

The Merging of Commercial and Military ROV Technology and Sabertooth

Chris Lade UDT June 2018

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AIM

- By the end of the presentation I would hope you would see that in many respects the commercial world has overtaken the military in its work in the underwater environment.
- That this offers an opportunity for an amalgamation of technologies.
- And that from a military perspective there are lessons to learn and exploit from commercial underwater operators.



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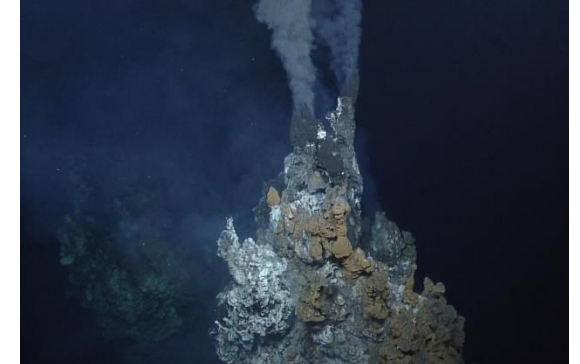
- The Range of Commercial Underwater Operations
- Common Factors
- The Range of Commercial and Military Underwater Systems
- Common Technology
- The Future
- A Case Study

SEAEYE LEOPARD

***Seaeye
Leopard***



FIELD PROVEN TECHNOLOGY





COMMON FACTORS

- The Underwater Environment
- Commercially
 - 24/7
 - All weathers
 - The Poles to the Equator
 - 25 km tunnel to the sewers of Brazil
 - Nuclear treatment plant clean up
- Driven by \$s or £s
- Efficient
- Effective
- Minimum Manpower
- Robust Systems, easily maintained.

