

potential to injure a marine mammal or marine mammal stock in the wild" and "any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns...to a point where such behavioral patterns are abandoned or significantly altered." That same language is also in the National Security Act of 2003 (H.R. 1835), which was introduced in April and is awaiting consideration by the full House of Representatives.

A separate reauthorization bill (H.R. 2693) with a different definition of harassment was introduced 10 July.

Snowe expressed frustration about the lack of sufficient scientific understanding regarding marine mammals and their reaction to sound, nearly a decade after the National Research Council (NRC) published its first of three reports on the topic in 1994. Snowe said that any change in the definition of harassment "has to be commensurate with an investment in research" about marine mammals.

Retired U.S. Rear Admiral Richard West, who is president of the Consortium for Oceanographic Research and Education, said "the fact that we are only roughly familiar with the effect of varying sound frequencies on 11 of the more than 70 identified marine mammal species" is limiting the ability to address the problem of the effect of sound on marine mammals.

He said that recent litigation against ocean acoustics research could increase, and that obtaining permits could become more difficult as a result. "While marine scientists share as a goal the need to understand and through that understanding, protect the marine mammals, they are becoming increasingly concerned that the [Act] has become an impediment to such research and could actually be contributing to the decline of these animals."

He said his group supports several modifications to the administration's definition, including defining harassment as "biologically significant" disruption of marine mammal

behavior. That change, he said, would follow the NRC panel recommendations and focus regulations on more major disruptions.

Peter Tyack, a senior scientist with the Woods Hole Oceanographic Institution in Massachusetts, said that some changes to the definition of harassment would be beneficial for researchers. But he noted that changing the definition alone would not affect the permitting of marine mammal research, because many of the most serious roadblocks scientists have encountered concern problems related to a different law, the National Environmental Protection Act. Tyack added that commercial fisheries appear to have received a special exemption from the Act "with much more scope to harass marine mammals than other activities such as conservation research, naval exercises, or oil exploration."

—RANDY SHOWSTACK, Staff Writer

## MEETINGS

### National Center for Airborne Laser Mapping Proposed

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Researchers from universities, U.S. government agencies, U.S. national laboratories, and private industry met in the spring to learn about the current capabilities of Airborne Laser Swath Mapping (ALSM), share their experiences in using the technology for a wide variety of research applications, outline research that would be made possible by research-grade ALSM data, and discuss the proposed operation and management of the brand new National Center for Airborne Laser Mapping (NCALM).

The workshop successfully identified a community of researchers with common interests in the advancement and use of ALSM—a community which strongly supports the immediate establishment of the NCALM.

#### *Background to the NCALM*

The primary motivation for using ALSM—also commonly referred to as LIDAR—to map the Earth's surface, is the recognition that the topography contains signatures of tectonic and erosional processes. It structures hydrologic pathways, soil moisture distribution, and ecosystems; it reveals the mechanics of glaciers and faults; and it must be used to predict vegetation assemblages, soil development, local climate, runoff or landslide, and flood plain hazards.

Until recently, it was not practically possible to obtain topographic data over broad areas with sufficient resolution and accuracy that it could be reliably used to advance our basic understanding of Earth surface processes. With the capability to generate ground surface data points every 1 m (or closer) at a

vertical accuracy of 5–10 cm, and a horizontal accuracy of 15–20 cm, ALSM now makes it possible to obtain such research-grade data.

Despite considerable effort, researchers have not been able to get research-grade ALSM data from commercial companies. Furthermore, there is a need for basic research to advance the use of ALSM technology, especially in the software for optimizing the speed and accuracy of data reduction. To meet these needs, the University of Florida (UF) and the University of California, Berkeley (UCB) submitted a proposal, "Collaborative Research: Facility Support to Establish and Operate a National Center for Airborne Laser Mapping (NCALM)" to the U.S. National Science Foundation (NSF).

