

# IRIS in 2020: A Strategic Plan

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*July 2015*



*Installation of a Transportable Array station in Alaska (2015)*

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## Introduction

With a new President onboard, significant advances in seismic instrumentation and analysis techniques over the last decade, the end of EarthScope in 2018, and the upcoming NSF re-compete of the management of the SAGE facilities, this is an opportune time to develop a vision and strategic plan for where we want IRIS to be in 2020.

In developing this strategic plan, an initial survey was conducted of IRIS Board members and IRIS Senior Managers, Program/Project Managers and Standing Committee chairs, to better understand how the IRIS community perceives its current direction and mission, its strengths and weaknesses, the threats it faces in both the intermediate and longer term, and the opportunities IRIS might capitalize on to be successful. In addition, telephone interviews were conducted with a subset of this group to get a better understanding of the cultural dynamics at play within IRIS and in the seismological community more generally. All of the information from the survey and interviews were shared with the IRIS Board, the Senior Management Team, and the IRIS Program/Project Managers and Standing Committee chairs who attended the 2-day strategic planning meeting held February 24-25, 2015 in Atlanta, Georgia.

IRIS is a mature organization that has been tremendously successful over the past 30 years. At the same time it is widely recognized that IRIS needs to move forward in a way that keeps the organization dynamic and relevant, especially in today's very difficult funding climate. While maintaining the capabilities of its core programs in instrumentation, data services and education and public outreach is generally seen as IRIS' highest priority, there is also great interest in developing new initiatives utilizing leading edge technology in order to address important scientific questions, engage a broader, more interdisciplinary scientific community and attract new sources of funding to support IRIS' programs and activities.

The attendees at the planning meeting also identified areas that are currently working well, but that with a reasonable amount of effort could be improved to provide significant value to the organization as a whole. These include optimizing IRIS' governance and management structure, developing new partnerships with industry and internationally, and engaging the next generation of seismologists and Earth scientists in the IRIS consortium. Lastly, an important part of IRIS' mission continues to be the integration of research and education, improving geoscience education and helping develop a more scientifically literate general public.

The plan presented here is derived from discussions over the course of the 2-day strategic planning meeting held in February 2015 and subsequent reviews and modifications by the Board of Directors and the Senior Management Team. The contents of this plan include the following two sections:

### **Strategic Foundations**

The vision, mission, and goals are presented to guide decisions that impact the long-term success and direction of IRIS.

### **Strategic Implementation**

A set of strategic priorities (with their accompanying objectives and action items) focused on overcoming barriers and leveraging cross-goal actions to utilize available resources efficiently and effectively.

## **Strategic Foundations**

These strategic foundations provide a governing framework for decision making by IRIS leadership. Every action taken should be in alignment with these foundations. If there are discrepancies then either the actions need to be reconsidered or the foundations need to be evaluated for appropriateness.

### **Vision**

*IRIS is a world leader in advancing discovery, research, and education in seismology to understand our planet and to benefit society.*

### **Mission**

- A. *Facilitate investigations of seismic sources and Earth properties using seismic and other geophysical methods.*
- B. *Promote exchange of seismic and other geophysical data and knowledge through the use of standards for network operations and data formats, and through pursuing policies of free and unrestricted data access.*
- C. *Foster cooperation among IRIS members, affiliates, and other organizations in order to advance seismological research and education, and improve Earth science literacy in the general public.*

### **Motto**

Facilitate, Collaborate, Educate

### **Visionary Goals**

These nine visionary goals are an explicit declaration of what members of the consortia would like to see IRIS achieve. Not all of these goals will be realizable in the next 5 years, but these goals define the direction IRIS must head in order to serve the needs of the IRIS community in 2020 and beyond.

- **An Engaged and Healthy IRIS Consortium**
- **Strong Programs in Instrumentation and Data Services, and Education and Public Outreach**
- **Leading Edge Technologies for the Collection and Dissemination of Seismic and other Geophysical Data**
- **Instrument Capabilities for Operations in Extreme Environments and other Frontier Areas**
- **An Efficient, Flexible, Inclusive, and Transparent Organizational Structure**
- **Robust and Secure Financial Resources**
- **A Broader Scientific Community Using IRIS Facilities**
- **Enhanced International Collaborations**
- **A Diverse Geoscience Workforce and a General Public Literate in the Earth Sciences**

## Strategic Implementation

### Strategic Priorities

Strategic priorities focus on what the organization needs to do to achieve its vision by overcoming obstacles and capitalizing on new opportunities. They are similar to the goals, but they are focused on action rather than the desired future state.

