The Collaborative Integration of Autonomous Underwater Vehicles into Military and Security Operations

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Presentation overview

- Context
- The ‘problem’
- Implementation through collaboration
- Examples and results
- Future works and lessons learnt

Strategic guidance

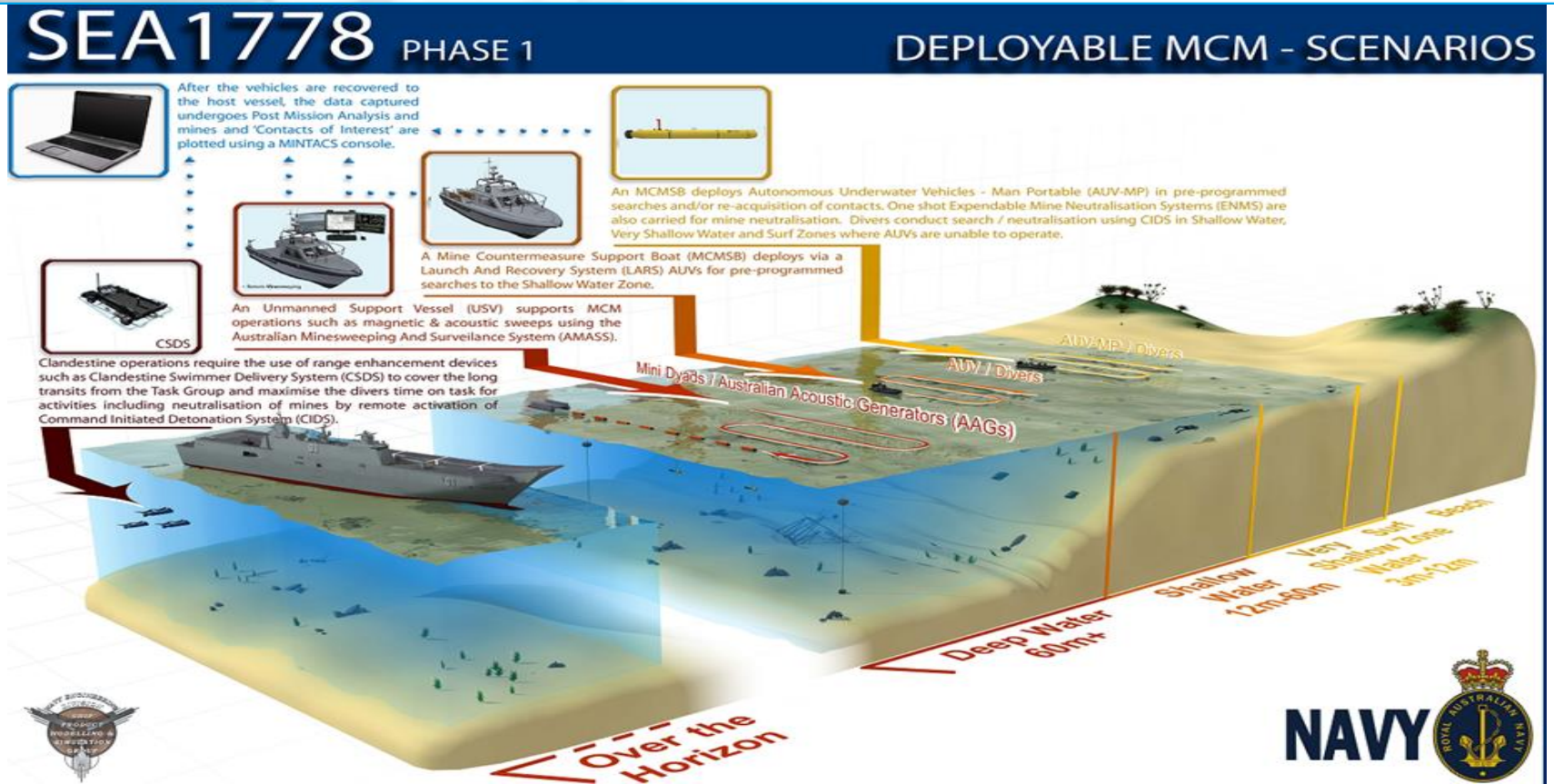
- The 2016 Defence White Paper emphasises unmanned technologies as being important to our future security.
  - Defence's ability to contribute to border protection will be enhanced with the introduction of more capable offshore patrol vessels, new manned and unmanned aircraft . . .
  - Further reshaping and growth of our military workforce . . . Will take into account the implications of new technologies, such as increasing automation and the introduction of more unmanned systems.
  - The *Hobart* Class ships and future frigates will operate embarked helicopters and tactical unmanned systems as integral components of their combat systems.
  - The acquisition of a class of patrol vessels . . . of around 70–80 metres in length will be able to embark unmanned aerial, underwater and surface vehicles . . .

Collaboration

“Navy, CASG and DST Group recognise the importance of working in partnership with academia and industry to develop unmanned and autonomous concepts and technologies to deliver future capability solutions effective in the maritime environment.”

