Lockheed Martin Australia
A Fully Integrated Future Force
Table of Contents

Executive Summary .......................................................... 3
A Fully Integrated Future Force ........................................... 5
1. Leverage advanced technologies to integrate ‘5th Generation’ capabilities and enable the ADF to operate in highly complex, future warfare environments. ......................... 5
2. Develop and sustain robust in-country industrial capabilities that are critical to sustaining and upgrading Defence Capabilities throughout their service life............................... 7
   2.1 People ............................................................. 7
   2.2 Industry Support................................................. 7
   2.3 Investment ....................................................... 9
   2.3.1 Power of Quantum......................................... 9
   2.3.2 Training, Simulation and Experimentation .......... 9
   2.3.3 Better Collaboration for Future Submarine (SEA1000) 10
3. Realise further efficiencies through a Whole of Government approach to delivering core services. ......................... 11
   3.1 Wider Collaboration ......................................... 11
   3.2 Service Based Contracts...................................... 12
4. Enhance our regional leadership position by developing, operating and sustaining a situational awareness capability, able to support Humanitarian Assistance Disaster Relief (HADR) operations. ................................................. 12
Conclusion .......................................................................... 13
Executive Summary

In formulating its 2015 Defence White Paper, the Federal Government invited interested parties to provide input through the Defence Issues Paper process.

As part of Australia's established defence industry base, Lockheed Martin Australia (LMA) welcomes the opportunity to provide Government with some ideas that it may wish to consider as it develops the White Paper.

LMA’s submission outlines several key pillars that we believe would benefit the Australian Defence Force (ADF) in its ability to deploy, operate and sustain its capabilities and provide an environment and platforms to attract the workforce of tomorrow into the organisation. If requested, LMA would be pleased to work with the Federal Government and/or Defence to mature these ideas.

Ultimately, the suggestions we offer in this submission would, we believe, deliver a more capable and sustainable ADF.

In response to the Defence Issues Paper invitation, LMA offers four areas for consideration:

1. Integration of ‘5th Generation Capability’. Through the use of contemporary network systems, the ADF can effectively integrate its older generation assets while maximising the capabilities of new, 5th Generation platforms.
2. Robust in-country industrial capabilities. A focus on people, effective industry support and targeted opportunities for investment will create a strong industry base for Defence capability into the future.
3. Whole of Government Approach. Leveraging versatile defence industry capabilities and business models can strengthen a Whole of Government approach to advancing the national interest.
4. Regional Leadership. Australian defence industry is capable of supporting Australia’s regional leadership and furthering regional stability.

Adopting the key pillars approach will not only deliver a more capable and sustainable ADF overall, but will enable the ADF to advance its transformation to a joint construct. Such an outcome will result from investing in people and technological innovation to complement the generational shift that is already occurring. This transformation would be enhanced by building a deeper relationship and collaboration with industry and academia in pursuit of innovation, and allow lower costs through smarter solutions.

Lockheed Martin Australia appreciates the opportunity to contribute to debate on Australia’s future national security priorities. We formally submit these pillars for Government consideration, and consent to their publication.

Returns to be directed to:
Lockheed Martin Australia Pty Ltd
C/- Head of Government Relations
Lockheed Martin Centennial House
A Fully Integrated Future Force

1. Leverage advanced technologies to integrate ‘5th Generation’ capabilities and enable the ADF to operate in highly complex, future warfare environments.

Australia’s geography, demography and economic base dictate that it will continue to have a smaller military than many countries in the region. Nevertheless, a review of Australia’s current ‘Order of Battle’ and the 2012 Defence Capability Plan details the ADF’s plans to continue its platform upgrade and enhancement program in order to maintain a regional capability edge.

However, the ongoing challenge for defence planning remains the need to deploy and operate platforms and systems that are based on capabilities and technologies from different generations. In LMA’s view, the ADF must look beyond individual platforms and systems and seek to integrate them into a networked capability. Future Defence operators will need to deploy and harness the multiplying effect of a contemporary, fully integrated Command, Control, Computers, Communications (C4) Intelligence Surveillance and Reconnaissance (ISR) system.

Contemporary systems can seamlessly collect, collate, fuse, visualise and disseminate multi-sensor, multi-system data and information. Now is the time to address this series of integrating functions ranging from real-time decision making, to near real-time analysis and tasking and other supporting functions. Importantly, advanced systems will need to be integrated into a C4ISR network to deliver operational outcomes or effects in a timely, precise manner. The networked C4ISR system must be capable of delivering outcomes and effects in each of the operating domains, namely: air, land, maritime, cyber and space. Improved C4ISR will provide greater understanding of an evolving operational environment to enable more informed decisions to be made and facilitate efficient and effective directed responses.

