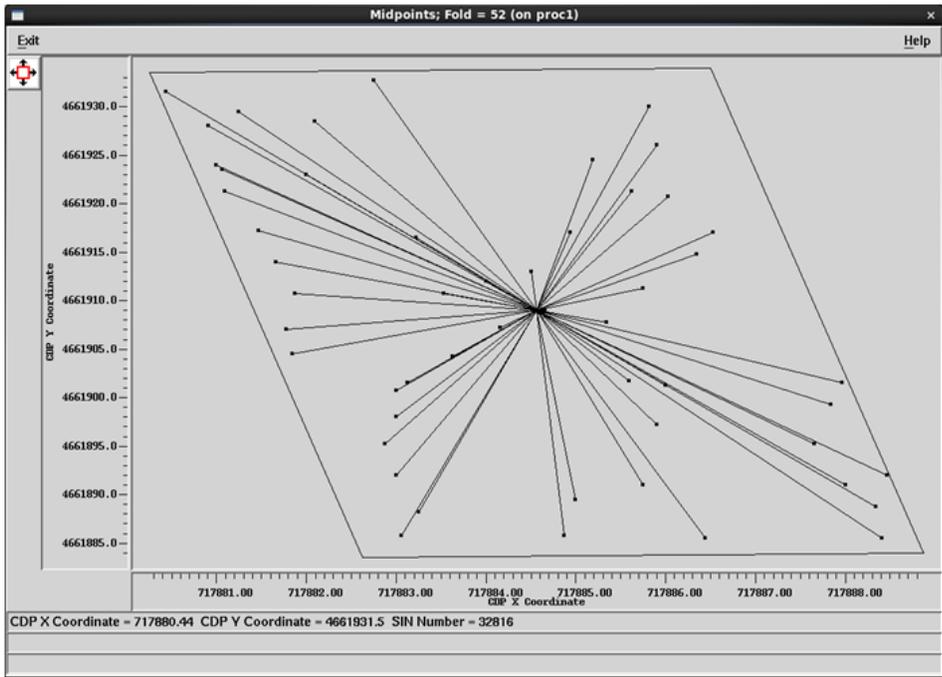
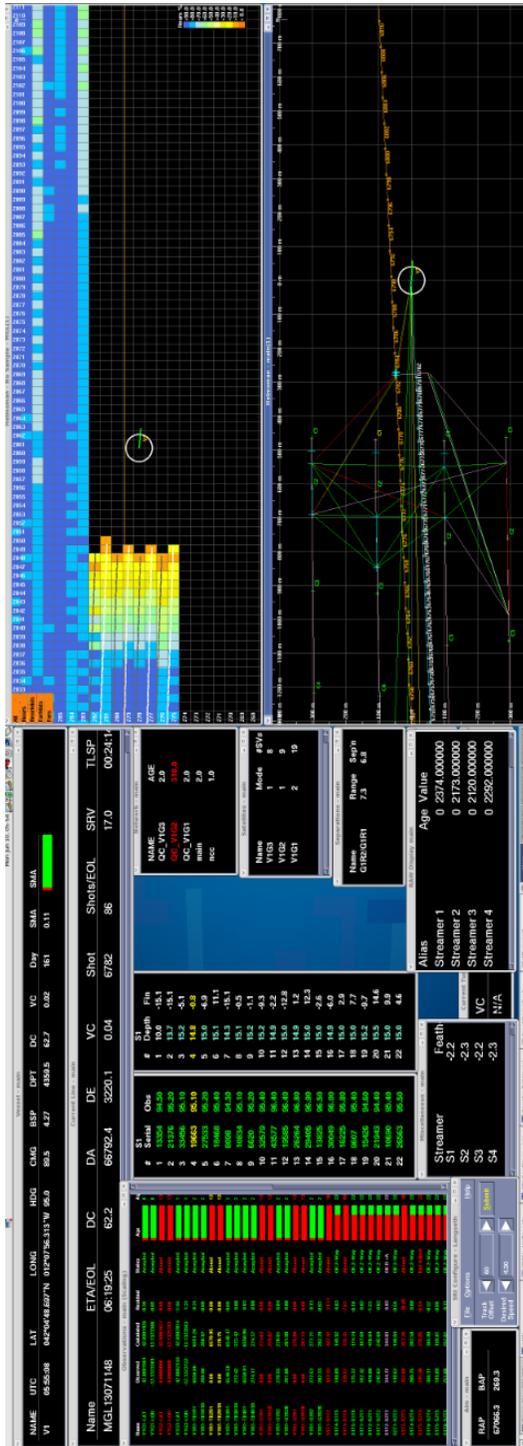


Figure: Distribution of CMPs in a bin of 6.25m X 50m with Fold 52 .This shows uniformly populated Bin with CMPs,contributing to center of bin.





## Appendix G – Personnel

For the MGL1307 cruise, the following personnel were aboard the *RV Langseth* during Leg One:

### R/V Marcus Langseth

FLAG: U.S.A.      HOME PORT: NEW YORK      CALL SIGN: WDC 6698      IMO# 9010137

Departure: Vigo, Spain      DATE: June 01, 2013      Voyage ML 13-07

### CREW LIST



#	NAME	POSITION	Nationality + Passport #	D.O.B.
1	<u>O'Loughlin, James E.</u>	Master	USA 422491426	11 Oct 59
2	<u>Zeigler, Stanley P. Jr.</u>	Chief Mate	USA 218775316	16 May 49
3	<u>Crum, Breckenridge C.</u>	2nd Mate	USA 456067760	17 Mar 81
4	<u>Wilson, West S.</u>	3 <sup>rd</sup> Mate	USA 488765377	22 Mar 84
5	<u>Woronowicz, Jason J.</u>	Bosun	USA 451621526	06 Jul 78
6	<u>Nadler, Marcus B.</u>	AB	USA 406826724	16 Mar 81
7	<u>Piscitello, Peter C.</u>	AB	USA 047430730	07 Dec 56
8	<u>Paragas, Petronio S.</u>	AB	USA 479603209	16 Sep 62
9	<u>Schaffner, Joshua A.</u>	OS	USA 478492672	12 Feb 81
10	<u>Dibbern, Brian K.</u>	OS	USA 452436234	25 Sep 83
11	<u>Pica, Stephen M.</u>	Chief Engr.	USA 436479392	16 Oct 57
12	<u>Tucke, Matthew S.</u>	1 <sup>st</sup> Engr.	USA 218572332	10 Oct 59
13	<u>Busenga, Clayton R.</u>	2 <sup>nd</sup> Engr.	USA 494522957	10 Feb 84
14	<u>Eero, Irina A.</u>	3 <sup>rd</sup> Engr.	USA 497468220	24 Apr 66
15	<u>Gutkowski, Cheryl</u>	Oiler	USA 104484933	04 Jun 71
16	<u>Floendo, Rodolfo A.</u>	Oiler	USA 475664281	28 Jul 57
17	<u>McCutchen, Jeffrey P.</u>	Oiler	USA 456602830	28 Oct 64
18	<u>McLean Fuller, Hervin</u>	Steward	USA 433009214	13 Mar 61
19	<u>Martires, Leoncio R. Jr.</u>	Cook	USA 462174118	29 Sep 64

## SCIENCE LIST

Departure: Vigo, Spain

DATE: June 01, 2013

Voyage ML 13-07

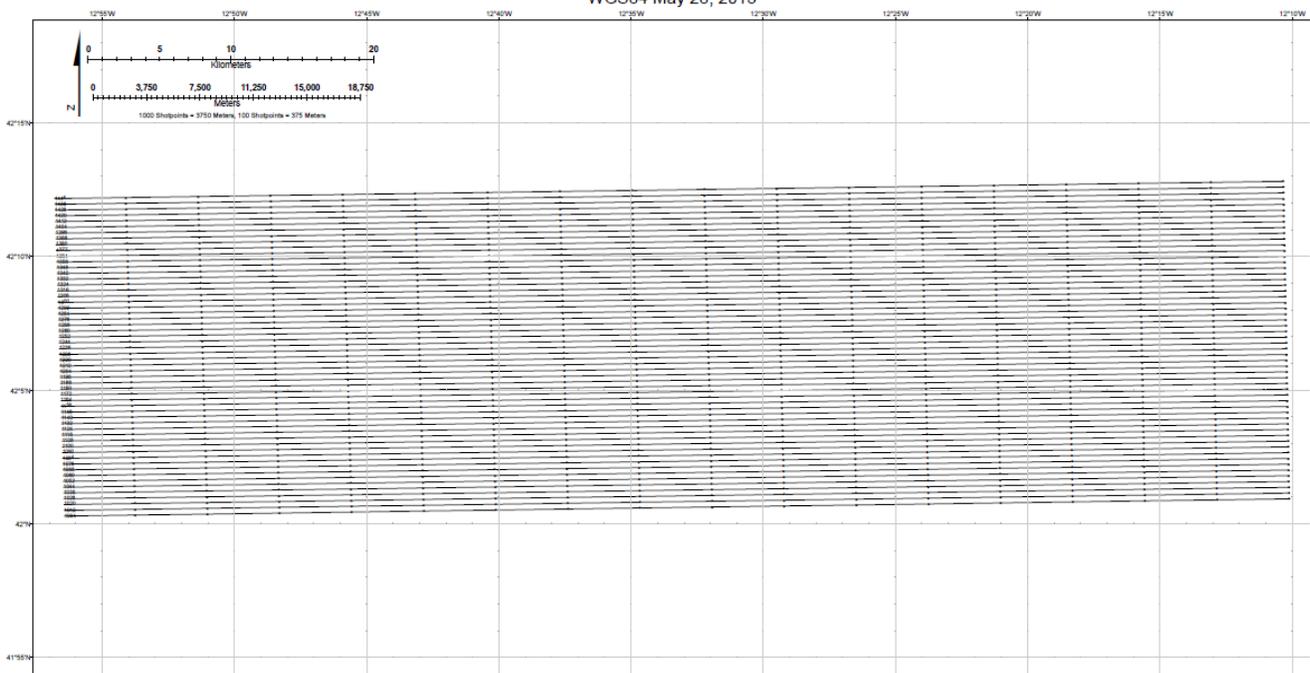
#	NAME	POSITION	Nationality + Passport #	D.O.B.
1	Sawyer, Dale S.	Co Chief Sci	USA 218244731	06 May 55
2	Shillington, Donna J.	Co Chief Sci	USA 711310803	19 Aug 76
3	Reston, Timothy	Co Chief Sci	UK 705058838	23 Mar 61
4	Ranero, Cesar R.	Co Chief Sci	SPAIN AAG426557	07 Jan 63
5	Danbom, Stephen H.	Scientist	USA 479526418	03 Dec 44
6	Dean, Sarah L.	Scientist	USA 402932846	10 Jan 87
7	Gibson, James C.	Scientist	USA 478458737	07 May 75
8	Holroyd, Luke J.	Scientist	UK 210813659	24 Jan 91
9	Jordan, Brian E.	Scientist	USA 455525017	11 Apr 86
10	Karplus, Marianne S.	Scientist	USA 483662715	07 Nov 82
11	Andres-Martinez, Miguel	Scientist	SPAIN AAA001372	22 Mar 87
12	Merry, Tobias B.	Scientist	UK 464754430	13 Aug 90
13	Tesi Sanjurjo, Mari A.	Scientist	VENEZUELA 024405443	25 Jul 89
14	Shuka, Khemraj	Scientist	INDIA F7711527	11 Nov 83
15	Cameron, Dara M.	PSO	USA 430699902	30 Apr 81
16	Ellis, Emily M.	PSO	USA 436285477	15 Jan 86
17	Ingram, Heidi E.	PSO	USA 304696644	07 Jun 83
18	Lago Garza, Rebeca	PSO	SPAIN BB770876	09 May 76
19	Piercy, Meghan J.	PSO	USA 439898824	01 Apr 62
20	Curtis, Klayton J.	Science Tech	USA 497566916	07 Jul 67
21	Grey, Matthew C.	Science Tech	USA 135361840	17 Jun 59
22	Gunn, Robert C.	Science Tech	UK 093210297	26 Nov 53
23	Gutierrez, Carlos D.	Science Tech	USA 491283040	19 Oct 48
24	Johnstone, Jay D.	Science Tech	Canada BA384939	25 Feb 75
25	Kasinger, Joshua D.	Science Tech	USA 472561382	27 Jul 80
26	Martello, Michael C.	Science Tech	USA 212491177	08 Sep 49
27	McKiernan, Bernard K.	Science Tech	USA 474195355	20 Jan 68
28	Poppenwimer, Tyler L.	Science Tech	USA 452022390	21 Mar 92
29	Spoto, Thomas R.	Science Tech	USA 488725488	31 Mar 58
30	Steinhaus, Robert J.	Science Tech	USA 488766243	01 Jun 71
31	Thompson, Alan J.	Science Tech	USA 484143967	06 Apr 85
32	Schwartz, John H.	Science Tech	Canada QE706615	24 Jul 49

# Appendix H – Seismic and Navigational Data Merging

## Navigation Line Summary

Sequence	line name	sp spacing	streamer length	sample rate	record length	source	sub-array	source depth	streamer depth	NRP-COS	COS-CNG	comment
2	001	MGL1307OBS1	37.5m	6000ms	2ms	15360ms	both	9m	12m			data used - off grid shooting
3	002	MGL1307OBS2	75m	6000ms	2ms	15360ms	port	9m	12m			effective spacing of 150m between port source shooting – OBS line
4	003	MGL13071172	37.5m	6000ms	2ms	15360ms	both	9m	12m			Grid shooting – first pass of Galicia 3D
5	004	MGL13071060	37.5m	6000ms	2ms	15360ms	both	9m	12m-15m			shooting grid
6	005	MGL13071164	37.5m	6000ms	2ms	15360ms	both	9m	15m			early eol d/t loss of ups
7	006	MGL13071164A	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
8	007	MGL13071052	37.5m	6000ms	2ms	15360ms	both	9m	15m			early eol d/t loss of ups
9	008	MGL13071052A	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
10	009	MGL13071156	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
11	010	MGL13071044	37.5m	6000ms	2ms	15360ms	both	9m	15m			ended early d/t telemetry errors on streamer 4
12	011	MGL13071148	37.5m	6000ms	2ms	15360ms	both	9m	15m			late start d/t nav problems
13	012	MGL13071036	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
14	013	MGL13071140	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
15	014	MGL13071028	37.5m	6000ms	2ms	15360ms	both	9m	15m			Late SOL ramping up from zero volume for 30 minutes
16	015	MGL13071132	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
17	016	MGL13071020	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid, ended early due to Spectra Shut Down
18	017	MGL13071020A	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
19	018	MGL13071124	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
20	019	MGL13071012	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
21	020	MGL13071116	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
22	021	MGL13071004	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
23	022	MGL13071148A	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
24	023	MGL13071044R	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
25	024	MGL13071180	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
26	025	MGL1307ARC1	150m	6000ms	2ms	15360ms	both	9m	15m			shooting to OBS on arc of turn.
27	026	MGL13071068	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
28	027	MGL13071020	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
29	028	MGL13071076	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
30	029	MGL13071196	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
31	030	MGL13071084	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
32	031	MGL1307ARC2	150m	6000ms	2ms	15360ms	both	9m	15m			shooting to OBS on arc of turn.
33	032	MGL13071204	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
34	033	MGL13071092	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
35	034	MGL13071204I	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
36	035	MGL13071100	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
37	036	MGL1307ARC5	150m	6000ms	2ms	15360ms	both	9m	15m			shooting to OBS on arc of turn.
38	037	MGL13071212	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
39												
40	038	MGL1307ARC6	150m	6000ms	2ms	15360ms	both	9m	15m			shooting to OBS on arc of turn.
41	039	MGL13071108	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
42	040	MGL13071172R	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
43	041	MGL13071076R	37.5m	6000ms	2ms	15360ms	both	9m	15m			shooting grid
44												
45												
46												
47												
48												

