

OFFICIAL



Australian Government

Defence

**DEFENCE SEAWORTHINESS REGULATORY SYSTEM
PUBLICATION 101 – REGULATORY OBLIGATIONS**

This document is issued for use within the Defence maritime domain and is effective on promulgation of the Defence Seaworthiness Management System Policy.

A handwritten signature in black ink, appearing to be "RA Durbin".

RA Durbin, CSC
Rear Admiral, RAN
Head Navy Engineering and Defence
Seaworthiness Regulator

Department of Defence
CANBERRA ACT 2600

26 July 2024

OFFICIAL

© Commonwealth of Australia 2024

This work is copyright. Apart from any use as permitted under the [Copyright Act 1968](#)¹, no part may be reproduced by any process without prior written permission from the Department of Defence.

All classified Defence information is protected from unauthorised disclosure and it is an offence to release classified information under the [Criminal Code Act 1995](#)² and the [Privacy Act 1988](#)³. Information contained in Defence publications may only be released in accordance with the [Defence Security Principles Framework](#)⁴.

DSwRSP 101
Edition 1, 2024

Sponsor:
Defence Seaworthiness Regulator (DSwR)

Cancellation
Defence Seaworthiness Management System Manual Edition 3 AL3

Developer:
Executive Director, Office of the Defence Seaworthiness Regulator (ED ODSwR)

Effective date:
26 July 2024

Review date:
XX Month 20XX

¹ <https://www.legislation.gov.au/Series/C1968A00063>

² <https://www.legislation.gov.au/Series/C2004A04868>

³ <https://www.legislation.gov.au/Series/C2004A03712>

⁴ <http://drnet/AssociateSecretary/security/policy/Pages/dspf.aspx>

FOREWORD

Operating innovatively and flexibly is crucial if Defence Groups and Services are to prosper in contemporary society. The Defence Seaworthiness Management System (DSwMS) supports the Defence organisation to do just that.

The DSwMS requires:

A Capability Managers to define how they will deliver the required operational outcome, what they need to deliver it, and the information needed to make decisions on the seaworthiness of their mission systems across the Capability Life Cycle

B a systematic approach to the management of seaworthiness and justified confidence that maritime mission systems are able to respond to government tasking and operational activities while the hazards to our personnel, the public and the environment are risk managed.

The system defines accountabilities and introduces independent layers of assurance between the Capability Manager and the Seaworthiness Regulator to provide the Defence Seaworthiness Authority (DSwA) with confidence in the seaworthiness of all registered Defence vessels.

The DSwRS 100 series publications support the Defence Seaworthiness Management System Policy and in turn, Defence Instruction Military Command Support Provision MCS1. The publications describe the DSwMS framework, directions, policies and procedures that guide all Defence and Industry personnel to deliver a lethal seaworthy Defence maritime capability.

The first three publications in the series are a direct replacement for the DSwMSMAN ie:

- DSwRSP 100 describes the intent and rationale for various elements of the DSwMS – including regulatory and risk management and assurance frameworks and operating model requirements
- DSwRSP 101 sets out regulatory controls for the Defence seaworthiness community. It describes the Governance and Management Compliance Obligations (GMCOs), Activity and Condition-Based Compliance Obligations (ACCOs) and unifying requirements
- DSwRSP 102 describes the Independent Seaworthiness Management Review (ISwMR) mechanism that provides independent advice on the governance and management of the DSwMS.

Other publications in the 100 series will be produced as required to ensure the DSwMS remains fit for purpose in a fast changing Defence capability environment.

AMENDMENTS

Proposals for amendment of DSwRSP 101 may be sent to:

Office of the Defence Seaworthiness Regulator (ODSwR)
Directorate of Regulation and Advocacy
Navy Headquarters
Department of Defence
Canberra ACT 2600

Amendment number	Amendment	Amendment type	Effective date

VOLUME CONTENTS

Volume 1: Defence Seaworthiness Management System Overview

Volume 2: Governance and Management Obligations (GMCOs)

Volume 3: Activity and Condition Based Obligations (ACCOs)

OFFICIAL

DSwRSP 101 Vol 1

vi

PARTS CONTENTS

Part 1: Defence Seaworthiness Management System Overview

Edition 1

OFFICIAL

PART 1: DEFENCE SEAWORTHINESS MANAGEMENT SYSTEM OVERVIEW

Contents

Foreword	iii
Amendments	iv
Volume Contents	v
Parts Contents	vi
Part 1: Defence Seaworthiness Management System Overview	i
Chapter 1	1-1
Defence Seaworthiness Management System Overview	1-1
The system	1-1
Glossary	1-2
Defence Seaworthiness Outcome	1-2
Defence Seaworthiness Argument	1-2
Seaworthiness Governance	1-3

List of figures

Figure 1-1: Defence Seaworthiness Management System components	1-2
--	-----

CHAPTER 1

DEFENCE SEAWORTHINESS MANAGEMENT SYSTEM OVERVIEW

The system

1.1 The Defence Seaworthiness Management System (DSwMS) comprises the following three complementary and aligned components⁵ (see Figure 1-1 below):

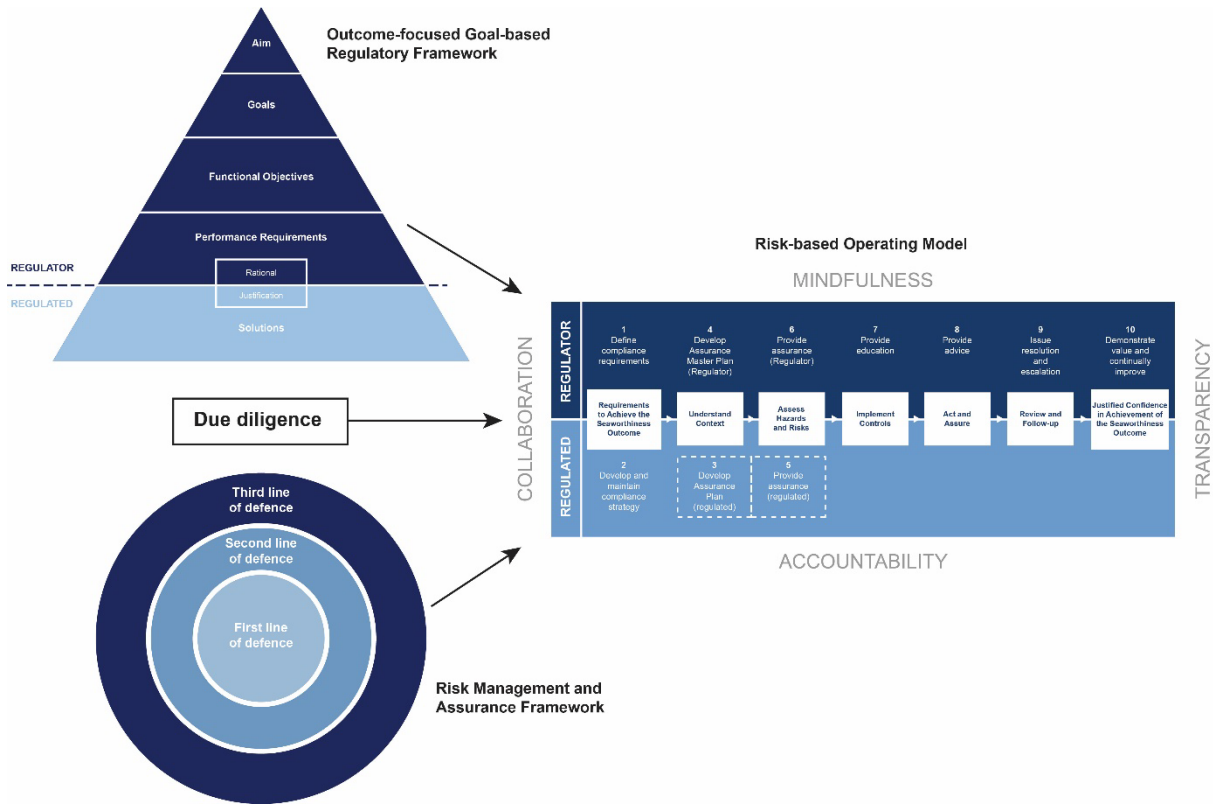
- a. The **DSwMS Regulatory Framework**, which articulates compliance obligations expressed as outcomes with associated function and performance requirements, and which must be satisfied to build confidence that hazards and risks to the Seaworthiness Outcome are being controlled. This framework consists of regulations of two types:
 - (1) an enterprise type that controls risks inherent in governance and management activities⁶ as they relate to achieving the Seaworthiness Outcome. Regulations of this type are referred to as 'Governance and Management Compliance Obligations' (GMCOs)
 - (2) a type specific to a maritime mission system and its enabling support system. This type controls hazards and risks inherent in specific mission and enabling support systems. Regulations of this type are referred to as 'Activity and Condition Based Compliance Obligations' (ACCOs).
- b. The **DSwMS Risk Management and Assurance Framework** establishes clear accountabilities for compliance with the obligations, and through assurance provides supporting evidence to justify confidence that hazards and risks to the Seaworthiness Outcome are being effectively managed.
- c. The **DSwMS Operating Model** which ensures the frameworks are developed, maintained and applied in a mindful and systematic manner through a series of core processes conducted by both the Defence Seaworthiness Regulator and the regulated community.

1.2 Collectively, these components create an enterprise wide system of control, through regulation, of hazards and risks to the Seaworthiness Outcome throughout the Capability Life Cycle (CLC).

⁵ DSwRSP 100 provides a detailed explanation of the DSwMS design of each component, including obligations imposed on the Defence Seaworthiness Regulator (DSwR) and the regulated community (particularly Capability Managers and other duty holders).

⁶ For example risk exists where governance and management activities: (a) are not suitable (not aligned, or do not produce the outcome to the specified performance requirement); (b) are suitable but are not followed (not available/not aware, training and competency inadequate etc.); (c) are suitable but not adequately resourced.

Figure 1-1: Defence Seaworthiness Management System components



Defence Seaworthiness Outcome

1.3 The Seaworthiness Outcome is outlined in the Defence Seaworthiness Management System Policy and described in detail in DSwRSP 100.

Defence Seaworthiness Argument

1.4 The DSwMS uses formal claims, arguments and evidence to make the case that the Seaworthiness Outcome is achieved for both specific mission systems and across the enterprise as a whole. The Seaworthiness Argument is expressed at the top level as follows:

- 1.5 If:
- a. the specified operational effect is interpreted, defined and formally articulated by the Capability Manager through an OSI
 - b. **and** the design and OSI remain aligned and understood throughout the CLC

- c. **and** a maritime mission system and its enabling support system are realised consistent with the design such that hazards/risks to personnel, the public and the environment are eliminated or minimised SFARP⁷
- d. **and** all defined tasks can occur within the boundaries of the OSI (i.e. within the boundaries of realised systems when operated and supported as intended)

then the likelihood of achieving the specified operational effect is maximised for the defined tasking(s) and hazards and risks to personnel, the public and the environment are eliminated or, where elimination is not practicable, minimised SFARP (i.e. the Seaworthiness Outcome is achieved).

1.6 The Seaworthiness Argument is explained in DSwRSP 100.

DSwMS compliance obligations

1.7 The DSwMS concepts are simple in nature, and can be summarised as:

- a. know what you want a mission system to do and how you intend to support it (taking account of hazards and risks to safety of personnel, the public and the environment, in this context)
- b. ensure the mission system design can deliver functions and performance aligned with the operating and support intent
- c. ensure the mission system is built or acquired (realised) to the designed functional and performance specifications
- d. operate the mission system within the designed functional and performance specifications.

1.8 In all cases it is expected that the Capability Manager will understand what is expected of a maritime mission system, what the design can actually achieve, and any gaps between the two that must be managed. Without a thorough understanding of what is expected, sufficient context cannot be established to identify the appropriate hazard and risk controls.

Seaworthiness Governance

1.9 The Defence Seaworthiness Authority (DSwA) has responsibilities to assure good governance of Defence seaworthiness arrangements, that support Capability Managers in achieving the Seaworthiness Outcome. The model for Seaworthiness governance is explained in DSwRSP 100.

⁷ Elimination, or minimisation so far as reasonably practicable, of hazards and risks is achieved by the implementation of controls.

1.10 The DSwA is accountable for assuring justified confidence in the achievement of the Seaworthiness Outcome and is responsible for establishing, managing and reviewing the efficacy of the DSwMS in achieving the Seaworthiness Outcome.

1.11 In order to provide an independent advisory pathway to the DSwA in accordance with contemporary governance practice, the DSwMS design includes an **Independent Seaworthiness Management Review (ISwMR)** Panel.

System rationale and responsibilities of Capability Managers

1.12 This publication focuses on GMCOs, ACCOs and unifying requirements. DSwRSP 100 provides the rationale and an in-depth explanation of the broader Seaworthiness management system - and the critical part Capability Managers and duty holders must play in ensuring the overall system is effective.

Glossary

1.13 Definitions, acronyms and abbreviations relevant to this publication are detailed in the Glossary contained in DSwRSP 100.

CONTENTS

Part 1: Governance and Management Compliance Obligation (GMCO) Goals

Part 2: Goal 1 – Enable Seaworthiness Management

**Part 3: Goal 2 – Maritime Mission System and Enabling Support System
Align with Capability Manager’s Authorised Operating and Support Intent**

Part 4: Goal 3 – Systems are Operated as Intended

PART 1: GMCO GOALS

Contents

Contents	i
Part 1: GMCO GOALS	i
Chapter 1	1-1
GOALS FOR GOVERNANCE AND MANAGEMENT	1-1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION GOALS	1-1
Goal 1: The Defence Maritime Enterprise enables achievement of the Seaworthiness Outcome through suitable governance and management activities and arrangements.	1-1
Goal 2: A maritime mission system and its enabling support system align with the Capability Manager's operating and support intent.	1-2
Goal 3: A maritime mission system and its enabling support system are operated in accordance with the Capability Manager's authorised operating and support intent.	1-2
Outcome	1-3

CHAPTER 1

GOALS FOR GOVERNANCE AND MANAGEMENT

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION GOALS

1.1 The Defence Enterprise is engaged in a complex undertaking requiring clear outcomes, accountabilities, authorities, direction, coordination and collective action. Enterprises of similar complexity typically implement highly structured governance and management systems and arrangements to:

- a. Enable and maintain the enterprise through:
 - (1) a clear articulation of accountabilities, roles and responsibilities
 - (2) provision of resources
 - (3) provision of guidance and direction (plans, policies, orders, instructions and publications)
 - (4) performance monitoring across the enterprise to provide feedback that enables adjustment, correction and control of risk.
- b. Use the resources and guidance provided above to perform the functions and activities necessary to deliver the enterprise aims and objectives. In the Defence context this includes acquiring and integrating multiple inputs in a coordinated and collective manner to realise, operate, sustain and eventually dispose of mission systems.

1.2 The Defence Seaworthiness Management System (DSwMS) Governance and Management Compliance Obligations (GMCO) codify governance and management good practice as it relates to achieving the Seaworthiness Outcome. This is done at a functional level that guides and enables the development and implementation of policies appropriate to the Capability Manager's roles, responsibilities and accountabilities in the One Defence enterprise context.

1.3 The DSwMS GMCOs sum to achieve the governance and management goals described below. They are consistent with the notion that an enterprise must first be 'enabled' and must then use the resources and guidance provided to undertake activities which will deliver against the enterprise aims and objectives.

1.4 The following is a description of the three GMCO goals. The GMCOs described in Parts 2 to 4 of this volume collectively sum to achieve these goals.

Goal 1: The Defence Maritime Enterprise enables achievement of the Seaworthiness Outcome through suitable governance and management activities and arrangements.

1.5 Good governance and management requires the following:

- a. an understanding of the enterprise aims, objectives and constraints (including legal constraints)
- b. an understanding of the risks:
- c. to achieving the aims and objectives above
- d. associated through achievement of those aims and objectives
- e. an understanding and application of required resources to deliver the aims and objectives, and to manage the associated risks
- f. provision for incident and accident response in a manner consistent with the risks and consequences associated with the enterprise
- g. monitoring and provision of information to authorities in a manner aligned with the roles, responsibilities and accountabilities of those authorities.

1.6 The GMCOs under Goal 1 provide a systematic set of requirements aimed at achieving this goal.

Goal 2: A maritime mission system and its enabling support system align with the Capability Manager’s operating and support intent.

1.7 By defining the operating and support intent (OSI) based on the full range of operational effects required during the in-service phase of the Capability Life Cycle, the Capability Manager has articulated what needs to be achieved by the ideal solution (in effect, the ideal user requirements).

1.8 All mission systems are designed and realised in accordance with a user and support intent in mind. However where the realised system does not align with the user intent, systems may not function and perform as required or expected, and they may also expose personnel and the environment to hazards and risks that have not been considered or controlled.

1.9 The GMCOs under Goal 2 provide a systematic set of requirements aimed at achieving and maintaining best possible alignment of user intent with realised systems. They also address the management of hazards and risks associated with that alignment.

Goal 3: A maritime mission system and its enabling support system are operated in accordance with the Capability Manager’s authorised operating and support intent.

1.10 The likelihood of achieving the Seaworthiness Outcome is maximised where mission systems are operated and supported as intended. Where mission systems are operated outside of the Capability Manager’s OSI, or where the support requirements are not brought to bear, then those mission systems may not function and perform as required or expected. In addition, they may also expose personnel and the environment to hazards and risks that have not been considered or controlled.

1.11 The GMCOs under Goal 3 provide a systematic set of requirements aimed at achieving and maintaining best possible alignment of the Capability Manager's OSI with the actual operation and support of the realised systems. They also address the management of hazards and risks associated with that alignment.

Outcome

1.12 All activities and arrangements necessary to effectively and efficiently govern and manage the Defence Maritime Enterprise are aligned with achievement of the Seaworthiness Outcome¹ and to good practice. Compliance with these goals in conjunction with those associated with the Activity and Condition Based Compliance Obligations collectively aim to ensure achievement of the Seaworthiness Outcome.

¹ Note the Goals and GMCOs are traceable to the Seaworthiness Outcome through the Seaworthiness Argument.

PART 2: GOAL 1 – ENABLE SEAWORTHINESS MANAGEMENT

Contents

Part 2: Goal 1 – Enable Seaworthiness Management	i
Chapter 1	1–1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION	
1.1 - GOVERNANCE AND LEADERSHIP	1–1
Functional objective	1–1
Outcome	1–1
Rationale	1–1
Requirements of Functional Objective 1.1	1–2
Policy	1–2
IMPLEMENTATION	1–3
PERFORMANCE REQUIREMENTS	1–3
GUIDANCE	1–4
Chapter 2	2–1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION	
1.2 - CONSULTATION, COOPERATION AND COORDINATION	2–1
FUNCTIONAL OBJECTIVE	2–1
OUTCOME	2–1
RATIONALE	2–1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.2	2–1
Policy	2–1
IMPLEMENTATION	2–2
PERFORMANCE REQUIREMENTS	2–2
GUIDANCE	2–3
Chapter 3	3–1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.3 - SEAWORTHINESS RISK MANAGEMENT	3–1
FUNCTIONAL OBJECTIVE	3–1
OUTCOME	3–1
RATIONALE	3–1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.3	3–2
Policy	3–2
IMPLEMENTATION	3–3
PERFORMANCE REQUIREMENTS	3–3

GUIDANCE	3-4
Chapter 4	4-1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.4 – CRITICAL FUNCTIONS	4-1
FUNCTIONAL OBJECTIVE	4-1
OUTCOME	4-1
RATIONALE	4-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.4	4-2
IMPLEMENTATION	4-2
PERFORMANCE REQUIREMENTS	4-2
GUIDANCE	4-3
Chapter 5	5-1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.5 - CRITICAL COMPETENCIES	5-1
FUNCTIONAL OBJECTIVE	5-1
OUTCOME	5-1
RATIONALE	5-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.5	5-1
Policy	5-1
IMPLEMENTATION	5-2
PERFORMANCE REQUIREMENTS	5-2
GUIDANCE	5-3
Chapter 6	6-1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.6 - INCIDENT RESPONSE	6-1
FUNCTIONAL OBJECTIVE	6-1
OUTCOME	6-1
RATIONALE	6-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.6	6-2
Policy	6-2
IMPLEMENTATION	6-2
PERFORMANCE REQUIREMENTS	6-3
GUIDANCE	6-5
Chapter 7	7-1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.7 - PERFORMANCE MANAGEMENT & CONTINUOUS IMPROVEMENT	7-1
FUNCTIONAL OBJECTIVE	7-1
OUTCOME	7-1
RATIONALE	7-1

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.7	7-2
Policy	7-2
IMPLEMENTATION	7-3
PERFORMANCE REQUIREMENTS	7-3
GUIDANCE	7-4

CHAPTER 1

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.1 - GOVERNANCE AND LEADERSHIP

FUNCTIONAL OBJECTIVE

1.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 1.1 is defined as:

Effective leadership and governance functions and structures to enable seaworthiness management are established and maintained.

OUTCOME

1.2 The Capability Manager has clearly documented and authorised mechanisms that specify how and by whom relevant Defence Seaworthiness Management System (DSwMS) compliance obligations will be satisfied, and through which they articulate and manage relationships and accountabilities in the DSwMS context.

1.3 Other duty holders understand their obligations and accountabilities to the Capability Manager in relation to the management of hazards and risks to the Seaworthiness Outcome.

RATIONALE

1.4 Defence is a complex organisation with multiple business units that deliver business outputs, which should ultimately sum to achieve the enterprise aim. In the seaworthiness context, the enterprise aim is defined as the Seaworthiness Outcome – maximise the likelihood of achieving the specified operational effect for the defined tasking, where hazards and risks to personnel, the public and the environment have been eliminated/minimised so far as is reasonably practicable (SFARP).

1.5 The relationships between the various Defence business units are driven by the requirement to achieve this aim. The Capability Manager must plan, manage and deliver capability, but this requirement is supported by enablers outside of the Capability Manager's chain of command. Thus, in recognition that many business units contribute to the Seaworthiness Outcome, the Capability Manager is specifically authorised and accountable for integrating the various business unit contributions to deliver the outcome.

1.6 Each business unit must manage risks to the Seaworthiness Outcome in the context of what they provide to the enterprise. The risk to achievement of the outcome is then managed around a central tenet, that being that primacy of the Capability Manager. Duty holders in each business unit are accountable to the Capability Manager for seaworthiness management.

1.7 The Capability Manager must understand where specific contributions by various business units introduce risk to achievement of the outcome across the Capability Life Cycle. To do this, the Capability Manager must establish a suitable framework of accountabilities for the management of hazards and risks to the

Seaworthiness Outcome and ensure that those accountabilities are understood and acknowledged by all contributing business units.

1.8 The Defence Seaworthiness Regulator (DSwR) aims to control hazards and risks to the Seaworthiness Outcome and interpret relevant legislation through the regulations. The regulations provide a framework to aid the duty holder in assessing risks to the Seaworthiness Outcome, but the accountability for managing the risks lies with the duty holder. Thus there is an expectation and a requirement that duty holders have an understanding of their duties in the legal context. The seaworthiness regulations have been designed to facilitate due diligence, but duty holders must themselves demonstrate mindfulness in their application. The Regulator will assist to provide guidance accordingly.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.1

Policy

1.9 The Capability Manager must enact policies that:

- a. Articulate the Capability Manager's authorities and accountabilities in relation to achievement of the Seaworthiness Outcome in the One-Defence context.
- b. Specify the Capability Manager's requirements and accountabilities of other business units for the management of hazards and risks to the Seaworthiness Outcome.
- c. Ensure that accountabilities for execution of legal duties¹ as they relate to subparagraphs (a) and (b) above and achievement of the Seaworthiness Outcome, are clear and unambiguous. These duties must include, but are not limited to:
 - (1) primary and further duties of the Person Conducting a Business or Undertaking in accordance with *Work Health and Safety Act 2011*
 - (2) primary and further duties as articulated in other legislation relevant to the Seaworthiness Outcome.²
- d. Embody proactive due diligence. The due diligence duties in this context include:

¹ The Defence Seaworthiness Regulator aims to control hazards and risks to the Seaworthiness Outcome and interpret relevant legislation through the regulations. The regulations provide a framework to aid the duty holder in assessing risks to the Seaworthiness Outcome, but the accountability for managing the risks lies with the duty holder.

² The Defence Seaworthiness Regulator aims to control hazards and risks to the Seaworthiness Outcome and interpret relevant legislation through the regulations. The regulations provide a framework to aid the duty holder in assessing risks to the Seaworthiness Outcome, but the accountability for managing the risks lies with the duty holder.

- (1) **Know.** Acquire and keep up-to-date knowledge of legislation relevant to the seaworthiness context.
- (2) **Understand.** Gain an understanding of the nature of Defence outcomes and what is necessary to deliver those outcomes in context of the achievement of the Seaworthiness Outcome (maximise likelihood of a maritime mission system achieving the specified operational effect for a defined tasking whilst eliminating or minimising SFARP the hazards/risks to personnel, the public, and the environment). In this context, understand the hazards and risks to personnel, the public and the environment.
- (3) **Resource.** Provide and use appropriate resources to eliminate or minimise SFARP hazards and risks to the achievement of the Seaworthiness Outcome.
- (4) **Monitor.** Monitor information on incidents, hazards and risks and respond in a timely manner to that information.
- (5) **Comply.** Comply with relevant legislative requirements.⁵
- (6) **Verify.** Verify the use of resources and processes in items 1.9d(3) through 1.9d(5) are applied as intended and are achieving the required outcome.

IMPLEMENTATION

1.10 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:

- a. defined and documented
- b. implemented through orders, instructions and procedures as necessary
- c. resourced appropriately
- d. monitored for adherence and achievement of the policy intent
- e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

1.11 All duty holders associated with the achievement of the Seaworthiness Outcome are able to articulate:

- a. their accountabilities and authorities
- b. how those accountabilities and authorities relate to and integrate with those of other duty holders to deliver the Seaworthiness Outcome.

- 1.12 The Capability Manager must:
- a. document their governance and leadership arrangements in context of the Defence Enterprise that are necessary to achieve the Seaworthiness Outcome
 - b. demonstrate that such documentation, once developed, is maintained, validated and made readily available to business units that contribute to achievement of the Seaworthiness Outcome
 - c. demonstrate the efficacy of those arrangements
 - d. demonstrate that the governance arrangements for duty holders in the second line of defence are aligned with requirements for the achievement of the Seaworthiness Outcome.

GUIDANCE

- 1.13 Further guidance for this Functional Objective is available from the DSwMS website.

CHAPTER 2

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.2 - CONSULTATION, COOPERATION AND COORDINATION

FUNCTIONAL OBJECTIVE

2.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 1.2 is defined as:

Consultation, cooperation and coordination mechanisms to enable seaworthiness management are established and maintained

OUTCOME

2.2 All personnel involved in the management of seaworthiness understand their own contribution and how that needs to fit with the contributions of others to achieve the Seaworthiness Outcome. They work together to maintain the level of integration and responsiveness necessary to achieve the Seaworthiness Outcome in a dynamic environment.

RATIONALE

2.3 In accordance with Functional Objective 1.1, the Capability Manager has established a framework of accountabilities for the management of hazards and risks to the Seaworthiness Outcome.

2.4 In a complex enterprise, the execution of these accountabilities requires collaboration across all contributing business units to ensure that the enterprise aim can be achieved. Furthermore, the dynamic nature of the Defence Enterprise requires a level of responsiveness that can only be achieved through effective collaboration.

2.5 Without effective collaboration, there is a danger that accountabilities and requirements can be interpreted in isolation (e.g. through the lens of a particular function or business unit). Whilst this can optimise the output of an individual function or business unit, it can introduce risk to the Seaworthiness Outcome, reduce overall efficiency, and result in unnecessary rework.

2.6 Therefore consultation, cooperation and coordination are necessary to achieve the Seaworthiness Outcome.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.2

Policy

2.7 The Capability Manager must enact policies that specify mechanisms that enable:

- a. Horizontal consultation, cooperation and coordination between duty holders who may have shared or overlapping duties across and/or external to Defence in relation to seaworthiness management and hazards and risks to the achievement of the Seaworthiness Outcome.
- b. Consultation, cooperation and coordination specifically relating to the development and maintenance of the core suite of unifying artefacts as they relate to specific maritime mission systems and their enabling support systems. The development and use of the unifying artefacts is supported by organisational agreements, contracts, and other arrangements such as terms of reference for integrated project teams.
- c. Consultation, cooperation and coordination specifically relating to dispute resolution or escalation requirements in the seaworthiness context.

2.8 All duty holders must enact policies that specify mechanisms that enable vertical consultation, coordination and cooperation throughout their business unit hierarchy or chain of command in relation to seaworthiness management and hazards and risks to the achievement of the Seaworthiness Outcome.

IMPLEMENTATION

2.9 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:

- a. defined and documented
- b. implemented through orders, instructions and procedures as necessary
- c. resourced appropriately
- d. monitored for adherence and achievement of the policy intent
- e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

2.10 The Capability Manager must:

- a. demonstrate that all necessary contributors to the Seaworthiness Outcome have been identified, including all relevant FIC elements and business units both internal and external to Defence
- b. demonstrate that mechanisms are in place to establish and maintain consultation, cooperation and coordination with those identified.

2.11 Duty holders must demonstrate that their personnel, associated with the achievement of the Seaworthiness Outcome, are able to articulate their own contribution and how that needs to fit with the contributions of others to achieve the Seaworthiness Outcome.

