~ Submission ~
2015 Defence White Paper
Securing Engineering, Science and Technical Capability in Defence
Dear White Paper Team,

RESOLVING THE TECHNICAL SKILLS GAP IN DEFENCE

On behalf of Professionals Australia members working in Defence, I thank you for the opportunity to submit this response to the 2015 Defence White Paper.

Professionals Australia is the association representing technical professionals working in engineering, science and technology within Defence. Our members are located across Australia and are involved at varying levels throughout the Defence organisation.

Firstly, we appreciate the Government’s commitment to improving “Australia’s long-term Defence capability” through the First Principles Review and the White Paper – Professionals Australia shares this commitment. This is a great opportunity to address the current inadequacies within Defence; mainly, a divestment in internal technical expertise.

It is Professionals Australia’s belief that internal technical expertise is the most fundamental component in Defence capability, and investment in maintaining and growing the engineering, science, and technological skills within Defence should be a key focus of the 2015 Defence White Paper.

In this submission I hope to present the 2015 Defence White Paper team with sufficient evidence to demonstrate that there is a skills gap within Defence, what the risks of this skills gap are, and with a range of solutions.

Your consideration of this submission and its recommendations is greatly appreciated.

Should you wish to discuss this submission further, please do not hesitate to contact me.

Sincerely,

Chris Walton,
Chief Executive, Professionals Australia
Executive Summary

Professionals Australia (formerly APESMA) understands the importance of the First Principles Review and the White Paper, and the wide-ranging consequences should the Government’s response be inadequate or ill-informed.

Professionals Australia has a strong commitment to co-operating with organisations to improve and maintain workforce capability. We are a founding member of the Australian National Engineering Taskforce. We have worked cooperatively with leadership across Defence in relation to the importance of in-house engineering and science capability. This is reflected in the joint communique (Appendix A) from Professionals Australia and Defence leadership to the technical and engineering job family.

Professionals Australia has undertaken an extensive survey of our membership working in Defence, held face-to-face consultation sessions and conducted an exhaustive audit of existing reports into Defence capability.

The findings of these activities inform the recommendations detailed in this submission. Our members’ insights and references from previous reports are cited in this submission.

Professionals Australia represents technical professionals working in engineering, science and technology across Defence. This submission focuses on the civilian Defence workforce. We acknowledge the important roles of both the ADF workforce and Defence industry workforce. The civilian workforce provides a critical continuity and cost-effectiveness that has traditionally underpinned the key engineering and science Defence organisations.

Our members play a critical role in developing and maintaining organisation capability across Defence, particularly in relation to the research, design, delivery and maintenance of materiel and infrastructure. They are also critical in ensuring that the Australian Defence Force maintains a technological edge with sufficient investment in existing and emergent technologies.

There is currently a serious gap in technical skills and knowledge within Defence, which now exposes the organisation to a high level of risk. As our members’ reiterated, the consequences of this will be catastrophic unless the skills gaps is addressed.

To reduce these risks and close the skills gap, strategic planning for the next decade needs to include workforce development which ensures the retention and upgrading of skills. There needs to be sustained investment in technological and industrial expertise to secure Defence capability over the medium to long term.

In this submission we specifically concentrate on the importance of an investment in civilian Engineering, Science and Technology to secure Defence capability.
**Recommendations**

1. Review the decision to shed 2200 civilian employees as outlined in the Budget forward estimates and recommit to an APS technical and professional workforce based on medium to long term requirements.

2. Create and implement a plan to develop and retain our national engineering and science capability as it relates to both ongoing and future requirements. The plan should cover how the right people are recruited and what measures are needed to keep technical professionals motivated and their skills current. This also needs a clear commitment to properly resourcing streams of technical expertise to ensure that we have a talent pool for the next 10-15 years.

3. Use the enterprise bargaining process to embed initiatives that genuinely support and value science and engineering workforce development. This will drive real productivity and Defence people capability.

4. Prioritise the cultural importance of technical integrity and safety in the development, delivery and maintenance of Defence materiel, systems and infrastructure.

5. Commit to an ongoing leading edge science and engineering research capability in Government. Science and engineering research are critical to Australia’s Defence edge in the 21st century.
Securing Defence Capability

The capability and responsiveness of the Australian Defence Force (ADF) is highly dependent on having people with the right skills and knowledge to successfully develop, select, integrate, maintain and operate technology for the ADF’s purposes.

