

**Protecting our Seas and Shores in the 21<sup>st</sup> Century –**  
**Consultation on proposals for modernising the Coastguard 2011**

**Supporting Documentation**

**Contents**

1. Coastguard Operations
2. Consultation Responses
3. Risk
4. Impact Assessment
5. Local Knowledge: Mitigating the Risk
6. Skill Fade
7. IT Technical Brief
8. Glossary of Terms

# 1. Coastguard Operations

## Context

In recent times there has been a fundamental shift in thinking about the seas that surround the British Isles, brought about by a changing economic, environmental and security situation. Incidents that have captured the attention of the public, and have influenced this shift include the loss of the BRAER, the SEA EMPRESS, the ERIKA, the PRESTIGE and the NAPOLI,. Maritime nations now recognise that the sea is a resource to be exploited as well as a route for transportation. Any nation looking to secure its economic prosperity needs to have policies and strategies that include the enhancement of maritime and environmental safety.

The European Union has developed this thinking in its Integrated Maritime Policy. The IMP has two essential themes, the wellbeing of its citizens and their prosperity. The wellbeing of the EU citizen turns on ensuring their security in terms of physical security, security of energy supply, security of borders, and economic security. Prosperity flows from activities such as aquaculture and fisheries, transport, commerce and recreation.

The Integrated Maritime Policy has produced a number of Directives, most notably the Vessel Traffic Monitoring and Information Directive. The uses of the seas and oceans, and the management of human activities are also considered in a number of international treaties and conventions to which the United Kingdom is a signatory. Those obligations can be categorised into 10 areas of activity that any maritime nation should deliver against to comply with, and benefit from, the effective management of its maritime interests.

They are described as the Coast Guard functions, although each state organises and allocates these functions differently. In detail, and with a commentary, they are listed at the end of this Annex as they are discharged in the UK.

The modernisation of HM Coastguard presents the UK with a unique opportunity to do two things:

- To modernise a search and rescue service that is effective but which needs to change and develop in order to remain relevant in the dynamic environment in which it operates. A key area here is ensuring that whilst addressing the UK maritime interests, HM Coastguard must maintain a search and rescue provision that continues to respond promptly, and effectively, to incidents related to leisure pursuits and activities on our coastline and coastal waters.
- To become the lead organisation for the broad spectrum of maritime safety activity and service the needs of partner organisations concerned with the maritime domain.

## How it would work

The coastguard would operate as a national network controlled by a Maritime Operations Centre. A Maritime Operations Centre differs significantly from existing rescue coordination centres. A Maritime Operations Centre is the base from which all maritime functions are discharged, principally search and rescue coordination, counter pollution and vessel traffic monitoring. It has a distant horizon, not limited geographically, monitoring UK maritime interests. The extent of these have, in the past, been limited by the boundaries of the UK Search and Rescue Region (SRR) and to search and rescue activity. Such limits are now interpreted more broadly by modern maritime nations as extending to wherever national maritime interests exist. This would include UK territories and wherever a UK registered vessel was present. This is referred to as the **UK Maritime Domain**. A key deliverable for the future coastguard is maintaining knowledge of the current status of these areas - **Maritime Domain Awareness**.

The MOC also provides a first point of operational contact for other government departments and other organisations into the maritime world, and vice versa. It exercises command and control over all Coastguard operations nationally and generates a maritime picture using information from a variety of sources to enable the active management of risk.

The MOC detects threats to safety, the environment and security at an early stage by comparing what is known to be normal routine activity with the prevailing situation, using information and intelligence. In this way the emphasis is moved to one of proactive working whilst retaining the ability to react appropriately and capably to emergency situations

The functions of the MOC can be set into three broad areas of activity. These are as follows:

- Civil maritime SAR coordination but with the capacity to take on aeronautical SAR coordination, in line with international best practice.
- Counter Pollution activities, including the monitoring of the UK Pollution Control Zone and leading a response to any pollution detected or reported.
- Traffic Monitoring, using information from a variety of sources and inputs to build up a picture of vessel traffic within the UK maritime domain. This picture is enriched with information held regarding the condition and cargoes of ships, which in turn allows for the risks presented by shipping, to safety and the environment, to be proactively managed.

The MOC is sufficiently large and staffed so as to be capable of managing operations for which it assumes direct control, and to actively monitor and influence operations being carried out from other sites. It is sufficiently resilient in terms of staffing to absorb the very heavy initial demand that might be presented by a major incident or civil emergency. Heavy demands can come from a disaster, natural or man made, or a major maritime accident. The decisions and actions taken early, if effective, can do much to mitigate the consequences. At present such a demand would present itself at an MRCC that may have a watch level set to the expected demand. Reinforcing it can and does take time, many hours or even days. It is important that HM Coastguard has a properly staffed MOC, supported by a wider network, to absorb this demand at no notice, and to respond properly and promptly to any demand.

The maritime picture generated by HM Coastguard for its own purposes is also extremely useful to other government departments with an interest in energy security, border security, or offshore conservation or development. The MOC, providing a single coherent portal for these interests, positions the MCA properly to deliver its experience and expertise into cross governmental preparedness and response, and enables a coordinated approach to major incidents, disasters and security threats.

Under our proposals, the MOC would be supported by a subsidiary site at Dover, where the site infrastructure is such that it can assume the role of the MOC once reinforced with additional staff. Other Maritime Rescue Sub-Centres (MRSC) would be located at Aberdeen, Shetland, Stornoway, Belfast, Milford Haven, Falmouth, Holyhead and Humber; with a much smaller operation on the tidal River Thames in London. The MRSC at Aberdeen would also host a data centre, providing resilience and geographical dispersions in the event of major outage or other emergency.

Underpinning maritime domain awareness is the knowledge base of HM Coastguard. The knowledge base is geographical information covering the entire service area enriched by an awareness of environmental factors, social relationships, the availability, capabilities and limitations of SAR assets and any other significant features that allow staff to fully understand the scene of action remotely. This understanding promotes the intelligent questioning of witnesses or informants, the appropriate selection and deployment of assets and the formulation of effective response plans. Operators will, supported by technology, spend the necessary time validating and developing this knowledge base, and remain competent in its application. Trainees will commence with a section proximate to their normal place of work but will, over time, become familiar with the entire service area.

## Conduct of Operations

At present, HM Coastguard operates territorially in that the UK search and rescue region is subdivided into sub areas, resources are allocated specifically to them and each has an MRCC operating within that sub area. This is a traditional way of operating but brings about certain limitations with regard to efficiency. The current structure and infrastructure of HM Coastguard is based on 19 Centres with all but one of these collecting and managing data through an independent information and communication system. Whilst technically paired (except for Stornoway/Shetland) the systems and data sets are individual and the resilience offered by the pairing is wholly dependent on both systems being operational.

The consequences of this structure are that the national work of HM Coastguard is delivered in a number of discrete packages associated with each pairing. Due to this design each MRCC is staffed to cope with predicted worst case scenarios and, at times of peak loading, has to adopt a strategy of controlled load shedding. This means that when Search and Rescue or emergency response workload is heavy, other less urgent work (such as the provision of marine safety information, routine call handling etc.) is suspended. Furthermore, outside of the pairing arrangements, support to loaded MRCCs is extremely limited. The requirements of the future, with regard to our legal obligations and in terms of managing risk, mean that the shedding or suspension of such activities are at best undesirable with the very real potential to miss a hidden distress alert.

This mode of operation has also led to a situation where different centres have developed different skills and levels of expertise. This applies to both types of incident (that have greater frequency in certain locations) and specific functions (e.g. Falmouth – Global Maritime Distress and Safety System (GMDSS) and International SAR activity, Dover – VTM, Aberdeen – Oil and Gas and CERs etc.).

Whilst this has undoubtedly developed centres of excellence and expertise, it has also introduced potential single points of failure.

In the proposed new Coastguard, the national Maritime Operations Centre and all of the Maritime Rescue Coordination Sub-Centres would operate from a single national networked data and communication system. Each operator on duty would have the capability to connect to any of the national network of radio sites and to any of the operating systems.

The proposal would establish a single virtual operations network. Staff on duty anywhere in this national network would be trained, practised and capable of delivering any of the functions required of HM Coastguard for the UK. This broadening of expertise would develop the work of all staff in terms of variety, frequency and quality.

Work would be conducted according to requirement and service delivery and not anchored to a specified area or sub area. This concept of operations is therefore functional, rather than territorial.

SAR coordination operations in coastal waters present particular challenges. Such operations may involve several different organisations, and local factors will have a substantial impact upon decision making and the assessment of initial information. Most if not all of the rescue providers will be volunteers. As such, coordinators must be familiar with a geographical area to allow for trust and confidence in the decisions they make by the people they are coordinating. The proposed system would cater for this by ensuring a minimum standard of local knowledge amongst on watch operators, supported by standardised gazetteers, databases and geographical information systems that will enhance individually learned knowledge.

Operating under the overall command and control of the MOC, work would be distributed across the network according to planning based on risk assessed factors including:

- Predicted levels of activity
- Known events

- Staff resource and capability
- Intelligence from partner organisations
- Environmental data (weather, tide etc.)

The MOC would also have responsibility for monitoring the national picture and adjusting work distribution either by reallocating a task, or by adjustment of the size of areas allocated to teams, or by adjustment of the size of teams.

### **Delivery of Maritime SAR Coordination**

At any given moment, the control of the Coastguard network would be directed by the Shift Manager at the MOC. Whilst complex, this task is manageable by the predictability of much of the demand for SAR and VTM, and by the effective use of risk management to generate a series of templates for normal working.

The factors that would inform the composition of these templates includes

- The likelihood of most SAR incidents occurring in terms of where, and of what general type
- The anticipated volume of normal and emergency radio and telephone traffic
- The technical state of readiness of the network, and any planned outages of ICT infrastructure
- Internal training events, or multi agency exercises planned
- Environmental data including wind, rainfall, visibility, tide times, and any predicted phenomena such as tidal bores or tidal surges
- Traffic patterns and density, and the passage of any vessels of interest through UK waters
- Any social or sporting events that may actually or potentially present a risk to safety

These templates would determine such things as the ideal staffing levels for each site, recognising team composition and skill sets, and any measures that might be deployed to manage risk such as warning and informing, the pre-deployment of assets or the planning of any form of early intervention.

The Shift Manager is then able to modify the template in response to acute factors such as the occurrence of a significant incident, unplanned staff absence at a site or sites, unexpected ICT outages, or an unusual weather event.

These modifications might entail changing the area of operation of a particular site, aggregating or disaggregating work teams, moving packages of work to teams not in contact with operational demand or initiating contingency plans.

SAR, VTM and CP operations will be dealt with by teams of officers, guided and directed by a Team Leader. The Team Leaders will have oversight of a number of teams, not all of which will be at the same site. The Team Leader will give tactical guidance to the teams, ensure compliance with operational procedures and doctrine and keep the Shift Manager advised of progress, and the capacity to cope at that moment and looking forward. By keeping an overview of operations carried out by more than one team, and by conferring routinely with other Team Leaders, the process of transferring incidents where required (change of shift etc.) will have the right level of assurance. This is because whilst an oncoming team may be initially unfamiliar with the intricacies of an incident, no matter how efficient the handover, continuity is provided by the Team Leader.

