

---

**Submission to the  
Joint Standing Committee on Foreign Affairs, Defence and Trade's Inquiry  
into the Department of Defence Annual Report 2023-24**

**31 January 2025**

C2 Robotics welcomes the opportunity to make a submission to the Committee's inquiry into the Department of Defence's Annual Report 2023-24.

**About Us**

C2 Robotics is a leader in robotics, autonomous systems and artificial intelligence based in Melbourne. Innovation, rapid concept development and iterative prototype fielding is at our core, with a key focus on developing innovative systems across the maritime, land and air domains. Our team is comprised of a group of highly experienced industry veterans and a leadership team that includes the founders of previous very successful Defence and aerospace companies in the AI and robotics fields. We are entirely Australian owned.

Our mission is to develop intelligent Robotics and Autonomous Systems (RAS) that can be produced in high volume, have low or no reliance on Global Positioning System (GPS)s satellite or high-bandwidth datalinks, and are attritable.

**Focus of this submission**

The Defence Subcommittee has identified the following primary themes for the inquiry:

1. Sovereign Defence Industrial Priorities
2. Defence Estate, Security and Resilience
3. AUKUS
4. Uncrewed/Autonomous Systems and their integration into the Joint Force
5. Progress on the transformation to an integrated focused force
6. Australian international defence cooperation and competition
7. Other issues as communicated to Defence.

This submission mainly focuses on **Themes 1 and 4**. Since C2 Robotics' work currently focuses on the Speartooth Large Uncrewed Underwater Vessel (see figure 1 below), we also contribute to the AUKUS Pillar 2 advanced capability of undersea warfare, so our submission is also relevant to **Theme 3**.



*Figure 1: Speartooth Large Uncrewed Underwater Vessel*

---

## **Autonomous systems—the context**

Every recent conflict in the world has demonstrated the value of Robotic and Autonomous Systems/Artificial Intelligence (RAS/AI). Their importance is on a sharply rising trajectory. This is due to their increasing capabilities, their decreasing cost, and the proliferation and easy replicability of their core technologies.

This means that in contemporary conflicts RAS/AI dominance is becoming a truly decisive factor. Ukraine's ability to design, produce and use RAS/AI systems in mass has kept the country in the fight against a much larger adversary.

While the Indo-Pacific's distances may be much larger than Ukraine's, this does not negate the advantages of RAS/AI. Rather, operations in our region lend themselves to greater use of RAS/AI because the Australian Defence Force's few crewed platforms cannot cover the extremely vast areas otherwise by themselves.

The technologies required to enable RAS/AI systems to operate over those distances already exist and are improving virtually daily, including advances in energy storage, propulsion, secure communications, miniaturisation, and autonomous navigation in satellite-denied environments. Just as the Government's 2024 National Defence Strategy noted that distance no longer protects Australia from threats such as long-range missiles, we need to accept the reality that RAS/AI systems will increasingly be able to operate over the vast distances of the Indo-Pacific.

The core technologies needed for long-distance RAS/AI are generally driven by the broader civilian sector (e.g. batteries, navigation systems, motors, satellite communications, etc). This means they are commercially available and increasingly affordable. It also means that a broad range of actors can design and build effective RAS-AI system. Moreover, RAS/AI systems are benefitting from huge advances in miniaturisation. The net result is that traditional nexus between a system's size and its range has been broken—small systems can now achieve long range.

Overall, we will continue to see the rapid proliferation of 'the small, the smart and the many.' These systems will be disposable (single use) or attritable (you can afford to lose it if necessary). Moreover, they will proliferate on the battlefield, making the employment of large, exquisitely expensive crewed systems increasingly risky and poor value for money.

The war in Ukraine has also signalled the return of mass to armed conflict. Scale and manufacturing capacity is everything in this area—even Ukraine can manufacture hundreds of thousands of drones each month. But 'the small, the smart and the many' only works if you can produce them at scale.

Australia needs to not only understand the implications of these developments but be an active participant in them. This requires not just small investments in innovation, but the commercialisation of RAS-AI systems so they can be brought into service to allow the Australian Defence Force to become familiar with both operating them and also countering them. Australia also needs to develop and support a technological and industry base that can design and produce these systems at scale.

