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

DIVISION 5: REMOTE AND AUTONOMOUS SYSTEMS

SECTION 4: LARGE UNCREWED SURFACE VESSELS

CHAPTER 11: AVIATION SYSTEMS

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 11: Aviation Systems, Part 1: ANC Rules, May 2024 Edition

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

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

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

AUSTRALIAN NAVAL CLASSIFICATION RULES

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AMENDMENTS

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

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Division 5: Remote and Autonomous Systems (RAS) Rules
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Chapter 11: Aviation Systems

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Australian Naval Classification Rules

Rule 0. Goal

- 0.1 The arrangement for Aviation Systems shall be designed, constructed, and maintained for all foreseeable operating conditions to:
 - 0.1.1 Provide a safe and effective operating platform for crewed and uncrewed air systems; and
 - 0.1.2 Provide an effective means of controlling and maintaining air operations.

Rule 1. System Capability

Functional Objective

- 1.1 The purpose of this Rule is to outline the principles and framework of Chapter 11 *Aviation Systems* and its application.

Scope

- 1.2 The rules of this chapter apply to all Large Uncrewed Surface Vessels (L-USVs) that operate manned air systems.
- 1.3 The application of this chapter to unmanned air systems is dependent on its size and subject to consultation with ANCA.
- 1.4 Division 2 *Core Design Rules* Chapter 01 *General Requirements* and Chapter 01 *Integrated Platform Survivability* applies to all chapters of the ANC Rules, as applicable to the design, and therefore in order to meet the Chapter 11 *Aviation Systems* goal, the requirements of both this chapter, Chapter 01 *Integrated Platform Survivability* and Division 2 *General Requirements* Chapter 01 *Core Design Rules* shall be met.
- 1.5 Division 3 *Ship Rules* Chapter 11 *Aviation Systems* goal applies to all Naval Vessels greater than 24 m length overall that carry persons. Therefore, to meet the Chapter 11 *Aviation Systems* goal, a L-USV that requires embarked persons shall meet the requirements of both this chapter and the requirements of Division 3 *Ship Rules* Chapter 11 *Aviation Systems* as applicable to the design.
 - 1.5.1 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 or 3, the following terms may be interchanged:
 - 1.5.1.1 'Ship' as 'L-USV';
 - 1.5.1.2 'Crew' or 'Operator' or 'Embarked Person' as 'End User';
 - 1.5.1.3 'Primary, 'Main' or 'Damage Control Station' as 'Remote Command Unit (RCU)';
 - 1.5.1.4 'Bridge' or 'conning position' as RCU; and
 - 1.5.1.5 'Signature Reduction' as 'Signature Management'.
- 1.6 The Aviation Systems of the L-USV shall match its RAS Maturity Level to allow End Users to safely operate the L-USV to achieve missions listed in the Operating and Support Intent (OSI).

- 1.7 The ANC Rules exclude training requirements. Division 3 *Ship Rules* Chapter 11 *Aviation Systems* assumes all End Users have an appropriate level of competence for the operation of the installed systems.

Rule 2. Communication Systems

- 2.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 11 *Aviation Systems* Rule 2 *Communication Systems* as amended in Table 1.1 below:

Table 1.1: Division 3 Chapter 11 Rule 2 Amendments

Rule Number	Amendment
2.1	The L-USV shall provide systems to enable direct communication with an air system and the End User, located at the RCU, to support air operations.
2.2	To enable the End User, located at the RCU, to communicate securely and directly with the air system at each air system launch/recovery position, the L-USV shall provide a communications system between the air system and defined position at the RCU.
2.3	A RCU to air system two-way radio communications system shall enable communication with air systems as follows:
2.4	The RCU should be capable of recording and retaining air system communications.
2.5	Not used.

Rule 3. Ship External Lighting

- 3.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 11 *Aviation Systems* Rule 3 *Ship External Lighting* as amended in Table 1.2 below:

Table 1.2: Division 3 Chapter 11 Rule 3 Amendments

Rule Number	Amendment
3.5	Where required by the OSI, the End User, located at the RCU shall be able to conduct flight operations on the L-USV at night.

Rule 4. Visual Surveillance

- 4.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 11 *Aviation Systems* Rule 4 *Visual Surveillance* as amended in Table 1.3 below:

Table 1.3: Division 3 Chapter 11 Rule 4 Amendments

Rule Number	Amendment
4.5	L-USV bulkheads surrounding the Flight Deck shall have a sufficient level of protection for the purpose of protecting the L-USV structure and to support incident response, in the event of a crash on deck.

Rule 5. Fire-Fighting

- 5.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 11 *Aviation Systems* Rule 5 *Fire-Fighting* as amended in Table 1.4 below:

Table 1.4: Division 3 Chapter 11 Rule 5 Amendments

Rule Number	Amendment
5.3	A Firefighting system(s) shall be provided to the flight deck.
5.4	If required by the L-USV OSI, Sufficient extinguishing media shall be held on the L-USV for multiple incidents.

Rule 6. Not Used

Rule 7. Aviation System Storage Area

- 7.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 11 *Aviation Systems* Rule 7 *Aviation System Storage Area* as amended in Table 1.5 below:

Table 1.5: Division 3 Chapter 11 Rule 7 Amendments

Rule Number	Amendment
7.1	An Aviation System Storage Area shall provide safe stowage of the Aviation Air System and, if required by the L-USV OSI, allow maintenance to be undertaken.
7.7.1	It shall also be operatable remotely by the End User, located at the RCU.
7.8	Not used.
7.9	Not used.
7.10	Not used.

