

APDR

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AUSTRALIAN DEFENCE IN A GLOBAL CONTEXT



Guided weapons
& explosive
ordnance update

Regional loitering munitions
programs

Australia needs to ditch the
FMS process

How Israel achieved weapon
production independence



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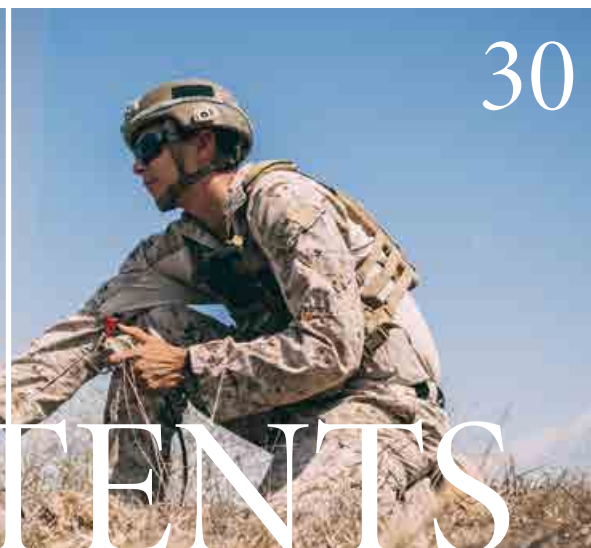
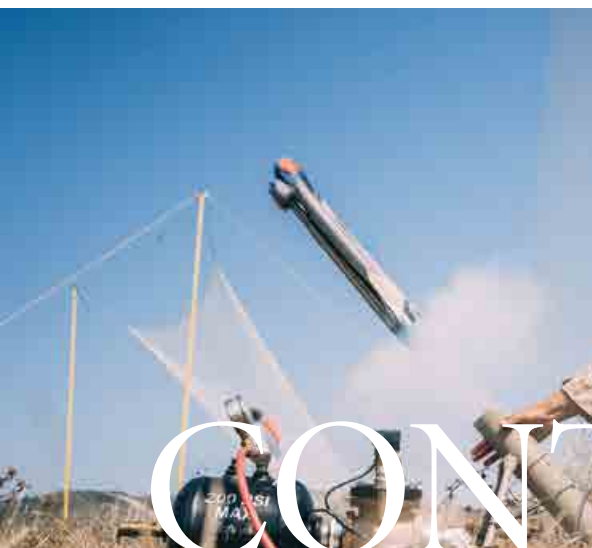
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Credit: CoA / Jason Slape



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Defence spending set to go backwards

Why is a Federal Labor government doing it to themselves again? One of the reasons why the party is absolutely terrified of being wedged on national security is because they were left completely exposed after cutting Defence spending a decade ago in the 2012 budget – and now history is repeating itself.

The budget cut is not APDR speculation – it is the conclusion of detailed analysis conducted by the Australian Strategic Policy Institute. ASPI is very thorough, conservative, and unwilling to strongly criticise the government of the day. However, even the title of their report is alarming: “The big squeeze – ASPI Defence budget brief 2023-2024.”

The numbers cannot lie. The main culprit is inflation, which is way higher than anticipated. Defence spending has been predicated on a 3% annual rate, but the reality is that for well over a year it has been running at double that. It is predicted to come down in the medium term but that doesn't help Defence now. There is some relief on the way – but not until 2027, and a huge amount of damage will have been done by then, especially to Australian industry.

The situation is made even worse because the previous government – and now this one – have been adding to things that need to be funded such as REDSPICE for cyber security, additional billions for the Guided Weapons & Explosive Ordnance enterprise (GWEO), and a commitment of \$3 billion to US and UK industry as some sort of voluntary contribution to their nuclear submarine industries. Other recommendations in the Defence Strategic Review add even more pressure to the system.

In 2012, Defence spending was cut in order to pursue a politically absurd strategy of trying to get the budget back into surplus “come hell or high water” in time for the 2013 Federal election. Any observer of politics could have told them – including Defence Minister Stephen Smith of DSR fame – that setting yourself up for a single point of failure with

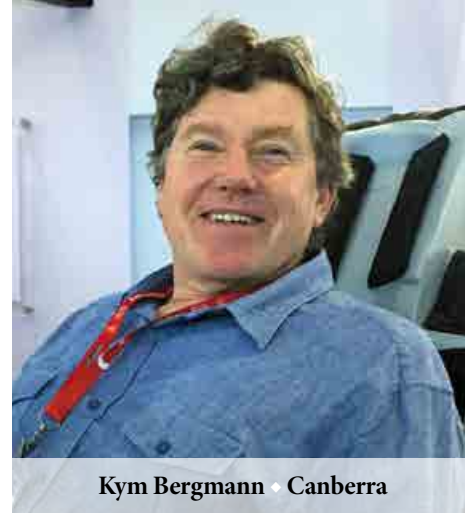
that sort of approach is extremely unwise, as proved to be the case. Due to economic factors beyond Australia's control, the budget remained in deficit – and the consequence was a huge and unnecessary hit to industry, particularly naval shipbuilding.

Leader of the Opposition Tony Abbott used that as a political blowtorch in the lead up to the election – and after winning continued to taunt Labor ceaselessly about their record, reducing Defence expenditure as a percentage of GDP to the lowest level since the start of the Second World War. This line of attack has continued ever since, and in the elections of 2016, 2019 and 2022 Labor has had to meekly follow along with whatever the Coalition said about national security – no matter how absurd – for fear of once again being credibly accused of wanting to cut Defence spending.

The difference of course was that in 2012 the strategic environment was more benign than today. Beijing did not seem at all threatening, despite a few warning signs. The country had started its land reclamation projects in the South China Sea, but Hong Kong was still being treated reasonably well and the foreign policy rhetoric and military spending were within normal guidelines.

The calculation could be safely made that a cut to Australian defence spending would not endanger national security, but with the overall budget picture now so positive, Labor would sweep back into power, viewed as the better economic managers. See how well that went.

Now Defence spending for the next two years will be down about \$1.5 billion in real dollars and a lot more than that when adjusted for inflation. If history is any guide, the Department will respond by cutting domestic programs and instead buy more from the US. There is actually a twisted economic logic to this: the Department of Finance compensates Defence for exchange rate variations, so it never loses out on FMS purchases. However,



Kym Bergmann • Canberra

there is no compensation for domestic inflation, so if an Australian product becomes more expensive, Defence has to wear the cost.

This is against a deteriorating strategic outlook where we are being told to prepare for a major conflict, most likely involving China. In these circumstances how can Defence spending be going down rather than up? It's as if the government is sleepwalking into a Defence funding train smash and is completely oblivious about what is happening.

In this part of the electoral cycle, the Coalition is supine because they are vulnerable to the charge that when they were in government, they were all talk and no action – a charge of some merit. Labor can continue to argue that they inherited a mess and are still sorting it out – but that won't work for much longer. Before the next election the current government will have full ownership of Defence decisions and they will suffer the consequences if things start to go adrift.

It's not as if Defence can't make urgent savings such as to cancel the \$4 billion purchase of refurbished M1A2 Abrams main battle tanks. To that we strongly suggest cancelling – or deferring for a decade – the unnecessary replacement of Tiger and Taipan helicopters at a cost of \$11 billion and counting (despite the fact that this idea makes the blood of some APDR readers boil).

We would also halt the acquisition of \$10 billion worth of new C-130Js until a proper competition can be carried out looking at the A400M and KC-390 to see if it is possible to find a far better value for money proposition. It's time for Defence and this government to start thinking outside the box before it's too late.

Make no mistake, if there is no change in direction the consequences for Australian industry will be even more disastrous than after 2012, which took years to correct and saw the sector contract by 30%.



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*A No. 1 Security Forces Squadron Bushmaster Protected Mobility Vehicle.
Credit: CoA / David Cotton*

NEW BUSHMASTER DEAL WILL SUPPORT JOBS IN BENDIGO

25 May 2023

Thales Australia said it has welcomed the announcement by the Australian Minister for Defence Industry Pat Conroy of a \$160 million contract to build new Bushmaster Protected Vehicles for the Australian Army. The contract for the new Bushmasters was signed at Thales Australia's Bendigo facility in the presence of Member for Bendigo Lisa Chesters who has been a strong advocate for manufacturing jobs in Bendigo.

Thales Australia CEO Jeff Connolly said the manufacture of new Bushmasters would directly support jobs at the Bendigo facility. "This is a strategic industrial capability that is vital for the Australian Defence Force. Today's contract signing is an important expression of support from the Government, not just for the Bushmaster vehicle, but also for the manufacturing capability and Australian supply chain that produces and sustains the vehicles. Work will begin immediately on the new vehicles, with a mix of troop-carrying vehicles and Command vehicles to be manufactured over the next 18 months.

"More than 1200 Bushmasters have already been manufactured at our Bendigo facility and as well as proving to be a life-saving vehicle for the Australian Army in operations in the Middle East, they have been exported to eight nations including the Netherlands, UK, Fiji, Jamaica, New Zealand, Japan and Indonesia," Connolly said. "Bushmasters gifted to Ukraine by the Australian Government are currently in service in Ukraine and providing a vital capability to the Ukrainian Armed Forces as they fight the illegal Russian invasion. In addition to our direct employment on site in Bendigo, the manufacture of Protected Vehicles supports around 360 jobs in our Australian supply chain with many suppliers across regional areas of Victoria and New South Wales."

AUSTRALIA AND REPUBLIC OF KOREA TO ENHANCE DEFENCE TIES

30 May 2023

The Deputy Prime Minister has finished his two-day visit to the Republic of Korea (ROK) representing the Prime Minister at the 2023 Korea-Pacific Islands Summit and meeting separately with President Yoon and Minister

of National Defense Lee Jong-sup.

At this morning's meeting the Deputy Prime Minister and Minister Lee agreed that Australia and the ROK would work on an enhanced bilateral framework, building on the 2011 Memorandum of Understanding on Defence Cooperation.

An updated framework would facilitate both governments' ambitions to strengthen the defence partnership to better respond to the security challenges in the region.

The bilateral defence relationship is already growing under the 2021 Comprehensive Strategic Partnership including across defence industry, joint military exercises, training, science and technology.

Enhancing the bilateral framework would enable deeper cooperation, including towards interoperability between our defence forces.

The Deputy Prime Minister also held a roundtable with Korean defence industry representatives, discussing the opportunities out of the Defence Strategic Review.

He visited the Joint Security Area where he was briefed on United Nations Command Military Armistice Commission (UNCMAC) and met Australian Defence Force personnel deployed to support demilitarisation activities on the Korean Peninsula.

At the inaugural Korea-Defence Pacific Islands Summit representatives from 18 members of the Pacific Islands Forum (PIF) met to reaffirm the shared commitment between Korea and the PIF, in support of a secure, peaceful and prosperous region.



Deputy Prime Minister and Minister for Defence, the Hon Richard Marles MP, visits the Joint Security Area in Korea, on the 30 May 2023. Credit: CoA / Lauren Larking

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Hanwha Defense Australia (HDA) is committed to its Australian presence. We are ahead of schedule in the construction of the Hanwha Armoured Vehicle Centre of Excellence (H-ACE) next to Avalon Airport due for handover completion and the start of operations in Q3 2024.

This facility is supported by the Victorian Government and is the foundation of our Australian defence programs both current and future. The Huntsman family of vehicles will be manufactured here, bringing back high technology vehicle manufacturing to the Geelong region for Australian and international customers into the future.



The final F/A-18 Hornet aircraft to fly in Australia, tail number A21-117, arrives at RAAF Base Williamtown, New South Wales. Credit: CoA / Craig Barrett

BOEING DELIVERS FINAL HERITAGE F/A-18 CLASSIC HORNET

23 May 2023

Boeing Defence Australia has delivered the last of eight F/A-18 Classic Hornets prepared under a heritage project to display the retired aircraft at RAAF bases and aviation museums across Australia. The unveiling of Classic Hornet A21-101 at the RAAF Association (WA) Aviation Heritage Museum of Western Australia at Bull Creek on 12 April was the culmination of the two-year project by BDA's Classic Hornet Sustainment Support (CHSS) team.

Each of the heritage Hornets – single-seat A models A21-022, A21-023, A21-029, A21-032, A21-040 and A21-043 plus the two-seat B models A21-101 and A21-103 – were identified as important heritage aircraft for the Australian War Memorial and the Air Force Collection for their significance to Australia's military aviation history.

The multi-stage preparation of each jet started with the removal of military software information, hardware and chemicals for safety and security reasons, before dismantling. Next, the wingless fuselage was lifted by crane onto the back of a semi-trailer for road transportation along with 22 boxes containing the wings and all other parts. Under the final stage, a team of six technicians spent approximately five weeks reassembling each aircraft at its new home.

"Many on our team have worked in both the RAAF and at Boeing for years, if not decades, supporting the Classic Hornets, which has fuelled their passion for this project," said BDA's CHSS Program Manager and RAAF veteran Gail Collie. "The team used their skills and expertise to return these remarkable jets to their former

glory so they can be honoured for their decades of service to Australia and its allies. We all feel privileged to have been part of such an important program that is preserving them for posterity."

Amy List, director of BDA's Sustainment Operations said the Australian Classic Hornet story exemplifies Boeing's platform life-cycle capability.

"As the original equipment manufacturer, our heritage companies built the Hornets and introduced them into service; then, for more than 23 years, we worked in partnership with the RAAF and local industry to upgrade, modify and maintain them. We also performed all end-of-service-life disposal activities, including preparing 20 jets for sale to the Royal Canadian Air Force and the eight for the Australian heritage project. It's an excellent case study in how Boeing's cradle-to-grave platform sustainment solutions enhance our customer's air defences and help ensure their frontline assets retain their capability edge for many decades."

The RAAF's fleet of 71 Classic Hornets were retired from operational service in December 2021 after nearly 40 years of service.

COMBAT SYSTEMS AGREEMENT BOOSTS SOVEREIGN SHIPBUILDING CAPABILITY

28 May 2023

BAE Systems Australia, Lockheed Martin Australia, Saab Australia and Defence have signed a Combat System Integration (CSI) Collaboration Agreement (CCA) that will grow a long-term, cost-effective and agile CSI sovereign industrial capability for the Navy's major surface combatants. The agreement is another significant step towards the development of continuous naval shipbuilding in Australia.

Specifically, the collaborative relationship will support CSI in surface vessels fitted with the US Navy's Aegis combat management system – produced by Lockheed Martin and with an Australian Interface developed by Saab Australia.

Through the CCA, BAE Systems Australia, Lockheed Martin Australia, Saab Australia and Defence have established the Combat System Integration – Integrated Project Team (CSI-IPT).

