

UNOLS *Marcus Langseth* Science Oversight Committee
MLSOC Workshop
The Brown Palace Hotel- Denver, Colorado
August 12-13, 2009

A copy of these minutes are available as a PDF document:

Executive Summary

The *Marcus Langseth* Science Oversight Committee, MLSOC and the National Science Foundation, NSF met in Denver, Colorado on August 12th and 13th, 2009. The focus of the workshop was to address the science proposal process, funding of these programs, widely distributed science operating ocean regions, and possible recruitment of new scientists to utilize this important national asset.

Action Items

- MLSOC & LDEO to follow up with OBSIP group on wire for lowering releases for testing.
- Write and submit a Workshop proposal to NSF.
- Develop a glossy brochure.
- MLSOC to provide input on upgrades to improve general oceanographic capabilities of *Langseth*.
- Recruitment of new MLSOC committee members
- Improvements to MLSOC and *Langseth* web site
- UNOLS Office to arrange AGU Mtg/13 Dec @ 2-5 pm
- MLSOC to establish a steering committee to lead efforts on workshop and brochure
- MLSOC & UNOLS will establish an online discussion forum to solicit community ideas on challenges, opportunities, and new models of community access to the *Langseth* facility.

Appendices

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III	MLSOC Overview Slides
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V	Environmental Compliance

Meeting Minutes

Steve Holbrook, Chair of MLSOC called the meeting to order at 0830 on 12 Aug. 2009. Steve's opening remarks posed the question: "How do we move forward to increase the use of the *Marcus Langseth* and that the next few years will be challenging."

Introductions were made around the room.

NSF Report

Linda Goad/NSF provided current schedule and projections. There are 2 cruises remaining in 2009: Toomey and Gardner, NOAA/Extended Continental Shelf multi-beam cruises. A lawsuit against the Canadian Dept. of Fisheries and Oceans is causing concerns for the Toomey cruise. Living Oceans Society and another group issued a complaint in Canada that SARA was being violated by DFO in Canada and they are seeking an injunction. Canadian government has 10 days to react or injunction goes into effect. NSF is waiting to see what will happen.

The funded science programs for the Langseth have been wide-spread across the Pacific Ocean which has resulted in long transits between operating areas. These are very expensive transits and costs are expected to increase in future years. The projected day rate for the Langseth in 2010 may limit the number of operating days to 180. In 2010 there are 3 cruises that are currently funded and scheduled:

Korenaga- Shatsky Rise- Tentatively starting from Dutch Harbor in April 2010 and finishing in Guam in May. Funded with ARRA funding to go to sea in 2010.

Wiens - Lau Basin.

Bangs 3D - Costa Rica.

To reduce the transit days we may want to consider an ocean-basin concept going forward. Grouping programs together in the same ocean region would be a more sustainable model. The length of time for the permitting process must be considered.

Jim Holik/NSF led a discussion on costs and equipment. New procurements: \$2.2 M funded.

- used streamer purchase
- near field sound source hydrophones
- sound source umbilical x 6
- MCS digital air management manifolds
- MCS streamer level device upgrade
- vane tow wire
- magnetometer winch
- oceanographic winch systems evaluation

Langseth General Purpose Capabilities Discussion

NSF made a decision to take a logical approach to evaluating the winches and the overall science outfitting. We need input from MLSOC on upgrades to make vessel a more capable oceanographic research vessel. These recommendations need to be made before the equipment proposal is submitted. The winches and length of oceanographic cables has hampered some OBS release tests. This needs to be addressed. Original cooperative agreement for conversion says that this will be a general purpose oceanographic vessel.

The trend appears to be that MGG users are no longer the dominant user of global class vessels. The Langseth must become a multipurpose vessel over the next few years for it to be a sustainable asset.

We also need to go to a more geographically based program, rather than thematically driven (e.g., MARGINS, RIDGE). Thematic programs worked fine for a while, but that model isn't working now. It was suggested that this conversation is going in the wrong direction and we need to have proposals come up from the community, not be driven by committee.

Costs

A spreadsheet of costs showed a projected 2010 day rate of \$84K/day for 3D and \$67K/day for 2D. Going to a pooled model of using the techs across the fleet should help save some costs. The day rate for Langseth is 10-20% higher than other global class vessels.

