

COLUMBUS

“Growing Knowledge Communities”

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MARCOM *Defence*

Original KT Approach

- University designs a Sensor to work once
- Proves the Concept
 - Finds an Industry Partner to develop it
 - Perhaps with help from a Network
 - or
 - Previous collaboration
 - Test the developed product
 - Deal with IPR / Licencing etc.
 - Take it to Market

Knowledge Transfer

-v-

Knowledge Communities



Knowledge Communities

Three Examples

- Southampton Marine & Maritime Institute
 - (SMMI)
- Marine Robotics Innovation Centre
 - (MARSIC)
- Centre for Defence Enterprise
 - CDE

SMMI

Established 2012

- SMMI produces knowledge through research. Aim is to help the marine and maritime sectors develop their use of research and innovation to improve productivity, economic growth and sustainability. The knowledge produced through research is also used to train the next generation of professionals.
- SMMI works with organisations of all sizes and types in many different ways. E.g. work with large companies is helping to tackle some of the major challenges facing the marine environment and society at large, whilst engagement with local companies seeks to maximise their competitiveness on the global stage to ensure wealth creation and new employment for the region and the wider UK.

SMMI

- Over 350 Academics
 - Faculties ranging from Oceanography to Ship Science
 - & from Biology to Health
 - & from Law to Music
- Funds 35 Postgraduate Scholars
- Has Inspired over 500 Projects
 - From “Greening Shipping” to Marine Archaeology
 - From Carbon Capture & Storage to Marine Autonomous Systems
- £100m Activity

Operating as a KT Community

- National Oceanography Centre (NOC)



NOC as a KT Community

- Engaging with Business & building a wider Community
- Simple Steps
 - Talking
 - Engaging
 - Discussion
 - Ideas
 - Aspirations
 - Reflection
- Horizon Scanning

NOC as a KT Community

Marine Robotic Systems Innovation Centre ‘Where Science meets Business’

- During 2014-15 NOC is invested £3.5M to expand facilities for SMEs developing MAS:
- New office, laboratory and workshop space
- Access to an extensive range of testing facilities
- £1M funding via University of Southampton for Systems Reliability Laboratory

MARSIC



MARSIC



Building a Community to Stimulate Innovation – A 4 stage approach

- 1. The aim is to build a community of innovative companies developing technology for both platforms and components of Marine Autonomous Systems
- 2. This community will co-exist with the NOC MARS team who have extensive experience of deployment in challenging environments
- 3. Building on existing NOC relationships to extend this community to future end-users in Defence, Energy & other emerging offshore sectors
- 4. Support the leveraging of supporting R&D funds from regional, national and international sources to assist developments towards end-user need

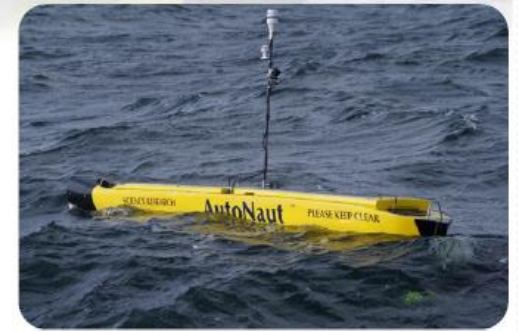
MARSIC

Supporting Small Companies - Long Endurance Marine Unmanned Surface Vehicle competition



