Mutant Submarine

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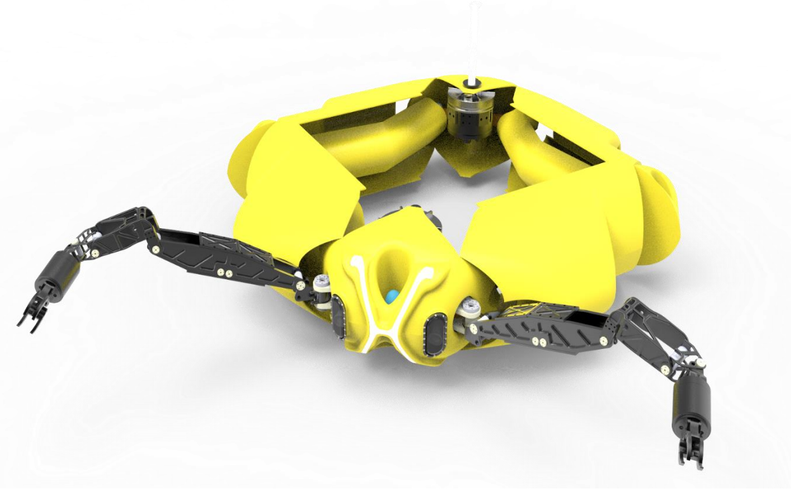
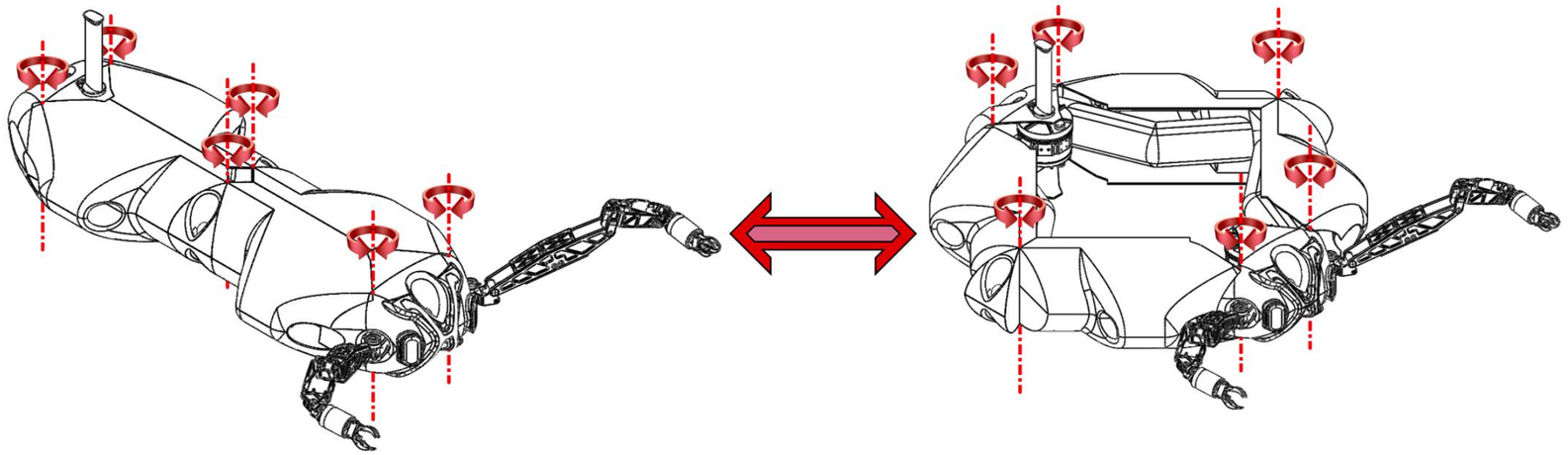
Invention

The technology, called RUFIVIST (Reconfigurable Underwater Vehicle for Inspection, Free-floating Intervention, and Survey Tasks), is part of the so-called Unmanned Underwater Vehicle (UUV), i.e. underwater drones without personnel on board. These vehicles are intended to carry out: survey tasks (acquisition of sensory data) on large stretches of the seabed or water column; close inspection operations on coastal and offshore infrastructure or ship keels; intervention operations such as, for example, manipulation operations on valve panels of Oil & Gas extraction plants or the collection of materials in Deep-Sea Mining. However, these numerous tasks are carried out by different vehicles, with their own technical and fluid-dynamic characteristics that make them little or no interchangeable, versatile or otherwise fungible. RUFIVIST incorporates hardware and software functions that allow, depending on the mission to be carried out, all the tasks in question, without the need for emergence and remotely intervening on the drone setup. Most survey drones have a torpedo-like shape in order to achieve the best compromise between size, usable volume, hydrodynamic efficiency and maneuverability. Torpedo vehicles, however, are unsuitable for carrying out tasks that require good hovering performance and, for the latter, it is preferable to build squat vehicles that have excellent isotropy characteristics in terms of ability to move, "push" and reject disturbances in a similar way. all possible directions. The "hovering missions" include: i) close inspection of coastal and offshore infrastructures; ii) the inspection of ship keels and other floating structures; iii) intervention operations in general.

The two task categories therefore require two very different designs, in order to meet completely different needs. The technology, on the other hand, provides for the possibility of dynamically reconfiguring the shape and the hydrostatic, hydrodynamic and actuation characteristics of the vehicle in order to make it suitable for carrying out hovering and survey tasks, depending on the needs of the moment, possibly in the context of of the same mission. The UV that implements the patent, therefore, represents a real breakthrough in the technology of underwater vehicles as it incorporates in a single object the characteristics of two completely different types of vehicles in the currently known technique.

Drawings & pictures





Industrial applications

The invention is of interest to all companies that need to carry out, perform on behalf of third parties or produce machinery for the performance of intervention, inspection and submarine surveys with various types of sensors: sonar, cameras, environmental sensors. In fact, the invention allows for inspections, repairs, maintenance (IRM activities) of underwater marine, river and lake infrastructures.

Further areas of use are the port area (eg monitoring of vessels, structures and sea beds), humanitarian demining works and for defense purposes.

The advantages of the patented vehicle are multi-functionality: it incorporates the advantages of a torpedo vehicle, and those of a compact vehicle intended for inspection, repair, maintenance (IRM) tasks; the ability to operate effectively in adverse environmental conditions: current and wave motion; modular components.

Possible developments

The patent is available under an exclusive and non-exclusive license. The licenses are available for the entire remaining term of the patent titles.

The research group is available for new research activities in collaboration and on behalf of third parties, technical insights, scientific advice, also aimed at raising the TRL of technology.

The TRL of various components of the invention is 6-7. For the complete system 3-4.
A technological maturation loan is currently underway, financed with the POCArno call from the University of Florence and MISE.

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