Team members will work in groups of between 3 and 5 and deal with SAR coordination, CP operations and VTM activity. Much of their SAR work will be done on a local/regional basis but they will be prepared to act outside of those areas to assist other teams as required, either to smooth uneven demand or to deliberately expose team members to a wider variety of scenarios and/or hone different skill sets. Operational control of teams will be given by a suitably qualified and experienced officer who will be nominated to act as Search and Rescue Mission Coordinator (SMC). The team should also expect to be carrying out work on a national basis, for example the

promulgation of MSI, the targeting of ships for Port State Control inspection or enhanced monitoring, liaising with neighbouring states , or liaising with other UK agencies.

Command and control will be exercised through delegation. Responsibility will be pushed down the chain of command to the lowest safe level to shorten decision-to-action time, and to empower the officers in contact with the situation. Accountability will flow up the chain of command to the Shift Manager, and beyond if more senior officers are acting as strategic commanders.

The maintenance of operational standards is of paramount importance. At the MOC, Shift Managers and Team Leaders will act as managers and coaches to staff at the MOC and at other sites. At Sub Centres, there will be one or two officers nominated as responsible for the maintenance of day-to-day standards, and will be assisting their colleagues in so doing as a part of their normal duties.

### **Coastal Safety Organisation**

The principal Coastguard presence on the coast is provided by the Coastguard Rescue Service, amounting to some 3500 volunteers in 368 teams around the coast. The intention is to develop the CRS into the broader maritime safety and accident prevention functions with a new management structure providing an opportunity to strengthen the relationship between the CRS and the community.

Complementing a leaner, busier management and coordination network is an enhanced coastal response capability based upon the Coastguard Rescue Service. The management of the CRS is presently carried out by 64 Sector Managers, who are responsible for the management, training and operational excellence of the CRS.

These Sector Managers are line managed on a day to day basis by nine Coastal Safety Managers who also have responsibility for the 18 MRCCs and London.

There have been two major coastal reviews, one in 1988 and another in 1997. These reviews resulted in modernising the equipment and procedures but kept the autonomy of the Sector system.

There are a number of distinct disadvantages to having 64 autonomous sectors namely:-

- Limited mutual support to Sector Managers
- Limited Line Manager Operational knowledge
- Disparity in work load between Sectors
- Working in isolation with little supervision
- Lack of support and resilience between Sectors
- Disparity in quality/quantity of training due to some sectors having 30 volunteers whilst others have over one hundred.
- No real mentoring & little support for new Sector Managers

Additionally there are disadvantages for the volunteers in the current system:-

- Limited availability of a full time Coastguard either on-scene of an incident or available to support on -going operations.
- Limited availability of advice concerning technical rescue issues out of hours.
- Limited availability of advice concerning personnel issues out of hours.
- Limited availability of a training officer during the long term absence of the Sector Manager.

However, in keeping with an ethos built around teamwork, mutual support and maintaining the integrity of maritime safety nationally, the proposal is to remove administrative boundaries and introduce a wider area concept.

It is proposed to enhance the availability of full time officers to the volunteers for operational attendance, leadership and advice, both during routine activities and, whenever required, by attendance at incidents. This will allow much more flexibility in the management and training of our volunteers and help to remove the current uneven distribution of CRTs between their management.

To this end, coastal operational management will be provided in a new structure that will consist of 18 teams, each comprising a Coastal Safety Team Leader and 4 or 5 Coastguard Safety Officers.

Each of these teams will report into one of 6 Coastal Safety Managers responsible for the overall delivery of the Coastguard Rescue Service mission.

### **Delivery of Coastal Safety**

A Coastal Safety Manager (CSM) on any day will work with colleagues in the strategic management of the Coastguard Rescue Service. Acting as line manager to a number of Coastal Safety Team Leaders, a CSM will ensure that the development and implementation of national policies align with the national strategic direction and enable the business continuity plan for coastal rescue response. They will also represent HM Coastguard at a strategic level with partner organisations and at other relevant bodies.

The CSM will also receive regular tactical and operational input from Coastal Safety Team Leaders to inform the strategic overview.

Each of the 18 team leaders will be responsible for the day to day management of a team of 4 or 5 Coastal Safety Officers. They will be the HM Coastguard representative at local resilience forums and will be accountable for the delivery of effective and efficient Coastal Search and Rescue within their area of responsibility.

Each team of Coastal Safety Officers will be responsible for the operational capability, readiness and safety of some 20 volunteer Coastguard Rescue Teams through sound management, training, and operational superintendence. This will include the enrolling, training, equipping and management of around 200 Coastguard Rescue Officers within an area. As an operational professional, each Team Leader and their Coastal Safety Officers will require technical rescue skills and knowledge and be able to take on-scene command of a multi Agency incident.

In order to standardise our commitment to the volunteer force there will always be one Coastal Safety Officer on 24-hour call for each of the 18 teams. The advice, support, technical expertise and, at times, on-scene presence, available to any Coastguard Rescue team within their area at any time, will enhance our ability to deliver the CRS role promptly effectively and safely.

When on duty or on-call, all Coastal Safety Officers are also available to the MOC or MRSC for detailed local intelligence and advice on coastal rescue issues. It is intended that this increased professional presence within coastal communities will also enhance the availability of advice and guidance to visitors and leisure users of the UK coastline and coastal waters.

Currently we depend on the local knowledge of our volunteers for details such as owners of land, access points, availability of 'civilian' transport such as tractors, type and condition of cliffs and foreshore, local activities, clubs and associations. That will continue in the proposed new arrangements. The on duty or on-call Coastal Safety Officers will act as focal points and additional resources to ensure that no greater burden is placed on our volunteers.

## Coastguard Functions

It can be seen that the MCA, acting either on behalf of the Secretary of State or through HM Coastguard in the exercise of its statutory functions, carries out 6 of the 10 activities described below. It provides material assistance to partner organisations in respect of the remaining four activities.

Function	Tasks	Lead Agency
<b>Search And Rescue</b>	Provision of initiation, coordination and direction of search and rescue units to the assistance of distressed ships or persons, provision of distress watch on GMDSS means and 999 system, provision of radio medical advice. HM Coastguard is also charged with the rescue of persons in distress on the cliffs or shoreline of the UK.	HM Coastguard
<b>Pollution Response</b>	Aerial surveillance of suspect or actual pollution, mobilisation of cleanup or mitigation teams, provision of information to SOSREP, provision of information to Bonn contracting states regarding movement of pollution, provision of information to SafeSeaNet, participation in CP exercises, identification and monitoring of places of refuge, monitoring and control of minor pollution incidents	MCA
<b>Vessel Traffic Management</b>	Provision of Traffic Information Service at Dover Strait TSS, Eastern Irish Sea VTS, Sunk VTS and at any other location where VTS is established as a safety measure either as an information or an organisation service), monitoring of traffic through reporting schemes, general monitoring of traffic around the UK for observance of COLREGS and to detect unusual or unsafe movement. Monitoring of vessel movement and type to identify high risk ships (not just tank ships), monitoring of hazardous cargo lists, monitoring of vessels proceeding under voyage limits imposed by MCA (tows, detained vessels proceeding to repair ports etc), provision of maritime safety information, monitoring of temporary exclusion zones, monitoring of vessels to ensure compliance with COLREGS, monitoring of traffic around OREI's and other critical national infrastructure (pipelines, oil and gas platforms etc), provision of information to MAIB, provision of SAR Cooperation plans to other emergency services as required, mobilisation of MIRG, provision of services underpinning eNav, provision of information to Marine Management Organisation, participation in multi agency exercises, monitoring of protected and dangerous wrecks, monitoring of marine conservation zones.	HM Coastguard
<b>Accident And Disaster Response</b>	Discharge duties required of category 1 responder including warning and informing, assisting other category 1 responders at scene of major incident by provision of resources (including communications), testing contingency plans by participating in exercises,	HM Coastguard
<b>Maritime Safety</b>	Acting as flag state, providing effective regulatory framework for manning, equipment, construction and operation of ships. Inspecting foreign ships in UK ports and using statutory powers to prevent the operation of substandard ships in UK waters.	MCA
<b>Maritime Security</b>	Provision of ship movement information, monitoring and selecting ships for inspection by MCA/TRANSEC	HM Coastguard/DfT

Function	Tasks	Lead Agency
	inspectors, monitoring ship movements around isolated port facilities to guard against undeclared port calls, provision of ship specific information to security services as required, reception of ship security alerts,	
<b>Customs</b>	Monitoring of vessel movement for unusual activity (cooperage), provision of incident or track information for prevention and detection of crime, identification and monitoring of target ships scheduled to arrive at UK ports or transit UK waters, notification of suspicious activity on board ship discovered by MCA surveyors.	UK Border Agency
<b>Border Control</b>	Monitoring of vessel movement for unusual activity (people smuggling), provision of incident or track information for prevention and detection of crime, identification and monitoring of target ships scheduled to arrive at UK ports or transit UK waters, provision of identity of persons assisted or rescued, notification of seafarers with suspicious or deficient documentation discovered at ship inspections by MCA surveyors, notification of stowaway or humanitarian rescue reports from ships bound to UK	UK Border Agency
<b>Fisheries Control</b>	Monitoring of vessel movement to detect illegal, unreported or unregulated (IUU) fishing. Surveillance of fishing grounds. Identification of suspect fishing vessels for inspection by MCA surveyors and/or fisheries officers.	DEFRA and devolved administrations, sea fisheries committees
<b>Law Enforcement</b>	Reporting of breaches of maritime legislation principally flowing from the Merchant Shipping Act 1995, gathering and collation of evidence to criminal standard. More general prevention of maritime crime.	MCA/Police/UKBA

## 2. Consultation Responses

The following table lists the findings of the internal review team's analysis of the responses received to consultation and describes who the concerns expressed by respondees have been addressed.

