Introducing Aquanaut, an autonomous underwater robotic vehicle (AURV) - the world's first hybrid subsea platform.

Nicolaus Radford[a]

[a]*Houston, Texas, USA*

Keywords:

1. Introduction

Human divers run health and safety risks every time they perform subsea inspection and maintenance work. They also have to face up to the practical limitations of working in ever-deeper water. Consequently, remotely operated vehicles (ROV) with all manner of tools have become the norm in the subsea realm. ROVs vary considerably in size – some would fit in a breadbin; others are as big as a large van. But, they all have one thing in common: an umbilical connection to topsides. Autonomous underwater vehicles (AUV), in contrast, have no umbilicals. But, until now, they had had a drawback of their own: they can only carry out only preprogrammed missions without the option for operator intervention. Houston Mechatronics Inc. now offers a third option for performing both AUV-style inspection missions and the work of a light-intervention ROV: an autonomous underwater robotic vehicle (AURV) called *Aquanaut*.

2. Aim

As a tetherless, subsea, transformable robot, an AURV can help to reduce the costs of subsea services.

3. Material and methods

As a tetherless, subsea, transformable robot, an AURV can help to reduce the costs of subsea services: inspection, maintenance, repair, drilling support, etc. And Houston Mechatronics' novel, patented shape-shifting morphology gives its AURV the ability for long-range, efficient cruising and for hovering with full attitude control for stable, close-in manipulation tasks. This new type of subsea vehicle is enabled by a NASA-inspired spaceflight robotics command and control (C2) architecture that offers operators user-in-the-loop control over low data rates, thereby eliminating the need for costly vessels and mission-limiting tethers

January 21, 2018

4. Results

Humans excel at making sense of and classifying objects in noisy or lossy compressed data. Humans are also very good at dealing with unexpected or unusual situations. Meanwhile, complex task execution without a high-bandwidth tether to the AURV necessitates a C2 architecture that permits local command authority and a level of self-sufficiency to execute high-level, human-directed tasks. That is where the command and control technology comes in. It consists of a combination of multimodal sensors for underwater 3D sensing, efficient transfer of the robot's 3D environment to the operator and a robust manipulation-task execution framework. In short, it enables the AURV to have minimal supervision.

5. Conclusions

Houston Mechatronics' AURV offers obvious safety, cost and time advantages to the global market of numerous offshore assets. But, in reality, the sky is the limit of what is possible. Houston Mechatronics engineers invent, innovate, engineer and integrate to take robotic operations further in energy, manufacturing, oil and gas, and transportation. No undertaking is too big or too small.

6. Keywords

Robotics; ROV; AUV; subsea; energy; manipulation
.

Author biography

Nicolaus Radford CoFounder and CTO of Houston Mechatronics, Inc.