Defence projects, particularly where they deal with new or emergent technology, are often inherently complex and this adds a layer of risk to materiel that is already laden with risk to cost, reputation and life.

We acknowledge the challenges between balancing public finances and protecting our national security interests, particularly given the current economic climate. This being said, we cannot compromise the medium to long term security of the nation by succumbing to short-term financial gains.

We hold the firm view that national security should be primarily driven by strategy and that addressing in-house expertise is critical to delivering Defence capability safely, effectively and in an economically responsible manner.

The Commonwealth Government, in its Budget forward estimates outlined that 2,200 civilian employees will lose employment – this is the opposite of what is needed in Defence.

The Defence civilian science and engineering workforce provides a critical continuity of cost-effective expertise unable to be provided by Defence contractors or ADF personnel. Along with ADF personnel they maintain a sovereignty of expertise not motivated by profit, ensuring their recommendations and decisions are founded in integrity and concern for both the well-being of and value for the Australian community.

Strategic planning for the next decade needs to include workforce development which ensures the maintenance and updating of internal skills and sustained technological and industrial expertise. Building and maintaining these skills will need to consider the long lead time required to develop appropriate levels of expertise and experience.

Of critical importance is the provision of in-house knowledge of Defence technologies, developing research in technologies where the market is unwilling or unable to do so, and an understanding of the marketplace.

At a time the Government is spending significantly on new and updated weapon systems, it makes no sense to erode the capacity to be a smart customer. It is also critical to ensure that maintenance of existing capability, including the Defence estate, is not put at risk by chronic under investment in technical expertise. The perception that Defence has been de-engineered is one that is shared by Defence industry.

Cuts to Defence’s technical workforce may appear penny-wise, but they are pound-foolish in the long term. A Senior Defence engineer identified the crux of the problems in response to a survey conducted by Professionals Australia:
"Professionals are being squeezed out of the decision-making process, whereby we are buying off-the-shelf items and no technical integrity is conducted or being conducted by external contractors who may or may not have the Defence interest in their best interest. Under-resourced projects due to [staff] cutbacks will mean that there will be often one engineer working on a large body of work and if they leave or are sick there is no one to pick up the work. Corners are being cut due to projects being under resourced.”

Billions of dollars in capability and the safety of Defence personnel (both today and in the future) are being put at risk by not investing in sufficient technical expertise.

Recommendation

1. Review the decision to shed 2200 civilian employees as outlined in the Budget forward estimates and recommit to an APS technical and professional workforce based on medium to long term requirements.

Act on Previous Report Findings

Four years ago, serious engineering maintenance problems were exposed when more than $500 million dollars of maritime Defence capability was retired early. One of the Navy’s key supply ships, HMAS Kanimbla, lost power entering Sydney Harbour and narrowly missed coming aground. The Kanimbla and its sister ship, HMAS Manoora, were decommissioned.

The Rizzo review which followed this event exposed the high level of risk caused by the loss of engineering capability in government agencies.

Prior to the Rizzo review taking place, the need to rebuild civilian engineering capability had already been identified in the Navy Civilian Engineering Workforce Study in 2010 with the startling observation “you do not really appreciate the value of something until it is almost gone”2. Similar issues have also been identified elsewhere such as in the Deloitte-authored engineering workforce review, and in a Senate inquiry into Defence procurement – both conducted in 2012.3

Another review conducted in 2012, the Coles review, into submarine maintenance, identified substantial problems, including the failure to retain and develop engineering skills caused by a recruitment freeze.

Warning bells were sounded even further back, with the Sea King (2005) and HMAS Westralia (1998) disasters.

The consistent findings by varied independent and government reports all acknowledge a technical skills gap. Despite this, there is unwillingness to properly deal with technical skill gaps across the organisation because of

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1 Professionals Australia  (2013) Survey Recognition, Resources & Reward
public sector policies that have put pressure on organisations to reduce APS workforce numbers and make any recruitment difficult without consideration of the long term consequences.