GUIDANCE

2.12 Further guidance for this Functional Objective is available from the DSwMS website.

CHAPTER 3

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.3 - SEAWORTHINESS RISK MANAGEMENT

FUNCTIONAL OBJECTIVE

3.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 1.3 is defined as:

Management systems to control risks to the Seaworthiness Outcome are established and maintained

OUTCOME

3.2 The risks to the Seaworthiness Outcome for a mission system and its enabling support system are sufficiently understood, and control mechanisms developed and managed, such that these risks are controlled.

RATIONALE

3.3 This Functional Objective establishes and maintains the capability to manage risk information generated through the application of compliance obligations in accordance with GMCO Goals 2 and 3. Unless risk information is acted on in a timely and appropriate manner, the Seaworthiness Outcome cannot be assured.

3.4 Hazards and risks to the Seaworthiness Outcome manifest at a mission system and enabling system level. The governance and management of those hazards and risks are characterised and aligned with duty holders' roles through the responsibilities and accountabilities described in DSwRSP 100.

3.5 This Functional Objective requires an approach to risk management that is consistent with the needs of those duty holders and which enables them to act appropriately on those hazards and risks to the Seaworthiness Outcome specific to, and collectively across mission systems and enabling support systems, throughout the Capability Life Cycle.

3.6 The types of seaworthiness risk that require management are those where the hazards and risks are credible and:

- a. Are characterised as localised in nature that may, irrespective of magnitude, result in localised harm (injury or fatality to one or several persons, or localised harm to the environment).
- b. Are characterised as major in nature that may, irrespective of likelihood, result in catastrophic consequences. These are typically managed through critical risk controls that prevent loss of control, regain control or mitigate loss of control, as determined through the Activity and Condition Based Compliance Obligation (ACCO).

- c. Are characterised as latent, chronic and systemic that can reduce control effectiveness and may be lead indicators to loss of control.
- d. Are associated with any excursions beyond the operating and support intent (OSI) where control effectiveness may be reduced (and risk exposure may arise in any of (a), (b) and (c) above).

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.3

Policy

- 3.7 The Capability Manager must enact policies that specify:
- a. procedures for controlling seaworthiness risk including the identification, assessment and management of:
 - (1) hazards and risks characterised as local in nature
 - (2) hazards and risks characterised as major
 - (3) hazards and risks characterised as latent, chronic and systemic
 - (4) hazards and risks associated with any excursions beyond the OSI in accordance with GMCO 3.3
 - b. the establishment and maintenance of risk management capability for each mission system and its enabling support system to:
 - (1) monitor and analyse risk control information
 - (2) prioritise and allocate resources to risk control activities
 - (3) communicate and educate regarding risk control
 - (4) resolve issues regarding risk control, and escalate where necessary
 - (5) report status, issues, breaches and incidents³
 - c. mechanisms and requirements for the transition of seaworthiness risk management throughout the Capability Life Cycle
 - d. mechanisms by which duty holders will be held accountable for the management of seaworthiness risk
 - e. a risk management methodology that can be applied in circumstances not covered by the established risk management systems and orders, instructions and publications (OIP).

³ Emergency response to accidents and incidents is covered in GMCO 1.6

IMPLEMENTATION

- 3.8 The Capability Manager must:
- a. identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:
 - (1) defined and documented
 - (2) implemented through OIP as necessary
 - (3) resourced appropriately
 - (4) monitored for adherence and achievement of the policy intent
 - (5) adjusted as necessary to ensure achievement of the policy intent
 - b. provide appropriate means of communicating risk to seaworthiness management duty holders.

PERFORMANCE REQUIREMENTS

- 3.9 The Capability Manager must demonstrate that the implemented system:
- a. with specific reference to localised hazard and risks:
 - (1) provides, where the hazards and risks are typically commonplace and well understood, systems and processes of control consistent with recognised codes of practice
 - (2) performs, where hazards and risks are not well understood or where it is specifically required by legislation, risk assessment and management in accordance with an applicable risk management standard
 - b. with specific reference to major hazards and risks:
 - (1) provides, where the hazards and risks are identified through the ACCO development and application process, systems and processes of control consistent with the Means of Compliance, as agreed through the compliance strategy
 - (2) performs, where hazards and risk are not sufficiently covered by controls identified through the ACCO development and application process, risk assessment and management in accordance with an applicable risk management standard and then engages with the DSwR to determine the requirement for additional regulation
 - c. with specific reference to latent, chronic and systemic hazardous conditions that can reduce control effectiveness and may be lead indicators to loss of control; monitor and manage the adequacy of these conditions including:
 - (1) seaworthiness culture – mindfulness, collaboration, accountability and transparency

- (2) the skills, qualifications, training and experience of personnel to perform their assigned role/task
 - (3) the fitness for purpose and maintenance of organisations, structures and arrangements
 - (4) the fitness for purpose and maintenance of systems of work for the management or operation of a maritime mission system and/or its enabling support system
 - (5) adherence to the systems of work identified above
 - (6) that personnel are sufficiently trained or experienced to respond to emergency or unplanned scenarios
 - (7) that maintenance requirements are identified for the maritime mission system and/or its enabling support system
 - (8) that identified maintenance requirements are implemented by personnel
 - (9) that deficiencies in a maritime mission system and/or its enabling support system in context of its OSI are identified or rectified by personnel
 - (10) that maintainers are skilled, trained, qualified, experienced or competent to perform maintenance procedures
- d. with specific reference to the management of risks associated with any excursions beyond the OSI, ensure:
- (1) that a defined risk management methodology is applied to manage seaworthiness risks during an excursion
 - (2) that any short term or long term impairment to system functionality or performance caused by an excursion is rectified
 - (3) compliance with GMCO 3.3.

GUIDANCE

3.10 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 4

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.4 – CRITICAL FUNCTIONS

FUNCTIONAL OBJECTIVE

4.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 1.4 is defined as:

Functions necessary for achievement of the Seaworthiness outcome are identified, established and maintained

OUTCOME

4.2 The Defence Enterprise builds and maintains the functional capabilities (including the required resources) to execute the processes necessary to achieve the Seaworthiness Outcome. The application of these functional capabilities is integrated by the Capability Manager through the processes and GMCOs 1.1 and 1.2.

RATIONALE

4.3 The regulated community delivers the Seaworthiness Outcome through a series of processes, which comprise activities performed by people. The execution of a process requires specific functional capabilities. Functional capabilities can include administration, engineering, training, operating etc., that are defined around the need for dedicated resource or specific domain expertise.

4.4 Therefore, functions by themselves do not deliver outcomes but need to be coordinated through a process that ultimately delivers the outcome. Thus it is the process that crosses organisational and functional boundaries.

4.5 Functions also need to be defined in terms of specific capabilities and therefore do not necessarily correspond to business unit structures.

4.6 Duty holders must understand the functional requirements of the processes that deliver the Seaworthiness Outcome, and ensure that the requisite functional capabilities are in place (including the required resources). These processes must include those that:

- a. relate to the GMCOs⁴
- b. are articulated through the DSwMS Operating Model.

⁴ Goal 1 addresses processes necessary for overall governance and management for the Seaworthiness Outcome; Goals 2 and 3 address processes specific to maritime mission systems and their enabling support systems throughout the CLC.

4.7 Therefore the intent of this GMCO is to ensure that the Defence Enterprise builds and maintains the functional capabilities to execute the seaworthiness processes required to achieve the Seaworthiness Outcome.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.4

4.8 The Capability Manager must enact policies that:

- a. Identify, establish and maintain the functions necessary to achieve the Seaworthiness Outcome. These functions must include, but are not limited to, those specifically required:
 - (1) for the development and maintenance of the core suite of unifying artefacts as they relate to specific maritime mission systems and their enabling support systems
 - (2) to satisfy the performance requirements under all compliance obligations
 - (3) to enact the DSwMS Operating Model.
- b. Identify the business units internal or external to Defence that are accountable to deliver those functions.
- c. Ensure that those accountabilities are supported by organisational agreements, contracts, and other arrangements such as terms of reference for integrated project teams.
- d. Ensure that functions are coordinated through appropriate processes to achieve the Seaworthiness Outcome in accordance with GMCOs 1.1 and 1.2.

IMPLEMENTATION

4.9 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:

- a. defined and documented
- b. implemented through orders, instructions and procedures as necessary
- c. resourced appropriately
- d. monitored for adherence and achievement of the policy intent
- e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

4.10 The Capability Manager must demonstrate that:

- a. all necessary functions have been identified⁵, including those provided by relevant FIC elements and business units both internal and external to Defence
- b. all accountable duty holders with respect to those functions have been identified
- c. systems are in place to establish, maintain and integrate those functional capabilities
- d. the functional capabilities have sufficient resources.

4.11 All duty holders associated with the achievement of the Seaworthiness Outcome are able to articulate:

- a. their functional contribution to the Seaworthiness Outcome
- b. how those contributions integrate with those of other duty holders, through processes necessary to deliver the Seaworthiness Outcome
- c. how those functional capabilities will be maintained.

GUIDANCE

4.12 Further guidance for this Functional Objective is available at the DSwMS website.

⁵ Analysis may reveal that some necessary functions are not currently provided and may require development, or sourcing from an appropriate provider.

CHAPTER 5

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.5 - CRITICAL COMPETENCIES

FUNCTIONAL OBJECTIVE

5.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 1.5 is defined as:

Functions necessary for achievement of the Seaworthiness Outcome are performed by suitably qualified and experienced people

OUTCOME

5.2 Suitably Qualified and Experienced Persons perform the functions necessary for the achievement of the Seaworthiness Outcome. This Functional Objective relates to the need for a qualified workforce and therefore complements Functional Objective 1.4.

RATIONALE

5.3 Specific domain expertise is required to execute the functions which are required to achieve the Seaworthiness Outcome (as identified through complying with GMCO 1.4).

5.4 Personnel obtain specific domain expertise through a combination of:

- a. training and education, leading to recognised qualifications
- b. experience in the specific domain
- c. experience in the broader Defence maritime context.

5.5 Once gained, the expertise is kept current through ongoing professional development to maintain currency with evolving methodologies and technologies.

5.6 Suitability requires that the qualifications and experience are current, relevant to the task at hand and at a level that enables the task to be successfully completed to the required standard.

5.7 Therefore the intent of this GMCO is to ensure that the Defence Enterprise maintains suitably qualified and experienced people to perform the functional capabilities, which execute the seaworthiness processes required to achieve the Seaworthiness Outcome.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.5

Policy

5.8 The Capability Manager must enact policies that:

- a. Identify, establish and maintain the qualifications and experience required to perform the functions necessary to achieve the Seaworthiness Outcome, as identified through compliance with GMCO 1.4.
- b. Maintain suitability of personnel performing those functions. Suitability requires that the personnel have qualifications and experience that are:
 - (1) current
 - (2) relevant to the task at hand, and
 - (3) at a level that enables the task to be successfully completed to the required standard.
- c. Provide assurance that these seaworthiness functions are being performed by suitably qualified and experienced people in all business units, internal or external to Defence.

IMPLEMENTATION

5.9 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:

- a. defined and documented
- b. implemented through orders, instructions and procedures as necessary
- c. resourced appropriately
- d. monitored for adherence and achievement of the policy intent
- e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

5.10 The Capability Manager must demonstrate that the:

- a. Qualifications and experience required to perform the functions necessary to achieve the Seaworthiness Outcome have been identified and documented.
- b. Personnel performing the functions required to achieve the Seaworthiness Outcome have obtained the requisite domain expertise through a combination of:
 - (1) training and education, leading to recognised qualifications
 - (2) experience in the specific domain
 - (3) experience in the broader Defence maritime context.
- c. Suitability of personnel performing those functions is maintained. Suitability requires that the personnel have qualifications and experience that are:

- (1) current
- (2) relevant to the task at hand, and
- (3) at a level that enables the task to be successfully completed to the required standard.

GUIDANCE

5.11 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 6

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.6 - INCIDENT RESPONSE

FUNCTIONAL OBJECTIVE

6.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 1.6 is defined as:

Emergency, incident and accident response, management, and investigation functions are established and maintained

OUTCOME

6.2 Potential emergencies, incidents or accidents of a credible nature and which have consequences for the achievement of the Seaworthiness Outcome are identified.

6.3 Harm mitigation controls for potential emergencies, incidents or accidents are prepared in advance.

6.4 Emergencies, incidents or accidents are responded to in an appropriate manner.⁶

6.5 Learnings from emergencies, incidents or accidents are captured and used to improve management of risks to the Seaworthiness Outcome.

RATIONALE

6.6 Whilst the DSwMS aims to eliminate or minimise so far as is reasonably practicable (SFARP) hazards and risks to the Seaworthiness Outcome, emergencies, incidents and accidents can still occur.

6.7 This Functional Objective addresses the requirement to:

- a. anticipate and prepare for potential, credible and reasonably foreseeable⁷ emergencies, incidents and accidents

⁶ Requirements under this Functional Objective can vary significantly between mission systems. For example, immediate action in the event of a SUBMISS/SUBSUNK emergency / incident / accident may differ by orders of magnitude from that for a small boat incident/accident (e.g. a capsized RHIB).

⁷ Research has demonstrated that “we tend to be over confident about the accuracy of our forecasts and risk assessments and far too narrow in our assessment of the range of outcomes that may occur”. See “Management Risk: a New Framework”, Harvard Business Review, June 2012, Annette Mikes and Robert S. Kaplan.

- b. respond, investigate and report once an emergency, incident or accident occurs.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.6

Policy

- 6.8 The Capability Manager must enact policies that require duty holders to:
- a. anticipate credible and reasonably foreseeable⁷ emergencies, incidents and accidents
 - b. make preparations to:
 - (1) respond to the occurrence of emergencies, incidents and accidents so as to eliminate or minimise SFARP, the harm arising
 - (2) regain control and restore maritime mission systems and their enabling support systems to their original state of operation after an emergency, incident or accident occurrence
 - (3) capture learnings and use them to improve management of risks to the Seaworthiness Outcome
 - c. act when an emergency, incident or accident occurs to:
 - (1) respond so as to eliminate or minimise SFARP, the harm arising
 - (2) regain control and restore maritime mission systems and their enabling support systems to their original state of operation
 - (3) report the occurrence in accordance with Capability Manager requirements and any applicable statutory requirements
 - (4) capture learnings and use them to improve management of risks to the Seaworthiness Outcome
 - (5) report findings and actions.

IMPLEMENTATION

- 6.9 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:
- a. defined and documented
 - b. implemented through orders, instructions and procedures as necessary
 - c. resourced appropriately
 - d. monitored for adherence and achievement of the policy intent
 - e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

- 6.10 The Capability Manager must demonstrate that duty holders have identified:
- a. credible and reasonably foreseeable emergencies, incidents and accidents of a localised nature that may, irrespective of magnitude, result in localised harm (injury or fatality to one or several persons, or localised harm to the environment)
 - b. credible and reasonably foreseeable emergencies, incidents and accidents that may, irrespective of likelihood, result in catastrophic consequences
 - c. specific activities and related emergency, incident and accident requirements identified in legislation, which may include, but are not limited to:
 - (1) incidents at major hazard facilities ('major incidents')
 - (2) plant and structures
 - (3) hazardous chemicals and asbestos
 - (4) confined spaces and falls from heights
 - (5) maximum quantities of pollutants.
- 6.11 The Capability Manager must ensure duty holders demonstrate that they are prepared for the identified emergencies, incidents or accidents by:
- a. Having an appropriate, documented and auditable hazard/risk assessment. Application of Activity and Condition Based Compliance Obligations in accordance with GMCO 2.2 will provide a basis for this assessment.
 - b. Having a response plan⁸, where an assessment indicates that an emergency, incident or accident is credible, that considers and addresses:
 - (1) collaboration with other response agencies such as police and emergency services
 - (2) immediate action procedures in response to an occurrence – including needs for first responders and for first aid⁹
 - (3) recovery procedures to regain control and restore functionality following an occurrence

⁸ The level of detail in the response plan should be proportionate to the magnitude of the potential emergency, incident or accident.

⁹ Refer Defence Environment and Heritage, and Defence WHS policies for enterprise-wide guidance regarding first response and first aid requirements respectively.

- (4) requirements for post-incident site preservation
 - (5) requirements for notifications and reporting
 - (6) provision for exercising and testing of the procedures
 - (7) information, training and instruction on the implementation of the procedures.
- c. Regularly reviewing and revising each hazard/risk assessment and response plan to:
- (1) maintain currency and effectiveness
 - (2) maintain alignment with applicable legislation and enterprise-wide guidance
 - (3) continually learn and improve through the use of information obtained from analysis of any relevant incident and/or accident within, or external to, Defence to:
 - (a) determine the effectiveness of extant hazard and risk controls
 - (b) effect improvements to those controls
 - (c) improve the response plan.

6.12 The Capability Manager must demonstrate that duty holders respond to emergencies, incidents or accidents in accordance with approved procedures:

- a. to eliminate, or minimise SFARP, the harm to people and the environment
- b. to regain control and restore maritime mission systems and their enabling support systems to their original state of operation
- c. that address statutory or other requirements for
 - (1) site preservation
 - (2) notifications and reporting
 - (3) legal or professional privilege¹⁰.

¹⁰ Some incident investigations may be subject to legal professional privilege. Legal professional privilege is a protection afforded by the law to the confidential communication between a client and their lawyer. It applies to documents that have been created for the dominant purpose of obtaining legal advice or in contemplation of legal proceedings. Certain documents requested by notices may be subject to legal privilege, and external regulators (such as Comcare) cannot compel disclosure of such documents. The privilege is Defence's privilege and individual personnel are not free to waive that privilege without proper authority. If a document is marked privileged and confidential, or is otherwise known to be privileged, it is crucial that specific legal advice is sought from Defence Legal before its disclosure or provision.

6.13 The Capability Manager must demonstrate that duty holders conduct investigations in accordance with approved procedures that address:

- a. the nature and the root causes of the emergency, incident or accident
- b. the management of the response to the emergency, incident or accident and the adequacy of the response plan
- c. recommendations for corrective actions, improvements and follow up.

6.14 The Capability Manager must demonstrate that duty holders report the occurrence of emergencies, incidents and accidents in accordance with:

- a. the need to inform impacted duty holders of any impairment to the delivery of operational effect or continuity of capability
- b. external reporting requirements of federal and state/territory regulatory authorities such as Comcare, the Australian Radiation Protection and Nuclear Safety Agency, any state/territory environmental regulatory authority and the Australian Maritime Safety Authority
- c. internal reporting requirements, including those of the Defence Seaworthiness Authority.

6.15 The Capability Manager must demonstrate that duty holders have eliminated or minimised SFARP, the likelihood of recurrence of an emergency, incident or accident by:

- a. remediating deficiencies in the application of extant controls
- b. enhancing existing controls
- c. implementing new controls.

GUIDANCE

6.16 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 7

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 1.7 - PERFORMANCE MANAGEMENT & CONTINUOUS IMPROVEMENT

FUNCTIONAL OBJECTIVE

7.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 1.7 is defined as:

Performance indicators, assessment activities, intervention measures and assurance processes to manage seaworthiness are established, maintained and used to inform decision-making

OUTCOME

7.2 Evidence is obtained that establishes the level of confidence in achievement of the Seaworthiness Outcome and enables informed decision-making.

7.3 Effectiveness of controls for hazards and risks to the Seaworthiness Outcome is managed and continuously improved based on performance feedback.

RATIONALE

7.4 All systems require feedback to stay in control and operate effectively in a changing environment.

7.5 Performance measurement is required for good decision-making and performance must be measured and managed at the right level by those best placed to act. In the context of seaworthiness, measurement must be aligned to duty holders' roles and functions in the three lines of defence Risk Management and Assurance Framework¹¹ for management of hazards and risks to the Seaworthiness Outcome.

7.6 This requires an understanding of the type of risk (characterisation), the applicable risk management approach and the timeframes in which hazards and risks need to be managed. Response requirements for hazard and risk management may be vastly different depending on which line of defence the duty holder is operating in:

¹¹ The Risk Management and Assurance Framework is based on the enterprise risk governance concept of three lines of defence, which provides a formal structure to support risk based decision-making and oversight in complex undertakings. The first line comprises the business and operations management (including supporting systems) where risks are managed on a day-to-day basis. The second line comprises the systems of control, which act on the first line (including supporting systems). The third line comprises enterprise-wide controls in response to legislation, government direction or enterprise outcome requirements. Organisations are aligned to the three lines when risk ownership is clearly identified, and functionally independent levels of risk oversight and assurance are provided.

- a. local and major hazards are generally dealt with in the first line of defence with a very short feedback cycle
- b. chronic hazardous conditions are generally assessed through a systematic approach to assessing hazards and risks where feedback cycles are often over a longer timeframe, and are generally dealt with by the second and third lines of defence.

7.7 Performance measures must be embedded into decision-making mechanisms to ensure that decisions are evidence based, and that timely and appropriate actions are taken.

7.8 As a seaworthiness Risk Management and Assurance Framework, the three lines of defence are focused on two key aspects of performance:

- a. Maturity – to what extent is the process or control defined, implemented and followed
- b. Effectiveness – to what extent is the outcome being achieved (does the process or control deliver the necessary effect).

7.9 In the first instance, assurance must seek to provide evidence to those who are best placed to act and improve the system, and to those who own the control. Thus each line of defence must conduct self-assurance against 7.8 (a) and (b).

7.10 In addition, the second and third lines of defence rely on information from the line(s) below for their decisions. Hence duty holders need to conduct assurance independent of the line(s) below in order to have justified confidence in their decisions.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.7

Policy

7.11 The Capability Manager must enact policies that specify:

THE REQUIREMENT FOR DUTY HOLDERS TO ESTABLISH AND MAINTAIN A PERFORMANCE MANAGEMENT SYSTEM THAT ADDRESSES THE REQUIREMENTS OF THE DSWMS COMPLIANCE OBLIGATIONS

- a. how assurance will be conducted at the first and second lines of defence so as to:
 - (1) ensure that controls intended to address hazards and risks to the Seaworthiness Outcome are resourced, in place and effective for their intended purpose
 - (2) satisfy the Capability Manager's compliance strategy
- b. the requirement for duty holders to incorporate seaworthiness performance management and assurance information into decision making.

IMPLEMENTATION

7.12 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:

- a. defined and documented
- b. implemented through orders, instructions and procedures as necessary
- c. resourced appropriately
- d. monitored for adherence and achievement of the policy intent
- e. adjusted as necessary to ensure achievement of the policy intent

PERFORMANCE REQUIREMENTS

7.13 The Capability Manager must:

- a. Demonstrate understanding of the performance requirements of the DSwMS compliance obligations.
 - (1) Demonstrate understanding of the totality of assurance requirements and subsequent activities as they pertain to seaworthiness, including those assurance activities that occur outside of the chain of command of the Capability Manager. Where such assurance activities occur by other Groups or Services, the Capability Manager may reasonably expect that these are done on their behalf in the seaworthiness context and may through GMCO 1.2 establish appropriate mechanisms to influence assurance activities to meet the Capability Manager's requirements.
- b. Demonstrate the effectiveness of assurance for both the first and second lines of defence, including those assurance activities that occur outside of the chain of command of the Capability Manager.
- c. Demonstrate that action has been taken on the basis of feedback from performance measurement and assurance activities to maintain control and to continuously improve the ability to achieve the Seaworthiness Outcome.
- d. Demonstrate the current state of seaworthiness management for their scope of responsibility.
- e. Demonstrate the current state of seaworthiness of maritime mission systems for their scope of responsibility.

- f. Report to the DSwR, as soon as is reasonably practicable, any significant failures¹² of compliance with any DSwMS compliance obligation, along with the actions being taken to remedy the non-compliance and prevent any future non-compliance.

7.14 All duty holders must demonstrate an understanding of the Capability Manager's assurance requirements with respect to seaworthiness management.

GUIDANCE

7.15 Further guidance for this Functional Objective is available at the DSwMS website.

¹² The duty holder must report to the DSwR where Defence Materiality Criteria or trigger conditions set through the DSwMS are reached or exceeded. See DSWRSP 100 Process 5.

PART 3: GOAL 2 – MARITIME MISSION SYSTEM AND ENABLING SUPPORT SYSTEM ALIGN WITH CAPABILITY MANAGER'S AUTHORISED OPERATING AND SUPPORT INTENT

Contents

Part 3: Goal 2 – Maritime Mission System and Enabling Support System Align with Capability Manager's Authorised Operating and Support Intent	i
Chapter 1	1–1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 2.1 - DEFINE OPERATING AND SUPPORT INTENT	1–1
FUNCTIONAL OBJECTIVE	1–1
OUTCOME	1–1
RATIONALE	1–1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.1	1–2
Policy	1–2
IMPLEMENTATION	1–2
PERFORMANCE REQUIREMENTS	1–3
GUIDANCE	1–3
Chapter 2	2–1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 2.2 – ALIGN SYSTEMS DESIGN WITH OPERATING AND SUPPORT INTENT	2–1
FUNCTIONAL OBJECTIVE	2–1
OUTCOME	2–1
RATIONALE	2–1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.2	2–2
Policy	2–2
IMPLEMENTATION	2–3
PERFORMANCE REQUIREMENTS	2–4
GUIDANCE	2–4
Chapter 3	3–1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 2.3 – ALIGN REALISED SYSTEMS WITH DESIGN	3–1
FUNCTIONAL OBJECTIVE	3–1
OUTCOME	3–1

RATIONALE	3-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.3	3-2
Policy	3-2
IMPLEMENTATION	3-2
PERFORMANCE REQUIREMENTS	3-3
GUIDANCE	3-3
Chapter 4	4-1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 2.4 - TRANSITION SYSTEMS TO AND FROM SERVICE	4-1
FUNCTIONAL OBJECTIVE	4-1
OUTCOME	4-1
RATIONALE	4-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.4	4-2
Policy	4-2
IMPLEMENTATION	4-2
PERFORMANCE REQUIREMENTS	4-2
GUIDANCE	4-3
Chapter 5	5-1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 2.5 - MISSION AND SUPPORT SYSTEM REMAIN ALIGNED TO APPROVED OPERATING AND SUPPORT INTENT	5-1
FUNCTIONAL OBJECTIVE	5-1
OUTCOME	5-1
RATIONALE	5-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.5	5-2
Policy	5-2
IMPLEMENTATION	5-2
PERFORMANCE REQUIREMENTS	5-3
GUIDANCE	5-3

CHAPTER 1

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 2.1 - DEFINE OPERATING AND SUPPORT INTENT

FUNCTIONAL OBJECTIVE

1.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 2.1 is defined as:

The Capability Manager's Operating and Support Intent insofar as it relates to the Seaworthiness Outcome is defined to the level required to support seaworthiness management decisions.

OUTCOME

1.2 The Operating and Support Intent (OSI) of the maritime mission system is sufficiently defined such that at any point in time it provides the primary reference point for decisions related to the management of seaworthiness. The OSI must:

- a. establish the context for the consideration of Activity and Condition Based Compliance Obligation (ACCO) and thence the determination of the critical controls required to manage hazards and risks to the Seaworthiness Outcome
- b. establish the basis for the development, revision and maintenance of a compliance strategy for the maritime mission system and its enabling support system
- c. provide a clear focus for the integration of FIC to achieve that compliance strategy.

RATIONALE

1.3 Mission systems and their enabling support systems exist to achieve the specified operational effects determined by the Capability Manager. The OSI is the translation of these operational effects into specific operating and support parameters and requirements. While the OSI is a fundamental reference for capability management more broadly, it is also fundamental to the management of seaworthiness.

1.4 From the perspective of managing seaworthiness, the OSI must be defined to a level of detail necessary to support the identification and management of hazards, risks and controls to the Seaworthiness Outcome through the design, realisation, operation and maintenance of the mission system and its enabling support system.

1.5 Consideration must also be given as to whether the maritime mission system OSI sufficiently covers the operating intent and supportability requirements of embarked and deployable subsystems or whether certain embarked or deployable

subsystems require their own OSI. Where this is the case, the Capability Manager must ensure that the OSIs of embarked or deployable subsystems are compatible and are integrated with the mission system OSI (see ACCO 3.7).

1.6 The OSI must also continue to evolve through the Capability Life Cycle (CLC), and as changes occur to tasking, usage, operating environment, configuration, and support arrangements or capabilities (see GMCOs 2.5 and 3.3).

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.1

Policy

- 1.7 The Capability Manager must enact policy that specifies the:
- a. requirement for the scope of the OSI to cover all elements necessary to assure the Seaworthiness Outcome is achieved
 - b. required level of detail or specificity to which the OSI is defined and documented at each phase in the CLC, in order to:
 - (1) establish the context for the consideration of ACCO and thence the determination of the critical controls required to manage hazards and risks to the Seaworthiness Outcome
 - (2) establish the basis for the development of a compliance strategy for the maritime mission system and its enabling support system
 - (3) provide a clear focus for the integration of FIC to achieve that compliance strategy
 - c. document approval and control processes
 - d. configuration management procedures for managing changes to the OSI.

IMPLEMENTATION

- 1.8 The Capability Manager must:
- a. ensure that this policy is:
 - (1) defined and documented
 - (2) implemented through orders, instructions and procedures as necessary
 - (3) resourced appropriately
 - (4) monitored for adherence and achievement of the policy intent
 - (5) adjusted as necessary to ensure achievement of the policy intent
 - b. provide appropriate means of communicating the OSI to seaworthiness management duty holders.

PERFORMANCE REQUIREMENTS

- 1.9 The Capability Manager must demonstrate that the OSI is:
- a. valid (suitable and adequate) in that it enables traceability from the capability need to mission system configuration baselines that encompass:
 - (1) all FIC
 - (2) the life-of-type of the maritime mission system
 - (3) the maintenance regime
 - (4) all other mission system and supporting system parameters relevant to the achievement of the Seaworthiness Outcome
 - b. sufficient for seaworthiness management purposes in that it:
 - (1) is defined to a level that enables development and maintenance of the mission system compliance strategy and hence can inform application of ACCO across the CLC
 - (2) is current (i.e specified operational effects, defined tasking, usage and configuration of the mission system align to OSI), available and authorised for use
 - (3) allows impacts to the compliance strategy, resulting from any subsequent change in the OSI, to be determined and tracked in context of the achievement of the Seaworthiness Outcome
 - (4) informs and supports the outcomes required by GMCO 3.2.