The CSI-IPT team will comprise professionals from the Department of Defence and an equal mix of combat systems integration professionals from each of the industry organisations, facilitating a 'one team' approach.

As part of the CSI-IPT, all four organisations will work collaboratively as a united combat systems team to design, integrate, test and deliver the integrated combat system for the Hunter class frigates and the major combat systems upgrade to the Hobart class destroyers.

BAE Systems Australia — Maritime Managing Director, Craig Lockhart, said:

"Key to delivering the high-end warfighting capabilities for Australia's naval surface fleet is the design, installation and integration of the combat management systems into a warship, and that's why we worked so hard to secure this collaborative arrangement with Defence, Lockheed Martin Australia and Saab Australia.

"Through close collaboration, we will establish an enduring Combat Systems Integration sovereign industrial capability for our nation."

Vice President of Operations Lockheed Martin RMS Australia and New Zealand, Steve Froelich, said:

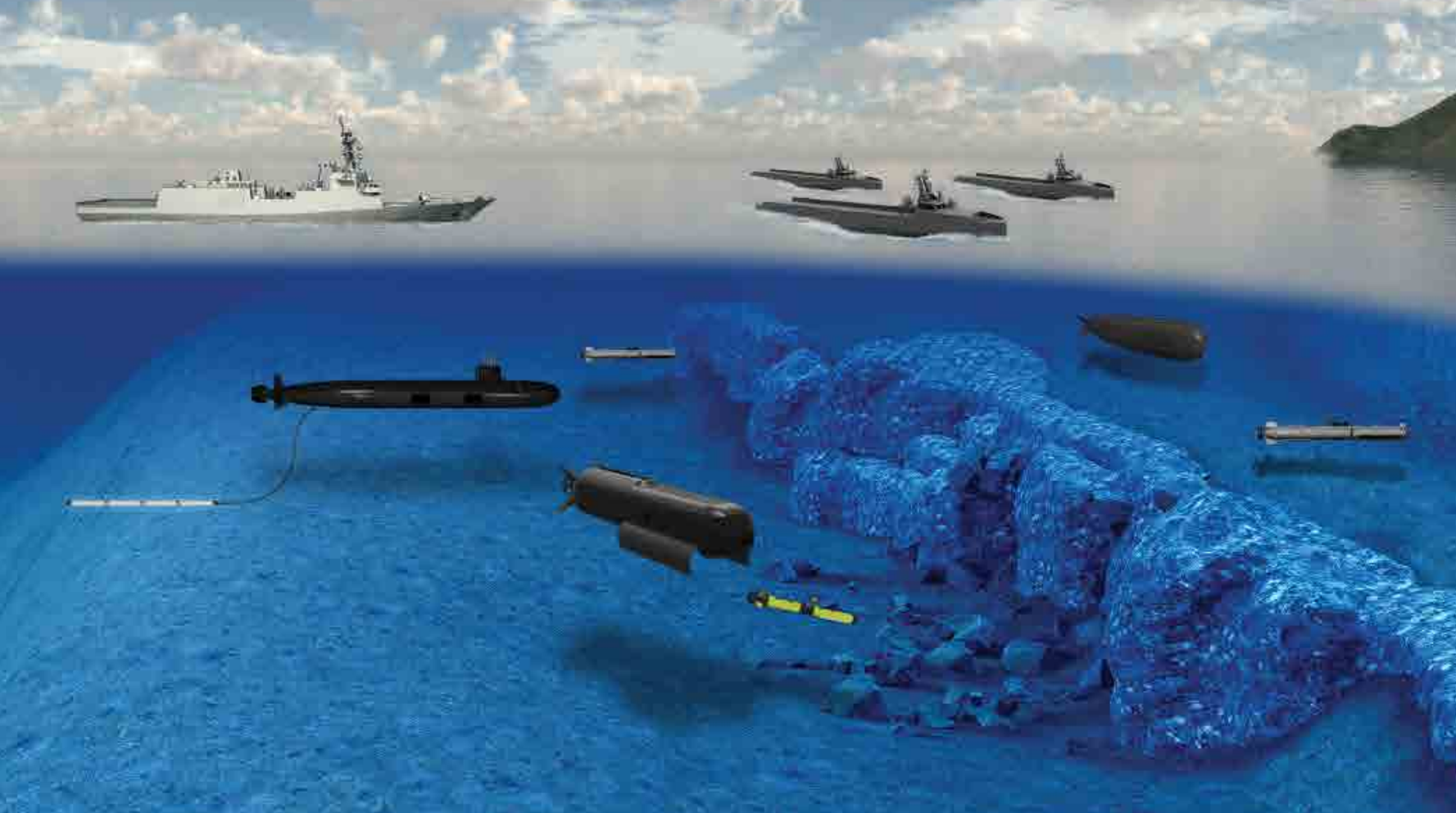
"As the manufacturer of Aegis, the world's most advanced combat system, Lockheed Martin Australia is proud to integrate, deliver and sustain this key maritime capability that safeguards our nation together with our valued partners – Defence, BAE Systems and Saab Australia.

"Working together makes us stronger. The CCA aligns all four organisations on a joint path of success to ensure Australia's security, economic growth and ongoing military interoperability with the US and allied partners across the Indo-Pacific."

Saab Australia Managing Director, Andy Keough CSC, said:

"Saab looks forward to working with our collaboration partners to build on the decades of combat system integration work we have successfully performed in partnership with the Department of Defence.

"Through this collaborative partnership, and as the nation's sovereign combat management system provider for the Royal Australian Navy's Surface Fleet, we are strengthening Australia's sovereign defence capability and jointly developing the skilled workforce we need to deliver future programs."



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Arafura Class Offshore Patrol Vessel, NUSHIP Arafura, at Osborne Naval Shipyard in South Australia. Credit: CoA

DIESEL ENGINE CONTRACT ENSURES CAPABILITY IS ALWAYS READY TO DEPLOY

25 May 2023

Acting Deputy Secretary Naval Shipbuilding and Sustainment Rear Admiral Wendy Malcolm said the \$190 million, five-year contract would build on the previous contract's benefits but include greater cost transparency, more effective risk management, and the opportunity to increase sovereign capability.

"This is a great example of Defence's commitment to achieving improved value for money, in conjunction with a robust

performance management framework that continues to support the deployment of the ADF," Rear Admiral Malcolm said.

"Penske Australia supports MTU-Friedrichshafen branded diesel engines on Navy's Anzac, Hobart and Armidale class vessels, as well as other crucial systems on Navy and Army platforms."

The new contract moves Penske Australia from a fixed price arrangement to a target cost incentive model, allowing Defence to monitor actual costs and verify value while improving efficiencies across different platforms.

"The contract will support more than 90 jobs across seven Australian sites, further improving

training and skills in the sustainment industry that are essential to providing the ADF with the equipment they need to complete their mission and return home safe," Rear Admiral Malcolm said.

"Support for new platforms, such as the Arafura class offshore patrol vessels, can be included in the future, providing incentives for industry partners to invest in the critical area of sustainment.

"This contract showcases the benefits of a collaborative partnership between Defence and its long-term Australian industry partner, Penske, who are both committed to creating value-driven solutions for materiel sustainment."



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An Australian Army soldier from the 3rd Battalion, The Royal Australian Regiment, fires a Javelin FGM-148 direct fire, guided weapon system during Exercise Kapyong Warrior at Townsville Field Training Area, Queensland. Credit: CoA / Dustin Anderson

Defence Strategic Review accelerates GWEO effort

Tim Fish ♦ Auckland

Australia's recent Defence Strategic Review (DSR) has placed the development of a sovereign Guided Weapons and Explosive Ordnance (GWEO) enterprise as one of its top priorities.

The ability to build and maintain large stocks of precision weapons and other munitions in any future high-intensity conflict is seen as essential to delivering the offensive and defensive capabilities needed to protect the country. Both the Covid-19 pandemic and the Russo-Ukraine War have reinforced how vulnerable supply chains are and how the world's production capacity for GWEO has been under pressure.

Released to the public on 24 April 2023, the DSR marked a shift in strategic focus that will change the shape of the Australian Defence Force (ADF) to better defend the maritime approaches to Australia using forward-positioned units and long-range weapons to establish an anti-access area denial (A2AD) zone.

The DSR stated: "Long-range strikes and other guided weapons are fundamental to the ADF's ability to hold an adversary at risk in Australia's northern approaches. To do this, the ADF must hold sufficient stocks of

GWEO and have the ability to manufacture certain lines."

It added: "The realisation of the GWEO Enterprise is central to achieving this objective."

However, the DSR was highly critical of the progress in developing the GWEO Enterprise to date citing a lack of financial resources granted so far and the funding plans for the next decade. It also highlighted concerns about a lack of workforce to sustain it and that a strategy for the delivery of the desired outcomes had yet to be produced.

The DSR blames the failure of the GWEO Enterprise to deliver down to "the manner in which it was established" and has inhibited the ability to meet its goals.

One of the main complaints – the lack of a senior officer to lead the GWEO Enterprise – was remedied on 8 May, when the Department of Defence (DoD) appointed Air Vice-Marshal Leon Phillips as Chief of the

GWEO Group.

The intention is to ensure that the GWEO Enterprise has the authority to direct strategy, capability development, acquisition and domestic production across all of Defence's GWEO needs. This early move by the DoD signified a realisation about the lack of urgency in delivering Australia's requirements and that progress so far has been too slow.

A spokesperson from the Australian DoD told APDR that AVM Phillips' immediate priorities "will be implementing the recommendations from the DSR, including developing plans to fast-track the development of domestic guided weapon manufacturing and the acceleration of foreign military commercial sales."

A need for an appropriate unpinning organisation structure to support the Chief of GWEO was also suggested in the DSR and the DoD said: "Both the Nuclear-Powered Submarine Taskforce and the GWEO group provide models for managing large, complex enterprises with multiple interdependencies under a single accountable officer. This provides clarity of roles and responsibilities, clear accountabilities and maximum efficiency."

The DSR provided a 'to do' list of actions that the DoD needs to do to support 'Accelerated Preparedness' in GWEO. In the short term, this includes increasing stocks of GWEO through the rapid acquisition of material from existing suppliers and contractors and exploring other sources of supply and contracting for the most important guided weapons.

In the longer term, it means establishing a domestic manufacturing capability to reduce reliance on overseas suppliers and to increase local Australian production capacity. This will support the ADF needs and contribute to the total production capacity of Australia's partner nations – mainly the US.

Now a total of \$32.2 billion of spending out to 2032-33 has been allocated for the establishment of the Enterprise. In the short term, the recent defence Portfolio Budget Statement (PBS) 2022-23 published in May allocated \$4.1 billion for the acceleration of GWEO that includes \$2.5 billion for the accelerated establishment of it and \$1.6 billion for long-range strike capabilities.

This is a significant increase on the \$1 billion that was allocated under the previous Integrated Investment Program (IIP), but it's not clear how much of that – if anything – has been spent.

"This was insufficient to enable the establishment of guided weapons manufacturing before 2027," the DoD spokesperson said, adding, "The Government has committed to delivering the first National Defence Strategy next year, which will contain greater detail on the programs that we will be pursuing in the future."

The DoD also agreed with the DSR recommendation that "Options for the increase of guided weapons and explosive ordnance (GWEO) stocks, including the rapid establishment of domestic manufacturing, should be provided to the Government by Q2 2024."

The DSR also recommended that by 2025 the DoD should develop a national logistics support concept "that considers strategic and industrial policy needs, and civilian, local and state government and military logistics capabilities" and by 2024 a National Support Division within the DoD to "develop concepts and conduct engagement to harness the nation's economic, industrial and societal strength."

On 5 April 2022 Defence selected two strategic partners: Lockheed Martin Australia (LMA) and Raytheon Australia (RAUS) to help deliver the

additional stocks and create the domestic manufacturing base. Aurecon was also appointed as a GWEO partner with expertise in facilities and infrastructure in Australia.

The DoD spokesperson said that both LMA and RAUS "were engaged to identify potential manufacturing and maintenance pathways for guided weapons and their components in Australia."

The spokesperson added: "Defence is currently working with LMA and RAUS to develop detailed and costed plans for domestic manufacture of GWEO. The DSR announcements will not impact Defence's relationships with the strategic partners."

Ken Kota, vice president of the Australian Defence Strategic Capabilities Office in Lockheed Martin told APDR that the DSR "changes things for us considerably" and that the company is "excited about the outcomes" from the review.

He said that since Lockheed Martin was selected as a Strategic Partner GWEO developments had been moving forwards over the last several months but "now with the new energy behind it there is tons of momentum and we're getting really focussed, fast."

James Heading, Director of Programs at the Strategic Capabilities Office in Lockheed Martin Missiles and Fire Control division told APDR that bringing forward the \$2.5 billion in funding that was originally slated for future years "has really opened up the throttle on the global enterprise."

He added: "We were treading fairly cautiously. A lot of decisions were in abeyance because the money wasn't physically there for the immediate years. That's certainly changed with the backing and the dollars behind it to get on."

Heading welcomed the appointment of AVM Phillips as a three-star level chief of GWEO but noted that the issue was not that there was nobody in charge but that the "sheer volume of work" that was being done "warrants the need to relook at priorities and needs an additional focus."

He explained that officials such as Chris Deeble, the deputy secretary of the Capability Acquisition and Sustainment Group (CASG) in the Department of Defence and Lieutenant General John Frewen Chief of Joint Capability who were delivering GWEO as part of their responsibilities already had an extensive portfolio across a wide range of issues to manage.

According to Heading it meant that when stepping into meetings with ministers at various stages they were "pushed and punished on a whole number of fronts." Therefore, the appointment of Phillips with a singular focus to deliver the GWEO Enterprise will provide that in-depth understanding and knowledge with direct input into how the government will get its messages across.

"That's not to say it was not clear in the past, it was just the resources were spread thin," Heading added.

The DoD's objective is to achieve a nascent assembly and production capability in Australia within two years and the release of the DSR and the formal defence budget allocations over the past months has offered clarity for the GWEO Enterprise and its structure going forward.

"I think that's a clear objective now," said Heading, "and we've been obviously engaged together with our industry partners, and Raytheon, as to what that might look like and providing input into how that can be approached."

The DoD spokesperson said that it is "developing options to fast-track the establishment of guided weapons manufacturing in Australia" and is working with industry "to develop detailed and costed plans for domestic

manufacture of guided weapons.”

Decisions are still forthcoming from the DoD about the options relating to the scale of the assembly and manufacturing capability that is planned. Kota would not comment on the details of these discussions, but he said that Lockheed Martin was helping to narrow the choices down.

