The Defence Space Safety Program Manual
Volume 1: Requirements for the DSSP

1. Introduction

Why regulate space safety

1. The launch, operation and return of space objects presents many complex safety hazards, which led the Australian government to promulgate space regulations to help protect public health, safety and property. These same activities can be even more challenging for Defence commanders and managers, due to Defence's often competing capability imperatives. For Defence to meet its legal and moral obligations to protect people while still delivering capability, a structured and generative approach to identifying and managing space safety risks is required.

2. Space safety regulations provide structure through prescribing requirements and standards for the design, construction, maintenance and operation of space objects and facilities. These regulations, when coupled with a generative space safety culture and with independent assurance, enable Defence commanders and managers to achieve a credible and defensible level of Defence space safety.

The Defence Space Safety Program

Context

3. The Defence Space Safety Program (DSSP), established by the Secretary of the Department of Defence and the Chief of the Defence Force through the *Defence Instruction, Military Command Support Provision 3* (MCS3), is intended to regulate and assure achievement of safety outcomes associated with the Defence space domain. The *Defence Instruction*, MCS3 provides for:

a. the Defence Spaceworthiness Authority (DSA) to establish, manage and review the effectiveness of the DSSP

b. the appointment of Director General (DG) Defence Aviation Safety Authority (DASA) as the Defence Space Safety Regulator

c. the promulgation of policies, responsibilities, directions, regulations, processes and definitions relating to the DSSP activities.

4. The DSA must establish the DSSP across Defence to assure the Secretary of the Department of Defence, the Chief of the Defence Force and Government that the management of Defence space safety is credible and defensible in the context of space safety obligations, and the Government commitment to be a responsible space actor. The basis for these safety obligations is the Commonwealth *Space (Launches and Returns) Act 2018* (SLR Act), the Commonwealth *Work Health and Safety Act 2011* (WHS Act), and international space treaties and sustainability guidelines that have been ratified by the Australian Government.

Functions and Responsibilities

5. Space safety is a command and management responsibility. Commanders and managers are therefore accountable for ensuring space objects under their command or control are designed, constructed, maintained and operated to appropriate standards by competent personnel.

***Note**: The Space (Launches and Returns) Act 2018 defines a space object as:*

(a) an object the whole or a part of which is to go into or come back from an area beyond the distance of 100 km above mean sea level; or

(b) any part of such an object, even if the part is to go only some of the way towards or back from an area beyond the distance of 100 km above mean sea level

6. The Defence Space Safety Regulator is to assure space safety, meaning that they must attain confidence and reassurance that those responsible for ensuring space safety are performing their duties satisfactorily. Described at the highest level, the functions and accountabilities are as follows:

a. independent safety assurance, specifically:

(1) the prescription and interpretation of space safety management policy, inclusive of Defence Space Safety Regulations (DSSR) and related standards

(2) the issuance and revocation of space safety authorisations (SSAs)

***Note**: SSA is the generic term for any formal notification document/artefact issued in response to an application from the regulated community in accordance with the regulations. SSA includes, but is not limited to, launch, return and payload permits, and launch facility licences.*

(3) oversight and enforcement activities to assure ongoing compliance with the DSSR and the continued validity of SSAs

***Note:** Since Defence Instruction, MCS3 precludes the Defence Space Safety Regulator from giving directions to Defence personnel, enforcement action is limited to the possible partial or full suspension the SSA.*

(4) the promotion of space safety through education, training, and dissemination of safety information

b. implementing a Defence system for the investigation of accidents involving Defence space objects, that aims to identify causes and prevent further accidents without apportioning blame or determining liability.

7. In accomplishing these functions and accountabilities, the Defence Space Safety Regulator must promote a generative space safety culture in the Defence space community. A generative culture is one where safety performance is maximised and safety behaviour is fully integrated into the management system as well as the conduct, values and attitudes of all members of the organisation. One key element of a generative culture is promoting a just culture, where individuals are encouraged to report safety-related information and the organisation's analysis of reported events focuses on 'system performance' and contributing factors.

8. Commanders and managers responsible for activities within the scope of the DSSP are to:

a. ensure compliance with the applicable DSSR

b. take all measures necessary to support independent safety assurance activities carried out by the Defence Space Safety Regulator in accordance with the DSSP.