The universities proposed to use existing state-of-the-art technology at UF for data collection and analysis, and at UCB for data distribution and archiving. Through its archiving and distribution center, and its commitment to open-source public domain software, NCALM would provide data and tools to explore and make discoveries that are simply not possible now.

The basic physics of ALSM has not changed since the first generation machines, but technological advances have enabled greater and more complete data acquisition. The UF system has recently been upgraded and can clearly provide the capability to collect research-grade data for many years. However, there are technological advances on the horizon and complementary sensors that should be evaluated and possibly integrated into the UF ALSM unit, as funds become available. Such items most immediately include:

- A waveform digitizer, which may greatly improve characterization of vegetation canopy structure by recording the full laser return. Optech Inc., Toronto, Canada, is now constructing

such an instrument, and it should be ready for evaluation within months.

- Single-photon ALSM may prove a more efficient approach. Instead of illuminating a small footprint of a meter or less diameter, single-photon systems illuminate much larger areas, and use a multi-channel or positional detector to record the locations of the returning photons to obtain high spatial resolution.

- Color digital photography would be valuable in many if not most mapping projects. UF has the capability, but does not currently own the equipment.

- Hyper-spectral sensors can be used simultaneously with ALSM data collection and would be valuable, especially to the ecological community (vegetation mapping), and to those interested in geochemical remote sensing. On the downside, the hyper-spectral instrumentation is relatively expensive and sufficiently bulky that it would require a larger aircraft than the one currently used by UF.

- Shallow-water bathymetry and terrestrial LIDAR is being explored by the Army Corp of Engineers for coastal and harbor studies. Optech Inc. has the capability to make a terrestrial-oriented LIDAR that could penetrate shallow water (6–10 m). Such an instrument would find immediate and widespread use in studies of river ecosystems and fluvial geomorphology.

#### *The Workshop and Its Results*

Some 50 scientists and students participated in the workshop, which was held in Gainesville, Florida, and convened jointly by UF and UCB. Five results emerged:

1. Based on the shared opinion that the availability of research-grade ALSM data has the potential to revolutionize studies in many Earth science disciplines, the participants expressed strong support for the NCALM proposal.

2. An initial steering committee of nine members was appointed and approved by workshop participants.

3. Specific suggestions were made for new and additional technology that should be evaluated and considered for inclusion in NCALM: ALSM wave-form digitization, single-photon signal level ALSM, color digital photography, hyper-spectral sensors, and shallow water bathymetry (integrated with the terrestrial ALSM unit).

4. A recommendation that funds be set aside for seed projects, rapid response, and other opportunities that would not need to pass through the NSF peer-review process.

5. A recommendation for a strong commitment to the development of open-source, public domain software, and to strong, Web-based access and analysis.

The proposed structure of NCALM, as presented in the UF-UCB proposal submitted to NSF, is intentionally simple, modest, and user-oriented. The existing UF ALSM unit and supporting equipment and facilities will be used to collect data in areas selected through the competitive NSF grant review process. These data will be analyzed both at UF and UCB, and made available to the principal investigators (PIs) through an archiving and distribution center at UCB (building on the Berkeley Seismological Laboratory-Northern California Earthquake Data Center system). Both the UF and UCB groups will contribute to software development that will increase the processing speed and data accuracy. PIs will contact the UF group during proposal preparation to obtain guidance on cost estimates, scheduling, and related issues.

Once funded, PIs and their students will be able to participate in all phases of the work, and there is support for student involvement at both Florida and Berkeley. One of the primary goals of NCALM will be to assist graduate students in applying ALSM in their research, and the graduation of these students will contribute to the pool of personnel qualified to staff academic institutions, government agencies, and private companies.

NCALM will establish a strong, Web-based distribution system of data and software, and data will be made available to the general research community after an agreed-upon amount of time (most likely 2 years). The Web material will be an important part of the NCALM education and outreach component.

The nine-member steering committee will be used to prioritize schedules, review the center's financial management, form contacts with other programs, and review the potential for technological upgrade. The steering committee will meet twice a year. The primary contact person at the NCALM for NSF will be the elected steering committee chair.

