iFADO Good practice:
An Offshore Test Platform for Research and Industry

Western Brittany in France hosts many organizations, both public and private, highly skilled in under water acoustics, submarine exploration and intervention and oceanography. Sustainable exploitation of the seas and growing maritime activities reinforce the need for highly efficient technologies to limit human intervention or improve safety and security for operators. Developing these technologies requires new equipment and algorithms to be tested at sea, in the natural environment.

A Cost-effective Multi-Purpose Platform

The need for a platform to test marine and submarine equipment emerged in 2008. Stakeholders from industry, research and academia shared their needs, expertise and assets to work together in the design a cost-effective service.

Figure 1: Sea Test Base pontoon

The project was supported by the Pôle Mer Bretagne Atlantique (PMBA) and certified by its Executive Board in November 2008. Sea Test Base was inaugurated in 2011, with the objective of offering cost-effective services in the best physical and technical conditions to industry, research and education to test, assess, validate, demonstrate or operate marine and submarine equipment.

It is located in the grounds of the French Naval Academy in Lanvéoc, in the Bay of Brest in Western Brittany, France. For a total cost of 1 M€, it is composed of quayside facilities: a control room, a 100 sqm hangar and storage containers, a closed storage area. It has access to a slipway, and a marina where a dedicated

rigid-hulled inflatable boat (RHIB) is moored. It operates a test pontoon located in the waters of the Naval Academy, connected to the control room. Once in place, the equipment can be monitored from anywhere through an internet connection. Offshore vessels and barges can be provided by operational partners. It can organize access to offshore operational areas outside the Bay of Brest for long range and deep-sea testing.

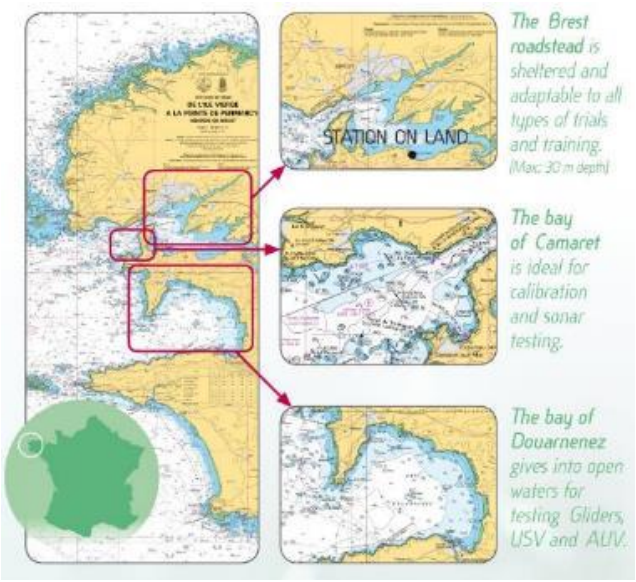

Figure 2: Sea Test Base operating areas

For Research, Industry and Academia

Sea Test Base has the legal status of a non-profit association (under the French law of 1901), funded by membership fees and by the Regional Council of Brittany, the Departmental Council of Finistère and the City of Brest. It is supported by partnerships with the French Navy, Technopôle Brest Iroise and Pôle Mer Bretagne Atlantique.

The association brings together industry, research institutes and training and education establishments. It aims to foster collaboration between members, particularly between Industry and Research, to facilitate the sharing of expertise and experience, to promote the members' technological skills and expertise and to integrate into a regional and European network.

Figure 3: Sea Test Base contributors

The platform can welcome most sectors of the Blue Economy aiming to test their equipment or develop their projects: The fishing industry, oil & gas, submarine exploration and exploitation, ship building, maritime security and naval defence projects. The research community, particularly hydrography, oceanography, underwater acoustics, marine engineering and hydrodynamics, can greatly benefit from the facilities. Graduate and post-graduate students from university and engineering schools in Brittany also use the base to carry out scientific projects during their studies.

With Significant Achievements

Since its inauguration, Sea Test Base has been carrying out 5 to 10 operations per year, lasting from a few days up to several months. The operations range from AUVs and sonar trials for the

defence industry to profilers and seismometers tests for oceanographic and hydrographic research centers.

As an example, the Sea Test Base platform was used to design, improve and qualify the hardware and the algorithms for a Multiple-Input and Multiple-Output (MIMO) modem for underwater acoustic transmissions, carried out by a small consortium of 2 SMEs and 1 research center. A 2-channel acoustic transmitter was installed on the platform, and a buoy fitted with a 4-hydrophone acoustic receiver was anchored nearby relocated at different distances.

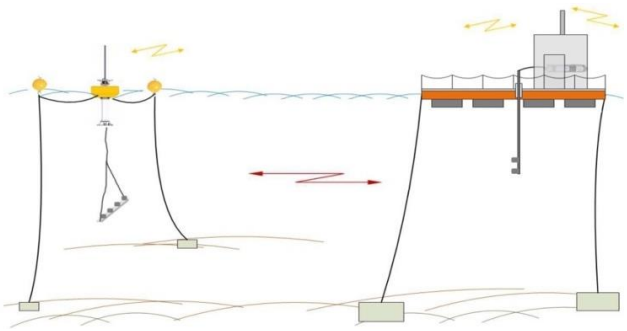

Figure 4: Testing the MIMO modem

Over several months in real conditions, this experiment demonstrated the spectral efficiency gain of the MIMO system compared to conventional single-transmitter communication and facilitated the design of a future underwater acoustic modem. This innovative modem will find applications for marine surveillance where the combination of broadband transmission, light equipment and low energy consumption is required, such as environmental data transmission and acoustic surveillance.

Figure 5: Testing an Unmanned Underwater Vehicle

Keys to success

- A concentration of industry and research in related fields within a defined geographic area is essential;
- The choice of the location is paramount: sheltered with easy access to offshore and deep-sea areas;
- The financial support from Regional and Local Authorities at the start of the project is significant;
- The support from local Innovation clusters and business development organizations is important;
- The link with naval and maritime authorities must be well established to facilitate authorization procedures;
- The structure and the management of the base allow for flexibility and reactivity in the conduct of operations;
- A solid business plan, including infrastructure, equipment and maintenance costs, must be established. Active business development should be considered.

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