ATOS

AN "ALL-OPTICAL" UNDERSEA ACOUSTIC SENSOR FOR MORE EFFECTIVE REMOTE MONITORING

Passive submerged sensors listen out for noises which can be detected under the sea and which are of interest to scientists, including geophysicists, and those responsible for the security of sensitive installations, such as ports, naval bases and offshore drilling facilities, or for combating terrorism and illegal trafficking.

The aim of the ATOS project was to create a maritime surveillance system demonstrator based on development of an "all-optical" undersea acoustic sensor. The sensor comprises innovative optical hydrophones that exploit fibre laser technology and feature laser cavities placed along the length of the same optical fibre. The fibre can be up to twenty kilometres in length and provides fibre-optic feed to the hydrophones, signal transmssion and processing offset. No submerged electricity is required unlike conventional sensors which rely on a piezoelectric process. The system is completed by traditional acoustic processing located out of the water.
The project partners contributed the various technological components needed for the demonstrator which was produced during the project and which has proved extremely promising in terms of its industrial potential. Performance has been improved and research has gone into the manufacturing processes which have been put into operation. The ATOS Optical Hydrophones, developed on the basis of laser cavities, offer high sensitivity over a wide bandwidth - from a few Hz to 7 KGz. Temperature and static pressure performance levels are very constant and the results of simulations and experiments are wholly consistent. Design and manufacturing processes have been perfected to that performance may be adjusted in line with specifications (e.g. bulkiness, temperature and immersion range, etc.).

In addition, excellent prospects have emerged from examining what the longer-term future holds for innovative laser optics, opening up the possibility of a simplified system in the future. A series of workshops involving an end-user committee, which was set up early on in the project, has identified potentially highly promising industrial applications for this new acoustic technology, particularly in the field of offshore.

A patent has been applied for by TUS and a "Soleau Envelope" (an interim form of French patent, pending a patent application) submitted by PERFOS. The various results of the ATOS project have been presented at 18 scientific symposiums and, during the project, 8 articles were published in scientific journals.

This new "all-optical" acoustic technology offers an extremely interesting alternative to existing systems as not only is it more

Partners

Companies

Thales, Sophia Antipolis [Project Developer]
CGG Paris
Lumibird, Lannion
Rakon Temex, Sophia Antipolis

Research centers

Ifremer, Toulon
Perfos, Lannion
Université de Rennes I : laboratoire EVC, Rennes
Université de Rennes I : laboratoire FOTON/ENSSAT, Lannion

Funders

- Fonds Unique Interministériel
- Conseil départemental des Alpes-Maritimes
- Conseil régional de Bretagne
- Conseil départemental des Côtes d'Armor
- Conseil départemental d'Ille-et-Vilaine
- Lannion Agglomération
- Rennes Métropole

Labelisation

21/11/2008

Overall budget

4 345 K€

robust and compact but it also opens the way to new fields of application, as a result of the potential for offset over large distances and/or for deep immersion of the acoustic sensors.