The F-35 with its impressive suite of ISR capabilities provides a catalyst for a thorough review of enabling systems with a view to achieving the long sought after networked warfare goal. Appropriately protected enabling systems will support transfer of critical data from the strategic level through to the tactical edge. A backbone of enabling information systems is required to leverage on-board capabilities, from loading the necessary electronic warfare and geospatial data ahead of a mission, to the post mission download of newly acquired information for subsequent analysis. Maximisation of the ISR capabilities of high performance platforms relies on modern capable infrastructure and well-trained technical personnel.

A central benefit of 5th Generation capability for commanders and operators is greatly enhanced situational awareness of the battle space. This is achieved through the fusion of internal and external sensor information and the ability to share the fused information with other platforms and C4ISR systems. For example, the F-35, using its stealth and low probability of intercept communication links, can penetrate heavily defended environments to gather information and/or target enemy forces undetected while communicating key information with other platforms.
Critical to these enablers will be the enhanced communication capabilities, such as low probability of intercept datalinks and large bandwidth datalinks that will enable networked operations between maritime, land and air assets. An enhanced Command and Control structure and connectivity is required to ensure forces can be tasked and re-tasked to meet emerging threats and opportunities. In the future the Air Warfare Destroyer, Future Frigates, Future Submarines and vital Army units need to be able to connect via the C4ISR network to ensure that they can both contribute to the common operating picture as well as use externally generated information from any systems such as F-35, Wedgetail and UAVs.

Further exploitation of the technology advantages of 5th Generation upgrades to ground based systems will ensure better prepared fighting forces. More accurate mission intelligence data loaded to onboard systems will support more effective post mission analysis of the terabytes of data downloaded from platform mission systems. Therefore, the ability to have access to accurate, timely data and to rapidly process that data is key to maximising the capability of the operational community.

By employing and leveraging 5th Generation capabilities into modern C4ISR systems, we believe Defence can significantly increase the capability of older, legacy platforms to be able to operate in a more complex environment with increased situational awareness.

The ability to support and operate in space provides a distinct and often survivable operational advantage. Assets deployed in space add a unique layer of data and information that enhances situational awareness and operational confidence. For example, GPS-facilitated targeting significantly increases the effectiveness of deployed weapons, reduces the instances of faulty targeting and the potential for collateral damage. Satellite-based protected communication links deliver seamless secure communications in contested environments, over broad areas across the battlefield. Additionally, space-based sensors enable detection of time-critical incidents thus enabling maximum consideration and response times.

Whether it is space-based sensors, space-enabled communications, weapons that deploy from or through space, system critical Positioning Navigation and Timing information or simply space-enabled transport, future C4ISR systems must be capable of integrating, tasking and managing these key systems and their often time-sensitive, unique-perspective information.

By harnessing the benefits, pervasiveness and reach of space-based assets the ADF will significantly improve the effectiveness of its C4ISR system and importantly optimise the operational effectiveness of its assigned assets to multiply the capabilities of a small force.

Harnessing the benefits of 5th Generation capabilities, across all environments, and other key modernisation processes, will contribute to a more capable and flexible ADF meeting the spectrum of government requirements in the region, from military diplomacy to Humanitarian Assistance Disaster Relief (HADR).
2. Develop and sustain robust in-country industrial capabilities that are critical to sustaining and upgrading Defence Capabilities throughout their service life.

2.1 People

LMA strongly believes that advancing science, technology, engineering, and mathematics (STEM) education is critically important to enabling future Defence capabilities. The ability for Australia to maintain a robust industrial capability and a technological advantage depends on a constant supply of highly trained, highly capable and highly motivated technical talent. This can best be achieved by advancing STEM education and establishing relevant and sustainable career pathways to attract and retain a skilled Defence sector workforce.

STEM skills include problem solving, critical and innovative thinking, numeracy and rigorous analysis. These skills are relevant and beneficial in a multitude of applications including but not limited to optimisation and alignment of business processes, organisational agility and applied innovation.

To take advantage of such skills another option would be for Defence to ‘facilitate’ commercial relationships between academia and industry with the aim of developing unique skills and/or technologies required to satisfy future Defence needs. The program could be an extension of the current Capability Technology Demonstrator program or a derivative of the program with both academia and industry sharing in any benefits resulting from future commercialisation.