MGL1307 Galicia 3D PrePlot  
WGS84 May 28, 2013



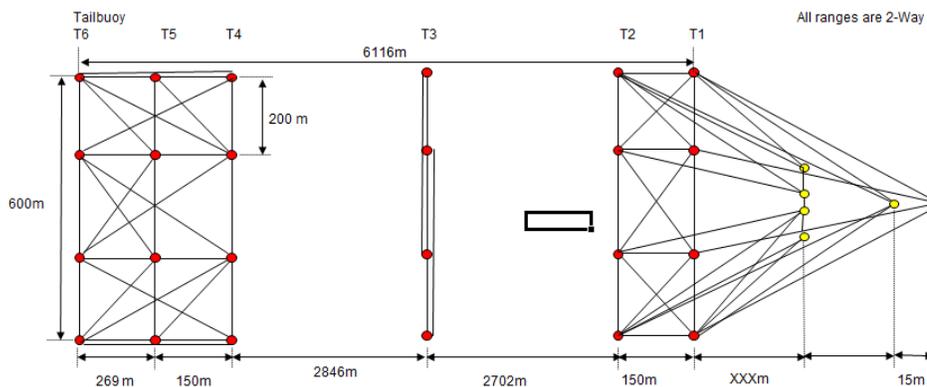
Naming Convention		Digicourse 2-Way Range: Spectra		2-Way Ranges		Digicourse 2-Way Ranges: Spectra		2-Way Ranges		Digicourse 2-Way Ranges: Spectra		2-Way Ranges	
Digicourse	Spectra	From	To	From	To	From	To	From	To	From	To	From	To
AA01 =	S1T1	AA01	AA02	S1T1	S1T2	BA01	IA01	S2T1	V1T1	CA04	DA06	S3T4	S4T6
AA02 =	S1T2	AA01	BA01	S1T1	S2T1	BA02	CA01	S2T2	S3T1	CA05	CA06	S3T5	S3T6
AA03 =	S1T3	AA01	BA02	S1T1	S2T2	BA02	CA02	S2T2	S3T2	CA05	DA05	S3T5	S4T5
AA04 =	S1T4	AA01	EA01	S1T1	G1T1	BA02	FA01	S2T2	G1T2	CA05	DA06	S3T5	S4T6
AA05 =	S1T5	AA01	IA01	S1T1	V1T1	BA03	CA03	S2T3	S3T3	CA06	DA04	S3T6	S4T4
AA06 =	S1T6	AA01	JA01	S1T1	V1T2	BA03	DA03	S2T3	S4T3	CA06	DA06	S3T6	S4T6
BA01 =	S2T1	AA02	BA01	S1T2	S2T1	BA04	BA05	S2T4	S2T5	DA01	DA02	S4T1	S4T2
BA02 =	S2T2	AA02	BA02	S1T2	S2T2	BA04	CA04	S2T4	S3T4	DA01	HA01	S4T1	G2T2
BA03 =	S2T3	AA02	EA01	S1T2	G1T1	BA04	CA06	S2T4	S3T6	DA01	IA01	S4T1	V1T1
BA04 =	S2T4	AA02	FA01	S1T2	G1T2	BA05	BA06	S2T5	S2T6	DA01	JA01	S4T1	V1T2
BA05 =	S2T5	AA02	JA01	S1T2	V1T2	BA05	CA05	S2T5	S3T5	DA02	GA01	S4T2	G2T1
BA06 =	S2T6	AA03	BA03	S1T3	S2T3	BA05	CA06	S2T5	S3T6	DA02	HA01	S4T2	G2T2
CA01 =	S3T1	AA03	CA03	S1T3	S3T3	BA06	CA04	S2T6	S3T4	DA02	JA01	S4T2	V1T2
CA02 =	S3T2	AA04	AA05	S1T4	S1T5	BA06	CA05	S2T6	S3T5	DA04	DA05	S4T4	S4T5
CA03 =	S3T3	AA04	AA06	S1T4	S1T6	BA06	CA06	S2T6	S3T6	DA04	DA06	S4T4	S4T6
CA04 =	S3T4	AA04	BA04	S1T4	S2T4	CA01	CA02	S3T1	S3T2	DA05	DA06	S4T5	S4T6
CA05 =	S3T5	AA04	BA06	S1T4	S2T6	CA01	DA01	S3T1	S4T1	EA01	FA01	G1T1	G1T2
CA06 =	S3T6	AA05	AA06	S1T5	S1T6	CA01	DA02	S3T1	S4T2	EA01	IA01	G1T1	V1T1
DA01 =	S4T1	AA05	BA04	S1T5	S2T4	CA01	IA01	S3T1	V1T1	FA01	GA01	G1T2	G2T1
DA02 =	S4T2	AA05	BA05	S1T5	S2T5	CA02	DA01	S3T2	S4T1	FA01	JA01	G1T2	V1T2
DA03 =	S4T3	AA06	BA04	S1T6	S2T4	CA02	DA02	S3T2	S4T2	GA01	HA01	G2T1	G2T2
DA04 =	S4T4	AA06	BA05	S1T6	S2T5	CA02	GA01	S3T2	G2T1	GA01	JA01	G2T1	V1T2
DA05 =	S4T5	AA06	BA06	S1T6	S2T6	CA03	DA03	S3T3	S4T3	HA01	IA01	G2T2	V1T1
DA06 =	S4T6	BA01	BA02	S2T1	S2T2	CA04	CA05	S3T4	S3T5				
EA01 =	G1T1	BA01	CA01	S2T1	S3T1	CA04	DA04	S3T4	S4T4				
FA01 =	G1T2	BA01	CA02	S2T1	S3T2	CA04	DA05	S3T4	S4T5				
GA01 =	G2T1												
HA01 =	G2T2												
IA01 =	V1T1												
JA01 =	V1T2												

R/V Marcus G. Langseth - Acoustic Offsets

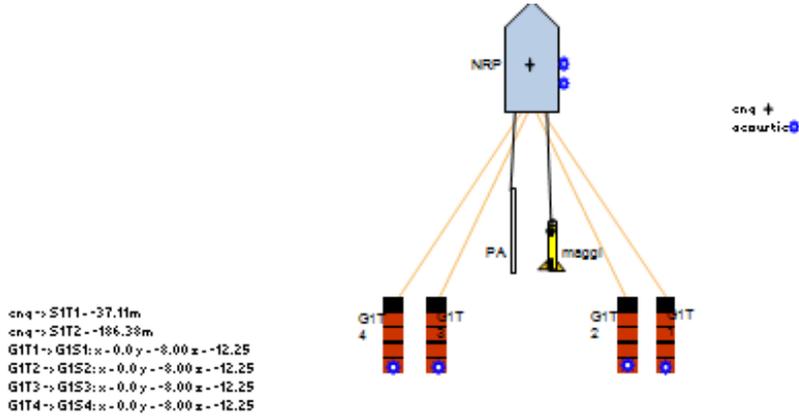
Digicourse

- Digicourse CTX Transceiver 4029 & Pole Mounted Transducer
- Digicourse Streamer CMX Acoustic Transceiver

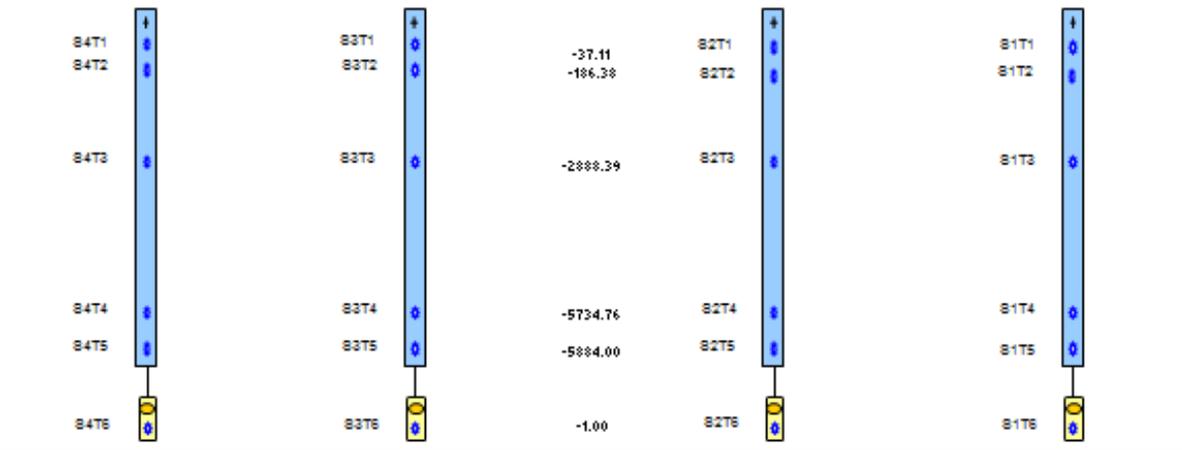
All ranges are 2-Way



All measurements in meters



Cable acoustic offsets are referenced to cnq in individual streams  
 ---  
 Tailbuoy acoustic referenced to RGPS

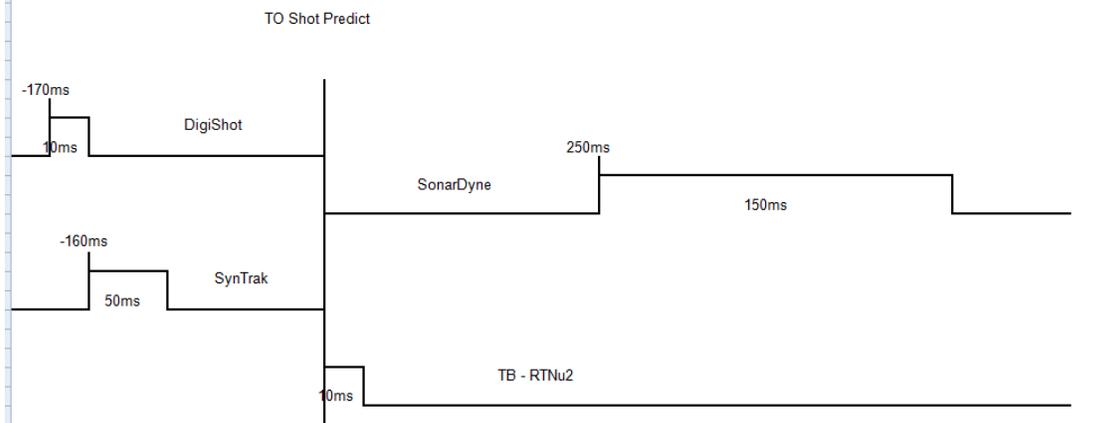


R/V Marcus G. Langseth

SPECTRA TIMING

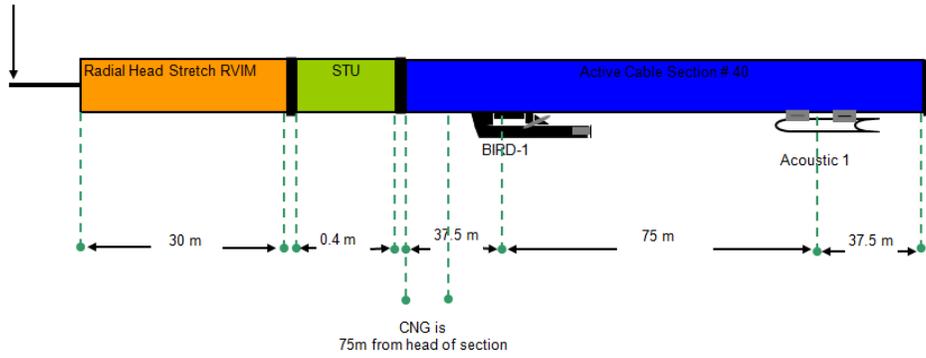
MGL1106

Sawyer 3D

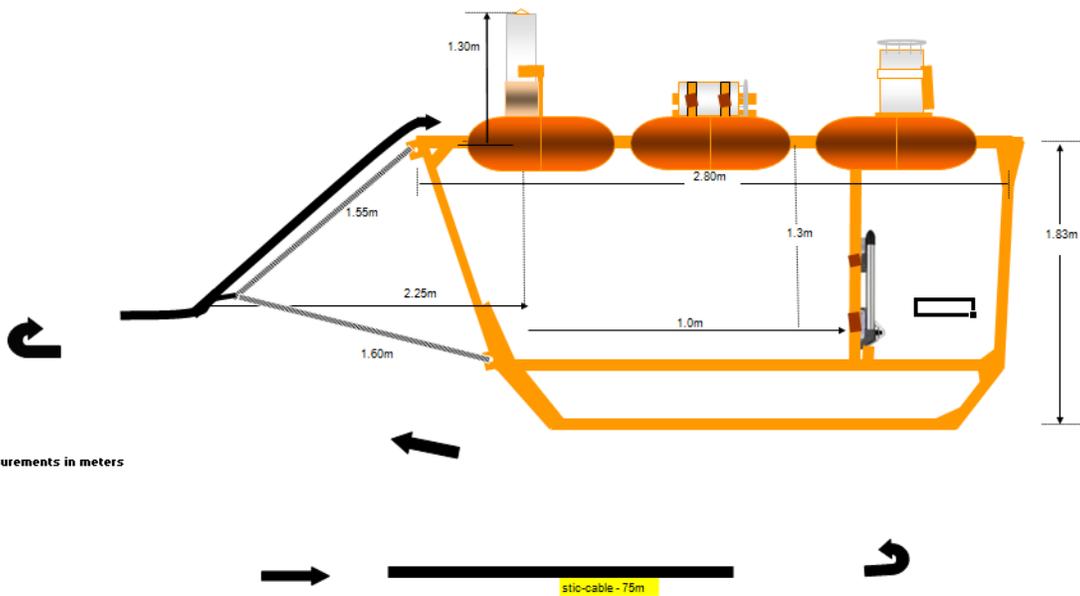


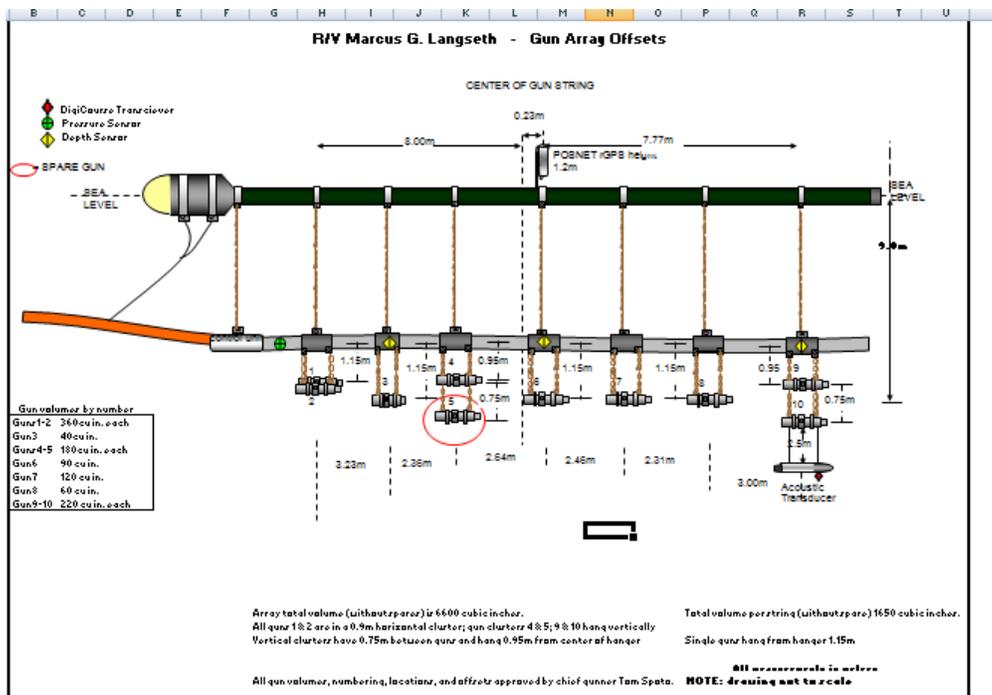
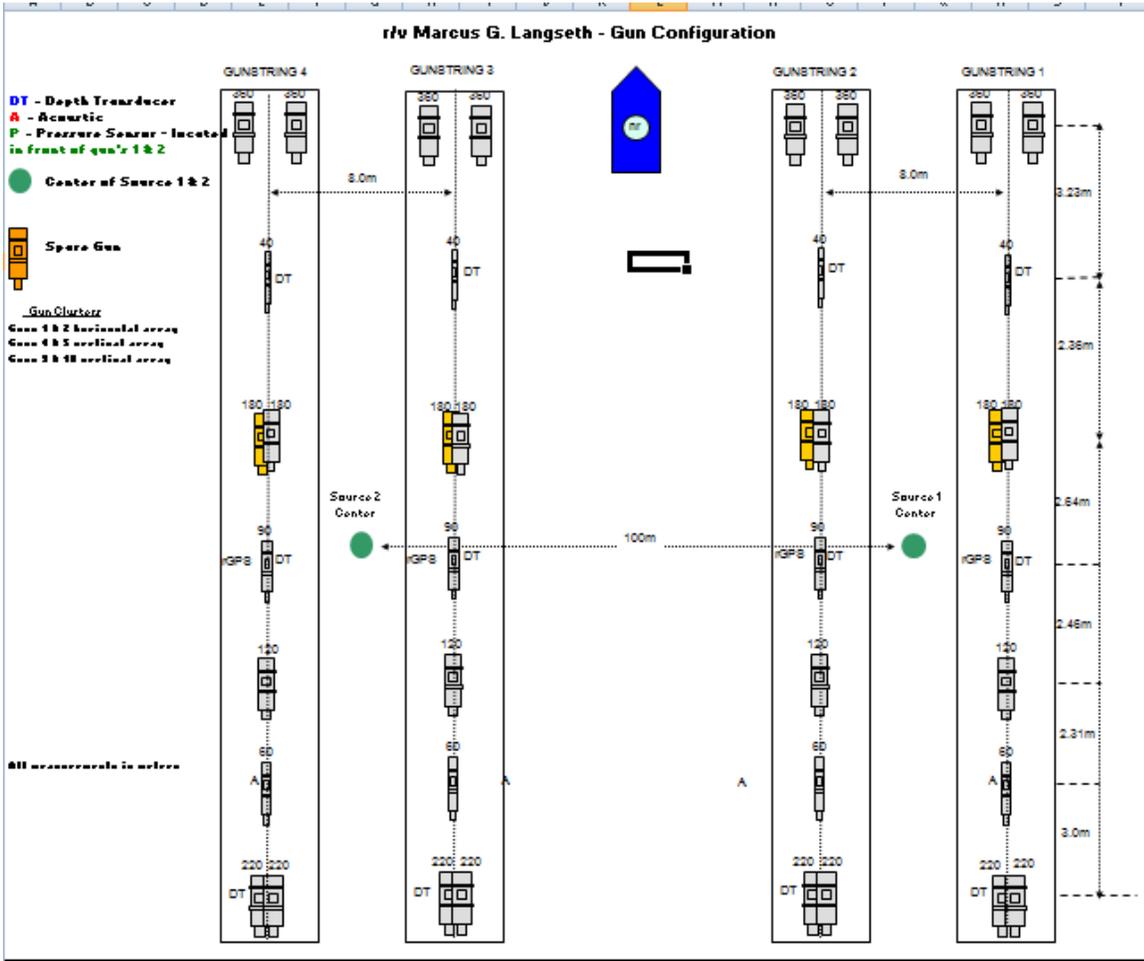
R/V Marcus G. Langseth - Streamer Front End

