



Australian Government

---

# SDIP 5 - Development and integration of autonomous systems

Annex B5

---

*Defence acknowledges the Traditional Custodians of Country throughout Australia. Defence recognises their continuing connection to traditional lands and waters and would like to pay respect to their Elders both past and present.*

*Defence would also like to pay respect to the Aboriginal and Torres Strait Islander peoples who have contributed to the defence of Australia in times of peace and war.*

© Commonwealth of Australia 2024

ISBN: 978-1-925890-66-2

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

# Overview of Annex B

This Annex contains the Detailed Sovereign Defence Industrial Priorities (Detailed SDIPs) for SDIP 5, in accordance with Chapter 3.

The SDIPs are:

**SDIP 1.** Maintenance, repair, overhaul and upgrade (MRO&U) of Australian Defence Force aircraft

**SDIP 2.** Continuous naval shipbuilding and sustainment

**SDIP 3.** Sustainment and enhancement of the combined-arms land system

**SDIP 4.** Domestic manufacture of guided weapons, explosive ordnance and munitions

**SDIP 5.** Development and integration of autonomous systems

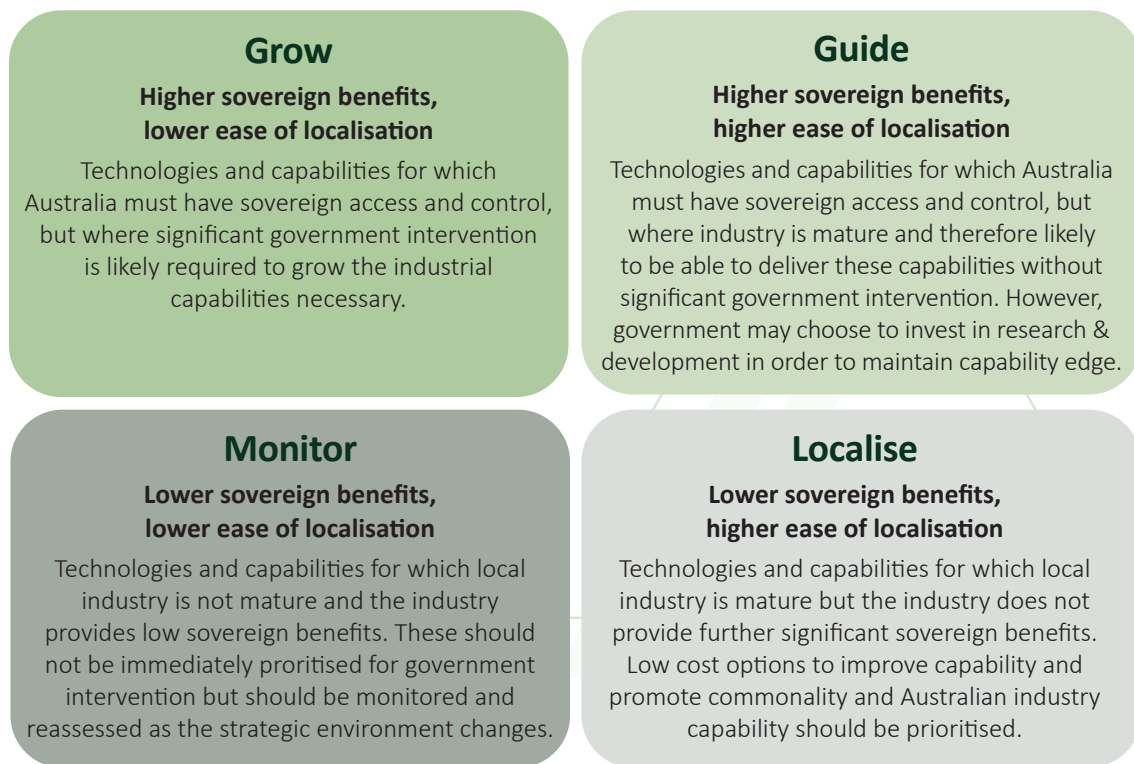
**SDIP 6.** Integration and enhancement of battlespace awareness and management systems

**SDIP 7.** Test and evaluation, certification and systems assurance

There are many areas where defence industry is already providing a service or capability to Defence; for example, the provision of enabling information and communication technology support including data centres, cyber and health services. Defence will continue to work with industry to ensure we have the level of industrial capability required in Australia to deliver defence outcomes.

