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**Orientation:** Technological Progress, Engineering and Business  
**Specialization Area:** Management & Law of the sea  
**Research Area:** 4.6 Knowledge networks and innovation in maritime activities



**PhD project:** A formalisation of new development environment of manufacturing systems according to end effector paths, adaptable to changing conditions and scenarios such as the oceanic.

**Supervisors:** Dr Julio Garrido Campos (Universidade de Vigo)

**Summary:** This thesis is framed in the context of technologies and methodologies involving industrial axis systems in their different configurations for the automation of machines that require the generation of movements following trajectories of some of their components. The EN.EDI group is participating in the European research project EAPA\_117/2018 CircularSeas: "Transforming ocean plastic waste into green products for maritime industries" as a part of the above-mentioned research line. The research group has to carry out an axis's optimization of the employed machinery in the project. Moreover, the group has to determine automation strategies that adapt the machinery to the changing maritime environment and the specific case of on-board manufacturing; all of them related to this thesis. More specifically, this thesis aims to address the "expansion" of current industrial manufacturing environments following trajectories, that although highly technological and advanced, continue to be anchored in classical machine configurations: CNC systems, robotics. For these, some many ongoing projects and technologies allow or aims to achieve the objectives of the thesis in terms of standardization, flexibility, and adaptability. Finally, two uses cases (oceanic environment and "on-the-fly" manufacturing) will be addressed as test and validation environments. Different prototypes will be used in both cases and the adaptation of their production process and their operation in different environments will be carried out (on-board and on land). This would represent a change in the conditions of the machine which can also be influenced by changes, for example, to its horizontal condition (on-board manufacturing) which will alter the operation of the machine.