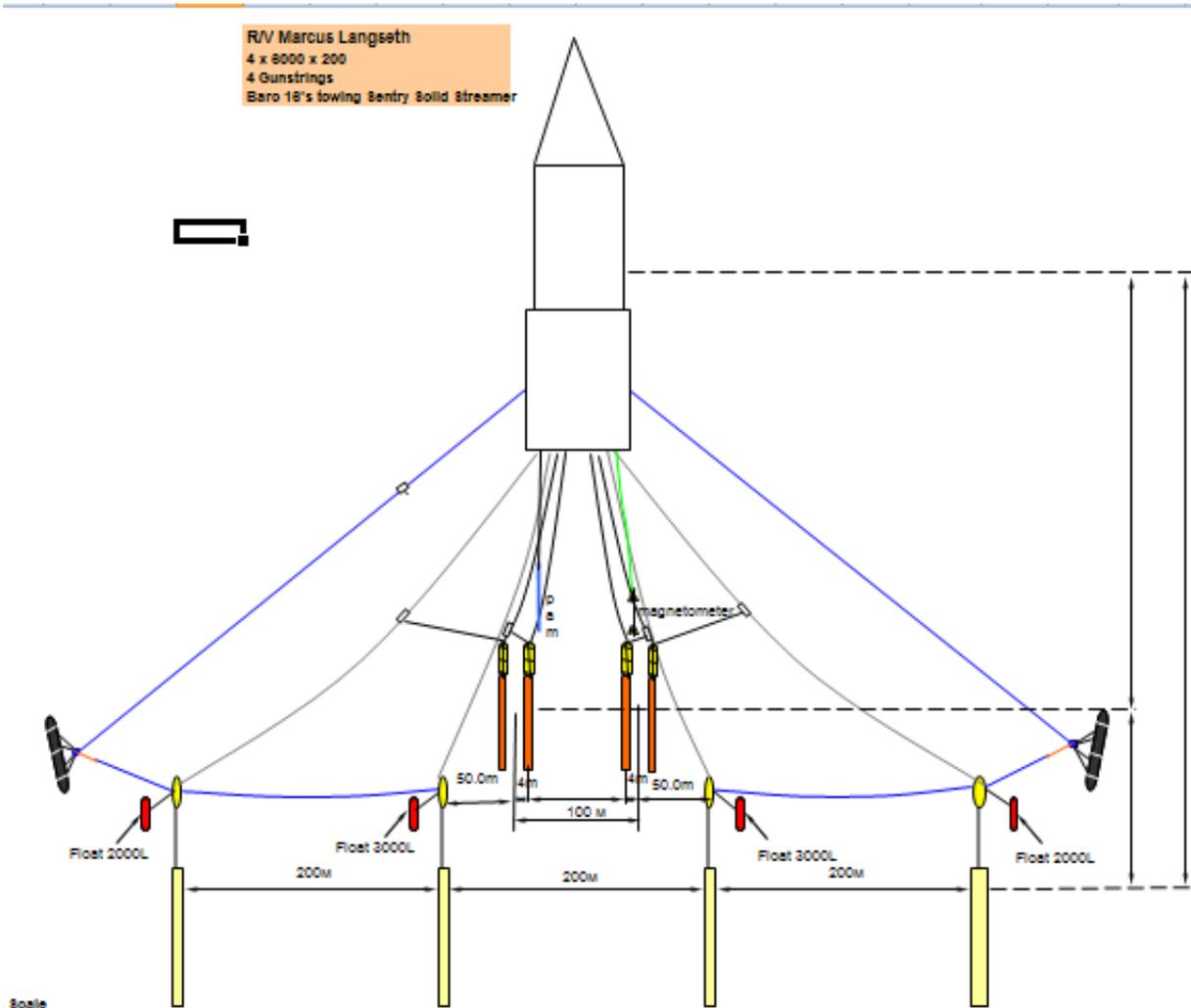
Lead-in:  
Outer = 505m  
Inner = 465m



Streamer layout along the vessel deck, labeled R/V Marcus G. Langseth - Tailbouy. The streamer is marked with letters A through V.

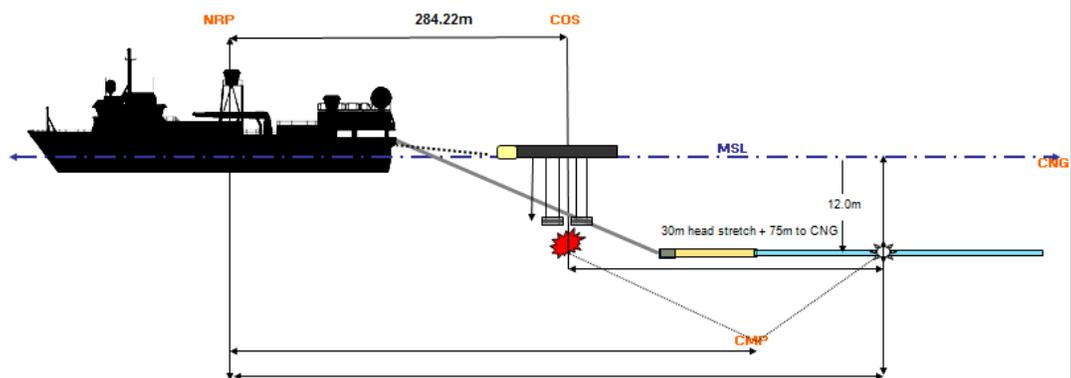




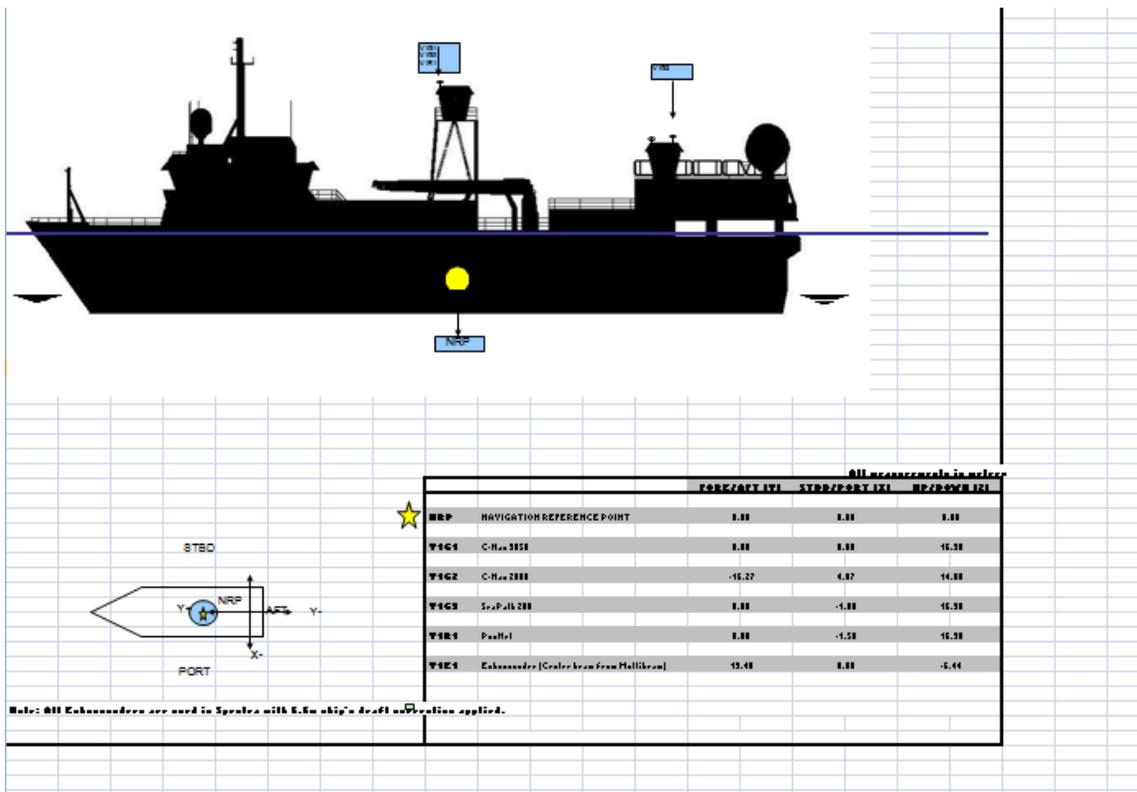


**R/V Marcus G. Langseth - Towing Offsets**

\*\*\* Offsets used for sequences \*\*\*



<b>NRP</b>	Nave Reference Point
<b>COS</b>	Centre of Source
<b>CWG</b>	Centre of Weight Group (Traces #001af;S1;S2;S3;S4)
<b>CMP</b>	Common Mid-Point
<b>MSL</b>	Mean Sea Level
<b>MRP-Steer</b>	29.5m
<b>MRP-COS(61-62)</b>	284.22m



All measurements in meters

		FORE/PORT (1)	STBD/PORT (2)	HP/POCH (2)
★	NRP NAVIGATION REFERENCE POINT	0.00	0.00	0.00
	W4G1 C-Hull 2020	0.00	0.00	-15.30
	W4G2 C-Hull 2000	-15.27	4.87	-14.80
	W4G3 Sr. Pulk 200	0.00	-1.00	-15.30
	W4E1 Pochel	0.00	-1.50	-15.30
	W4E2 Ekonsander (Center beam from Malibran)	15.40	0.00	-5.40

Note: All Ekonsanders are used in Sparta with 8.5m ship's draft no deviation applied.

## Appendix I – Miscellaneous

### Incidental Take Statement

Section 9 of the ESA and federal regulation pursuant to Section 4(d) of the ESA prohibit the “take” of endangered and threatened species, respectively, without special exemption. “Take” is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the NMFS as an act which actually kills or injures wildlife, which may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Sections 7(b)(4) and 7(o)(2), taking that is incidental and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are nondiscretionary, and must be undertaken by the NSF and the Permits and Conservation Division so that they become binding conditions for L-DEO for the exemption in Section 7(o)(2) to apply. Section 7(b)(4) of the ESA requires that when a proposed agency action is found to be consistent with Section 7(a)(2) of the ESA and the proposed action may incidentally take individuals of listed species, the NMFS will issue a statement that specifies the impact of any incidental taking of endangered or threatened species. To minimize such impacts, reasonable and prudent measures and term and conditions to implement the measures, must be provided. Only incidental take resulting from the agency actions and any specified reasonable and prudent measures and terms and conditions identified in the incidental take statement are exempt from the taking prohibition of Section 9(a), pursuant to Section 7(o) of the ESA.

Section 7(b)(4)(C) of the ESA specifies that in order to provide an incidental take statement for an endangered or threatened species of marine mammal, the taking must be authorized under Section 101(a)(5) of the MMPA. One of the federal actions considered in this Opinion is the Permits and Conservation Division’s proposed authorization of the incidental taking of fin, blue, sei, humpback, and sperm whales pursuant to Section 101(a)(5)(D) of the MMPA. With this authorization, the incidental take of listed whales is exempt from the taking prohibition of Section 9(a), pursuant to Section 7(o) of the ESA.

### **3.2. AMOUNT OR EXTENT OF TAKE**

The NMFS anticipates the proposed seismic survey in the northeastern Atlantic Ocean might result in the incidental take of listed species. The proposed action is expected to take three blue, 1,242 fin, 131 sei, two humpback, and 196 sperm whales by exposing individuals to received seismic sound levels greater than 160 dB re 1  $\mu$ Pa by harassment. These estimates are based on the best available information of whale densities in the area to be ensonified above 160 dB re 1  $\mu$ Pa during the proposed activities. This incidental take would result primarily from exposure to acoustic energy during seismic operations and would be in the form of harassment, and is not expected to result in the death or injury of any individuals that are exposed.

We expect the proposed action will also take individual sea turtles as a result of exposure to acoustic energy during seismic studies, and we expect this take would also be in the form of harassment, with no death or injury expected for individuals exposed. Harassment of sea turtles is expected to occur at received levels above 166 dB re 1  $\mu$ Pa. As we cannot determine the number of individuals to which harassment will occur, we expect the extent of exposure will occur within the 166 dB isopleth of the *Langseth’s* air gun array.

Harassment of blue, fin, humpback, sei, and sperm whales exposed to seismic studies at levels less than 160 dB re 1  $\mu$ Pa, or of leatherback, loggerhead, hawksbill, green, and Kemp’s ridley sea turtles at levels less than 166 dB re 1  $\mu$ Pa, is not expected. If adverse reactions such as startle responses, dive reactions, or rapid departures from the area by listed whales or sea turtles are observed outside of the 160 dB or 166 dB re 1  $\mu$ Pa isopleths, respectively, while air guns are operating, incidental take may be exceeded. If such reactions by listed species are observed while air guns are in operation, this may constitute take that is not covered in this Incidental Take Statement. The NSF and the Permits and Conservation Division must contact the Endangered Species Act Interagency

Cooperation Division to determine whether reinitiation of consultation is required because of such operations.

Any incidental take of blue, fin, humpback, sei, and sperm whales or leatherback, loggerhead, hawksbill, green, and Kemp's ridley sea turtles is restricted to the permitted action as proposed. If the actual incidental take meets or exceeds the predicted level, the NSF and Permits and Conservation Division must reinitiate consultation. All anticipated takes would be "takes by harassment", as described previously, involving temporary changes in behavior.

### **3.3. REASONABLE AND PRUDENT MEASURES**

The NMFS believes the reasonable and prudent measures described below are necessary and appropriate to minimize the impact of incidental take of listed whales, sea turtles, fishes, and invertebrates resulting from the proposed action. These measures are non-discretionary and must be binding conditions of the NSF funding of the proposed seismic studies and the NMFS' authorization for the exemption in Section 7(o)(2) to apply. If the NSF or the NMFS fail to ensure compliance with these terms and conditions, the protective coverage of Section 7(o)(2) may lapse.

1. For listed sea turtle and marine mammal species these measures include the following: vessel-based visual monitoring by marine mammal and sea turtle observers; speed or course alteration as practicable; implementation of a marine mammal and sea turtle exclusion zone within the 180 dB re 1  $\mu\text{Pa}_{\text{rms}}$  isopleth for shut-down procedures; emergency shutdown procedures in the event of an injury or mortality of a listed marine mammal or sea turtle; and ramp-up procedures when starting up the array. The measures for marine mammals are required to be implemented through the terms of the IHA issued under section 101(a)(5)(D) and 50 CFR 216.107.
2. The implementation and effectiveness of mitigation measures incorporated as part of the Reasonable and Prudent Measure mentioned above and the associated Terms and Conditions must be monitored.

### **3.4. TERMS AND CONDITIONS**

In order to be exempt from the prohibitions of Section 9 of the ESA, the NSF, Permits and Conservation Division, and L-DEO must comply with the following terms and conditions, which implement the Reasonable and Prudent Measures described above. These terms and conditions are non-discretionary.

To implement the Reasonable and Prudent Measures, the NSF and the NMFS shall ensure that

1. L-DEO implements the mitigation, monitoring, and reporting conditions contained in the IHA and this Opinion.
2. The Chief of the Endangered Species Act Interagency Cooperation Division is immediately informed of any changes or deletions to any portions of the monitoring plan or IHA.
3. L-DEO immediately reports all sightings and locations of injured or dead endangered and threatened species to the Permits and Conservation Division and NSF.
4. The NSF and the Permits and Conservation Division provide a summary of the implementation and effectiveness of the terms of the IHA to the Chief of the Endangered Species Act Interagency Cooperation Division. This report shall confirm the implementation of each term and summarize the effectiveness of the terms for minimizing the adverse effects of the project on listed whales and sea turtles.

### **Conservation Recommendations**

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

We recommend the following conservation recommendations, which would provide information for future consultations involving seismic surveys and the issuance of incidental harassment authorizations that may affect

endangered large whales as well as endangered or threatened sea turtles and fishes:

1. *Effects of seismic noise on sea turtles.* The NSF should promote and fund research examining the potential effects of seismic surveys on listed sea turtle species.
2. *Estimate additional isopleth ranges.* The NSF provides modeling for exclusion zones which have largely been based on threshold analyses of marine mammals. As better scientific data become available, modeling additional decibel levels that are biologically relevant to other ESA-listed species (e.g., sea turtles) may improve the effects analysis and precision of take estimates.

In order for the Endangered Species Act Interagency Cooperation Division to be kept informed of actions minimizing or avoiding adverse effects on, or benefiting ESA-listed species or their habitats, the Permits and Conservation Division should notify the Endangered Species Act Interagency Cooperation Division of any conservation recommendations they implement in their final action initiation Notice

This concludes formal consultation on the proposed seismic source survey to be funded by the NSF and conducted by the L-DEO on board the *R/V Langseth* in the northeastern Atlantic Ocean, and the issuance of an incidental harassment authorization for the proposed studies pursuant to Section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA). As provided in 50 CFR §402.16, control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of authorized take is exceeded, Section 7 consultation must be reinitiated immediately.