Rule 8. Flight Deck

- 8.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 11 *Aviation Systems* Rule 8 *Flight Deck* as amended in Table 1.6 below:

Table 1.6: Division 3 Chapter 11 Rule 8 Amendments

Rule Number	Amendment
8.2.6	Forward maintenance activities if required by the L-USV OSI
8.2.10	Not used.
8.11	Not used.
8.16	Not used.
8.19	Not used.

Rule 9. Landing Aids

- 9.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 11 *Aviation Systems* Rule 9 *Landing Aids* as amended in Table 1.7 below:

Table 1.7: Division 3 Chapter 11 Rule 9 Amendments

Rule Number	Amendment
9.2.2	Operated and displayed at the RCU.
9.3	L-USV motion data shall be provided at the RCU and to the air system in accordance with the OSI.
9.5	Not used.

Rule 10. Aviation Services

10.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 11 *Aviation Systems* Rule 10 *Aviation Services* as amended in Table 1.8 below:

Table 1.8: Division 3 Chapter 11 Rule 10 Amendments

Rule Number	Amendment
10.1	If required by the L-USV OSI, aviation services shall be provided to support air system operations and all aviation related maintenance activities.
10.4	If required by the L-USV OSI, the L-USV shall provide stowage for aviation servicing fluids.
10.5	If required by the L-USV OSI, power to support the air system(s) shall be available at each starting and servicing position.
10.6	If required by the L-USV OSI, the L-USV shall provide facilities to store bulk aviation fuel.
10.7	Emergency shut off for fuel and/or power shall be provided at the required positions as determined by the OSI.

Rule 11. Aviation Compartments

11.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 11 *Aviation Systems* Rule 11 *Aviation Compartments* as amended in Table 1.9 below:

Table 1.9: Division 3 Chapter 11 Rule 11 Amendments

Rule Number	Amendment
11.1	If required by the L-USV OSI, aviation compartments shall be provided to enable air system maintenance and aviation operations to take place.
11.5	Air System Control Station(s) (ASCS) shall be provided at the RCU to monitor flight operations to and from the Flight Deck.
11.6	Not used.

Rule 12. Electromagnetic Hazards

12.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 11 *Aviation Systems* Rule 12 *Electromagnetic Hazards* as amended in Table 1.10 below:

Table 1.10: Division 3 Chapter 11 Rule 12 Amendments

Rule Number	Amendment
12.1	The L-USV's Electromagnetic emissions shall not adversely affect air system safety or the L-USV's operations.
12.2	The hazards associated with L-USV aviation related electromagnetic emissions shall be assessed to ensure that the L-USV's operations are not adversely affected.

Rule 13. Not Used

Rule 14. Vertical Replenishment and Transfer

- 14.1 The L-USV shall comply with Division 3 *Ship Rules* Chapter 11 *Aviation Systems* Rule 14 *Vertical Replenishment and Transfer* as amended in Table 1.11 below:

Table 1.11: Division 3 Chapter 11 Rule 14 Amendments

Rule Number	Amendment
14.1	L-USV's shall be capable, where required by the OSI, of transferring stores or explosive ordnances.
14.2.3	A suitable means for the earthing cargo shall be available;
14.2.5	Not used.
14.3	Where transfer by air is provided for in the OSI the L-USV shall be provided with Ship and Air System(s) Limits for those transfers and the associated equipment to assess those limits.
14.7	Effective means of communications, complying with the requirements of Division 3 Chapter 08 <i>Safety Communications</i> , are to be provided between the RCU and the air system(s).
14.10	Not used.

Rule 15. Remote Monitoring

Functional Objective

- 15.1 The L-USV shall have Remote Monitoring capabilities to ensure the safe operation of aviation systems.

Scope

- 15.2 This rule is applicable for L-USV with a Remote Monitoring level of RM3 or greater and have the requirement IAW the OSI to conduct aviation operations.

Performance Requirements

- 15.3 The L-USV system with Remote Monitoring level of RM3 or greater it shall have the ability to monitor systems critical to ensuring the safe operation of aviation systems.

Rule 16. Remote Control

Functional Objective

- 16.1 The L-USV shall have Remote Control capabilities to ensure the safe operation of aviation systems.

Scope

- 16.2 This rule is applicable for L-USV with a Remote Control level of RC3 or greater and have the requirement IAW the OSI to conduct aviation operations.

Performance Requirements

- 16.3 The L-USV system with Remote Control level of RC3 or greater it shall have the ability to control systems critical to ensuring the safe operation of aviation systems.

Rule 17. Autonomy

Functional Objective

- 17.1 The L-USV shall have autonomy control and decision-making capabilities to ensure the safe operation of aviation systems.

Scope

- 17.2 This rule is applicable for L-USV with an Autonomy level of A3 or greater and have the requirement IAW the OSI to conduct aviation operations.

Performance Requirements

- 17.3 The L-USV system with an autonomy level of A3 or greater shall have the ability to autonomously control and sustain systems required for the safe operation of aviation systems.