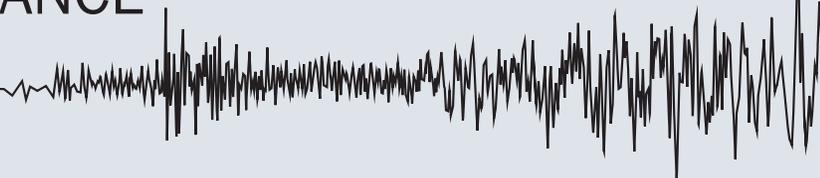


20 IRIS AT A GLANCE 09



IRIS

Board of Directors

Susan Beck (Chair)	University of Arizona
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Ed Garnero	Arizona State University
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Steve Grand	University of Texas, Austin
David Okaya	University of Southern California
Suzan van der Lee	Northwestern University

During my second year chairing the IRIS Board of Directors, IRIS and the community have been busy pushing ahead to improve seismology activities and research. The core facilities – the Global Seismographic Network, PASSCAL, the Data Management System, and the E&O Program – are essential to seismology. In addition, IRIS is moving ahead on several fronts.

USArray is fully operational: the Permanent Array is returning data, the Transportable Array is rolling and inspiring new uses of large-scale arrays, magnetotelluric data are expanding rapidly, and the Flexible Array is in big demand. Undergraduate students continue to efficiently site TA stations. “Adoption” of TA stations is increasing the number of permanent broadband stations that operate efficiently and deliver outstanding real-time data. The EarthScope meeting in 2009 was particularly exciting with new discoveries that would have been impossible without USArray.

Seismologists have taken advantage of economic stimulus funding to improve the nation’s seismology infrastructure – acquisition and deployment of the GSN’s next-generation data loggers and additional instrumentation is off to an excellent start. Polar seismology has advanced rapidly, thanks partly to projects funded by NSF’s Office of Polar Programs to develop more efficient instrumentation for Antarctica and to acquire instruments for International Polar Year experiments. The Board established the IRIS International Development Seismology Committee to help develop sustainable technical infrastructure and human capacity in low- and middle-income countries for geophysical research, education, hazard mitigation, and resource exploration.

Looking to the future, IRIS completed or contributed to reviews of the E&O Program, and its own management

structure, each of which will move IRIS ahead in ways that best serve the community. With logistical help from IRIS, the seismology community and other geophysicists prepared “Seismological Grand Challenges in Understanding Earth’s Dynamic Systems”, which outlines the areas where scientific progress is most needed in the coming decade and will be invaluable as we plan ahead for IRIS.

I look forward to working with many of you in preparing a proposal for a new IRIS Cooperative Agreement with NSF to operate the core programs over the next five years. The Board of Directors has appointed an outstanding team editorial team for the proposal. Brian Stump will lead work on the Project Description that is the heart of the proposal; Jim Gaherty will coordinate work of the Standing Committees on the Program Sections; Ed Garnero and David Okaya will coordinate community input to develop the Accomplishments volume. The Board of Directors will remain deeply involved, and ensure that IRIS submits a proposal that responds to the “Seismological Grand Challenges” report, incorporates input from the Program Standing Committees and all members of our community, and describes vibrant programs that continue innovating to meet the evolving needs of geophysical investigators.

As always, I welcome comments and ideas from the community as we move IRIS forward, and I thank all of the partners that work with IRIS, IRIS committee members, IRIS staff, and NSF program managers for another successful year at IRIS.

GSN

Standing Committee

Xiaodong Song (Chair)	University of Illinois at Urbana-Champaign
Susan Bilek	New Mexico Tech
Colleen Dalton	Boston University
Adam Dziewonski	Harvard University
Gavin Hayes	U.S. Geological Survey
William Leith	U.S. Geological Survey
David McCormack	Natural Resources Canada
Jeff McGuire	Woods Hole Oceanographic Institution
Jeroen Ritsema	University of Michigan

The Global Seismographic Network is a permanent telemetered network of state-of-the-art seismological and geophysical sensors. A forefront source of free and open data for seismological research and Earth Science education, the GSN is also a principal global source of data for earthquake locations, earthquake hazard mitigation, earthquake emergency response, and tsunami warning. Installed to provide broad, uniform global coverage of Earth, 153 GSN stations are now sited from the South Pole to Siberia and from the Amazon basin to islands in the Indian Ocean, in cooperation with over 100 host organizations and seismic networks in 69 countries. The GSN is primarily operated and maintained through the USGS Albuquerque Seismological Laboratory and through the University of California at San Diego IRIS/IDA group, and managed by IRIS. Twenty GSN-Affiliate stations and arrays contribute to the network, including the nine-station USGS Caribbean Network. The GSN coordinates closely with other international networks through the FDSN, of which IRIS is a founding member, and participates in the Global Earth Observing System of Systems.

