Summary.pdf

Strategic Plan for the Institut de Ciències del Mar (Institute of Marine Sciences) May 2005

SUMMARY

1. PRESENTATION

The Institut of Ciències del Mar (ICM) together with the Unidad de Tecnologia Marina (UTM) belongs to the Natural Resources area of the CSIC. Both Institutes are part of the Centre Mediterrani d'Investigacions Marines i Ambientals (CMIMA) and share in addition of the building , a single administration and general services for maintenance, computer center, library and building facilities. The CMIMA is located in a new building equipped with modern and spacious laboratories and support facilities, right on the waterfront of the city of Barcelona, between the new Olympic yacht harbor (walking distance) and the large commercial harbor of the city. Barcelona, with a metropolitan area of more than 4.5 million people, is the capital of the Autonomous Community of Catalunya and as such is the home of all its political and administrative organizations.

THE INSTITUT CIÈNCIES DEL MAR (ICM) PRIMARY MISSION IS:

To seek and communicate scientific understanding of the oceans and their decisive role within the Earth as a whole.

To create the fundamental knowledge to address societal concerns such as climate change, hazard prediction, and sustainability.

IT IS THE GOAL OF INSTITUT OF CIÈNCIES DEL MAR (ICM):

1. **To be a world leader in multidisciplinary marine research and in advancing the understanding needed for sustainable balance between marine environment and human activity**
2. **To be a national leader in fostering interdisciplinary research, and in strengthening the integration of marine science with emerging technologies.**

To fulfill this mission ICM has as January 2005 :

A total building space of 5.898 m^2 of which 4.318 m2 are Laboratories. Technical Services and Research Facilities.

Human resources: 41 civil servant research scientist staff, 27 research scientist contracted, 55 predoctoral students and 23 research support personnel

The research personnel are organized in three Departments according to their basic discipline: Marine Geology and Physical Oceanography, Marine Biology and Oceanography, and Marine Renewable Resources.

The ICM research objectives are defined in seven lines:

1. Ocean structure and dynamics on different scales
2. Marine sediment record and development of the continental margins and basins
3. Matter and energy fluxes in the oceans
4. Biodiversity and dynamics of marine ecosystem
5. Biology of marine species and populations
6. Integrated coastal system research
7. Sustainability of marine resources

2. ANALYSIS OF THE STATE OF THE ART OR POSITION OF THE CENTRE/INSTITUTE IN ITS COMPETITIVE ENVIRONMENT

Strengths

1. *The Institute size (*about 150 people*) and multidisciplinary.* The ICM personnel comprise highly specialized researchers with a wide range of expertise within marine sciences: 41 tenure scientist, 27 non tenure scientist, with academic formation in the five major disciplines: mathematics, physics, chemistry, geology and biology.
2. *Historical treasure trove.* The ICM, with more than 50 years of history, has accumulated a large amount of marine scientific material, information and knowledge, very useful and of high interest both scientifically and socio-economically. Exponents of that are: 1)The most important Marine science library in Spain, the Biological Reference Collection and the Seismic Reflection Profile and Marine Sediment Core Reference Collections.
3. *New building* with substantial facilities for marine research location, and space for future growth.
4. *First class research quality*, as shown by the high SCI impact of the publications of ICM scientists, and also by their numerous invitations to conferences and committees.
5. *International positioning,* with a high degree of participation in international projects and committees, as well as a record of extensive postdoctoral formation abroad. Important *flux of visiting scientists*, especially young researchers (graduate students and postdoctoral) from both Spain and abroad.
6. Excellent results in the *acquisition of competitive resources and funding* (in 2004 a total of 77 competitive projects and 13 contracts, services, or agreement with companies and public sector) with a high diversification of sources. (Different national and international funding agencies and programs). Experience in projects on *technological development* (PETRI, P4, EU, ESA)
7. Technical support staff in some of the Technical Services with knowledge, dedication and expertise.
8. *The ICM publishes Scientia Marina*, one of the few Spanish science journals that is currently listed in the SCI. The journal, with free access to Internet users, also devotes special issues to highly specialized topics, meeting proceedings and workshop outputs.