Michael Enachescu offered an industry point of view that when we moved to 3D, we never looked back. Quality of data is unbelievable. It appears the community is divided, not fully supporting 3D capability. I don't think you should go back to 2D, this is a 3D platform and it has to be used as such. We have to sell this as a major research undertaking.

Environmental compliance

Holly Smith/Bill Lang – provided a clear overview of what the environmental compliance issues are and how to work within the process. Environmental compliance should begin early on in the process. There are several major federal statutes which include:

National Environmental Policy Act ("NEPA") of 1969 which is a procedural statute requiring "hard look" at environmental impacts to determine if actions will significantly affect the quality of the human environment. Currently there is a subcontract to LDEO for environmental consultants to develop an EA for each individual seismic survey. To date, NSF has concluded after reviewing each cruise EA to issue a mitigated FONSI (Finding of No Significant Impacts) - we have impacts, but are mitigating to a level of

insignificance.

Exec. Order 12114: Environmental effects abroad of major federal actions order with furthers purpose of NEPA

MMPA (Marine Mammal Protection Act) 1994 modified to establish an expedited process (120 days) by which citizens can incidentally "take" small numbers of MM by "harassment".

CZMA - Coastal Zone Management Act- applies within 3 nm of coast - state coastal zone.

Foreign clearance required if within 200 nm of foreign state (foreign EEZ). We are subject to a foreign nation's rules which should become apparent during official vessel clearance process which is initiated by the ship operator.

Preliminary Assessment: Cruise planning must incorporate some kind of "Preliminary Assessment" of environmental impacts. This step is an important one, especially if significant political or environmental issues are identified as potential reasons that the cruise should not be conducted.

Lessons learned: PI should understand terms & enforce IHA (PI's institution is "on the hook" for compliance). Marine Mammal Observers (MMO) on the vessel are responsible for enforcing the IHA.

Measures can be taken to increase chances of successfully obtaining environmental authorizations:

- Avoid politically sensitive, and/or disputed waters
- Avoid marine sanctuaries which may have greater restrictions on certain activities
- Conduct experiments in deeper water (>1000m) (typically allows sound to attenuate more rapidly, thereby decreasing potential for impact)
- Conduct public outreach
- Use smallest possible energy source for the experiment

Would be helpful to have PI's from 2010 cruise schedule meet with NSF/NMFS in September-October for a meeting to review potential activities. Process with NMFS has been going much more smoothly lately with current personnel. It is more efficient to provide information and input into the process at this point (or earlier) with NMFS, otherwise it can become much harder, or too late, to change things.

Issues - Open Discussion DAY 1

NSF needs assistance from MLSOC to identify the really exciting science. We have this facility, let's use it. Steve Holbrook suggested a glossy brochure would help to educate our community. We don't need a 100-page science plan, but a brochure that highlights the science in an informative manner.

There was also discussion that the MLSOC committee needs to evolve into something much more like DESSC with much more up-front involvement.

We have a lot of existing partnerships that could be improved upon. MGG & ODP are big users, but not the only users. We have PO occasionally using the ship; EAR-Cont Dynamics; developing partnership with EAR on whole general area of seismology, both active and passive. Need to think of creative, interdisciplinary partnerships. We got together at NSF and started looking at numbers/costs. These projects are hard to fund due to costs. So we need to think about the whole process.. How do we develop ideas for places to go and things to study scientifically? Typically NSF panels fund "small science" i.e. individual PIs. At the other end is "big science", i.e. individuals participate, but as part of a larger structure. For MGL we'd like to discuss something that's in between. We need something that's not random, not "9000 points of light". Something that is designed to get biggest bang for buck and does best science possible. ICDP is a possible model, workshops on science. Or could have geographical workshops i.e. Atlantic, Pacific, Indian Ocean, etc. We need to make sure we don't leave anybody out. Let's make sure that the Langseth "goes everywhere in the next decade." Otherwise some sectors of the community may lose interest.

Funding and Scheduling.