GUIDANCE

- 1.10 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 2

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 2.2 – ALIGN SYSTEMS DESIGN WITH OPERATING AND SUPPORT INTENT

FUNCTIONAL OBJECTIVE

2.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 2.2 is defined as:

The functions and performance of the design of the maritime mission system and enabling support system, and the Capability Manager's authorised Operating and Support Intent are aligned, while hazards and risks to the Seaworthiness Outcome are eliminated or minimised SFARP

OUTCOME

2.2 The function and performance of the mission system and enabling support system as designed is fit for purpose in meeting the Capability Manager's intent. The hazards and risks to the Seaworthiness Outcome are understood and a strategy for managing the hazard and risk controls is in place.

RATIONALE

2.3 Maximising the likelihood of a maritime mission system achieving the specified operational effect where hazards and risks to people and the environment are minimised SFARP (the Seaworthiness Outcome) occurs where systems are designed, realised, transitioned, operated and supported in alignment with the Capability Manager's operating and support intent (OSI).¹

2.4 Incorporating the ability to achieve the Seaworthiness Outcome into the design of a system is generally more effective and efficient than correcting for shortcomings once the system is realised.

2.5 For pre-existing-systems², knowledge of the original operating and support intent is necessary if those systems are to be modified, operated and supported to achieve the Seaworthiness Outcome.

2.6 Design is an iterative process and design constraints for new or existing systems may require modification of an OSI through due process as the system moves through the Capability Life Cycle (CLC).

¹ The OSI is defined through compliance with GMCO 2.1.

² Typically MOTS / COTS type solutions.

2.7 The design will generally set inherent limitations on hazard and risk controls, which must be understood when operating within the OSI, but more importantly, when excursions beyond the OSI are necessary.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.2

Policy

2.8 The Capability Manager must enact policies that ensure that throughout the determination of requirements and the ensuing design development and selection activities for a maritime mission system and its enabling support system, the authorised OSI is considered in undertaking seaworthiness hazard identification, risk evaluation and the development of hazard and risk controls. The policy must ensure the consideration of hazards and risks including, but not limited to those:

- a. of a localised nature, such as risks to the functional performance of a discrete aspect of the maritime mission system necessary to achieve the specified operational effect(s), or which might result in localised harm, irrespective of magnitude (i.e harm is contained albeit consequences may range from minor injuries to fatality of one or several persons, or localised harm to the environment)
- b. that may result in catastrophic consequences, irrespective of likelihood, in order to ensure sufficient specific controls are provided, including command and management systems and arrangements
- c. that may arise throughout the CLC and which must take account of the disposal phase
- d. of an operational, safety or environmental nature that relate to the operation or support of the maritime mission system itself, including but not limited to:
 - (1) hazards created by the natural environment (sea state, temperature, pressure, wind)
 - (2) hazards the maritime mission system might create for the environment (through areas of operation, operating doctrine, etc.)
 - (3) critical hazards relating to safety, environment or operations; such as hazards relating to structural integrity, life support (including breathing atmospheres, firefighting and damage control), lifesaving capability and capacity, Suitably Qualified and Experienced Personnel (SQEP) for role etc. (note: this may be done through compliance with ACCOs)
 - (4) hazards created by the function and role of the maritime mission system, including:
 - (a) interactions between the maritime mission system and other mission systems
 - (b) interactions between the maritime mission system and the general public

- (c) reasonably foreseeable threats
 - (5) limitations in the state of technology
 - (6) hazards during all phases of the CLC
- e. relating to normal (at sea, alongside/in maintenance), degraded and emergency operating states of the maritime mission system
- f. relating to the capacity and suitability of the enabling support system to sustain the maritime mission system in a seaworthy state, including those:
 - (1) created through critical enabling functions such as operating and materiel maintenance philosophy and doctrines (compatibility and interoperability with existing approaches and systems), and safety and environmental management systems compatibility and interoperability³
 - (2) related to the adequacy of critical support system elements such as supplies, infrastructure, information systems, SQEP, manning to maintain critical functions, industry support and ability to grow or maintain support capability, emergency services, contingency arrangements, etc.
 - (3) related to funding or organisational change, such as funding shortfalls adversely affecting the provision of spares, documentation, or training; or reorganisation leading to transitional or ongoing shortfalls in personnel numbers or competencies, etc.
- g. relating to critical support system interface functions such as shore power, lift and load capabilities etc.

2.9 The policy must ensure that duty holders refer to the Activity and Condition Based Compliance Obligations (ACCOs) and identify those that are applicable in the context of the OSI. This will facilitate the consideration of, and identification of controls for, hazards and risks to be articulated in a compliance strategy as required by DSWRSP 100.

IMPLEMENTATION

2.10 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:

- a. defined and documented

³ For example a class of ship may be acquired that was designed with a maintenance philosophy which may differ from the approach the Capability Manager has embodied in policy. These philosophies must align or the differences and effects must be understood and risk managed. As another example, the safety management system employed by a contractor, may not have the necessary interoperability with the Capability Manager's safety management system.

- b. implemented through orders, instructions and procedures as necessary
- c. resourced appropriately
- d. monitored for adherence and achievement of the policy intent
- e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

2.11 The Capability Manager must be able to demonstrate that:

- a. The design is documented and traceable to the OSI.
- b. The OSI and the design are aligned:
 - (1) where the design is pre-existing (e.g. off the shelf), this may constitute a limitation to the OSI thus the impact of the limitation must be reflected through amendment of the OSI
 - (2) where no pre-existing design exists, the design must fully reflect the requirements articulated in the OSI.
- c. Alignment between the OSI and the design is maintained where either is required to change for any reason. Such circumstances may include, but are not limited to:
 - (1) the design cannot meet the specified requirement as articulated in the OSI
 - (2) the Capability Manager amends the OSI.
- d. Where the OSI is amended, it continues to meet the requirements of GMCO 2.1.
- e. Understanding of the approved design is sufficient that hazards and risks can be identified and assessed through application of the ACCO process to further develop the compliance strategy for the mission system and its enabling support system.

GUIDANCE

2.12 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 3

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 2.3 – ALIGN REALISED SYSTEMS WITH DESIGN

FUNCTIONAL OBJECTIVE

3.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 2.3 is defined as:

A maritime mission system and its enabling support system are realised consistent with the approved design

OUTCOME

3.2 The maritime mission system and its enabling support system are delivered as per the function and performance requirements of the approved design and the operating and support intent (OSI).

3.3 The hazard and risk controls are realised as articulated in the compliance strategy.

RATIONALE

3.4 Maximising the likelihood of a maritime mission system achieving the specified operational effect where hazards and risks to people and the environment are minimised so far as is reasonably practicable (SFARP) (the Seaworthiness Outcome) occurs where systems are designed, realised, transitioned, operated and supported in alignment with the Capability Manager's OSI.⁴

3.5 'Realised' in a Defence Seaworthiness Management System (DSwMS) context means the development, integration and commitment of all elements necessary to deliver the systems as designed to satisfy the OSI. It therefore includes all relevant FIC.

3.6 The systems as realised may result in further limitations on hazard and risk controls than intended through design (i.e functional and performance criteria for hazard and risk controls may not have been achieved). Where this is the case, these limitations must be understood and managed when transitioning to service. In some cases, in order to maintain control over hazards and risks SFARP, it may be necessary to realign the:

- a. configuration baseline

⁴ The OSI is defined through compliance with GMCO 2.1.

- b. life-of-type
- c. maintenance and support regime
- d. extant OSI.

3.7 Realisation occurs not only in the initial establishment of a mission system and its enabling support systems, but also when a system is taken out of the control of the Capability Manager's in-service representative for a major upgrade or configuration change. Refer also to GMCO 2.4.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.3

Policy

3.8 The Capability Manager must enact policies that, throughout the process of realising a mission system and enabling support system, ensure that:

- a. alignment is maintained with the OSI and where deficiencies exist in the realised systems, that policies and OIP require alignment is established either through:
 - (1) appropriate configuration management mechanisms
 - (2) amendment of the design and subsequently the OSI by SQEP and with the authority of the Capability Manager's representative
- b. the function and performance of the realised systems are verified to be in accordance with the requirements of the approved design
- c. adequate information is provided to enable the systems to be operated as intended, including but not limited to:
 - (1) the extant OSI
 - (2) design constraints and limitations of the realised systems (some of which may only become apparent during verification)
 - (3) controls for the hazard and risks to the Seaworthiness Outcome in the context of the design.

IMPLEMENTATION

3.9 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:

- a. defined and documented
- b. implemented through orders, instructions and procedures as necessary
- c. resourced appropriately
- d. monitored for adherence and achievement of the policy intent

- e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

3.10 The Capability Manager must demonstrate that:

- a. The realised system is traceable to the approved design.
- b. The function and performance requirements of the hazard and risk controls have been achieved in the realised system as designed. The level of validation and verification should be proportional to the level of risk associated with the system in question.
- c. Any hazards and risks introduced through test and evaluation activities are identified assessed and eliminated or minimised SFARP through application of suitable controls.
- d. Where aspects of the realised system are identified as deficient with respect to the design:
 - (1) the hazards and risks associated with the deficiencies have been identified and assessed
 - (2) the hazards and risks associated with the deficiencies have been addressed through controls developed in consultation with appropriate stakeholders
 - (3) the reasons for the deficiency and resultant corrective actions have been recorded and communicated as necessary.
- e. Where deficiencies in the realised system exist, or the Capability Manager amends the OSI during realisation, that alignment with OSI has been re-established and that the OSI continues to meet the requirements of GMCO 2.1 (this ensures line-of-sight is maintained between the capability need and the configuration baseline).
- f. The compliance strategy has been updated to maintain alignment with the realised system and to reflect any changes arising from (a) through (e) above. In some cases this may involve amendment of AMOCs where the realised system is unable to satisfy the function and performance criteria and therefore additional administrative controls or other controls as appropriate may be required.

GUIDANCE

3.11 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 4

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 2.4 - TRANSITION SYSTEMS TO AND FROM SERVICE

FUNCTIONAL OBJECTIVE

4.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 2.4 is defined as:

Management of hazards and risks to the Seaworthiness Outcome is maintained throughout transitions of the mission system and its enabling support system to and from control of the Capability Manager's in-service representative

OUTCOME

4.2 Seaworthiness management accountabilities and knowledge, necessary for the management of hazards and risks relating to the Seaworthiness Outcome, are formally transferred to the Capability Manager's in-service representative following realisation of a maritime mission system and its enabling support system.

4.3 Where a mission system and its enabling support system are removed from the control of the Capability Manager's in-service representative for any reason, accountabilities and knowledge, necessary for the management of hazards and risks relating to the Seaworthiness Outcome, are formally transferred to the appropriate authorities. Such circumstances may include, but are not limited to:

- a. mid-life upgrades
- b. major configuration changes.

RATIONALE

4.4 Maximising the likelihood of a maritime mission system achieving the specified operational effect where hazards and risks to people and the environment are minimised so far as is reasonably practicable (SFARP) (the Seaworthiness Outcome) occurs where systems are designed, realised, transitioned, operated and supported in alignment with the Capability Manager's operating and support intent (OSI).⁵

4.5 Transition in a seaworthiness context applies to the transfer of control of the mission system and its enabling support systems to and from the Capability Manager's in-service representative.

⁵ The OSI is defined through compliance with GMCO 2.1.

4.6 Transition into service includes all those elements that are necessary to achieve and sustain operational service.

4.7 Transition of mission systems and enabling support systems into and out of service can create uncertainties or ambiguities in accountabilities with respect to the management of hazards and risks to the Seaworthiness Outcome.

4.8 In addition, transition is frequently a point where knowledge necessary to effectively manage hazards and risks to the Seaworthiness Outcome is lost or inadequately transferred.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.4

Policy

4.9 The Capability Manager must enact policies that ensure the accountabilities and knowledge, necessary for the management of hazards and risks relating to the Seaworthiness Outcome, are formally transferred to and from the Capability Manager's in-service representative where mission systems and enabling support systems transition into or out of service.

IMPLEMENTATION

4.10 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:

- a. defined and documented
- b. implemented through orders, instructions and procedures as necessary
- c. resourced appropriately
- d. monitored for adherence and achievement of the policy intent
- e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

4.11 The Capability Manager must demonstrate that:

- a. accountabilities for the management of hazards and risks to the Seaworthiness Outcome are clear, understood, accepted and documented at all times
- b. the knowledge necessary for management of hazards and risks relating to the Seaworthiness Outcome of the mission system and its enabling support system is transferred during transitions of control to and from the Capability Manager's in-service representative
- c. transition planning takes into account all elements (including all FIC) necessary to manage hazards and risks to the Seaworthiness Outcome.

GUIDANCE

4.12 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 5

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 2.5 - MISSION AND SUPPORT SYSTEM REMAIN ALIGNED TO APPROVED OPERATING AND SUPPORT INTENT

FUNCTIONAL OBJECTIVE

5.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 2.5 is defined as:

A maritime mission system and its enabling support system remain aligned with the Capability Manager's approved operating and support intent

OUTCOME

5.2 Mission systems, and their enabling support systems, remain aligned with the approved operating and support intent (OSI) throughout the Capability Life Cycle (CLC).

RATIONALE

5.3 Maximising the likelihood of a maritime mission system achieving the specified operational effect where hazards and risks to people and the environment are minimised so far as is reasonably practicable (SFARP) (the Seaworthiness Outcome) occurs where systems are designed, realised, transitioned, operated and supported in alignment with the Capability Manager's OSI.⁶

5.4 GMCOs 2.1–2.4 aim to ensure that mission systems and their enabling support systems are aligned to the OSI throughout design, realisation and transition activities. However, misalignment can occur unintentionally if the significance of changes or decisions made during these activities are not recognised. Misalignment also often occurs as a result of the accumulation of minor changes over time. Examples of changes that can cause misalignment include:

- a. changes to the intended tasking
- b. changes to support arrangements
- c. work arounds or error rectifications that have unintended or consequential ('knock-on') effects, particularly where these effects occur in other parts of the system.

⁶ The OSI is defined through compliance with GMCO 2.1

5.5 Misalignment increases risk to the Seaworthiness Outcome. Constant vigilance is therefore required to detect misalignment. Once misalignment has been detected, action needs to be taken to either:

- a. return the mission system and its enabling support system to the level of functionality and performance required by the OSI and to meet the requirements of its compliance strategy
- b. redefine the OSI and update the compliance strategy through an approved process that takes into account the short and long term implications for achieving the Seaworthiness Outcome
- c. do a combination of (a) and (b) above.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.5

Policy

5.6 The Capability Manager must enact policies that:

- a. require duty holders to establish and maintain systems to monitor the alignment of a mission system and its enabling support system with its OSI
- b. on detection of misalignment, require duty holders to:
 - (1) return the mission system and its enabling support system to the level of functionality and performance required by the OSI and to meet the requirements of its compliance strategy; and/or
 - (2) use a structured and formalised change management approach, consistent with relevant Defence Seaworthiness Management System (DSwMS) compliance obligations and which must be applied to:
 - (a) variations to the OSI
 - (b) proposed modifications to a maritime mission system which are not driven by changes to the OSI but which affect the associated OSI
 - (c) variations to enabling support system functions which affect the associated OSI.

IMPLEMENTATION

5.7 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:

- a. defined and documented
- b. implemented through orders, instructions and publications
- c. resourced appropriately

- d. monitored for adherence and achievement of the policy intent
- e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

5.8 The Capability Manager must demonstrate that alignment between the OSI and the designed and realised systems is:

- a. being monitored effectively, not just for the impacts of major changes, but also for the cumulative impact of numerous small changes
- b. maintained where change is required for any reason, including, but not limited to:
 - (1) the Capability Manager amends the OSI
 - (2) changes to legislation require different solutions (e.g. emission control)
 - (3) technology becomes redundant or obsolete
 - (4) the life-of-type of a maritime mission system is extended
 - (5) new or changed operational requirements emerge
- c. controlled through a structured and formalised change management approach.

GUIDANCE

5.9 Further guidance for this Functional Objective is available at the DSwMS website.

PART 4: GOAL 3 – SYSTEMS ARE OPERATED AS INTENDED

Contents

Part 4: Goal 3 – Systems are Operated as Intended	i
Chapter 1	1–1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 3.1 - ENSURE OPERATING AND SUPPORT INTENT IS UNDERSTOOD	1–1
FUNCTIONAL OBJECTIVE	1–1
OUTCOME	1–1
RATIONALE	1–1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.1	1–2
Policy	1–2
IMPLEMENTATION	1–2
PERFORMANCE REQUIREMENTS	1–3
GUIDANCE	1–3
Chapter 2	2–1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 3.2 - OPERATE & SUPPORT SYSTEMS AS INTENDED	2–1
FUNCTIONAL OBJECTIVE	2–1
OUTCOME	2–1
RATIONALE	2–1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.2	2–2
Policy	2–2
IMPLEMENTATION	2–2
PERFORMANCE REQUIREMENTS	2–3
GUIDANCE	2–3
Chapter 3	3–1
GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 3.3 – OPERATING AND SUPPORT INTENT IS EVOLVED AS REQUIRED	3–1
FUNCTIONAL OBJECTIVE	3–1
OUTCOME	3–1
RATIONALE	3–1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.3	3–2
Policy	3–2

IMPLEMENTATION	3-2
PERFORMANCE REQUIREMENTS	3-2
GUIDANCE	3-3

CHAPTER 1

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 3.1 - ENSURE OPERATING AND SUPPORT INTENT IS UNDERSTOOD

FUNCTIONAL OBJECTIVE

1.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 3.1 is defined as:

The Capability Manager's operating and support intent is understood by operators and in-service support providers.

OUTCOME

1.2 Operators and in-service support providers of mission systems and their enabling support systems understand the boundaries articulated by the operating and support intent (OSI), beyond which the system of controls may not be effective in supporting the achievement of the Seaworthiness Outcome.

1.3 With respect to the OSI, operators and in-service support providers understand the:

- a. performance standards
- b. operating concept
- c. operating parameters/limits/envelope(s).

1.4 With respect to critical seaworthiness controls, operators and in-service support providers understand the:

- a. hazards and risks which the controls are designed to manage
- b. way which the systems of control act to prevent loss of control, regain control or mitigate loss of control, when operating within the boundaries of the OSI
- c. limitations of the systems of control when operating beyond the boundaries of the OSI.

RATIONALE

1.5 Hazard and risk controls are designed and realised to be effective and reliable when the mission system is operated and supported within the boundaries defined by the OSI (as required through compliance with all of Goal 2).

1.6 The compliance strategy of a mission system and its enabling support system defines the systems of control for hazards and risks to the Seaworthiness Outcome through the acceptable means of compliance for each Activity and

Condition Based Compliance Obligation (as required through compliance with GMCO 2.2).

1.7 If there is an excursion beyond the limits of the OSI, these systems of control may no longer be reliable and effectiveness may be impaired even on return to operation within the OSI.

1.8 Therefore, operators and in-service support providers must understand these limits so that they can remain within the bounds of the OSI or are deliberate in the management of hazards and risks where excursions beyond these boundaries occur.

1.9 Policies to be followed when boundary excursions occur in the operation or support of a mission system are at GMCOs 1.3, 3.2 and 3.3.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.1

Policy

1.10 The Capability Manager must ensure that policy is enacted that requires:

- a. that with respect to the OSI, operators and in-service support providers understand the:
 - (1) performance standards
 - (2) operating concept
 - (3) operating parameters/limits/envelope(s)
- b. that with respect to the systems of controls, operators and in-service support providers understand the:
 - (1) hazards and risks which the controls are designed to manage
 - (2) the ways in which the systems of control act to prevent loss of control, regain control or mitigate loss of control, when operating within the boundaries of the OSI
 - (3) the limitations of the systems of control when operating beyond the boundaries of the OSI.

IMPLEMENTATION

1.11 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:

- a. defined and documented
- b. implemented through orders, instructions and procedures as necessary
- c. resourced appropriately
- d. monitored for adherence and achievement of the policy intent

- e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

- 1.12 Operators and in-service support providers must demonstrate that:
 - a. they are mindful of all relevant aspects of the applicable OSI(s) as they relate to the performance of their duties
 - b. they can articulate and recognise the boundaries of the applicable OSI(s) that exist with respect to the performance of their duties
 - c. they understand how the systems of control that are relevant to the performance of their duties work and the limitations of these systems
 - d. that they understand the implications of their decisions and actions for the achievement of the Seaworthiness Outcome.

GUIDANCE

- 1.13 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 2

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 3.2 - OPERATE & SUPPORT SYSTEMS AS INTENDED

FUNCTIONAL OBJECTIVE

2.1 The Functional Objective of Governance and Management Compliance Based Obligation (GMCO) 3.2 is defined as:

A maritime mission system and its enabling support system are operated in accordance with the Capability Manager's operating and support intent.

OUTCOME

2.2 There is justified confidence that a maritime mission system is prepared, employed and supported in accordance with its approved operating and support intent (OSI) and will achieve the Seaworthiness Outcome.

2.3 Hazards and risks, as they relate to the achievement of the Seaworthiness Outcome by the maritime mission system and its enabling support system, are known, understood and eliminated or minimised so far as is reasonably practicable (SFARP), in the operation of the systems.

2.4 Evidence is available, through assurance, to justify confidence in the achievement of the Seaworthiness Outcome.

RATIONALE

2.5 Maximising the likelihood of a maritime mission system achieving the specified operational effect where hazards and risks to people and the environment are minimised SFARP (the Seaworthiness Outcome) occurs where systems are designed, realised, transitioned, operated and supported in alignment with the Capability Manager's OSI.¹

2.6 Hazard and risk controls are designed and realised to be effective and reliable when the mission system is operated and supported within the boundaries defined by the OSI.

2.7 The compliance strategy of a mission system and its enabling support system defines the systems of control for hazards and risks to the Seaworthiness Outcome through the acceptable means of compliance for each ACCO.

¹ The OSI is defined through compliance with GMCO 2.1.

2.8 If there is an excursion beyond the limits of the OSI, these systems of control may no longer be reliable and effectiveness may be impaired even on return to operation within the OSI.

2.9 Deliberate management of hazards and risks through an approved risk management methodology (established under GMCO 1.3) is required where excursions beyond the OSI occur.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.2

Policy

2.10 The Capability Manager must enact policies that require the authorities responsible for operating a maritime mission system and/or its enabling support system to:

- a. Establish and maintain systems to monitor the operation of a mission system and its enabling support system with respect to the approved OSI.
- b. Operate the system within its approved OSI SFARP.
- c. Follow an approved risk management methodology where excursions beyond the OSI occur in accordance with GMCO 1.3.
- d. Establish and maintain operational assurance requirements specific to a maritime mission system and its enabling support system. These requirements must be identified and then be verified as being met, current and consistent with the authorised OSI prior to operation. They include but are not limited to:
 - (1) certification, licensing, and authorisation
 - (2) orders, instructions and procedures
 - (3) Suitably Qualified and Experienced Personnel
 - (4) management arrangements consistent with intended operations.
- e. Establish and maintain appropriate arrangements for the enabling support system prior to the operation of a maritime mission system. These arrangements must address the preparedness of the support system to enable the maritime mission system to meet its approved OSI and achieve the Seaworthiness Outcome.

IMPLEMENTATION

2.11 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:

- a. defined and documented
- b. implemented through orders, instructions and procedures as necessary

- c. resourced appropriately
- d. monitored for adherence and achievement of the policy intent
- e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

2.12 The Capability Manager must demonstrate:

- a. traceability of maritime mission system and enabling support system usage to the OSI
- b. that monitoring of operations anticipates, warns and tracks excursions beyond the OSI
- c. that where excursions of a maritime mission system and/or its enabling support system outside the OSI occur, the appropriate hazard and risk management methodology is applied as required by GMCO 1.3 and any subsequent amendments to the OSI are made in accordance with GMCO 3.3.

GUIDANCE

2.13 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 3

GOVERNANCE AND MANAGEMENT COMPLIANCE OBLIGATION 3.3 – OPERATING AND SUPPORT INTENT IS EVOLVED AS REQUIRED

FUNCTIONAL OBJECTIVE

3.1 The Functional Objective of Governance and Management Compliance Obligation (GMCO) 3.3 is defined as:

The Operating and Support Intent of a maritime mission system and its enabling support system is evolved as required, to deliver the Seaworthiness Outcome

OUTCOME

3.2 The operating and support intent (OSI) reflects actual usage so that controls for hazards and risks to the achievement of the Seaworthiness Outcome, developed during the design and implemented during the realisation of the maritime mission system and its enabling support system, can be evolved through the remainder of the Capability Life Cycle (CLC).

3.3 The controls for hazards and risks to the achievement of the Seaworthiness Outcome specified in the compliance strategy provide justified confidence in the achievement of the Seaworthiness Outcome during operation in accordance with the OSI, throughout the life of type.

RATIONALE

3.4 Maximising the likelihood of a maritime mission system achieving the specified operational effect where hazards and risks to people and the environment are minimised SFARP (the Seaworthiness Outcome) occurs where systems are designed, realised, transitioned, operated and supported in alignment with the Capability Manager's OSI.²

3.5 Emerging requirements, government direction or other factors may lead to a maritime mission system being required for use outside of its original intended purpose. Thus an ongoing review of the OSI by the Capability Manager must continue until the eventual disposal of the maritime mission system, with the OSI evolving to reflect necessary changes in a timely manner. All such changes must be effectively communicated to all affected stakeholders.

² The OSI is defined through compliance with GMCO 2.1.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.3

Policy

- 3.6 The Capability Manager must enact policies that specify that:
- a. In the case of a discrete activity outside of the OSI (excursion), the activity must be deliberately risk-managed in accordance with GMCO 1.3. These circumstances should be an exception, rather than rule, under the DSwMS.
 - b. In all cases where there is misalignment between the OSI and the operation of the realised system, consideration must be given to any long-term implications and the requirement for formal change to any or all of the:
 - (1) configuration baseline
 - (2) life-of-type
 - (3) maintenance and support regime
 - (4) extant OSI.

IMPLEMENTATION

- 3.7 The Capability Manager must identify duty holders who are responsible for sponsoring and managing the policy and ensure that the policy is:
- a. defined and documented
 - b. implemented through orders, instructions and procedures as necessary
 - c. resourced appropriately
 - d. monitored for adherence and achievement of the policy intent
 - e. adjusted as necessary to ensure achievement of the policy intent.

PERFORMANCE REQUIREMENTS

- 3.8 The Capability Manager must demonstrate that:
- a. the OSI is measured in context of a mission systems configuration, the activities it is conducting and the operating environment in which those activities are being performed
 - b. in context of the measures above, alignment is maintained or re-established where required between the OSI and the realised system
 - c. any changes to the OSI are made through a formal controlled process that ensures decisions, impacts and implications are understood and communicated to relevant stakeholders.

GUIDANCE

3.9 Further guidance for this Functional Objective is available at the DSwMS website.

CONTENTS

Part 1: ACCO Goal

Part 2: ACCO Goal 1 - The functions necessary for the mission system to exist and endure are established, monitored and maintained

Part 3: ACCO Goal 2 - The functions necessary for mission systems to move and maintain position are established, monitored and maintained

Part 4: ACCO Goal 3 - The functions necessary for the mission system to perform the tasks are established, monitored and maintained

PART 1: ACCO GOAL

Contents

Contents	i
Part 1: ACCO GOAL	i
Chapter 1	1-1
GOALS AND UNIFYING REQUIREMENTS FOR ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATIONS	1-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION GOALS	1-1
Outcome	1-1
UNIFYING REQUIREMENTS	1-1
PHYSICAL REQUIREMENTS	1-4
Outcome	1-4
Rationale	1-4
Physical element requirements	1-6
PERSONNEL REQUIREMENTS (COMPETENCY AND CAPACITY)	1-7
Outcome	1-7
Rationale	1-7
Personnel element requirements	1-8
COMMAND AND CONTROL REQUIREMENTS	1-9
Outcome	1-9
Rationale	1-9
Command and control element requirements	1-10
SECURITY REQUIREMENTS	1-11
Outcome	1-11
Rationale	1-11
Security element requirements	1-11
IMPLEMENTATION MATURITY REQUIREMENTS	1-12
Outcome	1-12
Rationale	1-12
Implementation maturity element requirements	1-12
GUIDANCE	1-13

CHAPTER 1

GOALS AND UNIFYING REQUIREMENTS FOR ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATIONS

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION GOALS

1.1 At the mission system level, the Activity and Condition Based Compliance Obligation (ACCO) goals below, in conjunction with the Governance and Management Compliance Obligation (GMCO) goals, collectively achieve the Seaworthiness Outcome (the “Aim”).

Goal 1: The functions necessary for the mission system to exist and endure are established, monitored and maintained

1.2 The structural elements of a maritime mission system are able to provide the physical form that withstands foreseeable loads and impacts; maintains a boundary with the external environment; and contains and protects an internal environment suitable for personnel and systems.

Goal 2: The functions necessary for mission systems to move and maintain position are established, monitored and maintained

1.3 Mission systems usually need to position themselves in order to achieve their defined tasks. Each mission system therefore needs to be able to maintain control of its speed, course, orientation and position to the degree required by its OSI.