This unwillingness to properly deal with the skill gaps is highlighted again in the DMO’s *Internal Audit into the Professionalisation of Engineers* which found that the state of the DMO Engineering and Technical workforce is a risk to Defence capability. It found that the organisation has a limited visibility of its workforce skills, and has no targeted strategy for the attraction and retention of the right skills and resources for future capability.4

Again, Professionals Australia reiterates the need to consider the impact of short-sightedness when planning for the release of a 10 year plan.

The *Internal Audit into the Professionalisation of Engineers* report highlights:

- A lack of succession planning
- Minimal workforce planning
- No recruitment strategy to target future jobs
- Planning focused on budget rather than future requirements.

Technical expertise across many critical engineering disciplines is already paper-thin. Too many areas of expertise are effectively one or two deep with a significant gap in expertise between senior and early career technical experts. This has been exacerbated by the limited capacity to recruit, promote and recognise expertise from within.

The Deloitte review identified that 55% of Defence engineering vacancies were critical or provided a risk to engineering capability. Yet since then we have seen a recruitment freeze and significant actual and planned reductions in engineering and science staffing across all Defence domains. Even in Navy, where the Rizzo Review has at least minimised engineering workforce reductions, significant reductions are planned for the engineering and technical workforce in the Australian Maritime Warfare Centre.

In revisiting the decision to reduce the Defence APS workforce there needs to be a commitment to the engineering and science APS workforce required for the next 10-15 years with a balance of developing, mid-career and expert professionals.

There is an opportunity to support such an approach with the current negotiations for the replacement of the Defence enterprise agreement. In the past, the generic nature of this agreement has been seen as an impediment to recognising and rewarding development and maintenance of technical expertise.

It is critical that Defence take the opportunity to embed initiatives within the agreement that facilitate mentoring, succession planning and recognition of technical expertise and management.

The agreement needs to be seen as having the capacity to be an enabler rather than a straightjacket.

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4 Defence Materiel Organisation, Ernst & Young (2014), p4.Internal Audit of the Professionalisation of Engineers (2013/14 No. 6)
In light of the library of reports and reviews which recommend urgent action to address the lack of engineering, technical and scientific expertise in Defence, it is imperative that decision makers take the necessary steps to properly address these issues.

“Defence requires a policy to cover the development and retention of our national engineering and science capability as it relates to Defence and our future needs. This needs to cover which fields we expect to develop and retain skills in, how we will get the right people and keep them motivated and current with their skills and knowledge.”\(^5\)

All the evidence points to a rising financial and safety risk associated with a failure to address engineering, scientific and technical capability. As the Navy Civilian Engineering Workforce Study put it:

“Sound independent engineering saves money and most importantly lives and reputation”.

Recommendation

2. Create and implement a plan to develop and retain our national engineering and science capability as it relates to both ongoing and future requirements. The plan should cover how the right people are recruited and what measures are needed to keep technical professionals motivated and their skills current. This also needs a clear commitment to properly resourcing streams of technical expertise to ensure that we have a talent pool for the next 10-15 years.

3. Use the enterprise bargaining process to embed initiatives that genuinely support and value science and engineering workforce development. This will drive real productivity and Defence people capability.

The importance of integrity

Technical integrity is critical to delivering effective capability and ensuring that Defence materiel and infrastructure is fit-for-purpose, meets Australian standards and limits risks to Defence personnel.

Ensuring there are sufficient skilled, experienced professionals within the Department is essential and underpins both professional and technical integrity. This is the message that resonates from the flotilla of reviews into Defence engineering.

The consequences of a “make do” culture led to the failure of the Kanimbla and Manoora and the Sea King and Westralia tragedies. Similar failures across the Ministry of Defence in the United Kingdom led to the Nimrod tragedy.

The 2009 Board of Inquiry into the engineering failure that led to the loss of the Nimrod aircraft identified the following systemic weaknesses:

- Undervaluing and dilution of engineering skills;
- Decline in the ability to be an “intelligent customer”;

\(^5\) Member, Professionals Australia (2014) White Paper Survey.
• “Double hatting” and “gapping”;
• Lack of trained safety engineers; and
• Shortage of manpower and skills fade

These weaknesses were underpinned by identified deficiencies in leadership, independence, people and simplicity.

While we recognise the efforts across the workforce to audit skills and modernise the technical regulatory frameworks these efforts have been stymied by external pressures on headcounts and a conservative approach to change.

