



Positioning UNAVCO
Advancing Science through Geodesy

Strategic Plan 2009 – 2013

Final copy

MISSION

UNAVCO, a non-profit membership-governed consortium, facilitates geoscience research and education using geodesy.

To UNAVCO:

A FLOURISHING UNIVERSITY CONSORTIUM

A VIBRANT SCIENCE COMMUNITY

A WORLD-CLASS GEODESY FACILITY

Our sponsors challenged us to diversify both the UNAVCO community and its revenue streams through a strategic planning process. This offered us the opportunity to revisit our goals in light of recent successes: the completion of the Plate Boundary Observatory including GeoEarthScope; the full integration of Polar Programs science support into core facility activities and funding; the hosting of the WInSAR consortium under the UNAVCO community umbrella; and the international recognition of UNAVCO as a model for geodesy community collaboration and open data archiving.

We believe that the university consortium is uniquely positioned to advance and support the science community goals articulated here. Our effective management of community interests is affirmed in the extraordinarily positive reviews of recent proposals to support EarthScope Operations and Maintenance and the UNAVCO Community and Facility.

Our plan provides a road map for how we will support community-driven initiatives that advance science through geodesy across a number of disciplines. It is both a management and communication tool, designed to support community work in ongoing and emerging science areas.

We face opportunity at every turn: to support EarthScope science as data sets mature, to advance community interests in expanded LiDAR and InSAR data acquisition; to influence monumentation standards and open data protocols as civic and commercial real-time GPS networks proliferate around the world; to support a burgeoning demand for TLS technology; to improve data access and analysis with web services and cyberinfrastructure; to expand the use of autonomous integrated geodetic networks to new scientific targets, new geographic settings, and new science disciplines; and to bring emerging data sets and technologies to the attention of investigators in many research areas such as atmospheric science and hydrology. In a climate that requires efficient and effective use of human and fiscal resources, this landscape of opportunity challenges us to be disciplined, selective, and focused in advancing science through geodesy.

As a community, we must set priority among these opportunities and then measure our progress. The strategic plan provides a foundation for an implementation plan that will detail actions, time lines, and specific metrics, and will be undertaken through UNAVCO governance, by the investigator community, and by facility staff.

Thank you for your hard work as a community in developing this plan. It will help guide our future through the support of both legacy and emerging science initiatives.

M. Meghan Miller
President

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VISION

We challenge ourselves to transform human understanding of the changing Earth by enabling the integration of innovative technologies, open geodetic observations, and research, from pole to pole.

In order to advance understanding of Earth processes, two major scientific challenges face UNAVCO's research and education community:

- To understand the *dynamic evolution* of the lithosphere, cryosphere, hydrosphere, and atmosphere on temporal scales spanning seconds to millennia.
- To investigate the *processes* that control natural hazards, including earthquakes, tsunamis, volcanic eruptions, and long term changes in climate, ice mass, global sea level, and coastal subsidence

Meeting these challenges will advance discovery of the processes that underlie Earth dynamics. Because of fundamental application to hazards science, dissemination of these advances informs education and decision-making, and carries great economic, political, and societal importance. We aspire to global mapping of the kinematics of the solid Earth and its fluid envelope across the temporal spectrum. This objective can be achieved through application of the most powerful geodetic observational tools available.

UNAVCO commits its energies and resources to achieving these ends in three areas. We will support integrative scientific studies that link kinematics to dynamics, process-based science, and hazards, through the collection and stewardship of long-term geodetic observations. We will establish new collaborations with communities that use geodesy to understand the changing Earth. Further, we will support the development of a new generation of scientists to sustain this work and to return the scientific benefits to society through Education and Outreach.

In pursuit of these science goals, investigators rely on UNAVCO as the world's premier organization for the collection and stewardship of geodetic data and products. The UNAVCO Facility provides science support through community coordination, field engineering, data services, technology innovation, and instrument testing, acquisition, and deployment. Further, it supports state-of-the-art global geodetic infrastructure that is developed and operated through international collaborations. EarthScope provides integrated geophysical observations that support investigation of the entire temporal spectrum of Earth deformation processes. In particular, the Plate Boundary Observatory (PBO) including GeoEarthScope provides unprecedented geodetic imaging of plate boundary deformation. Together, the UNAVCO Facility and PBO are committed to enabling efficient testing, adoption, and implementation of rapidly evolving geodetic technologies needed to support cutting edge geodynamics research.