9. Commitment to *outreach activities,* as shown by participation in many initiatives at personal and institutional levels. *Commitment to undergraduate and graduate education.* ICM scientists participate in graduate programs, both as teachers and thesis advisors, and tutor training stays, for professional school and undergraduate university students.
10. An *enriching local environment*, in the vibrant city of Barcelona, that favors the interaction with educational institutions, universities, research centers and enterprises

Weaknesses

1. From a general point of view, there are constraints or weaknesses set up by the general *research* environment of the EU and of Spain. These weaknesses are inherent to our society and to the structure and function of the governmental organizations and we cannot address them directly. Only we list weaknesses that ICM can tackle.
2. *Absence of certain expertise and research topics* necessary to strengthen the multidisciplinary of the ICM and to incorporate or use new technologies
3. *Scarcity of qualified support and technical personnel* and difficulties in recruiting them. Timing, selection, and duration of the contract, etc. subjected to constraints not based on scientific needs.
4. *Low visibility of our scientific activity* among governmental institutions, both regional and national. Often, ICM contributions are better known internationally than in Spain!.
5. *Low accessibility of existing information and databases* within the ICM, both historic and current, for ICM scientists as well as outsiders.
6. *Insufficient transfer of research results* to potential users and society in general

Opportunities

1. *The existence of the Marine Technology Unit*, also housed at the CMIMA, promotes collaboration in technological development and contact with both private companies and the technological universities of the metropolitan area.
2. *The setting of the CMIMA in the vicinity of a biomedical campus*, currently in expansion, will stimulate scientific interactions and the sharing of facilities between the two communities, and opens the door to the utilization of marine genomic technologies to understand the rich diversity of processes present in marine organisms and their importance in the context of their evolution, adaptation, physiology and ecology.
3. *New CSIC oceanographic research vessel (60 meters long, providing more space for scientists on board and for instrumentation*) will expand allocation of ship-time per research project. will encourage participation of large multidisciplinary groups, as well as research in marine regions heretofore not considered by Spanish scientists.
4. *Increased recognition of the importance of environmental issues* by governments. Global and EU regulations (Habitat, Kyoto protocol, Water Quality, etc.) regarding the marine environment that require knowledge, data and tools for the regional and national administrations.

5. *Establishment of the European Research Council* with independent funds specifically allocated for high quality science projects.
6. *Specific contribution of Spain, with the support* of the National Space Program and Ministry of Industry, *to the European Space Agency SMOS* (Soil Moisture and Ocean Salinity) *mission.*
7. Program of the Catalan government of funding independent permanent research positions within existing universities and research institutes (ICREA PROGRAM).
8. *Availability in the near future of more space in the same building.* The first floor of the CMIMA building is presently rented by Centre de Regulació Genòmica (CRG) with an expected departure in 2007. This space would allow marine research to grow, promoting new lines of research and supporting new initiatives. It would furthermore allow the development of the Marine Station Project as well as optimization of the initial investment in the specific marine infrastructures of the CSIC in the CMIMA building.

Threats

1. *Low priority of basic marine research* in the policies of the autonomous and central government, as well as in the European Framework programs.
2. Low acknowledgement by CSIC of the unique infrastructure requirements of marine research.
3. Increase of the role of non-scientific criteria in the definition of research policies and in managing science.
4. Lack of "critical mass" of Spanish marine scientists and not adequate organization to compete against the large new consortium forming in other nations of Europe to cope with the new directions in EU funding.
5. Increase of the ZEE to 300 miles, with constraints in obtaining permits to work and to sample in continental shelves.
6. *Low salary competitiveness* of the CSIC with respect to the private sector and to other (EU) countries.
7. *Risk of losing important research lines* currently developed by Ramón y Cajal fellowship holders and by other young researchers, due to lack of tenure track positions.
8. *Jeopardy of missing a unique opportunity for future growth and development* of the ICM, if the first floor of the CMIMA building is lost (to activities not related to marine science).

Integrated analysis

One of the central challenges of marine research is understanding how the physical, chemical, geological, and biological processes of the Earth's natural system are functionally integrated, as well as understanding the dynamics of coupled natural and human systems on a wide range of scales. To achieve that successfully, it is necessary to have, on one hand, scientists highly specialized in diverse skills and knowledge while on the other hand, scientists who can work together in a team to solve problems or questions.