The DoD spokesperson explained: “These plans, once considered and



HMAS Perth fires an Evolved Sea Sparrow Missile while operating in the Philippine Sea at Exercise Pacific Vanguard 2022 during a Regional Presence Deployment. Credit: CoA / Emelio Mackie

approved by Government, will set timelines and priorities for guided weapon manufacturing. The plans will also include options for the increase of guided weapons and explosive ordnance stocks, including the rapid establishment of domestic manufacturing.”

Lockheed Martin is also in negotiation with the US government to ensure approvals for the export of the IP and technology that would allow the overseas manufacturing and sustainment of US missiles to take place. Washington will want to see which areas it can secure the benefit of having additional lines of production and support for some weapons or components with the extra industrial capability and workforce funded by Australia that the US military can take advantage of.

Kota said the two governments have been working together for some time to identify the best way forward that can satisfy the requirements of both countries. He added that Washington and Canberra are now getting down to specific details and the company would be ready to support those decisions when they are made.

The delivery of the GWEO Enterprise is to be completed in three phases. The first ‘accelerate’ phase has a timeframe of 0-5 years and aims to provide the initial GWEO acquisitions and improve supply chain resilience with the strategic partners. The second phase ‘grow’ stretches out to 10 years and will see the co-development of future weapons and an enhancement of the industrial base to manufacture and maintain more complex weapons. The third phase ‘sustain’ through to 15 years will increase Australia’s involvement in the design, development and manufacture and support of specific weapons with more complete integration into partner nation supply chains.

To meet the accelerated timeline and the renewed push to deliver

elements of the GWEO Enterprise earlier as stated in the DSR, Lockheed Martin Australia has been putting in the groundwork and has conducted planning and scenarios with a fast-track timeframe in mind. Heading said the company would have liked to have begun the work “yesterday” but explained that it is not all about building new facilities.

“It’s also about refurbishment or reuse. It’s that stepwise approach, what can we do now with existing infrastructure and existing sites? Then look at where it makes sense to grow and in which areas, so it is something that is happening real time now,” he said.

Kota said that the DSR gave guidance about how the DoD should not “wait for perfect” in terms of its planning and arrangements for establishing the GWEO Enterprise. He explained that a “new strategic approach toward getting a minimum viable capability as opposed to waiting for it to be perfect along with removing the big barrier of financing and advancing government decisions is going to help us achieve those goals earlier.”

The DoD spokesperson said that the DoD “is assigning additional workforce to the GWEO Enterprise to enable its acceleration in line with the increased funding provision.”

Despite the criticism in the DSR the GWEO Enterprise has already had some achievements on several fronts. Talks were already underway with Lockheed Martin Australia and Raytheon Australia for the domestic production of their guided weapons and it has accelerated the acquisition of the Tomahawk cruise missile, Joint Air-to-Surface Standoff Missiles – Extended Range (JASSM-ER) long range strike missiles, Naval Strike Missile and sea mines.

Australia has also contributed \$70 million to the development of Increment 2 of the Precision Strike Missile (PrSM) under development by Lockheed Martin in the US.

Meanwhile a Request for Proposal has been issued for the domestic manufacturing of large calibre munitions including 155mm artillery and 81mm mortar rounds and the DoD has already commissioned the domestic production of the BLU-111 500lb air-launched bombs.

Early infrastructure development includes the opening of a new \$96 million naval missile maintenance facility at Orchard Hills in Sydney, NSW in April 2022 and in January that year the \$14 million Hypersonic Research Precinct at Eagle Farm in Brisbane, QL. Elsewhere refurbishment is ongoing on the Point Wilson Explosives Area (PWEA) waterside infrastructure, VIC, under a \$193 million contract with CPB Contractors awarded back in 2019.

The PBS 2022-23 also stated that the Guided Weapons Explosive Ordnance Storage Program Tranche 2 will provide storage facilities and infrastructure at various ADF bases and depending on government and parliamentary approval construction is planned to commence in mid-2024 for completion in late-2026.

In its conclusions, the DSR has fired a severe warning shot across the bows of the DoD to push ahead with the GWEO Enterprise. That an obvious organisational and personnel change had not been undertaken earlier seems odd. Also, the lack of realisation that industry cannot and will not move without sufficient money being fronted up and decisions being taken are causes for concern. Considering the warnings over recent years from strategists that there is no longer a 10-year warning time for a potential major regional conflict to break out, the lack of urgency establishing a GWEO Enterprise until now means that significant time has been wasted. It means in the event of a war the ADF could find itself exhausted of munitions within a very short time and with no means of re-supply.

GWEO head Air Marshal Leon Phillips

Kym Bergmann ♦ Canberra



Air Marshal Leon Phillips

He was kind enough to answer questions from APDR so that people in industry know him better:

Please start with some background: what were your previous roles in RAAF and was there a connection with guided weapons?

In May 2023, on promotion to Air Marshal, I became the inaugural Chief of Guided Weapons and Explosive Ordnance (GWEO) for the newly established GWEO Group. Throughout my career, I have been involved in delivering weapon systems to the Australian Defence Force, predominantly the Royal Australian Air Force. Many of those high-end programs have inextricable links to companion weapons delivery programs. To be effective in modern combat, there needs to be the tightest connection between weapons, their vehicle of carriage and secure communications and targeting systems.

I have established highly successful teams, delivering complex aerospace projects as well as their in-service support. Some of these projects include;

- F-111, E-7A Wedgetail
- F/A-18 Classic Hornet upgrade
- P-8A Poseidon and related weapons delivery
- MQ-4C Triton; and
- F-35A Lightning II with its weapons programs.

I have partnered with various government and industry partners on all levels, enabling successful cooperative programs such as the E-7A and F-35 projects with the US Air Force and establishing cooperative programs with the US Navy on the P-8A and Triton. I have just finished my tenure as the international co-chair for the Joint Strike Fighter Executive Steering Board with representatives from seven other partner nations - a key part of which I advocated for the earliest release of weapons capability for Australia. Each of these programs has involved integration of GWEO functions onto the platforms in collaboration with the US. In other roles I've worked more

directly with Australian industry to develop and sustain indigenously devolved capabilities such as the Wakulda Air Battle Management System.

I have a passion for connecting the warfighter with industry, mindful of the needs of our ADF and the commercial realities of the defence sector.

Presumably you will have supporting staff – how long will it take to put your team in place?

In the establishment of the GWEO Group we will bring together the delivery aspects currently under the Capability, Acquisition and Sustainment Group (CASG) which provides support to the three services. The capability manager role to uplift domestic manufacturing and production from the Joint Capabilities Group (JCG) will also fall under the new group. With the GWEO Group being newly established, we will be working on a roadmap which will include the GWEO acquisition needs of each of the three services.

The Government has announced that as a key priority of the Defence Strategic Review there is \$2.5 billion over the forward estimates towards the acceleration of GWEO. This program will ultimately look at domestic manufacturing, increased GWEO stock holdings and acquiring long-range strike missiles. We will work with the Government and our industry partners to achieve these three key priorities with a plan to return to government in the second quarter of 2024.

Stockpiling existing weapons would seem to be a relatively easy undertaking – is this a correct perception?

The war in Ukraine has demonstrated the importance of magazine depth, particularly in a protracted conflict. With increasing global demand for advanced guided weapons, some delivery lead times can stretch to more than five years. Our ability to stockpile guided weapons remains dependent on how quickly those weapons can be produced, which is largely beyond Australia's control.

This is why, in parallel with increasing our stocks of guided weapons, the Government is investing in Australia's capability to manufacture them. Over time, this will reduce our dependence on foreign supply chains, boost total allied industrial production capacity and increase our self-reliance.

Do you have in mind some sort of consultation process with Australian industry – if so, how will it work and in what sort of timeframe?

Australian industry is at the heart of the GWEO enterprise. Ultimately our objective is to uplift the collective capability of Australian industry to manufacture and support guided weapons.

Reflecting that core objective, our two strategic partnerships are with Raytheon Australia and Lockheed Martin Australia. Defence has brought in two Australian-controlled companies – Aurecon and the Australian Missile Corporation – as above-the-line enterprise partners to work alongside Defence staff in planning and delivering the GWEO enterprise.

Defence has run a number of consultation and information-sharing forums for industry. These have included an industry-wide request for information to seek views and ideas on establishing the GWEO enterprise, and several industry updates. We also engage frequently with some of the key industry players already involved in GWEO manufacturing. I have already started engaging directly with industry and this will be one of my top priorities over the coming months.

NIOA CEO, Rob Nioa, in conversation with APDR editor Kym Bergmann

(Right) Rob Nioa. Credit: Nioa Group



Kym Bergmann: Let's start with the big picture. How do you feel about the DSR? Has it achieved the right balance?

Rob Nioa: The first thing is that it's just a relief to get it out publicly because it has held everything up for six months. Whether it needed to or not, it has had an impact on things such as decisions that should have just been waved through as part of the normal process but were not.

Rightly or wrongly, people in Defence felt that they were not able to make decisions and we have lost half a year.

The second point is that it has been honest – though the public version clearly has less detail than many people would like. I can only hope that the classified parts of the review went into greater depth on some strategic issues.

Overall, it looks like it's heading in the right direction. It's very specific around some of the points about the Guided Weapons and Explosive Ordnance Enterprise (GWEO), which I think are very helpful.

It looks like the government is very focused on trying to achieve outcomes in accordance with the recommendations of the DSR – and that they will hold the department to account. The early signs are that it's going to be a meaningful document and it will be a roadmap or a blueprint for moving forward.

Kym: Are you already seeing signs that things are starting to move post-DSR, or is it more of an expectation? Also, I noticed sprinkled throughout it references to off-the-shelf and the need for speed, which is often code for buying more stuff FMS.

Rob: Yes, that's a potential trap. One of the highest risk outcomes would be for the department to interpret the DSR in that way, or to take it as some sort of marching order for more FMS purchases – or even just directing orders straight to foreign companies.

In my view FMS is redundant and no longer fit for purpose in regard to munitions.

If we are going to rely on FMS – or even think that we are going to get any meaningful addition to our GWEO inventory within a short time via FMS – that would be a very flawed assumption.

I'm already aware of massive global delays in obvious, high profile products such as guided weapons and missiles – the sorts of things that have been publicly named as priorities. Many things are actually in short supply – including artillery ammunition.

The fact is that the US itself can't get many of these products for its own use, so it's hardly going to turn around and sell them to us via FMS while Ukraine requires them in an active conflict. Other nations have placed multiple orders in the last 12 months, meaning they are far ahead of Australia

– plus there are plenty of gaps in the US inventory which will need to be filled ahead of Australian requirements.

A decision to order a munition via FMS now is actually a decision not to get that product.

Kym: I'm really glad you mentioned that because it's as if some people on the DSR team don't understand how FMS works.

Rob: If anyone in Defence thinks that by using FMS they will be expediting the process the opposite will be the case. If they place an FMS order for almost anything it will be the worst of all outcomes for Australia.

In my view the only way to go is acquiring things as a direct commercial sale for mature products from companies but there are still dangers. If those orders are placed with foreign companies controlled by their governments, there are still uncertainties about whether those products are going to reach Australia in the required timeframe. We aren't going to achieve technology transfer just by ordering from overseas and hoping for the best.

Defence needs to be careful about how they take their riding instructions from the DSR.

In my view the best way to do this is to place commercial orders for as much as possible directly with Australian companies and let them purchase things on behalf of Defence. That creates a pipeline of orders –

and that gives economies of scale – and that allows the transition of imported products to domestically manufactured products and components.

Kym: Are we talking about a transfer of IP to Australian companies and letting them get on with it?

Rob: It's actually an easy, straightforward roadmap. It's a well-trodden path and we have done it on multiple occasions for example in the area of explosive ordnance – but it has to start with a purchase order.

Firstly, an Australian company has to have something ordered from them – and that has to be on a multi-year basis, not as a one off. Once you have that, industry can then analyse vulnerabilities in the supply chain. If we find that there's a single point of failure that's going to cause potential problems in one of the outer years, we can then start dealing with that.

We can either come up with alternatives or figure out how to onshore that particular element. That allows you to prioritise the effort. You don't need to necessarily be making everything on the first day. We need

to be able to figure out a sensible pathway and then when there are opportunities to grow the business and a logical way that can be done.

We are facing a crisis with allied munitions supply.

We have to move urgently to a system of what is necessary – and we really have to be targeted and get some action going in a few highly critical areas.

Kym: Do you want to nominate some of those? I remember we have previously talked about things such as fuses. Do you have a list of technology priorities?

Rob: Yes, fuses are going to be a particular bottleneck because they are needed for just about everything when it comes to larger munitions. This is everything from artillery shells down to medium calibre rounds with things such as air burst technologies.

The global demand for fuses is well beyond what the industrial capabilities of the Western world can produce. That's clearly a challenge that we need to address – and there are multiple ways of doing so.

We need an immediate short-term fix, and

part of that might be cross-qualifying the fuses you need for one type of munition with another to at least work with what you have. At the same time, we should look at how to start manufacturing them in Australia. I think that is a priority area.

Kym: I've taken a particular interest in South Korean defence technology companies and I know that some of them such as Hanwha are more than prepared to help Australia and to urgently transfer whatever technology we think we need and its personally frustrating that decision-makers just aren't interested. Hanwha is prepared to establish a Multiple Launch Rocket System manufacturing facility here and do it fast, while we will be waiting forever for HIMARS deliveries. Do you have a view on the sorts of international partnerships that we should be looking at?

Rob: I think you are right – if we cannot get a particular capability that we want, we are going to have to look at the alternatives. The issue with Defence trying to make

*HMAS Hobart fires an Evolved Sea Sparrow Missile (ESSM) during a transit through the Arafura Sea at Exercise Singaroo 2022.
Credit: CoA / Daniel Goodman*



commercial decisions for themselves is that they are likely to come up with the wrong result.

Let industry solve the problem.

Appoint an Australian prime contractor to deliver that capability. We have to talk about the capability and not a particular product. If a local company is given a purchase order and they are responsible to the Australian government – not to a foreign government or a foreign board – they can go about delivering the required capability.

That company can then try to acquire HIMARS as a direct commercial sale. In the event that it is not available within the necessary timeframe, the company should then look at alternatives that might include examining what is happening within the HIMARS supply chain that is preventing timely deliveries.

If for example it's a particular guidance system, or a warhead or a rocket motor, we could then potentially address that matter. The solution could involve on-shoring or domestic production. As an interim remedy it might be necessary to look at alternate

products. That can be managed and we should be able to migrate from one capability to another.