Area of Concern Arising from Consultation	Addressed by...
<p><b>Local Knowledge</b></p> <p><b>Internal Review Team Finding 1</b></p> <p>The responses suggested that the overriding concern in the responses to the consultation was that the proposed reduction in RCCs will lead to loss of local knowledge, local intelligence, give rise to potential difficulties with local language and dialect and lead to delayed response and potential loss of life.</p> <p><b>Internal Review Team Finding 2</b></p> <p>The responses suggested that the proposals placed an over-reliance on SAR volunteers for local knowledge when in fact, because they are volunteers, they may not be available or their local knowledge may be inconsistent and at no set standard.</p> <p><b>Internal Review Team Finding 3</b></p> <p>The responses suggested that the importance and context of local knowledge and its associated factors in SAR co-ordination were thought to be under-valued in the proposal.</p> <p><b>Internal Review Team Finding 4</b></p> <p>The responses suggested that many of the concerns relating to local knowledge emanated from, or were related to, the small craft user and recreational community who felt they had not been adequately considered in the proposal.</p>	<p>Retaining additional centres and increasing to 24 hour coverage at all locations will give assurances about familiarity with unusual local place names, particularly in remoter areas where multiple language differences may prevail. The retention of stations at Stornoway and Holyhead will mitigate the transition risks presented by the Welsh and Gaelic languages. Together with the uplift of coastal community based officers, this provides the levels of assurance to the Coastguard Rescue teams</p> <p>The revised proposals do not put an additional burden onto Volunteer Coastguard Rescue Officers. As outlined in the original proposals it will be the additional operational leadership staff that will provide the extra source of local intelligence. These officers will also be a direct point of contact for the small craft and leisure community and are not volunteers.</p> <p>An important element of these revised proposals will be a National Gazetteer which will be available for all watch keepers across the UK network.</p> <p><b>These also address concerns raised in the Transport Select Committee report.</b></p> <p>Retaining additional centres and increasing to 24 hour coverage at all locations will give assurances about familiarity with unusual local place names, particularly in remoter areas where multiple language differences may prevail. This was also addressed within the original proposal by the 50% uplift in the number of professional Coastguards based in coastal communities. These officers will be the prime contact between devolved and local services and organisations (including leisure and commercial groups).</p>

<b>Local Resilience and Relationships</b>	
<p><b>Internal Review Team Finding 5</b></p> <p>The responses suggested that the reduction in the number of RCCs will weaken the local operational relationships with devolved administrations, emergency services, SAR and civil resilience partners and that this will impact on command, control, communications and co-ordination within single or multi-agency incidents including major incident working.</p>	<p>This was addressed within the original proposal by the 50% uplift in the number of professional Coastguards based in coastal communities. These officers will be the prime contact between devolved and local services and organisations (including leisure and commercial groups). They will be the at-scene officer at multi-agency operations.</p>
<p><b>Internal Review Team Finding 6</b></p> <p>The responses suggested that the reduction in the number of RCCs could lead to isolation of Coastguard Rescue Teams (CRTs) and other SAR partners who view RCCs as the focal point for Coastguard activity and a source of local knowledge and maritime information.</p>	<p>Retaining additional centres and increasing to 24 hour coverage at all locations will give assurances about familiarity with unusual local place names, particularly in remoter areas where multiple language differences may prevail. Together with the uplift of coastal community based officers, this provides the levels of assurance to the Coastguard Rescue teams</p>
<p><b>Internal Review Team Finding 7</b></p> <p>The responses suggested that respondents felt that the proposed 'centralisation' of HM Coastguard will weaken its local 'presence' when the current Government drive is for regional advancement and an increased localism agenda.</p>	<p>See above</p>
<p><b>Internal Review Team Finding 8</b></p> <p>The responses suggested that there was no real evidence in the proposals that new or developing external pressures e.g. major expansion in off-shore renewable energy developments, importation of Liquid Petroleum Gas and other marine related activities and industries have been considered.</p>	<p>The developing Vessel Traffic Monitoring mission for HM Coastguard is a prime requirement for the future. This will include the coverage of areas of significant offshore development and the movement of significant vessels and cargo. This has always been a key consideration in the development of a nationally networked Coastguard that, under the command and control of a MOC, is able to maintain a high level of maritime domain awareness.</p> <p><b>These also address concerns raised in the Transport Select Committee report.</b></p>

<p><b>Concept of Operations</b></p> <p><b>Internal Review Team Finding 9</b></p> <p>The responses suggested that the consultation proposals lacked detail of the MOC role, concept of operation and its relationship with the daytime RSCs. The lack of information concerning the protocols, processes and procedures to be used in support of such a concept were also noted by respondents.</p> <p><b>Internal Review Team Finding 10</b></p> <p>The responses suggested that the respondents saw no evidence of robust testing or field trials to prove the MOC and daytime RSC concept of operations nor of the technological solution that will facilitate this concept and the wider modernisation.</p> <p><b>Internal Review Team Finding 11</b></p> <p>The responses suggested that the handover of incidents from daytime RSC to MOC and vice versa was perceived to be high risk for delivering emergency response which could be mitigated by providing 24 hour cover at the retained centres.</p> <p><b>Internal Review Team Finding 12</b></p> <p>The responses suggested that whilst there was support for a modernisation of HM Coastguard it was based on 24 hour cover at any retained centres. There was little support for daytime RSCs.</p> <p><b>Internal Review Team Finding 13</b></p> <p>The responses suggested that Respondents felt that the complexity of co-ordinating SAR response operations by a volunteer Coastguard Rescue Team in the 'dry' coastal littoral area when involving land, sea or air assets and its relationship with the MOC or RSC was not addressed in the consultation proposals.</p>	<p>Retaining more Centres and keeping them as a 24 hour operation, eliminates the need for daily handovers between the MOC and other centres.</p> <p>The MOC retains overall strategic command and control for the management and distribution of work across the national network.</p> <p>The concept of operations was tested by modelling against actual data for the busiest day on record. The technology concept is already in operation in the Aberdeen/Forth pairing where both centres operate from a single ICT platform. Further testing will be undertaken once the proposed future design is decided. The technical solution uses tried and tested existing systems.</p> <p>The revised proposal is based on 24 hour provision at all sub-centres.</p> <p><b>This also addresses concerns raised in the Transport Select Committee report.</b></p> <p>See above</p> <p>The coordination of “dry” SAR incidents was described in the consultation document as a future intention. This would not be undertaken until the new coordination and coastal structures were established, fully staffed and running in a steady state. The move to CRS coordination of such incidents would be lead by the new Coastal Safety Officer structure and be introduced on a risk managed basis.</p> <p><b>This also addresses concerns raised in the Transport Select Committee report.</b></p>
--	---

<p><b>Internal Review Team Finding 14</b></p> <p>The responses suggested that respondents indicated that the proposals assume an unrealistic level of technology in terms of communications and navigational aids within the small boat and recreational community.</p> <p><b>Internal Review Team Finding 15</b></p> <p>The responses suggested that respondents indicated that the MCA Regional operations structure worked against the concept of a national maritime emergency response system by putting an unnecessary 'dog-leg' in the command and control chain.</p>	<p>The proposals were wholly cognizant of the technology available and in use within the small boat and leisure sector. There was never any reduction in the quality of service provided to these sectors within the proposal. However the retention of a wider network of 24 Hour centres together with the increase in provision to the CRS is intended to alleviate this concern</p> <p>The final structure of management across the wider MCA business would evolve as driven by business need and the careful management of the transition process.</p>
<p><b>The Coastguard Rescue Service</b></p> <p><b>Internal Review Team Finding 16</b></p> <p>The responses suggested that the demands already placed on the volunteer CRS are such that there is little or no capacity to take on the proposed additional roles, particularly the complex process of on scene co-ordination, and the additional training it will entail.</p> <p><b>Internal Review Team Finding 17</b></p> <p>The responses suggested that whilst there was support for strengthening the management of the CRS as per the proposals, some respondents questioned the need to introduce another layer of management and preferred the introduction of a layer working in support of current Sector Managers which would also introduce a degree of succession planning and career development.</p> <p><b>Internal Review Team Finding 18</b></p> <p>That a considerable investment in technology will be required to achieve the proposed improvements in the management of, and support to, the CRS, and for the data transfer requirements needed to ensure effective on-scene co-ordination.</p>	<p>The revised proposals do not put an additional burden onto Volunteer Coastguard Rescue Officers. As outlined in the original proposals it will be the additional operational leadership staff that will provide the resource required for the provision of on scene coordination and any additional training.</p> <p><b>This also addresses concerns raised in the Transport Select Committee report.</b></p> <p>The Team Leader role is an operational one and designed to bridge the gap between the CSM and operational teams as well as providing the leadership and direction for these teams of community based officers.</p> <p>The technology required will be based on the eventual requirements for this task, best practice from other services involved in such work and, fully explored opportunities for joint working where applicable.</p>

## Resource and People

### Internal Review Team Finding 19

The responses suggested that the reduction in the number of RCCs and the lack of mobility amongst staff could potentially lead to a substantial loss of expertise and experience which *in extremis* could affect MCA's ability to fulfil its statutory SAR co-ordination role and maintain its Vessel Traffic Monitoring (VTM) capability.

### Internal Review Team Finding 20

The responses suggested that the staffing of MOCs and daytime RSCs could lead to an unacceptable two-tier Coastguard service in terms of grade, pay and operational exposure.

### Internal Review Team Finding 21

The responses suggested that the modelling of RCC activity to identify peak and non-peak periods did not appear to have included all non-SAR tasks and may not represent the true picture of RCC activity patterns.

### Internal Review Team Finding 22

The responses suggested that the proposals minimised the opportunities for career advancement as there would be fewer sites and fewer posts.

### Internal Review Team Finding 23

The responses suggested that many respondents raised questions concerning the 'unknowns' i.e. new terms and conditions of service; annualised hours and watch patterns; relocation package; redundancy terms.

As with the original proposal, all operational coastguards in all locations will be skilled to the same levels, and will have the opportunity to practice the full range of their skills.

**This also addresses concerns raised in the Transport Select Committee report.**

There will be no discrimination in terms of training or type of work between centres.

The levels of other activity including the provision of marine safety information, routine telephone and radio traffic as well as other operations were taken into consideration. This included questionnaires (designed in conjunction with the PCS) sent to a number of MRCCs selected by the PCS and supported by face to face interviews.

**This also addresses concerns raised in the Transport Select Committee report.**

The proposed reduction in the service is proportional across all disciplines and grades. The provision of 24 hour station at all locations increases the number of posts available at each location and the proposal also introduces additional opportunities within the Coastguard Rescue Service.

Terms and conditions cannot be included until the final future structure is agreed and negotiations have been discussed with Trade Unions.

<p><b>Technology</b></p> <p><b>Internal Review Team Finding 24</b></p> <p>The responses suggested that the updates and improvements to HM Coastguard's existing information technology, which would underpin the modernisation proposals, were untested and unproven in a live environment.</p> <p><b>Internal Review Team Finding 25</b></p> <p>The responses suggested that other Government and Regional Authority failures to deliver successful implementations of major system/technology improvements prompted questions concerning the MCA's ability to deliver the key improvements which were the corner stone of the proposed modernisation.</p>	<p>Retaining more centres and keeping them as a 24 hour operation will provide greater assurance that the transition to upgraded systems can be managed at a more measured pace, and provides more opportunities for robust and rigorous user testing.</p> <p>Retaining both Stornoway and Shetland will provide increased local assurances and confidence that services can be maintained to at least current levels.</p> <p>The MCA has successfully implemented successive technological improvements over the last 25 years. We would intend to maintain this record of achievement by proper project management. The proposal will make use of the latest versions of existing tried and tested technology.</p>
<p><b>The Programme</b></p> <p><b>Internal Review Team Finding 26</b></p> <p>The responses suggested that there was concern expressed that the extended period of consultation and the potential for more to come would impact on the delivery period. A number of respondents felt the time line was unrealistic in the base case.</p>	<p>Retaining more operational coastguards across a greater number of centres lessens the extent of change and so reduces the risks and challenges around transition to the new lay-down. The timelines have been extended to take account of extended consultation</p>