# Science Support Plan

*R/V Marcus G. Langseth*



Galicia 3D Seismic Mission  
2013

Cruise no. MGL13-07

For

Drs. Dale Sawyer (Rice), Julie Morgan (Rice), Donna J.  
Shillington (LDEO)

## CONTENTS

PAGE

<b>1. Cruise Overview .....</b>	<b>5</b>
<b>1.1. Cruise Objectives .....</b>	<b>5</b>
<b>1.2. Cruise Schedule.....</b>	<b>6</b>
<b>1.3. Science Party Cruise Details .....</b>	<b>6</b>
1.3.1. Operations.....	7
1.3.2. Safety Gear.....	7
1.3.3. Equipment.....	7
<b>1.4. Proposed Survey Areas/PLANS .....</b>	<b>7</b>
<b>2. Operation and System Status.....</b>	<b>13</b>
<b>3. Permits and Environmental planning.....</b>	<b>14</b>
3.1. Permits.....	14
3.2. Export Controls.....	14
3.3. Hazardous Materials .....	14
3.4. Shipping, Fishing and Diving Activities.....	14
3.5. Obstructions and Shallows .....	14
3.6. Weather.....	15
<b>4. Cruise Participants .....</b>	<b>15</b>
4.1. Technical Staff.....	15
4.1.1. Technical Staff Responsibilities.....	15
4.2. Maritime Crew.....	16
4.3. Science Party .....	16
<b>5. Geodetic Parameters and Positioning.....</b>	<b>17</b>
5.1. Geodetic and Projection Parameters.....	18
5.1.1. Gravity Tie Point.....	18
5.2. Positioning Reference Systems .....	18
5.3. Magnetic Declination .....	19
5.4. Coverage for Differential Corrections.....	19
<b>6. Survey Equipment and Operations .....</b>	<b>19</b>
6.1. Seismic .....	19

6.1.1.	Shooting Plan.....	22
6.1.2.	Seismic Parameters .....	22
6.1.3.	Seismic Recording Systems.....	22
6.1.4.	Seismic Streamer .....	22
6.1.5.	Seismic Source .....	22
6.1.6.	In Sea Positioning Systems .....	23
6.1.7.	Acoustic Measurements.....	24
6.1.8.	Seismic QC Processing.....	24
<b>6.2.</b>	<b>Sonars.....</b>	<b>24</b>
6.2.1.	Multibeam Echosounder .....	24
6.2.2.	Sub-bottom Profiler .....	25
6.2.3.	Acoustic Doppler Current Profiler .....	25
<b>6.3.</b>	<b>Magnetics and Gravity.....</b>	<b>25</b>
6.3.1.	Magnetics.....	25
6.3.2.	Gravity.....	25
<b>6.4.</b>	<b>XBT .....</b>	<b>25</b>
<b>6.5.</b>	<b>CTD .....</b>	<b>26</b>
<b>6.6.</b>	<b>Navigation.....</b>	<b>26</b>
<b>6.7.</b>	<b>Meteorological.....</b>	<b>26</b>
<b>6.8.</b>	<b>Surface Seawater.....</b>	<b>26</b>
<b>6.9.</b>	<b>Client-provided Instrumentation .....</b>	<b>26</b>
<b>6.10.</b>	<b>Lamont Data System (LDS) .....</b>	<b>26</b>
<b>7.</b>	<b>Data Management and Data Distribution .....</b>	<b>27</b>
<b>7.1.</b>	<b>Line Name Convention.....</b>	<b>27</b>
7.1.1.	Navigation and Support Data.....	27
7.1.2.	Recording and Other System Data.....	27
<b>7.2.</b>	<b>Data Distribution.....</b>	<b>27</b>
7.2.1.	Collection.....	27
7.2.2.	Distribution and Transport.....	28
7.2.3.	Archival and Release.....	28
<b>8.</b>	<b>Computers and Communications .....</b>	<b>29</b>
<b>8.1.</b>	<b>Ship's Network.....</b>	<b>29</b>
<b>8.2.</b>	<b>Email, Data Transfers and Internet Access .....</b>	<b>29</b>
<b>8.3.</b>	<b>Scientist Owned Computers.....</b>	<b>30</b>



8.4. Public Computers.....	30
8.5. Voice Communications.....	30
<b>9. Shipboard Safety and Security .....</b>	<b>30</b>
9.1. Shipboard Safety.....	30
9.2. Medical Care .....	30
9.3. Shipboard Security .....	31
<b>10. Secondary Vessels .....</b>	<b>31</b>
10.1. Chase Boats .....	31
10.2. OBS Handling Boats.....	31
<b>11. Contacts and Addresses .....</b>	<b>31</b>
11.1. Office of Marine Operations.....	31
11.2. Protected Species .....	32
11.3. R/V Marcus G Langseth .....	32
11.4. Agents .....	32
<b>12. Experience and Feedback.....</b>	<b>33</b>
12.1. UNOLS Post Cruise Assessment Form.....	33



## APPENDICES

### ABBREVIATIONS

2D	Two-dimensional
3D	Three-dimensional
ACQ	Acquisition
ADCP	Acoustic Doppler Current Profiler
CSO	Chief Science Officer
CTD	Conductivity, Temperature, Depth
DA	Designated Authority
DOR	Daily Operations Report
DP	Dynamic Positioning
EEZ	Exclusive Economic Zone
ERP	Emergency Response Plan
GI	Generated Injection
GPS	Global Positioning System
IHA	Incidental Harassment Authorization
LDEO	Lamont-Doherty Earth Observatory, Columbia University
LDS	Lamont Data System
MBES	Multibeam Echo sounder
MCS	Multi Channel Seismic
MGDS	Marine Geoscience Data System
MMO	Marine Mammal Observation
MSL	Mean Sea Level
NSF	National Science Foundation
OBS	Ocean Bottom Seismometer
OMO	Office of Marine Operations, Lamont-Doherty Earth Observatory
OSU	Oregon State University
PAM	Passive Acoustic Monitoring
PI	Principal Investigator
PPE	Personal Protective Equipment
PSO	Protected Species Observer
QC	Quality Control
R2R	Rolling Deck to Repository
SBES	Single beam echo sounder
SBP	Sub-Bottom Profiler

SEG Y	Society of Exploration Geophysicists Y Format
SRD	Streamer Recovery Devices
SSS	Side Scan Sonar
SVP	Sound Velocity Probe
TBD	To Be Determined
UNOLS	University-National Oceanographic Laboratory System
UTC	Coordinated Universal Time
UTM	Universal Transverse Mercator
WGS	World Geodetic System
XBT	Expendable Bathythermograph



## 1. CRUISE OVERVIEW

MGL13-07 is a 3D seismic reflection survey in the Atlantic Ocean offshore Galicia, Spain. The proposed survey area is shown in Figure 1.4. The principal investigators (PIs) and science party objectives will drive this program on the *R/V Langseth* with the coordination and advisement of the technical staff headed by the Office of Marine Operations (OMO) at Lamont Doherty Earth Observatory (LDEO). The proposed 3D acquisition survey requests dual source arrays, four 6 km streamers deployed at 200 m spacing and run in a 64 km by 22.4 km box, a 2D line extending to the West, and an array of 78 OBS's. The *R/V Poseidon* will be deploying and recovering the OBS's. The survey program will be dynamic and varying dependent on the seabed conditions, weather conditions, and maximizing the science objectives.

Other supporting equipment shall consist of a Kongsberg EM122 Multibeam echo sounder, Knudsen 3260 3.5 KHz Sub-bottom Profiler, Bell Aerospace BGM-3 gravimeter, the RDI 75 kHz acoustic Doppler current profiler (ADCP), and the Geometrics 882 magnetometers. LDEO will ensure that the equipment in use meets the manufacturer's specifications, and also meets internal quality requirements. The technicians onboard are proficient in the operations of standard systems, but are not experts. If the investigation requires expertise in any of the acquisition, including data processing, staff the science party accordingly (i.e. sail a data processor equipped with the proper equipment to complete the science objectives, including software). Other science studies will be ongoing, per scientist request and shipboard specifications.

The principal investigators (PIs) are Dale Sawyer from Rice University and Donna Shillington from LDEO. They will be onboard for the survey operations, as well as 13 other scientists/students (total of 15 scientists), 12 LDEO/contract technicians and 5 Protected Species Observers (PSOs) including one foreign observer.

The cruise is expected to take 45 days to complete, currently set from June 1 – July 15 2013, not including mobilization and demobilization days. The ship is scheduled to sail on June 1 from Vigo, Spain. Scientists will be permitted



onboard the day before sailing. At the end of the cruise, the scientists must disembark the day after the ship arrives in port. Vigo, Spain is the planned port call location.

Please be advised that EU regulations, as per Schengen Treaty, will apply in the port of Vigo, Spain. For nationals not required to have Schengen visa, only valid passport is needed. All sailing personnel need to have a passport valid out at least 6 months.

### **1.1. CRUISE OBJECTIVES**

(Pulled from IHA application information submitted by the PI)

L-DEO plans to conduct a seismic survey in the northeast Atlantic Ocean west of Spain at between  $\sim 41.5\text{--}42.5^\circ\text{N}$  and  $\sim 11.5\text{--}17.5^\circ\text{W}$  (Fig. 1). Water depths in the survey area range from  $\sim 3500$  m to  $>5000$  m. The seismic survey would be conducted International Waters and within the EEZ of Spain, and would be scheduled to occur for  $\sim 39$  days during 1 June–15 July 2013. Some minor deviation from these dates would be possible, depending on logistics and weather.

L-DEO plans to use conventional seismic methodology in the Deep Galicia Basin of the northeast Atlantic Ocean west of Spain. The goal of the proposed research is to collect data necessary to study the rifted continental to oceanic crust transition in the Deep Galicia Basin west of Spain. This margin and its conjugate are among the best studied magma-poor, rifted margins in the world, and the focus of studies has been the faulting mechanics and modification of the upper mantle associated with such margins.

Over the years, a combination of 2-D seismic reflection profiling, general marine geophysics, and ocean drilling have identified a number of interesting features of the margin. Among these are the S reflector, which has been interpreted to be a detachment fault overlain with fault bounded, rotated, continental crustal blocks and underlain by serpentized peridotite, and the Peridotite Ridge, composed of serpentized peridotite and thought to be upper mantle exhumed to the seafloor during rifting.



To achieve the project's goals, the Principal Investigators (PIs), Drs. D.S. Sawyer (Rice University), J.K. Morgan (Rice University), and D.J. Shillington (L-DEO) propose to use a 3-D seismic reflection survey, 2-D survey, and a long-offset seismic program extending through the crust and S detachment into the upper mantle to characterize the last stage of continental breakup and the initiation of seafloor spreading, relate post-rifting subsidence to syn-rifting lithosphere deformation, and inform the nature of detachment faults. Ocean Bottom Seismometers (OBSs) and Ocean Bottom Hydrophones (OBHs) would also be deployed during the program. It is a cooperative program with scientists from the U.K., Germany, Spain, and Portugal.

The survey would involve one source vessel, the R/V Marcus G. Langseth. The Langseth would deploy an array of 18 airguns as an energy source with a total volume of ~3300 in<sup>3</sup>. The receiving system would consist of four 6000-m hydrophone streamers at 200-m spacing and up to 78 OBH/S instruments. The OBH/Ss would be deployed and retrieved by a second vessel, the R/V Poseidon, provided by the German Science Foundation. As the airgun array is towed along the survey lines, the hydrophone streamer would receive the returning acoustic signals and transfer the data to the on-board processing system. The OBH/Ss record the returning acoustic signals internally for later analysis.

A total of ~5834 km of survey lines, including turns, would be shot in a grid pattern with a single line extending to the west (Fig. 1). There would be additional seismic operations in the survey area associated with airgun testing and repeat coverage of any areas where initial data quality is sub-standard. In our calculations (see § VII), 25% has been added for those additional operations.

In addition to the operations of the airgun array, a multibeam echosounder (MBES) and a subbottom profiler (SBP) will also be operated from the Langseth continuously throughout the survey. All planned geophysical data acquisition activities would be conducted by L-DEO with on-board assistance by the scientists who have proposed the study. The vessel would be self-contained, and the crew would live aboard the vessel for the entire cruise.



## 1.2. CRUISE SCHEDULE

This cruise will consist of one leg, approximately 45 days from 01 June 2013. It is expected that crew change and resupplying of the vessel will occur during the scheduled port calls, before and after the cruise. The following schedule (Table 1.1) is preliminary and is subject to change depending on the local weather and environmental conditions experienced on site during the survey.

**Table 1.1: Proposed cruise schedule**

<b>Tentative Date</b>	<b>Activity</b>	<b>Port</b>
6/1/2013	Start of survey	Vigo, Spain
7/15/2013	End of survey	Vigo, Spain

More details as this schedule firms, including mobilization and demobilization dates.

Departure from port is typically scheduled for between 0800 and 1000. Arrival back to port is typically scheduled for the same time period (early morning). PIs are requested to direct any requests for sailing time changes to the Captain, who will relay details back to OMO.

The science party will be permitted to move onboard and have access to the ship starting a day before sailing. At the end of the cruise, the scientists may stay onboard for 1 night after the ship arrives in port. Network services will be available until their departure. LDEO will arrange berthing for this size mission group. Doubling of personnel in all applicable cabins will have to be looked at closely and assigned to accommodate the total personnel count. All participants are advised that this will likely be a full ship.

## 1.3. SCIENCE PARTY CRUISE DETAILS

This section contains some of the cruise details that the science party has requested or needs their attention.

### 1.3.1. Operations

A number of operational decisions will need to be confirmed with the CSO and the PIs before and during mobilization.



- Survey waypoints and operation plan
- Source configuration
- Streamer configuration
- Other scientific objectives

### **1.3.2. Safety Gear**

Safety is of the utmost importance! The science party will comply with all the vessel safety rules and regulations. In accordance, most personal protective equipment (PPE) will be provided onboard. However, the science party is asked to pack safety toe shoes (composite toes if not steel toes) to work on the back deck. Coveralls or sturdy clothing is recommended for back deck work. Closed toed shoes are necessary in the galley. The PIs may have more safety requirements based on the science objectives (i.e. safety glasses in the rock cutting lab).

PFDs and survival suits, if necessary, are on the vessel.

### **1.3.3. Equipment**

In general, the science party should bring all their own equipment, computers, hard drives, etc. LDEO has some general use computers for Internet, basic tasks, but are not outfitted for most scientific analysis. Please coordinate with onshore OMO if special arrangements (space onboard, special wiring, etc.) for equipment are necessary.



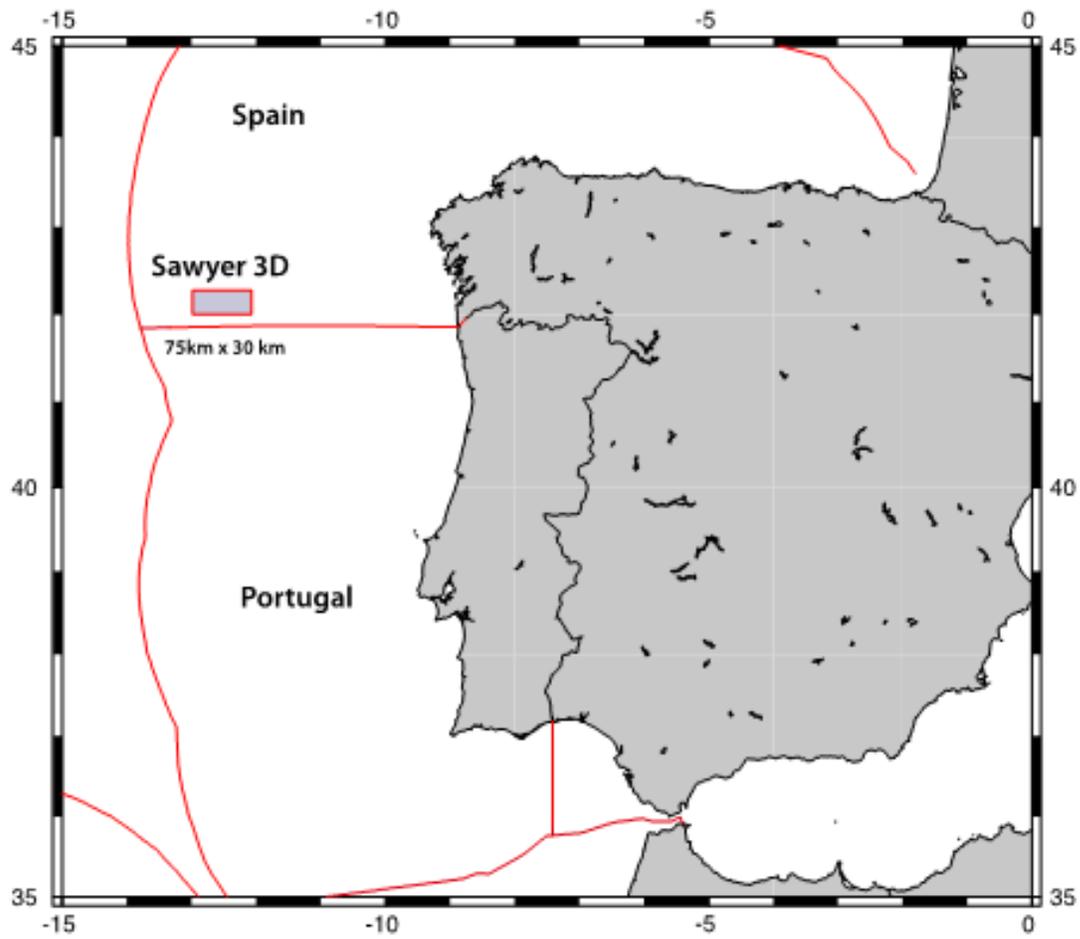
#### 1.4. PROPOSED SURVEY AREAS/PLANS

The following survey area and shooting plan is proposed by the science party:



Figure 1.4: General location map and proposed survey area





**Figure 1.5: General location map with EEZ delineations and proposed survey area**



## Acquisition Configuration

### Equipment Configuration

Streamers	4
Sources	2
Separation	200
Streamer Spread	600
Extra Spread (m)	100
Total Spread (m)	700
Streamer Length (m)	6000
Total Length (m)	6500

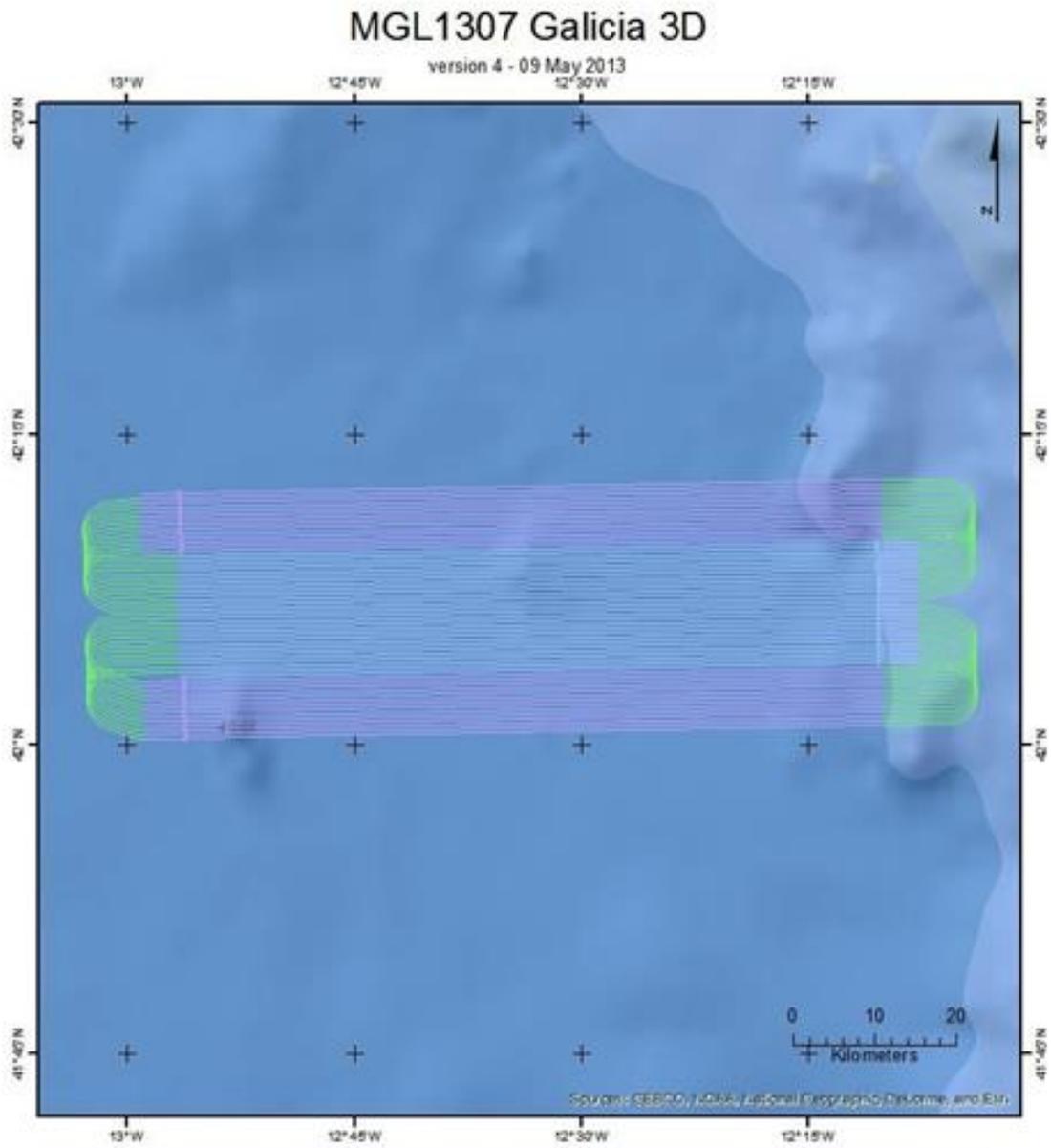
### Performance

Turn Radius (m)	2500
Online Speed (knots)	4.50
Offline Speed (knots)	4.50
Turning Speed (knots)	4.50
Safe Draft (m)	20

