PROJECT

AQUO

Achieve QUIeter Oceans by shipping noise footprint reduction

Funding: European (7th RTD Framework Programme)
Duration: Oct 2012 - Sep 2015
Status: Complete with results
Total project cost: €4,199,735
EU contribution: €2,999,571

Call for proposal: FP7-SST-2012-RTD-1
CORDIS RCN : 104629

Background & policy context:
Recent directives outline the need to mitigate underwater noise footprint caused by shipping, to prevent negative consequences to marine life.

Objectives:
In this context, the final goal of the AQUO project is to provide practical guidelines for policy makers, which are acceptable to shipyards and ship owners. The list of solutions will be split into solutions regarding ship design (including propeller and cavitation noise), and solutions related to shipping control and regulation. Exploitation of the AQUO project results is expected to have significant impacts, meeting the requirements of the MSFD.

Methodology:
The project is supported by relevant methods and tools which will be used to assess the effectiveness of noise mitigation measures in order to select the most appropriate:

- A noise footprint assessment tool will be derived from Quonops, an existing operational underwater noise prediction system, connectable with AIS shipping data. The tool will be adapted to the problem considered and validated by comparison with in-situ measurements at sea
- Dedicated bio-acoustic studies will be conducted on different marine species representative of European maritime areas, with the goal of deriving criteria regarding acceptable limits for underwater noise caused by shipping
- Computer methods will be developed and scale model experiments will be done to predict the radiated noise from ship propellers, including cavitation effects and interactions with ship hulls. These predictive techniques will be validated in comparison with measurements

To support the analysis, several vessels, including commercial ships, will be tested at sea. Indeed, the project will benefit from the strong expertise of the consortium in the field of ship noise and vibrations, relying on the long term experience of many ships and a dedicated database. A proposal for a European standard for ship Underwater Radiated Noise measurement will also be produced

Parent Programmes:
FP7-TRANSPORT - Transport (Including Aeronautics) - Horizontal activities for implementation of the transport programme (TPT)

Institute type: Public institution
Institute name: The European Commission
Funding type: Public (EU)

Lead Organisation:

Naval Group
Address: Rue Du Docteur Finlay 40-42 75015 Paris France
**EU Contribution:** €356,959

**Partner Organisations:**

**Totalforsvarets Forskningsinstitut**

Address: Gullfossgatan 164 90 Stockholm Sweden

Organisation Website: [http://www.foi.se](http://www.foi.se)

**EU Contribution:** €186,373

**Canal De Experiencias Hidrodinámicas De El Pardo**

Address: Carretera de la Sierra, S/N 28048 EL PARDO,MADRID Spain

Organisation Website: [http://www.cehipar.es](http://www.cehipar.es)

**EU Contribution:** €126,615

**Bureau Veritas**

Address: Boulevard du Château 67-71 92571 NEUILLY SUR SEINE France

Organisation Website: [http://www.bureauveritas.com](http://www.bureauveritas.com)

**EU Contribution:** €180,217

**Centrum Techniki Okretowej Sa**

Address: Ul Szczecinska 65 80 392 Gdansk Poland

**EU Contribution:** €50,042

**Universitat Politecnica De Catalunya**

Address: Calle Jordi Girona 31 8034 Barcelona Spain

Organisation Website: [http://www.upc.edu](http://www.upc.edu)

**EU Contribution:** €413,315
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<td>Communaute Des Associations Europeennes</td>
<td>Rue Marie De Bourgogne 52 1000 Brussels</td>
<td>€42,480</td>
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<td>Des Chantiers Navals</td>
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<td>Sspa Maritime Consulting Ab</td>
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<td>Università Degli Studi Di Genova</td>
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<td>Droevendaalsesteeg 4 6708 PB Wageningen</td>
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Working towards quieter oceans

Noise from human activities, much of it related to maritime traffic, has reached unprecedented levels in the marine environment. Recent EU directives have outlined the need to mitigate underwater noise from shipping to prevent adverse impacts on marine life.

An EU-funded project, ‘Achieve quieter oceans by shipping noise footprint reduction’ (http://www.aquo.eu (AQUO)), addressed the problem of underwater noise. Its aim was to develop guidelines for policymakers, shipyards and shipping owners for reducing noise from ships.

Project partners studied underwater noise at three levels: noise sources (ships), maps of shipping underwater radiated noise (URN), and the impact on marine life. Experiments were successfully conducted on cod, harbour porpoises and marine invertebrates to determine the impact of noise on these organisms.

An assessment of typical URN from vessels is being investigated, which is based on a partner's existing database and open literature data. Computer methods will be developed and scale model experiments conducted to determine the level of URN from ship propellers and interaction with the hull.

Full-scale measurements were conducted on six different ships. Regarding propeller noise, advanced studies were conducted on two test cases (a coastal tanker and a research vessel) with the development of numerical predictions compared to water tunnel reduced scale experiments and to scale one measurements at sea. A new ship URN procedure was developed for both shallow and deep waters and tested at sea on six different vessels. A system of acoustic buoys was also designed for long-term in situ real-time measurements at sea and deployed in the Mediterranean.

A noise footprint assessment tool has been derived from an existing noise prediction system and connected with Automatic Identification System (AIS) data. The AIS is an automatic tracking system used on board ships for identifying and locating vessels. This tool allows real time prediction of underwater noise related to ship traffic in a full maritime domain. In this project, it is also used to assess the efficiency of different mitigation measures.

Guidelines developed by the AQUO consortium will include practical and economically feasible design recommendations for reducing the URN of ships. It will also meet the requirements of the Marine Strategy Framework Directive (MFSD). The mitigation measures are addressing either noise control measures at ship design level, either ship traffic management measures. The selection of the most efficient mitigation measures will be based on the scientific results from the different studies.

Thanks to the efforts of the AQUO project, the problem of noise levels in the marine environment is being addressed. This will help to reduce the negative impact on sea life, particularly marine mammals.

Documents:
Final Report Summary - AQUO (Achieve QUieter Oceans by shipping noise footprint reduction)

STRIA Roadmaps: Vehicle design and manufacturing, Network and traffic management systems
Transport mode: inland
Transport sectors: Passenger transport, Freight transport
Geo-spatial type: Other