Technology Strategy Board
Driving Innovation

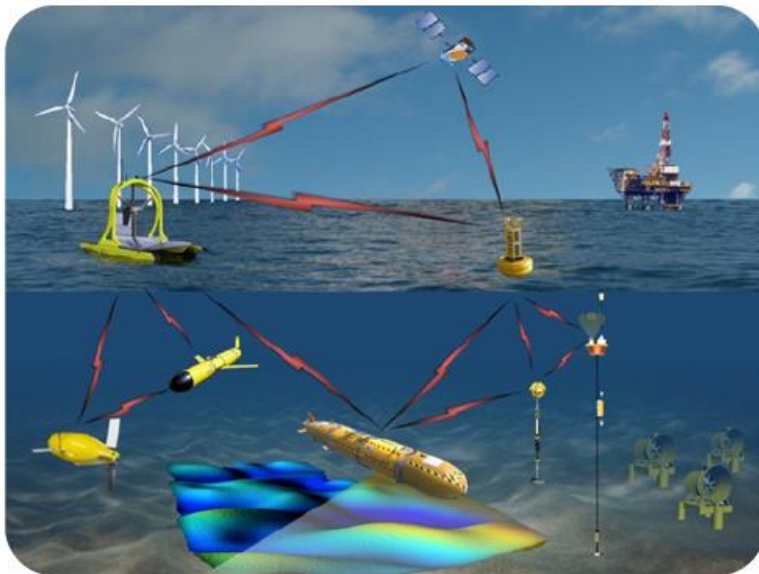
- Target: 90 day endurance with 10kt over 100NM 'sprint'
- 6 x £50k concept studies awarded 2012
- Down-selected to ASV Ltd. and MOST Ltd. 2013
- Initial prototype trials Portsmouth Harbour Dec 2013
- 2nd trials Loch Fyne Feb 2014



MARSIC

Supporting business with SBRI

2014-15 Autonomous Adaptive Ocean Sensing Networks



These systems will:

- Be capable of coordinating a suite of marine autonomous systems
- Enable the gathering of data from the ocean over periods of several months
- Able to track and sample dynamic features

MARSIC

InnovateUK Projects Funded (Total £2.9M)

- **Launch & Recovery of Multiple AUVs from an USV**
 - **Partners:** Planet Ocean (Lead), ASV, UoS, NOC
 - **Funding to NOC:** £180k
 - Development low-cost AUV and launch & recovery system from an USV for applications including defence, oil spill monitoring and science. Deployment of microAUVs from an USV will provide science users increased range, spatial sampling resolution and reduced cost versus some existing ship time solutions.
- **Pressure Tolerant Lithium Sulphur Battery for Marine Autonomous Systems**
 - **Partners:** Steatite (lead), Oxis, MSubs, NOC
 - **Funding to NOC:** £228k
 - Development of a revolutionary pressure tolerant rechargeable battery with high energy density and endurance based upon new, innovative Lithium Sulphur (Li-S) chemistry.
- **Autonomous Surface / Sub-surface Survey System**
 - **Partners:** ASV (lead), Sonardyne, Seebyte, NOC
 - **Funding to NOC:** £193k
 - Development of an integrated system using USVs, AUVs and novel communications technology for conducting low cost shore based full water column marine surveys and monitoring operations for offshore energy applications, deep sea mining prospecting and Carbon Capture and Storage monitoring.



Roadmap for Sensors & Instrumentation for Atlantic Observing

- International community aims to integrate and improve ocean observing not least in the Atlantic through a European project AtlantOS (<https://www.atlantos-h2020.eu/>)
- As part of this effort we are developing a freely available ten-year roadmap for sensors and instrumentation which we hope will become a useful reference document.
- We hope this will allow prediction of when and in what form new sensor and instrument technologies and capabilities will be available for ocean observing system designers and operators for the next ten years.

- CDE Approach
 - Background
 - Speculative Assistance
 - Seed Funding
 - Assisted Development
 - Partnership Brokering
 - Community Engagement
 - Transfer across Sectors
- Rapid Production
 - Simple IPR models

CDE

Challenge

protection

situational awareness

power

communications

data

lethality

mobility

human performance

lower cost of ownership

Sub-categories

personnel, platforms, facilities, digital systems, materials

sensors, precision navigation and timing, reduced global positioning system (GPS) dependability, persistent surveillance, status of digital systems

provision, sources, non fossil, hybrid, management, fuel efficiency

secure, unsecure, mobile, novel forms

cyber, information, big data, management and processing, sensemaking, visualisation, delivery, interoperability

weapons: conventional, novel, directed energy, defence, less than lethal

platforms, air, land, sea, space, human, means of propulsion

physical and mental, systems interface, survivability, sustainment, training, medical

platforms, equipment, facilities

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Growing Knowledge Communities

Thank you for your
attention

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