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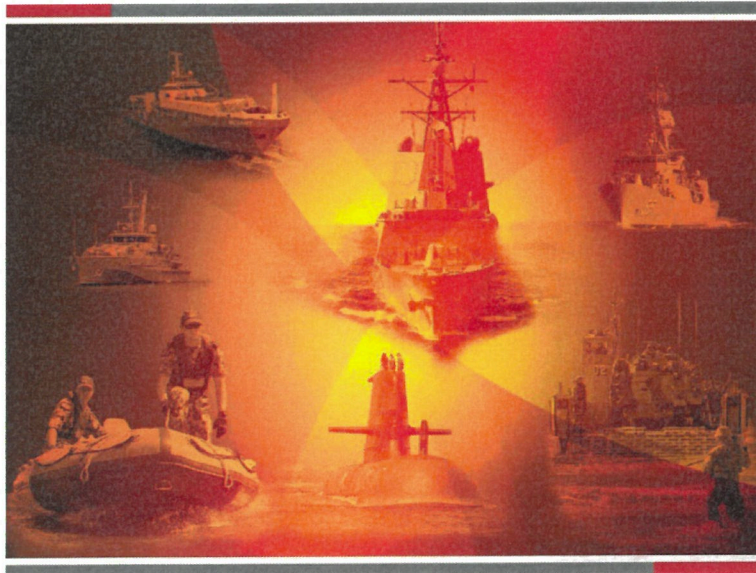
**AUSTRALIAN NAVAL CLASSIFICATION AUTHORITY
MANUAL (VOLUME 2)**

DIVISION 5: REMOTE AND AUTONOMOUS SYSTEMS

SECTION 4: LARGE UNCREWED SURFACE VESSELS

CHAPTER 01: INTEGRATED PLATFORM SURVIVABILITY

PART 1: ANC RULES



This document is issued for use by Defence and Defence Industry personnel and is effective forthwith.

A handwritten signature in black ink, appearing to read 'CN Dagg'.

CN Dagg, CSC
Assistant Secretary
Australian Naval Classification Authority
Department of Defence
CANBERRA ACT 2600
May 2024 Edition

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ANCA Manual (Volume 2)

Division 5: Remote and Autonomous Systems, Section 4: Large Uncrewed Surface Vessels, Chapter 01: Integrated Platform Survivability, Part 1: ANC Rules, May 2024 Edition

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Australian Naval Classification Authority

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>

AUSTRALIAN NAVAL CLASSIFICATION RULES

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⁵ <https://www.defence.gov.au/business-industry/industry-governance/australian-naval-classification-authority/australian-naval-classification-rules>

AMENDMENTS

Proposals for amendments to the ANCA Manual (Volume 2) may be sent to:

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EDITIONS

Edition	Edition	Amendment type	Effective
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Division 5: Remote and Autonomous Systems (RAS) Rules
Section 4: Large Uncrewed Surface Vessel (L-USV)
Part 1: ANC Rules

Chapter 01: Integrated Platform Survivability

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Australian Naval Classification Rules

Rule 0. Goals

- 0.1 Large Uncrewed Surface Vessels (L-USV) exposed to extreme threat conditions shall be designed, constructed, and maintained to achieve a level of survivability aligned with the Operating and Support Intent (OSI) that optimises Susceptibility, Vulnerability and Recoverability to maintain post damage capability for all credible threats in all Foreseeable Operating Conditions (FOCs).

Rule 1. General

Functional Objective

- 1.1 The purpose of this Rule is to outline the principles and framework of Chapter 01 *Integrated Platform Survivability* (IPS) and its application.