### 3. RISK

Key

1-3	6-9	
4-5	10-12	13-25

Existing Operating Model	Future Operating Model (2)
Current Risk	Residual Risk

Ref	Theme	Systemic Risks	Likelihood (out of 5)	Impact (out of 5)	Risk Score	Commentary on MCA risk mitigation	Risk mitigation provided by new measures	Likelihood (out of 5)	Impact (out of 5)	Risk Score
1	SAR Coord	Mission failure caused by delayed or incorrect response. Insufficient staff available.	3	4	12	Use of overtime; risk assessment of predicted demand to tolerate depleted watch levels; temporary transfer of staff; use of flanking/pairing arrangements where available; rationing of leave; cessation or reduction of off line training or other project work	Flexible rostering, Larger watch keeping panels in MOC gives managers more resilience to cope with major incident or civil emergency. Use of network to reassign work between teams assists with risks presented by unplanned staff absences at Sub-Centres, particularly at times of low forecast demand when baseline watch keeping level will not be light.	1	3	3
2	SAR Coord	Mission failure caused by delayed or incorrect response. Skills fade.	2	5	10	Continuing Professional Development routine; local training initiatives. Risk score varies with station and time of year, so quiet stations carry higher residual score, all stations carry higher residual score in Q4. Skills outside station typical demand impossible to reinforce.	Increased exposure to live incident working, ability to direct live work at individuals or teams, Ability to match workforce to projected demand. Options for shadowing across network.	1	5	5

Ref	Theme	Systemic Risks	Likelihood (out of 5)	Impact (out of 5)	Risk Score	Commentary on MCA risk mitigation	Risk mitigation provided by new measures	Likelihood (out of 5)	Impact (out of 5)	Risk Score
3	SAR Coord	Mission failure caused by delayed or incorrect response. Insufficient qualified staff available.	3	4	12	Effective staff management; best use of TC capacity, risk mitigation limited by staff mobility and ability to work effectively at different station .	National network allows for better management of training margin, releasing officers either as teams or as individuals for training. Deployment of more flexible training methods such as on site, off line training. Restructuring of professional development pathway to impart essential skills first, and assess progressively.	1	4	4
4	SAR Coord	Mission failure caused by delayed or incorrect response. Observance of procedures	3	4	12	Issuance of clarification to extensive rule set (derived risk - clarification matches rule set by volume). Professional seminars for CSM and RCCM. Input to training products by Standards Team.	Introduction of revised and restructured rule set, giving emphasis to first principles and professional judgement. Larger MOC teams and networked sites easier to supervise and assess. New rule set uses live feedback procedure to keep it current and aligned to emerging best practice.	2	4	8
5	SAR Coord	Non emergency, safety critical tasks not performed. Insufficient staff available.	3	3	9	No mitigation	Automation of MSI, use of intelligent call routing, greater resilience of larger MOC teams, greater use of DSC for routine traffic, ability to push work to teams experiencing lower demand, ability to reinforce teams under load by either adding team members or taking non essential tasks, or reducing the area of operation.	1	2	2

Ref	Theme	Systemic Risks	Likelihood (out of 5)	Impact (out of 5)	Risk Score	Commentary on MCA risk mitigation	Risk mitigation provided by new measures	Likelihood (out of 5)	Impact (out of 5)	Risk Score
6	SAR Coord	Mission failure caused by delayed or ineffective response. Local knowledge.	2	3	6	Local knowledge tests on station, set to local standard. Some attempt to standardise data sharing within Area, less success between Areas, No national standard gazetteer. Retention of 1979 District based concept of operations to conserve knowledge base.	Pre-determined operational postures expose operators to familiar areas. Local knowledge harvested, stored and shared in GIS based format. Critical mass of staff from existing MRCCs retained. Use of CRS to validate and improve knowledge base.	2	3	6
7	SAR Coord	Mission failure caused by delayed or incorrect response. Disruption to chain of command	3	4	12	On call rota relies on more than one means of alerting duty officers. No mitigation for lack of access to operational systems remotely. Chain of operational command not coincident with line management - untreatable.	All operational and tactical decisions made by officers on site at MOC 24/7. Unity of command for all three missions, Staff structure allows for coherent subsidiary and accountability.	nil	4	nil
8	SAR CRS	Mission failure caused by delayed or incorrect response. Observance of procedures. Coast Rescue.	3	5	15	Mitigation relies on continuous training and development of volunteers. Attendance by full-time officers at live incidents is not provided for other than on an ad hoc basis.	Future structure enhances the number of sector managers available for training and supervision. Provides an additional level of supervisory management and provides on call 24 / 7 operational availability	1.5	5	7.5
9	SAR CRS	Mission failure caused by delayed or incorrect response. Insufficient staff available. Coast Rescue	2	5	10	Use of volunteers has inherent risk of non availability - however support from flank stations - in most cases - is available with increase in the overall response time.	Use of volunteers has inherent risk of non availability - however support from flank stations - in most cases - is available with increase in the overall response time. Professional officer available 24/7	1.5	5	7.5
10	SAR CRS	Mission failure caused by delayed or incorrect response.	3	5	15	Regular supervised training is dependent on all Sector Manager posts being filled. Cover during vacancies, leave of period of sickness is not consistent.	Future structure enhances the number of sector managers available for training and supervision. Provides a an additional	1	5	5

Ref	Theme	Systemic Risks	Likelihood (out of 5)	Impact (out of 5)	Risk Score	Commentary on MCA risk mitigation	Risk mitigation provided by new measures	Likelihood (out of 5)	Impact (out of 5)	Risk Score
		Skills fade. Coast Rescue					level of supervisory management and provides on call 24 / 7 operational availability			
11	SAR CRS	Mission failure caused by delayed or incorrect response. Insufficient qualified staff available. Coast Rescue	3	5	15	Not able to maintain skill levels in all teams due to varying levels in ratio of sector manager to volunteers.	Future structure enhances the number of sector managers available for training and supervision. Provides a an additional level of supervisory management	1.5	5	7.5
12	SAR CRS	Mission failure caused by delayed or ineffective response. Local knowledge. Coast Rescue	2	4	8	Local knowledge tests for CROs. LK patrols carried out several times a year by each CRT.	Local knowledge tests for CROs. LK patrols carried out several times a year by each CRT.	2	4	8
13	SAR CRS	Mission failure caused by delayed or ineffective response. Partnership working	2	3	6	Attendance at LRF, RRF (although records show attendance is uneven by area and by inappropriate officers), joint exercises (subject to local initiatives)	LRF.RRF engagement more consistent via strategic management board of CSMs , removal of RCCM from resilience machinery, increased presence at complex incidents.	1	3	3
14	SAR CRS	Mission failure caused by delayed or incorrect response. Disruption to chain of command. Coast Rescue	4	4	16	Vacant sectors managed on an ad hoc basis by flank sector managers or by untrained watch staff on secondment.	The provision of additional sector managers and the introduction of a new supervisory grade coupled with team working concept will ensure that sectors will have properly trained and effective supervision	1.5	4	6

Ref	Theme	Systemic Risks	Likelihood (out of 5)	Impact (out of 5)	Risk Score	Commentary on MCA risk mitigation	Risk mitigation provided by new measures	Likelihood (out of 5)	Impact (out of 5)	Risk Score
15	VTM	Mission failure caused by inadequate monitoring or a delayed or missed intervention. Insufficient staff.	2	3	6	Use of overtime; risk assessment of predicted demand to tolerate depleted watch levels; rationing of leave; cessation or reduction of off line training or other project work. Activity only formally carried out at Dover and Aberdeen, so no other people resilience measures available.	Greater staff resilience at MOC, larger watch levels. Ability of Dover to load shed non VTM work back to MOC. Broadening of skills profile allowing more staff to discharge VTM function. Possibility of track table export from Dover to offer limited resilience to CNIS.	1.5	4	6
16	VTM	Mission failure caused by inadequate monitoring or a delayed or missed intervention. Skills fade	1.5	3	4.5	Rotation of staff across tasks, requirement to re-qualify every 5 years, VTM demand constant, no link to seasonal or diurnal demand.	Rotation of a greater critical mass of staff across tasks, requirement to re-qualify every 5 years, VTM demand constant, no link to seasonal or diurnal demand. Greater critical mass of staff	1	4	4
17	VTM	Mission failure caused by inadequate monitoring or a delayed or missed intervention. Insufficient qualified personnel	2	3	6	Use of PDP system to put staff through course, VTM task does not occupy all staff on watch so some resilience during period of duty.	VTM training embedded in professional development, development of in house V103 training at Dover.	1.5	4	6
18	VTM	Mission failure caused by inadequate monitoring or a delayed or missed intervention. Observance of procedures	2	3	6	Local desk instructions, CNIS Manager on site, use of V103 qualification. Localised work instructions in place at Aberdeen, presence of CERS manager on site. No issued procedures for VTM using passive sensors..	Published procedures, competence standards, better supervision of MOC and SC staff	1.5	4	6
19	CP	Mission failure caused by delayed or ineffective response.	3.5	5	15	Redeployment of staff from SOSREP team, extended periods of on call duty, no further mitigation.	Information gathering, assessment and alerting functions taken from CPSOs into MOC, so constantly available.	1	5	5

Ref	Theme	Systemic Risks	Likelihood (out of 5)	Impact (out of 5)	Risk Score	Commentary on MCA risk mitigation	Risk mitigation provided by new measures	Likelihood (out of 5)	Impact (out of 5)	Risk Score
		Insufficient staff.					Some cross training available between CPSO as field officer and Sector Team leaders.			
	ICT	Major Network Incidents	See risk descriptions and comparisons contained in the document "Consultation on proposals for modernising the Coastguard 2011 : Supporting Brief - Coastguard Technology Refresh V2"							
	ICT	Network Incidents								
	ICT	Major Technical Failures								
	ICT	Technical Failure								

- SAR Coord Search and Rescue Co-ordination
- SAR CRS Search and Rescue Coastguard Rescue Service
- VTM Vessel Traffic Monitoring
- CP Counter Pollution Information and Communications
- ICT Technology

#### 4. Impact Assessment

Impact of proposals on the re-creational maritime user community, beach users , coast walkers					
Affects/Impacts	Close MRCC	Create new MOC	Convert MRCC to sub-Centre	Convert MRCC into a MOC	Improving in CRS Management
Our ability to receive and respond to distress urgency and safety messages is unaffected.	Applies	Applies	Applies	Applies	N/A
All distress calls made by radio will be received as now through the existing radio communications network and will be dealt with as now by teams of Coastguard Officers using existing technology and professional practice.	Applies	Applies	Applies	Applies	N/A
Our ability to receive and respond to distress urgency and safety messages is unaffected. All 999 calls directed to HM Coastguard will be received as now through the same telephone networks and will be dealt with as now by teams of Coastguard Officers using existing technology and professional practice. These teams will be based either at the MOC or the appropriate sub Centre. The MOC will control work distribution and delegation of functions around the national network, this will include all 999 calls.	Applies	Applies	Applies	Applies	N/A
The MOC will control work distribution and delegation of functions around the national network, this will include all maritime distress calls. Work will be delegated to sub-Centres (but not necessarily the same operating areas as the sub Centre's previous MRCC area).	N/A	Applies	N/A	Applies	N/A
Front line rescue assets such as volunteer CRS teams, helicopters and lifeboats are unaffected by these proposals and will respond as normal when tasked by the MOC or sub-Centre.	Applies	Applies	Applies	Applies	Applies
Volunteer CRS teams will benefit of improved professional leadership and teams will continue to deal with incidents in a geographical area with which they are familiar.	N/A	N/A	N/A	N/A	Applies
Volunteer CRS teams will enjoy a greater level of operational leadership from more flexible and multi - skilled teams of professional officers. These professional teams will also be able to offer support around the clock at complex or protracted incidents.	N/A	N/A	N/A	N/A	Applies
Volunteer CRS teams will manage resilience work formally through the LRF network with partner organisations, and more informally by strengthening ties between coastal users and organisations such as ports and harbours, clubs, marinas, volunteer rescue organisations and interested parties without increasing the burden on volunteers.	N/A	N/A	N/A	N/A	Applies