1. **Maintaining State-of-the-Art Core Facilities**
2. **Developing New Initiatives**
3. **Acquiring New Resources to Develop a More Diversified Funding Base**
4. **Optimizing IRIS Governance and Management**
5. **Strengthening Internal and External Relationships**
6. **Broadening the IRIS Community**
7. **Promoting and Advancing Education and Public Outreach**

Each of the strategic priorities is listed on the following pages with a set of tactical approaches, objectives, action items, and the goals they impact.

The **Tactical Approaches** express what broad actions may have a strong influence on achieving the strategic priority. The **Objectives** are specific end results chosen to achieve the strategic priority. The **Action Items** are actions to be taken to achieve each of the objectives. The **Visionary Goals It Impacts** lists all of the goals that may be influenced by achieving the specific strategic priority. They show how significant the strategic priority and its supporting objectives are.

Strategic Priorities							
	#1	#2	#3	#4	#5	#6	#7
Visionary Goals	Maintaining State-of-the-Art Core Facilities	Developing New Initiatives	Acquiring New Resources to Develop a More Diversified Funding Base	Optimizing IRIS Governance and Management	Strengthening Internal & External Relationships	Broadening the IRIS Community	Promoting and Advancing Education and Public Outreach
An Engaged and Healthy IRIS Consortium				X	X	X	X
Strong Programs in Instrumentation and Data Services, and Education and Public Outreach	X	X					
Leading Edge Technologies for Collection and Dissemination of Seismic and other Geophysical Data	X	X	X				
Instrument Capabilities for Operations in Extreme Environments and other Frontier Areas	X	X	X				
An Efficient, Flexible, Inclusive and Transparent Organizational Structure				X	X		
Robust & Secure Financial Resources			X				
A Broader Scientific Community Using IRIS Facilities		X		X	X	X	
Enhanced International Collaborations		X			X	X	
A Diverse Geoscience Workforce and a General Public Literate in the Earth Sciences			X				X

## Strategic Priority 1: Maintaining State-of-the-Art Core Facilities

### *Tactical Approaches*

- Pursue multiple approaches to secure funding to recapitalize and modernize core instrumentation
- Investigate viability of leasing vs owning certain types of instrumentation to shift the recapitalization burden to the lessor
- Obtain community input on priorities for future core facilities

### *Objectives*

1. Recapitalization and modernization of core instrumentation
2. Provide leading edge data curation and dissemination capabilities
3. Foster community engagement in the governance of these facilities to ensure they meet the future needs of the science and education communities

### *Action Items*

1. Recapitalization and modernization of core instrumentation
  - a. Assemble list of recapitalization needs and prioritize
  - b. Develop a multi-year strategy for funding recapitalization involving both Congressional engagement (e.g. GSN model) and seeking NSF funding (as part of core grant or special programs such as GEO's proposed new Mid-Sized Infrastructure Fund)
  - c. Secure new sources of funding to sustain state-of-the-art capabilities and incorporate new technologies on an ongoing basis (see Strategic Priority #3)
2. Provide leading edge data curation and dissemination capabilities
  - a. Develop new tools (basic/automated) to assess data quality and optimize data usage
  - b. Modernize data storage capabilities, including handling of massive datasets
  - c. Foster collaboration/coordination with similar data centers through organizations like the FDSN to facilitate dissemination of data from both IRIS-managed and other networks
  - d. Develop high level data products that make results accessible to non-specialists
3. Foster community engagement to ensure core facilities meet the needs of the science community
  - a. Keep facilities responsive and accountable to community representatives on IRIS Standing and Advisory Committees
  - b. Host regular community workshops to obtain community input on scientific goals and future facility needs
  - c. Provide training opportunities for students and early career scientists on the use of IRIS-managed facilities

### ***Visionary Goals this Strategic Priority Impacts***

- Strong Programs in Instrumentation and Data Services, and Education and Public Outreach
- Leading Edge Technologies for the Collection and Dissemination of Seismic and other Geophysical Data
- Instrument Capabilities for Operations in Extreme Environments and other Frontier Areas