## **Speartooth LUUV as a case study of what Australia can achieve**

Based on our experience in developing the Speartooth LUUV, we are convinced that Australia has the potential to be world leader in the development and production of military RAS-AI systems. We are making this submission not as a sales pitch for Speartooth, but to inform the Committee of what Australian sovereign industry is capable of right now.



## **C2 Robotics Pty Ltd**

ABN: 28 639 639 179

---

Speartooth was very specifically designed to solve Australia's specific domain problems of long-range maritime force projection. It can carry military payloads over strategically relevant distances.

Moreover, we have designed it to be extremely affordable through its use of commercial-off-the shelf (COTS) components. Its batteries are identical to those used in electric vehicles, for example. We believe that no other company in the world has focused more on developing and delivering a system that can operate at the ranges relevant to our domain while achieving a cost point that can support huge scale our domain requires. Put another way, Speartooth can be produced in large numbers at low cost by existing Australian manufacturing facilities.

Speartooth's entry to US market has shown that it is a world-leading product. C2 Robotics has been able to achieve this with a team of around 20 engineers, demonstrating what Australian SMEs are capable of achieving. This has been supported by innovation funding from the Department of Defence, but the sums involved are trivial compared to the development of traditional crewed systems such as warships, submarines, and combat aircraft. Systems such as Speartooth provides a huge opportunity for the Australian Defence Force to develop timely and cost-effective force projection; the value for money outcomes are likely to be unparalleled.

Speartooth is only one story of the ability of Australian defence SMEs to deliver world-leading capabilities. Our concern is that current Defence investment and industry priorities are not set up to maximise the opportunities these capabilities offer.

### **Current Defence investment priorities: the risk of lost opportunities**

We would emphasise that C2 Robotics and the Speartooth system is 100% sovereign owned. The 2024 *Defence Industry Development Strategy* makes no distinction between a company owned here or internationally; a local ABN is all that is required to be considered a sovereign industrial capability; we believe this is a major flaw in strategic thinking for many reasons.

- Current conflicts show the importance of having an indigenous defence industrial base that can surge to meet threats. This has been demonstrated by Ukraine, Israel and even Yemen. Local industry can rapidly modify systems to meet evolving requirements.
- The slow delivery of guided weapons, whether manufactured overseas or under licence here, shows that we are still completely dependent on the priorities of overseas suppliers. Governments have been announcing the acquisition of missiles such as LRASM, JASSM-ER and SM-6 since 2020. We still have not received war stocks of those weapons.
- Defence has recently chosen to acquire small quantities of loitering weapons from overseas, despite Australian industry being capable of designing and building such systems. This represents a huge opportunity cost to the development of Australian industrial capability.

While we are certainly not advocating that Defence acquire Australian-made drones at the same scale as Ukraine is, but it needs to go beyond the drip-feed of innovation funding. If Australia as a sovereign nation wants to have the ability to surge production in time of conflict and crisis, it needs to support actual production in peacetime.

Currently, however, as listed in tables published in the Defence Annual Report, nearly all of the Top 30 acquisition projects are either off-the-shelf acquisitions from overseas (e.g., F-35A, Blackhawk helicopters, tanks, etc), or the local assembly of overseas designs relying on overseas intellectual property and components (e.g., Hunter-class frigates, armoured vehicles, etc). This is [consistent](#) with other years' expenditure.

### **Investment in autonomous systems: hype versus reality**

The Defence Annual Report states that 'we are also accelerating near-term investments in uncrewed aerial systems and counter uncrewed aerial systems, remote autonomous systems...'

In our view it is difficult to see actual large-scale investment in sovereign Australian autonomous systems. Some investment has been made in research and development through various innovation funds, but there is little evidence of actual acquisition of Australian-designed and made systems.

The Integrated Investment Program refers to:

- \$5.3-7.2 billion in subsea warfare and uncrewed maritime systems
- \$4.3-5.3 billion in uncrewed air systems

While these are substantial sums, there is no breakdown of these number to indicate what funding is dedicated either to Australian SMEs working on autonomous systems or to 'the small, the smart, and the many' in general.