Instead, we have Defence personnel making decisions without understanding the industrial impact of what they are doing. Unless things change, we are going to continue going around in circles like we are at the moment.

“If anyone in Defence thinks that by using FMS they will be expediting the process the opposite will be the case. If they place an FMS order for almost anything it will be the worst of all outcomes for Australia.”

Kym: That sounds a bit radical and presumably CASG would disappear, which doesn't particularly bother me.

Rob: No, that's not right. The GWEO for example has been re-established outside of CASG as a separate Group.

However, within the CASG construct it can still work by appointing a Prime System Integrator to go and buy a particular

capability. Companies can work in that system with CASG doing the contracting.

That's exactly how our LAND 159 contract works. We start with system specifications rather than with a particular product in mind. We then solicit the market and use commercial intelligence to inform the Department about the options for meeting the requirement. Defence then has the say

over which particular paths they wish to go down. The process is clear so everyone knows why things are being done.

We do the testing, the acquisition, introduction into service, through life support, management and ultimately disposal of a range of products. All of this is in the negotiated scope of work for the Australian PSI.

There are a large number of these sorts of contracts being administered by CASG right now.

Even if you go into shipbuilding and aircraft this is typically how they occur. LAND 159 is seen as a great success because of the volume of work and capability it delivered in a very short period.

That should be the same with munitions – give an Australian company the job! Describe the capability required and tell them to go and get it in the timeframe needed.

If we have 10 years before something is needed, that will lead to a particular outcome. But if we need to have something up and running much more urgently in say 3 years then the options will be more limited.

But for this to work we have to be given the job. At the moment Australian industry is sitting on the sidelines waiting for something to happen. There is no local industry involved in solving these problems.

Kym: I know that when the GWEO was stood up it was meant to have fixed the problems – but despite ambitious aims and a lot of promises from government nothing much seems to have happened.



Armament Technicians from No. 3 Squadron, load a new Australian manufactured Bomb Live Unit (BLU 111) configured as a Guided Bomb Unit (GBU-12) onto F-35A Lightning II aircraft A35-040 at RAAF Base Williamtown, New South Wales. Credit: CoA / Craig Barrett

Rob: With the GWEO the current contracting model essentially inhibits the manufacture of guided weapons in Australia.

Kym: That's extraordinary.

Rob: The only companies that have been appointed to the GWEO Enterprise are Raytheon, Lockheed Martin, the Australian Missile Corporation, and Aurecon.

The DSR was scathing about the program - and rightly so.

As a rule, the major Primes do not own the full IP to be able to create a guided weapons manufacturing industry in Australia. They have good finished products - but they don't own the IP for the rocket motors, the warheads, the fuselages, and all those other subsystems that make up the finished product. They are all owned by other companies.

That's not a recipe for production in Australia.

Aurecon is an infrastructure company that will be able to build things and advise on essential infrastructure- but that's not technology for guided weapons.

On the other hand the Australian Missile Corporation (Ed: noting that Robert Nioa is the sole shareholder of the independently operated company) has 350 companies under its umbrella and can do that exactly. All of that capability is sitting there waiting.

Contractually, the AMC is currently only allowed to provide advice - not to deliver.

That's a fundamental issue that needs to be addressed.

Kym: That looks to be a self-defeating structure.

Rob: That was self-evident to the authors of the DSR. They were highly critical of the GWEO program because it cannot deliver under the current contractual arrangements.

Unless the new leadership changes that, we will have more of the same.

We have very high hopes for Air Marshal Leon Phillips, the head of the GWEO Group . Also, Air Vice Marshall Gerry van Leeuwin - who started in late January - and Andrew Byrne. A lot will depend on those three and they will determine whether this is a success or a failure.

Current indications are that they will move quickly and bring some direct decision-



*An Australian Army soldier from 107 Battery, 4th Regiment, Royal Regiment of Australian Artillery, sets a M1156 precision guided kit fuze for firing with a M777 howitzer during Exercise Chimera held at Shoalwater Bay Training Area, Queensland.
Credit: CoA / Kyle Genner*

making to bear. From an industry perspective the signs are positive - for the first time.

Time will tell whether these indicators are translated into contracts - which is what we need - or whether the opportunity will be lost. At the moment they are bringing a sense of urgency and good commercial thinking to the table. They need to be allowed to move and place contracts.

Kym: Money shouldn't be the issue because the government has tipped more billions of dollars on top of the billion or so that the previous government committed to bringing forward.

Rob: Yes - and they now have a directive from government to get on with the job and spend the money. There should be no remaining barriers to them being able to get going.

Australian capability is available. Money is available. The government wants it to happen. It's now down to individual leadership.

My suggestion is to stop having Defence people try to solve commercial issues, rather than working with industry to lead on delivery. Defence must contract with Australian-controlled companies to solve these problems. Let us get on with it.

Kym: Do you have a priority list for capabilities, allowing for the fact that it's up to Defence to define their own needs.

Rob: The first thing I would say is that we don't have to produce everything here immediately.

Give us an order for munitions - and then give us a time frame to implement full Australian production. This gives Australian industry the demand signal to create the capability - if in fact it's required.

If we never get the orders, we are never going to produce anything in Australia - simple as that.

Everything will flow from that. If we get orders, it will become apparent that we need large scale rocket motor production and large-scale warhead production. These are the first two things that will need to happen.

These technologies will be required for an entire fleet of guided and non-guided weapons.

If we can build rocket motors, we can build for HIMARS, we can build for SM-2 and SM-6. We could even transition into hypersonic missile production.

The same is true for warheads, which can be scaled up and down.

To that we can add fuses and the large-scale manufacture of artillery ammunition.

Kym: Let's return to the FMS system for a moment. It's always struck me as something of a distorted view to believe that it's somehow doing Australia a favour when it acts on cold hard commercial reality.


Rob: Over the last 20 years or so the billions of dollars that Australia has poured into US defence industry will have been very much welcomed by it. I'm sure they are very thankful for it.

But what that's meant is that those billions and billions of dollars represent lost opportunities for Australian industry for decades.

That's why we now have a growing munitions crisis. We are seeing the actual cost of the failure to develop Australian capabilities.

The cost of addressing that supply gap is going to cost extra billions of dollars.

At least we now have the chance to get it right.



For more than 35 years, BAE Systems Australia has designed, manufactured, tested, delivered and supported Guided Weapons in Australia.

Ready to deliver next generation GWEO

BAE Systems Australia has invested to establish a qualified guided weapon and explosive ordnance (GWEO) capability that exports to the world and supports an ecosystem of Australian suppliers, hundreds of engineers and technicians and world class advanced manufacturing facilities.

Today, we are focussing on the future by advancing the design and development of new guided weapons, partnering with Europe's largest missile group and increasing production at our facilities exporting missile subsystems to the United States.

This means we are equipped and ready to deliver the next generation of guided weapons in support of the Commonwealth's aspirations to establish a national GWEO Enterprise.

Expanding our Australian GWEO capability and capacity

As the nation's leading weapons system developer, BAE Systems Australia is expanding its advanced manufacturing capacity to support the establishment of a sovereign GWEO Enterprise.

BAE Systems Australia will design, develop, test and deliver a new generation of GWEO products that will increase and sustain sovereign industry capability for the Commonwealth and our global customers.

Nulka active missile decoy

IN SERVICE

BAE Systems Australia manufactures Nulka, a rocket-propelled, active missile decoy system designed to 'seduce' modern anti-ship missiles away from their targets, protect them and their crews.

Evolved SeaSparrow Missile

IN SERVICE

BAE Systems Australia manufactures sub systems for the Evolved SeaSparrow Missile (ESSM), a medium-range, surface-to-air missile developed to protect warships from advanced anti-ship cruise missiles.

Joint Strike Missile

IN PRODUCTION

BAE Systems Australia supplies Passive RF Sensors for the Kongsberg Joint Strike Missile (JSM), a long-range precision-guided missile primarily designed for integration with fixed-wing aircraft to engage land and naval targets.

Razer™

IN DEVELOPMENT

BAE Systems Australia has created the Razer low-cost precision guided munition (LCPGM) as a sovereign glide munition able to be deployed from a range of airborne platforms to engage targets with great accuracy.

MBDA Partnership

IN DEVELOPMENT

BAE Systems Australia and European missile group MBDA have announced a collaboration agreement that will support Australia as it develops its sovereign Guided Weapon and Explosive Ordnance (GWEO) Enterprise.

Hypersonic Weapons

IN DEVELOPMENT

BAE Systems Australia is investing in high speed weapons systems, including hypersonic long-range strike and hypersonic and ballistic missile defence, providing the opportunity for an enduring sovereign capability and to position the nation as a major global contributor in this disruptive and important technology field.



BAE SYSTEMS

GWEO Enterprise Partners – Aurecon and SMA

Geoff Slocombe ♦ Victoria

The Australian Government came to grips with the reality confronting the country's defence capability a couple of years ago. This was that the warning time for a future military opponent's attack on Australian territory had shrunk from a presumed ten years to a seriously shorter interval, possibly within 24 months. At the same time, potential adversaries – one in particular - were rearming with a range of sea, land and air platforms which could fire longer range and more powerful explosive ordnance.

The Government's response to this new military challenge was to realise that the current methods of procuring new defence capabilities would not deliver results within the required timescale. A new approach was needed.

When APDR asked about the Government's defence priorities their spokesperson responded formally, but with little new information, as has become the new normal:

"In its response to the Defence Strategic Review, the Government has confirmed that the Guided Weapons and Explosive Ordnance (GWEO) Enterprise is one of its highest Defence priorities," he said. "The Australian Defence Force must have the capacity to deter through denial any adversary's attempt to project power against Australia. The realisation of the GWEO Enterprise is central to achieving this objective.

"Participation in the GWEO Enterprise is open to all Australian



United States Army fire a MIM-104 Patriot missile during an air defence live fire demonstration at Naval Station Leovigildo Gantioqui during Exercise Balikatan 2023. Credit: CoA / Nadav Harel

industry. Defence's Strategic Partners are already beginning to engage with potential local suppliers of components and services" the spokesperson concluded.

On 31st March 2021, the GWEO Enterprise was borne, requiring widespread participation from Defence Industry as well as from the Defence organisation and the ADF.

Through an Enterprise approach, the Government decided it is better positioned to coordinate the network of stakeholders and inputs involved in supplying and sustaining GWEO. This involves the expansion of support systems for GWEO across seven enterprise enablers which underpin the life-cycle of GWEO:

- manufacturing
- research and development
- education and training
- test and evaluation
- maintenance and repair
- storage and distribution
- disposal.

The GWEO Enterprise aims to enhance Australia's self-reliance and supply chain resilience with a longer-term goal of developing a sovereign guided weapons manufacturing capability. Defence has developed an industry partnership model that includes Strategic Partners and Enterprise Partners.

In April 2022, Raytheon Australia and Lockheed Martin Australia were formally announced as Strategic Partners of the Enterprise and are working with Defence to accelerate GWEO acquisitions. They are also identifying initial manufacturing and maintenance initiatives for the Enterprise. This will create opportunities for Australian businesses of all sizes.

Similarly, Enterprise Partners will provide specialist advice and services directly to Defence and the ADF, as well as keeping the two Strategic Partners informed on what is required from them.

In early April 2022 Aurecon was appointed as the first Enterprise Partner by the Department of Defence. The company stated at the time that Aurecon will initially have a focus on enterprise infrastructure, including options and integration into Defence Estate, as well as related capabilities such as storage and distribution, asset management, and test and evaluation.

Through this partnership, Aurecon is seeking expressions of interest from individuals and other entities to collaborate and support in delivering outcomes.

Damon Howes, Managing Director, Defence and National Security at Aurecon has said:

"It is a crucial time for Australia, Defence and our industry, and the underlying motivation to accelerate progress is paramount.

"We seek like-minded companies and individuals to reach out. We can't do this all by ourselves and nor do we wish to – our focus is on the outcome."

Aurecon is partnering with Defence and broader industry to deliver Defence capability outcomes and does this through aligning the Defence values with the Aurecon Defence Values of Co-creation, Excellence, Integrity, and Legacy.

Damon Howes also said:

"This partnership has been, and will continue to be, exemplified by

collaboration to achieve the GWEO Enterprise Objectives across the short, medium- and long-term planning horizons.

"To achieve these objectives, the partnership will initially focus on establishing the Enterprise, supporting the definition of requirements and developing a range of options for consideration by Defence.

"It is a crucial time for Australia, Defence and our industry, and the underlying motivation to accelerate progress is paramount."

Also in April 2022, the Sovereign Missile Alliance (SMA), a joint venture between Electro Optic Systems (EOS) and Nova Systems, was announced as an Enterprise Partner in the \$1 billion GWEO Enterprise.

"The expertise the SMA brings to the GWEO Enterprise will lead to greater self-reliance for a range of hi-tech guided weapons," said Jim McDowell, at that time the CEO of Nova Systems.

"The Enterprise will bring operational sovereignty to Australia, which in the case of guided weapons, is about removing the risks of losing access to, or control over these essential weapon systems."

The SMA draws on the strengths of EOS and Nova Systems, two leading sovereign defence companies with an established local supply chain comprising more than 600 Australian businesses across the country.

"SMA expects to contribute its experience in optimising ordnance readiness to enhance available missile inventory, as well as contribute to the progressive alignment and evolution of GWEO technology with sovereign requirements going forward", said Ben Greene, Group CEO, EOS.

SMA involves a collective workforce of 1,000 local employees, an annual revenue of more than \$500 million, and \$40 million in research and development to deliver world-leading innovation.

Having led EOS through the formation and success of SMA in being selected as an Enterprise Partner, long-serving founder Dr Ben Greene retired as Group CEO, EOS and took up the role of Head of Innovation, EOS.

His replacement was announced that as from 1 August 2022 Dr Andreas Schwer would Chief Executive Officer, EOS.

For the previous two years 2020-22, Dr Schwer acted as President of EOS Europe, Middle East and Africa and, as such, has an extensive understanding of the company's global operations.

Australian Missile Corporation (AMC) was announced by Defence in September 2022 as another GWEO Enterprise Partner. A separate article in this APDR edition examines their role and capabilities in detail.

This agreement seals the AMC's commitment to working with Defence, industry, and the other GWEO Enterprise Partners to deliver the GWEO Enterprise objectives across the short, medium and long-term planning horizons.

The AMC has recently embarked upon a nationwide recruitment campaign for a range of defence experts and skilled professionals, from guided weapons engineers to high-tech project managers and logistics specialists.

