

the operation of and services provided by the UPC and will make important contributions to advance the geosciences.

#### IV. The plan for the next five years

As stated in the introduction, Unidata was founded by the meteorological community so that universities could acquire and use real-time weather data in education and research. Since then, both the Unidata community and the scope of its activities have grown, and participation in the program has broadened both geographically and to other geoscience disciplines. This organic growth has occurred with modest incremental resources due largely to the leveraging of capabilities in the program's traditional areas.

During the next five years, Unidata proposes to extend and enhance its role as a community facility and to leverage the following core competencies:

- Low-latency distribution of real-time data
- Integrated geoscience data analysis and visualization
- Data access infrastructure, including services for managing and serving archived data
- Community engagement, bringing stakeholders together to address common needs
- Comprehensive software support
- Advocacy on behalf of the community on data and related matters
- Flexible and platform-independent software solutions

The plan identifies areas where Unidata can facilitate educational and research activities that lead to advances at the frontiers of atmospheric and related sciences.

Even though Unidata has a tradition of *proactively* enabling research and education related to weather, the climate science community has only *indirectly* benefited from many of the capabilities developed by the UPC. As universities respond to challenges presented by climate change, Unidata must accommodate needs in that area. As documented in the Results of Prior Support section, the climate community has been using Unidata software (e.g., netCDF and TDS), although climate science has not thus far been a primary focus for Unidata. In this proposal, facilitating research and education in climate is singled out as a new priority area for Unidata.

As noted earlier, a second notable scientific trend in the atmospheric science community over the past decade has been the steady move toward probabilistic forecasting, using ensemble weather prediction techniques. This proposal recognizes that change and presents an approach for addressing the attendant challenges and community needs.

The proposed plan and endeavors therein are guided by the results of a comprehensive strategic planning effort over the past year that included strong input from and leadership by Unidata's governing committees and feedback from the broader community. That effort helped to clarify Unidata's goals and connect them to Unidata's overarching mission to enable research and education in the geosciences. The resulting strategy builds on the successes of the present program, its capabilities and core competencies, and its unique niche in providing robust, reliable, and comprehensive data services and tools to geoscience users. It should be emphasized that even as Unidata embarks on this plan to enhance and adapt its tools and services to meet the needs of an evolving community, the program remains deeply committed to meeting its responsibilities to the core atmospheric science community. The quality of services that the core community has come to expect will be maintained and enhanced as a result of the new partnerships and synergies.

In this section, we present a plan that is centered around the following six thematic focus areas:

1. Broadening participation and expanding community services
2. Advancing data services
3. Developing and deploying useful tools

4. Enhancing user support services
5. Providing leadership in cyberinfrastructure
6. Promoting diversity by expanding opportunities

The proposed endeavors and advances are so important that the greatest risk would be not to pursue them, leaving Unidata universities with static tools and services in a dynamic environment of rapid technological and scientific advances.

## **1. Broadening participation and expanding community services**

Since Unidata's inception, there has been a gradual evolution in the Unidata academic community as many traditional meteorology departments in universities broadened their mission, scope, and role in the scientific and educational enterprise. This gradual metamorphosis has been shaped by the changing landscape as environmental, scientific, educational, and societal priorities have evolved due to a growing shift toward integrative and collaborative science. Even as atmospheric science programs in universities evolved, Unidata has attracted users in other geoscience and engineering disciplines to its tools and services. Today, the Unidata community includes researchers, educators, and students in many geoscience and engineering departments, unconstrained by international boundaries. This organic broadening of the community is expected to continue, and the proposed plan positions Unidata to respond and adapt to the evolving needs of a growing community.

### *International activities*

Increasingly, the conduct of science requires strong international scientific partnerships and the sharing of information, knowledge, and other assets. This is particularly true in the geosciences where the highly coupled nature of the Earth system and the need to understand global environmental processes and their regional linkages have heightened the importance of international efforts. The climate system, for example, is far too complex a puzzle to be unraveled by individual nations. As science becomes increasingly global in nature, it is critical that focus is placed on full, open, and timely access to and sharing of ESS data and related analysis tools.

The Unidata Program recognizes the benefits of a global cyberinfrastructure and the power of networked communities, as institutions and people exchange knowledge and resources. Unidata's international activities began modestly as the MeteoForum project in 2001, funded with internal UCAR funds. Since then, Unidata as a community has developed a growing portfolio of international outreach activities, conducted in close collaboration with academic, research, and operational institutions on several continents. The portfolio includes providing data, tools, support, and training as well as activities that bring various stakeholders together to address important issues, all toward advancing the goals of building a globally-engaged community of educators and researchers. Real-time atmospheric science data delivered to Latin America has helped initiate teaching innovations in universities in Argentina, Brazil, Chile, and Costa Rica. As a result of these efforts, data are also flowing from other continents back to the U.S. for educational, research and operational use.

### **Priorities for the next five years:**

- Continue to foster a shared vision for and community ownership of the program, creating a framework for capturing community input
- Provide a transformative learning environment for the community by involving users as both contributors to and stakeholders in Unidata
- Broaden participation in Unidata from closely-related geoscience disciplines such as hydrology and oceanography
- Adapt services to the needs of the climate community
- Leverage partnerships with universities to entrain nearby community colleges into the Unidata community
- Continue to broaden participation in Unidata governing committees