NA3 - Work Package (WP) 3 – Eco-Responsibility and Eco-Design for existing and new Research Vessels (RV)

Work Package 3 (WP3) is a NA which is due to complete in the middle of 2013. The WP has been divided into two themes.

The first theme entitled '*Eco-responsibility*' *(NOC Southampton)*

Task 3.1 – Research Vessel – Life Cycle Assessment (RVLCA)

Task 3.2 – Research Vessel Environmental Management Plan (RVEMP)

Task 3.3 – Research Vessel Environmental Management System (RVEMS)

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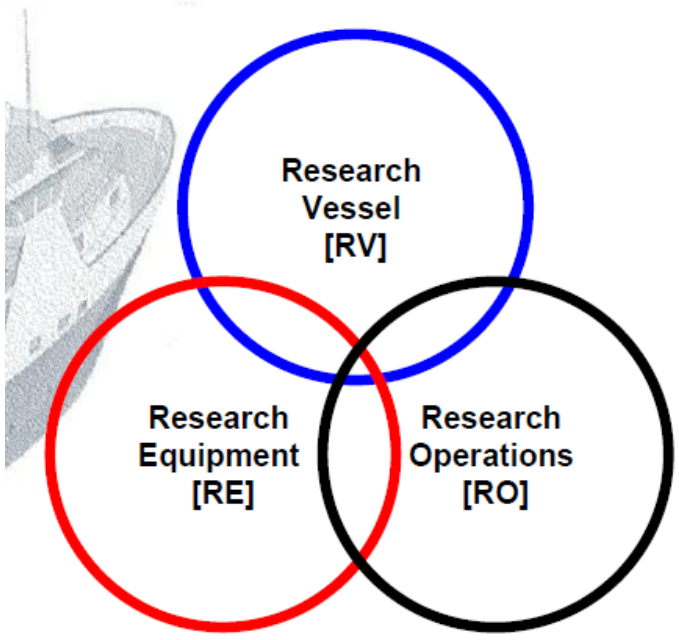
In the proposed Research Vessel Life Cycle Analysis [RVLCA] the approach adopted for the delivery of a 'Green' Eurofleets capability was to develop a three facet inter-related research delivery capability model. It is argued that the proposed model allows for the capture of all of enviornmental aspects of the delivery of a marine scientific reserach capability.

Research Vessel

Research Equipment

Research Operations



Traditional Model

Eurofleets

Three Research Vessel Life Cycle Analysis Inventory Types

[RVLCA][RV] – LCA Inventory Table		
Life Cycle Stage	Environmental Aspect	Environmental Impact
Requirements		
Design		
Build & Mid Life Update		
Operation Normal		
Operation Laid Up		
Operation Refit, Recertification & Upgrade		
Disposal / End of Life		

It is possible to have a fully environmentally compliant Research Vessel with respect to the ISM code or ISO 140001 standards but still not be able to undertake certain types of scientific experiment.

[RVLCA] [RE] – LCA Inventory Table		
Life Cycle Stage	Environmental Aspect	Environmental Impact
Requirements		
Build / Procure		
Operation Normal		
Operation Modification		
Operation Autonomous		
Operation Loss		
Operation Non Recoverable		
Operation Logistics		
Disposal / End of Life		

For example the use of acoustic scientific equipment in designated marine mammal protection areas.

[RVLCA][RO] – LCA Inventory Table		
Life Cycle Stage	Environmental Aspect	Environmental Impact
Science Proposal		
Peer Review		
Cruise Planning		
Cruise Passage		
Cruise On Station		
Post Cruise Disposal of Scientific Sample		
Post Cruise Disposal of Scientific Waste		

Report WP 3.1 Key Conclusions

Growing complexity of the nature of marine scientific research
One single LCA is not an appropriate approach and a three inventory approach would be more suitable.

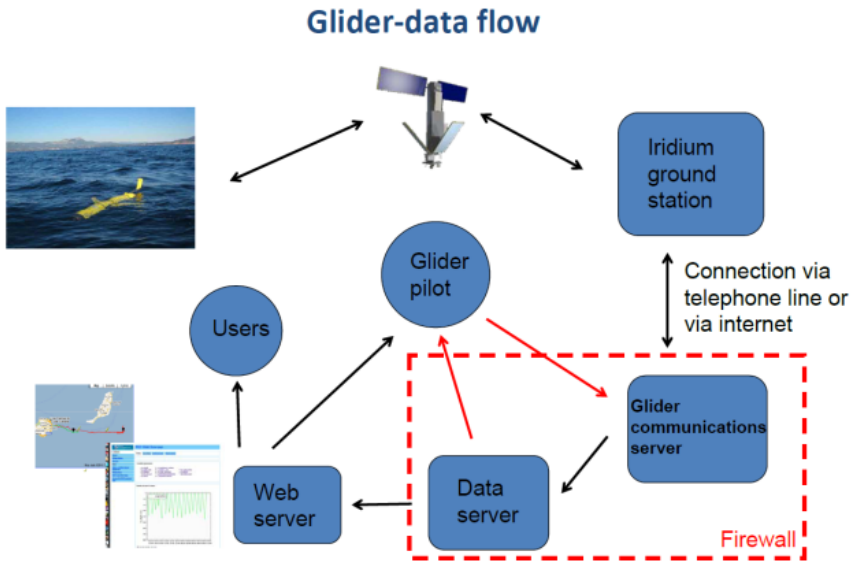
That due to the variability of vessels, research equipment and research operations RVLCA inventory templates.

That the scale of the applicable environmental legislation and how EU Member States vary in how they enact and enforce that legislation will mean that the development of any EUROFLEETS research vessel environmental management plans and environmental management systems will have to be generic in approach.