Typically, the skills and experience of military personnel do not naturally link to the skills and experience of a commercial business manager. While the complementary nature of this relationship has many benefits, a lack of a common understanding of key business drivers, both military and commercial are often a source of misunderstanding and contention. One way to address this is to create opportunities that promote a greater common understanding of these drivers. To that end, the ADF may wish to consider adopting an ‘industry immersion’ program for selected Defence personnel noting DSTO already do something similar with its personnel. This program would aim to develop and enhance the commercial acumen and experience of selected ADF members, while at the same time creating an opportunity for the commercial sponsor to gain a greater appreciation for military drivers. Under the program, selected military members would be posted for an agreed period of time to a commercial company and fully integrated into their management team. The proposal would be to expose the ADF member to agreed key commercial roles to enable the member to gain exposure to commercial governance and dealings.

LMA believes this type of emphasis can produce results in enhanced policy cohesion and adherence to value for money principles, producing improved outcomes for both government and industry and for the Australian population.

2.2 Industry Support

The Department of Defence has made numerous program investments to assist industry engagement and LMA supports the continued funding of programs that are of direct and ongoing benefit to Australian industry. Programs such as Skilling Australia’s Defence Industry (SADI) and the Global Supply Chain (GSC) are examples of initiatives that LMA strongly supports, as they promote an enduring
partnership with Australian industry. The GSC program in particular receives tremendous support and expert assistance from the Defence Materiel Organisation (DMO) and the Defence Industry Innovation Centre (DIIC) and ongoing funding to these organisations, in LMA’s opinion, is vital to the future success and competitiveness of the Australian Defence industry.

Further, Defence and industry focus on innovation, research, development and commercialisation pathways for new technologies could create enhanced strategic value, particularly for those pathways deemed of strategic importance to the Australian Government in the next 20-40 years. Lockheed Martin has global leadership history in assisting with the development of such commercialisation pathways and is already working in partnership with governments to assist the STEM agenda, in recognition of its important role in enabling readiness of both Defence and industry against future challenges.

A sincere endeavour by all parties to create the settings for a more genuine and transparent partnership between Defence and industry would assist the productivity outputs sought. A globally competitive defence industry capability is important to ensuring the longevity and success of Australian Defence. The nurturing of this capability rests with prime contractors, government (at all levels), industry associations and other aligned organisations tasked with representing industry members. Together we can effect positive change, via targeted assistance, training and exposure of Australian industry to international export markets.

LMA is keen to support and collaborate with local industry and has developed a strong relationship with a range of companies within the many programs we are currently involved with in Australia. There is also a drive into global STEM programs and cutting edge innovation through collaboration with a number of Australian universities on niche technological advancements. This kind of research and development is core to LMA’s customers’ needs to ensure the correctly trained people are available to deliver the required products and services. Therefore, if industry can anticipate the future needs of Defence better it can help to design and invest in the future skills needed to offer integrated solutions. As a demonstration of our current industry support activities Lockheed Martin signed its Global Supply Chain (GSC) Program Deed in 2011 and has since awarded approximately $13M USD in contracts to Australian small-to-medium enterprises and research and development communities.

In addition to the GSC program Lockheed Martin Aeronautics has signed an Industry Program agreement with the Australian Government as part of the Production Sustainment and Follow on Development Memorandum of Understanding to provide F-35 production work to Australian companies. To date, over 28 companies have been involved in the program with a total contract value in excess of $400M AUD. A number of the companies have been able to win additional work with other areas of Lockheed Martin as a consequence of the capabilities developed to meet F-35 production standards. For example, Quickstep has subsequently won contracts for composites work on the C-130J worth several tens of millions of dollars. The potential value of the F-35 production contracts for Australian companies is in excess of $6B AUD. This represents a major growth opportunity to Australian industry allowing them access into the global market as the above mentioned are all export
focused activities. This example simply illustrates what is possible when incentives to leverage local talent are utilised.

One area of investigation Defence may wish to examine is for a way to assist new market entrants into the defence industry. For example, as a first step, before attempts are made to connect the small-to-medium enterprises to the global supply chain through the GSC program or other initiatives, Defence may consider ways to incentivise universities to increase their early outreach to nurture defence innovators and entrepreneurs to assist these innovators on the path to industry applicable commercialisation.

2.3 Investment

LMA has identified the following areas which the ADF may wish to consider as a priority for future investment.