A significant amount of time during the workshop was dedicated to the issue of funding and scheduling. The unique nature of seismic research and the associated costs with operating such a complex ship and equipment will require new ways of doing this science. What we need is (1) exciting science, and (2) a good plan. This meeting is a brainstorming session that will produce new ideas. We need a whole plan from the community, so we need some workshops. How many, on what, we need to work that out. Need one on exciting science. Then need one on solutions on how to manage things. What it would take to get scientists interested in attending one of these workshops is the availability of 3D data sets.

There was discussion that the Langseth should be described not as a multichannel seismic vessel, but as a crustal studies vessel. This label would be more all encompassing.

We need to bring in the broader community including those who are not well trained in seismics but could use the facility. DESSC would be a good model as they have broad meetings when people show where they were thinking about proposing work.

Various business model ideas were considered with one option of the possibility of a "Grand Opening." We need to have a period of time, say 3 years, where the MGL does what it is supposed to do, that is collect 3D data. Having an open access model would make it easier for people not to worry about losing their particular leg. We have no young people in our field. Tell the community that in next 5 years, we're going to collect (15) 3D data sets. How do you decide? Hopefully by transparency and workshops. The number of places where 3D data would work is fairly limited by where existing data

exists.

This issue of who is going to process the data was raised due to the high cost and effort involved in processing these data sets? One solution may be to use interns at a processing center, so that students/scientists can learn the processing, however the best learning opportunity may come from interpretive processing, i.e. science-guided analysis.

John Louie gave a demonstration of OpenDTect software and posed the question of imagining what 3D data on laptops in classrooms would do for geology classes all across the country.

Another way to broaden the community is to have broader groups of PI's in the projects. In order to do that, the grants are going to have to have some money to allow this broader population to take part in cruise.

The issue of funding panels was discussed and the idea of a separate panel to review these proposals was considered. One model is to have it part of the regular MGG panel, by adding a day on Friday to discuss the seismic proposals. On that day you bring in some new people with seismic expertise. We'd want to have more than 20 minutes per proposal. So if we have 6 Langseth proposals, that's a full day.

We should write down pros and cons of "open ownership" model. We don't have to make decision here, but we should enumerate pros and cons. Long-term forecasting of areas of operation. We must do this, whether we do Scenario A (new money, lots of 3D) or Scenario B (make do with current resources). What would this look like? Perhaps a model of focusing on one geographical region per year was considered.

Mike Enachescu offered that you need to have 30-40 proposals first, and then pick your areas. You'll never get 3 or 4 proposals in a very small area. You need LOTS of proposals because half of them will not be funded. And you need champions for particular areas.

Nathan Bangs suggested that pre-proposals are a great idea. If these are focused on some of the scientific goals, rather than technical details, you would bring in new people that are interested in the scientific goals. If you got a lot of those, it would become clear where the ship could go.

In early discussion on the operations for the Langseth it was felt that we probably wouldn't be able to afford more than one to two 3D cruises per year.

Long-range planning was discussed and one idea is to propose a 10-year plan to circumnavigate the globe's oceans. Also to be considered was a training cruise as well as what interesting science could be done "in the middle" of ocean basins, to make transits more useful? Planning ahead will make it much easier to plan to work together with foreign collaborators. We also need to coordinate more with the ready made communities in IODP and MARGINS who are already invested in Langseth science.

Ideas for a community workshop

The goals of a workshop would be to plan for new models of Langseth usage, including (1) process for planning future areas of operation of Langseth and (2) new models of community-based science. Pre-proposals from community (1 page) to establish areas of interest would be needed.

Need to find out where in the world people want to work. We need to be open to any place in the world because U.S. science should be GLOBAL. Need to get an idea of where the mature ideas are and this needs to be science driven. The workshop needs to allow for the visionary science as well as the details of seismic research. People could submit ideas even if they can't attend the meeting. The AGU meeting in December 2009 would be an appropriate venue for a meeting called "Laying the groundwork for the future of the Langseth."

The possibility of a foreign country membership program, like IODP, that would actually bring in cash in exchange for participation in the program needs to be considered. There may also be Southern Ocean research opportunities?

The workshop should be held as soon as possible and be well presented so that the attendance is good. It should not just be a Langseth workshop but should focus on the grand challenges in 3D seismology. A key issue is identifying and inviting a broader community. Send this out to all deans and department heads in the country.