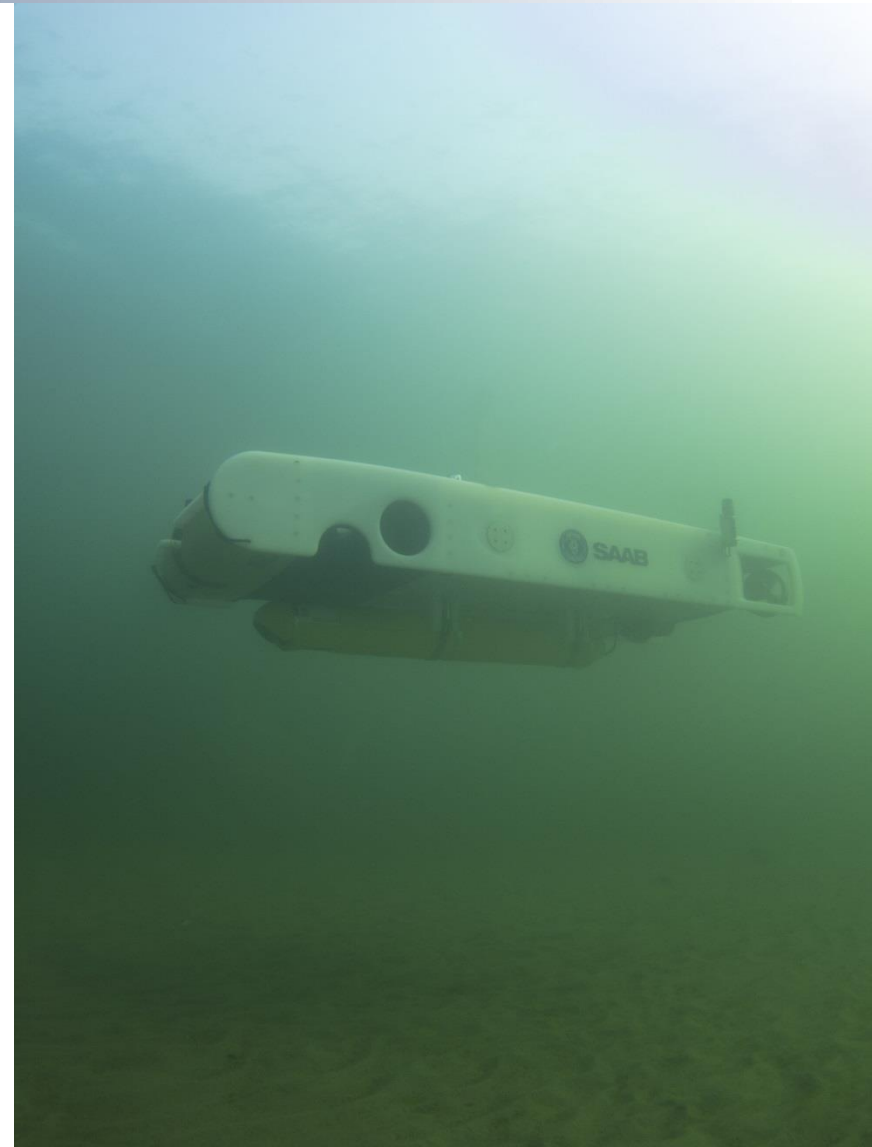
SAAB UNDERWATER SYSTEMS

MERGING THE BEST OF DEFENCE & COMMERCIAL

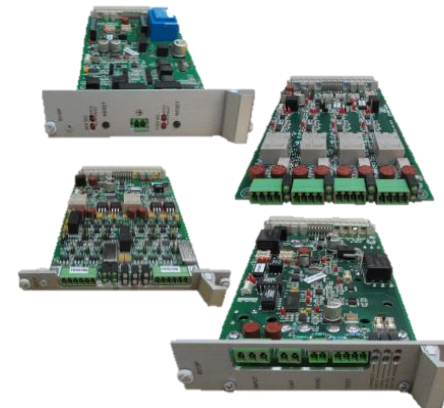


CORE TECHNOLOGIES

- Systems technology
- Control Systems
- Autonomy and Automation
- Guidance and navigation
- Sensor fusion
- Propulsion technology
- Power Management & Distribution
- Signature management



COMMON TECHNOLOGY PLATFORM



BENEFITS OF ICON BEYOND VEHICLE CONTROL

Remote connectivity opens up many new opportunities:-

- Operations
 - Real time health monitoring
 - Asset tracking and management
 - Consumables, tools and skills
 - Connected manufacturing intelligence
- Service & Support
 - Remote support
 - Preventative/Predictive maintenance
 - Enhanced customer service
- Assets
 - Usage
 - Warranty management
 - Configuration management
- User
 - Common user interface (familiarity)
 - Common training
- Engineering
 - Remote software management
 - Connected quality (engineering)
 - Simplified life cycle management
 - Lower development risks
 - Reduce time to market
- General
 - Create economies of scale / increase common parts / reduced inventory
 - Increase building block/system connectivity – Easier integration between systems
 - Greater data analytics

COMMERCIAL VISION

1. ROV's hosted from surface (Platforms, FPSO, USV) - operator and related personnel located onshore. Vehicles located on seabed for extended periods
2. Tetherless ROV/AUV (hybrids) systems capable of performing all inspection / monitoring tasks (with and without man in the loop), Further steps to increase capability to include routine light intervention.
3. Subsea resident autonomous vehicles capable of routine field support tasks

DEVELOPMENT STATUS



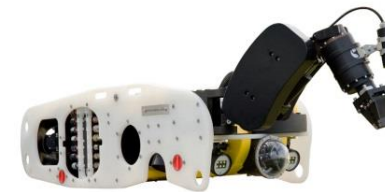
- Electric tooling
- High efficiency pumping
- ElectricTMS
- Subsea exchangeable skids
- Maintenance management
- Subsea Hosted



- Autonomy
- Through water communications
- Docking stations
- Energy storage
- Subsea resident
- Qualification



- USV Integration
- Operable over low bandwidth high latency data links
- Man out of the loop launch & recovery

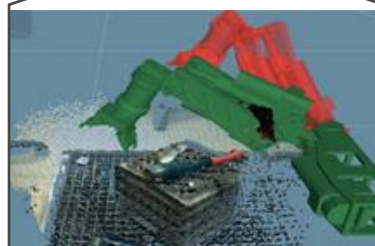


- Advanced pilot aides
- Precise manipulation
- HMI



- Autonomy
- CAD/CAC
- Mission planning
- Energy storage

Navigation, Automation, Autonomy, Reliability, Efficiency



Sabertooth



SEAWASP A CASE STUDY



**How Operator – Manufacturer
Interaction can work**