<b>Impact of proposals on large and small commercial shipping and response to the threat of maritime pollution</b>					
<b>Affects/Impacts</b>	<b>Close MRCC</b>	<b>Create new MOC</b>	<b>Convert MRCC to sub-Centre</b>	<b>Convert MRCC into a MOC</b>	<b>Improving in CRS Management</b>
Our ability to receive and respond to distress urgency and safety messages is unaffected.	Applies	Applies	Applies	Applies	N/A
All distress calls made by radio will be received as now through the existing radio communications network and will be dealt with as now by teams of Coastguard Officers using existing technology and professional practice.	Applies	Applies	Applies	Applies	N/A
Our ability to receive and respond to distress urgency and safety messages is unaffected. All 999 calls directed to HM Coastguard will be received as now through the same telephone networks and will be dealt with as now by teams of Coastguard Officers using existing technology and professional practice. These teams will be based either at the MOC or the appropriate sub Centre. The MOC will control work distribution and delegation of functions around the national network, this will include all 999 calls.	Applies	Applies	Applies	Applies	N/A
The MOC will control work distribution and delegation of functions around the national network, this will include all maritime distress calls. Work will be delegated to sub-Centres (but not necessarily the same operating areas as the sub Centre's previous MRCC area).	N/A	Applies	N/A	Applies	N/A
Improved ship tracking and risk assessment will shorten response times to incidents involving collision, grounding or breakdown.	Applies	Applies	Applies	Applies	N/A
Constantly available senior commanders will assume control of complex pollution incidents as they arise, as they are constantly on duty at the MOC.	N/A	Applies	N/A	Applies	N/A
The Counter Pollution and Salvage Officer will be embedded into the new volunteer CRS management structure.	N/A	N/A	N/A	N/A	Applies
Front line rescue assets such as volunteer CRS teams, helicopters and lifeboats are unaffected by these proposals and will respond as normal when tasked by the MOC or sub-Centre.	Applies	Applies	Applies	Applies	Applies
Volunteer CRS teams will benefit of improved professional leadership and teams will continue to deal with incidents in a geographical area with which they are familiar.	N/A	N/A	N/A	N/A	Applies
Volunteer CRS teams will enjoy a greater level of operational leadership from more flexible and multi skilled teams of professional officers. These professional teams will also be able to offer support around the clock at complex or protracted incidents.	N/A	N/A	N/A	N/A	Applies
Volunteer CRS teams will manage resilience work formally through the LRF network with partner organisations, and more informally by strengthening ties between coastal users and organisations such as ports and harbours, clubs, marinas, volunteer rescue organisations and interested parties without increasing the burden on volunteers.	N/A	N/A	N/A	N/A	Applies

<b>Impact of proposals on provision of safety information</b>					
<b>Affects/Impacts</b>	<b>Close MRCC</b>	<b>Create new MOC</b>	<b>Convert MRCC to sub-Centre</b>	<b>Convert MRCC into a MOC</b>	<b>Improving in CRS Management</b>
Automation of transmission of weather information, the centralisation of NAVTEX and SAFETYNET broadcasts into the MOC, and smart telephone call handling will make MSI constantly available to mariners and coastal users. Routine transmissions can continue in the face of casualty working in a way that does not happen at the moment.	Applies	Applies	Applies	Applies	N/A
The new and reinforced CRS management structure will provide greater capacity for targeted safety interventions with coastal organisations and training and educational establishments (in partnership with other safety organisations as appropriate).	N/A	N/A	N/A	N/A	Applies

<b>Impact of proposals on the International Convention on Maritime Search and Rescue 1979 and Aeronautical and Maritime Search and Rescue (IAMSAR) manual</b>					
<b>Affects/Impacts</b>	<b>Close MRCC</b>	<b>Create new MOC</b>	<b>Convert MRCC to sub-Centre</b>	<b>Convert MRCC into a MOC</b>	<b>Improving in CRS Management</b>
No impact, these proposals are compatible with the International Convention on Maritime Search and Rescue 1979. This convention requires that the UK “establish rescue coordination centres for their search and rescue services and such sub-centres as they consider appropriate.” The convention further states “Each rescue co-ordination centre and rescue sub-centre... Shall arrange for the receipt of distress alerts originating from within its search and rescue region. Every such centre shall also arrange for communications with persons in distress, with search and rescue facilities and with other rescue co-ordination centres or rescue sub-centres.”	Applies	Applies	Applies	Applies	Applies
No impact, as outlined in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual published by the International Maritime Organisation: “Every SRR has unique transportation, climate, topography and physical characteristics. These factors create a different set of problems for SAR operation in each SRR. Such factors influence the choice and composition of the services, facilities, equipment and staffing required by each SAR service.”	Applies	Applies	Applies	Applies	Applies

<b>Impact of proposals on interface between MRCC/MRSC and CRS; with third party SAR providers and with foreign administrations.</b>					
<b>Affects/Impacts</b>	<b>Close MRCC</b>	<b>Create new MOC</b>	<b>Convert MRCC to sub-Centre</b>	<b>Convert MRCC into a MOC</b>	<b>Improving in CRS Management</b>
Operationally, the relationship between the MOC and sub Centre and the CRS will continue, as the MOC and sub Centres will continue to call out the CRS and regard it as a Declared Facility.	Applies	Applies	Applies	Applies	Applies
Managerially the CRS will assume it's own identity within HM Coastguard, and service provision as a declared facility will be established in a Service Level Agreement between National Incident Commanders based at MOC(S) and the CRS Oversight Group.	Applies	Applies	Applies	Applies	Applies
Operationally, the relationship between external assets declared for SAR and the MOC and sub Centres remains unchanged. Day to day liaison and relationship management with these organisations will be a responsibility of the CRS and form a part of the SLA between the CRS and the national network.	Applies	Applies	Applies	Applies	Applies
Operational liaison, currently carried out from a number of MRCCs will be harmonised at the MOC with the organisational liaison carried out at HQ. This will improve the consistency of message that we give to our overseas partners, and allow them to better understand our organisation looking in.	Applies	Applies	Applies	Applies	Applies
<b>Affects/Impact on MCA corporate targets</b>					
No impact - the output deliverables will stay the same, the change will be in 'how' we deliver them.	Applies	Applies	Applies	Applies	Applies

## 5. Local Knowledge: Mitigating the Risk

### Current Process

When the current MRCC structure was established in the late 1970s it resulted in a dramatic reduction in the number of stations around the UK.

With individual stations therefore required to cover larger geographic areas, there were two perceived risks:

- Failure by Coastguard officers to acquire knowledge of their area of responsibility
- Failure by Coastguard officers to remain current in knowledge of their area

With this in mind, work was carried out to ensure that Coastguard officers developed sufficient individual knowledge to have rapid access to:

- How to operate station-specific equipment
- Search and Rescue units within their own and flanking areas
- The local Coastguard Rescue organisation
- Other local emergency organisations and authorities
- Main geographical features and dangers to navigation (including knowing where to find additional information)
- Specific dangers and potential incidents
- Shipping routes and schedules, and the nature and local distribution of other waterborne activities
- Other local assets and sources of information
- Major Incident Plans pertaining to the area
- Local counter-pollution procedures
- Radio coverage
- Charts and publications available
- Emergency towing or salvage facilities and arrangements
- Controlled airspace

### Current Risk Mitigation

The principal mitigation measure was (and remains) a combination of local instruction, self-study and area familiarisation, regularly tested by a 2-yearly local knowledge examination for which national guidelines exist.

The standard template for these examinations is a 17 question paper with a pass mark of 80%. The examinations are set and administered by each MRCC, with format and content based on local specific factors. These guidelines were last reviewed in 2006.

This approach has been effective, but carries the risk that decisions could be made on the basis of retained knowledge (what a Coastguard officer **believes** is true) instead of factual knowledge derived from informed investigation and interrogation of information systems (what they **know** to be true).

With the increasing complexity of the Coastguard mission, this risk needs to be actively mitigated. For example, it would be unrealistic to expect every individual Coastguard

officer in, say, Aberdeen, to retain accurately in memory every detail of the ever-increasing and changing laydown of offshore installations and pipelines in their area of responsibility.

## **Future Coastguard**

The breadth and complexity of the Coastguard task is increasing as the 21<sup>st</sup> century progresses. Officers are expected to handle ever greater quantities of data and information with speed and certainty. At the same time, modern technology and systems offer new methods for acquiring, assessing, storing, retrieving and sharing data and knowledge to supplement the capacity of individual intellect and memory, and 'retained knowledge'. Examples of such technologies are:

- location-specific data linked to the source of an alert message (for example via telephone, radio or beacon ), linked to:
- Map, charting and geographical information systems that include overlays showing assets, resources and geographical/topographical data, linked to:
- databases storing contact details of, for example, local resources and sources of more detailed local information..

Using such aids in a controlled and systematic way will enable Coastguard officers to extend the scope of their existing skills and geographical sector awareness to derive a comprehensive, accurate and dependable understanding of :

- all the relevant systems applicable to their area of work
- how to access them quickly and correctly
- how to interrogate them for highly detailed knowledge, including multiple place names (Welsh/Gaelic, local and phonetic)

Building on information and knowledge already held within the Coastguard service, the intent is to enhance both generic and specific training in the use of knowledge support systems, whilst standardising procedures for information gathering, storage and retrieval. The desired outcome is a Coastguard service in which local knowledge is nationally configured, accessible to officers with far less dependence on individually retained knowledge, and applied to consistent and measurable professional standards.

## 6. Skill Fade

There has been considerable research on the subject of skill fade. Simply put, 'skill fade' describes the decay of ability over time to perform functions. Effective training based on a sound competence management system can ensure satisfactory levels of knowledge and skills on completion of training and any associated qualification.

However, these levels are not always maintained in the workplace, and one of the key factors contributing to this deterioration of competence is the frequency with which a task is performed and the range of knowledge that has to be accessed to successfully complete the task.

Considerable Human Factors studies and research has been conducted on this subject, for example: US Navy (NAVEDTRA 1975), Wisher (1992), Arthur et al (1998), Healy et al (1998), Summers et al (1998), Human Factors Integration Defence Technology Centre (UK HFI 2007).

This work has shown that not only is frequency a factor but also:

- that differing skills deteriorate at dissimilar rates, for example, motor or physical skills are less prone to decay than cognitive skills;
- task complexity: the higher the complexity, the higher the rate of fade;
- tasks requiring the recall of bodies of knowledge: a higher rate of fade

Most Coastguard coordination work requires cognitive skills, is complex, and needs staff to recall bodies of knowledge.

The current UK Coastguard structure has led to a situation where Coastguard officers can potentially have protracted periods with low exposure to incident working. Additionally, incident types tend to have a degree of geographical clustering. Thus in one location an officer may have infrequent but regular exposure to certain types of incident but very rare opportunities to deal with other categories of incident. This tends to produce pockets of expertise but little standardisation of competence levels, with the risk of that knowledge and/or skills will fade over time, albeit at varying rates according to locality.