IRSO/ERVO Code of Practice as the basis of a EUROFLEETS equivalent code.

Any subsequent phases of the EUROFLEETS programme consider the development of a tailored LCA training programme for Consortium members

In the 'Autonomous' case a growing number of Principal Scientists fly their gliders in support of their marine scientific research operations from ashore. This can and will give rise to both safety and environmental compliance issues.



The UK National Marine Facilities Sea Systems now has a new autonomous facility called the 'Marine Autonomous and Robotic Systems [MARS] as an adjunct the Research Vessels they operate.

MARS will be used to support the NERC FASTNEt [http://www.smi.ac.uk/fastnet] programme which will see up to 750 hours of glider deployments not involving the use of Research Vessels

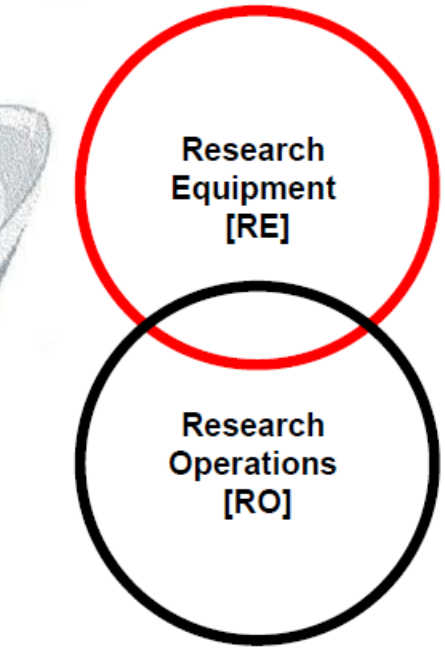
National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

No.3 November 2011

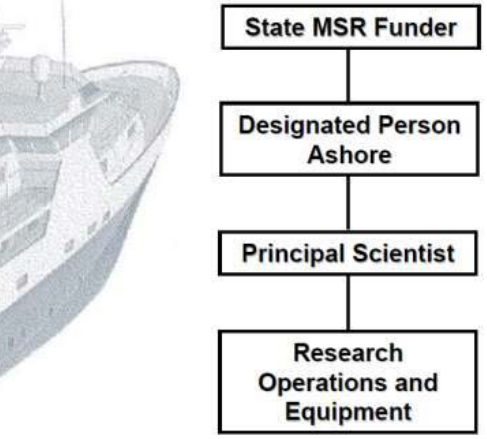
Marine Autonomous and Robotic Systems Facility Newsletter

Eurofleets

With the 'autonomous model ' based on a principal scientists marine scientific research being delivered from by an AUV capability not deployed and operated from Research Ship the environmental responsibilities are not so well defined under the maritime ISM code or ISO 14001. Two of the planned Eurofleets RVLCA can be used [Equipment and Operations]. It has been proposed that the Research Vessel Designated Person Ashore could have oversight of the environmental and safety issues arising from this form of marine science delivery



Autonomous Model



Proposed Environmental Responsibilities Diagram for the Autonomous MSR Delivery Model

Report WP 3.2 Key Conclusions

The future RVEMS will be based on the use of either the ISM code or ISO 14001.

Environmental Operational Procedures for RO and RE are limited or in certain cases non existent

The 'Traditional' MSR delivery model format for the allocation of Environmental Responsibilities does not work when applied to the 'Autonomous' MSR delivery model as both the RV and its master may not be present during the delivery and subsequent operation of the autonomous capability.

Report WP 3.2 Key Conclusions

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The second theme is entitled 'Vessel *Eco-design' which is made up of one task broken down into* three subtasks.

Task 3.4 – Guidelines towards future new buildings and innovative eco-design for Regional Vessels.

Task 3.4.1 – Description of current vessel performance

Task 3.4.2 – Current vessel eco-performance = listing available tools

Task 3.4.3 – Establishment of guidelines for Regional vessel eco-design

Eurofleets

Eco-Design of Research Vessels

by Andre Cattrijsse, Roland Rogers, Harrold van Vliet, and Pieter Huyskens

Introduction

To improve the aging European marine research fleet on green ship operations, the EuroFleets project drafted guidelines for eco-responsibility of existing and eco-design for new build research vessels. This essay summarizes these guidelines but considers only those technologies that improve a ship's environmental impact beyond the legal requisites as "*green*."

The fashionable "green ship" does not exist and the environmental impact free vessel is a theoretical concept. The term "greener" or "cleaner" ship is better wording. Reducing the environmental footprint of ships and their operations involves too many aspects for a straightforward meaning of the "green ship" concept. The continuous development of technologies and conventions gradually narrows the perception of "*green*." A flashy green ship today will likely be a pitch black one tomorrow. A clear definition of the green ship concept and its auditing would be beneficial for the entire shipping industry. A mature green status necessitates full consideration of the cradle-to-cradle approach.

Pollution by Oil

Ship operational oil pollution remains an important environmental issue. Oils and oily residuals continuously enter the environment either through direct release or from deck run wash. The yearly amount of oily substances that enters the marine environment through simple ship operations is larger than those caused by incidents or accidents and estimated to amount annually to over 80 million litres. MARPOL allows discharge of bilge water at concentrations below 15 parts per million under strict circumstances. [MARPOL is the International Convention for the Prevention of Pollution from Ships; MARPOL is short for marine pollution.]

High speed centrifuges or membrane microfiltration technologies clean bilge water to much lower concentrations. Even better, operators should choose not to discharge under any circumstance and dispose of oil at shore. Many research vessel operators have indicated that they adopt this approach.

The use of biodegradable oils and lubes in the maritime sector is growing. Biodegradable

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