Our long-term success depends on development of a forward-looking, diversified workforce that draws on and cultivates talent across the demographic spectrum of gender and ethnicity, across international boundaries, and across scientific disciplines. The UNAVCO community further relies on the Education and Outreach program to inform the public interest and to support the development of partnerships, collaborations, curricula, and student opportunities.

CORE VALUES

In order to accomplish our mission of research and education, as a community and science support organization, we hold these values:

- Advancement of community science goals
- Excellence in science, service, and education
- Open access to data products and scientific exchange
- Data preservation and stewardship
- Efficient and effective use of resources
- Strong service ethic and “can do” attitude
- Transparent community governance
- Scientific and professional integrity
- Diversity of scientific, educational, and social perspectives

STRATEGY AND ACTIONS

Based on its core values, UNAVCO will pursue six strategies to deliver on its mission and vision. This set of strategies is the heart of “Positioning UNAVCO – Advancing Science through Geodesy” and, taken with actions for each strategy, provide the road map to guide UNAVCO in creating its future during the next five years.

1. Community

Continue to build the UNAVCO scientific community that uses geodesy by further developing core strengths in solid Earth science, while responding to emerging community needs and enhancing UNAVCO’s visibility at home and abroad

2. Scientific Diversity

Support expanded use of geodesy and integration of new communities across science disciplines

3. Support Services

Provide effective and efficient support to the scientific community – through community planning, equipment acquisition and sharing, engineering and data services, and education and outreach activities

4. Technology

Support innovative application of existing and novel technologies for the investigator community in funded science projects, education, and outreach

5. Resources

Diversify the resource base in support of the science community

6. Leadership

Continuously improve the leadership role and effectiveness of UNAVCO management and governance to support future growth

STRATEGY AND ACTIONS

This set of strategies is the heart of “Positioning UNAVCO, Advancing Science through Geodesy” and, taken with actions for each strategy, provide the road map to guide UNAVCO in creating its future during the next five years. Actions are the detailed means to achieve each strategic objective.

Strategy #1: Community

Continue to build the UNAVCO scientific community that uses geodesy by further developing core strengths in solid Earth science, while responding to emerging community needs and enhancing UNAVCO’s visibility at home and abroad.

Actions Needed:

- *Core Strengths and Emerging Needs:*
 1. Educate the science community, sponsors, and public on the accomplishments of the Plate Boundary Observatory and EarthScope.
 2. Encourage and explore opportunities for international/global applications that build on the Plate Boundary Observatory and EarthScope capabilities
 3. Increase the visibility of NASA funded science
- *Enhance UNAVCO’s Visibility:*
 4. Improve communication with sponsors
 5. Promote geodesy and community science among stakeholders
 6. Communicate UNAVCO’s research support role and available services within the science community
 7. Increase awareness and visibility of UNAVCO within the international scientific community to support and seed collaboration and the development of global data sets

Strategy 2: Scientific Diversity

Support expanded use of geodesy and integration of new communities across science disciplines.

Actions Needed:

1. Strengthen relationships with scientific communities beyond solid earth science - including atmospheric science and hydrology
2. Explore connections with new educational institutions – including primarily undergraduate institutions and minority serving institutions
3. Explore industry opportunities for student internships
4. Re-engage the neotectonics and paleoseismology communities
5. Continue integration and strengthening of InSAR and LiDAR communities

Strategy #3: Support Services

Provide effective and efficient support to the scientific community – through community planning, equipment acquisition and sharing, engineering and data services, and education and outreach activities.

Actions Needed:

- *Planning:*
 1. Provide coordination and support for nascent, regionally-focused community-driven collaborations
- *Equipment acquisition and equipment pool:*
 2. Continue to exploit community leverage for equipment specifications and cost through centrally negotiated vendor agreements
 3. Increase visibility of Terrestrial Laser Scanner and its applications
 4. Optimize use of UNAVCO campaign receiver pools to meet investigator demand
 5. Plan for renewal of UNAVCO receiver pools in the GNSS era
- *Support services:*
 6. Enhance user support through the web interface
 7. Enhance archive services
 8. Continue development and distribution of software tools for data processing and display
 9. Identify community needs for Information Technology solutions and seek funding opportunities to support them through Cyberinfrastructure and other sources
 10. Offer technical support and seek funding to upgrade monumentation for the global GPS network
 11. Work with foreign universities and agencies to establish open data practices
 - a. Work with foreign space agencies to increase access to SAR archives
 - b. Support the WEGENER initiative to establish an open GPS archive
 12. Initiate discussions with NASA and others (including UNAVCO community) regarding an enhanced UNAVCO role in space missions
- *Education and Outreach:*
 13. Provide community training for equipment use and data analysis
 14. Lead community development of a coherent, modern geodesy curriculum.
 15. Explore opportunities to develop an equipment pool for undergraduate instructional programs
 16. Explicitly address the connection between geodesy fundamentals and scientific advances within web content and other outreach materials

Strategy #4: Technology

Support innovative application of existing and novel technologies for the investigator community in funded science projects and education & outreach.