The MLSOC needs to get together and submit a proposal for two exercises: a workshop and a glossy document. Include salary for people in leadership positions. We can submit the proposal out of cycle and then plan to hold it in March or April.

Action Item: Steve Holbrook and Graham Kent decided that they would write the proposal and submit it by Oct. 1. Target will be 80-100 participants and open to all interested. The product from this workshop will be a glossy brochure which will be a short, glossy document highlighting the exciting science that is being done. Brochure can also serve as background information for environmental compliance as well as public relations.

Processing Centers

The discussion turned back to processing centers and the feasibility of 3D Processing Center. In the "Rolls Royce" plan, data would roll into some kind of processing center straight from cruise, which would produce a useful product on a short time scale. Pros: get a useful result in a timely fashion; anyone who wants/needs to work on the volume can do so; does some initial QC on the data.

The merits of industry processing were listed: The pros know what they're doing; you're

likely to get a good product; they will do the sorts of things that you don't want your graduate students spending a lot of time on, but students can still do internships to learn about those parts of the processing.

Cons: Not likely to be a turnkey product, because they are out to make money, so they may take shortcuts. They also don't have a lot of experience working with the kinds of data we do so they might actually process out things that are our targets. Industry is cyclical, so there are times they are begging for our business, but other times we are not a priority. They deal with much bigger companies, so we are not always a priority. Sometimes when they hear from an academic group, they immediately worry about what kinds of discounts we'll ask for, etc. Long-term contract may not be workable, because things change over time.

An academic based processing center was discussed as we will always want to maintain some 3D processing capability in academia. Risk of having industry do it is that it may be impossible to contact that company several years later to discuss the original processing details. However if there are only a few 3 D projects every few years, the staffing stability may become an issue.

Michael Enachescu offered this fact that industry no longer does their own processing; they are using contractors because it's too hard to keep from going obsolete. Even Lithoprobe program eventually went back to contractor processing, due to difficulty of keeping software maintained.

Question was posed if NSF would entertain a proposal to handle 3D data, perhaps through Teragrid initiative? In principle, there is nothing to stop IRIS or UTIG or anybody to write a proposal to OCI (Office of CyberInfrastructure) or CDI (Cyber enabled discovery and innovation) offering their services to Langseth data. They could compare capabilities and costs of industry vs. academics -- doesn't have to be one or the other, could be a hybrid. OCI funds about 80% hardware and 20% data management, visualization, etc

Non-traditional use of Langseth

The use of the Langseth for non-traditional use will require research as the risk of losing the letter of designation as an oceanographic research vessel are real risks when commercial work is considered.

Next steps for MLSOC

MLSOC might consider an online discussion to discuss various scenarios. What is appropriate timeline for a workshop? What is appropriate timeline for a glossy brochure? MLSOC to set up two subcommittees: one to organize workshop, one to create a glossy brochure. Put these in a proposal to NSF.

Summary of Wednesday's proceedings at the MLSOC "Future of 3D Seismology" discussions.

MLSOC will take on two major tasks:

Propose, organize, and host a community workshop on "Scientific Challenges and Opportunities in Marine 3D Reflection Seismology."

Develop a plan for a "glossy brochure" highlighting scientific opportunities for 2D and 3D marine active-source seismology and an implementation plan for community-wide access.

Community Workshop:

The meeting will have 80-100 attendees, and will be held in March or April, at a site to be determined as soon as possible. Holbrook and Kent, representing MLSOC, will write the proposal and submit to NSF by Oct. 1, 2009. No subcommittee is needed. Invitees will be U.S. earth scientists representing critical MARGINS, RIDGE2K, IODP, and others; however, a key effort will be to broaden the invitee list to include those outside the usual *Langseth* users, such as those in the SEG community and international community.

MLSOC will hold an open public forum on the same topic at Fall AGU, 2009, on the Sunday prior to the meeting, 2-5 pm.

Topics to be discussed:

Science opportunities for 2D and 3D marine seismology, with a focus on the key role of Langseth facility in advancing science goals of broad range of programmatic (e.g., MARGINS, IODP) and investigator-driven science.

Improving community-wide access to 3D data. Models of processing seismic data, including feasibility of a 3D processing facility.

Improving efficiency of scheduling — e.g., by long-term forecasting of areas of operation.