There needs to be the capacity to ensure that the appropriate level of skilled personnel is assigned to support materiel, infrastructure and research and get past the organisational dysfunction of full time equivalent (FTE) constraints.

The challenge is unambiguous. Invest in and prioritise technical integrity and safety or expect not just project cost and schedule overruns but another Sea King, Westralia or Nimrod.

**Recommendation:**

4. Prioritise the cultural importance of technical integrity and safety in the development, delivery and maintenance of Defence materiel, systems and infrastructure.

### Science and Research

Australia’s Defence Science and Technology Organisation (DSTO) has a strong record of strong research as well as providing technical support to the ADF: the black box flight recorder, the Jindalee over-the-horizon radar network, anechoic submarine tiles and Nulka, a missile decoy system – are all storied examples of projects that have their genesis in DSTO research.

The review should clarify whether current cuts to expenditure on defence science is affecting war-fighting capability now and into the future. In the context of declining Defence science budgets, decisions over the next year will define the technological fundamentals of medium-to-long-term defence capability.

It has been more than a decade since the Kinnaird report, the 2003 report into Defence’s procurement problems, and DSTO is focused less on developing indigenous technological advances for the ADF and more upon service provision, such as expert advice for the defence and security portfolios. This advisory function is important but should be allied with the development of new capabilities.

This is not to say that there is not significant value in greater partnerships between Defence and research institutions and leading edge Defence industry research companies. In this regard we believe it makes sense for the Government to reconsider its approach to the funding of Cooperative Research Centres and to support ongoing alliances with Australian industry and the tertiary sector.

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The decline in a focus on technological advances is also a function of a deteriorating investment in defence science and technology. As a proportion of defence budgets, DSTO expenditure has decreased from 2.31 per cent in 2001-02 to 1.52 per cent in the 2014-15 budget.

Since technological and geopolitical trends suggest science will be an even greater driver of defence capability than it was in the 20th century it is imperative that government invests in science and explores models that use ingenuity to deliver greater capability.

It is the view of Professionals Australia that this is the challenge for Defence science that we should be aspiring to if we are serious about maintaining a technological edge in the 21st century. Rather than consideration of outsourcing or privatisation of this capability (where the assets are the brains of skilled Defence scientists and engineers) we should be looking at strengthening our science and technology capability.

**Recommendation:**

5. Commit to an ongoing leading edge science and engineering research capability in Government. Science and engineering research are critical to Australia’s Defence edge in the 21st century

**Conclusion**

In response to the Rizzo Review the then Chief of Navy (and now VCDF) Vice Admiral Ray Griggs sagely observed that we “have for too long viewed engineering as an overhead and not as a mission enabler.” The earlier Navy Workforce Review recognised that “external influences, both within Defence and more broadly within the public sector challenge the notion of the importance of sound independent engineering advice.” In some part, this explains the lack of attention to the deterioration in science and engineering expertise across the public services. It intimated the likely challenges for the AWD/LHD projects and was clear that the engineer base was insufficient for future capability.

The consequence of not investing and listening to science and engineering expertise has come at an obvious cost in the cases of the *Westralia, Sea King, Seasprite, Kanimbla* and *Manoora*: lives, reputations, cost and loss of critical capability.

Professionals Australia recognises the challenges faced by both the First Principles and White Paper Teams in your consideration of the future shape of the Defence organisation and the key strategic challenges ahead. The people challenge is unambiguous. The success of these endeavours relies on ensuring previous reports are read and understood and that the civilian and ADF science and engineering workforce are strengthened to meet these challenges.

Professionals Australia looks forward to discussing the above recommendations with both the White Paper and First Principles Teams in greater depth.

