CORNET Call for Proposals: International Collective Research

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Organisation:	**Polish Naval Academy**
Website address:	**https://www.amw.gdynia.pl/**
Organisation typology:	□ SME Association X University □ Research Centre □ Other (please specify)
Sector:	X Materials X Process Engineering, Energy Technology and Environment □ Business Management and Organisation X Construction and Production □ Chemistry, Textile, Food, Health and Medical X Measurement and Information
Field of specialisation:	**Department of Ship Engine Room Exploitation** Department activity areas are the construction and operation of marine machinery, including the construction and operation of marine propulsion and power plants, diagnostics of marine machinery, emission of toxic compounds in the exhaust fumes of marine engines, as well as statistical methods in operation, reliability and diagnostics of marine machinery and equipment. The subject of the conducted research focuses mainly on issues related to the broadly understood diagnostics of marine diesel engines (combustion and turbine engines). This activity has been developed continuously since 1982 thanks to experienced research teams. The implementation of over 20 research works allowed for the development of the Basic Diagnostic System for marine engines. **Department of Machine Ship Construction Foundations** Department specializes in scientific research on the impact and ballistic resistance of ship materials and marine structures. The subject of the research are materials intended for shielding structures, mainly shipbuilding. The works are carried out on the behavior of materials at high strain rates with the use of experimental and numerical modeling. The obtained results are used in the design of shields and armor. In the field of computer-aided design, the Institute performs numerical calculations with the use of the world's leading licensed software Autodesk Inventor, MSC Patran, MSC Marc / Mentat, ANSYS and ANSYS AUTODYN and LSDYNA. You can also perform calculations with your own Fortran programs. In 2010, work was completed on a fast graphics algorithm based on OpenGL, implemented in the IzoliniaGL graphics pre-processor.

Expertise offered:	1. **Diagnostics of marine propulsion systems**, including thermodynamic and vibration parameters tests, endoscopic inspections, indicated pressure analyzes, exhaust gas composition analysis. 2. **Optimization of ship power plants operation processe**s with the use of artificial intelligence elements in terms of reliability, reduction of exhaust emissions and the use of alternative fuels. 3. **Design problems for marine propulsion systems**, including design of silent thrusters, energy analysis of propulsion systems, propulsion system configurations, combined and hybrid systems. 4. **Energy efficiency**, including the designation, modeling and analysis of the energy efficiency of ship propulsion systems, as well as ship devices and systems, as well as the analysis of the possibility of increasing their energy efficiency in terms of achieving strategic goals regarding the reduction of greenhouse gases. 5. **Computer simulations and numerical modeling of structural elements**, including modeling of the overall strength of the structure, impact resistance of the structure, simulation models of foundation foundations, taking into account damping, especially with the use of discrete models as vibration dampers, modeling of the fatigue strength of the structure, numerical procedures of material models, including composite materials for the purposes of computer simulations, the use of numerical SPH modeling for bird strike analysis, numerical basic research in CFD and FSI for propellers and load-bearing profiles.
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