### Contract

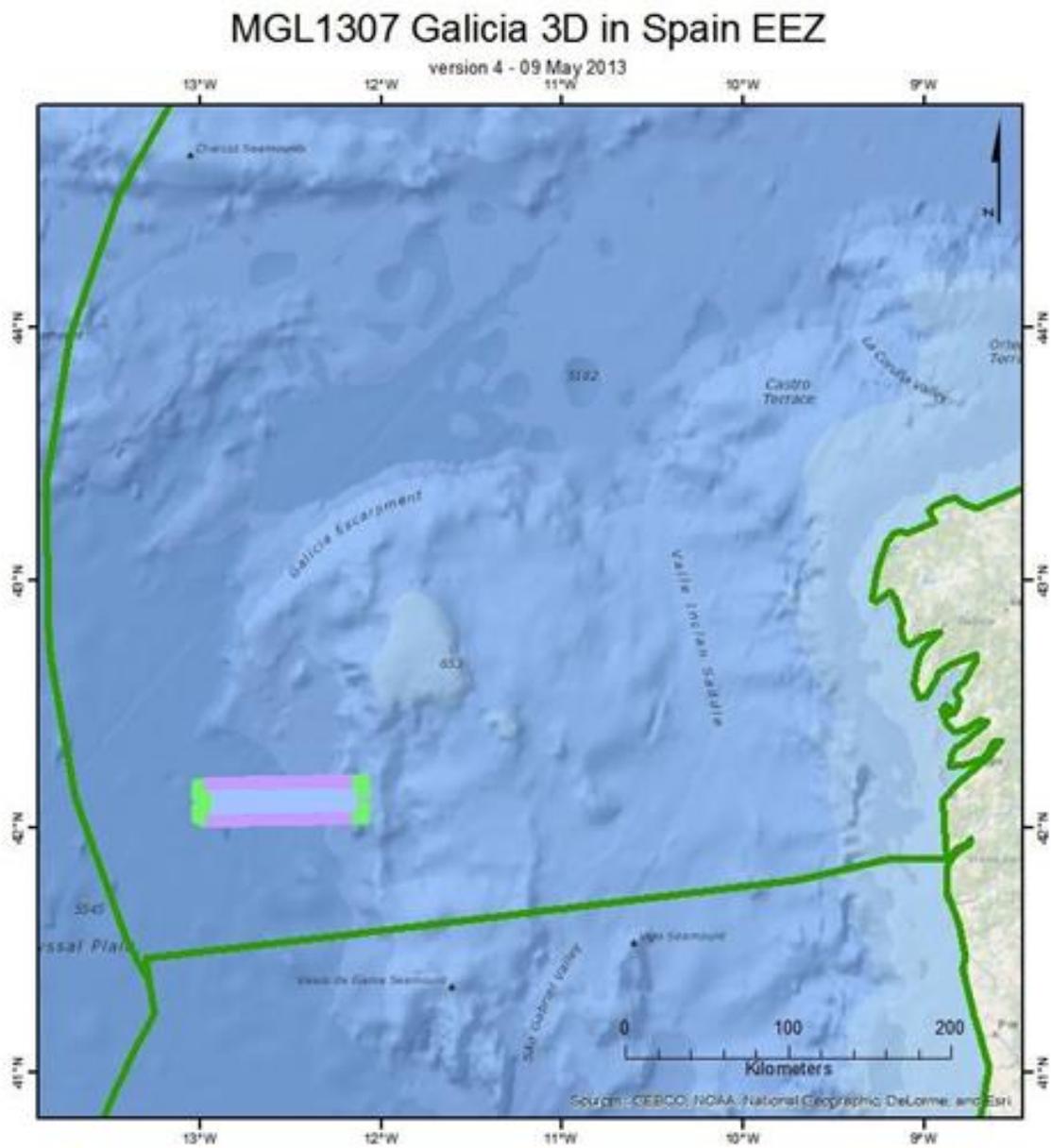
Run In (m)	6000
Run Out (m)	3400
Max Missed Shots	8
Line Change Limit	8:00





**Figure 1.6: Proposed survey plan**





**Figure 1.7: Track plan relative to the Spanish and Portuguese Coast.**

**Table 1.2: Waypoints of seismic lines (UTM Zone is 28N)**

Line Name	Shot Point	Latitude	Longitude	Northing	Easting
V1004	5001	420017.34 N	0125626.18 W	670545.1 4	652362. 7
V1004	6708	420056.08 N	0121005.07 W	734486.1 4	655386. 2
V1012	5001	420030.31 N	0125626.59 W	670526.2 4	652762. 2
V1012	6708	420109.04 N	0121005.32 W	734467.3 4	655785. 7
V1020	5001	420043.27 N	0125626.99 W	670507.3 4	653161. 8
V1020	6708	420122.00 N	0121005.56 W	734448.4 4	656185. 3
V1028	5001	420056.23 N	0125627.39 W	670488.4 4	653561. 3
V1028	6708	420134.96 N	0121005.81 W	734429.5 4	656584. 8
V1036	5001	420109.19 N	0125627.80 W	670469.5 4	653960. 9
V1036	6708	420147.92 N	0121006.05 W	734410.6 4	656984. 4
V1044	5001	420122.15 N	0125628.20 W	670450.6 4	654360. 4
V1044	6708	420200.88 N	0121006.30 W	734391.7 4	657383. 9
V1052	5001	420135.11 N	0125628.60 W	670431.7 4	654760
V1052	6708	420213.84 N	0121006.55 W	734372.8 4	657783. 5
V1060	5001	420148.07 N	0125629.01 W	670412.8 4	655159. 5
V1060	6708	420226.80 N	0121006.79 W	734353.9 4	658183. 1



V1068	5001	420201.04 N	0125629.41 W	670393.9 4	655559. 1
V1068	6708	420239.75 N	0121007.04 W	734335.0 4	658582. 6
V1076	5001	420214.00 N	0125629.81 W	670375.1 4	655958. 6
V1076	6708	420252.71 N	0121007.28 W	734316.1 4	658982. 2
V1084	5001	420226.96 N	0125630.22 W	670356.2 4	656358. 2
V1084	6708	420305.67 N	0121007.53 W	734297.2 4	659381. 7
V1092	5001	420239.92 N	0125630.62 W	670337.3 4	656757. 8
V1092	6708	420318.63 N	0121007.78 W	734278.3 4	659781. 3
V1100	5001	420252.88 N	0125631.02 W	670318.4 4	657157. 3
V1100	6708	420331.59 N	0121008.02 W	734259.4 4	660180. 8
V1108	5001	420305.84 N	0125631.43 W	670299.5 4	657556. 9
V1108	6708	420344.55 N	0121008.27 W	734240.5 4	660580. 4
V1116	5001	420318.80 N	0125631.83 W	670280.6 4	657956. 4
V1116	6708	420357.51 N	0121008.51 W	734221.6 4	660979. 9
V1124	5001	420331.77 N	0125632.23 W	670261.7 4	658356
V1124	6708	420410.47 N	0121008.76 W	734202.7 4	661379. 5
V1132	5001	420344.73 N	0125632.64 W	670242.8 4	658755. 5

V1132	6708	420423.43 N	0121009.01 W	734183.9 4	661779
V1140	5001	420357.69 N	0125633.04 W	670223.9 4	659155. 1
V1140	6708	420436.39 N	0121009.25 W	734165.0 4	662178. 6
V1148	5001	420410.65 N	0125633.44 W	670205.0 4	659554. 6
V1148	6708	420449.35 N	0121009.50 W	734146.1 4	662578. 1
V1156	5001	420423.61 N	0125633.85 W	670186.1 4	659954. 2
V1156	6708	420502.31 N	0121009.74 W	734127.2 4	662977. 7
V1164	5001	420436.57 N	0125634.25 W	670167.2 4	660353. 7
V1164	6708	420515.27 N	0121009.99 W	734108.3 4	663377. 2
V1172	5001	420449.53 N	0125634.65 W	670148.3 4	660753. 3
V1172	6708	420528.23 N	0121010.23 W	734089.4 4	663776. 8
V1180	5001	420502.49 N	0125635.06 W	670129.4 4	661152. 8
V1180	6708	420541.19 N	0121010.48 W	734070.5 4	664176. 4
V1188	5001	420515.46 N	0125635.46 W	670110.5 4	661552. 4
V1188	6708	420554.15 N	0121010.73 W	734051.6 4	664575. 9
V1196	5001	420528.42 N	0125635.86 W	670091.7 4	661952
V1196	6708	420607.11 N	0121010.97 W	734032.7 4	664975. 5

V1204	5001	420541.38 N	0125636.27 W	670072.8 4	662351. 5
V1204	6708	420620.06 N	0121011.22 W	734013.8 4	665375
V1212	5001	420554.34 N	0125636.67 W	670053.9 4	662751. 1
V1212	6708	420633.02 N	0121011.46 W	733994.9 4	665774. 6
V1220	5001	420607.30 N	0125637.07 W	670035.0 4	663150. 6
V1220	6708	420645.98 N	0121011.71 W	733976.0 4	666174. 1
V1228	5001	420620.26 N	0125637.48 W	670016.1 4	663550. 2
V1228	6708	420658.94 N	0121011.95 W	733957.1 4	666573. 7
V1236	5001	420633.22 N	0125637.88 W	669997.2 4	663949. 7
V1236	6708	420711.90 N	0121012.20 W	733938.2 4	666973. 2
V1244	5001	420646.18 N	0125638.28 W	669978.3 4	664349. 3
V1244	6708	420724.86 N	0121012.44 W	733919.3 4	667372. 8
V1252	5001	420659.15 N	0125638.69 W	669959.4 4	664748. 8
V1252	6708	420737.82 N	0121012.69 W	733900.5 4	667772. 3
V1260	5001	420712.11 N	0125639.09 W	669940.5 4	665148. 4
V1260	6708	420750.78 N	0121012.94 W	733881.6 4	668171. 9
V1268	5001	420725.07 N	0125639.50 W	669921.6 4	665547. 9



V1268	6708	420803.74 N	0121013.18 W	733862.7 4	668571. 4
V1276	5001	420738.03 N	0125639.90 W	669902.7 4	665947. 5
V1276	6708	420816.70 N	0121013.43 W	733843.8 4	668971
V1284	5001	420750.99 N	0125640.30 W	669883.8 4	666347
V1284	6708	420829.66 N	0121013.67 W	733824.9 4	669370. 6
V1292	5001	420803.95 N	0125640.71 W	669864.9 4	666746. 6
V1292	6708	420842.62 N	0121013.92 W	733806.0 4	669770. 1
V1300	5001	420816.91 N	0125641.11 W	669846.0 4	667146. 1
V1300	6708	420855.58 N	0121014.16 W	733787.1 4	670169. 7
V1308	5001	420829.87 N	0125641.51 W	669827.1 4	667545. 7
V1308	6708	420908.54 N	0121014.41 W	733768.2 4	670569. 2
V1316	5001	420842.84 N	0125641.92 W	669808.3 4	667945. 3
V1316	6708	420921.49 N	0121014.65 W	733749.3 4	670968. 8
V1324	5001	420855.80 N	0125642.32 W	669789.4 4	668344. 8
V1324	6708	420934.45 N	0121014.90 W	733730.4 4	671368. 3
V1332	5001	420908.76 N	0125642.73 W	669770.5 4	668744. 4
V1332	6708	420947.41 N	0121015.15 W	733711.5 4	671767. 9



V1340	5001	420921.72 N	0125643.13 W	669751.6 4	669143. 9
V1340	6708	421000.37 N	0121015.39 W	733692.6 4	672167. 4
V1348	5001	420934.68 N	0125643.53 W	669732.7 4	669543. 5
V1348	6708	421013.33 N	0121015.64 W	733673.7 4	672567
V1356	5001	420947.64 N	0125643.94 W	669713.8 4	669943
V1356	6708	421026.29 N	0121015.88 W	733654.8 4	672966. 5
V1364	5001	421000.60 N	0125644.34 W	669694.9 4	670342. 6
V1364	6708	421039.25 N	0121016.13 W	733636.0 4	673366. 1
V1372	5001	421013.56 N	0125644.74 W	669676.0 4	670742. 1
V1372	6708	421052.21 N	0121016.37 W	733617.1 4	673765. 6
V1380	5001	421026.53 N	0125645.15 W	669657.1 4	671141. 7
V1380	6708	421105.17 N	0121016.62 W	733598.2 4	674165. 2
V1388	5001	421039.49 N	0125645.55 W	669638.2 4	671541. 2
V1388	6708	421118.13 N	0121016.86 W	733579.3 4	674564. 7
V1396	5001	421052.45 N	0125645.96 W	669619.3 4	671940. 8
V1396	6708	421131.09 N	0121017.11 W	733560.4 4	674964. 3
V1404	5001	421105.41 N	0125646.36 W	669600.4 4	672340. 3

V1404	6708	421144.05 N	0121017.35 W	733541.5 4	675363. 9
V1412	5001	421118.37 N	0125646.76 W	669581.5 4	672739. 9
V1412	6708	421157.01 N	0121017.60 W	733522.6 4	675763. 4
V1420	5001	421131.33 N	0125647.17 W	669562.6 4	673139. 5
V1420	6708	421209.96 N	0121017.85 W	733503.7 4	676163
V1428	5001	421144.29 N	0125647.57 W	669543.7 4	673539
V1428	6708	421222.92 N	0121018.09 W	733484.8 4	676562. 5
V1436	5001	421157.25 N	0125647.98 W	669524.9 4	673938. 6
V1436	6708	421235.88 N	0121018.34 W	733465.9 4	676962. 1
V1444	5001	421210.21 N	0125648.38 W	669506.0 4	674338. 1
V1444	6708	421248.84 N	0121018.58 W	733447.0 4	677361. 6

## 2. OPERATION AND SYSTEM STATUS

At the date of writing, the following pertain to this cruise:

- The IHA (mammal permit) is in process.
- Foreign Clearance permits is complete. Foreign clearance received Friday 04/26/13.
- The following issues (if applicable) were noted during preceding operations and are currently outstanding:
  - Source/Towing/Handling:
    - Baro16 Tested in March 2013. Small changes may need to be made during final deployment.
  - IT/Comms/Sonars/Processing:



- SBP – half transducers only
- Navigation/Positioning:
  - The PosMV system upgraded to version 5, Feb 2013.
- Syntrak MCS/Acquisition:
  - Lead-in #2 still to be changed out
- Seismic air compressors:
  - Nothing to note

### 3. PERMITS AND ENVIRONMENTAL PLANNING

#### 3.1. PERMITS

Because this is a seismic mission, OMO must comply with the National Environmental Protection Act, the Endangered Species Act and Marine Mammal Protection Act of 1972. Filing of the Incidental Harassment Authorization (IHA) is being handled by OMO. The Protected Species Observers (PSO) Handbook and the IHA will be reviewed via phone with vessel personnel (Captain, Technician in Charge and Lead PSO) and onshore OMO personnel (Mammal permit coordinator, Technical manager and Operations manager) prior to start of seismic operations. *This process will detail the allowed source depths for the duration of this cruise.*

#### 3.2. EXPORT CONTROLS

United States export controls exist to protect the national security and foreign policy interests of this country. Export controls govern the **shipment, transmission, or transfer** of certain sensitive **items, information or software** to foreign persons or entities. Where applicable, they may require authorization from the US Government in the form of an export license. Please see Appendix I for more information.

All personnel will be checked on the consolidated screening list is a list of parties for which the United States Government maintains restrictions on certain exports, reexports or transfers of items.



*Please notify the office if you have any export control items. If you have questions please contact the office before the cruise.*

### **3.3. HAZARDOUS MATERIALS**

Science programs requiring the use of hazardous materials including radioactive substances shall coordinate needs with the Office of Marine Operations well in advance of the mission. The *Langseth* is obligated to comply with the University National Oceanographic Laboratory System's (UNOLS) "Research Vessel Safety Standards"; Section 9 details UNOLS requirements for dealing with hazardous material usage onboard the vessel.

“The Chief Scientist will be responsible for the proper transportation, shipping and disposal of hazardous materials and waste, including the empty containers, associated with their project. Transportation and disposal must be carried out in accordance with Federal, State and Local regulations. In no case will this responsibility be passed to the ship’s crew or operating institution”.