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APPENDIX ONE

JOINT COMMUNIQUÉ

BY
CHIEF OF NAVY
CHIEF OF ARMY
CHIEF OF AIR FORCE
VICE CHIEF OF DEFENCE FORCE
CHIEF EXECUTIVE OFFICER DEFENCE MATERIEL ORGANISATION
DEPUTY SECRETARY PEOPLE STRATEGIES AND POLICY
AND
ASSOCIATION OF PROFESSIONAL ENGINEERS, SCIENTISTS AND MANAGERS
AUSTRALIA (APESMA)

TO
THE ENGINEERING AND TECHNICAL PROFESSIONAL WORKFORCE

COMMITMENT TO APS ENGINEERING AND TECHNICAL PROFESSIONAL WORKFORCE

PURPOSE

1. The purpose of this joint communiqué is to articulate the commitment by Defence and the Association of Professional Engineers, Scientists and Managers Australia (APESMA) to work together to support engineering capability in Defence by ensuring that engineers and technical professionals in Defence receive appropriate recognition of their responsibilities, authorities, and where appropriate, delegations, in undertaking their roles effectively.

BACKGROUND

2. Defence has noted the concerns raised by APESMA and employees. APESMA is the peak industrial organisation representing professional engineers and other technical professionals in both the public and private sector. Defence is aware that engineers are concerned that their salaries are not competitive with the salaries provided to engineers in other Government entities and the private sector. Engineers have expressed their concerns regarding the attraction, development and retention of engineering skills. Defence understands that engineers are seeking the introduction of a separate salary structure, which includes a broadband, to address these issues.

3. A number of reviews have provided recommendations relating to the engineering and technical professional workforce within Defence. The current Senate inquiry into engineering shortages highlights this as an issue across the economy. The Rizzo Review into ship repair and maintenance practices was released in July 2011. Four of the Review's recommendations relate to the 'engineering capability' or 'workforce' in the maritime domain. One of the key Rizzo recommendations was for the development of an innovative and comprehensive through life career plan for the recruitment, retention and development of engineering talent within this domain.
TECHNICAL REGULATORY FRAMEWORKS WORKFORCE REVIEW

4. A joint working group has been established to undertake a review of the challenges facing Defence's engineering and technical workforce. Initially, the review will examine whether APS employees exercising technical authorities within a technical regulatory framework are doing so commensurate with their classification level. More broadly, the review will create an opportunity to deal with related issues if they emerge and require addressing by Defence. The review will also consider the APESMA proposal to introduce a broadband or a separate salary structure for engineers and other technical professionals.

5. In response to the issues highlighted by APESMA and employees, and to demonstrate Defence's commitment to the engineering and technical professional workforce, the terms of reference for the review have been included in the proposed Defence Enterprise Collective Agreement 2012-2014 at Annex I. This requires the Joint Working Group to report to Defence's Head People Policy during the first half of 2012.

MEMBERSHIP OF TECHNICAL REGULATORY FRAMEWORK WORKFORCE REVIEW WORKING GROUP

6. The Joint Working Group has representatives from Defence Materiel Organisation, Navy, Army, Air Force, the Defence Science and Technology Organisation and Defence Workplace Relations. Union representatives are from APESMA, the Australian Manufacturing Workers Union and the Community and Public Sector Union.

REVIEW CONSIDERATIONS

7. The Joint Working Group will consult with other stakeholders within Defence, including the Rizzo Review implementation team and industry communities as required, to achieve the most comprehensive and relevant information on the issue.

8. The review will be cognisant of the responsibilities of Group Heads and Service Chiefs. There may not be a single solution across Defence. Any recommendations of the review will have regard to differences in priorities, organisational structures and technical regulatory requirements between maritime, air, land and explosive ordnance domains and impacts on the engineering and technical professional workforce.
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COMMITMENT

9. Collectively we are committed to working together to improving Defence's required engineering and technical capability. Our engineers and technical professionals are an integral part of this capability. We are therefore committed to attracting, developing and retaining the engineering expertise Defence requires.

R J GRIGGS, AMCSC
Vice Admiral, Royal Australian Navy
Chief of Navy
3 March 2012

D. L. MORRISON AO
Lieutenant General
Chief of Army
29 February 2012

M. D. BINSKIN
Air Marshal
Vice Chief of Defence Force
27 February 2012

CHRIS WALTON
Chief Executive
Association of Professional Engineers,
Scientists and Managers Australia
19 March 2012

WARREN KING
Chief Executive Officer
Defence Materiel Organisation
17 February 2012

G. J. BROWN AO
Air Marshal
Chief of Air Force
23 February 2012

G. R. FOGARTY AM
Major General
Deputy Secretary
People Strategies and Policy Group
15 March 2012