Scope of DSSP Activities

9. The following Defence space activities are within the scope of the DSSP, to the extent that they may affect space safety:

a. **Launch Facilities**: The design, construction, maintenance and operation of the following launch facilities (fixed or mobile) involved in the space launch sequence (including range control):

(1) Defence launch facilities

(2) commercial launch facilities in Australia used for Defence activities

(3) foreign military launch facilities in Australia not regulated by the Australian Space Agency (ASA)

b. **Defence Orbital Payloads**: The design, construction, maintenance and operation of Defence's orbital payloads when:

(1) the design, construction or maintenance of the payload is conducted by, or on behalf of, Defence

(2) the payload is owned, or partially owned, by Defence

(3) Defence is responsible, or partially responsible, for payload operations

***Note**: An orbital payload can be part or all of a resident space object (ie an artificial object that orbits the Earth).*

***Note:** For orbital payloads that include both Defence and non-Defence (eg civil or foreign military) elements, only the Defence payload elements are within the scope of the DSSP. When Defence is an end-user of shared payload outputs, without any control over or ownership of the payload design/operation, the payload is outside the scope of the DSSP.*

c. **Space Launch and Return**: The design, construction, maintenance and operation of space objects involved in launches/returns when:

(1) space objects are launched or returned by Defence

(2) civil space objects not regulated by the ASA are launched or returned for Defence purposes

(3) civil space objects not regulated by the ASA are launched from or returned to Defence facilities or Defence controlled range areas

(4) foreign military space objects not regulated by the ASA are launched from or returned to Australia

***Note:** For launches and returns of space objects that include both Defence and non-Defence elements, the Defence Space Safety Regulator in consultation with the ASA will determine the extent of DSSP application.*

10. The investigation of Defence space activity accidents, with the aim of identifying causes and preventing further accidents, is within scope of the DSSP.

DSSP Boundaries

11. In *Defence Instruction,* MCS3 one of the objectives of the DSSP is to regulate and assure safety outcomes associated with the space domain (including operating launch facilities and launch/operation/return of space objects). Further, *Defence Instruction,* MCS3 states the DSSP must be consistent with the safety objectives of the SLR Act and be designed to achieve a safety standard commensurate with the safety standards established under that Act.

12. While the DSSP coverage extensively aligns with the SLR Act, it is purposely narrower in several aspects. First, it does not cover those elements of the SLR Act that focus beyond personnel safety, including damage to property, industry development, environmental protection and heritage site protection. In alignment with this limitation, the DSSP only covers elements of the international space treaty obligations tied to personnel safety. Next, the safety focus of the SLR Act is on the general public, with the protection of workers and related parties being subject to separate legislation. In Defence's context, this separation is not useful to commanders and managers; consequently, the DSSP encompasses the protection of Australian Defence Force (ADF) members and other persons in accordance with the WHS Act.

13. Although protecting Defence and civil property is not a focus for the DSSP, it does recognise that certain property damage can magnify the safety consequences of a space activity accident. The following examples are illustrative:

a. **On the ground**: Space object debris striking fuel storage facilities, chemical plants, multi-storey buildings, and so on, would probably result in multiple fatalities

b. **On water**: Space object debris striking ships and fixed platforms would present a high fatality risk to the often large number of occupants

c. **In the air**: Space object debris striking an aircraft would likely result in total fatalities

d. **In space**: Modern satellites are increasingly used for safety-related activities (eg emergency communications, aircraft safe separation, medical services, etc), so damage from other space objects could credibly contribute to fatalities. This effect would be magnified if resultant space debris collides with other satellites.

14. Consequently, the DSSP scope is more fully described as protecting ADF members and other persons from substantial harm as a result of Defence space activities, which necessarily includes protecting high-safety-consequence property. Whether a safety element is within or outside the scope of the DSSP, commanders and managers still retain accountability for ensuring all activities are safely executed. For safety elements outside the scope of the DSSP, however, commanders and managers do not benefit from DSSR requirements and guidance, nor the Defence Space Safety Regulator's independent assurance.