Our method for training and developing HM Coastguard officers in search and rescue is very well established, and effective. However, without regular exposure to live incidents these skills fade at the individual level and the opportunity for the service to learn from experience is diminished. In addition, the bodies of knowledge that underpin this initial training are continuously being updated in response to the changing operational world of the Coastguard.

### **Workload Transition**

Research and analysis by the Human Factors Division of the US Coast Guard has shown that the transition from long periods of low activity to infrequent, high intensity working is stressful and shown not to produce optimum performance. The 'shock loading' this brings is intensified when the activity is unfamiliar or infrequently practiced.

Combined with skill fade as described above, workload transition increases the risk of sub-optimal performance and potential failure where there is a low frequency of exposure to live incident working in Maritime Rescue Coordination Centres.

## 7. IT Technical Brief

### Executive Summary

The original version of this brief was published as part of the supporting documentation made available during the first stage of the 'Consultation on Proposals for Modernising the Coastguard 2010'; It detailed the high level technical design of the proposed systems architecture.

This revision outlines the amended technical design, altered only slightly in terms of increased sub-centre network link resilience to support the increase in the hours of operation of the sub-centres as a result of the consultation process; the increase in number of sub-centres has not affected the fundamental design.

As previously, whilst supporting the future concept of Coastguard operations through enhanced operational connectivity, resilience and redundancy by a combination of core infrastructure consolidation, virtualisation and duplicated connections, it will effectively be independent of the organisational structure and will utilise the existing technologies currently employed within current operations rooms.

The reduction in total geographical footprint and total number of core system components outlined in this brief is part of the wider consolidation of data centres as outlined in the HMG ICT Strategy<sup>1</sup>. However, in addition to this consolidation this design allows MCA to look at the potential for improvement in the quality of service support given; things that we will look to introduce include:

- provision of increased proactive technical on-site engineering resource at the data centre and disaster recovery sites, and;
- the creation of an ICT 'Operations Bridge', as per the ITIL® IT Service Management definition to improve proactive service support and increase operational service availability.

The MCA will look at opportunities to update current systems to the latest versions during the reconfiguration works to ensure continued technical support. As well as ensuring technical continuity it will also reduce the requirement for significant system operator training, and reduce the impact of transition.

Due to the remote nature of some of the MCA radio infrastructure it is acknowledged that there will always be an impact due to severe weather conditions or local failures at or around a remote radio site and our resilience planning will continue to require manning of these sites during extensive outages. Even though the MCA has successfully run in this configuration for the past 10 years, the MCA intend to use the opportunity of the re-configuration of the radio network to "dual-connect" individual resources from essential remote radio sites to both data centres which means a core VHF radio footprint would be available in the event of a single data centre failure, thus improving the resilience of the radio network. The data centres are planned to be co-located with the proposed MOCs.

---

<sup>1</sup> <http://www.cabinetoffice.gov.uk/resource-library/uk-government-ict-strategy-resources>

## Links to Independent Report Findings

An independent report has been published by the Independent Review of MCA specialists, led by Non-Executive Director Bob Banham. An overview of responses to the findings deemed pertinent to the technical solution is given here:

IRT Report Theme	Finding		Technical Response
Local Knowledge	1	That the overriding concern in the responses to the consultation was that the proposed reduction in RCCs will lead to loss of local knowledge, local intelligence, give rise to potential difficulties with local language and dialect and lead to delayed response and potential loss of life.	<p>With the increase in the number of 24/7 MRsCs in support of local knowledge concerns as proposed in the new consultation document, a national information system will be provided to further enhance their ability to capture, store and recall the variety of place names, colloquialisms and local anomalies throughout the UK.</p> <p>While these findings are not specifically linked to technical issues, the proposed technology gives support to the effective, secure and timely reporting and exchange of information. As outlined above.</p>
	4	Many of the concerns relating to local knowledge emanated from, or were related to, the small craft user and recreational community who felt they had not been adequately considered in the proposal.	
Concept of Operations	9	The consultation proposals lacked detail of the MOC role, concept of operation and its relationship with the daytime RSCs. The lack of information concerning the protocols, processes and procedures to be used in support of such a concept were also noted by respondents.	<p>While these findings are not specifically linked to technical issues, it is perhaps worthwhile to outline the support that the technology will give to effective and secure information exchange.</p> <p>Currently Coastguards act on information passed to them which is subsequently stored within a local information system which has limited access for other operators outside of the current station pairing structure.</p> <p>In the new technical design the national nature of those information systems means that any Coastguard can receive and enter the information, making it immediately available to all Coastguards in the national network. There is therefore a reduction in the need for the “re-keying” of information</p>

IRT Report Theme	Finding		Technical Response
	10	The respondents saw no evidence of robust testing or field trials to prove the MOC and daytime RSC concept of operations nor of the technological solution that will facilitate this concept and the wider modernisation.	when passed from one station to another, thus reducing the risk of error as well as improving the speed of information exchange between stations.
	11	The handover of incidents from daytime RSC to MOC and vice versa was perceived to be high risk for delivering emergency response which could be mitigated by providing 24 hour cover at the retained centres.	The single network approach for information systems such as Command & Control (Vision), Geographical Information System (C-Scope) and Search Planning System (SARiS) will ensure that all operators have access to all information whenever they need it.
	14	Respondents indicated that the proposals assume an unrealistic level of technology in terms of communications and navigational aids within the small boat and recreational community.	<p>In respect of the level of technology testing, the current technical implementation for Aberdeen and Forth shows the capability for the current ICCS system to work with remote operators. The lessons learned from the impact of failure of the telecommunications link between these two sites have been taken into consideration in the use of VoIP connections between MRSCs and data centres.</p> <p>The remote radio infrastructure around the coast will be the same as it is now and as such from a technical perspective will offer the same capability to the user communities mentioned.</p>
The Coastguard Rescue Service	18	That a considerable investment in technology will be required to achieve the proposed improvements in the management of, and support to, the CRS, and for the data transfer requirements needed to ensure effective on-scene co-ordination.	It is recognised that there will be some level of investment in technology to deal specifically with CRS operations. Provision has been made for this and will be addressed during the overall enhancement of the leadership of the CRS and in response to detailed operational requirements as they are developed.

IRT Report Theme	Finding		Technical Response
Technology	24	That the updates and improvements to HM Coastguard's existing information technology, which would underpin the modernisation proposals, were untested and unproven in a live environment.	<p>While it is true that the versions that we <b>may</b> upgrade to are unproven within HM Coastguard, they are available as 'commercial off the shelf' offerings and are in use by other international and domestic emergency response customers of these suppliers.</p> <p>As with finding No.10 above, both within the MCA, at Aberdeen and Forth, the MCA have operated with this technology in the proposed configuration for a number of years. It has also been deployed in a number of emergency services in this configuration utilising the same technology as proposed.</p>
	25	That other Government and Regional Authority failures to deliver successful implementations of major system/technology improvements prompted questions concerning the MCA's ability to deliver the key improvements which were the corner stone of the proposed modernisation.	<p>The MCA has a proud history of HM Coastguard business change projects enabled by technology, most notably the Integrated Coastguard Communications System implemented from 1999, the Channel Navigation Information System implemented from 2002 and the Automatic Identification System implemented from 2005.</p> <p>The technological changes outlined in this document would, as in previous projects, be undertaken by experienced MCA operational and technical staff utilising relevant third parties where necessary, but managed as a programme of works in house. In this way, risks of transition from project to live operation are minimised as the knowledge and experiences of issues built up during project phases are understood and retained 'in-house' post project completion. They will also be subject to HM Government governance requirements laid out by the Major Projects Authority and HM Treasury.</p>

## Current Technology

The current technical solution is based on a 'fortress' resilience design, essentially meaning that if and when external networked communications fail, a MRCC is still able to operate with a limited functionality.

The high level design is shown in the diagram below.

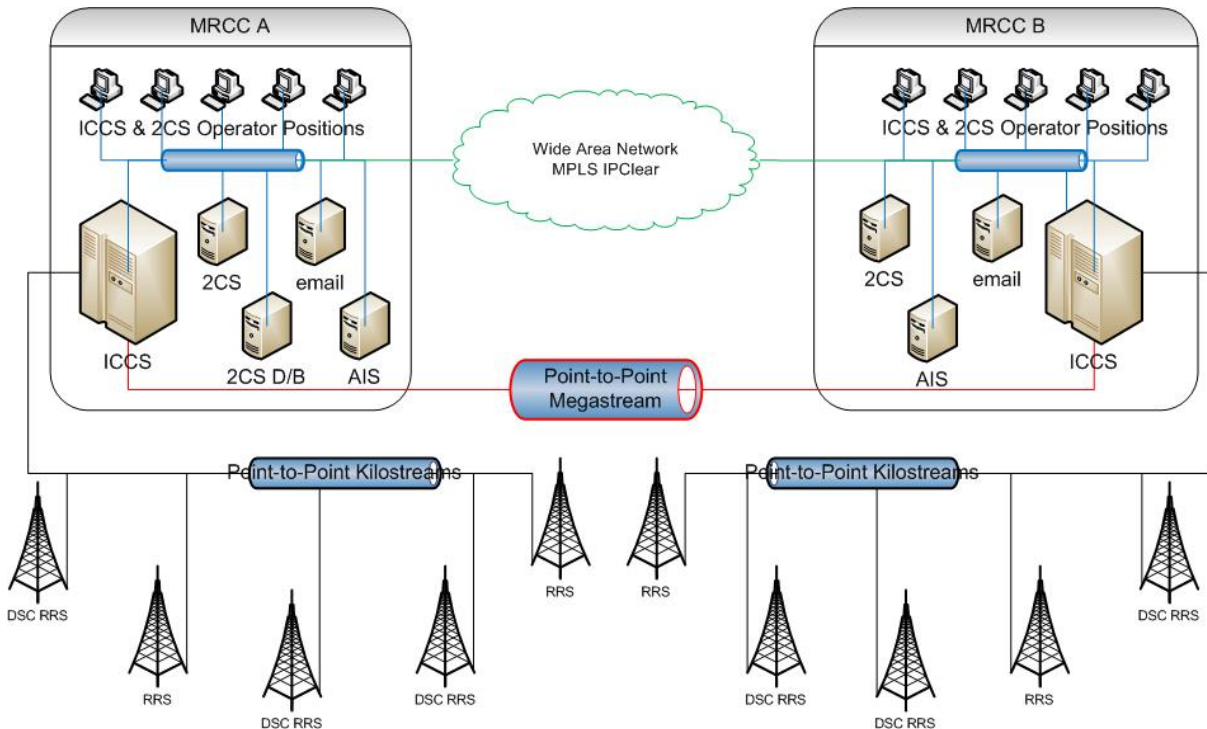


Figure 1: Existing Technical Design

### Radio Sites and ICSS

Each hilltop remote radio site is connected back into a single communications switch (ICCS)<sup>2</sup> at the controlling MRCC via one or more point-to-point KiloStream (the exact number of Kilostreams depends on the number of radio resources on each hilltop).

Each ICSS is linked to the paired MRCC's ICSS via a point-to-point connection (Megastream) allowing the paired MRCC to utilise the remote radio site resources of the opposite MRCC as long as the 'remote' ICSS is functioning.

