The Allied Geophysical Lab (AGL) Vision

Our goal is to do excellent applied geophysical research!

We are dedicated to making significant advances in the understanding and imaging of the subsurface. Specifically, we will work with the resource industry and professional societies to create novel ways to discover and conscientiously recover resources while educating the next generation of geoscientists.

Scope of Work

Making a more accurate and higher resolution image of the subsurface and its resources is always a primary task of applied geophysics. Estimating lithologies and associated petrophysical properties is, in turn, essential. Determining the saturation state of a reservoir and its change has become critical. There remain many grand challenges in applied geophysics: At AGL, we emphasize the physics behind making geologic images of the subsurface. This involves three main categories: Acquisition, analysis, and interpretation of largely seismic data. A key component of our effort is to make geophysical measurements in the laboratory, computer, and field. We have one of the few physical/robotic modeling facilities in the world dedicated to making scaled surveys of structures of energy interest. In addition, we write and employ a number of numerical modeling and analysis codes. Furthermore, we have an excellent capability to acquire near-surface geophysical data (seismic, VSP, well logs, GPS, GPR, and gravity). The University owns a section of land near Galveston that we are developing as a geophysical test site (the La Marque Geophysical Observatory). In 2013, we drilled and cased two 425 ft wells at La Marque which are now used for borehole geophysical teaching and research. UH also manages a 100-person geoscience field camp near Red Lodge, Montana which we use for the education of students in geophysical field methods.

On the processing and analysis side, we develop algorithms related to the imaging and understanding of geophysical (mostly seismic) data. We also use many of the industry-standard processing codes (Paradigm, Landmark, VISTA, Petrel, Kingdom). Our particular expertise is in multicomponent seismic analysis, seismic attributes, borehole seismic, AVO, quantitative interpretation, attenuation, and anisotropy. We are involved with a number of case histories including resource targets as the Barnett, Bakken, and Marcellus shales. In addition, we have numerous studies relating to VSP and 3D (several 4C) seismic data sets in the Gulf of Mexico.

Along with our six closely associated faculty (Stewart, Thomsen, Han, Chesnokov, Zhou, and Castagna), we have some 70 graduate students and staff attached to our applied geophysics effort. We are enthusiastic about working with our industry partners!

Consortium Proposal: *Allied Geophysical Laboratories*

Agreement period: *June 1, 2013 – May 31, 2014*

Company contribution (2013-2014): *$45,000.*

Our goals are ambitious and moving forward will require sponsorship for the purchase of equipment, instruments, computers, and software. New personnel are needed to undertake research, maintain and operate equipment, as well as for administrative operations, university reporting, safety compliance, and sponsor communications. An overview of our proposed activities in 2013-2014 is shown below.

Activities and Timeline: 2013 – 2014

	June 2013	Oct. 2013	Dec. 2013	May 2014
Equipment	200-ch seismic, ultrasonic upgrade, GPS, microphones	300-ch 3C seismic vibroseis; 120 land nodes	Shallow marine seismic	Ocean-bottom seismometers
Facilities & software	VISTA, Petrel, Kingdom, Focus, hardware upgrades	Transform, Landmark Hampton-Russell	Computer hardware upgrade	ProMax
Personnel	Application geophysicist	Administrative assistant	Post-doctoral geophysicist	System/data geophysicist
Physical modeling	3D VSP, fracture/fault	Time-lapse sand	3C structure nonlinear	3C-3D anisotropy
Field work	Houston/local (salt & faults);Haiti; Louisiana	Montana (deeper structure); Texas crater; Utah sand	Houston/local (deeper structures)	Gulf of Mexico (shallow tests)

Deliverables and Other Benefits:

The new AGL aspires to make a significant impact on the science of geophysics and deliver clear benefit and advantage to our sponsors. A list of deliverables and other benefits follows:

- All AGL-sponsored physical modeling data will be available to sponsoring organizations
- All field data acquired by AGL will be available to sponsors
- All AGL-sponsored theses, posters, preprints, expanded abstracts, and technical papers and reports will be provided to sponsors
- Software will be periodically released to sponsors
- Sponsor representatives will be invited to the AGL Annual Spring Meeting summarizing the year's research activities in addition to the Annual Dobrin Geophysics Lecture
- Each sponsor will receive periodic communication about AGL personnel, activities, and research
- Sponsors will have a voice on the AGL Industrial Advisory Board to provide guidance and counsel to the Lab
- Sponsors have the opportunity to become familiar with students (prospective staff) and their work

Budget Overview: 2013-2014

Through 2013-2014, we intend to purchase a substantial amount of geophysical equipment. To date, the University of Houston has provided $1,500,000 toward this effort to date. We seek further contribution from the industry and various other agencies. Equipment purchases are to upgrade the existing physical modeling facility as well as provide an augmented field acquisition and data processing capability. We have assembled a full industry-standard land (Vibroseis) system and are developing a marine capability. Other supporting equipment includes GPS, well-logging, VSP, CG-5 gravimeter, and GPR instruments.

2013 – 2014 Budget	Expenses	Revenue
Equipment, instruments, computers	$410,000	
Personnel salaries	$400,000	
Field work, travel, communication	$115,000	
University, state, federal contribution (cash)		$385,000
Industry sponsorship (cash)		$540,000
Total	$925,000	$925,000

Lab instruments

Transducers, A/D converters, controllers, lasers, control & recording, software $75k

Field equipment

120 channels of seismic node recorders and 3C geophones $85k; 96-channels of Geodes $50k

Well Logging tools, cable, winch, and truck $80k; VSP tools, cable and recorders, and GPS $45k

Computers

Hardware, software, and visualization $75k

Personnel

Five graduate students $150k; Four technical and admin. staff $250k

Field work

Survey travel $45k

Travel

Conferences, meetings, courses $20k

Communication

Publication costs, newsletters, seminars, meetings $50k

Total 2013-2014 expenses $925k

We require a number of additional staff to operate and maintain the various computer and measurement systems as well as facilitate research. We anticipate hiring four staff throughout 2013-2014. They would include an application geophysicist, postdoctoral fellow, system and data manager, and an administrative assistant. We seek AGL industrial sponsors from the energy, mining, engineering and related sectors. Annual sponsorship cost is $45k for 2013-2014. A reduced rate of $15k is available for smaller enterprises (under $5 million annual revenue). We anticipate that this support and collaboration will arise primarily from the energy industry. We also offer a limited number of Founding and Sustaining Memberships that allow more direct involvement and impact on the future of AGL and its people. Contact Director Robert Stewart (rrstewart@uh.edu) for further information.