2.3.1 Power of Quantum

As a consequence of rapid increases in the complexity and integration of military systems, a wide range of time critical mathematical and logic based problems associated with analysing, verifying and computing the myriad and volume of available data will become intractable with present computational techniques. LMA believes that in the future, critical systems will become so complex that problems will take too long or become too expensive to solve using even the most powerful supercomputers. Quantum computation is inherently faster than classical computation at verifying software algorithms, analysing large data sets, and optimising problems of all sorts. Application of quantum computation to these problems will significantly reduce the rate at which Defence requirements for computational resources will increase providing an inherent efficiency.

Quantum systems are immensely sensitive to their surrounding environment. This makes building a quantum computer difficult, but enables an array of incredibly sensitive measuring devices for light, chemicals, electric and magnetic fields, and a host of other natural and man-made phenomena. Demand for greater sensor capability will drive future devices to be based on quantum principles that are now exploited in the laboratory but are currently in need of several years of concerted development effort to put in the field. Further applications of applied quantum physics to energy storage, communications and cyber security remain developmental but advances in the more mature areas of quantum sensors and quantum computation will help to bring these possibilities closer to reality for Defence for future benefit.

2.3.2 Training, Simulation and Experimentation

To ensure the optimal use of highly technical platforms, systems and capabilities, effective and efficient training packages need to be established. Modern weapons systems designed to meet complex threat environments need robust training systems to ensure crews are exposed to the full spectrum of threats and situations likely to test them in real life. Hence, personnel aspects of capability, including advanced training, must be a key focus to timely introduction into service of new
Currently, fighting units need to travel vast distances to train with more advanced, often overseas based Defence Forces, in dedicated and sophisticated training ranges. Further, most high value assets such as Wedgetail and Growler aircraft, Anzac Class frigates or Collins class submarines are only available in limited numbers in most forces. To address the future need for training future operations, LMA recommends Defence continue developing a training system that enables units to train extensively without the need to travel or the need to overwork scarce assets. One avenue for this is through the expansion of Live, Virtual and Constructive (LVC) capability as envisioned when the Joint Combined Training Capability was initially established, bringing cost and service synergies to the ADF. Modern systems are designed to manage high intensity environments and unless there is an ability to stress the system operators in realistic scenarios they will not learn how to gain the greatest benefit from that system. LVC can overcome these limitations of scarce assets by providing scenarios entailing the right combination of live, virtual and constructive entities to ensure the systems and personnel are thoroughly tested. Sophisticated ranges also provide for live work-ups with our allies prior to any live operations.

The best way to determine how Defence should employ its latest capabilities is to conduct experimentation to test the ‘art of the possible’. For the ADF to maximise the effectiveness of its new capabilities, it is critical for units to experiment with these capabilities to determine optimal employment regimes and interoperability with other joint or coalition capabilities. A robust experimentation capability that enables all ADF current and future/proposed systems will ensure the correct selections are made with respect to platform choice as well as operational concepts.

2.3.3 Better Collaboration for Future Submarine (SEA1000)

Future Submarine (SEA1000) will be the largest and most complex Defence program ever undertaken by Australia. The current machinery of government is more geared to limited project management approaches. LMA believes the Future Submarine acquisition will demand a more comprehensive program management approach, including the use of industry experienced program managers.

Regardless of the platform chosen or where it is built, Australia has a vital interest in retaining sovereign capability with respect to certain aspects of the combat system of its future submarines. Australia is likely to have specific requirements imposed by mission types, such as security, interoperability, self-reliance and legislation. These requirements, especially the software development and integration must be accommodated by the combat system integrator to reflect the configuration of the sensors and weapons of the future submarine. Australia has the technical need to ensure the reliable supply of its specialised equipment and to have the ability to satisfy its unique requirements.

LMA understands and supports Australia’s desire for United States (US) combat system and weapons, noting some tailoring to meet Australia’s requirements. This tailoring would most effectively be initially accomplished by a US combat systems integrator. Consequently LMA’s position is that Australia, in order to protect its own sovereignty, must eventually have an indigenous capability in combat system
software development and integration, but suggest this capability should be one that is developed in co-operation with a US combat systems integrator.

Associated with the development of this capability is the establishment of a domestic infrastructure to bring together the appropriate resources. For example, the US model for achieving this is composed of four overarching organisations. LMA recommends Australia consider how these four organisations operate and are managed in the US model and then tailor its infrastructure formation to meet its SEA1000 requirements.

3. Realise further efficiencies through a Whole of Government approach to delivering core services.

3.1 Wider Collaboration

The challenges of future threats to our nation are not going to be only borne on the shoulders of Defence. Australia requires domestic interoperability and clear inter-departmental protocols in times of national interest, national crisis or national threat to better align the deployment of agile and responsive capability within the nation’s borders. This interoperability also needs to be capable of supporting a variety of responses covering natural disasters through to domestic terrorism.

