Scientists themselves can no longer afford the time to be intimately familiar with the detailed workings of each and every instrument in these networks. There are too many systems to learn and to maintain. A new generation of Master's level science support staff, cross-trained in oceanography and computer science, electronics or engineering, is emerging to fill the gap. Freed from the distractions of raising their own funding and pursuing academic tenure, these skilled technicians can concentrate on installing, operating and maintaining the numerous new systems presently available or soon to arrive. Their work is facilitated by instrument developers that provide easy to use interfaces that enable their sensors to be reprogrammed, adjusted, recalibrated, error checked, etc., either by a knowledgeable support person, or via a central computer controlling a network. Public outreach to the K-12 community will promote interest in oceanography and responsible stewardship of the oceans, and the new technology will attract more students to the field. We should not make it our sole purpose to turn every graduate student we attract into a new Ph.D. Often it is the Master's level oceanography graduates with strong technical backgrounds who appear to be having the most fun.

## National Coordination Committee for Linking and Standardizing Observation Systems

The Internet and World Wide Web have made possible the linking of individual real-time observation systems maintained and operated by a variety of partners from federal and state agencies, academia, and the private sector. What is needed (beside the funding mentioned above) is a national committee that not only links the various web sites, but also coordinates national standards, calibration techniques, quality control procedures, data formats, website formats (for the data), and other issues that affect the integrated use of the data from all these different sites. Even now there are websites from which a user can be linked to a variety of sites providing real-time data for a particular region, but seeing these data displayed nicely on different websites is different from having easy access to all the data being displayed, so that they can be used in a model or for some other application.

## Summary

Coastal ocean observation networks are currently operating or are being constructed at numerous locations around the United States and in other nations. The rationale for their construction and maintenance include both long-term and real-time applications. Enabling technologies that now make this possible include the rapid advances in sensor and platform technologies, multiple real-time communication systems for transmitting the data, and the emergence of a universal method for the distribution of results via the World Wide Web. Future sensors and platforms that will expand the observation capabilities include new ocean color satellites, altimeters, HF Radars, numerous moored instruments and autonomous vehicles. A common set of limitations each network must address includes operational support, instrument calibration, bio-fouling, power requirements, and data management. Future recommendations include the training of a new generation of computer and field support personnel, and the development of partnerships and long-term support mechanisms to foster the development of national and international distributed observation networks.

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