Scope

- 1.2 The scope of this Chapter is to describe the Goals, Functional Objectives and Performance Requirements of the L-USV's ability to maintain a level of Post Damage Capability and provide protection of the environment, against all credible threats and damage scenarios in all FOCs.
- 1.3 The minimum survivability level is provided by the International Convention for the Safety of Life at Sea (SOLAS). However, this alone does not provide a sufficient level of survivability and may not be applicable to the context, for Post Damage Capability and protection of the environment, for the majority of L-USV operations in peacetime, constabulary and combat operations.
- 1.4 Chapter 01 *Integrated Platform Survivability* provides additional requirements to all Chapters of the ANC Rules Division 5 Section 4, as applicable by the IPS level. Therefore, in order to meet Chapter 01 *Integrated Platform Survivability* goals, the requirements of this Chapter shall be met when designing and verifying other Division 5 Section 4 Chapters, to the extent necessary to meet the OSI.
- 1.4.1 Division 3 Chapter 01 *Integrated Platform Survivability* goal applies to all Naval Vessels greater than 24 m length overall that carry persons. Therefore, to meet the Division 5 Section 4 Chapter 01 *Integrated Platform Survivability* goal, a L-USV that requires embarked persons shall meet the requirements of both this chapter and the requirements of Division 3 Chapter 01 *Integrated Platform Survivability* as applicable to the design.
- 1.4.2 The Rules listed in this Chapter are based on those in the corresponding Chapter within Division 3 *Ship Rules* and have been adapted for L-USV. When referring to Division 2 *Core Design Rules* or Division 3 *Ship Rules*, the following terms may be interchanged:
- 1.4.2.1 'Ship' as 'L-USV';
- 1.4.2.2 'Crew' or 'Operator' or 'Embarked Person' as 'End User';
- 1.4.2.3 'Primary, Main or Damage Control Station' as 'Remote Command Unit (RCU)'; and
- 1.4.2.4 'Signature Reduction' as 'Signature Management'.

- 1.4.3 The IPS arrangements of the L-USV shall match its Remote and Autonomous System (RAS) Maturity Level to allow End Users to safely operate the L-USV to achieve missions listed in the OSI.

Application

- 1.5 The L-USV design shall meet the L-USV's survivability in accordance with the OSI, to:
- 1.5.1 Retain post damage capability for both combat and platform systems from credible threats; and
- 1.5.2 Not used.
- 1.6 The survivability controls shall be designed for each area of the survivability domains as follows:
- 1.6.1 Susceptibility: The tactical and post detection capability shall be ensured by understanding the threat capabilities and applying susceptibility controls:
- 1.6.1.1 Signature Management;
- 1.6.1.2 Threat Detection; and
- 1.6.1.3 Countermeasures.

Note: See Chapter 13 *Combat Systems* for requirements relating to threat detection, countermeasure systems, decoys, and their associated systems.

- 1.6.2 Vulnerability: The post damage capability shall be ensured by understanding the damage extent from the defined threats and applying vulnerability controls:
- 1.6.2.1 Zoning, Separation and Redundancy;
- 1.6.2.2 Shock Hardening;
- 1.6.2.3 Blast Hardening; and
- 1.6.2.4 Ballistic Protection.
- 1.6.3 Recoverability: The recovered capability shall be ensured by understanding the damage extent from the defined credible threats and applying recoverability controls:
- 1.6.3.1 Incident Management;
- 1.6.3.2 Fire Control;
- 1.6.3.3 Flood Control;
- 1.6.3.4 Hazardous Substance Control;
- 1.6.3.5 Chemical, Biological, Radiological and Nuclear Defence; and
- 1.6.3.6 Not used.
- 1.7 The survivability controls of the L-USV shall match its RAS Maturity Level to allow safe operations as listed in the OSI.

Note: See Chapter 06 *Fire Safety* for requirements relating to fire control.

Note: See Division 2 Chapter 01 *General Requirement Rule 7 Hazardous Areas* for requirements relating to hazardous substance control.

Note: See Chapter 07 *Escape, Evacuation and Rescue* for requirements relating to preservation of life.

Rule 2. Post Damage Capability

- 2.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 01 *Integrated Platform Survivability* Rule 2 *Post Damage Capability* as amended in Table 1.1 below:

Table 1.1: Division 3 Chapter 01 Rule 2 Amendments

Rule Number	Amendment
2.5	Not used.
2.6	Not used.
2.7.1	Safety systems to support situational awareness of the vessel for both the End User to facilitate safe navigation, including communications.
2.7.3	Not used.
2.7.7	Not used.
2.8	The RCU shall ensure adequate management of the damage event and adequate operation, control, and monitoring of the remaining functions post damage.
2.9	The End User shall be provided with suitable operator information for operation in the damaged state.

