



PROJECT ACRONYM AND TITLE:

Decision Support System Development for Autonomous Navigation (D-DAN)

FUNDING PROGRAMME:

Call for funding of Institutional research projects of the University of Rijeka financed from source 581 – Recovery and Resilience Mechanism (University of Rijeka, Institutional Research Projects)

PERSON RESPONSIBLE: Srđan Žuškin, PhD

Project total cost	26.782,69 EUR
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SUMMARY AND OBJECTIVE: Decision support system (DSS) development in the Integrated Navigation System (INS) of existing vessels, as well as technological advances in the development of Maritime Autonomous Surface Ships (MASS), represent a significant step towards improving navigation safety, efficiency, and maritime transport sustainability. Autonomous navigation uses advanced technologies, such as artificial intelligence, machine learning, sensor fusion with information processing, and more accurate navigation systems to enable autonomous decision-making in a dynamic environment.

The D-DAN project is based on the first level of autonomy (IMO Degree One), where DSS systems are developed using autonomous processes in navigation, but ultimately with a human in the loop as the final decision maker. The algorithms for autonomous navigation are based on the voyage planning process and the safer maritime navigation process implementation. The autonomous voyage planning process uses discrete optimization methods based on Global Path Planning (GPP) between ports. A static environment and a safe voyage plan are separately optimized for the autonomous navigation application.

DSS systems for safer maritime navigation implementation and autonomy are based on collision avoidance decision-making processes and rules classifications in accordance with the International Regulations for Preventing Collisions at Sea (COLREG) for the COLREG DSS development. In addition, a decision-making process model with a fuzzy collision risk index is developed to provide timely and trustworthy data information for assessing the risk of collision at sea. The algorithm fusion will significantly contribute to developing a higher degree of autonomy. At the same time, the D-DAN project development will present a significant DSS system for the officer of the watch (OOW) regarding voyage planning and monitoring.

Start date	End date
1 October 2025	30 September 2029

PROJECT TEAM

No.	Member	Affiliation	Role
1.	Srđan Žuškin	University of Rijeka, Faculty of Maritime Studies, Croatia	Team Leader
2.	David Brčić	University of Rijeka, Faculty of Maritime Studies, Croatia	Researcher
3.	Igor Rudan	University of Rijeka, Faculty of Maritime Studies, Croatia	Researcher
4.	Marko Gulić	University of Rijeka, Faculty of Maritime Studies, Croatia	Researcher
5.	Davor Šakan	University of Rijeka, Faculty of Maritime Studies, Croatia	Researcher
6.	Martina Žuškin	University of Rijeka, Faculty of Maritime Studies, Croatia	Researcher
7.	Ivan Vilić	University of Rijeka, Faculty of Maritime Studies, Croatia	PhD candidate



8.	Marko Strabić	University of Rijeka, Faculty of Maritime Studies, Croatia	PhD candidate
9.	Michele Martelli	Department of Electrical, Electronic, Telecommunication Engineering and Naval Architecture (DITEN), University of Genoa, Italy	Researcher
10.	Andrej Androjna	Faculty of Maritime Studies and Transport, University of Ljubljana, Slovenia	Researcher