The workshop community agreed that the duties of the initial steering committee should include writing detailed governance guidelines for NCALM, with specific procedures for electing members to the board. The following people agreed to serve on the initial steering committee: Collin Stark, Lamont-Doherty Earth Observatory of Columbia University; Bea Csatho, Ohio State University; David Tarbonton, Utah State University;

Mike Ellis, University of Memphis; Rudy Slingerland, Pennsylvania State University; Ramon Arrowsmith, Arizona State University; Don Carswell, Optech Inc.; William Dietrich, UCB; and Ramesh Shrestha, UF

The workshop participants recommended that some portion of the annual budget of the NCALM be set aside for "seed projects" that will enable PIs to get critical data to test ideas and develop major research proposals. They also emphasized that the NCALM should be able to provide rapid response to document the topographic effects of such occurrences as major earthquakes, large-scale flooding, or extensive landslides. In general, such opportunities may come along in a variety of ways, including partnering with groups in some projects that could provide valuable topographic data to the broad research community. It was suggested that something like 20% of the NCALM budget should be reserved for this purpose.

The Workshop to Discuss the National Center for Airborne Laser Mapping (NCALM) was held 24–26 April 2003, in Gainesville, Florida.

#### Acknowledgment

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—BILL CARTER and RAMESH L. SHRESTHA, University of Florida, Gainesville; and BILL DIETRICH, University of California, Berkeley

## FORUM

### Comments on "Anonymous Reviewers"

#### From C.J. Robinove

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Myrl Beck's Forum article denouncing anonymous reviews (*Eos*, 1 July 2003) is right on the money. Perhaps he read my letter in *Applied Physics* in 1990 also denouncing anonymous reviews.

Some years ago, I received an anonymous review of a paper I had submitted for journal publication. The reviewer raised such interesting questions that I wanted to discuss them with him. I phoned the editor of the journal and asked if he would tell me the name of the reviewer. He politely declined, but when I told him I thought I recognized the handwriting of the reviewer and named him, he relented and said I was correct! I called the reviewer and he was generous enough to spend a wonderful hour on the phone with me discussing the paper. The paper was published with great consideration given to his ideas, much to its

betterment. Now *that's* a reviewer whose interest is in improving the paper and helping the author, not just showing how smart he is or slapping down a junior colleague. The AGU motto, "unselfish cooperation in research," can be well exemplified by those who wish to help rather than to tear down.

When I review a paper for a journal that insists on anonymous reviews, I always state in the review that I want the author to know I reviewed it. I am not ashamed of my knowledge or my lack of knowledge in a particular field, and I will comment only on the basis of my knowledge. I may question a part of a paper, but that is because I don't know the answer and believe that other readers may also be ignorant of that point. Reviewers have a duty to help the authors, help the advancement of the science, and help the journals publish useful papers. When you criticize the work of one of your students or of a scientist who works under your direction, you are not anonymous. Why should you be with others?

Unethical reviews should also be punished, if they can be identified. I wrote a paper that was reviewed in-house by one of my USGS colleagues. I made revisions based on his

helpful suggestions. The journal to which I submitted the paper asked him to review it. Instead of telling the editor that he had already done so, he did a new review with new ideas (which were not at all helpful). He should have declined to review the paper for the journal; and I, in turn, should have told the editor about that double-dealing.

Let's do away with anonymous reviews and take both the credit and the blame for our ideas.

—CHARLES J. ROBINOVE, U.S. Geological Survey (retired), Monument, Colo.

#### From R.E. Criss and A.M. Hofmeister

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We share many of the experiences and most of the sentiments relayed by Myrl Beck in his 1 July contribution to the *Eos* Forum, as well as those of a similar nature expressed by Alexander McBirney in his March 2003 commentary in *GSA Today*. We are in fact delighted that senior scientists are speaking up about the unsatisfactory nature of anonymous reviews. However, we believe they understate the problems, partly because the situation is worsening with time. Moreover, the brunt of