Mr Goddard, CEO of AMC, has said that the AMC's collaboration platform had grown in recent months to now include more than 350 participants from the defence, innovation, academia and government sectors covering all required capabilities to ensure an Australian-focused, domestic industrial base can be mobilised.



No. 82 Wing Training Flight instructor Flight Lieutenant Scott (right) and student Pilot Officer Niall conduct pre-flight checks on the GBU10, 2000lb Laser Guided weapon, loaded on an F/A-18F Super Hornet.
Credit: CoA / Pete Gammie

Guided Weapons Acquisitions in the Air Domain

Geoff Slocombe ♦ Victoria

The Royal Australian Air Force (RAAF) fleet of aircraft has been significantly modernised in recent years, so that all fighter aircraft are now fitted with at least one and more often multiple guided weapon

This is not a weapon capability that remains fixed from original delivery until end-of-life and removal from the fleet. Every few years, new guided weapons or new versions of existing weapons are offered to the RAAF. Naturally, the extent to which they are fitted to which type of aircraft depends on that aircraft's principal role. Some, like the latest F-35 fighters, are intended for an offensive role which can be either air-to-air combat or air-to-ground or air-to-sea target destruction.

The RAAF's F-35As are fitted with AIM-9X "Sidewinder" Short Range Air-to-Air Missile range 35km and speed Mach 2.5, AIM-120 Advanced

Medium-Range Air-to-Air Missile (AMRAAM) range 105km and Mach 4 speed, GBU-31 Joint Direct Attack Munitions (JDAM) Guided Bombs weight 230 to 910 Kg, and Laser-Guided Bombs.

Compare this with an RAAF KC-30A Multi-Role Tanker Transport (MRTT) which does not carry any guided missiles and relies for its defence from an attacking enemy aircraft by both a screen of RAAF fighters and also electronic self-protection measures.

The RAAF lists its fleets of aircraft by capabilities for air combat, surveillance and maritime, air mobility, and finally the air training group.

Crewed and uncrewed aircraft are included in these categories.

The guided weapons fitted to the RAAF's F-35A fleet have already been listed. What about the other fighter aircraft like the Hawk 127 trainer, the F/A-18F Super Hornet, and the E/A-18G Growler?

The RAAF utilises the Hawk 127 lead-in fighter as a jet trainer and fast jet pilot conversion aircraft. Pilots complete a fourteen-week Introductory fighter conversion course with No 79 Squadron at RAAF Pearce (near Perth). Once completed, the pilots then proceed to another fourteen-week course at No 76 Squadron at RAAF Williamstown (near Newcastle), where they focus on air-to-air and air-to-ground weapons training.

With technologies constantly upgrading and improving, the Hawk 127 is flexible in that its systems can be upgraded. This ability to adapt means it can be used to progress crews on conversion to the F-35A Lightning II aircraft. Despite not being an operational aircraft, it has all the capabilities to perform day and night missions and provide air support. In RAAF service it can be fitted with 4× AIM-9 Sidewinder or A132 ASRAAM guided missiles on wing pylons and wingtip rails.

The F/A-18F Super Hornet, capable of flying at Mach 1.6, was originally acquired to cover the later than planned deliveries of the F-35A but now has combat roles in its own right. The current members of the RAAF can carry a wide range of guided missiles including the AIM-9X "Sidewinder" Short Range Air-to-Air Missile, AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM), Joint Direct Attack Munition (JDAM) and Laser JDAM, Conventional and Laser-Guided Bombs, AGM-154 Joint Stand-Off Weapon (JSOW) and AGM-84 Harpoon Anti-Ship Missile.

The E/A-18G Growler is an electronic attack aircraft which carries ALQ-99 Low and High Band jamming pods, capabilities for electro-magnetic spectrum dominance, as well as enhanced Situational Awareness and Networking. Capable of travelling at Mach 1.6, it can also carry guided AGM-88 (HARM) Anti-Radiation Missiles, AIM-120 Air-to-air missiles and AIM-9X "Sidewinder" Short Range Air-to-Air Missiles.

Moving on to other RAAF aircraft. The P-8A Poseidon, one of the RAAF's more recent acquisitions, operates in the surveillance and maritime group with roles in anti-submarine warfare (ASW), anti-surface warfare (ASUW), and intelligence, surveillance and reconnaissance (ISR). It is armed with torpedoes, lightweight AGM-84 Harpoon anti-ship missiles, and other weapons, can drop and monitor sonobuoys, and can operate in conjunction with other assets, including the Northrop Grumman MQ-4C Triton maritime surveillance unmanned aerial vehicle (UAV).

Guided missile upgrades

Most guided missiles fitted to RAAF aircraft come from two large multinational companies, headquartered in the United States – namely Lockheed Martin and Raytheon. They have long established subsidiaries in Australia which are expected to grow larger as a result of the creation of the Guided Weapons and Explosive Ordnance (GWEO) enterprise.

It is no coincidence that they have both been appointed Strategic Partners of GWEO, with a particular mission to create extensive missile manufacturing operations in Australia. In the first five years these missiles will probably be ones already in use, but in the future, it is likely that new designs will be created and manufactured locally.

One of the challenges of importing guided missiles from the United

States is that each order is subject to approval from the US State Department, creating potential delays although in practice they are usually very prompt in reaching their decisions.

One of the better aspects of the GWEO Enterprise is the strong possibility that Australian manufactured guided missiles will be sold in quantity to the United States to help maintain their warfare-level inventories.

The 2023-24 Defence Budget shows that project AIR 6000 Phase 5 air-to-air weapons for the new air combat capability for the F-35A and Super Hornet has \$911 million in approved funding which is not yet spent.

The Royal Australian Navy has announced plans to replace the Harpoon guided missile fired from their frigates and destroyers with new Norwegian-made Kongsberg Naval Strike Missiles. These will have a greater range, allowing the country to improve its marine striking capabilities.

In April 2022 then Defence Minister Peter Dutton announced that Australia would speed up the acquisition of 80 Joint Air-to-Surface Standoff Missile Extended Range (JASSM-ER) for the Royal Australian Air Force. This purchase received US State Department approval as a Foreign Military Sale in July 2022 for an estimated \$US235 million (\$AU340 million). As yet APDR has not detected any actual purchase activities of this missile. The range of RAAF fighters is around 1,000km so the extra range of up to 925km will be invaluable.

The acquisition of up to 200 Lockheed Martin AGM-158C Long Range Anti-Ship Missiles (LRASM), initially for use by the RAAF's F/A-18F Super Hornets, formally announced by the then Defence Minister in May 2022, has been foreshadowed and approved by the US State Department, but does not yet appear to be actioned.

This guided missile, costing over AU\$5 million each, has an operational range of >37km and flies at high subsonic speed.

Flying under the radar of March 2023's AUKUS submarine announcement was the revelation that the United States had agreed to sell Australia up to 220 Raytheon Tomahawk cruise missiles. This is a precision weapon that launches from ships and submarines and can strike targets precisely from 1,000 miles away, even in heavily defended airspace.

Although this missile is launched from a naval ship, its action and accuracy are similar to guided missiles being launched from aircraft. Tomahawk missiles are not launched from aircraft because they are designed to fly at very low altitudes and therefore are best delivered from the sea. They fly at Mach 0.74 and can travel 1,350 nautical miles while flying as low as 30 metres above the sea surface.

In conclusion

The advent of more accurate longer-range fire from land-based and warship weapons has created a challenge for the RAAF which it has met by progressively upgrading the guided missile explosive ordnance that it carries so that it can stand-off further from its adversaries.

The obvious gap in the RAAF's fleet is a bomber capability able to deliver heavy loads of explosive ordnance on critical adversary ground targets. Naturally, such a capability would have to be accompanied by existing air-to-air combat aircraft.

The time to take decisions is now, rather than to hope that this RAAF capability is not required, or that it can be supplied by friendly air forces.

New conflicts - new missiles

Richard Gardner ♦ Stevenage, UK

The Russian invasion of Ukraine provided a long-awaited wake-up defence call throughout NATO countries who have previously become accustomed to allowing a general hollowing out of force levels. This was in the belief that the era of East-West confrontation was over, and that technological superiority in platforms and weapons systems would compensate for declining combat numbers.

The brutally aggressive Russian attacks in February 2022 sent shock-waves across Europe as defence chiefs pondered what would have to be done, short of risking World War Three by direct involvement, to help Ukraine contain or defeat the biggest military threat to East European countries since the end of the Cold War. Added to the challenge for NATO was the reality of how to respond to growing Chinese ambitions across the Asia Pacific region, in the knowledge that its leaders would be watching very closely how the West responds in Ukraine.

Established Western norms, such as air and sea dominance, and ISTAR superiority, are now being put to the test on a scale and depth last approached during the Cuban Missile crisis in the 1960s. Interceptions of Russian aircraft by NATO fighters are an everyday occurrence around East-West borders while on the ground history is repeating itself.

The prospect of rolling mass formations of tanks and armoured vehicles, as last used in Iraq, were thought to be tactics consigned to the past - but clearly this was a big miscalculation. However, the re-emergence of old-style armoured land battles has thrown a new focus on how best to defeat an enemy prepared to lose large numbers of its own assets. This has been done in the belief that it can wear down opposition, especially if sophisticated defensive weapons are not available in sufficient numbers and are also extremely expensive.

Making every capability and weapon count by exploiting superior design and performance remains one of the most important factors that are being actively brought forward in Europe, with a new sense of urgency. One example of how the defence sector is investing in new facilities and product developments to meet evolving requirements was revealed in May at MBDA's new Digital Battlespace Facility at its UK Headquarters, design and production site at Stevenage.

CAMM missile firing © MBDA



Chris Allam is Managing Director MBDA UK and Group Engineering Director and he explained to APDR how the company is tackling the need for transformational change by expanding its research and development, design and production capacity, as well as headcount, to meet the changing military environment. Advanced weapons and associated systems are at the core of this Anglo-French enterprise and the last year has been an exceptional one with Euro 9 billion in new orders and a 22.3 billion backlog.

"MBDA is seen as a critical asset as a tool for sovereignty - to ensure national sovereignty in complex weapons through co-operation." He said. "An indigenous UK complex weapons capability provides operational independence and is now greatly increasing in importance. The pace of change of the threats, resilience through industrial capacity, an expansion of effects and domains and the optimisation of those effects, and the issue of third party control, all contributes to our missile capability being the tip of the spear in modern defence."

He added, "The company's workload is fast expanding with new developments and production across all air, sea and land domains. In production is ASRAAM, CAMM, Meteor and Land Ceptor and under development are new versions of Spear, Brimstone, FCASW and Sea Venom. During 2022 new UK orders were placed for the Future Cruise/Anti-Ship Weapon, Sea Viper and Spear EW.

"International orders included CAMM-ER, Mala Narew (Land Ceptor), ASRAAM integration on India's LCA, Meteor integration on Korea's KF-21, Sea Ceptor for Canada and CAMM for Brazil. So far in 2023 the biggest

new order has been from Poland, worth £1.9billion which will include creating more highly skilled jobs in the UK and Poland and will give a major upgrade to the country's air defence capabilities with the highly mobile Pilica+ with CAMM missiles."

Beyond Storm Shadow/Scalp

Current deep strike missile production is centred on the Storm Shadow, which is carried on RAF Typhoons and which is being enhanced. Range is over 150km after air launch and recently missiles have been transferred to Ukraine to allow a doubling of that country's stand-off range capability to hit rear-located targets of strategic importance to Russian forces, compared to that from HIMARS rockets (with an 80km range).

Storm Shadow has been used highly effectively by the RAF in combat conditions in the Middle East and is also produced in France as the Scalp missile, carried by Rafale combat aircraft. An autonomous navigation system gives it enhanced survivability.

The next generation long-range cruise missile from MBDA for anti-ship or against land targets will be the FC/ASW and will be both stealthy and very survivable - and network enabled. It will eventually replace Storm Shadow and Scalp with the air forces of the UK and France. Two platforms are under consideration. One design is subsonic and the other is hypersonic. The next development stage will start in 2025.

MBDA provides a very comprehensive range of advanced air-to-air missiles in the shape of the dog-fighting ASRAAM, and medium/long range Meteor, and both are in full production with spiral development enhancements in hand. ASRAAM has a new UK seeker which gives even greater manoeuvrability and instant target cueing.

The Meteor is undoubtedly the outstanding AAM in its class combining long range and high speed with an enhanced network enabled "first kill" Beyond Visual Range performance with a larger no-escape zone. It is used by 6 nations and gives Typhoons, Rafales and F-35s what has been described as a combat winning performance.

Suitable air dominance features, including missiles but referred to as effectors, for the next-gen Global Combat Air Platform (GCAP), alias the Tempest, led by the UK in partnership with Italy and Japan, will be developed in parallel with the aircraft design. This envisages a development prototype flying in the second half of this decade. The likely mix of weapons might include directed energy, though this will depend on decisions to be made later in the program.

In the most recent Anglo-French Summit Meeting in Paris in April it was reaffirmed that Anglo-French co-operation remains fundamental to maintaining a sovereign capability in the development and production of complex weapons for air defence and long-range strike and attack. There is one centre of excellence for the joint programs which include Storm Shadow/Scalp, Meteor, Sea Venom/ANL and Aster.

Chris Allam was upbeat on how the current missile product portfolio had delivered significant advantages. He said:

"Since the joint government/industry partnership agreement on Complex Industrial Strategy was signed in 2010 the advantages of securing sovereign defence capabilities and new investment have enabled rationalisation of weapon types from 22 to 5 in the UK in favour of greater commonality, modularity and reuse.

"Export benefits have increased to 50% of revenue, and frontline capabilities have been regenerated. For the future, the established

benefits are secured and end-to-end agility, transformation, the digital thread, resilience, rapid spirals and the 'virtuous circle' from increased exports are all in place."

He quoted as an example of the latter the most recent major export win supplying Poland with a range of the latest weapons that have only just been accepted by the UK. Other orders are under negotiation.

Apart from ensuring Poland's aircraft are updated in the air defence role, the new mobile Ground Based Air Defence missiles will introduce an enormous step forward protecting national air space. The CAMM missile family is being introduced to the British Army as Land Ceptor and is in service with the Royal Navy as Sea Ceptor.

It offers an enhanced modular air defence solution for area defence and is highly mobile. A spiral development is CAMM-ER with extended



Spear EW (MBDA image)

range. The Spear family of stand-off attack weapons has been joined by Spear-EW, which has a jamming/confusing role.

In a typical attack scenario multiple Spear weapons would be launched by a Typhoon or F-35, the folding wings extend to give a true loitering or extended range capability, and a Spear-EW would provide confusing radar and other electronic returns making detection of the armed missiles very difficult for a defender.

