

STATUS AND FUTURE NEEDS OF DISTANCE-LEARNING AT SDSU FIELD STATION PROGRAMS

The Field Stations Program (FSP) at SDSU operates three field stations in Southern California: Santa Margarita Ecological Reserve (SMER), Sky Oaks Field Station (SOFS), and Fortuna Mountain Research Reserve (FMRR). In addition, Tijuana River National Estuarine Research Reserve (TRNERR), jointly operated by US Fish and Wildlife Service and California State Parks, is an FSP auxiliary field station.

Both SMER and SOFS are served by 45 Mbps network connectivity, established and maintained in collaboration with the NSF-funded High Performance Wireless Research and Education Network (HPWREN). Both reserves are covered by wireless bubbles and have a large number of environmental sensors, including weather, water quality, ecosystem flux sensors and video cameras. Real-time data from the sensors are available on FSP website (<http://fs.sdsu.edu/remot2>), and is archived for long-term analysis. High-performance connectivity to TRNERR is currently being planned to provide real-time access to its four automated weather and water-quality monitoring stations. An expansion of its monitoring network is also planned. FMRR exists within Mission Trails Regional Park (MTRP), a popular urban park within the City of San Diego. We are in discussion with city agencies to bring high-performance network connectivity to MTRP and install automated monitoring observatories.

FSP staff, in collaboration with HPWREN staff and National Park Service, has successfully conducted several live interactive virtual field visits to Santa Margarita Ecological Reserve for students in K-12 classrooms and attendees at technology fairs. A biologist interacted with participants using video and audio, demonstrating the response of real-time data from environmental sensor to changing field conditions.

FSP seeks opportunities to collaborate with other organizations in the following areas:

- 1) Develop effective education modules that can be integrated into existing K-12 curricula. The ability to present geographically diverse sites would increase the appeal to school administrators.
- 2) Select or develop reliable point-to-multipoint video-conferencing hardware and software toolkits that make deployment in many classrooms easy and economical.
- 3) Select, configure, or develop instruments that would enhance the virtual experience for students who are physically removed from the site (i.e., surround-sound).
- 4) Develop self-contained sensor array modules that can be deployed easily and rapidly in remote locations. The modules would include communication instruments for communicating with classrooms.
- 5) Develop easy-to-use analysis tools for students in the classroom to use to explore and analyze the real-time data stream coming from the remote site.

- 6) Develop standards and protocols for sharing real-time data for the above (4) purpose.
- 7) Develop relationships with and materials for prospective schools.
- 8) Establish network connectivity to target schools in rural areas of Southern California.