Rule 3. Signature Management

- 3.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 01 *Integrated Platform Survivability* Rule 3 *Signature Management* as amended in Table 1.2 below:

Table 1.2: Division 3 Chapter 01 Rule 3 Amendments

Rule Number	Amendment
3.1	The L-USV shall be designed to manage and maintain signatures to influence detection by threats and their operators as specified in the OSI.
3.2	The L-USV's signatures shall be designed to influence the likelihood of detection from threat operators as required by the OSI.
3.3	The L-USV's signatures shall be designed to influence the likelihood of detection from credible combat threats as required by the OSI.
3.5	All signature management systems shall be design, constructed and maintained to achieve overall effectiveness, as specified in the OSI.

Rule 4. Zoning, Separation and Redundancy

- 4.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 01 *Integrated Platform Survivability* Rule 4 *Zoning, Separation and Redundancy* as amended in Table 1.3 below:

Table 1.3: Division 3 Chapter 01 Rule 4 Amendments

Rule Number	Amendment
4.3	Sub-divided zones shall be aligned to watertight, fire, smoke, and damage control zones required by Chapter 03 Buoyancy and Stability and Chapter 06 Fire Safety.

Rule Number	Amendment
4.4	The zoning, separation and redundancy of vital systems shall be determined from the level of Post Damage Capability required by the OSI.
4.6	Not used.
4.7	The L-USV shall be designed and equipped to enable the formation of control boundaries autonomously or remotely by the End User.
4.8	Not used.

Rule 5. Shock Hardening

- 5.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 01 *Integrated Platform Survivability* Rule 5 *Shock Hardening*.

Rule 6. Blast Hardening

- 6.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 01 *Integrated Platform Survivability* Rule 6 *Blast Hardening* as amended in Table 1.4 below:

Table 1.4: Division 3 Chapter 01 Rule 6 Amendments

Rule Number	Amendment
6.4	The L-USV structure and fittings shall be designed to withstand blast damage sufficient to retain the post damage capabilities required by the OSI.

Rule 7. Ballistic Protection

- 7.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 01 *Integrated Platform Survivability* Rule 7 *Ballistic Protection* as amended in Table 1.5 below:

Table 1.5: Division 3 Chapter 01 Rule 7 Amendments

Rule Number	Amendment
7.1	The L-USV shall be fitted with ballistic protection systems to retain capability against the defined ballistic threats to the extent necessary to meet the OSI.
7.9	Not used.

Rule 8. Incident Management

- 8.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 01 *Integrated Platform Survivability* Rule 8 *Incident Management* as amended in Table 1.6 below:

Table 1.6: Division 3 Chapter 01 Rule 8 Amendments

Rule Number	Amendment
8.5	The Incident Management System shall include systems that provides or assist the Autonomous Control System or End User located at the RCU with situational awareness.
8.6	Not used.
8.7	The L-USV systems shall be designed to operate in a number of modes, as required by its RAS Maturity Level, including:

Rule Number	Amendment
8.7.2	Remote manual operation by the End User located at the RCU;
8.7.3	Not used.
8.8	Not used.
8.9	Not used.

Rule 9. Flood Control

9.1 The L-USV shall comply with Division 3 *Ship Rules Chapter 01 Integrated Platform Survivability Rule 9 Flood Control* as amended in Table 1.7 below:

Table 1.7: Division 3 Chapter 01 Rule 9 Amendments

Rule Number	Amendment
9.2	The L-USV is to be provided with a means of alerting the RCU to the presence of flooding that may affect the essential safety or capability functions of the vessel.
9.15	The system is to be rapidly operable from the RCU and all Damage Control Stations.
9.16	Indication of system operation shall be available at all control positions including the RCU.
9.19	Not used.

Rule 10. Chemical, Biological, Radiological and Nuclear Defence

10.1 The L-USV shall comply with Division 3 *Ship Rules Chapter 01 Integrated Platform Survivability Rule 10 Chemical, Biological, Radiological and Nuclear Defence* as amended in Table 1.8 below:

Table 1.8: Division 3 Chapter 01 Rule 10 Amendments

Rule Number	Amendment
10.2	If required by the OSI, CBRN situational awareness shall be provided to the End User at the RCU through an automatic detection system that can perform the following:
10.4	Not used.
10.5	Not used.
10.6	Not used.
10.7	Not used.
10.8	If required by the OSI, the L-USV shall be designed with systems for the removal of CBRN agents and contamination.
10.9	Not used.
10.10	Not used.