### Command and Control System (2CS)

Each MRCC has a Command and Control application server on which a database holds details of current open incidents, resource status & local knowledge records, and to which each operator position connects. Additionally at one MRCC of the pair, there is a master database server that maintains a database of both open and closed incident data for the

<sup>2</sup> There are 10 RRS which are physically connected to two separate MRCC for current operational reasons. The need for this will be negated in a national MOC configuration as each operator will be able to connect to any hilltop resource without the fixed operational boundaries of the current MRCC setup.

pair. This master 'Area' database is then synchronised with a web server at HQ that allows view-only access to incident data via an intranet based system to view operational system information.

The paired servers exchange information with each other across the wide area network (WAN), a network which allows for 'self-healing' of data communication routes fail between the two fixed MRCC end points.

### **Automatic Identification System (AIS)**

AIS base stations located at remote radio sites connect into servers at their controlling MRCC via IP-enabled Kilostreams, effectively making a point-to-point connection. AIS data is sent in to servers at each MRCC where duplicate vessel receipts are removed before being passed on to a central server based at HQ which serves additional users via the web client.

### **Search and Rescue Planning system (SARIS)**

Each MRCC has a number of networked terminals that are able to create and save search plans for use within an MRCC. These plans are saved to a network drive available within the MRCC which is not accessible from their paired location.

### **GMDSS (DSC and Navtex)**

DSC sites are currently connected to the controlling MRCCs using an IP data stream over a point-to-point Kilostream connection. DSC is operated within the existing setup as a national service and configured to allow local MRCC operators to only see the DSC base stations that they are responsible for.

The current national operational infrastructure for Navtex has 2 x servers which allow users anywhere on the network to operate the Navtex system. Currently the user software is installed on operator terminals at two MRCCs only.

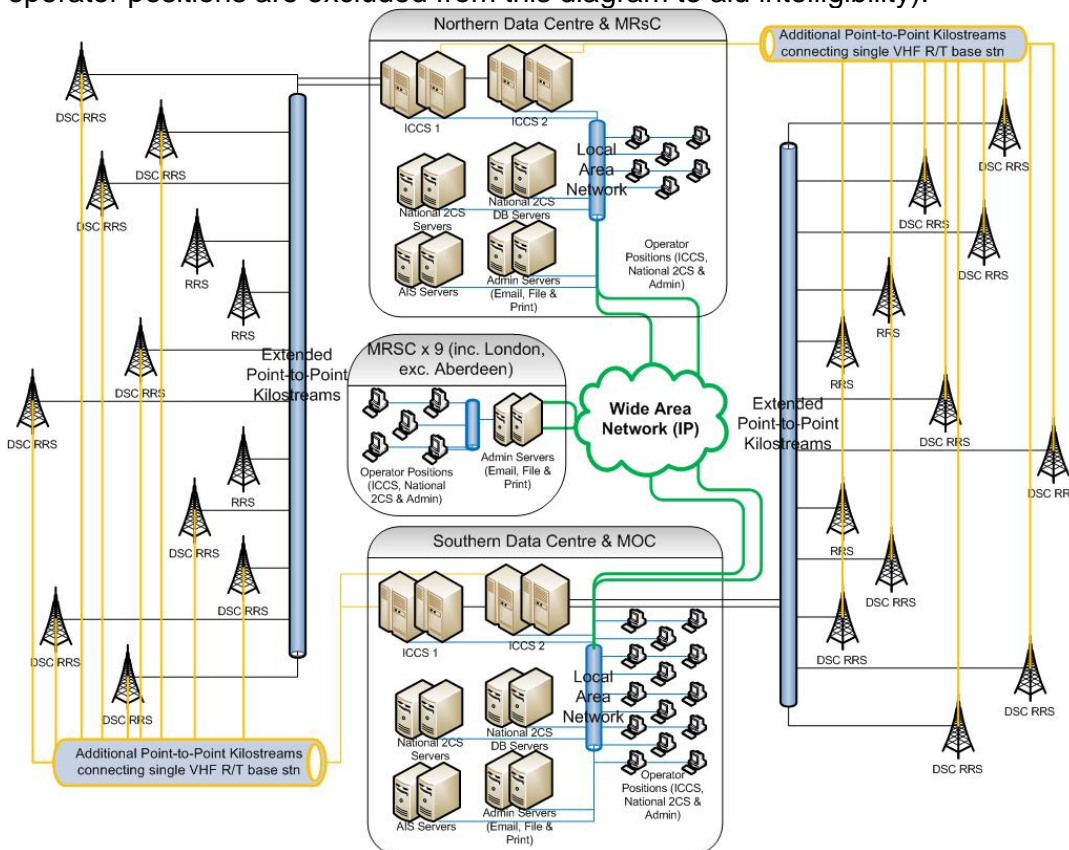
## Proposed Technology

The proposed technical architecture introduces a ‘hub and spoke’ resilience design, which means that if and when external networked communications to a sub-centre fails, operational capability for that area(s) of work that sub-centre were responsible can be picked up from anywhere else in the network. In addition to this, in the (highly unlikely) event of a data centre technical failure, a core radio coverage footprint is maintained by use of equipment available at the opposite main data centre.

The proposed technology solution seeks to meet the high level aims of data centre consolidation<sup>3</sup> as outlined in the HMG ICT Strategy. Additionally, while the introduction of network infrastructure diversity to enhance resilience to each sub-centre means new connectivity to each MRsC, the removal of core processing equipment from these sites (except Aberdeen and Dover) means that there is a reduced need for short response times and priority SLAs at these sites. At the same time we will be able to improve on existing response times and resilience at the data centres by providing on-site technical support and introducing an Operations Bridge at the National MOC to monitor system health and overall service availability live.

Desirable elements of ‘fortress’ are retained by locating the main body of operational staff in the same building locations as the data centres, but the connection of essential services (AIS, DSC and at least single channel VHF R/T for all DSC fitted hilltops) means the likelihood of total failure of multiple services across multiple operational coastal areas is significantly reduced<sup>4</sup>.

The high level design is shown in figure 2 (n.b. disaster recovery site and stand-by MOC operator positions are excluded from this diagram to aid intelligibility).



<sup>3</sup> <http://www.cabinetoffice.gov.uk/resource-library/data-centre-consolidation>

<sup>4</sup> See ‘Risk Assessment Tables’ in section 4 of this document.

**Figure 2: Proposed Technical Design**

## **Radio Sites and ICCS**

As before, it is not proposed to alter or reduce numbers or locations of VHF, MF or DSC fitted remote radio sites.

Each hilltop remote radio site is connected back into communication switches (ICCS)<sup>5</sup> at the closest geographical data centre, split on a line between the Mersey and Humber estuaries. These connections are via one or more point-to-point KiloStreams, the exact number of which will, as now, depend on the number of radio resources on each hilltop. Each ICCS switch will be replicated locally (for both resilience and redundancy), and more detailed technical discussions with key suppliers will indicate how many core services will be able to be replicated off-site at the disaster recovery facility<sup>6</sup>.

It is also proposed to run connections for a single VHF radio base station from each hilltop fitted with VHF DSC to each data centre as independently as is possible given diverse routing limitations within the national telecommunications infrastructure. This will mean that failures affecting the Kilostreams into the data centres themselves (A end) will not mean a complete outage of VHF radio communications from the remote radio sites connected to it; while this will reduce the need for hilltop manning, it is unlikely to prevent the need to man individual hilltops owing to failure of main exchange equipment or cabling at the remote (B) end.

In respect of the ICCS systems, it is proposed that two levels of redundancy will be installed: firstly the ICCSs own inherent redundancy with two operational sides, and secondly to replicate this on site with a second full two-sided ICCS that can take over in the event of a failure of the first. It is intended that these systems will not operate in a permanent “parent-child” arrangement, but that each will be expected and made to operate as the “parent” for periods of time, in proactive service management activity undertaken by on-site technical resource.

## **Command and Control System (2CS)**

The proposed 2CS configuration will see a single national system, allowing each operator within the MCA operational network to see all incidents, resources, messages and information. Operators will be able to filter, through configuration, to only make pertinent information on the operational geographical area of interest available to an operator. This will be configurable through login profile and selection of operational areas as workload and available resource dictate.

The command and control system will have a single UK national database configured for both high availability and redundancy, with offsite backups available for Disaster Recovery in extended outages.

## **Automatic Identification System (AIS)**

---

<sup>5</sup> The need for the 10 RRS which are physically connected to two separate MRCC is negated in this national MOC configuration as each operator can connect to any hilltop resource.

<sup>6</sup> Such a disaster recovery facility would allow the recovery of one or more operational ICCS systems at the DR site, but it is expected that this would require an extended period of time (~48 hours) to run this system up to be fully operational.

AIS base stations located at remote radio sites connect into servers via a point-to-point WAN connection from the hilltop to the nearest WAN 'point of presence' (PoP) at a telecommunications exchange. Transfer of data onward to the central server equipment from the PoP would be over the MPLS WAN, a self-healing, multi-path telecommunications network currently used by MCA for provision of the core Wide Area Network. This means that data packets will be able to arrive into either data centre.

AIS data will be sent via the WAN into national server(s) located at both data centres. At any one time, one of these data centre servers' will be acting as primary and will handling requests from and serve AIS target data to operator display terminals around the operational network, both data centres and sub-centres.

Duplicates will be removed at a UK national level.

Database(s) used to provide this national functionality will be configured for both high availability and redundancy, with offsite backups available for Disaster Recovery in extended outages.

## **SARIS**

Each data centre will have SARiS processing capability available to each operator within the network, and will store resulting Search Plans in a shared network space that will allow the display of search plans on the AIS operator display terminals across all stations.

## **GMDSS (DSC and Navtex)**

DSC sites are currently connected into the operational network and onward to the servers located at the data centres using an IP link to the nearest point of presence (PoP), and then into the wide area network. DSC will be operated as a national service and configured to allow operators to see only the DSC base stations that they are responsible for. DSC Distress alerts will continue to open an incident and locate it, as well as relocating the chart on the operator AIS display.

The current national operational infrastructure for Navtex has 2 x servers which allow users anywhere on the network to operate the Navtex system. Currently the user software is installed on operator terminals at two MRCCs only.

## **Maritime Rescue sub Centres (MRSC)**

A change from the previous proposal is the operation of MRSCs on a 24x7 basis, and to that end resilience has been introduced for the wide area network links to the core data-centre equipment. By providing dual network links, risk of failure is reduced; however impact of failure of both links will still be the same. Without the WAN link the MRSCs will have no ICCS functions, no live 2CS capability nor any VTM picture.