From the Defence Annual Report 2023-24, the bulk of this funding is planned for large, expensive uncrewed systems that can only be acquired in small numbers. The Report's tables list Defence's Top 30 acquisition projects by in-year spending. There are only two uncrewed/autonomous systems in this list. The first is AIR 7000 Phase 1B (Triton High-Altitude Long-Endurance UAS) with a total approved budget of \$3,095 million to acquire a total of four aircraft. The second is DEF 6014 Phase (MQ-28A Ghost Bat) with an approved budget of \$958 million.

We don't wish to argue the merits of these acquisitions, but neither system is an example of 'the small, the smart and the many' that can be rapidly designed and built at scale by Australian industry. Indeed, Australia's involvement with the Triton program has been going for over 20 years and has not yet achieved Initial Operating Capability.

### **A disturbing potential future**

We believe that the single biggest relevant factor for force generation today is a country's capacity for industrial mass production of autonomous systems.

In this regard China's capabilities are vastly ahead of Australia and its allies.' China's industrial capacity has achieved staggering dominance across consumer grade, mass produced electronics, drones, electric vehicles, battery systems and similar. If C2 Robotics had been a Chinese company, then building Speartooth would have been far easier due to the ability to access such a broad industrial base, and manufacturing at scale would be easier again. Moreover, Speartooth is essentially an underwater electric vehicle; China is expected to manufacture 10 million electric vehicles this year. This is sobering to consider because there are Chinese companies already developing LUUVs.

---

This raises the prospect of the ADF's maritime operating environment being densely populated with LUUVs. This is likely to occur well before Australia's nuclear submarine capability is established or meaningful numbers of new frigates enter service. Once those submarines and ships arrive, they will be confronted by vast numbers of small, virtually undetectable LUUVs carrying thousands of sensors and weapons.

Moreover, those fleets of LUUVs could be used by an adversary to bring the commercial shipping that Australia relies on to a halt. A major power could deploy tens or even hundreds of thousands of them. But we should note that even relatively small states and indeed non-state or quasi-state actors increasingly will have the ability to produce LUUVs in meaningful numbers, as the Houthi campaign to shut down Red Sea shipping already suggests.

Australia cannot stop the proliferation of mass fleets of autonomous systems. But we can do more to prepare for this future. Developing and acquiring LUUVs and other RAS-AI systems of our own means:

- Australia can develop its own deterrent capability based on disposable and attritable RAS-AI systems that can deliver mass across our area of strategic military interest.
- We can develop our understanding of how best to counter those system when operated by an adversary before they appear on our doorstep.

### **C2 Robotics' recommendations**

We would like to make two broad policy suggestions.

The first is that Australia's defence industry policy should explicitly recognise the value of Australian defence SMEs and actively support them. Preserving and fostering critical technological and industrial capabilities is entirely consistent with the [Commonwealth Procurement Rules](#) and the Department of Finance's [value for money guidelines](#). It is also consistent with the practices of small and medium-sized democracies that have consciously built their own defence industries to meet strategic threats, such as South Korea, Israel, Sweden, and Türkiye.

The second is that balance of investment in the Defence IIP between traditional crewed platforms and 'the small, the smart and the many' should be reprioritised. Even small adjustments to the IIP can deliver RAS-AI systems rapidly and at scale. Over the coming decade just two megaprojects acquiring 'traditional' crewed capabilities, the nuclear-powered submarine enterprise and the Hunter-class frigates, will alone consume 23-29% of Defence acquisition budget (\$75-95 billion of a planned \$330 billion total) and –all going well— only deliver the first submarine and frigate. In contrast, a small fraction of this would fundamentally transform both Australian defence SMEs as well as provide the ADF with world-leading RAS-AI well before the end of the decade.

These two outcomes could be delivered through the establishment of IIP funding lines dedicated explicitly to acquiring systems developed by Australian SMEs in critical areas such as RAS-AI and guided weapons.

Dr Thomas Loveard  
Chief Technology Officer  
& Co-Founder