Goal 3: The functions necessary for the mission system to perform the tasks are established, monitored and maintained

1.4 The purpose of a mission system is to achieve the required operational effects through performing defined tasks. This will often involve the use of specific military systems (e.g. detectors and effectors). The capability to perform a defined task will often need to be maintained or restored in the face of damage or impairment.

Outcome

1.5 All functions necessary for the mission system to exist and endure, move and maintain position, and to perform the defined tasks are aligned with the operating and support intent (OSI), and the specified functional performance of the physical, personnel, and command and control constituents are established, monitored and maintained for the intended life.

UNIFYING REQUIREMENTS

1.6 Consistent with the Defence Seaworthiness Management System (DSwMS) outcome-focused goal-based regulatory approach; the goals above are underpinned through functional objectives. The functional objectives sum to deliver the goals which in turn, sum to deliver the aim (the Seaworthiness Outcome). Each ACCO articulates a set of functional objectives. The design, realisation and operation of a

mission system must result in solutions which meet those functional objectives in context of its OSI.

1.7 Each ACCO also articulates requirements and considerations which pertain to risks which might prevent achievement of the functional objective, or which may result through achieving the functional objective. For example, a ballast water system may be necessary to achieve stability (a functional objective). A failure to maintain or operate the ballast system correctly may result in failure to achieve the stability required. However, achieving stability through ballast water transfer, may introduce a risk to the environment through harmful pest translocation. In addition, this may also introduce a flow-on risk to operating through possible denial of port access as a result of failing to meet local environmental management standards.

1.8 The ACCOs aim to consolidate the current knowledge of hazards, risks and controls as they relate to maritime mission systems, at a functional level, that guides and enables selection and application of controls appropriate in context of the OSI. That is the functional objectives are defined in a manner that allows them to be interpreted and applied so a particular mission system can control hazards and risks as appropriate to its specific context.

1.9 Functional objectives are achieved through the collective and integrated contribution of the constituent elements of a mission system - physical, personnel and command and control. That is:

- a. Physical elements form the basis of all mission systems. Physical elements include all the inanimate things that are necessary to constitute the mission system, as distinct from personnel. This includes, for example, structures, machinery, equipment, hardware, software, consumables (such as fuels, lubricants, munitions) and so on.
- b. Almost all mission systems require interaction with personnel. The OSI and the physical elements of a mission system will usually set the personnel requirements, while human factors will usually have to be taken into account in the design and use of the physical elements. In accordance with GMCO 2.1 and 3.1, the OSI needs to be sufficiently defined and understood to provide guidance with respect to personnel and their interaction with the physical elements. Personnel must be trained and perform their tasks in an environment that enables the task to be sustained - they must be effective in their role which also requires that they be kept safe and well.
- c. All mission systems operate in complex and dynamic environments. For a mission system to achieve its defined tasks, decisions must be made, communicated and executed - efficiently and effectively. This requires each mission system to have appropriate integration of physical elements and personnel, as well as systems of communication, authority, command and control.

1.10 It follows that seaworthiness hazards and risks are managed through the function and performance of the constituent elements. Failure of those constituents to function and perform to the required levels lessens the likelihood of achieving the operational effect for the defined task; and may expose personnel, public and the

environment to harm (there is risk to the Seaworthiness Outcome). The Seaworthiness Regulator is interested in consequences relating to the inability of the mission system to achieve the defined task, harm to persons and harm to the environment. Therefore, the mission system must have systems of control that:

- a. in the first instance, prevent loss of control
- b. where control has been lost, regain control
- c. and should regaining control be unachievable, eliminate or minimise consequences.

1.11 The above concepts can be represented through the following argument. If a mission system has systems of control designed to meet the ACCO Functional Objectives in the context of its OSI and it can demonstrate through these systems of control that:

- a. physical elements of a mission system are suitable (fit for purpose), reliable and supportable
- b. **and** personnel elements are competent in their roles and there are sufficient numbers to sustain the task
- c. **and** decision rights (including authorities and delegations) as applicable to achieving activities and tasks are understood and executed appropriately, and decisions are made by the authorised persons in a timely manner and executed effectively in accordance with the intent
- d. **and** appropriate security provisions to address vulnerabilities are established, monitored and maintained
- e. **and** all systems of control are implemented to a level of maturity that is appropriate and effective for the mission system, given its phase in the Capability Life Cycle (CLC)

Then it is reasonable to expect that the systems of control can act collectively to achieve the Seaworthiness Outcome.

1.12 Therefore, ACCO requirements call for solutions (systems of control) that act on or are enacted through one or more of these constituents to ensure they function and perform to the appropriate levels as they apply to each functional objective in the context of the OSI (refer to DSwRSP 100 for further information regarding systems of control).

1.13 There are a set of common and unifying requirements that apply to all constituents and across all ACCOs, as well as unique requirements specified in each ACCO. The unifying requirements for each constituent are described below.

1.14 The systems of control must meet both the unique requirements specified in each ACCO, as well as the common and unifying requirements for each constituent described below.

1.15 The ACCO requirements also recognise that the maturity of controls must be appropriate to the requirements of the specific phase of the CLC that the mission system is currently in. For example, during commissioning, there may be a requirement that fire-fighting and damage control functions be available prior to specific test and trial activities. In addition, the requirements of each ACCO will have associated vulnerabilities (point of weakness) that must be identified, managed and controlled. Thus, security is an integral component of a system of control and must be considered across each ACCO.

PHYSICAL REQUIREMENTS

1.16 The physical elements general requirement is defined as:

All physical elements necessary to achieve the ACCO Functional Objectives in accordance with the OSI are established, monitored and maintained for the intended life.

Outcome

1.17 Physical elements function to a level of performance that enables the mission system to operate in accordance with its OSI (achieved in conjunction with the specific physical element requirements of each ACCO).

1.18 Physical elements function at a level of reliability that enables the mission system to operate in accordance with its OSI.

1.19 Physical elements are supported in a way that enables the mission system to operate in accordance with its OSI.

Rationale

1.20 The specific functional objective and requirements of physical elements are defined in the ACCOs, therefore the common unifying requirements that follow focus on the critical characteristics applicable to all physical elements from a seaworthiness perspective, as follows:

- a. **Reliability.** The performance characteristics of physical elements and systems, which are primarily about the ability of an element or system to perform its required functions within specified tolerances under specified conditions for a specified time. The reliability of physical elements and systems needs to be at levels which allow the mission system as a whole to achieve its defined tasks and availability as specified in the OSI.
- b. **Supportability.** The characteristic of physical elements and systems, which is primarily about the ability of an element or system to be maintained at or restored to meet the specified performance and condition. The supportability of physical elements and systems needs to be at levels which allow the Mission System as a whole to achieve its defined tasks and availability as specified in the OSI, for the intended life.

- c. **Compatibility.** The characteristic of physical elements and systems, which is primarily about the ability of an element or system to coexist or interact appropriately with other elements, systems, personnel and the environment.

1.21 Many physical elements are difficult to change once the mission system has been realised. Thus it is imperative that the functions and performance align with the operating intent and that reliability and supportability of these physical elements be planned and managed from as early as practicable in the Capability Life Cycle. This in turn, requires that the OSI is sufficiently evolved and understood to provide the necessary guidance in accordance with GMCO 2.1 and 3.2.

1.22 Moreover, ongoing management of the physical elements, including all supportability requirements, is necessary to sustain achievement of the Seaworthiness Outcome in accordance with GMCO 2.5 and 3.3. For a variety of reasons, physical elements are subject to degradation over time which can lead to loss of functional performance that may be gradual or catastrophic in nature. In addition, other physical elements are consumed and require replenishment on an ongoing basis. Therefore, physical elements require upkeep, update, resupply and upgrade (in accordance with OSI requirements); all of which need to be supported through supply chains. In addition, physical elements may become obsolete due to them no longer being needed, or being no longer supportable.

1.23 Physical elements are required to interact with other physical elements, personnel and the environment. Where such interactions occur consideration must be given to the compatibility of physical elements consistent with the Seaworthiness Outcome. Such considerations may include but are not limited to:

- a. human factors and ergonomics
- b. selection of materials and substances
- c. requirements for isolation or separation

1.24 Circumstances may arise where physical elements do not function reliably or are not supported appropriately. Such, circumstances may arise where, for example:

- a. operating environments are not adequately considered during design
- b. systems are operated outside of the original design intent
- c. systems support is not aligned with use (e.g. maintenance regime inadequate)
- d. inappropriate deferral of maintenance occurs
- e. trade off of longer term maintenance requirements occur in favour of shorter term operational requirements where remediation action is not conducted (e.g. not planned and executed)
- f. operation of a maritime mission system exceeds design criteria through unforeseen event (e.g. excessive sea state).

Physical element requirements

1.25 The duty holder must demonstrate that physical elements and systems as they relate to each ACCO:

- a. Perform their functions at a level of reliability that enables the mission system to operate in accordance with its OSI. This means that:
 - (1) each physical element has a defined reliability target or standard against which it is being managed
 - (2) the reliability target or standard is traceable and reconcilable to the OSI
 - (3) the costs, benefits and risks associated with managing to that standard, from the perspective of the mission system as a whole are understood
 - (4) the actual reliability is being monitored and managed with respect to the target or standard.

- b. Are supported in a way that enables the mission system to operate in accordance with its OSI. This means that:
 - (1) each physical element has a defined support regime covering supply and replacement, performance and condition monitoring, maintenance and repair, and obsolescence
 - (2) the support regime is traceable and reconcilable to the OSI
 - (3) the costs, benefits and risks associated with using the defined support regime, from the perspective of the mission system and its supporting systems as a whole are understood
 - (4) adherence to the support regime is being monitored and managed
 - (5) the support regime is being regularly reviewed and improved, from the perspective of the mission system and its supporting systems as a whole.

- c. Are compatible, taking into account:
 - (1) system to system interactions (e.g. electromagnetic, cathodic, noise and vibration, thermal transfer, contaminant transfer, vent locations relative to intake locations)
 - (2) human factors, including but not limited to maintenance access, ergonomics and ease of use, required level of operator skill and reliability, impact of human error (e.g. failsafe modes), health and safety and required staffing levels
 - (3) environmental factors, including but not limited to production of airborne and waterborne pollutants, use and management of environmentally harmful substances.

PERSONNEL REQUIREMENTS (COMPETENCY AND CAPACITY)

1.26 The Personnel general requirement is defined as:

Activities necessary to achieve the ACCO Functional Objectives are performed effectively by appropriate numbers of personnel who are suitably qualified and experienced.

Outcome

1.27 Activities required to achieve each ACCO Functional Objective in the context of the OSI are performed effectively.

1.28 People performing these activities are Suitably Qualified and Experienced Personnel (SQEP).

1.29 There are appropriate numbers of SQEP to conduct these activities, given the expected tempo and duration of the mission system tasks, and the potential impact of sickness, injury or loss of personnel.

Rationale

1.30 Almost all mission systems require input from, and interaction with, personnel.

1.31 Specific skills and expertise are required to perform the activities that deliver the ACCO Functional Objectives.

1.32 Personnel obtain specific skills and expertise through a combination of:

- a. training and education, leading to recognised qualifications
- b. experience in the specific activities and tasks, including performance feedback to ensure the experience that is gained is correct
- c. experience in similar related fields.

1.33 Once gained, the skills and expertise are kept current through ongoing development to maintain currency with evolving techniques, methodologies and technologies.

1.34 Activities that deliver each Functional Objective therefore need to be performed by people who have qualifications and experience that are current, relevant to the task at hand and at a level that enables the activities to be successfully completed to the required standard - Suitability Qualified and Experienced Personnel (SQEP).

1.35 In order to maximise the likelihood of achieving the defined task on an ongoing basis, an appropriate number of SQEP are required. While a given task or activity may be performed by fewer personnel in the short term, this is likely to compromise the ability to sustain the activities in the longer term. Therefore, appropriate numbers of SQEP are required in order to sustain activities and tasks for

the intended tempo and duration. DSwMS recognises that circumstances may arise where allocation of SQEP to activities and tasks is not ideal, but may be necessary in the short term. However, under DSwMS this should be an exception and is not considered acceptable as a standard practice.

1.36 From the perspective of the mission system as a whole, consideration also needs to be given to the extent to which individual SQEP are spread across multiple activities, so as to avoid single points of failure and resource contention between multiple concurrent activities.

Personnel element requirements

1.37 The duty holder must demonstrate that:

- a. The requirements for qualifications and experience necessary to perform the activities and tasks as they relate to the ACCO Functional Objectives in the context of the OSI are identified, established, maintained and documented.
- b. Personnel conducting activities and tasks as they relate to the ACCO Functional Objectives are suitably qualified and experienced. Suitability requires that the personnel have qualifications and experience that are:
 - (1) current
 - (2) relevant
 - (3) at a level that enables the task to be successfully completed to the required standard(s).
- c. There are appropriate numbers of suitably qualified and experienced people to conduct the activities that deliver the ACCO Functional Objectives, given the expected tempo and duration of the mission system tasks, and the potential impact of sickness, injury or loss of personnel.
- d. Sufficient consideration is given to the use of on the job training (OJT) in developing suitable skills, qualifications and experience; and allowances made for appropriate numbers of SQEP to continue the normal, essential and emergency functions of the maritime mission system whilst training requirements are catered for.
- e. Appropriateness of qualifications and experience is verified through performance review.
- f. Personnel performing the necessary activities and tasks are appropriately authorised to do so.

1.38 Where the duty holder cannot demonstrate the above performance requirements in the case of a discrete activity or task, or in the case of any excursion of the mission system outside its OSI, then they must demonstrate that hazards and risks are deliberately managed through an approved risk management methodology (established under GMCO 1.3).

COMMAND AND CONTROL REQUIREMENTS

1.39 The Command and Control element objective is defined as:

Systems of command and control that enable the integration, coordination and control of physical and personnel elements to achieve the ACCO Functional Objectives are established, monitored and maintained.

Outcome

1.40 Decision rights (including authorities and delegations) as applicable to achieving activities and tasks are understood and executed appropriately.

1.41 Decisions are made by the authorised persons in a timely manner.

1.42 The decisions are executed effectively in accordance with the intent.

Rationale

1.43 Maritime mission systems typically operate in complex, dynamic environments and therefore a mission system must respond and adapt in an appropriate timeframe to achieve the specified task. This requires an understanding of the operating environment and objectives, and the ability to make decisions, provide direction and enact those decisions.

1.44 Command and Control, therefore, are defined as follows:

- a. Command is the exercise of authority, decision making and communicating intent.
- b. Control is mechanism by which the intent is enacted.

1.45 The exercise of command requires a clear understanding of accountabilities, and specifically decision rights within those accountabilities. Where accountabilities and decision rights are not understood, achieving the Seaworthiness Outcome is compromised. The principles of Command and Control apply at multiple levels from the strategic, through operational to routine tasks.

1.46 This performance requirement applies to those levels of Command and Control inherent to the mission system and that are required to integrate and apply the constituent elements of the mission system to the task.

1.47 The intent is to ensure Command and Control is appropriate and effective as it relates to the mission system achieving the Seaworthiness Outcome.

1.48 Within a mission system Command and Control manifests in two forms, Command and Control for the purpose of enabling and maintaining the basic functioning of the mission system, versus Command and Control to use the mission system as a whole to achieve the defined task and the operational effect (e.g. use the mission system to conduct HADR operations).

Command and control element requirements

1.49 The duty holder must demonstrate that in relation to the activities required to achieve each Functional Objective in the context of the OSI that:

- a. The decision rights (including authorities and delegations) as applicable to achieving activities and tasks are defined, documented and understood. This means that
 - (1) individuals are Suitably Qualified and Experienced (SQEP) to hold their decision rights and accountabilities
 - (2) individuals understand the limits of their decision rights and know when to hand off and to where.
- b. Decisions are made at the right level, by the authorised persons in a timely manner. This means that:
 - (1) the authorised persons understand the functions and interdependencies of the physical and personnel elements of the mission system and its supporting systems, and hence understand the implications of their decisions (including potential 2nd and 3rd order implications, and short and long term implications) on the Seaworthiness Outcome
 - (2) the authorised persons know what information is required to make a given decision
 - (3) information necessary to make informed decisions is available at the right time and in a form that supports effective decision making.
- c. The decisions are executed effectively in accordance with the intent. This means that:
 - (1) decisions are communicated and direction given in a precise and timely way that enables the accountable SQEP to execute them effectively
 - (2) there are sufficient resources to ensure that this communication and direction is given, taking into account any need for redundancy or alternative channels
 - (3) implementation of decisions is monitored and recorded for completeness and effectiveness, and feedback is provided to both decision-makers and those executing the decisions.

1.50 Command and Control systems must give consideration to the cognitive abilities and limits of personnel to process information relating to complex activities and environments. Examples include:

- a. littoral operations involving concurrent operations, troop movements and deployed assets, where control may need to devolved in a planned, transparent and timely manner

b. use of decision support systems in highly complex multi-threat situations.

1.51 Where automated decision making and control mechanisms are used, specific consideration must be given to the authorisation of automated systems and the handover and intervention points between manual and automatic control.

SECURITY REQUIREMENTS

1.52 The Security objective is defined as:

Appropriate security provisions to address vulnerabilities that may prevent achievement of ACCO Functional Objectives are established, monitored and maintained.

Outcome

1.53 Security-related vulnerabilities are addressed in proportion to their consequences to ACCO Functional Objectives.

Rationale

1.54 Each ACCO Functional Objective comprises a series of requirements that are considered in the context of the constituent element requirements described above. These requirements will have associated vulnerabilities (points of weakness) that may be exploited intentionally or unintentionally and hence pose a risk to achievement of the Functional Objective. Security refers to the identification, management and control of these vulnerabilities and is therefore, a critical component of an effective system of control.

Security element requirements

1.55 Vulnerabilities may be exploited through, for example, attack, theft, infiltration or compromise, harassment and so on, resulting in an inability to achieve the Functional Objective and hence the Seaworthiness Outcome.

1.56 Therefore, vulnerabilities must be identified, assessed and addressed in the context of each Functional Objective and in the context of the constituent elements.

1.57 Given the growing interconnectedness and interdependencies between physical and information systems, new and novel vulnerabilities are arising. These must be considered across all ACCOs. For example, a propulsion system interfaced with a control and monitoring system, which is also connected to an external communication system, may allow a cyber-intrusion that results in enemy control of the propulsion system. Similarly digital navigation information may be maliciously altered to cause the grounding of a mission system.

1.58 Specific security considerations are included in ACCO Functional Objectives as required.

1.59 Consideration must also be given to prescribed compliance requirements relevant to security. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory

and other requirements relevant to the seaworthiness context (refer to guidance for further details).

IMPLEMENTATION MATURITY REQUIREMENTS

1.60 The Implementation Maturity objective is defined as:

Systems of control required for each Functional Objective are implemented to a level of maturity that is appropriate and effective for the mission system, given its phase in the Capability Life Cycle (CLC).

Outcome

1.61 Systems of control are implemented to the level necessary for the phase of the CLC that the mission system is in.

1.62 Systems of control are progressively implemented from as early as practicable in the mission system's CLC.

Rationale

1.63 The ACCO performance requirements take a life cycle view of the systems of control themselves, within the broader context of the mission system lifecycle overall.

1.64 In most cases there will be a degree of alignment between the control and mission system life cycles. Therefore, there are requirements for the systems of control to be implemented to certain maturity levels at each phase of the mission system life cycle, or in some cases at specified milestones. For example fire detection and fighting systems may need to be fully functional at a specific mission system construction milestone.

1.65 In addition, giving consideration to the systems of control early in the mission system life cycle enables better control solutions to be developed and integrated into the mission system and at lower cost than if they are retrofitted as an afterthought.

1.66 The implementation requirements therefore aim to ensure that the implementation of systems of control starts as early as practicable in the mission system life cycle and then progresses in line with the needs of the mission system as it moves through its CLC.

Implementation maturity element requirements

1.67 Capability Managers must ensure that each system of control achieves maturity levels appropriate to the functional need for that system of control in the mission system CLC.

1.68 Control maturity levels must address the following considerations:

- a. context for effective and efficient systems of control has been established
- b. systems of control are designed to be Fit for Purpose

- c. systems of control are realised as designed
- d. effectiveness of systems of control is enabled through life
- e. systems of control are operated and maintained as designed through life
- f. efficiency and effectiveness of systems of control is continually improved.

1.69 The required levels of maturity for each of these considerations at each phase in the CLC are set out in the Guidance.

GUIDANCE

1.70 Further guidance for this Functional Objective is available at the DSwMS website.

PART 2: ACCO GOAL 1

Contents

Part 2: ACCO GOAL 1	i
Chapter 1	1-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.1 - STRUCTURAL INTEGRITY	1-1
FUNCTIONAL OBJECTIVE	1-1
OUTCOME	1-1
RATIONALE	1-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.1	1-2
GUIDANCE	1-5
Chapter 2	2-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.2 - BUOYANCY, TRIM AND STABILITY, AND SEAKEEPING	2-1
FUNCTIONAL OBJECTIVE	2-1
OUTCOME	2-1
RATIONALE	2-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.2	2-2
GUIDANCE	2-3
Chapter 3	3-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.3 - ELECTRICAL POWER	3-1
FUNCTIONAL OBJECTIVE	3-1
OUTCOME	3-1
RATIONALE	3-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.3	3-2
GUIDANCE	3-2
Chapter 4	4-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.4 - ILLUMINATION AND LIGHTING	4-1
FUNCTIONAL OBJECTIVE	4-1
OUTCOME	4-1
RATIONALE	4-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.4	4-2

Chapter 5	5-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.5 - AUXILIARY SYSTEMS AND HOTEL SERVICES	5-1
FUNCTIONAL OBJECTIVE	5-1
OUTCOME	5-1
RATIONALE	5-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.5	5-2
GUIDANCE	5-5
Chapter 6	6-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.6 - REPLENISHMENT AND EXTERNAL SERVICES	6-1
FUNCTIONAL OBJECTIVE	6-1
OUTCOME	6-1
RATIONALE	6-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.6	6-2
GUIDANCE	6-5
Chapter 7	7-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.7 - SURVIVABILITY AND PRESERVATION OF LIFE	7-1
FUNCTIONAL OBJECTIVE	7-1
OUTCOME	7-1
RATIONALE	7-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.7	7-3
GUIDANCE	7-6
Chapter 8	8-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.8 - COMMUNICATIONS	8-1
FUNCTIONAL OBJECTIVE	8-1
OUTCOME	8-1
RATIONALE	8-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.8	8-3
GUIDANCE	8-6
Chapter 9	9-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.9 - INTEGRATED CONTROL SYSTEMS	9-1
FUNCTIONAL OBJECTIVE	9-1
OUTCOME	9-1
RATIONALE	9-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.9	9-2
GUIDANCE	9-5

CHAPTER 1

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.1 - STRUCTURAL INTEGRITY

FUNCTIONAL OBJECTIVE

1.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 1.1 is defined as:

Appropriate structural integrity of physical elements including hull, structures and fittings is established, monitored and maintained

OUTCOME

1.2 The structural elements of a maritime mission system are able to provide the physical form that withstands foreseeable loads and impacts; maintains a boundary with the external environment; and contains and protects an internal environment suitable for personnel and systems.

RATIONALE

1.3 Structural integrity is a performance characteristic of physical elements and systems, which requires the establishment and maintenance of the following conditions:

- a. structural strength
- b. boundary integrity
- c. durability
- d. ergonomics.

1.4 Of all physical attributes, structural integrity is fundamental to enable a mission system to exist and endure. Structural integrity is achieved through:

- a. the design and the margins incorporated into that design
- b. the build quality
- c. the in-service operation and maintenance practices applied over the design life of the mission system.

1.5 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. the impaired performance of physical elements and systems
- b. loss of a platform and associated consequences to people and the environment as a result of the catastrophic failure of the structure

- c. the reduction of the service life of a mission system
- d. the loss of availability associated with emergent structural maintenance.

1.6 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. environmental contamination and/or harm to personnel through use of structural treatments (e.g. antifouling and anticorrosive coatings)
- b. safety related consequences associated with inspections, survey and maintenance (e.g. working from heights, confined space entry)
- c. limitations on future configuration changes, caused by optimising structural integrity around the initial design (e.g. high-speed craft optimised to be lightweight are then unable to be fitted with additional equipment for a change of role).

1.7 A common cause of the above consequences is usage outside of, or support not in accordance with the OSI.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.1

1.8 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

1.9 Structural Integrity is linked to most other ACCOs, but specifically requires consideration in conjunction with:

- a. ACCO 1.2 – Buoyancy, Trim and Stability, and Seakeeping
- b. ACCO 1.6 – Replenishment and External Services
- c. ACCO 1.7 – Survivability and Preservation of Life
- d. ACCO 2.1 – Propulsion and Manoeuvrability
- e. ACCO 2.3 – Berthing, Mooring, Anchoring and Towing
- f. ACCO 3.4 – Carriage and Handling of Loads
- g. ACCO 3.5 – Carriage of Explosive Ordnance and Dangerous Goods
- h. ACCO 3.7 – Embarked and Deployable Sub-systems.

1.10 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

1.11 **Structural Strength** – the ability to withstand static and dynamic loads imposed on the whole structure and on localised areas. Consideration must be given to all loads that may be foreseen, including, but not limited to those which may be imparted through:

- a. the structure and structural elements of the mission system, to ensure that the structure itself does not present a hazard (e.g. permanent or temporary distortion through inherent structural mass)
- b. loads in operation associated with, but not limited to:
 - (1) variation in speed, turning, pitching, rolling, yawing and slamming
 - (2) variable loading conditions associated with fuels, ordnance, outfit and ballast
 - (3) berthing, mooring, anchoring and towing, docking, tug operations as covered under ACCO 2.3
- c. external environmental conditions including:
 - (1) wind
 - (2) wave height and period
 - (3) temperature (air and sea)
 - (4) water pressure due to depth
 - (5) water density
- d. carriage and handling of cargoes and employment of embarked and deployable sub-systems including systems ‘fitted for but not with’
- e. equipment and systems including any related considerations such as foundations, point loads, pressure and vibration.

1.12 **Boundary Integrity** – the external barriers and internal segregation of the mission system to obtain structural strength and improve stability and survivability characteristics. Boundary integrity considerations must include, but are not limited to the prevention of ingress or egress of:

- a. water
- b. weather
- c. substances including fuels, lubricants, chemicals and gases
- d. thermal energy as a result of differences in temperatures across the boundaries for example, as a result of incident sunlight, water temperature and internal air temperature.

1.13 **Durability** – the ability to withstand degradation and maintain functional performance when subject to corrosion, erosion, wear, fatigue, heat or impact damage, considered in the context of the OSI. Specific considerations must include, but are not limited to:

- a. appropriate preservation of structures through material selection (including material compatibility), coatings, treatments and active/passive cathodic protection measures
- b. design margins and redundancy (e.g. margins for wastage, double hulling and internal bulkheads for impact durability)
- c. the alignment of survey, maintenance, repair and replacement regimes.

1.14 **Ergonomics** – designing and arranging systems and equipment so that they interact most effectively and safely with people. In terms of structural integrity, there is a risk that in applying the considerations above, the mission system compromises the ability to accommodate and protect personnel and enable human activities such as operations, inspections and maintenance. Therefore, specific consideration must be given to:

- a. protecting personnel and enabling essential safety functions in the event of all foreseeable emergencies and accidents at least until the persons have reached a place of safety or the threat has receded (in conjunction with the requirements of ACCO 1.7 – Survivability and Preservation of Life)
- b. permit embarked persons to carry out their duties effectively and safely including habitability aspects
- c. provide means of access to undertake maintenance activity such as survey servicing and repair, equipment removal and replacement, etc.

1.15 **Operation and Support** – managing the impact on this Functional Objective based on the way the mission system is operated and supported. Excursions outside of the OSI or tasks that impose heavy duty cycles (e.g. repeated loading and unloading of heavy equipment such as vehicles) have the potential to reduce mission system performance, availability and life. Therefore, consideration must be given to the establishment of systems of control to:

- a. articulate the operating conditions and limitations to operators
- b. align survey, maintenance, repair and replacement regimes to actual usage
- c. assure usage within the OSI
- d. identify and act where excursion outside the OSI occurs
- e. maintain alignment between the OSI and actual or required usage in accordance with GMCO 3.3.

1.16 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence

directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

1.17 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 2

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.2 - BUOYANCY, TRIM AND STABILITY, AND SEAKEEPING

FUNCTIONAL OBJECTIVE

2.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 1.2 is defined as:

Buoyancy, trim and stability, and seakeeping are established, monitored and maintained

OUTCOME

2.2 The maritime mission system is able to obtain and maintain, in all foreseeable operating conditions:

- a. The specified vertical position in or on the water column.
- b. An upright orientation.
- c. Motions tolerable to the operation of equipment, systems and personnel in both immediate and long term use. Motions include those intended by the mission system, for example through accelerations and turning; and those caused through the external environment for example wind, wave and current.

RATIONALE

2.3 Mission systems operate on the water surface or in the water column (can operate in three dimensions, hence operate with six degrees of freedom). Buoyancy, trim and stability, and seakeeping are fundamental characteristics of a mission system that are essential to locate and orientate the system in or on the water column and respond appropriately in the operating environment. In addition to immediate operating and safety effects, poor management of controls relating to achieving buoyancy, trim and stability, and seakeeping may impact operational effect due to, for example, loss of port access through failure to comply with environmental requirements related to ballast water.

2.4 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. uncontrolled ingress of water due to insufficient freeboard, poor load management, the environment (including heavy weather), or credible disturbances including damage
- b. operational limitations imposed through embarked and deployable sub-systems.