Actions Needed:

- *Requirements:*
 1. With users and agencies, define the requirements for and explore implementation of a global telemetry system

2. Develop a plan for integration of new GNSS technologies and InSAR missions to enhance geodetic observations
 3. Explore further applications of autonomous sensor networks to geodesy
- *Integrated networks and new techniques:*
 4. Provide development and testing of receivers, antennas, domes, monuments to assure 1-mm global geodesy as GNSS instrumentation evolves
 5. Seek support for expanded geophysical networks to support community-driven science opportunities (e.g. polar networks, hurricane tracking, high-rate and real-time networks)
 6. Support development of the next generation NASA observing system with site vector co-location
 7. Explore acquisition of a ground based portable radar interferometer
 8. Develop natural hazard event scenarios and plans for responsive instrument deployments and data acquisition

Strategy #5: Resources

Diversify the resource base in support of the science community.

Actions Needed:

1. Cultivate new funding sources in support of UNAVCO's mission, including federal, foreign, and private sources
2. Work creatively with sponsors in finding support for interdisciplinary initiatives and new science areas
3. Explore pathways for support to Education and Outreach and other activities that are critical to UNAVCO's mission
4. Explore the boundary conditions and pilot a plan under which UNAVCO can participate in commercial activities while maintaining its core values
5. Explore ways of expanding NASA funding base in support of community science
 - a. participate in ICESat 2 (Ice, Cloud, and Land Elevation Satellite) – calibration and validation).

Strategy #6: Leadership

Continuously improve the leadership role and effectiveness of UNAVCO management and governance to support future growth.

Actions Needed:

1. Cultivate board use of geodesy across science disciplines
2. Set an international standard for data sharing in the geodesy community
3. Review membership by-laws for currency in light of expanded activities since inception
4. Ensure efficient, effective management of UNAVCO to meet community and sponsor needs
5. Establish a business development plan to keep UNAVCO viable on behalf of the membership
6. Encourage diversity of science and cultural perspectives in governance
7. Ensure active and effective governance by the Board of Directors

CRITICAL SUCCESS FACTORS AND METRICS

Critical Success Factors are key areas in which UNAVCO must perform well on a consistent basis in order to achieve its mission and vision within fiscal constraints. Metrics gauge progress on the Critical Success Factors and are linked to the strategies noted in brackets below. These metrics will be linked to specific actions in the implementation plan.

Publication of high impact science that uses UNAVCO resources

[Community, Scientific Diversity, Support Services, Technology]

- Number of papers that acknowledge UNAVCO support
- Number of papers with results that rely on UNAVCO resources
- Impact factor of these publications

Funding of research that uses UNAVCO resources

[Community, Scientific Diversity, Support Services, Technology, Resources]

- Profile of funded projects in the sponsor database
- Profile of non-sponsor funded projects

Diverse involvement in UNAVCO activities and projects

[Community, Scientific Diversity, Leadership]

- Composition of UNAVCO community members attending meetings, workshops and short courses
- Number of journals represented in the publication database
- Degree and research profile (Carnegie classification) and minority-serving status of member institutions
- Profile of Associate Membership

Archive for data preservation, stewardship, and open access

[Support Services, Technology]

- Number of data products in and out of the archive by type
- Number of unique users and domains by technique
- Number of software downloads

Community use of state-of-the-art geodetic technology

[Support Services, Technology]

- Number and diversity of users drawing on the equipment pool
- Sufficiency of the equipment pool to meet investigator demand
- Community equipment acquisition

Community involvement in and use of Education and Outreach programs and products

[Community, Scientific Diversity, Support Services, Technology, Resources]

- Workshop and short course participation
- Number of interns each year
- Web site use
- Number of principal investigator projects that include Education and Outreach resources

Sustainability/viability of the funding sources

[Community, Resources, Leadership]

- Profile of funding sources and amounts
- Optimal overhead rate

A well-functioning corporation with informed community governance

[Community, Leadership]

- Attendance at the business meeting
- Election participation by member representatives
- Composition and balance of the Board of Directors and governance committees
- Governance committee attendance and regular reporting to the Board of Directors
- Board of Directors' training and assessment; management performance review
- Sponsor, community, and employee satisfaction
- Audit outcomes and findings; federal compliance