

4. OCEAN SCIENCES AND MARINE ENVIRONMENTAL INDUSTRIES

4.1 The Ocean Sciences Market

This sector includes the provision of equipment and services for, predominantly, government-controlled marine science and technology laboratories engaged in national and international oceanographic and environmental programs. These include the World Ocean Circulation Experiment (WOCE) and the North Sea Project, as well as the activities of commercial organizations involved in ocean activities, excluding hydrocarbons and defence.

These technology areas include exploration, surveying and measurement technology (e.g., instrumentation, deployment systems, survey techniques, mapping, modelling, data management and analysis) and technology required for support of subsea operations (e.g., power, communications and navigation).

The market pull with regard to ocean science is the development of large international scientific programs and/or the development of enabling technologies. The main areas of increasing interest and likely development in the ocean sciences and environmental areas are:

- autonomous vehicles for passive and active sensing and data-gathering
- improved deep-towed systems
- medium-depth medium-scale side scan sonar
- improved expendable instruments
- improved swath, scanning and profiling instruments
- autonomous seabed research stations

[HMSO: CCMST Report — *Marine Sciences in The U.K., A Strategic Framework*, 1990]

A report, published by the Natural Environment Research Council (NERC) in March 1990, *Deep Sea Oceanography in NERC: A Report of the Expert Group Review Panel*, identified several areas of missing technology within the U.K. marine science area where future developments could stimulate new scientific work. These included:

- in-situ chemical sensor systems for tracer measurements
- interactive systems for controlling instruments on the ocean floor or within the water column
- low-light video systems for geological, geophysical or biological work on the ocean floor
- the general area of laser applications for controlled sampling of physical, chemical or biological properties
- remote manipulators for controlling and positioning equipment or sampling material on the ocean floor
- tethered vehicles for work on the continental slopes

The panel included experts from overseas and, therefore, it could be assumed that the requirements are not limited to the U.K. scientific establishment.

The development and application of autonomous underwater vehicles (AUVs) has received increased attention in science, the military and industry in recent years. The market is certainly not confined to Europe. The Deep Ocean Long Path Hydrographic Instrumentation (DOLPHIN) development will require a significant technological advance, especially in the area of power sources, before it can become a reality. In addition, the cost of R&D will be more than a single company, or even country, can invest on its own. Furthermore, as the main requirement identified in the relatively short term