2.5 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. harmful pest translocation as a result of ballasting activities in the control of stability
- b. emergency ingress / egress may be impaired due to increased subdivision of the hull in order to maintain stability and buoyancy in the event of damage
- c. operational range may be limited where fuel is used as a component of the ballast system
- d. limitations on future configuration changes, caused by optimising buoyancy, trim and stability, and seakeeping around the initial design (e.g. as a result of configuration changes over the life of the vessel, weight distributions change affecting desired seakeeping characteristics).

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.2

2.6 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

2.7 Buoyancy, Trim, Stability and Seakeeping is linked to other ACCOs, but specifically requires consideration in conjunction with:

- a. ACCO 1.1 – Structural Integrity
- b. ACCO 1.6 – Replenishment and External Services
- c. ACCO 1.7 – Survivability and Preservation of Life
- d. ACCO 1.9 – Integrated Control Systems
- e. ACCO 2.1 – Propulsion and Manoeuvrability
- f. ACCO 3.4 – Carriage and Handling of Loads
- g. ACCO 3.6 – Carriage of Non-crew Personnel
- h. ACCO 3.7 – Embarked and Deployable Sub-systems.

2.8 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

2.9 **Buoyancy** – a fundamental characteristic for a mission system to obtain and maintain its specified vertical position in or on the water column. The buoyancy characteristic of a mission system must be such that it can obtain and maintain vertical position to meet OSI requirements and have or produce sufficient reserves of

buoyancy in all foreseeable circumstances, including intact and damage conditions, in the environment in which the mission system is to operate.

2.10 **Trim and Stability** – fundamental characteristics of a mission system to obtain and maintain the intended orientation (across all applicable degrees of freedom). A mission system must provide sufficient resistance to perturbation from the intended orientation, in order to maintain operation of systems and to prevent capsize, as well as adequate restoring energy to return upright once disturbances are removed.

2.11 **Seakeeping** – a fundamental characteristic of the mission system with respect to the motions it experiences in performing its defined taskings across the range of foreseeable operating environments and conditions. A mission system's seakeeping characteristics must be such that motions remain tolerable to, and do not place undue limits on the operation of equipment, systems and personnel. This includes the requirement to maintain ship handling in alignment with the seakeeping characteristics of the mission system, to avoid excessive forces generated through, for example, slamming, broaching etc.

2.12 Monitoring and maintenance of margins of stability must be actively managed across the Capability Life Cycle. Thorough assessment of the impact to buoyancy, trim and stability, and seakeeping is required when making capability or configuration changes.

2.13 Specific consideration must be given to the provision of decision support tools (e.g. trim and stability handbooks, loading calculators etc.) to assist ships' complement to monitor and manage trim and stability of the mission system during normal operation (including loading and unloading) and in damaged condition.

2.14 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

2.15 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 3

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.3 - ELECTRICAL POWER

FUNCTIONAL OBJECTIVE

3.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 1.3 is defined as:

Appropriate electrical generation, storage and distribution to power the required functions and services is established, monitored and maintained

OUTCOME

3.2 Sufficient and suitable electrical power is supplied, in all foreseeable operating conditions, to:

- a. functions (e.g. propulsion, detecting etc.) and services (e.g. hotel services) required to perform defined taskings
- b. essential safety systems during degraded or emergency conditions.

RATIONALE

3.3 All maritime mission systems require power of various types for the purposes of both internal functions of the mission system and the generation of energy for movement. Electrical power, as distinct from other forms of power, is often associated with well-known hazards and the need for specific management. This ACCO therefore, deals specifically with the management of hazards and risks associated with electrical power. Other types of power are dealt with in other relevant ACCOs, for example, hydraulic power is dealt with under ACCO 1.5 – Auxiliary Services and Hotel Services. Similarly, propulsive power is dealt with under ACCO 2.1 – Propulsion and Manoeuvrability.

3.4 Electrical power is generated from energy sources such as fuel, wind, chemicals or sunlight, and is distributed and converted where required to support demand. Electrical power sources also include storage devices such as batteries and capacitors.

3.5 This ACCO applies whether the electrical power source is dedicated to this function or provided as a secondary function, such as propulsion systems that are also used to generate electricity. Furthermore, electrical power may be provided from external sources such as shore power.

3.6 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. inability to achieve the required operational effect due to critical functions not being available, such as loss of power to detectors resulting in a loss of situational awareness

- b. harm to personnel due to loss of hotel services, such as heating, ventilation and cooling
- c. harm to the environment due to loss of auxiliary functions such as sewage treatment.

3.7 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. vulnerability due to the detection of electro-magnetic signature
- b. harm to personnel through electrical shocks
- c. harm to the environment from generation of substances such as hydrogen, chlorine and ozone created to treat (or as a by-product) grey and black water.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.3

3.8 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

3.9 Electrical power is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.4 – Illumination and Lighting
- b. ACCO 1.5 – Auxiliary Systems and Hotel Services
- c. ACCO 1.6 – Replenishment and External Services
- d. ACCO 1.8 – Communications
- e. ACCO 1.9 – Integrated Control Systems
- f. ACCO 2.1 – Propulsion and Manoeuvrability
- g. ACCO 3.2 – Detectors
- h. ACCO 3.3 – Effectors.

3.10 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

3.11 **System Durability** – the ability of the system to maintain functional performance in the context of the OSI and to withstand degradation. Consideration must be given to durability aspects of electrical power systems, including but not limited to:

- a. Limiting the effects of mutual interference, failure or damage of power sources, distribution networks and the functions or services requiring power through suitable redundancy, isolation and separation of power sources and distribution networks.
- b. Suitable protection measures to protect personnel and equipment are fitted to electrical sources, storage devices and distribution systems when operating in normal, degraded and maintenance states. These protection measures (including those associated with damage control functions) must not in themselves pose a danger to personnel, the environment or any other function or service.
- c. Functionality to regain sufficient electrical power to restore essential functions from a dead ship condition.
- d. Suitable arrangements for the installation, storage, charging (e.g. impact of charge/discharge rates and cycles), power monitoring and management, use, maintenance and disposal of electrical energy storage devices.
- e. Transitional power supplies where no interruption or disruption to the electrical supply of operational and essential safety systems is required.

3.12 Consideration must also be given to the characteristics of the materials used in electrical power systems, including but not limited to:

- a. Off-gassing, venting and leakage associated with electrical systems (e.g. associated with batteries, cabling etc.) in normal operating and in degraded or damaged (e.g. fire) conditions.
- b. Combustion and explosion characteristics of materials used in power sources (e.g. lithium ion or hydrogen/oxygen fuel cells etc.).
- c. Electrical potential incompatibility of materials resulting, for example in galvanic corrosion. Such consideration may include the need for earthing, bonding and cathodic protection measures.

3.13 In addition to the unifying requirements of Volume 3, Part 0, specific attention is to be given to the provision of sufficient and suitably qualified and certified Electrical System Operators and Maintainers during the in-service phase of a mission system. These personnel are to be afforded sufficient opportunity to develop and maintain the experience necessary to conduct operations and maintenance on electrical power systems.

3.14 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

3.15 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 4

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.4 - ILLUMINATION AND LIGHTING

FUNCTIONAL OBJECTIVE

4.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 1.4 is defined as:

Appropriate illumination and lighting to support operation of the mission system is established, monitored and maintained

OUTCOME

4.2 The mission system is provided with sufficient illumination levels to perform its defined taskings in all foreseeable operating conditions.

RATIONALE

4.3 Maritime mission systems require illumination for operational and habitability purposes in both normal and emergency conditions. In addition, lighting configuration may be used in achieving a specified operational effect such as through use of deceptive lighting, anti-piracy measures or in support of deployable sub-systems (e.g. aviation).

4.4 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. collision through loss of, or inadequate navigation lighting
- b. health and safety consequences due to inadequate workplace lighting
- c. harm to the environment through failure to detect hazardous conditions e.g. suitable bilge lighting to detect pipe work leaks.

4.5 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. Increased detectability of the mission system through navigation and upper deck operational lighting.
- b. Harm to personnel as a result of lighting optimised for one purpose, but which is incompatible with another. For example, night vision for a bridge watchkeeper may be impaired through visual landing aids leading to a collision.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.4

4.6 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

4.7 Illumination and Lighting is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.7 – Survivability and Preservation of Life
- b. ACCO 1.8 – Communications
- c. ACCO 1.9 – Integrated Control Systems
- d. ACCO 2.2 – Situational Awareness
- e. ACCO 3.7 – Embarked and Deployable Sub-systems.

4.8 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

4.9 Consideration must be given to the general characteristics of mission system illumination and lighting including, but not limited to:

- a. illumination intensity regarding:
 - (1) configurability
 - (2) adjustability (dimming)
 - (3) hazards to personnel such as through high intensity lighting
- b. illumination quality including aspects such as reflection, glare, flicker and shadowing
- c. illumination colour including its effects on visibility, distinguishability, night vision and so on
- d. illumination detectability and dark adaptation arrangements
- e. the ability of the illumination system to withstand degradation and maintain functional performance (i.e the system's durability), such as:
 - (1) limiting the effects of failure or damage of lighting networks through suitable redundancy, isolation and separation of lighting networks

- (2) having fittings and enclosures that are suitable for the intended operating environment (e.g. weather-proof, explosion-proof, shock and vibration, etc.)
 - f. system compatibility such as:
 - (1) between lighting systems, for example red lighting and instrumentation lighting
 - (2) between lighting and imaging systems, for example visual landing aids and Night Vision Imaging Systems
 - g. heat output including aspects such as loading and hazards to personnel and equipment
 - h. the hazards and risks associated with power sources, wiring, fittings and switches such as electrocution or unintended ignition source.
- 4.10 Specific consideration must be given to illumination and lighting with respect to:
- a. Normal workplace and operational requirements. Lighting must be provided to those parts of the mission system normally accessible to, and used by personnel to enable the conduct of their duties and for the purposes of habitability.
 - b. Contingency and emergency escape lighting requirements.
 - c. Visual aids for the purpose of:
 - (1) Visual identification and location (knowing what an object is, where it is and/or what task it is performing). For example, illuminating pennant number, or configuration of navigation lighting or task lighting such as for mine-hunting purposes.
 - (2) Assisting the deployment and recovery of sub-systems such as aircraft and landing craft, for example visual landing aids.

4.11 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

4.12 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 5

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.5 - AUXILIARY SYSTEMS AND HOTEL SERVICES

FUNCTIONAL OBJECTIVE

5.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 1.5 is defined as:

Appropriate auxiliary systems and hotel services to support mission systems functions and habitability requirements are established, monitored and maintained

OUTCOME

5.2 Appropriate auxiliary and hotel services are provided in all foreseeable operating conditions to:

- a. support or provide mission system functions
- b. support or provide subsystem functions
- c. eliminate or minimise harm to personnel and/or the environment
- d. provide necessary habitability requirements.

RATIONALE

5.3 Auxiliary systems are defined as those systems that are supplementary to, or indirectly support, primary mission system functions; while hotel services support habitability. A given system may provide both an auxiliary service to other systems as well as hotel services, for example, a fresh water system.

5.4 Some auxiliary systems are intended as a control to minimise harm to personnel and/or the environment, for example, gas detection systems, oily water separators and sewage treatment plants.

5.5 Auxiliary systems and hotel services may include, but are not limited to:

- a. fuel and lubricant management systems to support propulsion and power generation
- b. heating, ventilation and air conditioning (HVAC) systems supporting both equipment and habitability
- c. fresh water generation and distribution
- d. food services, accommodation, sanitation, health and recreation systems.

5.6 Some auxiliary systems are sufficiently aligned to a specific Functional Objective that they are addressed through the specific ACCO for that Functional Objective. For example, the possible need for ballast water exchange is highlighted under ACCO 1.2 – Buoyancy, Trim and Stability and Seakeeping. Therefore the need for an auxiliary system such as a ballast water treatment plant would arise in consideration of managing the hazards and risks associated with ballast water exchange. Similarly, systems associated with survivability and preservation of life are addressed under ACCO 1.8 – Survivability and Preservation of Life. Therefore, this ACCO covers all those auxiliary systems and hotel services not covered elsewhere.

5.7 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. failure to achieve the operational effect due to inadequately or incorrectly sized auxiliary systems e.g. HVAC systems not having sufficient capacity to cater for the full range of operational conditions
- b. harm to personnel through heat stress due to a lack of appropriate HVAC systems
- c. harm to the environment due to an inability to manage waste.

5.8 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. increased mission system vulnerability due to complex systems interdependency
- b. harm to personnel through activation of relief valves
- c. harm to the environment due to chemical treatments used to support hotel services such as sanitation.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.5

5.9 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

5.10 Auxiliary Systems and Hotel Services is linked to all other ACCOs, but specifically requires consideration in conjunction with:

- a. ACCO 1.3 – Electrical Power
- b. ACCO 1.6 – Replenishment and External Services
- c. ACCO 1.7 – Survivability and Preservation of Life
- d. ACCO 1.8 – Communications
- e. ACCO 1.9 – Integrated Control Systems
- f. ACCO 3.2 – Detectors

- g. ACCO 3.3 – Effectors
- h. ACCO 3.4 – Carriage and Handling of Loads
- i. ACCO 3.6 – Carriage of Non-crew Personnel
- j. ACCO 3.7 – Embarked and Deployable Sub-systems.

5.11 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

5.12 **Integration** – the ability of an auxiliary system or hotel service to interface and operate with other subsystems, to a level which enables the mission system to achieve the defined tasking. Consideration must be given to aspects of integration, including but not limited to:

- a. Compatibility and suitability of interfaces and supporting services (interoperability) such as:
 - (1) Fixings and couplings.
 - (2) Information transfer and management.
 - (3) Any impairment imposed by or on the auxiliary system or hotel service through normal, essential and emergency functions of the mission system. For example, damage control states may require isolation of certain auxiliary systems, or certain auxiliary systems such as oily water separators may not be able to be used in proximity to coastlines.
- b. Capacity of the maritime mission system to support and sustain the auxiliary system or hotel service in terms of:
 - (1) specialist personnel
 - (2) space and weight
 - (3) structural suitability
 - (4) the cumulative and concurrent requirements or impacts of multiple auxiliary systems e.g. electrical power load.

5.13 **Prevention of Contamination** – Auxiliary systems and hotel services are often required to take in, store, and distribute substances including fuels, lubricants, water, air and other gases. All of these systems must consider the levels and kinds of contamination that may impact the intended function. Consideration must be given to:

- a. material suitability, for example avoiding the use of tank paint schemes or materials that may leach contaminants into potable water

- b. avoiding material degradation, for example rusting pipe work introducing particulate contamination
- c. preventing cross contamination that may occur through:
 - (1) system interfaces for example, leaking oil cooler resulting in saltwater contamination of lubrication oil
 - (2) system modes of operation and potential interactions between systems, for example unintentionally opening a compressed air test system to the saltwater fire main
 - (3) inappropriate system separation for example toxic gases (exhaust fumes, H₂S) drawn into ventilation systems
- d. preventing external contamination for example, taking on board contaminated fuels, or debris left in pipework during construction or repair.

5.14 **Control of Hazardous Substances and States** – Auxiliary systems or hotel services may contain substances which are inherently hazardous to people or other systems (flammable, corrosive toxic, etc.), and/or are in a hazardous state (high pressure, temperature, velocity etc.). Consideration must be given to:

- a. Containment measures to confine the substances to the system (including storage tanks, pressure vessels, piping, ducting etc.). The design, construction and maintenance of these containment measures must take into account:
 - (1) The state that the substance must be maintained in (liquid, gas, temperature etc.).
 - (2) Potential failure modes and failure points in the context of the specific use of the auxiliary system or hotel service. For example, the use of flange guarding or shields to prevent fuel spray.
- b. Movement and transfer of substances within or between systems. Systems of control including management systems and protocols must be designed, constructed and maintained to prevent:
 - (1) transfer of substances to unintended locations, for example discharge of sewage, contaminated oil into a clean oil storage tank etc.
 - (2) transfer of incorrect volumes, weights or pressures; for example overflow of storage tanks, over pressurisation of a gearbox, unintended effects on trim and stability.
- c. Treatment and disposal of hazardous substances, for example grey and black water, oily water, used lubricants and chemicals etc.

5.15 **System Durability** – the ability of the system to withstand degradation and maintain functional performance in the context of the operating and support intent (OSI). Considerations must include, but are not limited to:

- a. Limiting the effects of operation, failure or damage of auxiliary systems and hotel services through suitable redundancy, isolation and separation.
- b. Suitable protection measures exist to protect equipment, personnel and the environment with respect to auxiliary systems and hotel services when:
 - (1) operating in normal modes and degraded states
 - (2) undertaking maintenance
 - (3) operating near personnel
 - (4) operating in or near sensitive environmental areas.
- c. Ensuring that protection measures in and of themselves do not pose a danger to operations, personnel, the environment. For example, ensuring pressure relief valves do not vent near personnel.

5.16 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

5.17 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 6

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.6 - REPLENISHMENT AND EXTERNAL SERVICES

FUNCTIONAL OBJECTIVE

6.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 1.6 is defined as:

Appropriate arrangements for replenishment and for interfacing with external systems are established, monitored and maintained

OUTCOME

6.2 To provide the mission system with the ability to interface with external systems in order to replenish or otherwise support the mission system or other mission systems as required in accordance with the operating and support intent (OSI).

RATIONALE

6.3 Most maritime mission systems need to interface with external systems at sea and ashore for the purposes of replenishment or provision of other services to or from the mission system. These interfaces can include power, water, sewage, communications as well as the capability to transfer people, cargo and equipment.

6.4 The activities associated with this ACCO may include:

- a. **Connecting** – the act of coupling required components to interface points. In the context of this ACCO, components may include couplings, connectors, conduits (hoses, pipes etc.), cables (electrical wiring, gun lines, wire ropes etc.), gangways, brows and so on.
- b. **Transferring** – the act of moving physical objects, fluids, gases, people, power or information between the mission system and the external system through the connecting arrangement.
- c. **Disconnecting** – the act of decoupling the mission system from the external system and making the systems safe.

6.5 The process of manoeuvring a mission system to perform these activities is covered under ACCO 2.1 – Propulsion and Manoeuvrability (e.g. joining or separating for replenishment at sea; arriving or departing with respect to berthing). The process of securing a mission system itself is covered under ACCO 2.3 – Berthing, Mooring, Anchoring and Towing.

6.6 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. loss of capability due to the inability to properly replenish the mission system
- b. harm to personnel caused by connecting or disconnecting activities
- c. damage to the environment through spillage caused by connecting or disconnecting activities.

6.7 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. loss of a mission system due to the inability to disconnect in an emergency situation, for example cables preventing closure of open hatches in submarines, or inability to separate mission systems in a timely manner during a replenishment at sea
- b. harm to personnel through trip hazards from cables or hoses
- c. harm to the environment through inadvertent transfer of pests via ship to shore connections.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.6

6.8 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

6.9 Replenishment and External Services is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.1 – Structural Integrity
- b. ACCO 1.2 – Buoyancy, Trim and Stability, and Seakeeping
- c. ACCO 1.3 – Electrical Power
- d. ACCO 2.1 – Propulsion and Manoeuvrability
- e. ACCO 2.2 – Situational Awareness
- f. ACCO 2.3 – Berthing, Mooring, Anchoring and Towing
- g. ACCO 3.4 – Carriage and Handling of Loads
- h. ACCO 3.5 – Carriage of Explosive Ordnance and Dangerous Goods.

6.10 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

6.11 **Connecting** – the act of coupling required components to interface points. Interfaces are the specific points of interaction and connection between the mission system and an external system such as the shore or another mission system. Consideration must be given to:

- a. compatibility and suitability of interfaces and services (interoperability) including, but not limited to:
 - (1) fixings and couplings, gangways and brows, including requirements for interoperability with other co-operating units and in foreign ports
 - (2) prevention of misconnection, for example between fuel and water, high and low pressure air, high voltage and low voltage power etc.
 - (3) information transfer and management
 - (4) security requirements including introduced vulnerabilities such as human access, cyber intrusion and so on
- b. configuration of mission system services in readiness for connection to external services
- c. separation of services from:
 - (1) other services, for example separating water from electricity
 - (2) personnel, for example keeping gangways clear of cabling
 - (3) the impact of other activities, for example keeping service cables away from maintenance activities
- d. dynamic interactions and loads caused by movement of the mission system relative to:
 - (1) a static system, for example movement of the mission system relative to the wharf due to tidal movements
 - (2) a dynamic system, for example during replenishment at sea where movement may occur across three dimensions and involve significant loads with high levels of human interaction.

6.12 **Transferring** – in the context of this ACCO, transferring is the act of moving physical objects, fluids, gases, people, power or information between the mission system and the external system through the connecting arrangement. The mission system must be able to achieve appropriate transfer in accordance with the OSI, therefore consideration must be given to:

- a. Capacity. The mission system must have sufficient capacity to achieve the required transfer in terms of:
 - (1) volumes (too much or too little)
 - (2) rate (too fast or too slow).

- b. Control. The mission system must be able to control the transfer process in terms of:
- c. stopping, starting or isolating transfer as required, including in emergency situations
- d. transfer rates
- e. transfer conditions such as prevention of overpressure and overflow.
- f. Quality. The mission system must ensure that:
- g. correct product is being transferred (e.g. correct type of fuel is being taken onboard)
- h. contamination is prevented (e.g. potable water is free of pathogens).

6.13 Transfer that occurs without a connection (e.g. a crane placing cargo onto a ship) is covered under ACCO 3.4 – Carriage and Handling of Loads and ACCO 3.5 – Carriage of Explosive Ordnance and Dangerous Goods.

6.14 **Disconnecting** – the act of decoupling required components to interface points. The mission system must have the ability to disconnect from interfaces in a timely and safe manner. Consideration must therefore be given to:

- a. release mechanisms and protocols, such as interlocks and quick release systems
- b. prevention and containment of leakage or spillage, such as non-return valves, hose purging or capping, spill kits etc.
- c. making safe and realigning systems for normal operation
- d. emergency equipment and protocols, for example:
 - (1) break away protocols for replenishment at sea
 - (2) provision of tools such as axes to clear cabling or hoses from doorways and hatches.

6.15 **Risks outside direct control** – Interfacing to external services exposes the mission system to vulnerabilities and risks associated with those services, which the mission system may have little control over. Therefore, the mission system must understand these risks and where necessary mitigate as appropriate. This may include a decision to not interface with an external service where the risks of doing so are unacceptable. Examples of where a mission system may have limited control include, but are not limited to:

- a. soundness of connections and components (e.g. shore power cables)
- b. continuity and quality of supply (e.g. electrical power surges, under voltage and currents, phase; water pressure; air pressure; data signal)

- c. human access to ports, wharves and associated facilities
- d. cyber intrusion
- e. unsafe port facilities work practices
- f. poor local environmental controls (e.g. lack of fuel spill booms, inadequate sewage treatment)
- g. situations where the local requirements (such as local harbour rules) exceed those articulated through these regulations or Australian standards.

6.16 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

6.17 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 7

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.7 - SURVIVABILITY AND PRESERVATION OF LIFE

FUNCTIONAL OBJECTIVE

7.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 1.7 is defined as:

Appropriate provisions for survivability and preservation of life to withstand credible threat scenarios are established, monitored and maintained

OUTCOME

7.2 The primary outcome is to achieve a level of mission system survivability aligned with the OSI that optimises trade-offs between susceptibility, vulnerability and recoverability for credible hazards, be it those in the operating environment (e.g. collision or grounding) or in a threat environment (e.g. enemy action).

7.3 The secondary outcome is to preserve life for the purpose of supporting the primary outcome. Where this is no longer viable, then the outcome is simply to save life.

RATIONALE

7.4 All maritime mission systems operate in hazardous and threatening environments with associated risks. Systems of control are put in place to manage those risks in accordance with the Defence Seaworthiness Management System (DSwMS) compliance obligations. Risks are realised when a loss of control occurs. Provisions must therefore be made for control to be regained and/or consequences minimised when these risks are realised.

7.5 Unique to the military context is that a mission system may be required to intentionally put itself in harm's way and to continue to fulfil its mission when damaged or impaired. Considerations in a purely civilian maritime operating context may not be appropriate in a military operating environment. For example, in the case of a collision or grounding, abandoning ship may be the response in a civil maritime operating environment, whereas in the military context, the priority may be performing damage control in order to continue to deliver the operational effect. These different approaches then lead to different physical, personnel and command and control arrangements.

7.6 In both the military and civilian context the controls relate to:

a. Survivability:

- (1) Susceptibility – the probability of incurring damage; or a threat detecting, reaching and detonating on a mission system. A mission system may be detected in many ways and it is therefore necessary to

minimise signatures in terms of underwater acoustics (i.e. cavitation), magnetic, radar cross section, heat, airborne noise, visual and so on. This ACCO focuses on passive susceptibility measures. Active susceptibility measures such as decoys are covered under ACCO 3.3 – Effectors.

- (2) Vulnerability – a point or points of weakness in the inherent ability of the mission system to resist damage and continue to maintain a certain level of functionality.
- (3) Recoverability – the ability of the mission system to restore a particular level of operation following damage or attack.

b. Preservation of Life¹²

- (1) Escape – the movement of persons to a place of relative safety on board the mission system following an emergency.
- (2) Evacuation – the movement of persons to a place of relative safety away from the mission system.
- (3) Rescue – the survival and recovery of persons to a place of relative safety, which offers an equivalent or higher level of safety than that prior to the incident.

7.7 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. partial or total mission system loss with associated failure to achieve operational effect; for example, where a mission system is placed in a missile threat environment without appropriate missile defence capability
- b. loss of life through inability to contain damage, for example through the spread of fire or flood
- c. harm to the environment through an inability to resist damage, for example, fuel leakage caused by impact damage.

7.8 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. collisions caused by the inability of other vessels to detect the mission system

¹ ANEP 77, Edition F, Version 1 – Naval Ship Code, Part 1, Chapter I, Annex E

² Lloyds Register - Rules and Regulations for the Classification of Naval Ships

- b. loss of life due to restrictions placed on escape and evacuation measures by features designed to reduce the vulnerability of the mission system e.g. watertight and fire sub-division measures, Chemical, Biological, Radiological, Nuclear (CBRN) arrangements.

7.9 In many cases, considerations regarding safety and the environment will be addressed through suitable controls relating to susceptibility and vulnerability. For example, double hull structures reduce vulnerability with respect to mission system integrity, as well as environmental hazards with respect to fuel spillage. However, the primary objective remains maximising the likelihood of achieving the specified operational effect.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.7

7.10 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

7.11 Survivability is inherently linked to many other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.1 – Structural Integrity
- b. ACCO 1.2 – Buoyancy, Trim and Stability, and Seakeeping
- c. ACCO 1.3 – Electrical Power
- d. ACCO 1.4 – Illumination and Lighting
- e. ACCO 1.5 – Auxiliary Systems and Hotel Services
- f. ACCO 1.8 – Communications
- g. ACCO 1.9 – Integrated Control Systems
- h. ACCO 2.1 – Propulsion and Manoeuvrability
- i. ACCO 2.2 – Situational Awareness
- j. ACCO 3.2 – Detectors
- k. ACCO 3.3 – Effectors
- l. ACCO 3.5 – Carriage of Explosive Ordnance and Dangerous Goods
- m. ACCO 3.6 – Carriage of Non-crew Personnel.

7.12 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

7.13 For this Functional Objective and with respect to Survivability, specific consideration must be given to:

- a. **Understanding threats** – identifying and understanding threats to the mission system in the context of its operating and support intent (OSI). Threats must be considered for both military and non-military activities. Threats may require both passive responses (inherent in a given mission system), as required through this ACCO; and/or active responses covered through other ACCOs (e.g. ACCO 3.3 – Effectors).
- b. **Minimising susceptibility** – reducing the probability of damage; or a threat detecting, acquiring, reaching and detonating through, for example:
 - (1) Internal detection systems, including but not limited to detection systems for flood, fire, toxic and atmospheric hazards, noise and magnetic. These considerations should be made in conjunction with the requirements of ACCO 1.9 – Integrated Control Systems for internal detection systems used to monitor threats to systems and equipment.
 - (2) External detection and avoidance mechanisms, through the use of Detectors covered in ACCO 3.2. For this purpose, examples may include but not limited to CBRN detectors, Mine and Obstacle Avoidance Systems, air defence radar etc.
 - (3) Passive and active minimisation of detectability in terms of mission system signatures, including but not limited to underwater acoustic (i.e. cavitation and other transmitted noise), airborne noise, wake, magnetic, heat, visual, radar cross section and other electromagnetic emissions.
- c. **Minimising vulnerability** – increasing the probability of surviving damage or a successful attack and maintaining continuity of operations at a certain level through inclusion of damage margins in design, redundancy, separation and reconfigurable systems and safe havens. Examples of where these considerations may apply include:
 - (1) stability and damage stability measures and margins such as subdivision, cross-flooding and watertight integrity features
 - (2) structural integrity damage margins and fire boundaries
 - (3) shock protection
 - (4) provision of sub-system redundancy, separation, isolation and reconfiguration
 - (5) choice of materials and stowage locations for example, explosive ordnance and flammable products
 - (6) citadels, CBRN safety zones and wash-down systems.

- d. **Maximising recoverability** – increasing the ability to contain further damage and restore operations where possible following the realisation of damage or enemy action. Considerations must include, but are not limited to:
- (1) protocols and mission system configurations for reducing vulnerability and improving recoverability, for example through increased readiness and watertight conditions
 - (2) activation of fixed and portable containment and control systems, such as establishing watertight and gas tight boundaries, firefighting, dewatering, degassing, and damage stability systems (e.g. cross flooding)
 - (3) reconfiguration of systems, such as the transfer from normal to alternate electrical power
 - (4) provision of sufficient numbers of Suitably Qualified and Experienced Personnel (SQEP), able to contain damage and restore operations.