“Proper storage, labeling, and spill response (clean-up) is the responsibility of the user. Anyone using hazardous material should be trained in proper laboratory safety procedures. The Chief Scientist shall be responsible for ensuring that safe laboratory procedures are followed including use of personal protective equipment, prohibiting the consumption of food and drinks in labs, and other safety precautions as outlined on MSDS and considered standard laboratory procedures”.

The vessel has limited storage for small amounts of chemicals, there is no onboard capacity to house large quantities. If large quantities of chemicals are required an appropriate chemical storage van will have to be obtained and installed on the vessel. The vessel does not have a fume hood available. Permits which may be required for the acquisition, transport or use of hazardous substances shall be obtained by the Chief Scientist with copies provided to the Office of Marine Operations. *The Marine Operations Office must review and approve any researcher coming aboard the Langseth with hazardous materials/chemicals.*



### 3.4. SHIPPING, FISHING AND DIVING ACTIVITIES

No significant activities anticipated.

### 3.5. OBSTRUCTIONS AND SHALLOWS

None anticipated.

### 3.6. WEATHER

Weather will be continually monitored while at sea. Weather forecasts will be available from the following systems:

[NOAA Weather](#)

[NOAA's National Weather Service Marine Forecasts](#)

[Buoy Weather](#)

[Weather Online \(UK\)](#)

## 4. CRUISE PARTICIPANTS

### 4.1. TECHNICAL STAFF

Survey operations will be based on a 24-hour day and the following offshore personnel will be utilized for this cruise:

**Table 4.1: Expected technical personnel**

<b>Participant</b>	<b>Group/Affiliation</b>	<b>Position</b>
Robert Steinhaus	L-DEO OMO	Chief Science Officer
Jay Johnstone	L-DEO OMO	Science Officer - ACQ/IT
Matt Grey	Contractor	Chief NAV
Tom Spoto	L-DEO OMO	ST&H
Bern Mckieman	L-DEO OMO	ACQ
Klayton Curtis	Contractor	ACQ
Allan Thompson	Contractor	NAV processor
Mike Martello	Contractor	NAV
Carlos Guitierrez	L-DEO OMO	Source Mechanic
Robbie Gunn	Contractor	Source Mechanic
Josh Kasinger	Contractor	Source Mechanic
Tyler	MATE	MATE Intern



Poppenwimer		
-------------	--	--

**Table 4.2: Expected protected species mitigation personnel**

<b>Participant</b>	<b>Group/Affiliation</b>	<b>Position</b>
Heidi Ingram	RPS-Geocet	Lead PSO
Dara Cameron	RPS-Geocet	PAM operator / PSO
Emily Ellis	RPS-Geocet	PSO
Meghan Piercy	RPS-Geocet	PSO
Rebeca Lago	RPS	PSO, Foreign Observer

#### **4.1.1. Technical Staff Responsibilities**

It is the responsibility of the technician staff to work in accordance with the issued procedures and within the cruise specifications. They are also responsible for maintaining the equipment, keep this in optimum condition and use it in accordance with the applicable procedures, work instructions and manuals. Technicians are responsible for all data gathered, to ensure that it is of maximum achievable quality and properly filed and labeled on the appropriate forms. Technicians will communicate with the Chief Science Officer on a continuous basis to keep him/her up to date with the status and progress of the work.

The technical support staff shall liaise with the science party to ensure that the best quality data obtainable is recorded. The science party is responsible for all geophysical data processing and interpretation. Data processors are NOT included in the technical support staff. The technical staff will assist, when possible, with other science operations including coring. However, the science party is responsible for in situ testing, storage, and transport of all samples to the onshore curation facility.

The technical support staff consists of a Technician in Charge / Chief Science Officer, IT / Navigation Technicians, Data Acquisition Technicians, and Source, Towing & Handling Technicians. Their responsibilities are as follows:



### **Chief Science Officer / Technician in Charge**

The Chief Science Officer (CSO) is the senior technician onboard and is the liaison between the cruise participants, the LDEO / OMO staff, the Captain, the LDEO / OMO office and the port agent. He / she coordinates the support effort among the various parties onboard. The Chief Science Officer is the first contact for issues related to on-board operations, cruise plans, etc. The CSO is responsible for deployment, recovery and trim of all towed seismic equipment.

### **IT / Navigation Technician**

The IT / Navigation Technician (IT /NAV) is in charge of navigation system parameters and operations. The navigation technicians are responsible for ensuring that correct procedures are used during the set-up and calibration of the navigation system, logging of all data and sensor information, correct installation, maintenance and operation of the SBES, MBES and motion sensors.

### **Data Acquisition Technician**

The Data Acquisition Technician (ACQ) assists in deployment, recovery and trim of all geophysical survey equipment, the seismic recording system parameters and operations as well as sound source controller operation. The survey technicians are responsible for the maintenance and operation of the survey equipment. This shall include overseeing that correct procedures are used during calibrations and winch operations, and that the data is logged in the correct format and electronic annotation is correct. This responsibility extends to assisting with installation and maintenance of the navigation and bathymetry spreads. They are also responsible for ensuring that correct procedures are used during the set-up and calibration of the multibeam systems and monitoring of the geophysical data.

### **Source, Towing & Handling Technician or Mechanic**

The Sound Source, Towing and Handling Technician (ST&H) is in charge of deploying, retrieving and maintaining the sound source as well as other seismic towed equipment.

### **Protected Species Mitigation**



The Protected Species Observers (PSO) required for mammal / protected species mitigation this cruise.

#### **4.2. MARITIME CREW**

This cruise will include the regular maritime crew of the R/V *Langseth*. The expected number of sailing crew is 20. The Captain is James O'Loughlin. The Chief Engineer is Stephen Pica.

#### **4.3. SCIENCE PARTY**

The following science party participants will be granted access to R/V *Langseth*. Next-of-Kin (NOK) forms will be sent to the PIs for distribution to the participants. Completed forms need to be returned to the OMO Manager, Technical Services no later than one (1) week before sailing. Failure to note and detail any participant could delay that participant's access to the vessel.

During operations, 2 members of the science party are needed at the main lab console for online data monitoring, log keeping, and other operational needs that arise (i.e. SVP casts, deployment, etc). These 2 people are asked to provide their undivided attention during their time assigned. The PI will assign shifts for 24 hour coverage. Participation is encouraged at all times, this is "your" science, however science party help is particularly needed during deployment and recovery of gear. Please do not hesitate to join the activity.



**Table 4.3: Expected science party members**

	<b>Participant</b>	<b>Group/Affiliation</b>	<b>Function</b>	<b>Gender</b>	<b>Email Address</b>
1	Dale Sawyer	Rice University, US	Chief Scientist	M	dale@rice.edu
2	Donna Shillington	LDEO, Columbia University, US	Co-Chief Scientist	F	djs@ldeo.columbia.edu
3	Tim Reston	U. Birmingham, UK	Co-Chief Scientist	M	t.j.reston@bham.ac.uk
4	Cesar Ranero	Barcelona, Spain	Co-Chief Scientist	M	cranero@icm.csic.es
5	Steve Danbom	Rice University, US	Seismologist	M	steved@rice.edu
6	Marianne Karplus	Univ. of Southampton, UK	Post Doc	F	M.S.Karplus@soton.ac.uk
7	James Gibson	LDEO, Columbia University, US	Grad Student	M	jgibson@ldeo.columbia.edu
8	Brian Jordan	Rice University, US	Grad Student	M	bj5@rice.edu



9	Mari Tesi Sanjurjo	Rice University, US	Grad Student	F	mat9@rice.edu
10	Sarah Dean	Rice University, US	Grad Student	F	Sarah.Dean@rice.edu
11	Miguel Andres Martinez	Royal Holloway, Univ. of London, UK	Grad Student	M	mandresmartinez87@gmail.com
12	Tobias Merry	U. Birmingham, UK	Grad Student	M	TBM011@bham.ac.uk
13	Luke Holroyd	U. Birmingham, UK	Grad Student	M	LH073@bham.ac.uk
14	Khemraj Shukla	Oklahoma State Univ., US	Grad Student	M	khemraj@ostatemail.okstate.edu
15	Boualem Pereira	Universidade de Aveiro, Portugal	Grad Student	M	boualem.pereira@gmail.com

Science party consists of 4 females and 11 males, for a total of 15 scientists.

## 5. GEODETIC PARAMETERS AND POSITIONING

All survey calculations will use the World Geodetic System 1984 datum (WGS84) UTM Zone (TBD at sea) projection. The Global Positioning System (GPS) operates on the WGS84 datum. The vessel's Differential GPS (dGPS) Reference Stations are defined in the WGS84 datum.



In order to obtain optimized navigation, waypoints need to be in decimal degrees (DD) to five (5) decimal points. Decimal degrees express latitude and longitude geographic coordinates as decimal fractions and are used in many Geographic Information Systems (GIS), web mapping applications such as Google Maps, and GPS devices. Negative numbers represent latitudes south of the equator and longitudes west of the Prime Meridian.

Example: 38.88972, -77.00888

### 5.1. GEODETIC AND PROJECTION PARAMETERS

The geodetic and projection parameters are detailed in the following table:

**Table 5.1: Project geodetic and projection parameters**

Global Positioning System Geodetic Parameters		
Datum	World Geodetic System 1984 (WGS84)	
Reference Ellipsoid	WGS84	
Semi Major Axis (a)	6378137.0 m	
Inverse Flattening (1/f)	298.257224	
Survey (local) Geodetic Parameters		
Datum	World Geodetic System 1984 (WGS84)	
Reference Ellipsoid	WGS84	
Semi Major Axis (a)	6378137.0 m	
Inverse Flattening (1/f)	298.257224	
Datum Transform Parameters: Global to Survey Datum		
X shift: 0.0 m	X-axis Rotation: 0.0 arcsec	Scale correction: 0.0 ppm
Y shift: 0.0 m	Y-axis Rotation: 0.0 arcsec	
Z shift: 0.0 m	Z-axis Rotation: 0.0 arcsec	
Map Projection (Project Projection Parameters)		
Grid	Universal Transverse Mercator (UTM)	
Projection Type	Universal Transverse Mercator (UTM), Northern Hemisphere	
Projection Zone	TBD	
Latitude at Origin		
Longitude at Origin (Central		

Meridian)	
False Easting	
False Nothing	
Scale Factor at Central Meridian	
Grid Units	Meters

### 5.1.1. Gravity Tie Point

Per standard procedure, a gravity tie will be done before and after this cruise. During the cruise, a ship-mounted gravimeter will measure gravity.

## 5.2. POSITIONING REFERENCE SYSTEMS

Two independent standard multi-station dGPS systems are required for the survey.

**Table 5.2: Vessel Positioning Reference Systems**

System	Equipment
Primary Nav system	C-Nav dGPS
Secondary Nav system	Seapath dGPS
Tailbuoy navigation	PosNet rGPS
Source navigation	PosNet rGPS (1 unit per subarray)
Acoustics	DigiCourse
Navigation processing	Concept Sprint 4.3.9
Bird Controller	DigiCourse
Survey-Gyro (Primary)	Simrad GC-80
Ships-Gyro (secondary)	Sperry MK-27
Speed Log	Furuno DS-50
Multibeam	Kongsberg EM-122

## 5.3. MAGNETIC DECLINATION

Source: [www.USGS.gov](http://www.USGS.gov) (<http://www.ngdc.noaa.gov/geomag-web/#declination>)

Model: IGRF-2005

Date: 06/01/2013

Position: 42°N, 13° W



Declination:  $-4.642^{\circ}$   
Variation:  $0.1423^{\circ}$  per year

Map for reference purposes only. Magnetic declinations should be calculated for various points using the Mag dec calculator found on [www.ngdc.noaa.gov](http://www.ngdc.noaa.gov).

#### 5.4. COVERAGE FOR DIFFERENTIAL CORRECTIONS

Below is the map of coverage for differential corrections. Please note the survey area with respect to these coverages. Areas of the survey not inside "Differential Coverage" zones will have positional accuracy degraded. Sub-meter positioning accuracy by the vessel systems is not available in areas outside "Differential Coverage" zones. Accuracy of position will be variable, and is dependent on number of satellites in view and the constellation geometry.

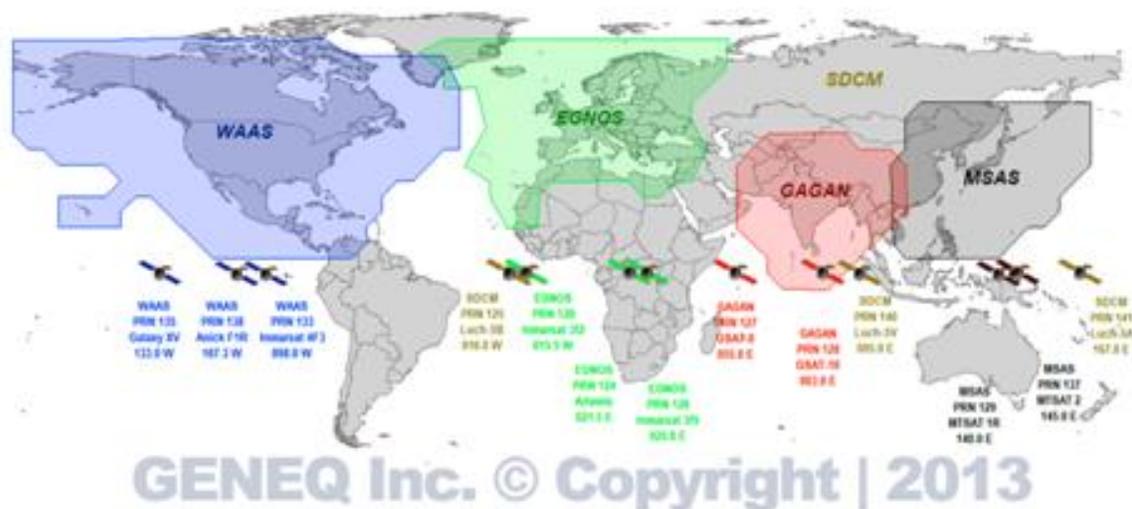


Figure 5.1: Map of coverage for differential corrections

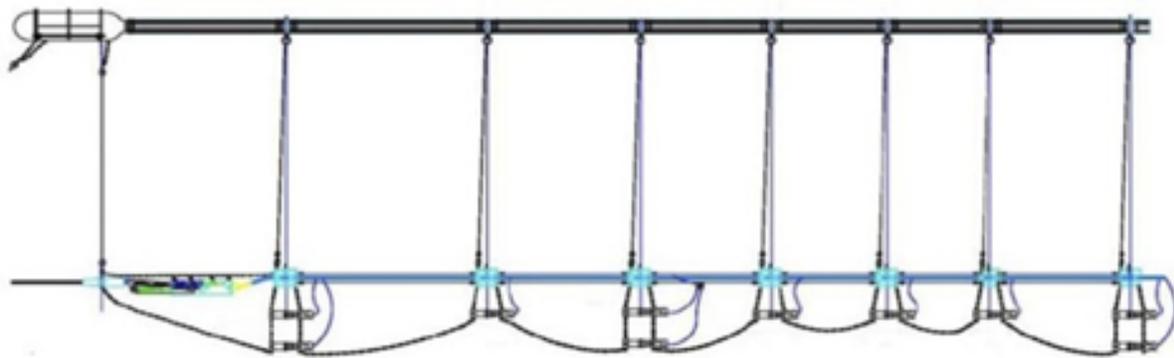
## 6. SURVEY EQUIPMENT AND OPERATIONS

### 6.1. SEISMIC

The 3D portion of this survey will be acquired using two tuned air-gun arrays (sources), consisting each of two sub-arrays with 1,650 cubic inches (in<sup>3</sup>); yielding a total of 3300 cubic inches (in<sup>3</sup>). Each sub-array will consist of a mixture of Bolt 1500LL and Bolt 1900LLX Elements and will be configured as two identical linear arrays or “strings” (Figure 6.1). Each sub-array will have ten elements; the first and last element in the sub-array are spaced 16 m apart. Nine elements in each sub-array will be fired simultaneously for a total volume of approximately 3,300 in<sup>3</sup>, whereas the tenth element is kept in reserve to be enabled in case of failure of another element should occur. Each Sub-Array will be towed approximately 260 m behind the vessel in 3D. Sub-array to Sub-array spacing in 3D will be ~8 m, while Source to Source separation will be 100 m (+/- 50 m cross line). Discharge intervals depend on both the ship’s speed and Two Way Travel Time (TWTT) recording intervals. The air guns will be discharged approximately every 37.5 meters, based on an assumed boat speed of 4.5 knots, with a 15-second recording window. The nominal firing pressure of each array is 2,000 pounds per square inch (psi). During firing, a brief (~0.1 s) pulse of sound is emitted. The air guns will be silent during the intervening periods.

The tow depth of the air gun arrays will be 9 m (or shallower, as specified by the IHA). Because the actual source is a distributed sound source (9 air guns) rather than a single point source, the highest sound levels measurable at any location in the water will be less than the nominal single point source level. In addition, the effective (perceived) source level for sound propagating in near-horizontal directions will be substantially lower than the nominal omnidirectional source level because of the directional nature of the sound from the air gun array (i.e. sound is directed downward).





**Figure 6.1: Seismic Array Diagram**

Flotation will be used to keep the air guns at a depth of 9 m and the vessel speed during data collection will range from 4 to 5 nautical miles per hour [knots]. Depth indicators are located on each string to verify the depth of the sources during acquisition. The sound source will be generated by the discharge of the air guns approximately every 37.5 m which is based on an assumed vessel speed of 4.5 knots. The expected timing of the shots is once every ~16.2 seconds.

The *R/V Langseth* will tow four hydrophone streamers with a length of approximately 6 km (3.7 mi) each. The intended tow depth is approximately 12 m. The depth can be changed by the PIs and is not set by the IHA like the source depth. Each streamer will consist of Sentry Solid Streamer Sercel cable. Each streamer will have 468 groups of hydrophones (channels), at intervals and length of 12.5 m. Each group consists of 12 hydrophones. Depth levelers are provided on each streamer to maintain them at the desired depths. Streamer Recovery Devices (SRD) are also provided in case of a malfunction to aid in recovery. The SRD are activated when the streamer sinks to a pre-determined depth (e.g. 50 m). Compass Birds are installed along each streamer to provide a heading value at each compass location. These are used to model each streamer shape real time in the navigation system.