Defence will refine the information in these Annexes through consultation with industry, and in line with the biennially-updated National Defence Strategy. Defence will work with industry to identify shortfalls, critical paths and areas for growth, using the approach described in Chapter 3 (Figure 4). The aim is to consistently and continuously guide and grow the defence industrial base, aligned to Defence's needs.

**Figure 1 - Approach to industrial prioritisation**



## Capability and Delivery Managers

The Vice Chief of the Defence Force is responsible for defining and communicating the capabilities Defence requires of Capability Managers. Capability Managers and Delivery Managers are responsible for the growth and health of the industrial capabilities required to deliver and sustain the directed defence capabilities.

## Industrial capability lifecycle

The information provided for each Detailed SDIP contains Defence's requirements against the industrial capability lifecycle.

### The industrial capability lifecycle consists of:



- ▶ **Innovation, Science & Technology** – innovative technology solutions that have been identified as meeting a defence capability need and providing an asymmetric advantage for Defence to develop, explore and mature to pull through to capability. These would be candidates for consideration under the Advanced Strategic Capabilities Accelerator (ASCA).
- ▶ **Design & Development** – areas that require further maturation and development beyond the prototype phase to meet a defence capability need.
- ▶ **Integration & Adaptation** – mature industry solutions or systems that need to be integrated with other defence systems and/or adapted to meet a defence capability need.
- ▶ **Manufacture & Assembly** – industry solutions, systems or components that Defence has determined must be manufactured and/or assembled in Australia, to ensure sovereignty and/or supply chain security and resilience.
- ▶ **Sustainment & Support** – industrial capabilities and services that Defence has determined must be delivered by industry in Australia to sustain and support defence capability.

# SDIP 5 - Development and integration of autonomous systems

---

## Capability and Delivery Manager

The Officer accountable for providing direction to Capability Managers for the development and integration of autonomous systems SDIP is the Vice Chief of the Defence Force. The Delivery Manager is the Deputy Secretary Capability Acquisition and Sustainment.

## Background

The Defence Strategic Review highlighted the criticality of undersea warfare capabilities (crewed and uncrewed) optimised for persistent, long-range sub-surface intelligence, surveillance and reconnaissance, and strike. It also highlighted the need for Air Force to maintain both crewed and autonomous systems capable of air defence.<sup>1</sup>

Autonomous systems offer Defence the opportunity to generate affordable mass, increase range and lethality and increase force protection. Highly capable autonomous systems are a force multiplier across all domains in both the physical and cyber-physical sense. They have the ability to provide a sustained effect that is adaptable, while being potentially low cost and consumable. They also offer significant opportunities in logistics for all domains both within Australia and overseas. Autonomous systems are cost effective, enabling Defence to create cost offsets while providing a deterrent to potential adversaries.

The uncrewed platforms that autonomy enables may be suitable for missions or employment that are excessively dangerous or high risk for a crewed platform, or mundane activities such as persistent surveillance. Cost effective and flexible autonomous systems provide a major capability advantage. We are seeking to access that advantage, with prototyping and experimentation activity occurring across all domains.

## Prioritisation approach

Mission-optimised, teaming and swarming technologies remain a key focus of Defence's efforts, including the ability to build endurance and mass, increase the threat to adversaries and create disruptive and asymmetric opportunities. This has been demonstrated through the AUKUS Pillar II initiatives and the experimentation undertaken to date.

Ongoing innovation, science and technology will help identify and focus Defence's efforts, including activity already underway under ASCA and joint experimentation being undertaken by the Services. Similarly, Defence will continue to invest in the development of autonomous systems across all domains, such as the Ghost Bat and Ghost Shark Programs.

## Epoch 1 outcomes

Defence will initially focus on proving that innovative autonomous systems are scalable, practical and dependable, and can be rapidly fielded and integrated into the current Australian Defence Force (ADF) force structure. We will prioritise the delivery of autonomous road transport convoy, optionally-crewed combat vehicles, experimental air vehicle and sub-surface prototypes to explore novel operational concepts and inform future investment decisions. It is important that all efforts in Epoch 1 build capability and capacity of Australia's sovereign robotics and autonomy sector.

Defence will be adopting a continuous capability development process, which will take advantage of rapidly evolving technology to introduce new capability as threats evolve. This may involve buying fewer systems up front and evolving capabilities through strategic industry partnerships.