7.14 For this Functional Objective and with respect to Preservation of Life, specific consideration must be given to:

- a. Escape – adequately provide for the movement of persons to a place of relative safety on board the mission system following an emergency
- b. Evacuation – adequately provide for egress, abandonment and survival at sea in the event that there is a greater risk to remain on the mission system than to abandon it
- c. Rescue – adequately provide for the ability to locate and rescue personnel from the water.

7.15 **Environmental considerations** – Seaworthiness is about maximising the likelihood of achieving the operational effect whilst seeking to minimise, so far as reasonably practicable, the risks to personnel, the public and the environment. When an event occurs that affects the survival of the mission system, the same considerations for minimising hazards and risks to the environment apply. In many circumstances the systems of control associated with vulnerability and recoverability will inherently assist in minimising hazards and risks to the environment. In some instances, unique environmental vulnerability considerations are appropriate. For example, the location of fuel tanks away from vulnerable areas or through double bottom arrangements may be necessary in order to minimise the release of hazardous substances into the environment.

7.16 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

7.17 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 8

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.8 - COMMUNICATIONS

FUNCTIONAL OBJECTIVE

8.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 1.8 is defined as:

Appropriate communications systems to provide information exchange are established, monitored and maintained

OUTCOME

8.2 Information can be exchanged both internally and externally in accordance with the operating and support intent (OSI).

RATIONALE

8.3 The ability to communicate clearly and in a timely manner is a fundamental aspect of mission system control and operation, and frequently occurs in concert with external systems and entities. Therefore, the ability to effectively exchange information with internal and external entities and systems is crucial. This ACCO deals with both external and internal communications.

8.4 Information exchange requirements may include:

- a. routine information (e.g. general announcements, personal such as email)
- b. routine command and control necessary for the day to day operating of the mission system
- c. operational command and control information necessary for conduct of specific tasks
- d. information relating to survivability (e.g. damage control)
- e. safety of life at sea (e.g. Emergency Position Indicating Radio Beacon (EPIRB), Global Maritime Distress and Safety System (GMDSS))

8.5 Information exchange requires different communications systems characteristics depending on the primary communication intent. For example, military command and control systems require security standards which would not apply to emergency or safety of life at sea communication arrangements. Communication systems may require characteristics that:

- a. support secure and emergency communications
- b. minimise “leakage” of information (e.g. from internal communication systems) and protect information from physical loss or cyber attack

c. enable linkage across multiple systems.

8.6 A mission system may have a range of communication systems, designed to receive and transmit information through, for example:

- a. visual means such as lights, signals, flags etc.
- b. standard radio spectrum including microwave, UHF, VHF and HF
- c. sound, such as underwater telephones, megaphones, sound signals
- d. hard connected communications such as through optical fibre, wire, sub-system umbilicals etc.

8.7 Furthermore, as these systems are designed to operate in various mediums, their performance is highly dependent on combinations of physical conditions (such as curvature of the earth) and environmental conditions. For example:

- a. Visual communication systems are greatly affected by line of sight and reduction in visibility, such as through moisture or dust in the air, or suspended solids in water.
- b. UHF and VHF communication systems are affected by line of sight, variations in atmospheric temperature, pressure and humidity.
- c. HF communication systems are affected by ionisation and recombination in the upper atmosphere, which varies with time of the day.
- d. Underwater sound communication systems are affected by variations in temperature, pressure, salinity, current speed and direction, background noise etc. Similarly, above water sound communication systems are affected by atmospheric temperature, pressure, humidity, wind speed and direction, background noise etc.

8.8 In general, activities and conditions associated with communications include interfacing, integration, activating, transmitting, receiving, and de-activating.

8.9 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. collision at sea due to misunderstanding the intent of another vessel in a 'rules of the road' situation, caused by poor communications
- b. failure to conduct effective damage control due to poor hand held communications
- c. failure to coordinate a response with cooperating units in order to achieve an operational objective.

8.10 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. detection by enemy due to increased susceptibility associated with active transmissions from communications systems
- b. interference with third party communications due to spectrum overload
- c. harm to personnel through exposure to radiation from a high-powered transmitter
- d. environmental damage through use of hazardous materials in communications systems components such as cadmium, polychlorinated biphenyls (PCBs) etc.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.8

8.11 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

8.12 This ACCO is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.3 – Electrical Power
- b. ACCO 1.4 – Illumination and Lighting
- c. ACCO 1.5 – Auxiliary Systems and Hotel Services
- d. ACCO 1.7 – Survivability and Preservation of Life
- e. ACCO 1.9 – Integrated Control Systems
- f. ACCO 2.2 – Situational Awareness
- g. ACCO 3.1 – Tactical Awareness
- h. ACCO 3.3 – Effectors
- i. ACCO 3.7 – Embarked and Deployable Sub-systems.

8.13 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include, but is not limited to, the activities and conditions described below.

8.14 **Interfacing and integration** – communication systems must be able to connect to and operate with other sub-systems (e.g. effectors) to a level which enables the mission system to achieve the defined tasking. In the military context, this may include, for example, whole of combat system alignment. Integration considerations must include, but are not limited to:

- a. compatibility and suitability of interfaces and supporting services (interoperability), such as:
 - (1) fixings and couplings
 - (2) information transfer and management
 - (3) any impairment imposed by the communication system on the normal, essential and emergency functions of the mission system
 - (4) safe to operating arcs and zones (e.g. sound and radiation).
- b. capacity of the mission system to support and sustain the communication system requirements including, but not limited to:
 - (1) specialist personnel
 - (2) available space
 - (3) structural suitability (e.g. top-side interference and the availability of space)
 - (4) the cumulative and concurrent requirements or impacts of multiple communication systems.

8.15 **Activation** – making a communication system ready for use. This often involves supply of high energy sources to electrical systems and transmitters. Activation considerations must include, but are not limited to:

- a. environmental conditions and limitations such as temperatures, humidity and other ambient conditions which may affect operation of transmitters or receivers
- b. access control for personnel necessary for the operation of the system
- c. other requirements for personnel in the vicinity of the communication system such as safe separation distance and clear areas to prevent exposure to equipment movement, radiation etc.
- d. requirements for, and hazards associated with, system tests, including:
 - (1) interfaces, such as aligning the communication system to auxiliary services
 - (2) interoperability, such as confirming integration with a combat management system
 - (3) readiness, such as calibration and tests of full system functionality
- e. requirements for, and hazards associated with, energizing a communication system such as:
 - (1) applying electrical power

- (2) the need for use of dummy loads (e.g. use of resistors to absorb transmissions during system testing instead of transmitting through antenna).

8.16 Transmitting and receiving – applying the communication system to exchange information. Transmitting and receiving considerations must include, but are not limited to:

- a. power output and proximity to other systems, personnel and wildlife, including considerations for options such as:
 - (1) susceptibility, where use of communication system may compromise position relative to a threat
 - (2) controls for personnel management (e.g. radiation hazard management, proximity to ships sound signalling devices etc.)
 - (3) controls for managing communication systems around wildlife (e.g. Standard Operating Procedures (SOPs)).
- b. bandwidth management, including effects on infrastructure and other systems (interference in airport communications, mobile phone networks etc.).

8.17 De-activating – making a communication system safe following use. This often involves the isolation of energy sources and securing the system from movement. Considerations must include, but are not limited to:

- a. the requirement for positive confirmation that a communication system has ceased transmitting and been de-energised
- b. the requirement to secure the communication system commensurate with the prevailing environmental conditions (e.g. wind, wave etc.) and operational circumstances (readiness, response and access requirements).

8.18 Information and cyber vulnerability – is of particular concern for communication systems, which are becoming increasingly connected to internal systems and making them accessible to remote exploitation (e.g. theft of information, system hijacking). Considerations must include, but are not limited to:

- a. access control
- b. hardware, software and cryptographic protections
- c. intrusion detection
- d. prevention of information leakage and emissions security
- e. detection and avoidance of social engineering (e.g. phishing and identity theft)
- f. isolation of compromised systems

g. system and data recovery.

8.19 **Communications system durability** – the ability of the communications system to withstand degradation and maintain functional performance in the context of the OSI. Considerations must include, but are not limited to:

- a. Limiting the effects of mutual interference, failure or damage of distributed communications networks. This may be through suitable redundancy, isolation and separation of power sources, distribution networks and processing units (e.g. communications management LANs).
- b. The requirements for suitable protection measures to electrical sources, processing units, storage devices and distributed communication networks. These are fitted in order to protect personnel and equipment when operating in normal, degraded and maintenance states. These protection measures (including those associated with damage control functions) shall not pose a danger to personnel, the environment or other equipment and systems.
- c. Functionality required to regain sufficient communications (for example, from a 'dead ship' condition) to exchange information in support of essential functions.

8.20 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

8.21 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 9

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 1.9 - INTEGRATED CONTROL SYSTEMS

FUNCTIONAL OBJECTIVE

9.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 1.9 is defined as:

Appropriate integrated control of multiple functions is established, monitored and maintained

OUTCOME

9.2 Discrete sub-systems and functions are integrated, controlled and monitored sufficiently to achieve the defined tasking in accordance with the operating and support intent (OSI).

RATIONALE

9.3 Each ACCO Functional Objective may have discrete control and monitoring systems whether they be manual or automated. However, a mission system is a 'system of systems' hence achievement of the defined tasking and the operational effect requires integrated control systems. For example, integrated control systems can include:

- a. combat management systems
- b. integrated bridge controls
- c. platform management systems
- d. personnel and asset tracking systems.

9.4 Therefore, this ACCO addresses those systems whose function is to integrate control of discrete functions to respond in concert to achieve the defined task and the operational effect. The requirement for integrated control systems results from:

- a. increasing system complexity
- b. the cognitive limits of personnel to process information relating to complex activities and dynamic environments
- c. the need for rapid response.

9.5 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. failure to achieve the operational effect due to inadequate control of system interactions such as combat system alignment between detectors and effectors
- b. harm to personnel through allowing unsafe operating modes
- c. harm to the environment due to lack of monitoring systems, for example absence of tank high level alarms resulting in inadvertent discharge of oily waste via tank vents.

9.6 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. failure to achieve operational effect through external exploitation of vulnerabilities created through interconnection of systems
- b. failure to achieve operational effect in degraded conditions due to loss of personnel skills associated with reliance on automation under normal conditions
- c. harm to equipment, people or the environment through well intended but inappropriate human intervention with an integrated control system, for example, taking local control of a diesel engine, and thereby isolating the safety monitoring systems for the equipment driven by that diesel engine.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 1.9

9.7 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

9.8 Integrated Control Systems is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.2 – Buoyancy, Trim and Stability, and Seakeeping
- b. ACCO 1.5 – Auxiliary Systems and Hotel Services
- c. ACCO 1.7 – Survivability and Preservation of Life
- d. ACCO 1.8 – Communications
- e. ACCO 2.1 – Propulsion and Manoeuvrability
- f. ACCO 2.2 – Situational Awareness
- g. ACCO 3.1 – Tactical Awareness
- h. ACCO 3.2 – Detectors
- i. ACCO 3.3 – Effectors
- j. ACCO 3.5 – Carriage of Explosive Ordnance and Dangerous Goods.

9.9 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

9.10 **Permutations and constraints** – understanding of the possible system and sub-system permutations and interactions. Understanding of the available permutations and interactions, and their implications for mission system functions and performance must be established and maintained.

9.11 **Modes of operation** – ensuring that integrated control systems support the mission system modes of operation in accordance with the OSI. Considerations must include, but are not limited to:

- a. Degree of autonomy, including:
 - (1) which functions should have autonomy and the scope of that autonomy
 - (2) the need to allow for external intervention
 - (3) authorisations and handover of control.
- b. Prevention of operation outside limits, including:
 - (1) warnings, limit indicators etc.
 - (2) governors, limiters etc.
 - (3) prevention of operator error.
- c. Human factors, including:
 - (1) man-machine interfaces
 - (2) cultural bias (e.g. reluctance to openly question authority)
 - (3) risk perception (e.g. ignoring alarms because the perceived risks is low)
 - (4) task persistence or fixation (focus on one task to the detriment of the underlying objective or broader issues)
 - (5) cue perception (distinguishing a difference between normal and abnormal modes, e.g. graphical readouts can be more effective than digital readouts)
 - (6) habitual response.
- d. Degraded operational modes, including:
 - (1) Mission system reconfiguration (e.g. automatic switching from a failed subsystem to an alternative on standby).

- (2) Cascading control for sub-systems and equipment (e.g. remote control defaults to local operating panel, which in turn defaults to local operation on the equipment). As greater manual intervention is generally required as controls cascade, specific consideration must be given to the maintenance of associated skills, operating instructions etc.
 - (3) Control and monitoring locations (e.g. normal and emergency bridge control).
 - (4) Failure modes of sub-systems including the need to fail safe and the ability to isolate systems in emergencies.
 - (5) Restarting from 'dead ship' condition.
 - (6) Maintenance of skills required to operate in all modes (e.g. through periodic exercising of system in all modes or provision of operating instructions).
- e. Communications between control points.
 - f. Maintenance and test modes.

9.12 **Monitoring and feedback** – obtaining data to understand the current state and, where appropriate, trends over the longer term. Most control systems are based on detecting deviations from the normal – through feedback and monitoring – to determine what control actions may be required. Considerations include, but are not limited to:

- a. having appropriate information on the current state and performance of the systems, including:
 - (1) the types and volumes of data
 - (2) timeframes for response
 - (3) accuracy and completeness (quality) of data
- b. setting appropriate baselines, tolerances and escalation levels
- c. identification and management of errors of evaluation including:
 - (1) false positives, for example indicating an alarm condition when no such condition exists
 - (2) false negatives, for example not indicating an alarm condition when the alarm condition does exist
- d. protection against corruption of information, either unintended (e.g. system issues) or intended (tampering or malicious action)
- e. data capture and feedback required for post activity and supportability purposes.

9.13 **Information and cyber vulnerability** – mitigating risks of remote exploitation (e.g. theft of information, system hijacking). Integrated control systems are increasingly connected to external systems, making them accessible to remote exploitation. Considerations must include, but are not limited to:

- a. access control
- b. hardware and software protections
- c. intrusion detection
- d. prevention of information leakage
- e. detection and avoidance of social engineering (e.g. phishing and identity theft)
- f. isolation of compromised systems
- g. system and data recovery.

9.14 **Integrated control system durability** – the ability of the system to withstand degradation and maintain functional performance in the context of the OSI. Integrated control systems are usually distributed or networked systems, considerations therefore include, but are not limited to:

- a. Limiting the effects of mutual interference, failure or damage of distributed control networks, for example through suitable redundancy, isolation and separation of power sources, distribution networks and processing units.
- b. Suitable protection measures to protect personnel and equipment are provided for electrical sources, processing units, storage devices and distributed control networks when operating in normal, degraded and maintenance states. These protection measures (including those associated with damage control functions) must not pose a danger to personnel, the environment or other equipment and systems.
- c. Functionality required to regain sufficient integrated control to restore essential functions.

9.15 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

9.16 Further guidance for this Functional Objective is available at the DSMS website

PART 3: ACCO GOAL 2

Contents

Part 3: ACCO GOAL 2	i
Chapter 1	1-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 2.1 - PROPULSION AND MANOEUVRABILITY	1-1
FUNCTIONAL OBJECTIVE	1-1
OUTCOME	1-1
RATIONALE	1-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.1	1-2
GUIDANCE	1-4
Chapter 2	2-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 2.2 - SITUATIONAL AWARENESS	2-1
FUNCTIONAL OBJECTIVE	2-1
OUTCOME	2-1
RATIONALE	2-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.2	2-3
GUIDANCE	2-5
Chapter 3	3-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 2.3 - BERTHING, MOORING, ANCHORING AND TOWING	3-1
FUNCTIONAL OBJECTIVE	3-1
OUTCOME	3-1
RATIONALE	3-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.3	3-3
GUIDANCE	3-5

CHAPTER 1

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 2.1 - PROPULSION AND MANOEUVRABILITY

FUNCTIONAL OBJECTIVE

1.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 2.1 is defined as:

Appropriate propulsion and manoeuvrability to achieve the range, speed, position and orientation requirements is established, monitored and maintained

OUTCOME

1.2 The maritime mission system is able to achieve the range, speed, position and orientation to achieve the defined tasking in accordance with the operating and support intent (OSI).

RATIONALE

1.3 Mission systems usually need to position themselves in order to achieve their defined tasks. Each mission system therefore needs to be able to move within a given range and maintain control of its speed, course, orientation and position to the degree required by its OSI.

1.4 Propulsion and manoeuvrability for maritime mission systems may comprise the following systems:

- a. **Propulsion systems** – provide power and a means of converting this power into propulsive force.
- b. **Manoeuvring systems** – control the orientation, speed and position of the mission system.
- c. **Stabilising systems** – assist in control the motion of the mission system and should be considered part of the manoeuvring system as their use or non-use may affect the vessels manoeuvring capability.

1.5 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. The impaired performance of the mission system as a result of misalignment between propulsion equipment choice and the actual usage. For example, placing highly variable loads on a propulsion system designed for constant speed running.
- b. Loss of capability and harm to personnel and the environment due to the inability to avoid hazards or threats e.g. loss of steering resulting in grounding.

c. The reduction of the service life of a propulsion system (or sub-system) as a result of usage in excess of the design limits.

1.6 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. increased susceptibility of the mission system due to the creation of a larger heat signature
- b. harm to personnel, equipment, flora or fauna through propeller strike
- c. impact on the environment through emission of exhaust gases.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.1

1.7 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

1.8 Propulsion and Manoeuvrability is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.1 – Structural Integrity
- b. ACCO 1.2 – Buoyancy, Trim and Stability, and Seakeeping
- c. ACCO 1.3 – Electrical Power
- d. ACCO 1.6 – Replenishment and External Services
- e. ACCO 1.9 – Integrated Control Systems
- f. ACCO 2.2 – Situational Awareness.

1.9 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

1.10 **Transit** – moving a mission system from one point to another. This requires consideration of propulsion and manoeuvring characteristics, including but not limited to:

- a. range and associated considerations of hull design and fuel/energy storage capacities to achieve that range
- b. speed of advance
- c. course keeping and change
- d. draught and trim.

1.11 **Manoeuvring and ship handling** – arriving and departing a berth or buoy, manoeuvring in confined channels and harbours and in proximity to other ships, seamanship evolutions, replenishment at sea, and low and high speed manoeuvres. Considerations of propulsion and manoeuvrability characteristics must include, but are not limited to:

- a. ensuring that ship handlers have situational awareness in accordance with ACCO 2.2 – Situational Awareness
- b. course keeping, change and turning performance
- c. acceleration and speed characteristics
- d. stopping capabilities
- e. responsiveness of propulsion and steering systems
- f. behaviours when operating at low speed and/or in shallow waters
- g. duty cycles on propulsion and manoeuvrability systems and equipment
- h. the effects of wind, waves, tides and currents
- i. other factors that may affect manoeuvring activities such as draught, trim, shaft direction and propeller pitch and load distribution.

1.12 **System durability** – is the ability of the system to withstand degradation and maintain functional performance and must be considered in the context of the OSI. These considerations must include, but are not limited to:

- a. Limiting the effects of operation, failure or damage of propulsion and manoeuvrability systems through suitable redundancy, isolation and separation.
- b. Suitable protection measures exist to protect equipment, personnel and the environment with respect to propulsion and manoeuvrability systems when:
 - (1) operating in normal modes and degraded states
 - (2) undertaking maintenance
 - (3) operating near personnel or small craft in the water
 - (4) operating in or near sensitive environmental areas
 - (5) operating in threat environments.
- c. Ensuring that protection measures in and of themselves do not pose a danger to operations, personnel, the environment or any other mission system component. For example, engine protection systems do not shut down an engine when operating in enclosed waters.

- d. Functionality to regain sufficient propulsive power and manoeuvrability from a degraded or dead ship condition.

1.13 **Operation and support.** Excursions outside of the OSI or tasks that impose heavy-duty cycles (e.g. repeated stop-start operation) have the potential to reduce mission system performance, availability and life. Therefore, consideration must be given to establish systems of control to:

- a. articulate the operating conditions and limitations to operators
- b. align survey, maintenance, repair and replacement regimes to actual usage and condition
- c. assure usage within the OSI
- d. identify and act where excursion outside the OSI occurs
- e. maintain alignment between the OSI and actual or required usage in accordance with GMCO 3.3.

1.14 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

1.15 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 2

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 2.2 - SITUATIONAL AWARENESS

FUNCTIONAL OBJECTIVE

2.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 2.2 is defined as:

Situational awareness to support understanding and action in relation to moving and positioning the mission system is established, monitored and maintained

OUTCOME

2.2 The primary outcome is to achieve sufficient awareness to inform effective decision making regarding the movement and position of the mission system.

2.3 The secondary outcome is to ensure that, where necessary, others are aware of the position, movement and intentions of the mission system.

RATIONALE

2.4 The ability of a mission system to move and maintain position is fundamentally dependent on the knowledge of that mission system's location relative to fixed and movable objects and to the prevailing circumstances and conditions. In the support of moving and maintaining position, this ACCO enables the execution and maintenance of appropriate course, speed and position of the mission system in relation to the waters, traffic and environmental conditions.

2.5 This ACCO is concerned with providing sufficient awareness for the mission system to move and maintain position. The additional awareness required in achievement of the defined task builds upon this ACCO but is specifically addressed in ACCO 3.1 – Tactical Awareness.

2.6 Situational awareness is about knowing where a mission system is and what is occurring around it. As well as physical location, this includes knowledge of prevailing circumstances and conditions such as wind, weather, tide, current and traffic. Situational awareness is needed for a mission system to:

- a. transit from one point to another
- b. manoeuvre, including:
 - (1) arriving and departing a berth or buoy
 - (2) operating in confined channels, around infrastructure (e.g. bridges), in harbours, and in proximity to other ships
 - (3) replenishment at sea and other seamanship evolutions

- (4) low and high speed manoeuvres
- (5) submerging, depth keeping and surfacing where required
- c. avoid collision and grounding (including considerations regarding changes to draught and hull appendages).

2.7 A failure to maintain appropriate levels of situational awareness has been identified as one of the primary factors in accidents attributed to human error¹², for example through:

- a. ambiguity in guidance, direction or accountability
- b. fixation on a course of action
- c. fatigue leading to delayed response or poor judgement
- d. cognitive overload due to operational tempo and complexity of the operating environment or task.

2.8 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. loss of capability and harm to personnel and the environment due to collision or grounding
- b. harm to other vessels or people, who are forced to take evasive action
- c. creation of an international incident through inadvertently operating in a foreign territory.

2.9 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. harm to personnel or the environment through emissions from the use of active detectors
- b. unwanted detection in an operational environment as a result of navigation lighting.

¹ Hartel, C.E.J., Smith, K., & Prince, C. (1991, April). Defining aircrew coordination: Searching mishaps for meaning. Paper presented at the 6th International Symposium on Aviation Psychology, Columbus, OH.

² US Coast Guard Team Coordination Training Student Guide 8/98 Chapter 5

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.2

2.10 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

2.11 Situational Awareness is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.4 – Illumination and Lighting
- b. ACCO 1.7 – Survivability and Preservation of Life
- c. ACCO 1.8 – Communications
- d. ACCO 1.9 – Integrated Control Systems
- e. ACCO 2.1 – Propulsion and Manoeuvrability
- f. ACCO 3.1 – Tactical Awareness
- g. ACCO 3.2 – Detectors.

2.12 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below³⁴.

2.13 **Observing** – gathering and validating (e.g. through multiple observation sets from different sources) the essential data and information of the surrounding environment and of the mission system. Observations must provide sufficient data to enable understanding and decisions with respect to moving and maintaining position of the mission system.

2.14 **Understanding** – collating, analysing, presenting and interpreting the data and information in order to:

- a. Know where the mission system is relative to where it is required to be.
- b. Know where the mission system is relative to other objects (this includes potential hazards such as land, seabed or other vessels).

³ Boyd, John, R., The Essence of Winning and Losing, 28 June 1995 a five-slide set by Boyd.

⁴ Endsley, M.R. & Garland, D.J. (Eds.) (2000). Situational awareness analysis and measurement. Mahwah, NJ: Lawrence Erlbaum Associates.

- c. Know where the mission system is relative to intentional threats. This aspect of situational awareness is specifically addressed in ACCO 3.1 – Tactical Awareness.
- d. Understand the prevailing circumstances and conditions in which the mission system is operating.
- e. Anticipate possible scenarios and develop courses of action to achieve the outcome.

2.15 **Deciding** – choosing the appropriate course of action. This is covered in part, under the command and control requirements of Volume 3, Part 0. With respect to situational awareness, specific considerations must also be given to:

- a. operational priorities
- b. separation between other vessels or objects
- c. navigation rules
- d. the requirements for automated decision making and control mechanisms based on complexity of the environment
- e. authorisation of automated systems and the handover and intervention points between manual and automatic control, for example activation of autopilot and the protocols for handover.

2.16 **Communicating** – exchanging information both internally and externally between systems and people. Considerations must include, but are not limited to, the requirement to:

- a. establish and maintain a common operating picture amongst mission system personnel
- b. direct mission system personnel to carry out a course of action
- c. obtain feedback from mission system personnel on the effectiveness of the chosen course of action
- d. inform other parties through, for example, radio communications, lights or sound signalling.

2.17 **Acting** – executing the chosen course of action, monitoring the effectiveness of that course of action and adjusting (through repeating the process above) and follow up as required. With respect to situational awareness, requirements must also be considered in the context of:

- a. the operating tempo
- b. the complexity of the operating environment and task(s).

2.18 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence

directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

2.19 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 3

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 2.3 - BERTHING, MOORING, ANCHORING AND TOWING

FUNCTIONAL OBJECTIVE

3.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 2.3 is defined as:

Appropriate berthing, mooring, anchoring and towing provisions to control the mission system position are established, monitored and maintained

OUTCOME

3.2 The mission system is able to be secured for the purpose of controlling its position without the use of its own propulsive power, under all foreseeable conditions.

RATIONALE

3.3 Mission Systems need to secure themselves alongside a wharf or pier, moor to a buoy and be able to anchor. Each mission system therefore needs to have the necessary and suitable arrangements to perform these functions as required by its OSI. In addition, maritime mission systems may be required to tow another mission system or object, or to be towed.

3.4 All these activities involve securing arrangements including fixed and non-fixed devices to hold a ship in position such as anchors, windlasses, bollards, fairleads, chains and mooring ropes. The activities associated with this ACCO include, but are not limited to⁵:

- a. **Berthing** – securing a vessel to her berth. The term “berth” refers to a location such as a quay, wharf, pier or jetty where the ship comes alongside, but it may also mean a place in which a vessel is moored or anchored. It generally refers to the normal location that a mission system is held until required for operations.
- b. **Docking** – making the mission system fast to a fixed or anchored structure, generally for a specific purpose such as loading cargo or embarking/disembarking forces. Periodically, docking will involve removal of the mission system from the water for the purposes of storage, inspection or maintenance.

⁵ These terms are used loosely in general practice and therefore should be considered in the context of achieving the intent of this Functional Objective rather than considered definitive.

- c. **Mooring** – making the mission system fast to a strong point such as those found on quays, wharves, jetties, piers, anchor buoys, and mooring buoys. An anchor mooring or mooring buoy fixes a mission system's position relative to a point on the bottom of a waterway without connecting the mission system to shore and allows a mission system to swing around that point when the direction of wind or tide changes.
- d. **Intentional grounding** – the act of deliberately making a mission system fast to the ground. Intentional grounding is often used for the purposes of military operations such as amphibious landings or bottoming of a submarine.
- e. **Anchoring** – connecting a mission system to the bed of a body of water to prevent the craft from drifting due to wind or current. Anchoring consists of determining the location, dropping the anchor, laying out the scope of chain (cable), setting the hook, and assessing the arc through which the mission system swings. Anchoring should be conducted in locations where the mission system is sufficiently protected; has suitable holding ground, enough depth at low tide and enough room for the mission system to swing.
- f. **Towing and pushing** – receiving motive assistance from, or rendering it to, another vessel. This also covers tugboat operations which include operations that involve pushing (or “leaning on”) another vessel.

3.5 The act of positioning the mission system for the purpose of berthing, docking, mooring, anchoring or towing is covered under ACCO 2.1 – Propulsion and Manoeuvrability.

3.6 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. loss of capability and damage to the environment as a result of collision or grounding due to mooring failure
- b. loss of support capability due to structural damage to wharf side infrastructure caused by inadequate design or lack of infrastructure maintenance
- c. harm to personnel caused through mooring activities.

3.7 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. damage or loss of capability where moored or docked vessels are unable to make way to avoid a hazard such as enemy action, a fire on a wharf or severe weather
- b. obstruction and trip hazards created by mooring lines through areas of access
- c. transfer of exotic species and pests through access to a mission system via mooring arrangements.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 2.3

3.8 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

3.9 Berthing, Mooring, Anchoring and Towing is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.1 – Structural Integrity
- b. ACCO 1.2 – Buoyancy, Trim and Stability, and Seakeeping
- c. ACCO 1.5 – Replenishment and External Services
- d. ACCO 2.1 – Propulsion and Manoeuvrability
- e. ACCO 2.2 – Situational Awareness
- f. ACCO 3.7 – Embarked and Deployable Sub-systems.

3.10 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

3.11 **Securing** – controlling the position of a mission system, generally without using its own propulsive power, through attaching itself to another object such as a wharf or mooring, or the seabed in case of anchoring. Considerations must include, but are not limited to:

- a. intended activity being undertaken by the mission system such as berthing, embarkation of troops and vehicles, dry-docking etc.
- b. prevailing circumstance and conditions that the mission system may experience such as threat environment, weather, tides and currents, and surge
- c. availability and suitability of infrastructure and fixing arrangements
- d. use of securing systems for prevention of collision and grounding
- e. structural damage that could result from securing.

