

Cost will remain a major issue. Whereas AUVs may provide an acceptable cost per profile over five years, the need for significant up-front capital investment will need to be justified through more rigorous cost-benefit analyses.

The ocean-science community will undoubtedly develop and use autonomous vehicles of many different types over the next decade. Many will be able to share sub assemblies and design philosophies, and engineers will continue to seek cost-effective solutions by adapting modules and components imported from the consumer and industrial sectors. It will become even more essential for engineers and scientists to maintain dialogue on requirements and specifications. As the vehicles become more capable, the legal aspects of their operations will need careful thought in national and international forums. More information concerning AUVs may be found in Griffiths et al. (2001).

- capability to sample in environments generally inaccessible to ships (e.g., in hurricanes or typhoons and under ice) (see Bellingham et al. 2000);
- good spatial coverage and sampling over repeated sections;
- capability of feature-based or adaptive sampling; and
- potential deployment of several vehicles from moorings, mother ships, off-shore platforms, and coastal stations.

An important factor for new platforms will be sampling flexibility. In particular, it should be possible to direct AUVs to critical sampling areas based on other remote and in situ data and model predictions. It is likely that AUVs will be increasingly called upon to replace some of the present ROV work efforts.

TOWARD THE FUTURE

At present, several specialized groups are developing and using autonomous vehicles (Griffiths et al. 2001). Numbers are expected to grow as mission length capabilities increase, costs decline, reliability improves, operation becomes more routine, and more sensors become available for various sampling needs. Creative uses of the vehicles will involve networking and information feedback loops to guide sampling programs (in some areas involving predictive models) and responses to extreme natural and anthropogenic driven events.