---

<sup>1</sup> DSR pages 54 and 60

Defence will leverage Industry 4.0 initiatives and use digital engineering as a means of rapidly evolving these disruptive and asymmetric autonomous capabilities. This will include establishing digital twins that support the development, test and evaluation, simulation and accreditation of these autonomous capabilities. Defence will also use digital twins to support cost effective manufacture and production. Similarly, Defence will be seeking to utilise additive manufacturing to increase the resilience of these autonomous systems, which is key to systems that may be subject to high attrition.

## Epoch 2 outcomes

Defence will further refine, enable and embed ongoing innovation and agility in the autonomous ecosystem. Epoch 2 will have a specific focus on operationalising and productionising contemporary industry best practice (Industry 4.0 initiatives) to enable continuous capability development of autonomous systems.

A specific focus will be on enabling the integrated force, including the integration of manned and uncrewed systems from seabed to space and allied interoperability.

Efforts in Epoch 1 will begin to enable capability realisation at speed. An integrated approach will enable rapid resolution of the key challenges that currently inhibit the adoption of highly capable autonomous systems. Importantly, practical demonstration, trialling and experimentation will enable the human machine teaming and swarming as the norm, not the exception.

The Ghost Bat and Ghost Shark capabilities, subject to ongoing science and technology and operational evaluation, will be at the forefront of these efforts with the aim of pulling these capabilities through to operational capability in Epoch 2.

Autonomous systems identified and prototyped by Defence as meeting the operational need in Epoch 1, under ASCA and joint experimentation, will be inducted into a continuous capability development cycle in Epoch 2.

## Detailed Sovereign Defence Industrial Priorities

The Detailed SDIPs identified for the Autonomous Systems are as follows:

- ▶ **Air vehicle** – including specific industrial capabilities/technologies that are required, such as design expertise, manufacturing for affordability, structures, coatings and treatments.
- ▶ **Propulsion** – including the spectrum of battery technologies, internal combustion, hydrogen, scramjet/ramjet, and solid fuel engines, including rocket assisted take-off systems.
- ▶ **System architecture** – including the ability to develop mission systems and modular open systems architectures that are capable of being multi-role, supporting timely integration and adapting to any sensor or weapon.
- ▶ **Guidance and control** – including guidance and control unique to each operating domain, such as autonomous navigation, position, timing and autonomous teaming behaviours.
- ▶ **Mission payloads** – including the spectrum of:
  - ▶ Optical, electro-optical/infra-red, radio frequency, electronic warfare, hyperspectral and sonar sensors.
  - ▶ Kinetic and non-kinetic effectors.
  - ▶ Data links and communications.
  - ▶ Self-protection systems.
- ▶ **Control segments** – including situational awareness, human machine interface, computer vision, autonomy enabling sensors such as radar, light detection and ranging (LIDAR), depth perception and passive sensing.
- ▶ **Autonomous enablers** – including digital engineering and digital twins, artificial intelligence, machine learning, mission rehearsal and simulation, and operational analysis.

**Table 1 - Detailed SDIPs for SDIP 5, Epoch 1 (2023-25)**

Description	Innovation, Science & Technology	Design & Development	Integration & Adaptation	Manufacture & Assembly	Sustainment & Support
Vehicle	✓	✓	✓	✓	
Propulsion	✓	✓			
System architecture	✓	✓			
Guidance & control	✓	✓	✓		
Mission payloads	✓	✓	✓		✓
Control segments	✓	✓			
Autonomous enablers	✓	✓	✓		

Subject to successful development of prototypes and maturity of technology in Epoch 1, Defence anticipates industry uplift in Epoch 2 as follows:

**Table 2 - Detailed SDIPs for SDIP 5, Epoch 2 (2026-30)**

Description	Innovation, Science & Technology	Design & Development	Integration & Adaptation	Manufacture & Assembly	Sustainment & Support
Vehicle	✓	✓	✓	✓	✓
Propulsion	✓	✓	✓	✓	✓
System architecture	✓	✓	✓		✓
Guidance & control	✓	✓	✓	✓	✓
Mission payloads	✓	✓	✓	✓	✓
Control segments	✓	✓	✓		✓
Autonomous enablers	✓	✓	✓		✓

✓ - Continuation from Epoch 1  
 ✓ - New in Epoch 2