With a 400km range Spear-EW could create havoc in enemy control centres masking true targeting intentions of the attack force. Sharing the same compact dimensions with the standard Spear weapon, Spear-EW can be carried alongside, using the same weapons bay or wing and fuselage pylons, a true force multiplier.

Changed perspectives

The threat from massed tank attacks is fast evolving as both conventional and unconventional methods defending ground units and key defensive areas have successfully been deployed in Ukraine using Western supplied weapons, including short-range missiles. Armed drones are also now used by both sides for surveillance, targeting and delivering weapons, and a proliferation of lightweight, adapted UAVs have introduced a radically changed aerial perspective.

This allows defenders and attackers to see moving and fixed targets over a wide range of situations from strategic hubs to isolated groups of soldiers. Even during the early stages of the Russian invasion, it soon became clear that low flying fixed wing attack aircraft and helicopters could be very vulnerable at low level.

In twelve months of intensive fighting, tactics and weapons have changed to meet new developments. Almost overnight the Russian Black Sea Fleet had to withdraw out of missile range and away from Ukrainian coastal positions following the sinking of a major Russian missile cruiser, the Moskova, by a sea-skimming missile. As the Russian Navy faces possible future encirclement by better armed Western navies, the expansion of the Chinese Navy is being monitored by those same Western forces that can see the potential vulnerability of carrier task forces to attack by long-range hypersonic cruise missiles and long-range underwater “cruise” torpedoes.

MBDA has achieved outstanding performance in combat conditions from its short-range Brimstone attack missile and has completed a “top-to-tail” upgrade leading to Brimstone 3, now in production. With a proven precision anti-armour air-to-surface attack capability against fixed or moving targets, it is now being adapted for future land system use on tracked and wheeled vehicle applications such as Overwatch and Boxer.

This has been a spiral development with new software modifications and is suitable for multi-platform use. It is seen as a battlefield deep shaping counter to advancing or static enemy armour. Sea Venom is a 120kg anti-surface or anti-vessel attack missile and is in service on Royal Navy Wildcat helicopters.

For naval area defence the Aster/Sea Viper is the main long-range air defence missile in service with the Royal Navy and French Navy. The existing Aster 15 is being upgraded to the latest Aster 30 standard, which offers 100km range against high end targets. It is equally effective against incoming aircraft or missile threats, subsonic or supersonic.

Aquila is the working name for the evolutionary development of the current Sea Viper, adding more speed and range. On the Royal Navy Type 45 destroyers the Sea Venom launch silos are being supplemented by the addition of 24 silos for CAMM, which will offer enhanced close-in air defence.

As part of the ships’ upgrade program, MBDA is playing a lead role in integrating improved multi-function and long-range radars and their control systems. Sea Ceptor/CAMM is also being introduced as the main missile armament on the Royal Navy’s Type 23 frigates and for the new generation Type 26 and Type 31 frigates.

Laser development continues

Mike Mew, Director of UK Sales and Business Development underlined the company’s forward-looking commitment to both upgraded missiles and new developments. Asked by APDR what the status was of the Dragonfire program he confirmed that ground tests had been highly satisfactory. Generating and projecting very accurate targeting results and preparations were in hand to follow up with more tests on a ship.

The system has many applications against air and surface targets with an ability to vary the projected power appropriately, such as a requirement to dazzle or distract, or a target kill.

The Royal Navy is particularly interested as a directed energy weapon would offer very many operational advantages such as speed of response,

flexibility in use against different targets, and reduced on-board space for conventional weapons storage and associated re-loading equipment. But issues relating to power generation at source, safety, dealing with vessel vibration, and such environmental and integration matters would be investigated as development continues.

New Digital Battlespace Facility

The need to coordinate the many aspects of designing, developing, testing and validating new and evolving complex weapons, along with experimentation and training, has been recognised within MBDA. This, in the form of a new multi-domain Digital Battlespace Facility at Stevenage, is a visible example of significant investment that aims to bring together models, simulations, real equipment and people throughout the weapon system lifecycle.

James Allibone is Deputy Director MBDA UK and his team is very enthusiastic concerning the experimental and training potential of the new facility which can produce a “digital twin” battle laboratory appropriate for multi-user immersive exercises simulating land, maritime and Blue and Red air elements. All aspects of weapon system operations can be simulated using the latest virtual and augmented reality aids.

It can be used to host joint manufacturer/customer experimentation with human factors, analysts, wargamers, mission planners and other experts present or linked to other locations in real time. The results of experimental integration activity can be examined locally to uncover emergent properties or at external sites.

The facility can thus justify, evolve and demonstrate current and future weapon system simulations to customers to enhance the iteration tempo on new equipment and methodologies. Mission playback and training analysis can all be achieved in this one location, combining virtual with real in another location if required.

Additional value will be gained from using the simulation facilities to maximise feedback from early concepting and exploring and this can continue through the development process to aspects of in-service support and designing suitable training activities. The company claims that the ability to originate a virtual reference system can act like an all-embracing synthetic environment to become a key enabler in risk reduction when developing standards, software and regulatory controls.

Future weapons concepts can be examined in realistic detail to assist the digital learning process. Integration is key to complex weapons design, development and operation and the facility can help speed up what can be a very involved stage in bringing forward new programmes and products.

Saving time equals saving money and being able to exploit the full virtual simulation capabilities across all domains avoids unnecessary duplication at the conceptual stage as well as when a project has advanced closer to live testing and evaluation. One example might be the need to examine how a radical new capability such as directed energy weapons can integrate with other weapons, sensors, ship systems and control rooms.

Could a laser weapon fit in with the layered missile and gun air defences aboard a ship, or could it replace them? What might a land version need to function alongside ground forces or in an area defence system? The simulations that are possible can take in a wide range of future scenarios to produce tactical data that will play a key role in determining viable outcomes. The results will determine how appropriate the options might be.



Australian supply chains drive resilience for Defence

Oleg Vornik • Sydney

Although the outlook for manufacturing at large remains uncertain, defence production is on the rise, and has been for three to four years.

It is therefore crucial for Australian defence primes, the manufacturers supplying to them, and government agencies to jointly increase local investment to establish and then maintain a sovereign, sustainable industry.

There has been notable movement in this regard since the onset of the COVID pandemic. With those operating in or provisioning to the defence industry categorised as essential services providers, local manufacturers gained exemptions to continue operating during lockdowns. Australia needed to support onshore manufacturing as the capability would prove crucial in the event of a conflict or national security threat.

Manufacturers subsequently saw a spike in demand as defence primes needed to get their supply locally or risk delays in development and higher costs as shipping lanes closed or slowed.

With the Federal Government allocating approximately \$57 billion to its defence budget and the latest Defence Strategic Review stressing preparedness, it's a crucial moment for defence primes to lean on local suppliers wherever possible, and in turn, for Australian manufacturers to double down on the investments made in the last three years to meet sovereign demand.

We saw national lockdowns as an opportunity to stress test our supply chains, and aggressively moved from overseas suppliers to local ones for components not already sourced locally. There were a number of immediate outcomes from the change.

Because Australian manufacturers were ready to produce, we avoided high shipping charges, and mitigated risks associated with the

development of kit for defence. The quality of work is also incredibly competitive, and the overall process is simplified – it's easier to vet and onboard suppliers, and the ability to brief local manufacturers is faster due to cultural alignments and the ability to offer direct training.

The last few years have also seen a significant change in the pace of engagement, sophistication and the responsiveness of a number of Australian supply chain manufacturers, bringing the cadence on par with world-leading standards.

We have seen significantly reduced lead times, and the number of Australian companies which can do post-processing work such as anodising, powder coating, ceramic coating, sand blasting and laser etching has risen. In turn, suppliers such as CNC manufacturers rely heavily on these, and often the lead time for post processing can outweigh the machining time for the metal itself, making for much faster processes overall.

Additionally, defence is inherently agile; every build is progressive, and build manuals develop over time. If you need to rework a piece that has come in from abroad and isn't to specification, sending it back overseas is a long, expensive process. As a defence company, we need to be ready to produce and deliver to the ADF; relying on secondary and tertiary partners presents risk.

A weaker Australian dollar also helps and counteracts the comparatively higher cost of labour.

For example, Stella Engineering, based on the NSW Central Coast, currently manufactures the DroneSentry-X vehicle based detect-and-defeat counterdrone system heatsink. It also manufactures the CNC components of the RfOne long range drone tracking sensor. With a reputation for taking on new challenges and experimenting with new manufacturing methods, the company recently invested in ceramic coating capabilities (Cerakote), which we now use across multiple products. As a result, the equipment is more durable and resistant to the elements.

Meanwhile, Clarke and Severn (C&S) is a cable manufacturer in Sydney which originally provided very low quantities of cables to start our relationship, and today supplies hundreds of thousands of dollars in orders each year. The willingness of Australian manufacturers like C&S to work with local companies during their prototyping results in high-volume contracts once equipment enters production.

While it's impossible to source every component locally – such as chips and batteries – due to the nature of our market, there are ample areas where we can manufacture even if we were cut off from the rest of the world (such as in the event of a major war – exactly the scenario the Defence industry needs to be ready for). Diverting investments that previously went abroad locally removes dependency; and ultimately as a defence technology business, our success is the success of our manufacturing partners.

With defence becoming a bigger priority, local manufacturers should see more work coming their way. Although mega-programs – such as submarine builds – contain complexities that make it difficult to get a foot in the door, the mid-tier ecosystem is good business at a time when demand outside of defence remains inconsistent. COVID-19 taught us that when there's international disruption, businesses fall on their knees.

Defence manufacturing operates contrary to this trend, and creates certainty for Australian manufacturers, the defence primes they supply, and ultimately the ADF.

Launch of a Switchblade 300 loitering munition (USMC - Cpl Jennessa Davey)



Kamikaze drones creating a buzz on the battlefield

Guy Martin • Johannesburg

While many nations are pursuing hypersonic weapons in the quest for greater speed, the world is also seeing the proliferation of the antithesis of these – low-cost loitering munitions that rely on their slowness to be effective.

The 2020 Nagorno-Karabakh War between Armenia and Azerbaijan put the loitering munition, or kamikaze/suicide drone, firmly on the map – followed by the Russian invasion of Ukraine last year. In the Nagorno-Karabakh conflict, Azerbaijan degraded Armenia's air defence systems using primarily Israel Aerospace Industries Harop and Elbit SkyStriker weapons, making it easier to attack ground targets.

In Ukraine, both sides use loitering munitions, particularly Russia. The latter's main manufacturer is ZALA Aero Group, which launched its KYB-UAV, also known as the KUB-BLA (Cube) in 2019. The propeller-driven munition can be used for surveillance as well as attack. It has a 40km range and 30 minute endurance with a 3kg payload.

More extensively used in Ukraine is the Lancet, a further development of the KUB-BLA. The latter was also unveiled in 2019 and comes in two main variants: the 5kg Lancet-1 with a 30 minute endurance and 12kg Lancet-3

with a 40 minute endurance. The Lancet was designed to autonomously locate and attack targets and was used successfully by Russian special forces in Syria in 2021. They have achieved over 100 successful hits in Ukraine, mostly against artillery (with at least a 15% miss rate).

This over-reliance on these types of weapons is because its attack helicopter fleet has suffered significant losses and now appears to be almost completely grounded. Due to a shortage of home-grown munitions, Russia has acquired hundreds of unmanned aerial vehicles (UAVs) from Iran, including Shahed-131/136 loitering munitions (Geran-1/2 in Russian service), which have proven effective, particularly against infrastructure. The 200kg rail-launched Shahed-136 has a 2,000+km range carrying a 50kg warhead, double the distance of the similar but smaller Shahed-131. A piston engine gives a top speed of more than 180km/h. Guidance is by inertial navigation system (INS), GPS and Glonass, making jamming

difficult.

Ukraine is developing its own loitering munitions – these include the catapult-launched RAM II, with an anti-armour or thermobaric warhead and 30km range, and ST-35 Silent Thunder multi-rotor with an anti-armour warhead and 60 minute flight time/30km range. One Way Aerospace is mass producing its Scalpel multi-rotor series for the Ukrainian military, which can deliver 1-3.5kg warheads, including a tandem RPG warhead for use against armour. Prices range from US\$1,000-2,200, which the company says is 20 times cheaper than American equivalents. As they are vertical takeoff and landing (VTOL) munitions, no launch tube or rail is necessary.

The 2020 Nagorno-Karabakh War between Armenia and Azerbaijan put the loitering munition, or kamikaze/suicide drone, firmly on the map - followed by the Russian invasion of Ukraine last year.

One Way Aerospace is also exporting its products and working on a series of long-range fixed wing designs.

As Ukraine uses up around 10,000 UAVs a month - including loitering munitions - it is even modifying first-person view racing drones into kamikaze weapons. At present it is reliant on hundreds of US-supplied systems, notably the AeroVironment Switchblade. There are two tube-launched versions of the Switchblade: the 2.5 g 300 model has a 10km range and 15 minute flight time, and cannot penetrate armour. The 600 model has a 40km range and 50 minute loiter time - the 55kg weapon can tackle armour. A soldier can find targets using onboard electro-optical and infrared cameras. Both Switchblade models have been provided to Ukraine and used in combat – the Switchblade 600, delivered from late 2022, is preferred for its anti-armour warhead, whereas US forces found the lighter Switchblade 300 useful in combating Taliban fighters in Afghanistan.

The US has provided over 1,000 Aevex Aerospace Phoenix Ghost loitering munitions – similar to the Switchblade - to Kiev, as well as Anduril Industries Altius-600M munitions. Ukraine has also received Warmate and D40 loitering munitions from Poland's WB Group and Australia's DefendTex respectively.

In Ukraine, the ability of loitering munitions to target convoys from a safe distance is a valuable attribute, given the significant number of armoured vehicles on the battlefield. Their low cost is another selling point - munitions like the Switchblade are significantly cheaper (US\$6,000 for the 300 series) than cruise missiles and anti-tank guided missiles. A Javelin system, for example, costs around US\$176,000 and a Hellfire missile US\$150,000.

Loitering munitions, while far less sophisticated than headline-grabbing cruise missiles and hypersonic weapons, are making much more of an impact on the battlefield. They are giving ordinary soldiers access to guided munitions, dispersing aerial surveillance and precision bombardment down to the squad level. Small teams are able to replicate artillery, but in a more mobile and evasive fashion.

Loitering munitions also have profound impacts on air defence systems - for militaries that cannot field stealth aircraft, they are an affordable way of gaining air superiority, especially when swarmed. As loitering munitions are generally small with a low radar cross-section and infrared signature, they cannot be easily detected, and countering them with conventional

air defences like missiles is both costly and difficult.