Commodore Stephen Hughes, RAN
Director General Littoral

Capability Example



Capability Example

BLUEFIN ROBOTICS

Bluefin-9M

The Bluefin-9M is a lightweight, two-man-portable autonomous underwater vehicle with a mission turnaround time of less than 15 minutes. Equipped with a variety of user-selected payloads for multiple applications, the Bluefin-9M provides the performance of much larger AUVs in a convenient and rapidly deployable package.

BLUEFIN ROBOTICS

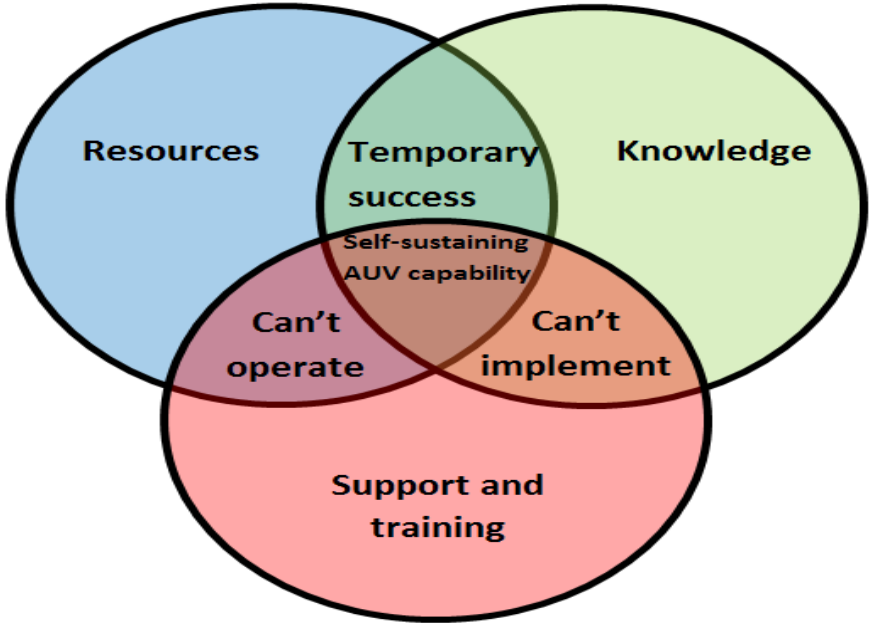
Bluefin-12S

The Bluefin-12S is a highly modular autonomous underwater vehicle with the ability to carry multiple payloads simultaneously. Its baseline low-cost navigation solution and 4.5-kWh energy capacity provide ample capability for most shallow applications. The ultimate configuration of Bluefin-12S is customizable for unique requirements.

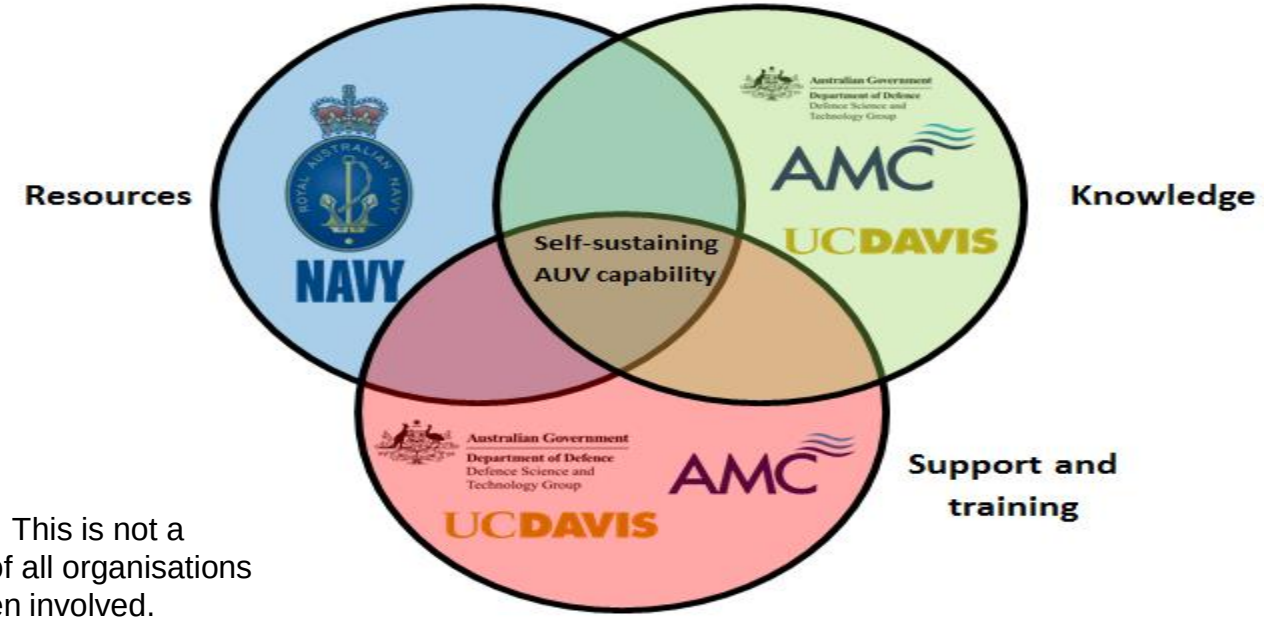
The ‘Problem’

- Inherent challenges to implement and maintain significant new capability
- Misconceptions regarding AUVs
- Highly trained personnel that are eager to learn but are not yet equipped
- Pre-existing Defence processes

Key components of AUV capability implementation



Implementation through collaboration



Example only. This is not a comprehensive list of all organisations that have been involved.