## Current Risks and Resilience

Event	Outcome Lost Services	Outcome Maintained Services	Outcome Mitigation Response	Likelihood x Impact = (each out of 5)		Risk
<b>Major Network Incident:</b> Failure of WAN link to MRCC	Failed connection to flank MRCC 2CS server, loss of national AIS picture, Loss of email and GD92 comms, loss of intranet (MNet) and internet (www) access	999 and other telephony services, VHF and MF Radio services to all aerial sites, DSC and AIS for locally connected sites ('technical district')	Flank station take control of the whole operational Area.  MRCC can no longer 'close' incidents in 2CS, ICT activity required to reconnect databases following restoration of link	2	4	8
<b>Major Network Incident:</b> Failure of multiple Kilostreams – single A-end (MRCC)	All VHF Radio services (VHF R/T and Ch00 Paging). Possible loss of AIS base station feeds.	999 and other telephony services, 2CS, National AIS picture (possible loss of local 'district' targets), email, inter- and intra-net services.	MRCC contact CROs to attend hilltops and monitor VHF radios and DSC locally.	2	5	10
<b>Network Incident:</b> Failure of multiple Kilostreams – single B-end (RRS)	All VHF Radio services (VHF R/T and Ch00 Paging) for the affected remote radio site. Possible loss of AIS targets local to the failed aerial site.	999 and other telephony services, VHF and MF Radio services (including DSC) to all other aerial sites, 2CS, local and national AIS picture, email, inter- and intra-net services.	MRCC assess importance of lost service and man hilltop with CROs if appropriate, or deploy a VHF fitted vehicle to strategic spot to carry out comms.	3	1	3
<b>Major Technical Failure:</b> Failure of ICCS at an MRCC	All routine telephony and VHF R/T communications for the MRCC. No ability for	999 and Ex-directory telephony services (fallback), 2CS, local and national AIS	Use Navtex, 999 and Ex-Dir lines to alert mariners and other authorities (flank MRCCs, ports,	2	4	8

	flank MRCC to cover.	picture, email, inter- and intra-net services.	harbours etc) declaring outage.  MRCC may decide to contact CROs to attend hilltops to monitor VHF radios and DSC locally			
<b>Major Technical Failure:</b> Failure of power supply to an MRCC	Non-essential services such as lighting, non-operational PCs and other non-operational 'facilities'.	999 and other telephony services, VHF and MF Radio services (including DSC) to all aerial sites, 2CS, local and national AIS picture, email, inter- and intra-net services.	UPS holds supply until emergency generator auto-starts. Generator then takes on supply until return of mains power.	2	1	2
<b>Major Technical Failure:</b> Failure of emergency power services at an MRCC	All services at local MRCC, including 999 and Ex-directory telephony, and ability for flank MRCC to cover VHF or telephony resources.	None – total outage for 'technical' district.	Use station mobile phone to alert flank MRCCs of outage. Flank MRCCs alert mariners, ports, harbours etc declaring outage.	1	5	5
<b>Technical Failure:</b> Failure of power supply to B-end (RRS)	After period of UPS support (~30 mins) all VHF Radio services (VHF R/T and Ch00 Paging for the affected remote radio site. Possible loss of AIS targets local to the failed aerial site. (coverage overlap from flank sites may reduce impact of failure)	999 and other telephony services, VHF and MF Radio services (including DSC) to all other aerial sites, 2CS, local and national AIS picture, email, inter- and intra-net services.	Controlling MRCC reduces use of transmit on all facilities at affected remote radio site, potentially using flank radio sites where possible to prolong UPS battery life for reception of holds service until restoration of mains power.	3	1	3

## Proposed Risks and Resilience

Event	Outcome Lost Services	Outcome Maintained Services	Outcome Mitigation Response	Likelihood x Impact =		Risk
<b>Major Network Incident:</b> Failure of single WAN link to a data centre	None.	All services maintained at all data centres, NMOC and SCs.	Diverse routing of 2 x WAN links into each data centre limits the impact of a typical 'high order' or major network failure.	2	1	2
<b>Major Network Incident:</b> Failure of both (diversely routed WAN links to a data centre	No 'live' access to databases at failed data centre.	All services maintained through opposite data centre, DR site and all SCs. Even if both WAN links to a data centre site fail, all services are maintained at opposite data centre.  Reduced flexibility on VHF for opposite half of the UK from 'live' data centre (single channel working on principal – DSC fitted – hilltops only).	Diverse routing of 2 x WAN links into each data centre limits the likelihood of occurrence, and duplication of essential resources (VHF R/T) limits impact of failure. Operations continue from opposite data centre which ensures limited continuing radio service for DSC footprint. AIS and Navtex and Sub-centre operator ability to connect to systems not affected	1	4	4
<b>Major Network Incident:</b>	All services lost at MRsC.	All services maintained from other operators	Work is shifted to operators at NMOC or	1	4	4

Failure of both WAN links to MRsC (exc. Aberdeen and Dover)		elsewhere in the network, both NMOC and MRsCs.	MRsC with un-affected connections to radio and data systems.			
<b>Major Network Incident:</b> Failure of multiple Kilostreams – single A-end (data centre)	All VHF Radio services at the remaining connected data centre (VHF R/T and Ch00 inc. Paging).	All services are maintained at opposite data centre.  Reduced flexibility on VHF at opposite data centre (single channel working on principal – DSC fitted - hilltops only)	To enable multi-channel working, NMOC and/or MRsCs can contact CROs to attend hilltops and monitor VHF radios and DSC locally.	2	3	6
<b>Network Incident:</b> Failure of multiple Kilostreams – single B-end (RRS)	All VHF Radio services (VHF R/T and Ch00 Paging for the affected remote radio site.	All services at data centres remain functional, including all radio services (including DSC) to all other aerial sites.  AIS likely to remain available from failed RRS due to change in method of connectivity away from point-to-point.	NMOC assess importance of lost service(s) at RRS and CROs attend hilltop if necessary. Alternatively deploy a VHF fitted vehicle to strategic spot to carry out link comms.	3	1	3
<b>Major Technical Failure:</b> Failure of ICCS at a data centre	Loss of radio and telephony services connected to failed ICCS.	All services are maintained at opposite data centre, so operators connected to failed ICCS re-connect to opposite data centre ICCS.  Reduced flexibility on	Operators at logged on to failed ICCS log-off their ICCS terminals and re-login to remaining functional ICCS servers (either local or remote).	2	2	4

		VHF (single channel working on principal – DSC fitted - hilltops only).				
<b>Major Technical Failure:</b> Failure of power supply to a data centre	Non-essential services such as lighting, non-operational PCs and other non-operational 'facilities'.	All essential services such as ICCS, DSC, Navtex,AIS, 2CS etc maintained by UPS and generator.	UPS holds supply until emergency generator auto-starts. Generator then takes on supply until return of mains power.	2	1	2
<b>Major Technical Failure:</b> Failure of emergency power services at a data centre	Loss of all services at failed data centre and connected stations.	All services are maintained at opposite data centre, so operators connected to failed data centre re-connect to opposite data centre systems.  Reduced flexibility on VHF (single channel working on principal – DSC fitted - hilltops only)	Network and system monitoring from opposite data centre alerts operational and technical staff of power failure.  To enable multi-channel working, operators can contact CROs to attend hilltops and monitor VHF radios and DSC locally.	1	3	3
<b>Technical Failure:</b> Failure of power supply to B-end (RRS)	After period of UPS support (~30 mins) all VHF Radio services (VHF R/T and Ch00 Paging for the affected remote radio site. Possible loss of AIS targets local to the failed aerial site (coverage overlap from flank sites may reduce impact of failure)	All services at data centres and SCs remain functional, for all radio services (including DSC) to all other aerial sites.	Controlling operators (NMOC or SC) reduce use of transmit on all facilities at affected remote radio site, potentially using flank radio sites where possible to prolong UPS battery life for reception of holds service until restoration of mains power.	3	1	3

# Annex A

## Latest supported versions of key technology systems

System	Current Operational Software	Proposed Operational Software at new data centres	Versions which may be available under current support contracts
ICCS	DS2000 v19 TDM (currently being upgraded from v12)	DS2000 v19 SIP	Not applicable
Command & Control	2CS Cx 2.7.33 (currently being upgraded from v2.7.29)	2CS Cx 2.7.33	2CS v3
Search Planning	SARiS v3.6 (currently being upgraded from v3.5)	SARiS v3.6	SARiS v4
Maritime Domain Awareness	KNC AIS C-Scope v2	KNC AIS C-Scope v2	KNC AIS C-Scope v3
GMDSS (Navtex & DSC)	ICS Comms Suite v4	ICS Comms Suite v4	Not applicable

## 8. Glossary of Terms

AIS	Automatic Identification System. AIS is an automated transponder system fitted to ships and increasingly leisure vessels, that allows them to be tracked using web based applications including C-Scope. AIS information supplements marine radar when it is used for collision avoidance.
BOSS	A web based browser that can be used to interrogate the data in VISION
C-Scope	The application that HM Coastguard uses to track AIS (Automatic Identification System) movements.
CERS/SVD	Consolidated European Reporting System / Single Vessel Database. The European Union (EU), through a variety of EU directives, has placed a requirement on Member States to work with the European Commission and co-operate on data exchange by implementing a system to capture data on vessel movements, dangerous cargoes, vessel safety, security information and the disposal of waste in European waters.
CNIS	Channel Navigation Information Service
Colregs	International Regulations for the Prevention of Collision at sea
CP	Counter Pollution
CRS	Coastguard Rescue Service
CSM	Coastal Safety Manager
DfT	Department for Transport
DSC	Digital Selective Calling initiates ship-to-ship, ship-to-shore and shore-to-ship radiotelephone and MF/HF radiotelex calls. DSC calls can also be made to individual stations, groups of stations, or "all stations" in one's radio range. Increasingly standard on maritime VHF fitted in leisure craft.
EC	European Commission
eNAV	Electronic Navigation Systems
EU	European Union
GMDSS	Global Maritime Distress Safety System
HQ	MCA Headquarters in Southampton
ICCS	Integrated Coastguard Communications System
ICT	Information and Communications Technology
IMO	International Maritime Organization
INMARSAT	A global satellite communications system for use by maritime and land based units using 11 geostationary satellites. This system supports voice and data communications.
ISM Code	International Safety Management Code
MAIB	Marine Accident Investigation Branch

MCA	Maritime and Coastguard Agency
MARPOL	The International Convention on Marine Pollution
MF	Medium Frequency Radio
MOC	Maritime Operations Centre
MOD	Ministry of Defence
MRCC	Maritime Rescue and Coordination Centre
MRSC	Maritime Rescue Sub-Centre
MSI	Marine Safety Information
OREIs	Offshore Renewable Energy Installations
PCS	Public and Commercial Services Union
PLA	Port of London Authority
RCC	Rescue Coordination Centre
RSCs	Rescue Sub Centres
Regular Coastguard Officers	Coastguard officers who are salaried staff employed within HM Coastguard to undertake roles relating to the initiation and co-ordination of Search and Rescue (SAR) and the management of the Volunteer Coastguard Rescue Service, civil resilience, counter pollution, salvage and national SAR policy.
SafeSeaNet	SafeSeaNet is the EU wide system that will be used to satisfy the data exchange requirements for vessel movements, dangerous cargoes, vessel safety, security information and the disposal of waste in European waters. The MCA use the CERS (Consolidated European Reporting System) to provide data for vessel reporting within Europe to SafeSeaNet.
SAR	Search and Rescue
SMC	SAR Mission Coordinator qualification
SOLAS	Safety of Life at Sea Convention 1974 (as amended)
SoSRep	Secretary of States Representative
TETRA	Terrestrial Trunked Radio - a radio system used by emergency services (called Airwave in mainland UK and Barracuda in Northern Ireland)
Transec	Department for Transport (DfT) Transport Security
TSS	Traffic Separation Scheme
UKSRR	UK Search and Rescue Region

UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea 1982
VHF	Very High Frequency Radio
Vision	The incident Management System by which operators use to co-ordinate and record incidents.
VTM	Vessel Traffic Monitoring (Management)
VTS	Vessel Traffic Services