As they gain traction with users, customers are already looking for more capable systems with bigger payloads and longer ranges that are still easy to use, and feature modular payloads as well as 'cooperative engagement' or swarming capabilities. On the other hand, cheaper and lighter multi-rotor VTOL munitions are proliferating – the average maximum takeoff weight of all loitering munitions unveiled in 2022 was 16kg – half that of similar weapons unveiled a decade earlier, driven in part by a switch to electric motors and miniaturised electronics.

The ability to launch from manned and unmanned platforms is another emerging trend. Many armoured vehicles are coming out with canister launchers for loitering munitions and vessels and aircraft are also increasingly carrying them, as are unmanned ground vehicles.

However, manufacturers need to be careful not to make loitering munitions too big, complex and expensive and take away from their cheap and cheerful appeal – the capabilities of loitering munitions will be limited by the need to keep production costs to a minimum, slotting them between artillery and missiles.

They are becoming an increasingly important item in military arsenals, although they are generally too small and short-ranged to decisively change the outcome of a conflict. Indeed, they do have numerous limitations, such as small range and payload. Operating in airspace that



A Warmate loitering munition hitting a target (WB Group)

is being jammed or spoofed is a significant hindrance and the growing proliferation of counter-UAV systems is another challenge. Furthermore, completely autonomous weapons raise questions regarding the laws of armed conflict, while artificial intelligence and autonomy that many loitering munitions rely on can cause errors and friendly fire events.

Nevertheless, the loitering munition market is growing rapidly, especially as the conflict in Ukraine demonstrates their effectiveness. Manufacturers from Sudan to South Africa and Serbia are offering systems: more new

LOITERING MUNITIONS

loitering munition designs were revealed in 2021 and 2022 than in the previous half a century - over 120 entities in 30 countries are developing or manufacturing loitering munitions. The Asia-Pacific in particular is driving the growth of the market, with nearly 40% of all new models over the last five years originating in the region.

Australia

Australia has more than one loitering munition development project underway. SME Innovaero and BAE Systems Australia, for example, are developing the 30kg electrically-powered Owl with a 100-200km range. It will be guided by an EO/IR camera and carry a 7kg warhead. A production prototype will be demonstrated at the end of this year. DefendTex already produces the Drone40 loitering munition, evaluated by the New Zealand Defence Force and in British service. The hand/tube-launched munition has a 20km range and 30-60-minute flight time. Payload options include a 40 mm grenade.

China

China acquired Harpy anti-radiation loitering munitions from Israel in the 1990s, apparently copying them as the ASN-301. It now manufactures its own range of loitering munitions: the China Aerospace Science and Technology Corporation (CASC), for example, several years ago unveiled its CH-806 flying wing munition with an 18kg payload. A piston engine gives a top speed of 180km/h and range of 1,000km/12-hour endurance. Launch is via catapult and command range is 200km+. Cameras and a synthetic aperture radar provide operator-controlled terminal guidance, although the munition can attack targets autonomously.

Other Chinese loitering munitions include the CASC CH-187 rotary wing micro UAV that although designed for surveillance, can be fitted with a small explosive payload for anti-personnel operations; and the WS-43, a 200kg weapon with a 60km range and 30 minute endurance that can be launched from a multiple rocket launcher. Norinco offers its Cruise Dragon series with a 10-300km range, while CASC in 2018 unveiled its FH-901, a 1.2 metre long canister-launched munition with a 150km/h top speed, 15km range and 2 hour endurance. It can be fitted with a fragmentation or shaped charge warhead capable of penetrating 10 cm of armour.

India

India is pushing hard to acquire loitering munitions, and its military already uses a large fleet (150+) of Harop/P-4 munitions as well as Warmates. In September 2021, the Indian Army ordered 100 SkyStriker loitering munitions from an Elbit Systems/Alpha Design Technologies Limited joint venture. The fixed wing SkyStriker has a 400km range and 5kg warhead.

Also in September 2021, Indian company NewSpace Research and Technologies received an Army contract for 100 locally developed 'swarm drone units' capable of seeking, tracking and striking targets with a 5/10kg warhead. These multirotors had been delivered by March this year.

Another Indian Army contract was awarded this year for 450 Nagastra-1 loitering munitions designed and developed by Solar Industries. This fixed wing munition has a 15km range and 1.5kg warhead. To augment its artillery, the Indian Army is running its Medium-Range Precision Kill System project which aims to acquire a suicide drone with a range of 40km and endurance of 2 hours with an 8kg warhead. The project was approved in November 2022.



*Launch of an AeroVironment Switchblade 300
Credit: USMC - Cpl Alexis Moradian*

The Indian Air Force, meanwhile, has just taken delivery of the first of 100 ALS-50 VTOL loitering munitions from Tata Advanced Systems Limited. This has a cruise speed of 100km/h, an endurance of more than one hour, and a range of more than 50km. It can carry a range of anti-personnel and anti-armour warheads up to 6kg. It is fitted with an EO/IR gimbal.

There are at least half a dozen other Indian companies developing (mostly small) loitering munitions as India pushes to acquire these weapons – the Indian Army and Air Force have multiple requests for proposals for hundreds, including for carriage on armoured vehicles. Neighbouring Pakistan, on the other hand, is barely pursuing loitering munitions and is not believed to have taken any into service, although two companies (Integrated Dynamics and CavalAir Aerospace and Defence) have developed multiple fixed and rotary wing loitering munitions.

Taiwan

Taiwan has a strong UAV thrust, and this extends to loitering munitions. Its most important type is the Chien Hsiang anti-radiation loitering munition, developed by the National Chung-Shan Institute of Science and Technology (NCSIST). This can be launched from a truck-mounted battery containing 12 munitions, or from ships. The weapon has a range of 1,000km and five-hour endurance. It was first displayed in 2017; production of 100+ is ongoing.

On the smaller end of the scale, in March NCSIST unveiled its first portable loitering munition, featuring an endurance of 15 minutes and range of 10km, with EO/IR guidance and a high explosive warhead. NCSIST is working on larger versions with longer ranges. The new munition could enter mass production next year.

Conclusion

Loitering munition production by countries like Taiwan and upcoming acquisitions by nations such as Japan are set to double the loitering munition market from over US\$1 billion at present to US\$2 billion by the end of the decade. Since they are relatively cheap and accessible, they are spreading across global battlefields, becoming an essential tool in the military arsenal along with man-portable anti-tank and air defence systems. Perhaps their greatest sales pitch is the fact that in Ukraine, low-cost Iranian-made loitering munitions have done far more damage than the expensive hypersonic weapons Russia has fired.

The development of Israel's defence industry explained

Arie Egozi ♦ Tel Aviv

There are some major reasons why Israel, a small country that recently celebrated its 75th birthday became one of the world's main developers of very advanced weapon systems. Surrounded by much larger countries and with a relatively small population, Israel has had to rely on high technology to deal with a huge array of threats.

Local companies make small arms, APCs, main battle tanks, patrol boats, missiles of all types from soldier carried anti-tank to ballistic missiles, autonomous systems for ground missions, UAV's, loitering weapon systems and very advanced air defence systems.

This is a very long list.

Most of the military systems are exported to many countries around the world. It can be said that this industry has been built by one major factor – critical necessity that stems from the threats to the security of Israel from Muslim countries. Some are on the border and others - like Iran - are far away but with a wish to destroy the country.

The major catalyst for Israel's metamorphosis from a small-arms manufacturer to a producer of sophisticated military systems came after the 1967 Six-Day War. During this war, France imposed an embargo on arms sales to Israel, threatening the delivery of combat aircraft and naval assets.

For its survival Israel has had occasionally to use unusual actions to get the tools it needed to protect itself.

In 1968 the French company Dassault had finished production of the 50 Mirage 5s paid for by Israel, but the arms embargo imposed by the French government in 1967 prevented deliveries from taking place. The Israelis replied by producing an unlicensed copy of the Mirage 5, the Nesher (Eagle), with technical specifications for both the airframe and the engine obtained by Israeli spies.

During 1974, production of the Nesher was phased out in favor of a more advanced Mirage derivative which had been planned in parallel to the Nesher. This fighter aircraft was dubbed Kfir (young lion).

Israeli defence industries were often influenced by outside forces. On one hand these forces created hurdles but at the same time they forced Israel to be more advanced in developing its defence systems.

One very major such hurdle was forced on Israel when it decided to develop an indigenous fighter aircraft. Israel Aerospace Industries (IAI) was contracted by the government, and in 1986 the first prototype of the Lavi performed its initial test flight.

The US did not like the Israeli attempt to develop its own fighter aircraft and put heavy pressure to cancel it, partly out of concerns that it would be a direct competitor to the F-16. The program was duly cut in 1987.

The irony is that embargoes and US pressure were the factors that brought Israeli defence industry to the point where in 2021 total sales amounted to US\$11.3 billion – a staggering amount for such a small

nation. This has come about because the country has been compelled to develop many of its own solutions, which can then be exported.

This growth actually appears to be accelerating, with the number of new agreements signed in 2021 increased by more than 30% compared to 2020. Numbers for 2022 are not released yet, but sources here say that they will be higher.

Significant defence sales in 2021 include: missiles, rockets, and air defence systems (20%), training and training services (15%), UAV and drone systems (9%), radar and EW (9%), manned aircraft and avionics (9%), observation and optronics (5%), weapon stations and launchers (7%), vehicles and APCs (7%), C4I and communication systems (6%), intelligence, information, and cyber systems (4%), ammunition and armament (4%), services and other (2%).

The rate of export agreements between countries (government-to-government), signed by the Ministry of Defence has more than tripled, \$3.365 billion in 2021 compared to \$911 million in 2020.

To give a real-life example of how things work in Israel: on November 12, 2021, Captain (Reserve) Dan received an urgent call to immediately get to his reserve army unit, part of the IDF depth command. Two days later he and his unit members were far away, and performed a complicated mission that involved ground, air, and sea units.

The mission will be classified for the next 25 years but when Dan, an engineer specialising in unmanned systems, was back at his desk in the Directorate of Defence Research & Development (DDR&D). He immediately used his fresh combat experience, which resulted in a system that the IDF is currently using in special operations far from the country's borders.

That example is not exceptional. The DDR&D office, where many of the most cutting-edge, top-secret Israeli weapon systems get the first push that very quickly turns into a full development program, draws on combat experience. It employs a lot of reserve military personnel who bring their most current battlefield knowledge back to the lab.

The Iron Dome, David's Sling, and Arrow air defence systems are just a few of the most well-known initiatives that were conceived in this office and are now integral components of Israel's defensive strategy.

In a recent visit to the DDR&D, APDR was given an opportunity to get some idea about future programs. At this moment, most of what was demonstrated cannot be discussed publicly, but suffice to say that many of these devices appear to be more out of a science fiction movie than a

practical military tool.

Colonel Nir Weingold is the head of planning, economics & IT in the DDR&D. He told me that the organisation is now working with some local companies on developing systems comprised of different robotic platforms that can operate in harmony in the combat zone. He revealed that ELTA, the electronics subsidiary of Israel aerospace industries (IAI), was selected for the full development of one such system.

"This system is highly classified," he said. "What I can say is that the Americans have been briefed about it, and they are very enthusiastic. One of the advantages of this system is its open architecture that enables plug-and-play of different combat tools, but I cannot add to this".

Colonel Weingold said that as Israel is continuously involved in combat operations, what we call the "war between wars," the ideas flow all the time to his teams. The war between wars — meaning the Israeli operations against terror organisations and countries like Iran that try to use neighbors like Syria to attack Israel — is a never-ending source of ideas. Each idea is evaluated by the development teams.

"Each of these teams include reserve officers that, after serving in their units, come back to our laboratories with very clear ideas about what is needed today and tomorrow. We deal with all layers of the requested system — technological and operational. In air defence for example we look at detection, EW and intercept. This is the uniqueness of the department — we look at every possible angle with a focus on what we think will be needed in future combat."

The combination of the urgent need to answer very critical operational needs is what drives local industry. The best example is the operational three tiered defence system against rockets and ballistic missiles.

This system is comprised of the Rafael Iron Dome and David's Sling protecting Israel from short and medium range rockets and the Arrow systems designed to intercept ballistic missiles. As a personal note, in recent clashes with the Hamas terror organisation in Gaza, it was very comforting to hear the distinct sound of an Iron Dome interceptor killing a rocket that otherwise would have hit our location.

This three-tiered system is continuously being upgraded.

The major effort now is focused on the development of the Arrow-4 ballistic missile interceptor. The design is aimed at dealing with new threats posed mainly by the Iranian long range ballistic missiles.

An expert that spoke on condition of anonymity said "Israel needs to plan its missiles defence capabilities for many years to come. At this point there is no hypersonic missile threat, but when you design such an advanced interceptor, this capability should be included as some countries develop such missiles and in the Middle East you must expect the unexpected".

The development is jointly managed by the Israel Missile Defence Organisation (IMDO), in the DDR&D, and the US Missile Defence Agency (MDA).

Today Israel deploys the Arrow and Arrow-3. According to the MoD the Arrow-4 will be an advanced, innovative interceptor with enhanced capabilities. It will address a wide range of evolving threats and will replace the Arrow-2 interceptors over the next decades.

The Israeli achievements in missile defence and the new reality that Europe faces in the wake of the war in Ukraine brought Germany to ask Israel for the Arrow-3. The deal had to be approved by the US on the basis that it participated in the development of this ballistic missile

interceptor.

Another example – the Russian tanks in Ukraine are being hit mostly by simple anti-tank missiles that Ukraine received from the west. Israel has identified the danger to tanks and APCs from these weapons and developed two advanced active protection systems (APS) for armored platforms.

Rafael is making the Trophy, while Elbit systems in making the Iron Fist. The Trophy APS is now in big demand in some European countries.

Based on lessons from the war in Ukraine, Rafael has added a "silent mode" to its bestselling Trophy.

By using four passive Electro-Optic (EO) sensors that are incorporated inside Trophy's radar antennas, this silent mode can be activated. The Elta Systems EO Sensor, sometimes known as "Othello," is a simple-to-install addition to the present Trophy Radar Antennas arrangement.

Both freshly created and already deployed Trophy APS systems can simply be upgraded with the Silent Mode Capability thanks to the easy integration of the EO Sensor. This enables the armored vehicles crews to operate the radar only before the threat is detected so that the emissions of the radars do not help the enemy to detect the tank or armored vehicles from long ranges.