GSN Stations with

Broadband seismometers	153
High-frequency/auxiliary broadband seismometers	142
Strong-motion sensors	121
Borehole sensors	50
Microbarographs	66
Real-time communication	147
GSN Stations Serving as IMS Auxiliary Stations	33

GSN Stations Installed during 2009

New stations	2
Next Generation System (NGS) upgrades to date.	52



Our Chilean host, Luis, observing operations of the next generation GSN system recently installed at Limon Verde, Chile (IU/LVC).

PASSCAL

Standing Committee

Richard Allen (Chair)	University of California, Berkeley
Paul Davis	University of California, Los Angeles
Matt Fouch	Arizona State University
Jesse Lawrence	Stanford University
Aibing Li	University of Houston
Doug MacAyeal	University of Chicago
Beatrice Magnani	University of Memphis
Tom Pratt	U.S. Geological Survey
Arthur Rodgers	Lawrence Livermore National Lab
Lara Wagner	University of North Carolina, Chapel Hill

The Program for Array Seismic Studies of the Continental Lithosphere facilitates portable array seismology worldwide for diverse scientific and educational communities with end-to-end experiment support services, state-of-the-art portable seismic instrumentation, and advanced field and database management tools. Over its history, PASSCAL has supported deployment of more than 5000 stations in over 600 experiments to image plate boundaries, cratons, orogenic systems, rifts, faults, and magmatic systems. By integrating planning, logistical, instrumentation and engineering services and supporting the efforts with full-time professional staff, PASSCAL has enabled seismologists to mount large-scale experiments throughout the U.S. and around the globe. The access to professionally supported state-of-the-art equipment and archived, standardized open data has revolutionized the way that geophysical research is conducted. PASSCAL influences international academic seismology by providing instrumentation to spur or augment collaborations and by pioneering standards and facilities that have been adopted by organizations worldwide.

Number of Experiments during 2009

New starts	60
Continuing experiments	44

Data Logger Inventory

Three-channel data loggers	928
"Texans"	542
Multichannel	13

Sensor Inventory

Broadband	508
Intermediate period	105
Short period	168



SEIDCAR station being installed in West Texas by volunteer teachers.



DMS

Standing Committee

- Keith Koper (Chair)
- Harley Benz
- Elizabeth Cochran
- Meredith Nettles
- Mike Ritzwoller
- Catherine Snelson
- Doug Toomey
- Bill Walter
- Saint Louis University
- U.S. Geological Survey
- University of California, Riverside
- Columbia University
- University of Colorado, Boulder
- New Mexico Tech
- University of Oregon
- Lawrence Livermore National Lab

The Data Management System is one of the largest scientific archives of globally distributed observational data in the world, with data from more than 100 networks operated by U.S. agencies and partners in more than 60 countries. Archiving and managing GSN and PASSCAL data is the core mission, but collecting other seismological data remains important. This year, we first received FDSN datasets from seven countries, began receiving data from three permanent networks in the U.S., and received data from eight experiments in addition to PASSCAL and EarthScope projects.

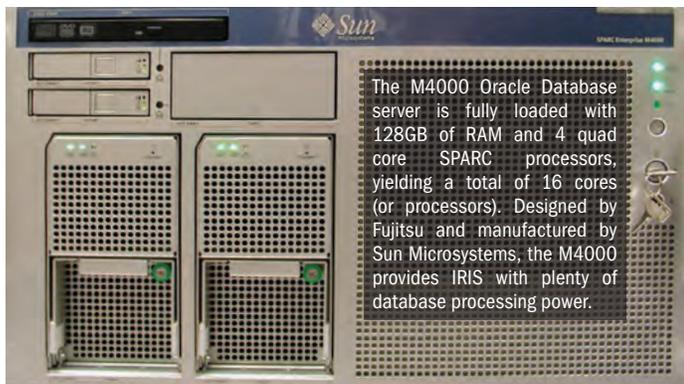
The DMS offers a wide and growing variety of services that Earth scientists rely on worldwide – researchers outside the U.S. request roughly 20% of the data that we distribute. Almost all of the data we manage are available within seconds of real time. We now support tens of concurrent requests to our archive, speeding our over 30,000 responses per month. We improved the popular new request mechanisms jWeed and VASE, and we are developing web services and workflows that eventually can provide customized products.

Data Archived (as of October 1, 2009)..... 103.2 terabytes

PASSCAL	27.7
GSN.....	16.4
EarthScope	13.1
FDSN.....	8.1
US Regional.....	31.4
Other.....	6.5

Data Shipped (projected to end of 2009) 55.1 terabytes

Customized from Archive.....	29.3
Real Time Data Distribution.....	19.6
DHI (BUD/POND/Archive).....	6.2



E&O

Standing Committee

- Michael Wyession (Chair)
- Bob Butler
- Ines Cifuentes
- John Hole
- Glenn Kroeger
- Gary Pavlis
- Wayne Pennington
- Laura Serpa
- Christa von Hillebrandt
- Washington University in St. Louis
- University of Portland
- American Geophysical Union
- Virginia Tech
- Trinity University
- Indiana University
- Michigan Technological University
- University of Texas at El Paso
- University of Puerto Rico, Mayaguez

The Education and Outreach program is committed to advancing awareness and understanding of seismology and Earth science while inspiring careers in geophysics. The E&O program develops and disseminates a suite of educational activities designed to impact 5th grade students to adults in a variety of settings, ranging from self-directed exploration using a computer, to the excitement of an interactive museum exhibit, a major public lecture, or in-depth exploration of the Earth's interior in a formal classroom.