Acoustic transponders will also be present along each streamer, tailbuoy, and subarrays. A head, mid, and tail network will be configured in the system to aid in the accurate positioning of the in-water equipment.





**Figure 6.2: Typical configuration for the air gun array and towing strategy**

### 6.1.1. Shooting Plan

A shooting plan will be developed and approved by the PIs and the Chief Science Officer during the cruise mobilization. The shooting plan should not be deviated from without written authorization from both. The plan must take into consideration known issues such as shallows, obstructions, fishing or other activity, protected marine areas, prevailing strong currents, and weather. In some cases the Captain and/or Marine Operation Manager may also have to provide approval if safe operation or safe navigation of the vessel is in question. A copy of each approved version of the shooting plan is kept with the documentation for the science cruise. Any changes to the shooting plan must be discussed with the Chief Science Officer first, then agreed upon changes are brought to the Captain.

Be aware the following:

- Use shot point 1001 for the start of each pre-plot, run-out shot-point is NOT included in pre-plots.
- A 3250 m run-out (85 shot-point) should be added to all lines.
- Run-in should be min. 6 km to ensure that the streamer is straight before start of line (SOL).

### 6.1.2. Seismic Parameters

### 6.1.3. Seismic Recording Systems

Recording type	Sercel Syntrak 960-24 recording system
Sample rate	2 ms
Recording length	15 or 14? seconds w/ no Deep Sea Delay
Low Cut Filter	2.0 Hz Digital Filter / 12 dB/OCT
High Cut Filter	206 Hz Digital Filter / 276 dB/OCT w/ linear Phase
Data format	SEG-D 8058 Rev 1 (demultiplexed) with External Header.
Media	Seisnet recording system, data recorded directly to disk

#### 6.1.4. Seismic Streamer

Streamer type	Thompson Marconi SENTRY
No of streamers	4
Streamer length	6000 m
Streamer separation	200 m
No of groups	468 channels
Group Interval	12.50 m
Group length	12.50 m
Streamer depth	9 m +/- 1 m
Near offset	~180m (3D) Center of source to center near group
Spacing of birds	Every 300m with extra redundancy at head and tail of streamers

#### 6.1.5. Seismic Source

Source type	BOLT guns
Shot interval	37.5 m
Number Sources	Dual (3D)
Source depth	9 m (MCS), per IHA permit application
Volume	3300 in <sup>3</sup>
Air pressure	1950 +/- 100 psi
Source separation	100 m
Max timing error	+/- 2 ms

See Appendix 3 for source details.

### **6.1.6. In Sea Positioning Systems**

#### **Tailbuoy**

A Tailbuoy will be deployed at the tail of each streamer for positioning. Each Tailbuoy is to be fitted with a GPS unit, a radar reflector, a strobe light, and a DigiCourse Acoustic transponder for ranging to the transponders on the tail of each streamer.

#### **Source Positioning**

Each Sub-Array float will have a Posnet rGPS Pod installed along with each sub-array having a DigiCourse acoustic pod.

#### **Streamer Positioning**

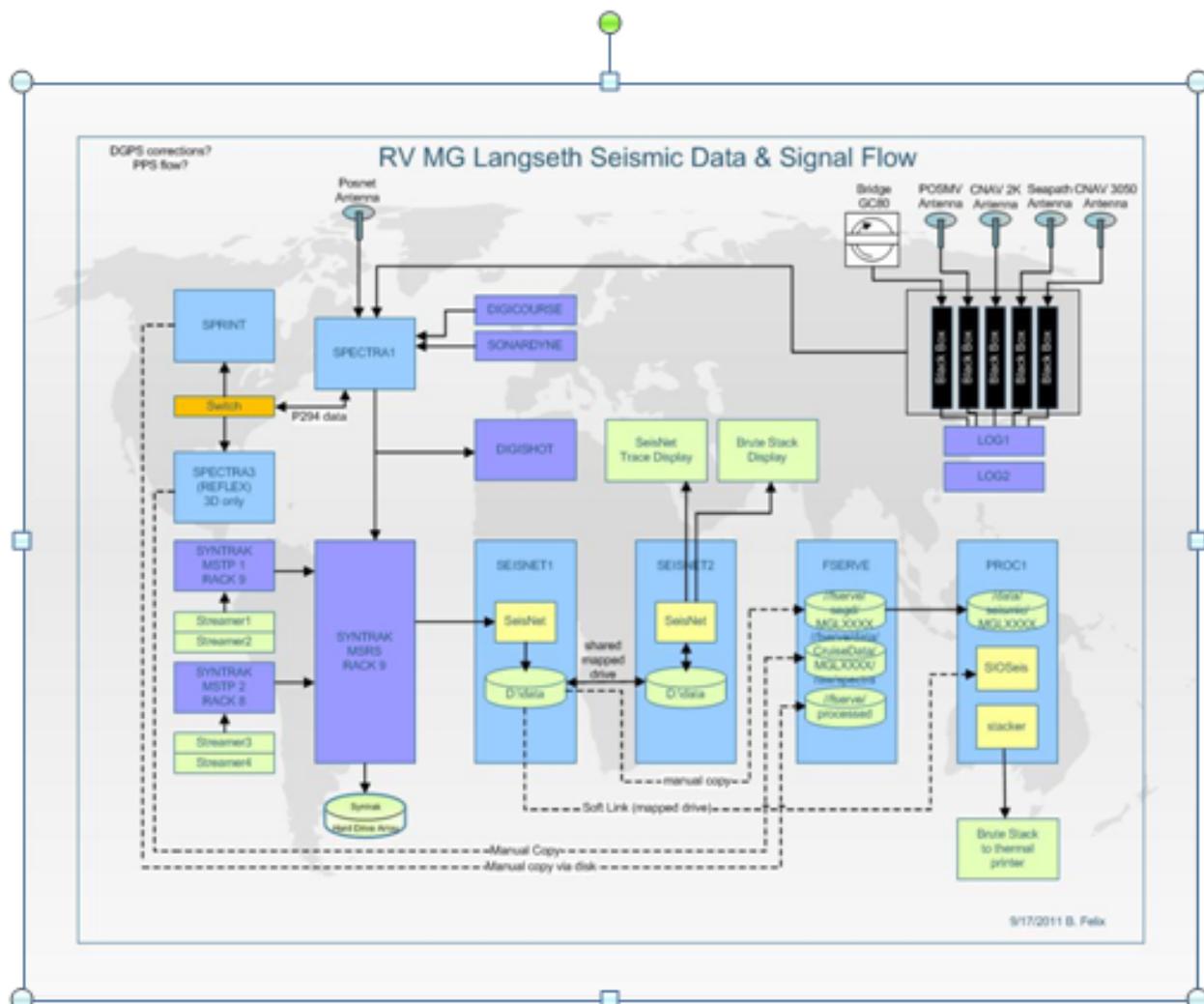
Streamers are positioned using a combination of Digicourse 5010/11 compass birds and DigiCourse acoustic transponders.

#### **Magnetic Compasses and birds**

The compasses and birds will be mounted at 300 m intervals on the streamer. The depth controllers / compasses will be DigiCourse model 5010 / 5011. Extra compass birds will be mounted in the front and tail of the streamer for redundancy.

#### **Acoustic Positioning**

Digicourse Digirange Acoustic Pods will be mounted on the streamer cable. The units mounted at the head of the Streamer will range to the Acoustic Transponder Pods co-located with the rGPS units on the Sub-Array Floats. Other units will be located in the middle of the streamer and will cross range to the units on the other streamers (if applicable). Units are mounted at the tail of the streamer, which will range to the tailbuoy transponder co-located with the rGPS unit and/ or the other streamers (if applicable).



**Figure 6.3: Seismic Data Flow Layout**

### 6.1.7. Acoustic Measurements

The strength of the air gun pulses can be measured in a variety of ways, but National Marine Fisheries Service (NMFS) commonly uses “root mean square” (in dB re 1 $\mu$ Pa [rms]), which is the level of the received air gun pulses averaged over the duration of the pulse. The rms value for a given air gun pulse is typically 10 dB lower than the peak level, and 16 dB lower than the peak-to-peak level (McCauley et al., 1998, 2000a,b).

The noise modeling for the proposed 3D seismic survey was conducted based on the results of mathematical modeling conducted by Greeneridge Sciences, Inc. (2011). The model results are based upon the air gun specifications provided for R/V Langseth and seafloor characteristic available for the Project

area. Safety and Exclusion zone dimensions are based on NMFS definitions for Incidental Harassment Authorizations (IHA). The Safety Zone is the distance within which received sound levels are modeled to be greater than 160 db and the Exclusion Zone is the distance within which received sound levels are modeled to be greater than 180 db. Table TDB from IHA.

#### **6.1.8. Seismic QC Processing**

Seismic quality control (QC) will be provided by seismic processing team, made up of science party members.

##### **Plan from Sawyer, for this cruise:**

1. We will filter and resample the data to 4 ms.
2. We intend to process each sail line as a 2D seismic section.
3. We intend to do velocity analysis at approximately 1 km spacing in E-W and N-S directions. We will use this to produce a 3D velocity volume.
4. We intend to construct a “brute stack” 3D volume using near offset traces. Sawyer has provided two additional processing Linux computers - called proc3 and proc4. Proc3 is a small machine for serving software licenses. Proc4 is a larger machine for processing seismic data. Sawyer is adding 5 Paradigm Echos licenses, 6 ProMax3D licenses, and 5 Petrel licenses for this cruise only.

## **6.2. SONARS**

The sonar equipment on vessel include the Kongsberg EM122 12kHz multibeam echo sounder, the Knudsen 3260 3.5 Khz Sub-bottom Profiler, and the RDI OS75 ADCP, are operated continuously throughout every cruise. Staff on board *Langseth* are proficient in basic operation of these systems, but are not sonar experts. **PI's who require advanced expertise during their cruise will need to bring their own personnel.**

### **6.2.1. Multibeam Echosounder**

The EM122 multibeam echosounder (MBES) is normally run with standard options enabled and automatic parameter adjustments enabled where possible. This configuration should provide good coverage (swath width), but may not provide optimal coverage under all conditions. These settings will not provide the best data quality. Specifically, reducing swath width is often required to



attain the best data quality and density. Consult with the technical staff or other authorities if there are specific requirements for your cruise.

Bathymetry data will be acquired (recorded) using a Kongsberg EM-122. The EM122 sound velocity profile (SVP) will be processed from the Expendable Bathythermograph (XBT) data and uploaded to the EM122 system by the technical staff. The updates will occur at the discretion of the technical staff or at PI request, up to once per day, coincident with XBT deployment (see Section 6.4 XBT).

**From Sawyer, for this cruise only:**

We request the deployment of one XBT at the midpoint of each sail line. Dirk Klaeschen, GEOMAR, is providing the extra XBT's. They are being shipped to the ship's agent in Vigo, Spain.

The science party will supply approx. 30 minutes of personnel time to perform the processing, per profile. Training in processing and uploading the profile to the multibeam will be provided by technical staff.

**6.2.2. Sub-bottom Profiler**

The Knudsen 3.5 Hz Sub-bottom Profiler (SBP) is normally run synchronized with the EM122 MBES. **This sometimes results in a reduction in the Knudsen sampling rate**, but minimizes interference with the EM122. PIs who wish to run the Knudsen without synchronizing to the EM122 must discuss this with the Chief Science Officer. If the multibeam is not in use, the Knudsen will be run in internal sync. Knudsen data is recorded in SEG-Y, KEA, and KEB formats. The SBP has only half the transducer power at this time.

**6.2.3. Acoustic Doppler Current Profiler**

A RDI OS75 Acoustic Doppler Current Profiler (ADCP) is installed on the vessel and has been in operation since 2011 science mission season. The vendor, Teledyne RDI, ran both Harbor Acceptance (done in San Francisco) and Sea Acceptance (done offshore San Diego) tests, completing the commissioning of the system. Dr. Jules Hummon from University of Hawaii joined the *Langseth* for the JMS inspection cruise and fully installed their on-



board system for logging, processing and QC of the data. The installation was completed and the unit is fully functional with daily email alerts automatically sending to the technical staff.

### **6.3. MAGNETICS AND GRAVITY**

#### **6.3.1. Magnetics**

The *Langseth* carries two Geometrics 882 magnetometers – one being a spare unit. *Langseth* policy is to deploy the magnetometer only in the work area. The magnetometer is not deployed during transits to and from the work area. The magnetometer must be recovered at less than 3 knots.

#### **6.3.2. Gravity**

The *Langseth* is equipped with a Bell Aerospace BGM-3 gravimeter. Gravity data will be handled by the R2R data archive group at LDEO (See Data Distribution below).

### **6.4. XBT**

The *Langseth* carries Sippican T-5 and T-7 Expendable Bathythermograph (XBT) probes, suitable for general oceanography and sound velocity use in the multibeam processing. *Langseth* deploys one probe daily when possible. Science party assistance (one person, ~20 minutes daily) is required for routine probe launch. Multiple people can be trained on probe launch operations. If no science party members are available to assist with deployments, deployments may be reduced as necessary.

Due to space and cost considerations, *Langseth* does not routinely carry probes in excess of these requirements. PIs who require additional probes or probes of a different type must discuss their needs with OMO before the cruise. PIs who have a specific deployment plan should work with shipboard technical staff during the cruise.

The standard cut-off limit for XBT probes will be used unless a specific request is made by the PIs (Probe T-5 to 1850 m and Probe T-7 to 700 m). Other Mk21 probes, e.g. XCTD's and XSV's, may be deployed using the Mk21 system. The LDEO technical staff does not provide these probes. If



required, they must be provided by the PIs. Note that during seismic operations, XBT probes often terminate early as they get caught in the gear.

For this cruise, as XBT data are requested as a secondary objective, a written execution plan is recommended. The plan should detail, at a minimum, frequency, location or distance between drops, probe type, and re-shoot specifics.

**From Sawyer, for this cruise only: XBT Data Plan**

We request the deployment of one XBT at the midpoint of each sail line. Dirk Klaeschen, GEOMAR, is providing the extra XBT's. They are being shipped to the ship's agent in Vigo, Spain.

The science party will supply approx. 30 minutes of personnel time to perform the processing, per profile. Training in processing and uploading the profile to the multibeam will be provided by technical staff.

## **6.5. CTD**

The *Langseth* carries a Sea-Bird Electronics SBE19 Conductivity, Temperature, Depth (CTD) system. This instrument does not have a water sampling system.

## 6.6. NAVIGATION

The navigation equipment on the vessel is as follows:

- Furuno FE700 echosounder
- Furuno DS50 doppler speedlog
- C-Nav 3050 DGPS
- C-Nav 2000 DGPS
- Simrad GC80 gyrocompass
- Sperry Mark 37 gyrocompass
- POS/MV Integrated Nav System
  - Upgraded February 2013
- Seapath Integrated Nav System
- Spectrum Instruments TM-4 Event Logger

These systems are provided to support seismic operations and the multibeam system. There are no user-configurable options. These systems are operated by the crew and technical staff, and are turned on or secured as necessary. They are normally operated, unless equipment or permit requirements dictate otherwise. All of these instruments output serial data and are logged using the Lamont Data System (see Section 6.10).

The navigation processing will be performed by the technical staff using the Concept Sprint Navigation Processing System.

Final data format: UKOOA P190

Final data medium: Electronic

## 6.7. METEOROLOGICAL

*Langseth* has an RM-Young Weather Station installed for wind speed/direction, air temp/humidity, and barometric pressure.

## 6.8. SURFACE SEAWATER

The following meteorological and hydrographical instruments are on the *Langseth* and are routinely operated:

- LDEO PCO2
- SBE-45 TSG



- Applied Microsystems MicroSV
- Sea-bird Electronics SBE38 Temperature Sensor

## **6.9. CLIENT-PROVIDED INSTRUMENTATION**

Set-up and operation of client-provided instrumentation is the responsibility of the Chief Scientist. The technical staff can assist with serial data feeds and network access.

## **6.10. LAMONT DATA SYSTEM (LDS)**

Serial data is logged via the Lamont Data System (LDS). The LDS provides a highly configurable system for receiving, recording, manipulating, and transmitting serial data. Access to this system, either to log data from client-provided instrumentation or to have navigation or other data sent to client instruments or data logging equipment, is possible. Please discuss these needs with the technical staff before the cruise.

LDS data is automatically copied (using rsync) to the cruise directory every six hours.

More details regarding data are in the following data management and distribution section.

## **7. DATA MANAGEMENT AND DATA DISTRIBUTION**

LDEO has implemented a file management system and directory structure that will enable all digital data to be organized and backed up efficiently on the vessel network.

### **7.1. LINE NAME CONVENTION**

Surveyed lines will be labeled in a logical and unique manner.

#### **7.1.1. Navigation and Support Data**

Lines names will include the cruise number, then the line number, and lastly the line type. Line numbers will start at one and increment sequentially during the survey. Lines will be identified at the end of the line name as Prime (P),



Reshot (R), or Infill (I). The line names can have a maximum of 12 characters.

Example: MGL12081001P

Cruise Number: MGL1307  
Line Number: -----1001  
Line Type: -----P/R/I  
P = Prime, R= Reshot, I= Infill

“Infill” lines used only in 3D mode.

CMP Line Numbers will start with 1001 for the first line and increase chronologically. The Pre-Plot (Track Lines) will increment by one (1) because of the number of CMP lines acquired during each pass.

#### 7.1.2. Recording and Other System Data

The format for line names of both of the RECORDS and HEADERS of all other data including the SEG-D and SEG-Y format should follow the full UKOOA 16 character standard to match the navigation data, as above.

### 7.2. DATA DISTRIBUTION

Upon arrival on the vessel, Chief Scientists shall meet with the Chief Science Officer and the Data Manager to discuss the NSF and *Langseth* data policies. Before departing the vessel, the Chief Scientist will meet again with the Data Manager and sign a data release authorization, which authorizes LDEO to transmit and submit the raw cruise data on their behalf. At this time, certain data sets may be marked for early release. *Langseth* does not routinely collect non-digital data (e.g. water samples, cores) during seismic operations. Should non-digital data be collected, it will be the responsibility of the Chief Scientist to arrange to have the samples removed from the vessel at the end of the cruise and ensure that NSF archiving requirements are met.