According to Elbit, it's Iron Fist APS offers 360-degree coverage against threats from a variety of ranges in open and urban environments. The system also gives the crew of the APC, situational awareness by alerting them to the presence and location of fire sources that could endanger the protected vehicle or the operational unit.

Elbit says that in short sensor-shooter engagements this capability is essential. The Iron Fist uses two launchers to enhance the kill probability of immediate threats.

Some years ago, the official name of the Israeli Air Force has been changed to the Air and Space Force. This change points to the use of space systems for the security of Israel. Most of this activity is highly classified but one aspect can partially be discussed.

Recently Israel has started to receive a steady flow of radar images from the payload of its newest spy satellite, the Ofek 13. About two weeks after the satellite's successful launch, the DDR&D's Space Administration engineering teams, IAI, and the IDF's 9900 unit activated the satellite's synthetic-aperture radar (SAR) for the first time. The satellite images received at the IAI control station were of excellent quality.

Since the satellite launch on March 29th, the IAI and MoD teams conducted a planned series of tests during which they gradually activated all of the systems and subsystems that comprise the satellite - including the SAR payload. The tests were successfully completed. The engineering teams will continue the rigorous testing process to prepare the satellite for operational use in accordance with the pre-planned protocol.

In addition to the very advanced Ofek 13, Israel has a relatively large number of locally made satellites in space. Most are equipped with imaging payloads, optical or radar based. Others are used for long range communications.

To answer a very critical need Israel is building a capability that will use swarms of mini and nano spy satellites. These will enable coverage of "areas of interest" almost continuously to detect, for example, preparations for the launch of Iranian ballistic missiles. When Israel's various satellites are mentioned, it should be noted that the launchers for the low orbit spy satellites are also manufactured locally.

Latest AUKUS outrage – buying towed array sonars from the US

Kym Bergamann ♦ Canberra

In the latest manifestation of AUKUS mania warping thinking inside Defence and government, Australia will hand over \$307 million (US\$207 million) to buy towed array sonar systems that could – and should – be made locally. There are some areas where we have world leading technologies – and sonar is one of them.

As well as decades worth of research and development undertaken by the old Defence Science and Technology Organisation, an enormous amount of expertise has accumulated in local companies such as Thales Underwater; Sonartech Atlas; Acacia; and Ultra – just to name the major players. In the 1970s and 1980s two slim line towed array sonar systems were developed in parallel, code named Kariwara and Narama, which were better than anything previously attempted.

In the 1990s under project SEA 1100 (Australian Surface Ship Towed Array System – ASSTASS) we built an indigenous low frequency active-passive towed array sonar system, originally sponsored by the legendary Commander Daffy Donald and subsequently managed by the almost equally legendary Jim Manson.

Australia exports sonar hardware and software for use on the nuclear-powered and armed submarines of the US, UK and France. Thales sonars equip ANZAC frigates; those from Ultra are on the Air Warfare Destroyers – and both are working on the underwater warfare systems of the future Hunter class frigates.

The impending purchase of SURTASS-E has left local industry totally gobsmacked – and for the moment no one is commenting publicly until they find out what is going on. Apparently, people only heard about this when the US Defense and Security Cooperation Agency sent the following obligatory notification to Congress on May 4:

“The State Department has made a determination approving a possible Foreign Military Sale to the Government of Australia of Surveillance Towed Array Sensor System Expeditionary (SURTASS-E) mission systems for Vessels of Opportunity (VOO) and related equipment for an estimated cost of \$207 million. The Defense Security Cooperation Agency delivered the required certification notifying Congress of this possible sale today.

“The Government of Australia has requested to buy Surveillance Towed

Array Sensor System Expeditionary (SURTASS-E) mission systems for Vessels of Opportunity (VOO); a shore processing mission system, a spare SURTASS passive acoustic array; containers; communications parts and support equipment (Classified and Unclassified); software (Classified and Unclassified); publications (Classified and Unclassified); training; US Government and contractor engineering support; and other related elements of logistics and program support. The estimated total cost is \$207 million.”

APDR understands that this system is to equip a second commercial offshore vessel that Defence acquired on the sly a few months ago – only confirming the multi-million dollar purchase after being busted by the media. This second-hand ship will apparently be used for underwater warfare research activities – though why the feasibility of building something similar in Australia was not considered is a total mystery.

Why Defence Minister Richard Marles and especially Defence Industry Minister Pat Conroy could think that this is a good idea is unknown. When this recommendation came over from the Department it should have sent alarm bells ringing because it's probably more about lavish postings to Washington than it is about capability.



*HMAS Ballarat patrols her assigned search area during the search for missing Indonesian submarine KRI Nanggala.
Credit: CoA / Ernesto Sanchez*

An earlier online version of this article pointed out that the RAN made an attempt to purchase SURTASS about two decades ago – but was blocked from doing so on environmental grounds. It transmits on a frequency known to disturb marine mammals – unlike the French-Australian CASSTASS Low Frequency Active Variable Depth Sonar then in use.

However, there is public domain information available suggesting that SURTASS-E is an entirely passive system. If so, the whales and seals are safe for the moment – but it is the Australian sonar industry that faces extinction.

The expenditure of more than \$300 million – probably equal to Australia's annual spend on domestic sonar technology – would go a long way towards keeping local industry world competitive. If SURTASS is passive-only that makes the situation even worse because we are paying a fortune for a few bits of towed cable – which is cheap and locally made – plus a bit of processing.

The SURTASS-E purchase is sheer madness. If the government wants to retain any credibility for its claims of supporting Australian industry, this decision needs to be reversed – now.

Bushmaster awaits comms fit

Tim Fish ♦ New Zealand

The arrival of an initial batch of 18 troop carrying variants of the Bushmaster NZ5.5 protected mobility vehicle (PMV) in New Zealand will give the NZ Army a considerable uplift in soldier protection.

However, the full vehicle C4 communications suite will not likely be installed in the Bushmasters until 2025-26. In the meantime, an interim radio system will be fitted in a small number of vehicles within the next few days to allow training on the vehicles to begin.

Sarah Minson, deputy secretary, capability delivery at the NZ Ministry of Defence (MoD) and lead for the Protected Mobility Capability Project (PMCP) Phase One told APDR that a tender for the Bushmaster C4 system would be released by the middle of the year.

A spokesperson from the NZDF told APDR that the funding for the C4 system comprises “about \$58 million in capital and \$32 million in operating funding over four years.”

Minson said whichever product is eventually chosen the vehicles would receive the new equipment in the 2025-26 timeframe.

It likely means that the Bushmasters will not be available for operational deployment until this time.

However, Minson added that she hoped the selected supplier would be able to fast track the installation of a smaller number of radios in some Bushmasters to allow an earlier introduction of the new communications capability and to achieve an initial operational capability.

The arrival of the 18 vehicles announced by New Zealand defence minister, Andrew Little at Trentham Military Base on 25 May is the first instalment of an expected 43. A second batch of seven vehicles were also due to arrive that day completing the consignment of 25 troop-carrying variants.

Additional vehicles will arrive in the coming months that will comprise four ambulance variants, 10 Command and Control (C2), two logistics and two maintenance variants and the order of Bushmasters under PMCP Phase One will be completed in September.

Little said that the vehicles will undergo testing and certification before being sent to home bases around New Zealand. The NZ Army's Queen Alexandra's Mounted Rifles (QAMR) regiment is expected to receive the lion's share of the Bushmasters as an armoured regiment that is part of the Royal New Zealand Armoured Corp.

The 43 vehicles will replace the NZ Army's existing fleet of 60 armoured Pinzgauers. According to QAMR commander Lt Col Jacob Murray the QAMR is “poised to play a central role” in the regeneration of land combat capability in the NZ Army.

The service is at the start of a three-year program to re-constitute its skills following its commitment to Operation Protect supporting the NZ government's response to the Covid-19 pandemic. During this time collective training from battle group level through to sub-unit level was cancelled or postponed and key capabilities were allowed to atrophy.

Exercise Torokwom 22-26 November 2022 was the first major combined arms exercise that the NZ Army had performed since Exercise Alam Halfa in 2019. The plan is to regenerate most of its military response options by



NZDF Bushmasters (Tim Fish photo)

mid-2025 and achieve pre-pandemic levels of activity by December 2027.

The Australian Army is expected to assist with this effort under the Plan ANZAC Bilateral Cooperation Plan, launched on 17 April, whereby the NZ Army will adopt Australian training and doctrine. The aim is to have a New Zealand Motorised Infantry Battle Group integrated within an Australian Army Brigade.

New utility vehicles (UVs) are also being procured under PMCP Phase One to replace the NZ Army's fleet of ageing Unimog trucks and 321 soft-skinned Pinzgauer vehicles.

“Work to replace the operational Unimog and non-armoured Pinzgauer vehicles continues. The current Request for Proposal closes in June,” Minson said, “The Request for Proposal encompasses approximately 230 UVs, both medium and light, which will need to be easily deployable and able to move people, equipment and supplies in difficult environments, such as a natural disaster. No decision on potential replacement vehicles is expected until 2024.”

This is a delay on the schedule outlined in the original procurement notice and Request for Information published in 2021 where planned deliveries of UVs was due across the 2023-24 timeframe.

The NZDF is looking for an off-the-shelf purchase of 106 UV-Medium (UV-M) and 99 UV-Light (UV-L) vehicles. The UV-M is to be delivered in five variants: cargo (30), troop-carrying (30), maintenance support (19), command post (18) and ambulance (9). It must have a 2-4 tonne payload with space for four crew and equipment. The UV-L order will be divided into 64 general service and 35 command and liaison variants. It will have a payload capacity of 1,400kg and space for a crew of 2-4 personnel.

Phase 2 of the PMCP upgrade or replace the NZ Army's 8x8 Light Armoured Vehicle (LAV). New Polaris MRZR-D 4x4 all terrain vehicles have already been delivered under PMCP.

The MoD's Defence Capability Plan 2019 allocated a total cost of NZ\$300-600 million for the PMCP but it is likely that numbers and timelines will be revised in the new Defence Policy Review (DPR).

Little said that the first elements of the DPR – the Strategic Assessment and the Future Force Design Principles – would be “due in the next couple of months.”



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News from across the Tasman

Geoff Slocombe ♦ New Zealand

NZ Defence Budget May 2023

The overall purpose of the New Zealand Defence Force (NZDF) and the Ministry of Defence is to provide for armed forces to be raised and maintained for:

- The defence of New Zealand and the protection of its interests, whether in New Zealand or elsewhere;
- The contribution of forces under collective agreement; and
- The contribution of forces to United Nations or other organisations or states for operations in accordance with the principles of the United Nations Charter.

The 1990 Defence Act also makes provision for the Defence Force to perform any public service or to assist the civil power in a time of emergency – both within New Zealand and elsewhere.

A current problem, being addressed as his top priority by Defence Minister Andrew Little, is that personnel are leaving the NZDF in droves. The NZDF, like others internationally, faces a recruitment crisis and has lost a net 10 percent (about 900) of its uniformed staff in two years.

A major Defence funding announcement, three days before the formal 17 May overall New Zealand Budget was released to Parliament, was claimed to deliver the biggest military pay increase in over a decade.

Minister Little announced a \$419 million boost to Defence's payroll, with personnel expected to receive pay increases of between \$4000 and \$15,000 depending on their rank, role and service branch. This will start from July 1 this year.

"High rates of staff turnover, as well as increasing calls on the NZDF such as responding to Cyclone Gabrielle in New Zealand, training Ukrainian troops in the UK, and surveillance and patrolling in our region means our forces are stretched," Little said.

The Minister said that "there is a moral obligation to ensure our soldiers, sailors and aviators are fairly paid for the critical and often dangerous work they do, and the Government takes that responsibility seriously on behalf of all New Zealanders".

In the Budget package there is also a further \$328 million for upgrading Defence Force assets and infrastructure, including \$90 million to deliver upgraded aviation fuelling facilities at Ohakea, and \$93 million will provide world-class communications to our frigates and new Bushmaster protected mobility vehicles.

"\$85 million to improve Defence housing, with up to 50 new buildings at Waiouru, and a renovation pilot for 13 properties at Burnham, Linton and Ohakea," Little said. "Many personnel and their families are asked to move between bases to serve and it is important the housing provided is suitable to support them to do their jobs."

(Note: All financial figures are in \$NZ. Currency conversion 19 May 2023 \$NZ1000 = \$A932 = \$US623)

New Zealand-China Strategic Defence Dialogue

On 10 May 2023, the New Zealand-China Strategic Defence Dialogue took place in Xi'an, China.

This event is a regular officials' level meeting. The Dialogue was led for New Zealand by Vice Chief of Defence Force, Air Vice-Marshal Tony Davies, and Ministry of Defence Deputy Secretary Policy and Planning, Richard Schmidt.

Apparently, the Dialogue was cordial and offered a useful opportunity for both sides to exchange perspectives on regional security issues. Further dialogue and cooperation at existing multilateral fora were also discussed.

The New Zealand-China Strategic Defence Dialogue is one of a wide suite of regular engagements that the New Zealand Defence Force and Ministry of Defence undertake with counterpart organisations internationally.

This meeting is the 11th iteration of the Strategic Defence Dialogue between New Zealand and China.

While the Strategic Defence Dialogue is an annual engagement, the 11th meeting is the first to take place since 2019, due to the interruption in regular Defence engagement activities that occurred as a result of the COVID-19 pandemic.

Valuing the indeterminate?

The New Zealand Institute of Economic Research (NZIER) has provided a summary for NZDF earlier this year of the key research findings on the value proposition of the New Zealand Naval Combat Force

Research shows that it is possible to estimate the economic value of military capabilities such as the frigate force from a range of perspectives: Cabinet Ministers, security experts and ordinary Kiwis.

- Placing an economic value on defence forces is something that has been discussed in the literature but never attempted before. This study is an original contribution to knowledge.
- Though initially sceptical, we have become increasingly confident about applying this task to the frigate force as we proceeded from a scoping phase to a pilot and then a proof of concept.
- In the final phase, we applied three different approaches to value the Naval Combat Force (NCF). These were from the perspective of Government Ministers, ordinary Kiwis and security experts.
- Our estimated valuations are ballpark estimates presenting a range of estimates.
- We expected the different perspectives to yield very different valuations – as we had found that Kiwis and experts had quite different preferences in the proof-of-concept phase.
- We found remarkably consistent valuations as that while different stakeholders valued different attributes all placed a significant economic value on the NCF in the range of \$NZ 3.5B–\$NZ 10B over 30 years.
- Like any experimental, leading-edge research, this finding is subject to caveats and cautions which are outlined in the Report.
- The research suggests that valuing defence forces is not an indeterminate issue and further refinements are possible.

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