In the past year, the efforts of the E&O program have focused on the enhancement of ongoing core activities and the expansion of their impact, as well as a careful look at the outcomes of the first 10 years of the program. The E&O program review included an external evaluation and a panel review, both of which were very positive about the value and impact of the program while also providing suggestions for the enhancement of program elements.

E&O This Year

Minority Recruitment Lectures for Internship Program.....	4
IRIS/SSA Distinguished Lectures	10
Undergraduate summer research interns	14
Teacher and college faculty workshops using IRIS materials	20
Teachers and college faculty attending IRIS-run workshops	140
Total AS1 seismographs in schools	190
Posters distributed.....	5,000
Students taught by IRIS-trained teachers.....	83,000
IRIS Web site visits, unique monthly visitors	2,300,000
Visitors to museums with IRIS/USGS displays	13,000,000



USArray

Advisory Committee	Matt Fouch (Chair)	Arizona State University
	Larry Brown	Cornell University
	Charles Langston	University of Memphis
	Maureen Long	Yale University
	Guy Masters	University of California, San Diego
	David Snyder	Natural Resources Canada
	Joann Stock	California Institute of Technology
	Rob van der Hilst	Massachusetts Institute of Technology
J. Douglas Walker	University of Kansas	

Operation and maintenance of USArray includes “rolling” the Transportable Array eastward across the U.S. Field crews construct, install and remove about 18 stations each month, and have moved well across the Great Plains. The Reference Network provides a fixed “reference frame”; most of these stations are operated and maintained by the USGS, but includes 20 long-term TA stations which provide more uniform coverage. The Array Operations Facility, operated by the PASSCAL Instrument Center, supports all phases of high-resolution Flexible Array studies that address EarthScope’s scientific goals; over the last five years, the NSF has supported twelve major experiments that collectively have occupied thousands of sites. Magnetotelluric observations complement seismic tomography; seven permanent observatories span the U.S. and more than 220 temporary sites in the Pacific Northwest have been occupied by USArray’s campaign instruments during the past four summers. Siting Outreach facilitates siting of USArray stations and works with numerous state and local organizations to raise awareness of EarthScope and USArray.

Transportable Array Stations (as of November 17)

Stations commissioned.....	855
Stations operating.....	454
Stations removed.....	401

Flexible Array Systems

Broadband systems.....	326
Short period systems.....	120
Single channel systems (Texans).....	1700

Magnetotelluric Systems

Backbone operating.....	7
Transportable sites occupied to date.....	221

Reference Network

Operating.....	115
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Station hosts are interested in EarthScope and often visit with crew members during the construction and installation of Transportable Array stations.



Polar Operations

Science Committee	Doug Wiens (Chair)	Washington University
	Sridhar Anandakrishnan	Pennsylvania State University
	Rick Aster	New Mexico Tech
	Meredith Nettles	Columbia University
	Mark Fahnestock	University of New Hampshire
	Carol Raymond	Jet Propulsion Lab
	Bob Smalley	University of Memphis
	Terry Wilson	Ohio State University

The Polar Services Group supports fieldwork both Antarctica and Arctic regions and maintains the pool of specialized equipment required to successfully return data from these challenging experiments. NSF/OPP facilitated the design of instruments to run unattended in Antarctica. Based on these designs, IRIS received additional OPP funds to acquire and establish a cold-rated station pool. Experiments using this pool have returned more than 85% of their data after two years of deployments, a vast improvement. NSF/OPP supports two FTEs to operate and maintain the pool and operate a cold chamber for testing, all housed at the PASSCAL Instrument Center. The development priorities now are instrumentation for wet environments, real time communications and ruggedizing stations for longer-term operations.

IRIS recently received an MRI award for the Greenland Ice Sheet Monitoring Network. This international collaboration will establish permanent observatories with open, real time data to monitor and catalog activity generated by Greenland’s glacier systems.

Polar Instrument Pool

Broadband stations.....	50
Intermediate period stations.....	6
Snow streamer channels.....	60
Summer-only quick deploy boxes.....	100
Xeos Iridium modems.....	30

Polar Experiments

Antarctica.....	8
Greenland.....	5
Alaska.....	5
Other.....	2



Gamburtsev Mountains experiment (AGAP) base camp. Tim Parker (PASSCAL Polar Support Group) and Masaki Kanao (National Institute of Polar Research, Japan) shown in this International Polar Year collaboration. (Photo by Guy Tytgat, PASSCAL Polar Support Group)