HUMAN UNDERWATER PENETRATION - AN UNORTHODOX VIEW

Iuliu Gavril MORARIU

School of Kinesiology, Simon Fraser University, Burnaby, B.C. (Canada)

We are living in a nonstop scientific revolution. Rapidly changing technologies daily challenge our personal knowledge. Our ability to adapt, remain competitive and survive is on trial everyday. No human activity is exempt. Everyone is affected including those involved in Human Underwater Penetration. Here, particularly in this highly specialized and exclusive field we are facing serious problems due to radical changes in methods and equipment. Even the attitudes towards the environment as well as customers' idiosyncrasies have lately undergone dramatic changes. And by "customers" we mean not only big oil companies but also a vast array of beneficiaries, from the Sunday skin diver to the diving scientist, whose demands and goals defy imagination. If anything less than close attention is paid to long range planning and current developments we will fail in our search for solutions to such complex issues. Contrary to the current pragmatic approach a fundamental new, scientific method is needed. In this initial stage we present the state of the art, a sketch of emerging trends and suggestions for future development.

The basic ideas for this study originate from observations of processes occurring all over the world. Diving communities are struggling with similar problems arising principally from two causes:

1. a decreasing appeal for the use of divers in both industrial and scientific operations;
2. the rapidly increasing use of Remote Operated Vehicles (ROV).

During the last several decades underwater habitats and other saturation diving systems have played an important role. However many a hope laid on them has already evaporated. The advent of the microcomputer is revealing a different future. Underwater technology is going through the most dramatic change in its history by contemporary efforts to replace men with robots. The tribute paid by industrialists and scientists alike to the newly born generation of glittering "smart machines" is perhaps the most significant factor in divers' decline. Consequently the diving community, as it is currently conceived, is threatened with increasing unemployment, even extinction. This trend is aggravated by too many specialized schools yearly turning out scores of new divers in the old mould. Simultaneously a shortage of highly trained pilots for ROVs is felt, as no schools for them are in operation yet. Thus an inadequate education and many other obstacles are holding up the progress of those willing to adjust to this restless, developing domain.

Screening the trends emerging from current diving practice brings additional information for future planning. However, complex, apparently unrelated factors may obscure our judgement. Fluctuating oil prices, ongoing talks regarding the sovereignty of the continental shelf and environmentalists' lobby against offshore drilling are a few such confusing elements. But regardless of their impact on public opinion these factors are not shaping the technology itself. At the human level one thing is sure: unless the diver is continuously upgrading himself and trying to become versatile he will be replaced by either a machine or a better trained colleague. This replacement will happen whether or not oil price changes. We ourselves won't witness the extinction of this ancient profession, of course. Those who advocate the uselessness of humans in underwater penetration exemplify how easily judgement can be deceived by misplaced enthusiasm. While ROVs will be seen in an increasing number, already discernible moves towards underwater harvesting, organized sea farming and underwater tourism will boost one-atmosphere habitats' development. And with the move from shallow to deeper waters, the one-atmosphere diving systems will inevitably give a new dimension to the human presence underwater.

In considering effective solutions for future education, research and diving practice the first recommendation is for a major shift in the existing training system. The new technology requires specialists with technical skills and engineering knowledge. Consequently, in addition to his enthusiasm and ability to breath underwater, the new generation diver will need to be an engineering technologist. Therefore new schools are needed. Research is required to either adapt modern training apparatus, or to design original simulation systems for training ROV pilots. Unlike the present in-the-field training practice such a system will insure against costly failures. Furthermore ROVs still demand extended engineering research regarding their hydrodynamics, statics and dynamic stability. Extended research and testing is required also to update and reaccredit the one-atmosphere habitat concept. Thus theoretical work and "in situ" long-term experiments with such systems must be carried out jointly with fisheries and offshore drilling experts.

Human Underwater Penetration by and large is responding erratically to profound technical and social changes. Scientific analysis and planning can head it effectively towards a flourishing future. The alternative could be either progressive extinction or technocratic aberration. Appropriate action is needed now, and it is up to us to take the required steps.

GEOPHYSICAL PROSPECTING METHODS APPLICATED TO BENTHONIC CARTOGRAPHY

Victor DIAZ DEL RIO and Jorge REY

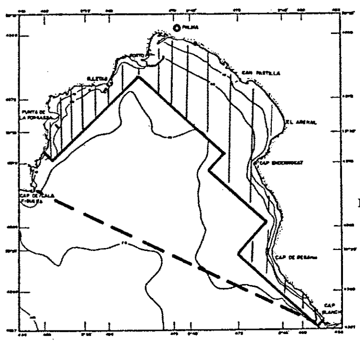
Instituto Espanol de Oceanografia,
Laboratorio Oceanografico de Fuengirola, Apartado 285, Malaga (Espana)

The poster synthesizes the different systems used to carry out the marine bottom cartography in the bay of Palma (Baleares, Spain) where an extensive Posidonia prairie occurs.

The bay was prospected during an oceanographyc cruise. The interest was focused on the area between the coast line and the 35 bathymetric contour line. Four different methods were used :
- Precision echosounder (35 kHz)
- Sub-bottom profiler (3,5 kHz)
- Side Scan Sonar (100 kHz)
- Seismic reflection (Uniboom 300 joules).

The seismic profiles were complemented with 321 Shipek samples and 30 piston cores. The shallow areas were mapped using vertical aerial photographs (black & white) 1:3000 scale.

All these techniques provided a good mean for obtaining a detailed map of seagrasses and sand boundaries. A chart of the marine bottom features was drawn on 1:20000 scale. This map shows the seagrass extension bathymetric contour lines and the different degraded zones. The results were optimal and it has been possible to compare the responses obtained by different techniques.



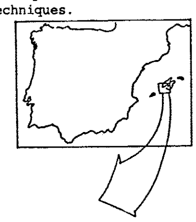


Figure : Situation of the surveyed area, presented in the poster. Dotted line indicates the limit of the bay. Dashed zone corresponds to the area prospected with Side Scan Sonar.

The side scan sonar combined with sub-bottom profiler records provide a good tool to discriminate the rocky bed from the dense prairie : the acoustic response in the side scan sonar records could not distinguish these two zones. In particular the texture of the superficial sediments from the seismic records and sediment samples were considered. The side scan sonar and high resolution seismic reflection techniques (3,5 kHz) are good tools to carry out studies on seagrasses and their relation ship with the substratum.

Seagrass distribution and state of conservation were related with different environmental features : antropic impact, environmental pollution, sedimentary dynamic regime, bottom types and depth.

BIBLIOGRAPHY

REY (J.) & DIAZ DEL RIO (V.), 1985. - Cartografia de los fondos marinos de la Bahia de Palma (Baleares, Espana) : Distribucion de las praderas vegetales y sedimentos superficiales. Abstract in : *Second International Workshop on Posidonia Oceanica Beds and Round Table on "Hydroids of the Seagrass beds"*, Ischia, sep. 1985.

REY (J.) & DIAZ DEL RIO (V.), 1985. - Resultados preliminares de la campana de geologia marine "BAPAL - 84" (Bahia de Palma, Baléares). *Inf. Téc. Inst. esp. oceanogr.*, 30, pp. 1-77.