## **Strategic Priority 2: Developing New Initiatives**

### ***Tactical Approaches***

- Incubate new initiatives in several different areas
- Start small and grow depending on community support and availability of funding
- Seek financial support for new initiatives outside of core (SAGE) grant

### ***Objectives***

1. Streamline and automate handling of data and metadata from the sensor to a user's "desktop" ("Dirt to Desktop")
2. Establish a full wavefield imaging capability for studies at a variety of scales
3. Develop an interdisciplinary, international Subduction Zone Observatory
4. Expand IRIS activities in marine seismology
5. Increase IRIS capabilities in hazard assessment and response
6. Seamlessly integrate IRIS Data Archive with HPC

### ***Action Items***

1. Implement "Dirt-to Desktop" (D2D)
  - a. Construct a D2D architecture that specifies the functions and relationships for all elements of a D2D system
  - b. Define and promulgate formats and protocols for sensors to self-document metadata, transport data and metadata, and command and control
  - c. Develop in-field tools for acquiring metadata digitally and reviewing data quality
2. Develop "full wavefield imaging" capability for studies at a variety of scales
  - a. Develop "white-papers" describing the scientific rationale for Large N and Array-of-Arrays
  - b. Develop a plan for a Large N Prototype System which would provide PIs with a mechanism to conduct Large N-style field experiments in 2016-2017
  - c. Assess Large N systems in terms of science return, experimental design, and required field and data management support
3. Develop an interdisciplinary, international Subduction Zone Observatory
  - a. Promote interest in SZO through special sessions and Town Hall meetings at AGU, EGU and other major international conferences



- b. Hold an interdisciplinary Subduction Zone Observatory workshop
  - c. Work with NSF and other Federal agencies (e.g. USGS) to define scope, potential cost, and source(s) of funding for a Subduction Zone Observatory
  - d. Work with USGS International Programs Office and the State Department to foster national government investment in SZO
4. Expand IRIS activities in marine seismology
  - a. Apply to renew Cooperative Agreement for OBSIP Management Office at IRIS
  - b. Work with OBSIP IICs to enhance OBS capabilities and performance
  - c. Pursue funding to establish a prototype, quasi-permanent broadband seafloor seismic station (e.g., 2-3 yr deployment; limited 2-way comms using waveglider or buoy)
  - d. Promote use of Amphibious Array and portable broadband seismic arrays in the oceans
5. Increase IRIS capabilities in hazard assessment and response
  - a. Explore opportunities for IRIS to participate in new NSF initiative on prediction and resilience against extreme events (PREEVENTS)
  - b. Modernize IRIS RAMP capability (in partnership with SCEC and USGS?)
  - c. Build partnership with Earthquake Engineering Research Institute
  - d. Proactively pursue archiving of strong motion data at DMC
6. Seamlessly integrate IRIS data archive with HPC
  - a. Establish a working group to identify issues and make recommendations
  - b. Collaborate with Lawrence Livermore National Laboratory and Oak Ridge National Laboratory to develop this capability
  - c. Work with NSF to obtain HPC resources for Earth sciences community

#### ***Visionary Goals this Strategic Priority Impacts***

- Strong Programs in Instrumentation and Data Services, and Education and Public Outreach
- Leading Edge Technologies for the Collection and Dissemination of Seismic and other Geophysical Data
- Instrument Capabilities for Operations in Extreme Environments and other Frontier Areas
- A Broader Scientific Community Using IRIS Facilities
- Enhanced International collaborations

## Strategic Priority 3: Acquiring New Resources to Develop a More Diversified Funding Base

### *Tactical Approaches*

- Invest IRIS unrestricted funds to develop a fundraising capacity
- Focus private fund raising on foundations, wealthy individuals and industry
- Utilize an Advisory Council to provide advice to Board and President on acquiring new resources

### *Objectives*

1. Establish a development program to raise funds for IRIS programs from individuals and foundations
2. Diversify funding by seeking support from other parts of NSF, other federal, state and local gov't's
3. Strengthen ties to industry