Possible new models of proposal submission and review. Feasibility of a programmatic approach to the *Langseth* facility for focused 3D acquisition.

Non-traditional use of *Langseth* facility (e.g., industry-supported science, international collaborations, non-traditional federal agencies).

Glossy Brochure:

- ~10 page focus on science opportunities
- ~2 pages on implementation plan
- Also available as an online version
- Summaries in layman's language
- Seek input/endorsements from IRIS, IODP, MARGINS, etc.

Workshop Location Ideas

Maybe Scripps as they have a great 3D visualization center. Conference center is good and holds up to 300 people. Might cost \$3-4 K/day.

Suggestions for Steering Committee:

Alistair or Neal -- SIO host; John Hole; Rick Gibson (will have a conflict in March); Donna S (or similar young person); Helene Carton? Nathan Bangs; Greg Moore; Katie Keranen (Oklahoma); Alan Levander.

Online discussion:

Good person to talk to would be Jeff Schufert at Ocean Leadership, who has recent experience with IODP online discussion. It is very inexpensive. Can also hire outside groups for relatively little money to collate results and make a report.

Issues to discuss with general group and open discussion on final thoughts on this meeting.

Need to have guidance/focus for workshop participants. Not going to be able to decide, e.g., how proposals are going to be handled, at a large meeting. On the other hand, you don't want to have a workshop based on foregone conclusions.

Have some keynote speakers who can outline some general possibilities.

One reason for our success so far is that we have had some champions for these projects. Opening this process up to the broader community certainly has to happen as we will need to have some key people making sure that the critical things happen. So: how do we get the key people to make sure that the details are taken care of? e.g., experimental design and sampling; program efficiency; logistical details like chase boats; contingency plans; decisions at sea; QC-based decisions at sea.

Key thing is we need to broaden the community. With the workshop, the key thing is to excite the broader community, not just the people we can think of off the top of our heads. Second point is that once you do broaden the community, the younger people will take over and bring in new skills.

If we want to emphasize the Langseth as a facility, we need a better webpage to present to the world. Invitees to meeting will Google Langseth and not easily find information about the ship.

MLSOC also needs a better webpage.

Put an article into Leading Edge on EPR 3D data as well as an article in EOS.

Two comments on workshop: (1) mention explicitly the connections of this tool to specific objectives to other plans that are out there -- put that in the workshop description. (2) Down the road, there's going to need to be closer interaction between LDEO and this group. Need to keep the operator involved in these discussions and beyond.

At Earthscope the demographics there were eye-opening -- much younger crowd there. We need to change that. Some of my thoughts echo things that Nathan has raised -- e.g., how this new model for 3D might apply to 2D/crustal transect work -- are there new models for that kind of work? We have to find ways to train young people in the processing without making them technicians.

MLSOC has to take the onus for this effort and it has to be all of you. You are doing great science but you need to get the word out.

We need expansion of resources. We don't necessarily have to drive everything to a consensus at this meeting, but results will have to be clear. It's going to be really important to get the right people there. Think about meeting at Scripps 15 years ago, large group of people were angry because they felt they were being cut out, denied access to data. We need to bring back those people who have walked away. It's critical that we push for expansion in resources, not just a different way of doing things with the same amount of money. Very important to get word out early about new models of data access so that we can get the right people to this meeting. One thing that's in the back of my mind is that 3D is really expensive, so I think that every 3D data set should be like an ODP cruise, legacy quality data for the future. We need to make sure that we set up these experiments so that we don't preclude future work with this data. Issues come up when you're out at sea, things go wrong, and you make compromises that make the data completely useless for future work. New model should include commitment to finish a volume.

Think back to OOI meeting in Puerto Rico. Everyone was certainly not in agreement but one of the biggest things that happened was on education and graduate students. Getting high school teachers involved who are really interested in what you're doing is very valuable.

MLSOC needs to help NSF promote our science. What we do as reflection seismologists has been very important to a broad community of scientists in the RIDGE community; do we try to engage the broader community in our workshop? Imaging is really facilitating multidisciplinary science, how do we get that into this process?

Data access. Putting data "out there" does not equal broad use. You have to do more than that. Must have a really strong web presence illustrating how the data are used will be really important.