Defence industry with its experience in meeting the distinctive requirements of complex, high technology, safety critical systems for employment in the most demanding of environments, can and does apply its skills to Whole of Government (WoG) challenges effectively. The complex program management, systems engineering, Information and Communications Technology (ICT) and other technology intensive skills that defence system integrators have developed over decades can be leveraged across the WoG challenge.

Australian defence industry continuously applies its processes, technology and, most importantly, highly skilled workforce to ensure that Defence capabilities procured overseas can be adapted as required to meet the Government’s particular requirements. Equally, Australian defence industry provides indigenous solutions to meet complex problems, such as sovereign C4ISR requirements, to ensure that the particular needs of the ADF, driven by geography, capability mix or operational imperatives, are met. This industry base also provides support to other government departments and is an incubator for unique and more generalist high technology skills within Australia.

With Government seeking both innovations in technology and commercial models, defence industry has demonstrated its capacity and willingness to adopt new business models to draw lessons from other sectors and partner with Defence to apply these lessons to meet the challenges faced. Therefore, Defence might consider more service based contracts with closely monitored Service Level Agreements to ensure deliver of capability in a more timely and affordable way.
3.2 Service Based Contracts

Service based contracts are of benefit to give a degree in flexibility and cost control. As an example, LMA has teamed with a range of Australian based Information Technology (IT) leaders, including small-to-medium sized enterprises for the Defence Chief Information Officer Group (CIOG) Centralised Processing Project. In this project, LMA will utilise lessons learned from its previous experience in government IT outsourcing contracts to rationalise Defence’s data centres and migrate applications using best practice commercial models. Using Lockheed Martin’s experience in supporting the US Government’s IT needs, as well as the mature LMA/Australian Tax Office IT partnership, exemplifies where Defence industry can apply skills developed across a variety of contracts to provide a consistent approach to large Australian Government IT users.

The Federal Government’s WoG procurement approach offers the potential for significant efficiencies in key administrative functions. Where appropriate, a WoG approach promises economies of scale and consistency in pricing and goods offered. Through expanding the baseline, industry can offer services with the benefits of economies of scale and a broader work scope upon which to build and sustain a suitable trained and skilled workforce. Importantly, from an industry perspective, establishing relevant Service Level Agreements often results in reduced costs and improved efficiencies in delivering the required services.

4. Enhance our regional leadership position by developing, operating and sustaining a situational awareness capability, able to support Humanitarian Assistance Disaster Relief (HADR) operations.

Australia’s position in the region, combined with its political will, financial strength and technical capacity, provides it with an ideal opportunity to take a leadership role in the region. LMA believes that Australia, through the ADF, is in a position to implement a regionally networked, ‘situational awareness’ system that could deliver a ‘regional picture’ for all subscribers to use as a baseline for monitoring daily operations, coordinating search and rescue activities, and monitoring regional ship and aircraft movements.

LMA proposes that the ‘regional picture’ comprise open source air and maritime traffic information that would be developed, maintained and shared with contributing nations. Specifically, nations could provide air and maritime flight and shipping plans, automatically collected track data from the various beacons and transponders that are already fitted to most platforms, along with other supporting information. Ideally, each of the nations within the region would contribute suitable data and supporting information that would be correlated and redistributed.

The ‘regional picture’ could be complemented by local environmental information such as weather, seismic or maritime forecasts to provide an enhanced situational awareness. Regionally, the benefits of collating and disseminating such a ‘regional picture’ include improved regional cooperation and awareness, cross-border monitoring, situational awareness, security of trade, search and rescue, and disaster warning and recovery.

Additional benefits for Australia include regional confidence building, regional burden
sharing and extended regional awareness.

**Conclusion**

Lockheed Martin Australia offers the above submission for consideration. We have identified key pillars to enable the ADF to achieve its mission statement “to defend Australia and its national interests” against any future threat. In particular these suggestions are intended to demonstrate at a high level how additional benefit can be leveraged from people, technology, platforms, processes and plans.

Adopting the key pillars approach will not only deliver a more capable and sustainable ADF overall, but will enable the ADF to advance its transformation to a joint construct. Such an outcome will result from investing in people and technological innovation to complement the generational shift that is already occurring. This transformation would be enhanced by building a deeper relationship and collaboration with industry and academia in pursuit of innovation, and allow lower costs through smarter solutions.

Lockheed Martin Australia appreciates the opportunity to contribute to debate on Australia’s future national security priorities. We formally submit these pillars for Government consideration, and consent to their publication.