15. Finally, the DSSP does not supersede or nullify applicable Australian legislative or Defence policy/regulatory requirements. For example, Defence's Explosive Safety Regulatory Framework continues to apply to space launch explosive ordinance and fuel handling, preparation and carriage, throughout the entire space system lifecycle.

The DSSP Manual

Purpose and Applicability

16. The DSSP Manual establishes policy and guidance for the implementation of the DSSP. It is applicable to:

a. Defence and industry personnel responsible for space activities identified as being within the scope of the DSSP, including agents of the Commonwealth

***Note**: An agent is a person who is authorised by the Commonwealth to conduct space activities on behalf of the Commonwealth and who has consented to perform that role. Industry personnel and agents should be bound to the DSSP through agreements with Defence. Australians and Industry personnel acting in Australia that are not agents will also be bound by the SLR Act.*

b. the Defence Space Safety Regulator and supporting staff.

Structure

17. The DSSP Manual is published in three volumes and a Manual of Standards:

a. Volume 1 expands on the *Defence Instruction,* MCS3 to establish requirements for the implementation of the DSSP, in particular:

(1) legal and governance arrangements

(2) independent safety assurance

(3) regulation of Defence space safety

b. Volume 2 presents the DSSR, establishing the requirements and provisions for the management of space safety by authorisation holders.

c. Volume 3 provides DSSP supporting information to promote understanding of the concepts and processes spanning the requirements or provisions established through Volumes 1 and 2

d. the DSSP Manual of Standards (DSSP MOS) provides detailed technical and operational material including standards and guidelines (tailored to Defence's context) for the design and construction of space objects, detailed descriptions of the way in which a space service or facility should operate, and other detailed material that contributes to Defence space safety.

Principles

18. The requirements detailed in this manual are based on the recognition that:

a. Defence shall implement a credible and defensible space safety program that recognises and supports compliance with safety-related statutory and international treaty obligations

b. risks to ADF members and other persons arising from space launch facilities and the launch/operation/return of space objects are to be eliminated or otherwise minimised so far as is reasonably practicable through a continuing process of hazard identification and safety risk management

c. the Defence Space Safety Regulator will establish requirements applicable to the space safety aspects of the design, construction, maintenance and operation of space launch facilities and the launch/operation/return of space objects. These requirements must:

(1) be consistent with the safety objectives of the SLR Act and be designed to achieve a safety standard commensurate with the safety standards established under that Act

(2) promote a generative space safety culture in the Defence space community

(3) align with Australian Government guidelines for regulation, as promulgated by the Department of the Prime Minister and Cabinet

d. the Defence Space Safety Regulator will be empowered to develop the necessary regulations and specifications for giving effect to the requirements of this manual. The Defence Space Safety Regulator is to also monitor the application of these requirements, and be empowered to withhold, impose conditions on, partially suspend, or fully suspend authorisations where necessary to ensure compliance. Such actions may be reported to the DSA

e. the scope and requirements of the DSSP are to be clearly defined so that persons, organisations, and products subject to the DSSP can be identified without ambiguity

f. authorisations to undertake Defence space activities shall only be issued by the Defence Space Safety Regulator once it has been determined the space activity falls within the scope of the DSSP and the applicant complies with the relevant DSSR

g. provisions are to be made for the Defence Space Safety Regulator to issue SSAs for foreign military space objects being launched/returned in Australia, and for foreign military launch facilities in Australia

h. provisions for achieving an equivalent safety level to that identified in the DSSR by means other than those provided in the acceptable means of compliance are to be made

i. adequate flexibility to effectively address special circumstances such as compelling operational imperatives shall be provided within the DSSP

j. the objectives of the DSSP may be efficiently achieved by leveraging the authorisations issued by other space safety authorities, to the greatest extent practicable

k. the Defence Space Safety Regulator should develop expertise in all aspects of Defence space safety covered by this manual, and actively educate and advise commanders and managers in its implementation

l. the Defence Space Safety Regulator will foster international relationships, including the harmonisation of rules, recognition of approvals and technical cooperation, and be entitled to establish the appropriate relations with the military and civil space authorities of foreign countries, allied and international militaries and international organisations competent in matters covered by this manual.