Education is the key to growing our field and bringing young people in. High school curriculum, college classes, etc. We need to do a better job which takes pre-prepared products.

We know how good this facility is and what the challenges are. We have to make sure we match the expectations of the scientists to the capabilities of the ship and the available resources.

Workshop outcome will facilitate our scheduling and other issues. We recognize that the ship is supposed to be a general purpose ship and we will make incremental progress toward that goal.

Science has to come first, not the tool. Use words like "3D visualization of subsea crust and associated geological hazards"

Add biological processes as well Strong advertisement is needed. Has LDEO thought to hire a part-time or full-time position for that? Keep an active list of potential users. Inform them with emails about where the ship is. We need a survey of potential users in the U.S., and how many have 3D processing centers and know how to process and interpret it. One member of this panel or LDEO should be a liaison to the IODP Site Survey Panel. I recommend using the following publications: The Leading Edge, AAPG Explorer, EAGE First Break -- put notes about Langseth in those magazines. All these magazines have sections for "short notes" or announcements -- put updates of ship and science. Say the ship is available for scientific research around the world. There are geological surveys around the world who could be your customers. These are all potential users. Don't forget that a few major oil companies have research departments who can hire you to do different things than exploring for oil and gas. There are some areas that a seismic contractor wouldn't touch and there is a niche there for Langseth (e.g., Labrador Sea). The other market is long 2D seismic lines (e.g., 1000-km-long lines). We did a 1500-km-long line with one vessel in Labrador Sea.

Need to fund some risky innovative research and some risky PI's. My own hope to do research proposals with any of these facilities is near zero. There are greener pastures for funding out there at other agencies. Panels need to take more risks. 2. You all love OpenDTect because it's a specialist tool -- for education you need to go to a more general tool. Fliedermaus is partway there; there's also Acrobat 3D.

MLSOC Business Meeting- Thursday 13 August

MLSOC- The next meeting will be in San Francisco on 13 December 2009.

Streamer Hardware: The lost 8 streamer sections need to be replaced.

When we got streamer from Western, there were 2 ships using this streamer, and the other Western ship was upgraded to a different streamer. We were offered 12 km of streamer for free; only pay for shipping; we had permission to spend money however that streamer is not available anymore. Western is reconsidering giving it away or may want to sell it.

The Nathan Bangs cruise will use 4 x 5 km streamer so he will have spares available.

Jim Holik asked if one option was to repair existing damaged streamer.

Al Walsh: There is currently no one who repairs these streamers. We are trying to find a shop that will do it.

Jim Holik: It makes no sense to go to sea without spares. Streamer upgrade path: New streamer 4x6 km would be ~\$13 M, including recording system. One possibility is to buy 12 km of new streamer (~\$7 M).

Other ship issues:

- Sub bottom profiler - Kongsberg SBP (?) 120
- Don't have a working science work boat
- Acoustic positioning system for streamer -- not sure if Western is going to donate that anymore. Would cost ~500-600 K.
- Winch. (general purpose) Still need this. Have used spare streamer winch successfully as a backup plan.
- Crane for OBS recovery -- crane on main deck has had lots of problems. Replacement would be ~\$100 K. Alternate plan is to put some tuggers around the A-frames.

Poor communication between chief scientist and OBSIP and NSF.- This needs to be addressed. Key is pre-cruise planning meeting. Need to have OBSIP present at precruise planning meetings.

MLSOC Committee personnel rotations

Steve Holbrook would like to nominate Nathan Bangs to MLSOC to replace Tom Shipley. Important to have a UTIG person on the committee; Nathan has lots of experience with 3D planning, acquisition, and processing. Steve Holbrook to call Nathan to check if he is willing, then send email to MLSOC for vote on nominating Nathan.

Do we need an industry person to replace Peter Littlewood?

It is recommended but may be difficult for them to attend, and they have to FIT into this committee. Vice-president of IAGC - Sarah Tsoflias would be a good person.

Steve Holbrook will email her to ask if she is interested. The email must be very clear about the expectations and time commitments of the committee.

UNOLS will do a call for nominations to the committee.

Would be good to have people on MLSOC who can serve as liaisons to other key communities, e.g., IRIS/Earthscope, IODP, and SEG.

Meeting Adjourn- 1230/13 August 2009