Example – AUV pilot course

Example – AUV pilot course

Resources:

• Navy: Accommodation, water craft, consumables, transportation

• DSTG/AMC: 2 x Gavia AUVs

Knowledge:

• AUV operations and research: Dr Alexander Forrest (UC Davis), Peter King (AMC), Isak Bowden Floyd (AMC), Supun Randeni (AMC)

• Military applications : Navy personnel

Support and training:

•AMC/UC Davis run course, teaching members of RAN

•Developed Standard operating procedures for future operations

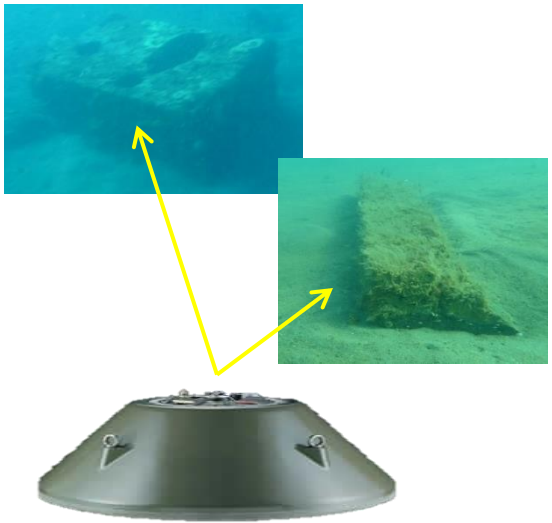
•Assisted in the support of DSTG ATR software

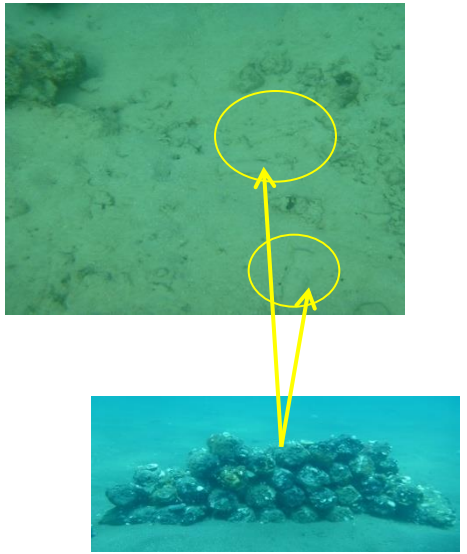
Misconceptions

- The Navy can’t/won’t work with industry outside of complicated contracts
- Everything we do is “Classified”
- Un-interested in research and environmental studies
- *“Science will keep pushing us apart”*

“Science will keep pushing us apart”

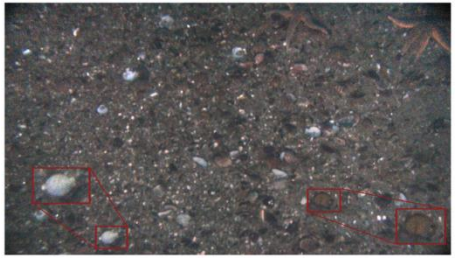
- Operation Render Safe 2013

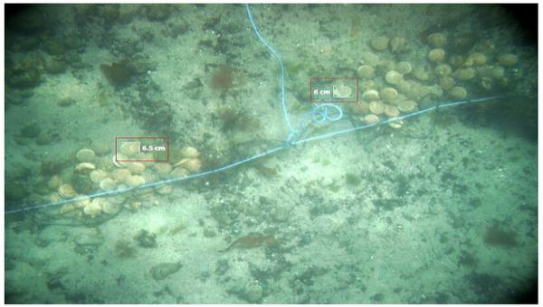




“Science will keep pushing us apart”

An enhanced color digital image of a scallop bed in Breidafjordur, Iceland, collected from the Gavia autonomous underwater vehicle.





Iceland scallops photographed with a AUV camera at 1.94 m above the bottom, from the water surface.

A checkered frame photographed underwater with the AUV camera for lens distortion correction where each square represents 15×15 cm.

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Moving forward

- No collaboration = No capability
- Collaboration efforts have accelerated project schedule in a lot of aspects
- AUV Spiral Development Plan
- Most goals are the same, just applied in different ways

Moving forward

- AMC ‘Work Experience’ program
- DSTG placement
- Military Exercises
- Autonomous Warrior – Nov 18
- Defence Cooperative Research Centre
- Enhanced industry / academia collaboration

Questions?


AUSTRALIAN MINE WARFARE TEAM 16
SAFE WATERS
PRESENTED BY
COMMANDING OFFICER