PROJECT

BESST

Breakthrough in European Ship and Shipbuilding Technologies

Funding: European (7th RTD Framework Programme)
Duration: Sep 2009 - Feb 2013
Status: Complete with results
Total project cost: €28,826,991
EU contribution: €17,457,500

Call for proposal: FP7-SST-2008-RTD-1
CORDIS RCN: 94135

Background & policy context:

BESST was initiated by EuroYards, an EEIG (European Economic Interest Grouping) representing leading European shipyards. Shipbuilders in Europe are facing tough competition due to worldwide shipbuilding overcapacity. In addition: climate change and increased public awareness call for reduced environmental impact and increased safety of shipping.

The main impact factors on Life Cycle Performance ('LCP') are cost, environmental impact, safety and societal needs. The challenge of the project was to ensure optimal interaction and integration of all sub-systems on ship level, by applying sophisticated process skills and technological innovations for specific ship systems; available research results were applied. This required, along with technical innovations, the development of a holistic approach for Life Cycle Performance assessment. Focus is put on the market segment of high value added, complex, one-of-a-kind ships, in particular cruise vessels, passenger ships, ferries and mega yachts.

Note that the involvement of shipyards, research institutes and universities, classification societies and industrial companies ensured that results can also be applied to other types of ships.

Objectives:

The objective of BESST was to develop ships with substantially improved Life Cycle Performance ('LCP'), compensating higher initial cost. This secured and improved the competitive position of European shipyards in a sustainable way, looking into the medium and long term future.

Having in mind the comparatively high labour cost in Europe, it is necessary to increase the competitiveness of European built ships through decreased life cycle cost, drastically reduced environmental impact and improved safety. In short, there is a need for:

- development of holistic life cycle performance assessment methods and tools comprising life cycle cost, environmental impact, safety and societal needs;
- development of innovative technical solutions for the most important ship systems and to combine them in an optimal way on ship level.

Methodology:

The project results was integrated in virtual show cases (ship concepts) demonstrating technical solutions as well as life cycle impact compared to current designs. Optimisation tools were developed and applied in a cooperative process proving feasibility, adaptability and efficiency to future commercial applications. In medium and long term the project set out to thus contribute to the competitiveness of European shipbuilding and shipping, as well as to the reduction of emissions and the environmental footprint of ships. It aimed to achieve a breakthrough in competitiveness, environmentally friendliness and safety of EU built ships. Although the project focused on passenger ships, ferries and mega-yachts,
the results will be (to a large extent) applicable also to other ships.

BESST set out to result in a reduction of life cycle cost and a reduction of CO2 emissions. Shipyards, research institutes and universities, classification societies and ship equipment suppliers are part of the consortium. Close interaction with ship operators will be achieved through a dedicated Advisory Group. A multi-level management structure, based on the experience of the shipyards in previous R&D and commercial projects, ensured efficient and targeted work of the consortium to ensure the envisaged impact.

BESST primarily looked at integrating technical innovations on ship level. Methods and tools for a holistic Life Cycle Performance ('LCP') were assessed. Based on a careful analysis of ship systems contributing (to the largest extent) to the LCP of a ship, technical innovations were be developed and assessed. The focus was on:

- Space Optimisation and Easy Maintenance;
- Improving Payload to Gross Tonnage Ratio;
- Cost Efficient Building Processes and Refurbishment;
- Improved Energy Efficiency and Reduced Emissions;
- Noise and Vibration;
- Improved Reliability through Condition Monitoring;
- Optimisation of Logistic Chains;
- Improving Safety and Security.

**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:**

**Fincantieri - Cantieri Navali Italiani S.p.a.**

**Address:**
Via Genova, 1
34121 TRIESTE
Italy

**Organisation Website:**
http://www.fincantieri.com

**EU Contribution:** €2,150,246

**Partner Organisations:**

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**Address:**
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1555 PAPENBURG
Germany

**Organisation Website:**
http://www.meyerwerft.com

**EU Contribution:** €1,521,476

**Schweisstechnische Lehr- Und Versuchsanstalt Mecklenburg-Vorpommern Ggmbh**

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<td>Kezia Sa</td>
<td>Rue Antoine De Saint Exupery 2 69002 Lyon France</td>
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Laboratorio Di Scienze Della Cittadinanza

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EU Contribution: €48,150

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20457 HAMBURG
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EU Contribution: €176,592

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<td>Future Shape GmbH</td>
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EU Contribution: €137,215

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http://www.01db-metravib.com

EU Contribution: €149,501

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Organisation Website: http://www.cmt-net.org
EU Contribution: €1,309,086

Emder Werft Und Dockbetriebe Gmbh

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26725 Emden
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EU Contribution: €0

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Organisation Website: http://www.chalmers.se
EU Contribution: €52,768

University Of Strathclyde

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G1 1XQ
United Kingdom

Organisation Website: http://www.strath.ac.uk
EU Contribution: €140,808

Technologies:
Life cycle analysis
Holistic life cycle performance assessment methods
Development phase: Research/Invention

Key Results:
The technical development work carried out within BESST project was coordinated by System Groups
Each System Group clustered from 2 to 4 SG sub-projects or work packages (WP) of the BESST project. Sub-projects developed new technical solutions, proved their feasibility in specific prototype applications and document the achievements in a generic way, so that they could easily be adapted to real ships. In addition, each sub-project developed specific life cycle performance assessment methods in the frame provided by WP01-HA-A, and performed an analysis of the impact of their results for the life cycle performance of the ship. The project was divided into 8 System Groups and each system group had at least two sub-projects:

1. SPACE OPTIMISATION AND EASY MAINTENANCE
   1.1 Multi purpose Public Rooms
   1.2 Easy maintenance and housekeeping
2. IMPROVING PAYLOAD AND GROSS TONNAGE RATIO
   2.1 Using the Potentials for laser welding for product performance
   2.2 Innovative lightweight materials and their application
   2.3 Advanced methods for early structural assessment
3. COST EFFICIENT BUILDING PROCESS AND REFURBISHMENT
   3.1 Design for easy refurbishment
   3.2 Block accuracy management
   3.3 Flexible and modular laser equipment
   3.4 Alternative corrosion protection systems
4. IMPROVED ENERGY EFFICIENCY AND REDUCED EMISSIONS
   4.1 Total energy management and alternative energy sources
   4.2 Efficient and flexible energy storage
5. NOISE AND VIBRATION
   5.1 Reduced noise emissions into air and water
   5.2 Low noise and ecological thrusters and propellers
6. IMPROVED RELIABILITY THROUGH MODEL-BASED DESIGN AND CONDITION MONITORING
   6.1 Hybrid-Electric ship propulsion system by model-based design
   6.2 IT-Solutions for condition monitoring
7. OPTIMISATION OF LOGISTIC CHAINS
   7.1 Toolset for onboard logistics planning and management
   7.2 Efficient baggage handling transport and storage
8. IMPROVED SAFETY AND SECURITY
   8.1 Integrated security management system
   8.2 Integrated IT-Network for essential services

For concrete and specific results on every system sub-project please visit the BESST project website.

**Strategy targets**

Innovating for the future technology and behaviour:

- A European Transport Research and Innovation Policy

Documents:
- [D 8-01 Achievements and results after the first year of activity (Other relevant documents)](#)

**STRIA Roadmaps:** Vehicle design and manufacturing
- Water transport (sea & inland)

**Transport mode:** Passenger transport, Freight transport

**Transport policies:** Decarbonisation, Environmental/Emissions aspects, Societal/Economic issues

**Geo-spatial type:** Other