3.12 **Towing and pushing** – securing a mission system to another vessel or object and then transferring motive force from or to the mission system. Specific considerations in respect to towing and pushing include but are not limited to:

- a. appropriate situation awareness measures including look-outs, lighting and signalling in accordance with ACCO 2.2 – Situational Awareness

- b. the ability to be towed or pushed, irrespective of whether the ability to tow another vessel or object is identified through the OSI
- c. structural requirements and limitations in accordance ACCO 1.1 – Structural Integrity, including forces and point loads associated with tug operations.

3.13 **System durability** – the ability of the system to withstand degradation and maintain functional performance, considered in the context of the operating and support intent (OSI). These considerations must include, but are not limited to:

- a. limiting the effects of operation, failure or damage of berthing, mooring, anchoring and towing systems through suitable redundancy, isolation and separation
- b. suitable protection measures exist to protect equipment, personnel and the environment with respect to berthing, mooring, anchoring and towing systems when:
 - (1) operating in special and normal modes, and degraded states
 - (2) undertaking maintenance
 - (3) operating near personnel or small craft in the water
 - (4) operating in or near sensitive environmental areas
- c. the minimum required levels of functionality of berthing, mooring, anchoring and towing systems in normal, degraded or dead ship conditions.

3.14 **Operation and support** – managing the impact on this Functional Objective from the way the mission system is operated and supported. In particular, excursions outside of the OSI or tasks that impose heavy duty cycles (e.g. repeated loading of particular securing points) have the potential to reduce mission system performance, availability and life. Therefore, consideration must be given to establish systems of control to:

- a. articulate the operating conditions and limitations to operators
- b. align survey, maintenance, repair and replacement regimes to actual usage
- c. assure usage within the OSI
- d. identify and act where excursion outside the OSI occurs
- e. maintain alignment between the OSI and actual or required usage in accordance with GMCO 3.3.

3.15 Specific consideration must also be given to:

- a. The hazards associated with the storage of mooring lines and anchor cables, for example corrosion and toxic gases.

- b. The unique relationship of this ACCO to infrastructure requirements such as wharves, moorings and docking facilities. Many of these aspects should be defined through the development of an OSI in accordance with the Governance and Management Compliance Obligations (GMCOs) in particular those obligations in Goal 2.

3.16 **Risks outside direct control.** In conjunction with the types of risks articulated in ACCO 1.6 – Replenishment and External Services, which are outside of the direct control of a given mission system, specific consideration must also be given to the quality and appropriateness of port facilities such as wharves and moorings that were not considered through the application of the preceding paragraph. Examples may include foreign ports or ports with limited or damaged infrastructure.

3.17 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

3.18 Further guidance for this Functional Objective is available at the DSwMS website.

PART 4: ACCO GOAL 3

Contents

Part 4: ACCO Goal 3	i
Chapter 1	1-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.1 - TACTICAL AWARENESS	1-1
FUNCTIONAL OBJECTIVE]	1-1
OUTCOME	1-1
RATIONALE	1-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.1	1-2
GUIDANCE	1-4
Chapter 2	2-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.2 - DETECTORS	2-1
FUNCTIONAL OBJECTIVE	2-1
OUTCOME	2-1
RATIONALE	2-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.2	2-3
GUIDANCE	2-7
Chapter 3	3-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.3 - EFFECTORS	3-1
FUNCTIONAL OBJECTIVE	3-1
OUTCOME	3-1
RATIONALE	3-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.3	3-3
GUIDANCE	3-6
Chapter 4	4-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.4 - CARRIAGE AND HANDLING OF LOADS	4-1
FUNCTIONAL OBJECTIVE	4-1
OUTCOME	4-1
RATIONALE	4-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.4	4-3

GUIDANCE	4-8
Chapter 5	5-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.5 - CARRIAGE AND HANDLING OF EXPLOSIVE ORDNANCE AND DANGEROUS GOODS	5-1
FUNCTIONAL OBJECTIVE	5-1
OUTCOME	5-1
RATIONALE	5-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.5	5-2
GUIDANCE	5-4
Chapter 6	6-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.6 - CARRIAGE OF NON-CREW PERSONNEL	6-1
FUNCTIONAL OBJECTIVE	6-1
OUTCOME	6-1
RATIONALE	6-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.6	6-3
GUIDANCE	6-5
Chapter 7	7-1
ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.7 - EMBARKED AND DEPLOYABLE SUB- SYSTEMS	7-1
FUNCTIONAL OBJECTIVE	7-1
OUTCOME	7-1
RATIONALE	7-1
REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.7	7-2
GUIDANCE	7-5

CHAPTER 1

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.1 - TACTICAL AWARENESS

FUNCTIONAL OBJECTIVE]

1.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 3.1 is defined as:

Tactical awareness to support decision making, coordination and control in relation to achieving the defined task is established, monitored and maintained.

OUTCOME

1.2 Tactical awareness required to enable the achievement of the tactical objective is obtained, in accordance with the operating and support intent (OSI).

RATIONALE

1.3 The OSI is generated from a strategic view of the operational effect(s) a mission system may need to achieve, or contribute to throughout its in-service phase. The specific tactical objectives for any defined tasking are generated from operational and tactical plans; or immediate response requirements, and should ideally fall within the OSI. This ACCO is concerned with providing sufficient awareness to achieve the specific tactical objectives and builds on that which is required for the movement and maintenance of position, as covered in ACCO 2.2 – Situational Awareness.

1.4 Activities to provide situational and tactical awareness will overlap in some circumstances, and in fact, the underlying steps of observing, understanding, deciding, communicating and acting are the same, but differ in how they are applied to achieve their respective objectives. In the military context, tactical awareness will involve requirements to:

- a. understand the defined tasking and its tactical objectives
- b. build a tactical picture
- c. perform, confirm or update a threat, target or task evaluation
- d. determine target allocation and effector assignment if required
- e. manage detector and effector activities
- f. perform post activity or engagement assessment including feedback of learnings to inform future operations.

1.5 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. loss of capability and harm to personnel and the environment due to failure to detect and respond to a threat
- b. harm to other vessels or people, through misidentification of a target.

1.6 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. unwanted detection in a threat environment as a result of trying to gain tactical awareness (e.g. use of active sonar)
- b. harm to personnel or the environment through emissions from the use of active detectors.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.1

1.7 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

1.8 Tactical Awareness is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.8 – Communications
- b. ACCO 1.9 – Integrated Control Systems
- c. ACCO 2.2 – Situational Awareness
- d. ACCO 3.2 – Detectors
- e. ACCO 3.3 – Effectors
- f. ACCO 3.7 – Embarked and Deployable Sub-systems.

1.9 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.¹²

1.10 **Observing** – gathering and validating data from multiple sources including mission system detectors, cooperating units, and external sensors such as satellites.

¹ Boyd, John, R., The Essence of Winning and Losing, 28 June 1995 a five-slide set by Boyd.

² Endsley, M.R. & Garland, D.J. (Eds.) (2000). Situational awareness analysis and measurement. Mahwah, NJ: Lawrence Erlbaum Associates.

The objective is to build a tactical picture for the mission system with respect to threats, targets, non-combatants, cooperating units, fixed and moving objects, the environment and so on. Considerations must include, but are not limited to:

- a. the level of clarity the mission system needs with respect to its defined tasking and its tactical objectives
- b. the required sophistication of the tactical picture and the complexity involved in building it
- c. information sources and requirements including, but not limited to:
 - (1) the types and volumes of data
 - (2) timeframes for decision making
 - (3) the limitations in the quality of data (accuracy and completeness).

1.11 **Understanding** – collating, analysing, presenting and interpreting the data and information in order to comprehend and ultimately develop appropriate courses of action. Considerations must include, but are not limited to:

- a. the ability to process and integrate the data, and to identify and discriminate between contacts
- b. knowledge of the capabilities and limitations of the mission system itself within the tactical environment and in the context of the tactical objective
- c. knowledge of the capabilities and limitations of cooperating units
- d. knowledge of the capabilities and limitations of targets and threats
- e. the ability to interpret the prevailing circumstances and conditions (environment) in the context of the tactical objective
- f. development and analysis of courses of action including the need to anticipate.

1.12 **Deciding** – choosing the appropriate course of action. This is covered in part, under the command and control requirements of Volume 3, Part 0. With respect to tactical awareness, specific consideration must also be given to the requirements for:

- a. automated decision-making and control mechanisms based on volumes, timeframes and complexity
- b. authorisation of automated systems and the handover and intervention points between manual and automatic control, for example activation of close-in weapon systems and the protocols for target engagement.

1.13 **Communicating** – exchanging information both internally and externally between systems and people. Considerations must include, but are not limited to:

- a. enacting the decision
- b. establishing and maintaining a common operating picture both internally and with cooperating units
- c. feedback on the progress of the chosen course of action.

1.14 **Acting** – executing the chosen course of action, monitoring the effectiveness of that course of action, adjusting (through repeating the process above) and follow up as required. In the context of tactical awareness considerations must include, but are not limited to:

- a. managing detector and effector activities
- b. performing post activity or engagement assessments including feedback of learnings to inform future operations.

1.15 **Operation and Support** – managing the impact on this Functional Objective based on the way the mission system is operated and supported. Excursions outside of the OSI may occur in the pursuit of tactical objectives, which have the potential to reduce mission system performance, availability and life. Therefore, consideration must be given to the establishment of systems of control to:

- a. articulate the operating conditions and limitations to operators
- b. assure usage within the OSI
- c. identify where excursions outside the OSI occur
- d. maintain alignment between the OSI and actual or required usage in accordance with GMCO 3.3.

1.16 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

1.17 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 2

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.2 - DETECTORS

FUNCTIONAL OBJECTIVE

2.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 3.2 is defined as:

Appropriate detectors to support situational and tactical awareness are established, monitored and maintained

OUTCOME

2.2 Detectors are able to provide the observational data required to enable the situational and tactical awareness sufficient to achieve the defined tasking, in accordance with the operating and support intent (OSI).

RATIONALE

2.3 Maritime mission systems must have a real time understanding of the environments in which they operate, including any passive or active threats, in order to perform their defined taskings and achieve the required operational effects. Requirements for this understanding are defined through ACCO 2.2 – Situational Awareness and ACCO 3.1 – Tactical Awareness.

2.4 The first step in obtaining either situational or tactical awareness of a mission system is observation. Observation requires the ability to gather information through sensing, for the purpose of perceiving something and assigning a level of significance to it. Sensing may occur passively or actively, it may be done through human perception (e.g. the eye) or manmade systems, and it can be employed to gain internal understanding (e.g. sub-system performance) or external understanding (e.g. the location of objects relative to the mission system).

2.5 Detectors are those systems employed by a mission system to enable observation through sensing. This ACCO deals with those detectors used for external sensing, contributing to situational and tactical awareness. Detection systems used for internal monitoring (e.g. gas detection, system performance etc.) are covered under ACCO 1.7 – Survivability and Preservation of Life; and ACCO 1.9 – Integrated Control Systems. Embarked or deployable sub-systems may themselves use detections systems or be used by the mission system as detection systems. Where this is the case, this ACCO should be read in conjunction with ACCO 3.7 – Embarked and Deployable Sub-systems.

2.6 Detectors are a key to modern mission systems and form a critical component of both moving and maintaining position (situational awareness), and achieving the defined task. In general, detectors are used to identify and locate physical objects in three-dimensional space, relative to a mission system, or to intercept signals (communications etc.). They will generally be required to interface with situational or tactical awareness systems, which interpret the detector

information to enable decisions and communication on courses of action. This may also involve integration of the detection system with effectors as part of a combat system.

2.7 The range of detecting systems on a mission system may vary considerably and sensors may obtain information through, for example:

- a. electro-magnetic radiation (microwave, HF, infra-red, light etc.)
- b. pressure (including pressure waves such as vibration, sound)
- c. direct physical contact, impacts and shock
- d. thermal energy (convection, conduction)
- e. magnetism
- f. nuclear, biological or chemical means.

2.8 Examples of detection systems include, but are not limited to, radar (navigation, air search targeting), active and passive sonar, magnetic anomaly systems, laser range finders, electronic warfare systems and so on.

2.9 Detector solutions generally involve optimising trade-offs between resolution and the ability to locate objects or signals relative to the mission system. For example, systems designed for high resolution (e.g. some mine hunting sonars) will have a corresponding lower range. Conversely, systems designed for long range such as low frequency sonars will have limited ability to discriminate or resolve a target in great detail.

2.10 In addition, the ability to locate an object in space is often dependent on the inherent limitations of a given detector. Location of an object relative to a mission system comprises range, bearing and altitude or depth, however a given system will often not ascertain all of these components. For example, a passive sonar may only determine bearing; and a two-dimensional air search radar will only determine range and bearing, but not altitude. Therefore, a combination of detectors is often required in support of situational and tactical awareness.

2.11 Detection systems are designed to operate in various mediums, and their effectiveness can be highly dependent on the dynamic environmental conditions within which the mission system is operating. For example:

- a. visual detections systems are greatly affected by turbulence, air quality, sea surface reflection (scintillation) etc.
- b. infra-red systems are significantly affected by variations in ambient temperature, water vapour etc.
- c. radar systems are affected by variations of atmospheric temperature, humidity and pressure, wave height (resulting in clutter) etc.

- d. HF systems are affected by time of the day (ionisation and recombination in the upper atmosphere)
- e. sonar systems are affected by variations in water temperature, salinity, pressure, current speed and direction, background noise etc.

2.12 A thorough understanding of detector limitations is required to avoid significant errors in the identification and location of objects (including targets), which can in turn lead to inappropriate courses of action. In the military context, for example, 3D air search radars (providing range, bearing and altitude) may be significantly affected by atmospheric refraction (ducting). This could lead to an aircraft appearing at a lower altitude and closer range to the mission system than its actual position, which could in turn lead to incorrect interpretations of hostile intent.

2.13 Active detectors usually emit energy, which has the effect of increasing the susceptibility of the mission system itself. In some cases, the power levels needed to achieve desired ranges can also be hazardous to personnel or the environment.

2.14 In general, activities associated with detectors include activating, transmitting, receiving, detecting, identifying and de-activating.

2.15 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. loss of capability and harm to personnel and the environment due to failure to detect and respond to a threat
- b. harm to other vessels or people, through misidentification of a target.

2.16 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. detection by enemy due to increased susceptibility associated with active transmission of sonar and radar
- b. harm to personnel through exposure to radiation from a high-powered microwave detector
- c. harm to marine life through use of high powered (high source level) sonar.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.2

2.17 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

2.18 Detectors is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.3 – Electrical Power
- b. ACCO 1.5 – Auxiliary Systems and Hotel Services

- c. ACCO 1.7 – Survivability and Preservation of Life
- d. ACCO 1.9 – Integrated Control Systems
- e. ACCO 2.2 – Situational Awareness
- f. ACCO 3.1 – Tactical Awareness
- g. ACCO 3.3 – Effectors
- h. ACCO 3.7 – Embarked and Deployable Sub-systems.

2.19 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include, but not be limited to the activities and conditions described below.

2.20 **Understanding** – the situational and tactical awareness requirements. The requirements to detect objects or signals for a given mission system must be identified and understood in the context of the operating and support intent (OSI). These requirements must be considered for both military and non-military activities, and may generate the need for active and / or passive detection. Thus, the level of understanding of these requirements must be sufficient to enable the design, allocation and integration of detection systems. Considerations must include, but are not limited to:

- a. The fidelity with which an object or signal must be resolved (degree of discrimination). This is often dependent on a balance of frequency and power requirements.
- b. Locational requirements, which must be determined relative to the mission system, in terms of:
 - (1) range
 - (2) bearing
 - (3) altitude or depth.
- c. Requirements for a combination of detection systems used in concert to provide the desired level of situational and tactical awareness.
- d. Requirements to measure, monitor and predict environmental factors contributing to detector performance, and required for interpretation of detector outputs (e.g. atmospheric, oceanographic conditions etc.).

2.21 **Integrating** – enabling the detector to interface and operate with other sub-systems (e.g. effectors) to a level which enables the mission system to achieve the defined tasking. In the military context, this often includes whole of combat system alignment. Integration considerations must include, but are not limited to:

- a. compatibility and suitability of interfaces and supporting services (interoperability) such as:
 - (1) fixings and couplings
 - (2) utilities including power, fuel, air, water etc.
 - (3) information transfer and management
 - (4) any impairment imposed by the detector on the normal, essential and emergency functions of the mission system
 - (5) safe to operating arcs and zones (e.g. sound and radiation)
- b. capacity of the mission system to support and sustain the sub system requirements such as:
 - (1) specialist personnel
 - (2) available space
 - (3) structural suitability
 - (4) the cumulative and concurrent requirements or impacts of multiple detectors.

2.22 **Activating** – is the process of making a detector ready for use. This often involves supply of high energy sources to mechanical and electrical detecting systems. Activation considerations must include, but are not limited to:

- a. environmental conditions and limitations including, but not limited to:
 - (1) motions, including those intended by the mission system, for example through accelerations and turning; and those caused through the external environment, for example wind, wave and current
 - (2) temperatures, humidity and other ambient conditions
- b. access control for personnel necessary for the operation of the system
- c. other requirements for personnel in the vicinity of the detector such as safe separation distance and clear areas to prevent exposure to equipment movement and/or radiation
- d. requirements for, and hazards associated with system tests, including:
 - (1) interfaces such as aligning the detector to auxiliary services
 - (2) interoperability such as confirming integration with a combat management system
 - (3) readiness such as calibration and tests of full system functionality

- e. requirements for, and hazards associated with energising a detector such as:
 - (1) through application of electrical power
 - (2) the need for use of dummy loads (e.g. use of resistors to absorb transmissions during system testing, instead of transmitting through an antenna)
 - (3) requirements, hazards and restrictions associated with the deployment of detection systems outside the mission system, such as towed array sonar (this must be considered in context of ACCO 3.7 – Embarked and Deployable Subsystems).

2.23 Transmitting and Receiving – applying a detector to search and/or monitor in order to gain information on the presence, and where possible the location in space, of an object or signal. In the case of a signal it may also be to obtain information on the content of that signal. Transmitting and receiving considerations must include, but are not limited to:

- a. power output and proximity to other systems, personnel and wildlife, including the need for controls for:
 - (1) sector or zone management (e.g. sector blanking)
 - (2) managing susceptibility, where use of a detector may compromise the mission system location
 - (3) people management (e.g. removing divers from water during sonar use, ceasing transmission to allow maintainer access to a mast etc.)
 - (4) managing detectors around wildlife (e.g. Standard Operating Procedures).
- b. effects on infrastructure and other systems (interference with airport radars, mobile phone networks etc.).

2.24 Detecting and Identifying – information processing tasks that may be conducted in concert with ACCO 2.2 – Situational Awareness and ACCO 3.1 – Tactical Awareness. Considerations must include, but are not limited to:

- a. errors that may be introduced through system operation (e.g. gyroscopic precession introducing positional errors)
- b. errors or limitations that may be introduced through the environment due to phenomena such as:
 - (1) reflection
 - (2) refraction resulting in, for example, horizontal or vertical bearing error
 - (3) scattering
 - (4) spreading

(5) absorption

c. requirements for independent verification (e.g. Identify Friend or Foe (IFF)).

2.25 **De-activating** – making a detector safe following use. This often involves the isolation of energy sources and securing from movement. Considerations must include but are not limited to:

a. requirements for positive confirmation that a detector has ceased transmitting and has been de-energised

b. requirements to secure the detector commensurate with the prevailing environmental conditions (e.g. wind, wave etc.) and operational circumstances (readiness, response and access requirements).

2.26 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

2.27 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 3

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.3 - EFFECTORS

FUNCTIONAL OBJECTIVE

3.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 3.3 is defined as:

Appropriate effectors to take action against a target are established, monitored and maintained

OUTCOME

3.2 The mission system has the means to create the intended effect on a specified target, in accordance with the operating and support intent (OSI).

RATIONALE

3.3 Maritime mission systems may be designed with the capability to engage targets. A target is an entity against which a mission system may be required to take action, in order to achieve a specified operational effect. Targets generally relate to military threats or objectives, but may also be considered in the context of non-military activities. For example, destruction of a submerged hazard in a shipping lane may require the application of an effector. An effector is a system that may be used to capture, exploit, disrupt, neutralise or destroy a target.

3.4 In the military context, effectors are generally a component of a combat system, which may also include communications systems (ACCO 1.8), tactical awareness systems (ACCO 3.1), detectors (ACCO 3.2), and embarked and deployable sub-systems (ACCO 3.7).

3.5 This ACCO is not intended to cover how all operational effects will be achieved in the context of the OSI, but rather is focused on 'offensive-type' systems which are not directly addressed in other ACCOs. A Rigid Hull Inflatable Boat (RHIB) or boarding party may be used to achieve an operational effect, however this is sufficiently covered through application of a combination of ACCOs, including this one. For example, a boarding party apprehending a Suspected Illegal Entry Vessel (SIEV) would need consideration of communications (ACCO 1.8), tactical awareness (ACCO 3.1), detectors (ACCO 3.2), effectors such as tactical batons and side-arms (ACCO 3.3), possibly tactical support elements from embarked forces (ACCO 3.6), and certainly the use of boats as embarked and deployable sub-systems (ACCO 3.7). Achievement of specific operational effects in the context of an OSI, will always require the application of multiple ACCOs, and in some cases, all.

3.6 In the context of this ACCO, effectors usually comprise an energy source and a delivery system to direct that energy source against the target or threat. Effectors may include, but are not limited to:

- a. projectiles including rockets, missiles; torpedoes, bombs, bullets and associated delivery systems
- b. explosives
- c. directed-energy including high powered lasers, microwaves, sonar and other sonic or ultrasonic devices
- d. water cannons, fire hoses
- e. disruptors or de-armers such as those used to neutralise ordnance
- f. naval mines
- g. personal equipment including tactical batons and side-arms
- h. chemicals such as tear gas
- i. jammers
- j. cyber-attack systems (hacking, viruses, etc.).

3.7 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. failure to deliver operational effect due to inability to destroy a target such as an enemy supply chain
- b. harm to personnel due to failure to neutralise a threat such as an incoming missile
- c. environmental contamination from poor maintenance (e.g. propellant leakage).

3.8 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. inability to deliver other mission system functions due to deployment of an effector (e.g. deploying close in weapons systems may limit aircraft operations)
- b. harm to personnel through effector handling activities such as embarking or disembarking torpedoes
- c. harm to personnel from blast, noise and hazardous material etc.
- d. environmental contamination through deployment of effectors, from sources such as propellants (e.g. Otto Fuel) or ordnance (e.g. lead).

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.3

3.9 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

3.10 Effectors is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.3 – Electrical Power
- b. ACCO 1.5 – Auxiliary Systems and Hotel Services
- c. ACCO 1.7 – Survivability and Preservation of Life
- d. ACCO 1.8 – Communications
- e. ACCO 1.9 – Integrated Control Systems
- f. ACCO 3.1 – Tactical Awareness
- g. ACCO 3.2 – Detectors
- h. ACCO 3.4 – Carriage and Handling of Loads
- i. ACCO 3.5 – Carriage of Explosive Ordnance and Dangerous Goods
- j. ACCO 3.7 – Embarked and Deployable Sub-systems.

3.11 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include, but not be limited to the activities and conditions described below.

3.12 **Understanding Threats** – the assessment of threats associated with both military and non-military activities, in the context of the OSI, to a level that allows the appropriate response options to be determined. Threats may require active responses, which are covered by this ACCO and/or passive responses, which are covered through other ACCOs (e.g. ACCO 1.7 – Survivability and Preservation of Life).

3.13 **Embarking** – the loading and off-loading of effectors (e.g. explosive ordnance, munitions etc.), which must be considered in the context of ACCO 3.4 – Carriage and Handling of Loads, ACCO 3.5 – Carriage of Explosive Ordnance and Dangerous Goods and safe work practices for embarkation and disembarkation at sea or alongside.

3.14 **Integrating** – enabling the effector to interface and operate with other sub-systems (e.g. detectors) to a level which enables the mission system to achieve the

defined tasking. In the military context, this often includes whole of combat system alignment. Integration considerations must include, but are not limited to:

- a. compatibility and suitability of interfaces and supporting services (interoperability), such as:
 - (1) fixings and couplings
 - (2) utilities including power, fuel, air, water etc.
 - (3) information transfer and management
 - (4) any impairment imposed by the effector on the normal, essential and emergency functions of the maritime mission system
 - (5) safe to fire arcs and zones (e.g. efflux, noise and radiation)
- b. capacity of the maritime mission system to support and sustain the sub-system requirements such as:
 - (1) specialist personnel
 - (2) space
 - (3) structural suitability
 - (4) the cumulative and concurrent requirements or impacts of multiple effectors.

3.15 Activating and Loading – making an effector ready for use. This often involves the handling and supply of explosive ordnance, propellants and other high energy sources to mechanical and electrical delivery systems. This often occurs under dynamic conditions and in confined spaces. Considerations must include, but are not limited to:

- a. environmental conditions and limitations such as:
 - (1) motions, including those intended by the mission system, for example through accelerations and turning; and those caused through the external environment for example wind, wave and current
 - (2) temperatures, humidity and other ambient conditions
 - (3) other environmental conditions such as potential for lightning strike etc.
- b. access control for personnel necessary for the operation of the system
- c. other requirements for personnel in the vicinity of the effector such as safe separation distance and clear areas
- d. requirements for system tests, including:
 - (1) interfaces such as aligning the effector to auxiliary services

- (2) interoperability such as confirming integration with a combat management system
- (3) readiness such as tests of full system functionality
- e. requirements for loading or energising an effector such as:
 - (1) movement of explosive ordnance from storage to the effector
 - (2) applying power to effectors from electrical, fluid (hydraulic, pneumatic), chemical or other energy sources
 - (3) use of dummy versus live loads in system tests including protocols to prevent inadvertent use of live loads.

3.16 **Engaging** - the application of an effector against the target. Engaging typically includes the steps of authorising, deploying, controlling and discriminating. The need to correct, recover or suspend the engagement once commenced must also be taken into account. Considerations must include, but are not limited to:

- a. Authorising engagement with a target, which often occurs under highly dynamic and stressful conditions, and with incomplete and/or inaccurate information. Command mechanisms associated with authorising an engagement must therefore provide the highest level of confidence possible to ensure the appropriate and sanctioned application of an effector. In the context of the OSI, considerations must be given to the following risks to confidence in authorising engagement:
 - (1) volume of information exceeds the capacity to process or is insufficient to formulate a decision
 - (2) information is not timely or is not current relative to the task
 - (3) information is not accurate or is incomplete; or
 - (4) decision rights are not clear or not effectively communicated, leading to unsanctioned authorisation.
- b. Deploying the effector, which involves the delivery system directing and delivering the effect to the target. Hazards and risks must be considered in the context of:
 - (1) Initiation, which may result in noise, shock, heat, efflux (blast), electromagnetic effects, post-initiation susceptibility and vulnerability.
 - (2) Monitoring and control (e.g. guided or directed effectors) to capture, exploit, disrupt, neutralise or destroy a target and minimise the possibility of unintended harm. Specific consideration must be given to maintaining target discrimination to ensure the effector is applied where intended. Note that monitoring is a part of the detection function (ACCO 3.2) and is required throughout an engagement.

- (3) Correction, in terms of the re-direction or re-application of the effector to ensure the effect is applied where intended.
 - (4) Recovery, in terms of the action(s) to be taken when an effector does not operate as intended (e.g. misfire). For example, establishment and training of immediate action drills for use of small arms or procedures to be followed where a missile fails to launch.
 - (5) Suspension of engagement, when there is a change in the conditions under which engagement was authorised. Examples include requirements for self-destruct mechanisms for guided munitions, check fire procedures and the use of “dead man switches” for gunfire serials.
- c. The engagement of effectors is managed in conjunction with the requirement to interpret relevant information sources (e.g. detect, identify and locate a threat) within the timeframes associated with the threat or operational requirement. Considerations for engaging must therefore be determined in conjunction with the requirements of ACCO 3.1 – Tactical Awareness and 3.2 – Detectors.

3.17 **De-activating** – making an effector safe following use. This often involves the unloading and return of explosive ordnance, propellants and isolation of energy sources. Considerations must include but are not limited to:

- a. the requirement for positive confirmation that an effector has been de-activated, unloaded and or de-energised
- b. the requirement to secure the effector commensurate with the prevailing environmental conditions (e.g. wind, wave etc.) and operational circumstances (readiness, response and access requirements).

3.18 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

3.19 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 4

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.4 - CARRIAGE AND HANDLING OF LOADS

FUNCTIONAL OBJECTIVE

4.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 3.4 is defined as:

Processes and systems for the carriage and handling of loads are established, monitored and maintained

OUTCOME

4.2 Loads can be effectively carried and handled in support of the defined taskings, in accordance with the operating and support intent (OSI).

RATIONALE

4.3 Maritime mission systems are often required to carry loads to support taskings. The proper stowage and securing of loads is of the utmost importance for safety of life at sea. Improper stowage and securing of loads has resulted in numerous serious injuries and in loss of life, not only at sea, but also during loading and off-loading (sometimes referred to as discharge).³ Moreover, unsecured or poorly handled loads may be damaged or cause damage to the mission system itself.