### 7.2.1. Collection

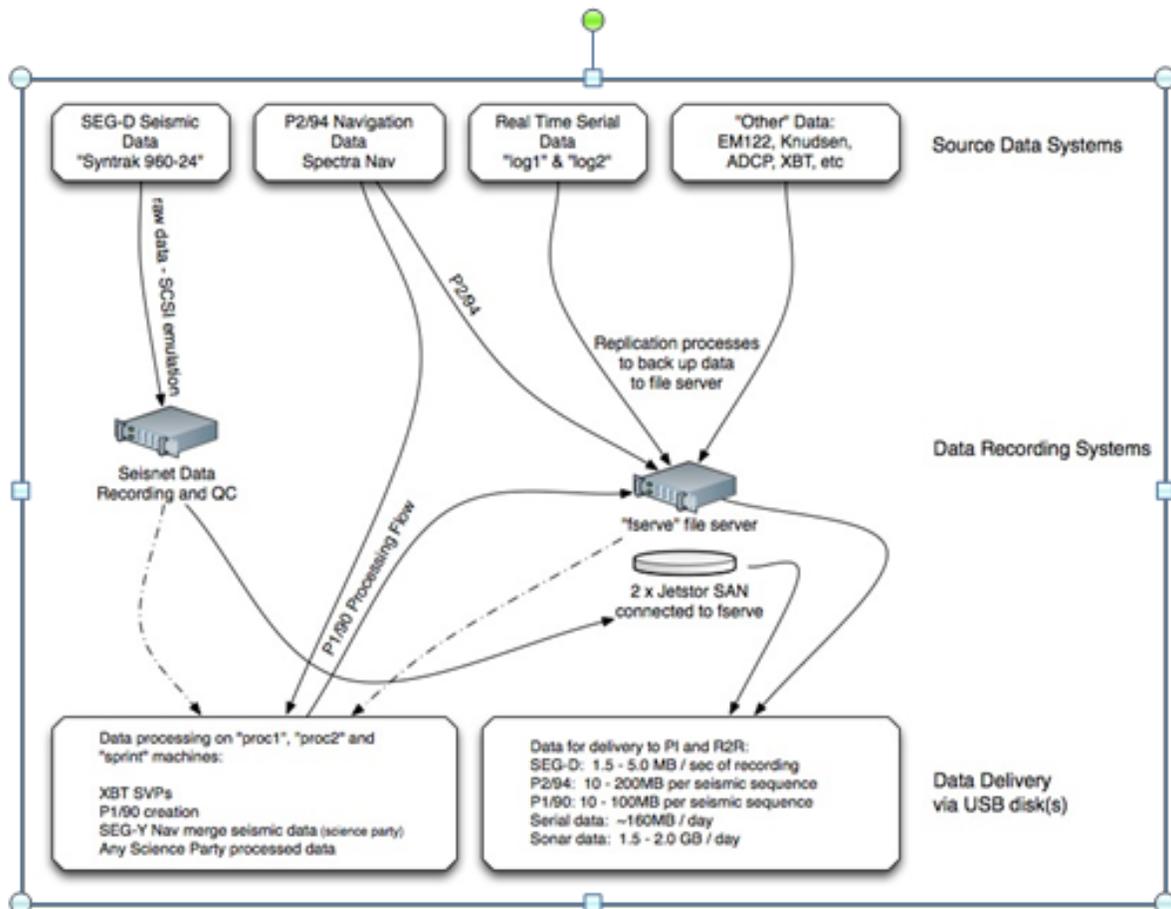
All data acquired from *Langseth* sensors flows to the central *Langseth* fileserver (fserve), where they are stored in a cruise-specific network share, called the ‘cruise directory’. All cruise documentation, log files, and records are also stored there. Shipboard researchers can access the cruise directory using a CIFS network share (standard Windows file sharing). *Langseth* technical staff will assist users in accessing the cruise directory. Access to the raw data is read-only, but writable areas are available for users to store documents and files. Users are encouraged to store any cruise-related materials (except seismic processing files) in the cruise directory. Users are also encouraged to load data from non-*Langseth* (i.e., client-provided) instruments in the cruise directory, also.

Multi-channel seismic shot data is recorded directly to RAID disk and is backed up on the central fileserver under a different share, called the ‘SEGD directory’.

Note that all shipboard researchers are provided credentials to access the cruise directory and SEG D directory. After the cruise is completed, these directories are archived and are not available to subsequent users. During the cruise, however, all cruise participants have access to all current data. If there are specific data security concerns, these MUST be identified before the cruise.

Toward the end of the cruise (usually the day of arrival), the technical staff will close the cruise directory and no further additions will be possible. Sufficient notice will be made to users to allow completion of work.





**Figure 7.1: Data Flow Layout**

### 7.2.2. Distribution and Transport

Data are logged until arrival at the pier. The data distribution will be finalized the day of arrival and will be ready for packaging the morning after arrival.

The technical staff will provide one set of data copies, including all raw underway digital data to the PI on portable hard drives. Further copies can be made by the PI from these hard drives. The seismic data is made available to scientists via network share, either NFS or CIFS.

If a gravity tie can be completed before the cruise directory is closed out, the gravity tie records will be stored on the cruise directory, including gravimeter data up to and through the gravity tie. If a gravity tie cannot be completed, a

gravity addendum will be compiled and made available to scientists at a later date.

### **7.2.3. Archival and Release**

Per NSF policy, all data collected must be made available to the public within two years of collection. NSF has funded several programs to archive and disseminate research data.

#### **Underway Sensor Data**

Underway data acquired routinely with the ship's installed sensors (e.g. multibeam, subbottom profiler, ADCP, MET sensors) are submitted to the NSF funded '[Rolling Deck to Repository](#)' (R2R) program. The R2R program is a data clearinghouse which receives raw data from all UNOLS vessels, provides basic data documentation and routine quality assessment, and ensures submission to the appropriate NOAA data center (the National Geophysical Data Center or National Oceanographic Data Center) for long-term archiving and distribution.

At completion of the cruise, the technical staff will submit the contents of the cruise directory to R2R.

#### **Multi-Channel Seismic Shot Data**

All multi-channel seismic field data collected aboard the *Langseth* are archived with the NSF-supported [Academic Seismic Portal at LDEO](#) of the [IEDA Marine Geoscience Data System](#) (MGDS). Multi-channel seismic data from most academic surveys conducted with the R/V *Ewing* are also available, as well as data from a number of earlier programs of the R/V *Conrad* and R/V *Vema*.

At completion of each cruise, the technical staff submit the contents of the SEG-D directory as well as all seismic logs and seismic navigation data to the MGDS. The Chief Scientist may request data be made public immediately, however a proprietary hold of 2 years is customary.

#### **OBS Data**

All OBS data are archived through the [IRIS Data Management Center](#) (DMC) and are submitted to the DMC by OBS Instrument Pool (OBSIP) personnel.

Founded in 1984 with support from the National Science Foundation, IRIS ([Incorporated Research Institute for Seismology](#)) is a consortium of over 100 U.S. universities dedicated to the operation of science facilities for the acquisition, management, and distribution of seismological data.

### **Science Party Instruments and Processed Data Created at Sea**

*Langseth* technical staff do not routinely handle the submission of any data acquired with science party instrumentation or created by on-board processing. For example, if the science party processes multibeam bathymetry data during the cruise, that processed data will not be included with the data package submitted by the technical staff to R2R or MGDS. However, these data can be included in the archive submission if the science party makes arrangements for this at the end of the cruise.

### **Processed seismic data**

Processed seismic data (e.g. stacked and migrated sections) from *Langseth* programs are archived at the [Academic Seismic Portal at UTIG](#) and are accessible by links from MGDS. Submission of processed data sets are the responsibility of scientists, in accordance with the requirements of the funding agency supporting their studies.

## **8. COMPUTERS AND COMMUNICATIONS**

### **8.1. SHIP'S NETWORK**

*Langseth's* computer network consists of gigabit networking to all lab spaces, with wireless accessibility throughout the ship. Internet access is on a separate, wired network. Only certain spaces have ports to access the internet. Refer to the Internet Access and Usage policy for details.

### **8.2. EMAIL, DATA TRANSFERS AND INTERNET ACCESS**

Access to email from home institutions is not blocked, and can be received on the internet-enabled network.

Large data transfers can be arranged. Transfers can be done at any time during the cruise but require coordination with the technical staff.



Internet access is a limited resource on ships. While HiSeasNet provides a 24-hour connection, bandwidth is less than that of a typical residential DSL service. Please refer to the internet access policy (on the internal *Langseth* web site) for information detailing how internet access is controlled. Any questions or assistance requirements, please contact the technical staff.



### 8.3. SCIENTIST OWNED COMPUTERS

Scientists may bring their own computers to the vessel. The technical staff will provide support in setting up a network connection and access to email, file services, and printing. Windows XP/Vista/7, Mac OS X, and Linux Redhat/Ubuntu/Debian/Fedora are supported.

Scientists may bring workstation computers. Please discuss beforehand with technical staff during planning stages to ensure enough space is available for all equipment. The tech staff will assist users in setting up workstations.

The technical staff can provide desktop support limited to setting up network access and configuring devices to access network services. Windows XP/Vista/7, Mac OS X, and Linux Redhat/Ubuntu/Debian/Fedora are supported. **Limited break/fix support is provided, on a best-effort basis.**

Updated anti-virus software is required prior to departure. Failing to update on-coming computers' anti-virus software puts the entire vessel network in danger.

### 8.4. PUBLIC COMPUTERS

*Langseth* provides workstations and software for seismic processing and general-purpose computing. These are located in the Main Lab. For a list of software available on these systems, please refer to the shipboard internal *Langseth* web site, or email the technical staff. Any questions or assistance requirements, please contact the technical staff.

Internet terminals (at least one) are also provided for crew and science party use. These may be relocated depending on mission requirements. Tech staff will brief the science party on internet terminal access during orientation.

### 8.5. VOICE COMMUNICATIONS

Telephone calls for the PIs can be made from any phone on the vessel. Upon arrival at *Langseth*, the PI will be issued a code to allow him/her to access an outside line via Fleet Broadband. On weekends, the internet may be secured



for up to two hours at a time to allow morale calls for all on board. Morale phone calls are in 15-minute slots.

## **9. SHIPBOARD SAFETY AND SECURITY**

### **9.1. SHIPBOARD SAFETY**

The Captain has the final authority for all safety-related matters posing any danger to the ship and/or anyone aboard it. Additionally, if anyone onboard finds that unsafe conditions exist, he or she has the authority to stop any related shipboard science until the situation is corrected. This would include issues of industrial, marine or laboratory safety

Orientation will be conducted for on-coming science party. This will include a safety briefing and vessel walk-through. Each cabin has station bill postings and copies of the UNOLS RVOC Safety Training Manual, Chapter 1.

### **9.2. MEDICAL CARE**

While in port, any non-emergency health or injury needs will be handled by the Captain. Arrangement can be made through either the Captain or the Chief Science Officer, who will pass the request on to the Captain. **ALL EMERGENCY MEDICAL SITUATIONS NEED TO BE COMMUNICATED TO THE CAPTAIN THROUGH THE QUICKEST MEANS AVAILABLE.** Emergency protocol will be addressed during orientation. Medical Advisory Systems provides medical advice while at sea. The Captain is the primary person to contact for medical care while at sea. Be advised that the infirmary is small and medical supplies are limited. It is the responsibility of all cruise participants to advise the Captain of any medical conditions, and ensure an adequate supply of any and all prescription medication required by that participant.

### **9.3. SHIPBOARD SECURITY**

The R/V *Marcus G Langseth* is a US flagged vessel, and can therefore be subject to MARSEC (marine security). All engineering spaces and vessel safe operation spaces are off limits to non-affiliated and/or non-escorted personnel.



All persons intending to board the vessel must provide positive proof of identification. A Passport, US drivers license, or TWIC (transportation workers identification credential) are accepted. Non-crew cannot enter a US port facility or board the *Langseth* unescorted without a TWIC. A TWIC card is not required. A gangway watch is maintained and all non-crew are required to sign-in and sign-out.

## 10. SECONDARY VESSELS

### 10.1. CHASE BOATS

None at this time, however may be deemed necessary later in the planning process.

### 10.2. OBS HANDLING BOATS

*R/V Poseidon* will deploy and recover OBS's for this mission. Efforts will be made to coordinate timing of each event, if needed. The OBS activity may be completely autonomous.

## 11. CONTACTS AND ADDRESSES

### 11.1. OFFICE OF MARINE OPERATIONS

**Table 11.1: Contact List for OMO**

Name	Position	Office	Home	Cell	Email
Paul Ljunggren	OMO Primary Contact / Operations Manager	845-365-8845	203-234-1543	914-806-5095	<a href="mailto:pwl@ldeo.columbia.edu">pwl@ldeo.columbia.edu</a>
Jeff Rupert	OMO Alternate / Tech Services	845-365-8367	845-544-2445	845-558-4239	<a href="mailto:Rupert@ldeo.columbia.edu">Rupert@ldeo.columbia.edu</a>

	Manager				
Sean Higgins	OMO Alternate / OMO Director	845-365-8528	914-831-5575	914-260-6759	<a href="mailto:sean@ldeo.columbia.edu">sean@ldeo.columbia.edu</a>
Martin Klein	Port Engineer			619-602-7398	<a href="mailto:porteng@ldeo.columbia.edu">porteng@ldeo.columbia.edu</a>
Megan Meyer	Tech Services	845-365-8377		914-589-4861	<a href="mailto:megan@ldeo.columbia.edu">megan@ldeo.columbia.edu</a>
OMO office fax number: 845-359-6817					

## 11.2. PROTECTED SPECIES

**Table 11.2: Contact List for Protected Species**

Name	Position	Office	Home	Cell	Email
Meagan Cummins	Safety/Environment Coordinator	845-365-8456		609-706-2508	<a href="mailto:cummings@ldeo.columbia.edu">cummings@ldeo.columbia.edu</a>
Paul Ljunggren	Operations Manager	845-365-8845	203-234-1543	914-806-5095	<a href="mailto:pwl@ldeo.columbia.edu">pwl@ldeo.columbia.edu</a>
Jeff Rupert	Tech Services Manager	845-365-8367	845-544-2445	845-558-4239	<a href="mailto:Rupert@ldeo.columbia.edu">Rupert@ldeo.columbia.edu</a>

## 11.3. R/V MARCUS G LANGSETH

Contact information for the vessel:

IMO 9010137

Registration NY3360FG

Call Sign WDC6698

MMSI

High Seas Net:

Bridge Extension 1000

Lab Extension 1401

Iridium Voice 011 8816 3183 0511 \* Only rings on bridge.

Via Inmarsat C (C-Link email) [436980010@inmc.eik.com](mailto:436980010@inmc.eik.com)

Fleet Broadband 870 773 153 692

Ocean Codes- 871 Atlantic East; 872 Pacific; 873 Indian; and 874 Atlantic West

Ship Cell Phones

Chief Science Officer 845-652-0509  
Captain 914-275-3918  
Chief Engineer 845-558-6188

Email addresses

Chief Science Officer [Roberts@ldeo.columbia.edu](mailto:Roberts@ldeo.columbia.edu)  
Science Officers [dmartins@ldeo.columbia.edu](mailto:dmartins@ldeo.columbia.edu)  
[jjohn@ldeo.columbia.edu](mailto:jjohn@ldeo.columbia.edu)  
Captain [captain@ldeo.columbia.edu](mailto:captain@ldeo.columbia.edu)  
Bridge [Bridge@ldeo.columbia.edu](mailto:Bridge@ldeo.columbia.edu)

#### 11.4. AGENTS

The ship agent for mission associated port call is:

E. Duran Shipping P&I Services

Agents in the Port of Vigo

Ph (+34) 986 43 53 44

Fax (+34) 986 43 08 02

Email: [vigo@estanislaoduran.com](mailto:vigo@estanislaoduran.com)

PIs/science party members are advised to ship scientific equipment directly to our handling agent. Clearly mark the package(s) with your name and cruise number. PIs and the science party members are responsible for all costs associated with shipping science party gear and equipment to and from the ship.

Handling agent and shipping details as follows:

R/V Marcus G. Langseth c/o  
E. Duran Shipping P&I Services, S.L.  
Canovas del Castillo 22 – Bajo  
36202 Vigo  
SPAIN  
Ph.: (+34) 986 43 53 44  
Fx.: (+34) 986 43 08 02  
AOH: (+34) 680 68 32 76 (mobile)  
e-Mail: [vigo@estanislaoduran.com](mailto:vigo@estanislaoduran.com)

## 12. EXPERIENCE AND FEEDBACK

### 12.1. UNOLS POST CRUISE ASSESSMENT FORM

The [Post Cruise Assessment](#) of the research cruise is part of a program to evaluate how well vessels and personnel of the academic research fleet are supporting the scientific objectives of the research community, and to identify areas that may need better support or guidance to improve the success of future projects. This Assessment should be filled out by the Captain, Chief Science Officer and PI/Co PI for each Cruise. Any other crew member or science party member is welcome to fill out an assessment form as they see fit.

Information provided in this form will be used by:

- Operating Institutions, Ship's Crew, and Technical Support Personnel
  - To make improvements to equipment and procedures on their vessels.
- UNOLS Office
  - To track the overall performance of the academic research fleet.
- Funding Agencies
  - To assess areas that requires more attention.
- Yourself
  - To make constructive suggestions for improvement that will benefit future research projects for yourself and your

colleagues and to let ship operators know what they are doing well.

The Technical Service Manager and Marine Operations Manger will evaluate all feedback. Personnel and/or personnel involved in operations affected by the feedback might be contacted to ensure that the feedback is understood correctly.

Based on the feedback given and evaluation and control performed conclusions for improvements are made. Details of improvements found necessary will be passed back to involved personnel and/or Client. The Technical Service Manager or Marine Operations is responsible for activation of the improvements.