### *Action Items*

1. Develop a program to raise funds for IRIS programs from individuals and foundations
  - a. Prepare development plan with case studies
  - b. Hire development officer or consultant
  - c. Establish and utilize the Advisory Council
2. Diversify funding by seeking support from other parts of NSF, other federal agencies, and state and local governments
  - a. Continue to grow support for IRIS-operated facilities from non-EAR parts of GEO (PLR, OCE, AGS and EHR)
  - b. Develop new initiatives with other communities in EAR and other parts of GEO that would utilize and expand capabilities of IRIS-operated facilities (e.g. GeoPRISMS, CZO, CUASHI)
  - c. Explore funding opportunities with DOE/USGS/state agencies on induced seismicity and with USGS on volcanic hazards
  - d. Take on role as operator of regional seismic networks (e.g. CEUSN)
3. Strengthen ties to industry
  - a. Start industry working group (various industries) to identify opportunities and assess feasibility
  - b. Maintain high IRIS profile at meetings such as SEG with activities such as "Lunch & Learn"
  - c. Develop an industry sponsored summer internship Masters program

### *Visionary Goals this Strategic Priority impacts*

- Robust and Secure Financial Resources

- Leading Edge Technologies for Collection and Dissemination of Seismic and other Geophysical Data
- Instrument Capabilities for Operations in Extreme Environments and other Frontier Areas
- A Diverse Geoscience Workforce and a General Public Literate in the Earth Sciences

## Strategic Priority 4: Optimizing IRIS Governance and Management

### *Tactical Approaches*

- Look for efficiencies in current operations
- Clarify organizational structure/roles

### *Objectives*

1. Efficient, flexible, inclusive and transparent organizational structure
2. Improve/simplify IRIS business structure

### *Action Items*

1. Efficient, flexible, inclusive and transparent organizational structure
  - a. Assess and verify right size of IRIS management and governance structure
  - b. Make committee agendas, action items and issues of concern available to the community
  - c. Solicit community input prior to committee meetings
  - d. Effective committee meetings (e.g. new member orientation materials and training for potential committee members)
2. Improve/simplify IRIS business structure
  - a. Hold planning retreat of SMT and/or Admin staff to optimize the structure
  - b. Create staff awards for the most innovative product or process
  - c. Improve communications between different IRIS Directorates and Admin staff
  - d. Provide short monthly updates on activities to IRIS administrative staff

### *Visionary Goals it impacts*

- An Efficient, Flexible, Inclusive, and Transparent Organizational Structure
- An Engaged and Healthy IRIS Consortium
- A Broader Scientific Community Using IRIS Facilities

## Strategic Priority 5: Strengthening Internal and External Relationships

### *Tactical Approaches*

- Improve internal communication
- Develop and strengthen external partnerships

### *Objectives*

1. Improve communication within IRIS, and with subawardees and consortium members
2. Maintain and strengthen partnerships with other facility operators (e.g. UNAVCO), other Federal agencies partner agencies, and international organizations

### *Action Items*

1. Improve communication within IRIS, and with subawardees and consortium members
  - a. Hold regular internal Town Hall meetings to provide updates to IRIS staff and major subawardees
  - b. Improve IRIS Webpage and Newsletter as vehicles to convey information about IRIS to the broader IRIS community (and beyond)
  - c. Semiannual President's written updates to the IRIS consortium and at the annual IRIS members meeting
  - d. Use social media (Facebook, Twitter) to engage and inform broader community of IRIS activities
2. Maintain and strengthen partnerships with other facility operators (e.g. UNAVCO), other Federal agencies, and international organizations
  - a. Establish joint, ad-hoc IRIS-UNAVCO working group on topics of common interest such as rapid event response (RAMP), GPS/strong motion measurements, seismic and geodetic observations in the ocean
  - b. Work with Presidents of other GEO-supported facility managers to address common issues with NSF
  - c. Hold regular meetings with NSF and other partner agencies (USGS, DOE, NOAA) to discuss common interests and future opportunities
  - d. Maintain lines of communication with international seismological community by regularly attending major international conferences (e.g. EGU, IUGG), and encouraging international participation in IRIS workshops

### *Visionary Goals it impacts*

- An Engaged and Healthy IRIS Consortium
- An Efficient, Flexible, Inclusive, and Transparent Organizational Structure
- A Broader Scientific Community Using IRIS Facilities
- Enhanced International Collaborations