In the ICM, this need was recognized 5 years ago when an analysis and revision of the general objective of the Institute was done on the occasion of restructuring and moving to a new building. The scientific organization of

the Institute was redefined in the seven general lines of research proposed. It is based on current expertise of the scientific staff and is consistent with collaboration and cross-disciplinary research being a key goal of the ICM. To change from a mentality that encouraged individual success and competitiveness within the Institute to a system that fosters collaboration, sharing of ideas, knowledge, expertise, and resources requires a tenure system, economic stability and time to develop. Advances in developing this collaborative, multidisciplinary system have been made and the results can be measured in scientific quality and funding revenues (Tables: 2.3.; 3.1.1; 3.2.1; 3.2.3 ;). Although, weaknesses have been recognized, new opportunities currently available and, after four years into this trajectory, the organization of the scientific human resources of the ICM has been shown to be valid and not so unique, since it has been implemented in other advanced scientific communities around the world.
The scientists in the ICM are grouped for administrative purposes according to basic disciplines and specific needs of instrumentation, laboratories, and specific technical support. As ideas and funding opportunities arise, teams form to develop new projects and stay together as long as the project lasts. (See Table 1.4.1.). This system is possible in the ICM because the multidiciplinarity within the same building as well as the Spanish scientific tenure system allows and encourages, on a day-to-day basis, discussions and dialogue about new knowledge, ideas and problems. In this way, innovation in one domain is introduced into another domain, solving problems and enhancing fresh thinking. On the other hand, the core, relatively small groups of specialists, act as nuclei to enhance our international and national collaboration because each specialist brings, from around the world, his own associations, acquaintances, and knowledge of new frontiers in his scientific specialty. The flexible approach of the duration of the teams facilitates introduction of new young ICM scientists into projects on equal footing with the more established scientists. Furthermore, the approach does not stifle the individual autonomy and independence of the research scientists so necessary for new ideas, innovation, and the introduction of new technologies. In addition it optimizes ICM's ability to respond to society's changing priorities and funding capacity. The flexibility of the Institute's organization and management systems generates institutional strength by fostering personal growth and development at the human level. Thus the Institute's strength is derived not only from the sum of the achievements from the synergistic effects of collaborative research projects, but also from the sum of the research achievements of all the individuals in the Institute.

3 STRATEGIC PLAN FOR THE ICM 2005-2009

Objectives and actions of the ICM for the period 2005-2009

To fulfill its Mission and pursue its Vision, and having identified its strengths, weaknesses, opportunities and threats, the Institute Ciències del Mar proposes a set of general objectives that will guide the actions of the Institute in the following years.

1. Continue with our flexible organization approach with the Seven Lines of Research proposed.
2. Maintain international position of those lines, recruiting and supporting the highest quality of staff and providing an organization that enhances scientific performance.
3. Develop research initiatives taking advantage of the ICM multidisciplinary strengths and the new opportunities within the local, national or international community.

4. Promote the use of advanced instrumentation, technologies, and systems to make the required observations at sea and in the laboratory.
5. Capitalize on the possibilities provided by new facilities such as the in-house presence of the Unidad the Tecnologia Marina and the proximity of the Park de Recerca Biomèdica.
6. Recruit and support the highest quality students and provide an organization that nurtures creativity, innovation and collaboration.
7. Increase our participation in outreach programs as well as look for new approaches of communicating and divulgating our scientific results
8. Actively influence the development of local, regional, national and European policies regarding sustainability, and increase public recognition of the ICM knowledge on societal concerns such as climate change, hazard prediction contamination.
9. Seek new methods for collaborative opportunities within the Institute and within the CSIC scientific community, as well as with universities and regional, national and international research organizations that can function or serve as an interdisciplinary research neighborhoods.
10. The specific objectives and actions are presented in Table 4.3.2. of the Main Document.

4. ADDED VALUE TO THE INSTITUTION OF THE CSIC AND TO SPAIN

The multidisciplinary oceanographic research carried out at the ICM is a key asset for the CSIC, which is the largest public research organization in Spain and aims to cover all major areas of scientific knowledge. The oceans play a fundamental role in regulating climate and the hydrological and biogeochemical cycles, and in controlling the capacity of Earth as a life support system, including our ability to fish and to raise crops and livestock. Multidisciplinary oceanographic research is particularly important in a country like Spain, with more than 7500 km of coast, and two large archipelagoes. Spain derives a large part of its economic activity and its Gross National Product from industry and activities related to the sea, such as tourism, leisure and fisheries. Spain is also the second country in world in the use of marine resources in its food supply and cuisine. As a public research institution, one of the aims of the CSIC is to promote new knowledge on the marine ecosystem and enhance society's ability to respond to existing concerns related to climate variability and the use of coastal and open ocean resources. It is also the responsibility of the CSIC to be able to give sound advice and help in unexpected societal or environmental crisis. The ICM has one of the largest pools of the country in marine research expertise and is in a good position to tackle these challenges and to interact with scientific teams from other countries. Given the general interest on marine-related issues, the outreach activities of the ICM provide also an important window for the public recognition of the role of the CSIC in supporting state-of-the-art research.