4.4 Modern mission systems often need to be highly configurable in order to adapt to changing operational requirements. Systems associated with handling, securing and storing of loads must have sufficient flexibility to support these changing requirements. However, this requires deliberate planning and consideration in the context of the operating and support intent. This planning may consider, for example:

- a. staging and pre-positioning of loads before embarkation taking account of, for example, concurrent wharf-side operations
- b. sequencing the order of loading depending on, for example, the expected sequence of consumption or use of the loads, weight distributions and effects on structural integrity, trim and stability and so on
- c. reconfiguration of the mission system for different loads and taskings
- d. limitations to mission system functionality or performance resulting from the carriage of certain load.

³ Code of safe practice for cargo stowage and securing (resolution A.714 (17)), International Maritime Organisation, amended to MSC / circular. 1026 adopted on 27 May 2002.

4.5 Systems for the carriage and handling of loads generally comprise the following components:

- a. the load itself, such as:
 - (1) vehicles
 - (2) containers
 - (3) loose, flat, pallet, portable tank or packaged units of cargo
- b. arrangements for loading (embarkation), off-loading (disembarkation), handling, movement and storage of loads such as:
 - (1) lifting and handling appliances including cranes, forklifts, cargo lifts, pallet trolleys/jacks etc.
 - (2) storage and securing arrangements
 - (3) access including hatches, doors, soft patches etc.
- c. wharf-side arrangements including:
 - (1) lifting and handling appliances
 - (2) staging, pre-positioning and sequencing for load movement
 - (3) security.

4.6 This ACCO also addresses general requirements for carriage and handling systems and appliances used for:

- a. carriage of explosive ordnance and dangerous goods, in conjunction with ACCO 3.5 – Carriage of Explosive Ordnance and Dangerous Goods
- b. embarking or deploying sub-systems, in conjunction with ACCO 3.7 –
- c. Embarked and Deployable Sub-systems
- d. lifting of personnel.

4.7 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. failure to achieve the defined tasking due to inability to integrate loads into the mission system
- b. harm to personnel or equipment as a result of the inappropriate use of load handling equipment
- c. loss of stability due to cargo movement in a heavy sea state as a result of inappropriate cargo securing arrangements

- d. harm to personnel and the environment due to failure of a wharf-side crane dropping cargo into the port.

4.8 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. impact on other operational requirements of the mission system as a result of the carriage of cargo in lieu of other embarked or deployable sub-systems
- b. potential harm to personnel where cargo prevents or hinders escape or evacuation
- c. harm to the environment through carriage of cargo from overseas back into Australia in contravention of quarantine requirements.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.4

4.9 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

4.10 Carriage and Handling of Loads is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.1 – Structural Integrity
- b. ACCO 1.2 – Buoyancy, Trim and Stability, and Seakeeping
- c. ACCO 1.5 – Auxiliary Systems and Hotel Services
- d. ACCO 1.6 – Replenishment and External Services
- e. ACCO 3.3 – Effectors
- f. ACCO 3.5 – Carriage of Explosive Ordnance and Dangerous Goods
- g. ACCO 3.7 – Embarked and Deployable Sub-systems.

4.11 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include, but not be limited to the activities and conditions described below.

4.12 Staging, Pre-positioning and Sequencing – planning and preparations prior to loading must consider how loads will be staged and pre-positioned to be loaded in an appropriate sequence. Considerations must include, but are not limited to:

- a. staging and making ready loads, including:
 - (1) protection or preservation for the marine environment

- (2) packaging, handling, stowage and transportation preparations
- (3) identification and separation of incompatible cargoes
- b. pre-positioning in terms of load locations and sequence including:
 - (1) incompatible operation (e.g. multiple loading evolutions)
 - (2) traffic management
- c. sequence of loading in terms of load distribution and location on the mission system taking account of:
 - (1) structural stresses including hogging, sagging, point loads etc.
 - (2) effects on buoyancy, trim and stability, and seakeeping characteristics of the mission system
 - (3) movement, access, egress etc.
- d. sequence of intended use in terms of:
 - (1) consumption (e.g. loading of provisions into refrigerated storage)
 - (2) off-loading (e.g. assault vehicles ahead of support vehicles, order of ports etc.).

4.13 Loading and Off-loading – movement of the load onto and off the mission system, both alongside and at sea. Loading and off-loading must be considered in conjunction with ACCO 1.6 – Replenishment and External Services and ACCO 3.5 - Carriage of Explosive Ordnance and Dangerous Goods where applicable. Loading and off-loading considerations must include, but are not limited to:

- a. Operation of the loading systems including:
 - (1) knowledge of the operation of the system (e.g. the need for specific training, licencing and instruction)
 - (2) operating parameters and limitations for use of the system (e.g. safe working loads (SWL), lifting height and reach, rates of movement etc.).
- b. Relative movement between the load and other objects including, for example, people, the mission system, and fixed or moving platforms such as wharves, other vessels or aircraft (helicopters); specific considerations of relative movement must include:
 - (1) system operations and degrees of freedom of the load during loading or off-loading, such as movement of a crane or a forklift
 - (2) environmental aspects such as wind speed, wave height, temperature (e.g. crane operations in high winds)
 - (3) load momentum, including any requirement for fenders, stops etc..

- c. Dynamic loading associated with:
 - (1) weight changes through the sea-air interface, for example when recovering submerged objects
 - (2) surface tension on recovery (e.g. lifting of small craft from the water etc.)
 - (3) accelerations due to environmental effects such as waves
 - (4) cross load tension such as load transfer between vessels at sea (e.g. replenishment at sea, jackstay transfer etc.).
- d. Proximity of loading systems (taking into account their operating envelopes) to:
 - (1) each other
 - (2) fixed objects
 - (3) hazards such as high voltage power lines
 - (4) other activities such as road and foot traffic, maintenance work etc.

4.14 **Handling** – the intentional movement of loads within a mission system. Handling of loads may occur in relatively benign environments such as alongside, or in highly dynamic environments when at sea; and may pose significant risks to personnel, the load itself and the mission system. Handling considerations must include, but are not limited to:

- a. Minimising the need for handling, through for example:
 - (1) suitable packing and stowage systems
 - (2) avoiding the need to breakdown loads for movement and stowage within the mission system
 - (3) reducing manual handling where possible
 - (4) appropriate location and sequencing of loads in the first instance.
- b. Load restrictions and handling procedures based on the prevailing circumstances and conditions, particularly those that affect the motion of the mission system. For example, forklift operations or use of hydraulic pallet jacks may be limited or restricted in certain wave conditions. Similarly, fixed handling equipment such as cranes may require restrictions due to pitch and roll effects.
- c. The need for defined access points, handling routes, barriers, guards, markings and signage.
- d. Effects on buoyancy, trim and stability, and seakeeping characteristics of the mission system whilst moving loads within the mission system.

- e. Fixed handling equipment such as cranes, lifts, and ramps with respect to:
 - (1) rated load and loading operations
 - (2) forces due to load motion (e.g. weight of load exceeds SWL of lifting appliance due to vertical accelerations of the mission system)
 - (3) forces and associated deflections due to mission system motion and inclination (e.g. jamming of a cargo lift due to flexing of the vessel at sea)
 - (4) appropriate distinction and procedures between service lifts and personnel lifts
 - (5) secured positions, particularly where the handling equipment performs multiple functions (e.g. an aircraft elevator that forms part of the deck).
- f. Mobile handling equipment, which in addition to the requirements of fixed handling equipment, must also consider:
 - (1) loose gear (such as tackle blocks, hooks etc.), fittings and ropes
 - (2) stowage when not in use.
- g. Movement of loads under their own power (e.g. motor vehicles) including considerations with respect to:
 - (1) venting of exhaust gases
 - (2) ramp angles exceeding traction, motive or braking limits due to vessel pitch or roll.
- h. Handling of fluids, which is also addressed under ACCO 1.2 – Buoyancy, Trim and Stability, and Seakeeping also requires specific consideration of:
 - (1) free surface effects (e.g. movement of fluid in a partially filled tank)
 - (2) spillage and leakage.

4.15 Securing and Storing – fixing of the load for carriage in the mission system and ensuring its safekeeping during transit. Considerations for securing and storing loads must include, but are not limited to:

- a. suitable securing arrangements to prevent loads shifting
- b. the ability of both the load and the securing arrangement to withstand dynamic forces due to mission system motion
- c. use of purpose built securing systems in preference to ad hoc or temporary securing arrangements, which can often be insufficient to withstand high dynamic forces
- d. the behaviour of the load itself during carriage, including:

- (1) any tendency to deform or compact, which may cause a loosening of securing arrangements
- (2) any tendency to slip where friction coefficients are low (or may be lowered by exposure to water or other substances)
- (3) free surface effects associated with carriage of fluids or shifting solids
- e. distributing and orienting the load to prevent tipping or collapsing
- f. any impingement on access, escape and emergency routes due to the location and securing of the load
- g. prevention of load contamination, degradation or damage, which may occur, for example, through exposure to the maritime environment or extremes of temperature
- h. provision of support and operating elements including lifting apparatus, pallets, cages, tooling etc.
- i. ensuring that securing and storing is:
 - (1) planned and supervised by Suitably Qualified and Experienced Personnel with sound practical knowledge of designed load securing requirements and limitations
 - (2) conducted by properly qualified and experienced personnel
- j. ensuring ship-handling decisions, especially those taken in bad weather conditions, take into account the characteristics of the load, its stowage position and its securing arrangements.

4.16 **Interfacing** – connecting a load with the mission system. Interfacing is often required to maintain the load in operating condition (e.g. charging of batteries on vehicles, electrical power for refrigerated containers, communication links with an embarked sub-system) and the mission system must have sufficient and suitable interfaces to support the embarked loads. Considerations must include, but are not limited to:

- a. fixings and couplings
- b. utilities including power, fuel, air, water etc.
- c. ability to disconnect or isolate loads from the mission system and/or each other, particularly in emergencies.

4.17 **System Durability** – the ability of the system to withstand degradation and maintain functional performance, in the context of the OSI. Considerations with respect to systems used for the carriage and handling of loads must include, but are not limited to:

- a. Limiting the effects of operation, failure or damage of carriage and handling systems through suitable redundancy, isolation and separation.
- b. Suitable protection measures exist to protect equipment, personnel and the environment with respect to carriage and handling systems when:
 - (1) operating in normal modes and degraded states
 - (2) undertaking maintenance
 - (3) operating near personnel, other handling systems or fixed objects
 - (4) operating in or near sensitive environmental areas.
- c. Ensuring that protection measures in and of themselves do not pose a danger to operations, personnel, the environment. For example, ensuring venting of vehicle exhaust fumes does not compromise the watertight integrity of the mission system.
- d. Structural requirements and limitations in accordance with ACCO 1.1 – Structural Integrity, including forces, distributed loads and point loads associated with handling and handling equipment.

4.18 In addition to the above, consideration must also be given to:

- a. Any impairment imposed by the carriage of loads on the normal, essential and emergency functions of the mission system.
- b. Any limitations the carriage of loads poses on the OSI or tasking requirements of the mission system e.g. carriage of loads in a mission system hangar space may impede or prevent aviation operations.
- c. Emergent requirements to embark loads which were not considered in the earlier phases of the CLC. These may require review and amendment of the OSI in accordance with GMCO 2.5 – Mission and Support System Remain Aligned to Approved OSI and GMCO 3.3 – OSI is Evolved as Required.

4.19 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

4.20 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 5

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.5 - CARRIAGE AND HANDLING OF EXPLOSIVE ORDNANCE AND DANGEROUS GOODS

FUNCTIONAL OBJECTIVE

5.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 3.5 is defined as:

Processes and systems for the carriage and handling of ordnance and dangerous goods are established, monitored and maintained

OUTCOME

5.2 Dangerous goods including ordnance can be effectively carried and handled in support of the defined task and in accordance with the operating and support intent (OSI).

RATIONALE

5.3 Many maritime mission systems are required to stow, handle and use dangerous goods including, but not limited to ordnance (spanning small arms munitions to missiles), fuels, lubricants or chemicals. In all cases, suitable arrangements must be provided for the proper loading, off-loading, handling and storage of these dangerous goods.

5.4 ACCO 3.4 – Carriage and Handling of Loads describes the requirements for the management and controls associated with the loading, off-loading, storage and use of loads. Explosive ordnance and dangerous goods are types of loads that may require additional considerations. This ACCO deals with those additional considerations and must be read in conjunction with ACCO 3.4.

5.5 Implicit in the term ‘dangerous’ is that there exists some inherent high level of risk associated with the goods in question. It also suggests that some particular standard of care applies. In the Defence Seaworthiness Management System (DSwMS) context, the standard for managing all hazards and risks is that they be eliminated or minimised so far as is reasonably practicable (SFARP). In the context of explosive ordnance, greater consideration may be required with respect to the resources made available for the management of the associated hazards and risks to demonstrate that the SFARP test is met.

5.6 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. failure to achieve the defined tasking due to inability to integrate explosive ordnance into the mission system
- b. harm to personnel through exposure to hazardous chemicals

c. harm to personnel and the environment through catastrophic explosion.

5.7 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. inability to deliver other mission system functions due to the movement and handling of dangerous goods (e.g. cease radiating on detectors or communications systems whilst handling ordnance or fuel)
- b. environmental contamination through venting, or intentional dumping from the mission system.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.5

5.8 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

5.9 Carriage of Explosive Ordnance and Dangerous goods is inherently linked to many other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.1 – Structural Integrity
- b. ACCO 1.6 – Replenishment and External Services
- c. ACCO 1.7 – Survivability and Preservation of Life
- d. ACCO 1.9 – Integrated Control Systems
- e. ACCO 3.3 – Effectors
- f. ACCO 3.4 – Carriage and Handling of Loads
- g. ACCO 3.7 – Embarked and Deployable Sub-systems.

5.10 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

5.11 **Staging, Pre-positioning, Sequencing, Loading and Unloading** – where dangerous goods are located within the proximity of a mission system they may pose a risk to the mission system itself should an event occur; such as unintended activation, explosion, spills etc. Therefore, additional considerations to those of ACCO 3.4 – Carriage and Handling of Loads must include:

- a. Appropriate safety, security and emergency response measures for both the protection of the dangerous goods and of the mission system itself. This may involve separation, blast protection, monitoring (e.g. patrols or cameras), and the provision of response capabilities.

- b. The quantities and co-location of incompatible loads or loads which may react to reinforce or amplify magnitude of damaging effects. For example, co-location of caustic substances with fuels may initiate fire; or co-location of fuel bladders with ammunition may result in greater damage than that from either in isolation.
- c. The need to minimise the time taken during which the dangerous goods remain pre-positioned or awaiting stowage, to avoid, for example, extended exposure to the elements, security risks etc.
- d. The need to understand and communicate any exposure limits and required conditions associated with the dangerous goods including for example, temperature, humidity, electrical interference, shock, vibration etc.

5.12 **Handling, Securing and Storage** – Dangerous goods held on board may pose a risk to the mission system through mishandling or degradation of the dangerous goods. Therefore, additional considerations to those of ACCO 3.4 – Carriage and Handling of Loads must include:

- a. Management of conditions and limits associated with the dangerous goods such as spark prevention, earthing, cooling, minimal height lifts etc.
- b. Specific requirements associated with compatibility as articulated at Volume 3, Part 0. This is of particular importance where there is a need for dangerous goods to coexist or interact appropriately with other elements, systems, personnel and the environment. An example of managing compatibility issues is through separation, such as:
 - (1) not locating magazines against the hull
 - (2) not locating paint and or chemical storages near potential ignition sources.
- c. Mitigation of effects where dangerous goods are used or activated intentionally or inadvertently. For example:
 - (1) venting from the storage space (e.g. explosive by-products, toxic gases etc.)
 - (2) use of blast and fire resistant bulkheads
 - (3) orienting ordnance to minimise consequences through inadvertent discharge
 - (4) making provision for rapid dumping or discharge.
- d. The need for access controls for personnel handling and working with explosive ordnance.
- e. The need for quarantine arrangements where dangerous goods are contaminated, faulty or expired; for example used refrigerant gas, or defective or expired munitions.

5.13 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

5.14 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 6

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.6 - CARRIAGE OF NON-CREW PERSONNEL

FUNCTIONAL OBJECTIVE

6.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 3.6 is defined as:

Processes and systems for the carriage of non-crew personnel are established, monitored and maintained

OUTCOME

6.2 Non-crew personnel can be embarked, managed, supported and, where applicable, enabled to effectively contribute to the defined tasking.

RATIONALE

6.3 Maritime mission systems are generally crewed by personnel whose roles are to perform functions that form an inherent and enduring component of the mission system, in accordance with its OSI. Defining the requirements for the crew or complement of a mission system is governed through application of GMCO 1.4 – Critical Function, GMCO 1.5 – Critical Competencies and Volume 3, Part 1 (Personnel Requirements) as they apply to each ACCO Functional Objective. However, a mission system is often required to embark and carry military and/or civilian non-crew personnel. Non-crew personnel typically have less knowledge than the crew of the mission system. This is of particular note in regards to shipboard routines, layout; and fire-fighting and evacuation procedures. In addition, non-crew personnel may vary from able-bodied to injured, to those who require full assistance. They may also range from highly disciplined personnel who can contribute, where required, through to uncooperative or antagonistic detainees.

6.4 Examples of non-crew personnel may include but are not limited to:

- a. Special personnel – people required in connection with the mission system's defined tasks. These may include trials and training personnel, aircraft pilots and crew, marine pilots, non-organic maintenance personnel, trainees, security detachments, technical and scientific staff. Special personnel are typically expected to be disciplined and able-bodied, and to have a fair knowledge of shipboard routines, layout, fire-fighting and evacuation procedures and safety equipment.
- b. Embarked forces – troop carrying. Embarked forces are expected to be very fit, well disciplined and able-bodied but, in general, will have a limited knowledge of shipboard routines, layout, fire-fighting and evacuation procedures and safety equipment.
- c. Passengers – people who are not employed or engaged in any capacity on board the ship and who do not fall into any of the other categories.

Passengers may include visiting dignitaries and families⁴ and are expected to have little or no knowledge of shipboard routines, layout, fire-fighting and evacuation procedures and safety equipment.

- d. Persons carried in an emergency – people who are embarked in order to avoid a threat to their safety. These people are expected to have no knowledge of shipboard routines, layout, fire-fighting and evacuation procedures and safety equipment. People in this category are usually embarked as a result of:
 - (1) general recovery for safety of life at sea⁵
 - (2) humanitarian assistance and disaster relief.
- e. Wounded personnel - injured people carried on board. Carriage of these - people may be a planned function of the ship (e.g. hospital ship), or unplanned such as in the event of the recovery of personnel in a safety of life at sea incident. Irrespective of their knowledge, these people are expected to have no capacity to contribute to shipboard routines, fire-fighting and evacuation procedures or the use of safety equipment.
- f. Apprehended persons – people held on board pending further investigation and/or action. These people may include potential illegal immigrants (PII) and persons suspected of criminal activity (e.g. drug trafficking) or non-sanctioned activities (e.g. unauthorised fishing).

6.5 Examples of the types of consequences associated with not achieving this Functional Objective can include:

- a. capsized mission system due to overloading
- b. harm to non-crew personnel where they are unable to evacuate due to unfamiliarity with the mission system layout.

6.6 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. impact on other operational requirements of the mission system as a result of having to accommodate non-crew, for example sea training group in the hangar which prevents flying operations
- b. harm to personnel or the environment through a spread of communicative disease or pests through failure to provide appropriate quarantine capability.

⁴ ANEP 77, Part 1, Chapter 1, Annex E Definitions and Abbreviations

⁵ United Nations Convention on the Law Of the Sea (UNCLOS), Article 98

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.6

6.7 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

6.8 Carriage of Non-crew Personnel is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.2 – Buoyancy, Trim and Stability and Seakeeping
- b. ACCO 1.5 – Auxiliaries and Hotel Services
- c. ACCO 1.7 – Survivability and Preservation of Life
- d. ACCO 3.7 – Embarked and Deployable Sub-systems.

6.9 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

6.10 **Training** – education and skill development for non-crew personnel as well as for crew who may need to manage or support them. Consideration must be given to the training requirements for the groups of non-crew personnel who are most likely to be embarked on board the mission system. Training considerations include, but are not limited to:

- a. the role expected of the non-crew personnel in the mission system's operation, maintenance, safety and emergency evolutions
- b. the role, capability and capacity of the crew in training, managing and supporting non-crew personnel
- c. the timeliness of training and the familiarisation with shipboard layout, routines, safety equipment and evacuation procedures
- d. communication considerations including language, signage (e.g. pictographs versus written word) etc.

6.11 **Mission System Capacity** - Consideration must be given to providing sufficient capacity (and the ability to sustain that capacity) for anticipated non-crew personnel (e.g. troop carriage, specialists in support of embarked subsystems, ships intended to carry PII etc.). These requirements are to be identified within the operating and support intent (OSI).

6.12 There are however, many circumstances where it may be necessary to embark non-crew personnel at short notice and in excess of anticipated requirements (e.g. rescue at sea, emergency troop lift etc.).

6.13 In all circumstances, non-crew personnel must be managed within mission system capacity constraints. Considerations must include, but are not limited to:

- a. stability and trim including the requirement to take account of:
 - (1) non-crew numbers
 - (2) personal property
 - (3) their location and possible on board movement (e.g. crowding and weight distribution etc.)
- b. emergency and evacuation equipment including access
- c. habitability including food, potable water, sleeping space and personal hygiene requirements
- d. protection from the elements including shelter from sun, sea (e.g. washed overboard), wind and rain etc.

6.14 **Health and Wellbeing** – for both crew (e.g. risk of communicable diseases) and non-crew personnel (e.g. treatment of pre-existing injuries). Considerations must include, but are not limited to:

- a. providing medical and emergency care
- b. preventing transmission of communicable diseases and the need for quarantine, isolation or separation
- c. supporting mental well-being including preventing self-harm.

6.15 **Security** – of people, property, information etc. The embarkation of non-crew personnel may expose the mission system to security risks which may result in, for example, intimidation or physical harm to crew and other non-crew personnel, malicious damage, interference with operations, disclosure of classified information etc. Security considerations must include, but are not limited to:

- a. surveillance measures, such as the search and monitoring of non-crew personnel
- b. physical control measures, such as the separation and restraint of uncooperative or aggressive non-crew personnel
- c. access control measures, such as exclusion of non-crew personnel from the internal areas of the mission system.

6.16 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

6.17 Further guidance for this Functional Objective is available at the DSwMS website.

CHAPTER 7

ACTIVITY AND CONDITION BASED COMPLIANCE OBLIGATION 3.7 - EMBARKED AND DEPLOYABLE SUB- SYSTEMS

FUNCTIONAL OBJECTIVE

7.1 The Functional Objective of Activity and Condition Based Compliance Obligation (ACCO) 3.7 is defined as:

Provisions to integrate and utilise embarked and deployable sub-systems are established, monitored and maintained

OUTCOME

7.2 Embarked and deployable sub-systems are able to contribute as intended to achievement of the defined tasking, in accordance with the operating and support intent (OSI).

RATIONALE

7.3 Maritime mission systems very rarely achieve the specified operational effect without employing embarked and deployable sub-systems. Embarked and deployable sub-systems are therefore the norm rather than the exception for maritime operations, and in many circumstances provide the prime capability elements through which operational effect is realised.

7.4 In many instances, modern maritime mission systems must also be highly configurable to adapt to changing operational requirements and therefore frequently employ embarked and deployable sub-systems to enable this.

7.5 **Embarked Sub-systems** – are not organic to the mission system, but are required to perform specific activities in support of the defined tasking. Embarked sub-systems may include, but are not limited to:

- a. hyperbaric chambers
- b. hospital services
- c. temporary accommodation and structures
- d. intelligence and communication suites
- e. sub-systems “fitted for but not with”.

7.6 **Deployable Sub-systems** – may or may not be organic to the mission system, but can be launched from the mission system and usually require recovery. Deployable sub-systems may include but are not limited to:

- a. divers and special forces (when deployed from the mission system in conduct of the task)
- b. remotely operated systems (tethered or untethered)
- c. aircraft (manned or unmanned)
- d. small craft
- e. submersibles (manned or unmanned).

7.7 Consistent with Governance and Management Compliance Obligation (GMCO) 2.1 – Define Operating and Support Intent, a maritime mission system OSI may not sufficiently cover the operating intent and supportability requirements of embarked and deployable subsystems. In this case consideration should be given to the requirement for a specific OSI for the embarked and deployable subsystem.

7.8 Examples of the types of consequences associated with failing to achieve this Functional Objective can include:

- a. failure to achieve the defined tasking due to inability to deploy an embarked sub-system
- b. harm to personnel due to loss of a sub-system (e.g. capsizing of a RHIB on launch, ditching of an aircraft or loss of a manned submersible).

7.9 Examples of the types of consequences associated with achieving this Functional Objective can include:

- a. impact on other operational requirements of the mission system as a result of the deployment of a system such as a towed array
- b. harm to personnel due to fatigue issues as a result of failure to understand the concurrent resource demands of operating deployable sub-systems
- c. legal non-compliance and potential harm to personnel where embarked systems prevent or hinder escape or evacuation
- d. harm to the environment through waste management system overload as a result of the embarkation of additional accommodation modules.

REQUIREMENTS OF FUNCTIONAL OBJECTIVE 3.7

7.10 The requirements for this ACCO comprise the unique requirements described below and the common, unifying requirements specified at Volume 3, Part 1.

7.11 Embarked and Deployable Sub-systems is linked to other ACCOs but specifically requires consideration in conjunction with:

- a. ACCO 1.1 – Structural Integrity
- b. ACCO 1.2 – Buoyancy, Trim and Stability, and Seakeeping

- c. ACCO 1.5 – Auxiliary Systems and Hotel Services
- d. ACCO 1.8 – Communications
- e. ACCO 2.2 – Situational Awareness
- f. ACCO 2.3 – Berthing, Mooring, Anchoring and Towing
- g. ACCO 3.1 – Tactical Awareness
- h. ACCO 3.2 – Detectors
- i. ACCO 3.3 – Effectors
- j. ACCO 3.4 – Carriage and Handling of Loads
- k. ACCO 3.5 – Carriage of Explosive Ordnance and Dangerous Goods
- l. ACCO 3.6 – Carriage of Non-crew Personnel.

7.12 Consideration must be given to hazards and risks that may limit achievement of this Functional Objective, or which may be realised through achievement of this objective. Systems of control to address these hazards and risks should not in and of themselves create further hazards or risks to this or other Functional Objectives. For this Functional Objective, consideration must include but is not limited to the activities and conditions described below.

7.13 **Embarkation** – loading and off-loading of embarked and deployable sub-systems. This must be considered in context of ACCO 3.4 - Carriage and Handling of Loads, ACCO 3.5 - Carriage of Explosive Ordnance and Dangerous Goods and safe work practices for embarkation and debarkation at sea or alongside.

7.14 **Interfacing** – Interfaces are the specific points of interaction and connection between the sub-system and the maritime mission system. The mission system must have the ability to support the embarked sub-system in its contribution to the defined tasking. Considerations must include, but are not limited to:

- a. compatibility and suitability of interfaces and supporting services (interoperability), such as:
 - (1) fixings and couplings
 - (2) utilities including electrical power, fuel, air, water etc.
 - (3) information transfer and management
- b. capacity of the mission system to support and sustain the sub-system, such as:
 - (1) specialist personnel
 - (2) space and weight

- (3) structural suitability
- (4) utilities and waste
- (5) survivability and preservation of life provisions, for example inclusion of temporary accommodation may require additional lifesaving capability such as life rafts and life jackets
- (6) the cumulative and concurrent requirements or impacts of multiple embarked sub-systems.

7.15 **Storage** – In conjunction with interfacing above, sub-systems storage must take account of:

- a. secure for sea requirements
- b. escape and emergency routes
- c. sub-system degradation, for example through exposure to the maritime environment
- d. carriage of support and operating elements including spares and tools
- e. the requirement to periodically conduct operability tests, particularly where the sub-system experiences extended durations of inactivity.

7.16 **Launch, Recovery and Handling** – For deployable sub-systems, the launch, recovery and on board handling usually requires specific procedures and equipment such as A frames for submersibles, Hiab cranes and cradles for small boat handling, yellow train and RAST for aircraft etc. Considerations must include, but are not limited to:

- a. dynamic interactions between the sub-system and the mission system including:
 - (1) the effect of environmental conditions, for example wave heights and directions, wind speed etc.
 - (2) peak loads
 - (3) effects on handling characteristics of the mission system and sub-system when operating in launch and recovery envelopes (e.g. speed differential, turbulence)
- b. requirements for personnel rated (typically known as man rated) launch and recovery systems.

7.17 **Operation** – use of the embarked or deployable sub-system on, in or around the mission system. Considerations must include, but are not limited to:

- a. prevailing environmental conditions
- b. operating envelopes, for example avoiding interference or clashes

- c. emissions including for example, exhaust, toxic gases and waste, radiation etc.

7.18 Specific consideration must also be given to:

- a. Any impairment imposed by the embarked or deployable sub-system on the normal, essential and emergency functions of the mission system.
- b. Any limitations the embarked or deployable sub-system poses on the OSI or tasking requirements of the mission system. For example, installation of temporary accommodation in a mission system hangar space may impede or prevent aviation operations.
- c. Emergent requirements to embark sub-systems which were not considered in the earlier phases of the Capability Life Cycle. These may require review and amendment of the OSI in accordance with GMCOs 2.5 and 3.3.

7.19 Consideration must also be given to prescribed compliance requirements relevant to this ACCO. This may include specified statutory requirements, or Defence directed means of compliance (DMOC). The ODSwR maintains a register of statutory and other requirements relevant to the seaworthiness context (refer to guidance for further details).

GUIDANCE

7.20 Further guidance for this Functional Objective is available at the DSwMS website.