Evening Technical Meeting
The Future of Subsea Autonomy

Featuring the Royal Australian Navy
Wednesday 12th June 2019
Parmelia Hilton Hotel (Swan Room), Mill St. Perth

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USV "sheep-dogging" AUV : Lieutenant James Keane - Capability Realisation Engineer, Royal Australian Navy

Autonomous Warrior 2018 (AW18) was an in international exercise in co-operative marine autonomy, and also an opportunity for the Royal Australian Navy (RAN) to develop and demonstrate experimental capability in conjunction with industry and academia. A 16' Wave Adaptive Modular Vessel (WAM-V) was developed and deployed as an Unmanned Surface Vessel (USV) 'sheepdog' for an Autonomous Underwater Vehicle (AUV), whilst also acting as a test-platform for new control behaviours and autonomy software.

LEUT Keane was first involved with automating WAM-V in 2014, conducting first-principles research into the maneuvering coefficients that were then used to develop a mathematical model of the WAM-V for simulations and the control system. In 2018, a fresh WAM-V was automated in a matter of months by integrating a control system from Ocius Technology Ltd, which was then able to integrate with a wider command and control system that aimed to demonstrate control of a multi-platform fleet.

As a member of the AW18 fleet, the WAM-V also demonstrated enhanced capability, such as real-time object identification using machine-learning algorithms developed in-house. This presentation explores the journey to automation, the capability demonstrated by the WAM-V, and the future of robust, persistent USV.

Multi-domain (Air, Sea and Subsea) Unmanned Maritime System of Systems Approach to Expeditionary Mine Countermeasures: Mark Gundersen – CEO, Marine Advanced Robotics

Marine Advanced Robotics, in cooperation with their technology partners, demonstrated to the US Navy an unmanned System of Systems approach to expeditionary mine countermeasures. The unmanned System of Systems included two types of unmanned subsea vehicles, two types of unmanned surface vehicles, and an unmanned aerial vehicle, all working in coordination to achieve a complex task. The intent was to expand the operational effectiveness beyond any of the individual vehicles by utilizing synergistic capabilities, while simultaneously decreasing overall cost with a network of affordable systems.

This presentation will provide an overview of the system integration required for the multiple systems approach, discuss the results and lessons learned, and explore future enhancements.

Evaluating Autonomous Systems: Lieutenant James Keane - Capability Realisation Engineer, Royal Australian Navy

The Royal Australian Navy (RAN) is in an experimental phase with Marine Autonomous Systems (MAS), and rapidly learning the core challenges with operating complex capability such as Autonomous Underwater Vehicles (AUV). Before new AUV systems can be deployed, they must be tested and proven ready for integration with the existing organization and fleet.

MAS will inevitably play an increasing role for future maritime operations and warfare, however, they must first become trusted assets that complement organizational culture and capability. This is a global challenge for organizations using AUV, where robotics control systems are becoming smarter, yet the rest of the organization may not be prepared for their effective employment.

Operational Test & Evaluation (OT&E) is the means to determine readiness of the overall system for operations. OT&E of probabilistic systems such as AUV is notoriously difficult. Yet it is increasingly critical to the achievement for effective and efficient operations that technical capability must be understood and characterized in the context of both the user organization, and the specific mission.

This presentation explores the approach taken in designing a repeatable, comparable OT&E framework and experiments to determine suitability and readiness of AUV for operations. The intention being that this framework, once established, could then be applied to new and evolving AUV platforms for comparison of capability, and rapid assessment of suitability for purpose.

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WAM-V MARINE ADVANCED ROBOTICS, INC.

Registration: 5.30 pm
Presentations: 6.00 pm – 7.30 pm
Networking over food/drinks
7.30 pm – 8.30 pm

Registration Costs	Early Bird (ends 5 June)	Regular (from 6 June)	Onsite
Member: Student/Individual/Corp	$30*	$40	$45
Non-Members	$50	$60	$65
5 Ticket Member Pass	$125	$200	$225
5 Ticket Non-Member Pass	$225	$300	$325

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