## Strategic Priority 6: Broadening the IRIS Community

### *Tactical Approaches*

- Engage early career investigators and scientists from other disciplines in IRIS activities (governance, workshops, planning)
- Pursue new facility capabilities in collaboration with other disciplines
- Increase international partnerships and activities

### *Objectives*

1. Increase participation of young scientists in IRIS governance structure and programs
2. Promote integrated, interdisciplinary science utilizing IRIS-managed facilities
3. Enhance coordination with international partners

### *Action Items*

1. Increase participation of young scientists in IRIS governance structure and programs
  - a. Enhance IRIS internship support by providing enhanced seismological training for graduate students and post-docs
  - b. Expand early career investigator training (e.g. curriculum development, proposal writing, papers navigating NSF and tenure process)
  - c. Set specific early career investigator participation numbers in IRIS committees (e.g. at least one per committee)
2. Promote integrated, interdisciplinary science utilizing IRIS-managed facilities
  - a. Hold workshops on interdisciplinary science themes
  - b. Pursue strong, active collaborations with other scientific and engineering disciplines in development of new IRIS initiatives such as SZO, Full Wavefield Imaging, and observations in extreme environments (oceans, polar)
  - c. Develop a partnership with the engineering community addressing structural hazards
  - d. Investigate establishment of disciplinary affiliates within IRIS (e.g. glaciology, helioseismology, atmospheric pressure, ocean layering, hydrology, etc.)
3. Enhanced coordination with international partners
  - a. Maintain and expand existing IRIS international presence through more structured participation in EUG, IUGG and other large international conferences
  - b. Seek ways of more directly engaging Foreign Affiliates in IRIS activities
  - c. Engage international partners in the development of SZO

### *Visionary Goals it impacts*

- An Engaged and Healthy IRIS Consortium
- A Broader Scientific Community Using IRIS Facilities
- Enhanced International collaborations

## Strategic Priority 7: Promoting and Advancing Education and Public Outreach

### *Tactical Approaches*

- Provide targeted products and services for a range of audiences, including; grades 6-12 students and teachers, college students and faculty, researchers, and the public.
- Expand traditional media outreach
- Strive for continuous improvement through a combination of ongoing internal and external evaluation.

### *Objectives*

1. Create undergraduate resources and workforce training opportunities
2. Increase the use of IRIS resources in grade 6-12 classrooms
3. Expand opportunities for the public to understand and appreciate seismology
4. Increase awareness of IRIS by NSF Leadership, OSTP and Congress

### *Action Items*

1. Create undergraduate resources and training opportunities
  - a. Continue providing a robust undergraduate summer research program
  - b. Provide a format for undergraduate faculty to share seismology education resources through the IRIS website
  - c. Create new resources as suggested by the community
  - d. Target two-year college faculty via the two year college mailing list and NAGT
2. Increase the use of IRIS resources in grade 6-12 classrooms
  - a. Continue participation in implementation of Next Generation Science Standards (NGSS)
  - b. Curate NGSS lessons for National Science Teachers Association
  - c. Modify existing IRIS resources to meet NGSS criteria
  - d. Develop a revised education webpage with a link to these resources
  - e. Solicit one pagers (research stories) from IRIS researchers focused on K-12 level (include a data/graph and interpretation of it)
  - f. Create “teachable moments” marketing plan by 2016, including creating a list of PI research areas
3. Expand opportunities for the public to understand and appreciate seismology
  - a. Capitalize on public interest following newsworthy earthquakes
  - b. Keep the IRIS home page updated with sufficient public-level content
  - c. Maximize use of social networking tools (Wikipedia, Facebook, YouTube, Twitter, Podcasts, etc.)
4. Increase awareness of IRIS by NSF and DOI Leadership, OSTP and Congress
  - a. Develop a new IRIS “business card” by 2016 (1 page describing what IRIS does) – Use IRIS members in each state
  - b. Develop an IRIS app for research stories

- c. Develop an IRIS PR plan by 2016
- d. Invest IRIS funds to sponsor several Hazards Caucus briefings each year, in collaboration with other members of the Alliance

*Visionary Goals it impacts*

- A Diverse Geoscience Workforce and a General Public Literate in the Earth Sciences
- An Engaged and Healthy IRIS Consortium