Chapter 4

Maintaining and rebuilding capability

Introduction

4.1 Chapter 4 will cover the remaining terms of reference of the inquiry. In particular, it will consider issues raised relating to:

- recruiting, remuneration, retention and retirement issues;
- training and development;
- links with industry, academia and other public research agencies; and
- outsourcing and contractors.

Recruitment

4.2 Defence stated that it 'continues to place a priority on attracting a highly skilled PSE workforce'. It noted that Defence continues to have a high ratio of applicants to advertised positions:[1]

> Defence remains an attractive PSE employer. Eighty Engineering and Technical job family positions advertised between August 2013 and August 2015 attracted 770 applicants. Similarly, 11 Science and Technology job family positions attracted 178 applications. Interest in Defence PSE positions extends to those entering the jobs market. The Department's engineering-related graduate program received 623 applications for 43 placements in 2015 and 624 applications for 48 placements in 2016. A recruitment campaign targeting Science and Technology PhD graduates attracted 148 applications for 10 positions. The number of applicants is significant given the degree of specialisation Defence sought for each of the positions advertised.[2]

Restrictions on recruitment

4.3 The APS 'recruitment freeze' was identified as having a significant impact on Defence's PSE workforce. However, Ms Skinner from Defence characterised it as a 'restrain in recruitment' rather than a recruitment freeze. She noted that Defence had continued to recruit in areas important to capability and safety and that 'where there has been any requests for technical workforce that are critical to capability, they have always occurred'.[3]

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1 *Submission 28*, p. 2.

2 *Submission 28*, p. 4.

3 *Committee Hansard*, 5 February 2016, p. 23.

4.4 Nonetheless, the consequences of restrictions on recruitment were highlighted in evidence. For example, Mr Efthymiou from Professionals Australia stated:

> What I have seen over the last 18 months is that an effective staff freeze, because we have not been able to recruit or promote, has a larger effect. The staff freeze that we have had for 18 months was preceded by a previous one in 2011. I am an EL1 with 11 staff and five direct reports. I have had three people leave in the last four months. I have not been able to recruit because I have not been able to advertise…I am replacing experienced staff with staff from a graduate scheme with 18 months of experience. At some point, that has to have an effect. Logic would dictate that we are introducing risk.[4]

4.5 Similarly, Mr Alan Gray and Mr Martin Callinan described the freeze on recruiting graduates that has been in place across Defence for the last several years as 'adding to the difficulties' for DSTG. While they acknowledged that DSTG was 'planning to recruit 20-25 new graduates in 2015-16', they considered this would not cover 'the losses that have occurred within the PSE community over the last several years'.[5]

4.6 Others argued that recruitment restrictions within Defence were increasingly transferring administrative and unrelated other duties onto the Defence PSE workforce. One submitter, who requested to be anonymous, described the focus of technical jobs moving from being less about 'the knowledge to investigate, develop and keep up with the latest technology available, and how to integrate it in support of the ADF' and more about 'ensuring we keep to the travel/training budget':

> These [tasks] include booking your own accommodation and travel arrangements when on course, and trials when support tasking at the various facilities around Australia. Procurement of plant, spares and even contractors. There is a high level of Defence Instructions, complex fiscal instructions and governance with these types of transactions.[6]

Professionalisation

4.7 The AMWU criticised Defence for preoccupation with 'so-called professionalisation' in its PSE workforce approach. This was seen as adversely affecting technical staff recruitment. For example, Mr Hunter stated he had seen 'technical positions lost to "professional" recruits because of the "more bang for bucks" outlook on worker value and the desire to move away from costly hardware facilities toward lower cost software oriented activities'.[7] However, there were also reports that there had been a progressive downgrading of some Defence PSE positions to allow staff without specialist skills to be recruited. Mr Keenan stated:

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4 *Committee Hansard*, 17 November 2015, pp 24-25.

5 *Submission 16*, p. 6.

6 Name withheld, *Submission 7*, p. 2.

7 *Submission 5*, p. 2.

> Most positions that were dedicated PSE, have been eroded over time because of the inability of management to attract qualified personnel. The protocol that appeared to have been adopted at that time, was to re-write the duty statements into a more generalised nature so that where PSE positions could not be filled, non PSE personnel could apply and successfully fill these positions to maintain Full Time Equivalent (FTE) numbers within the departments.[8]

4.8 There also appeared to be difficulties in recruiting particular specialist Defence PSE positions. For example, Mr Leggatt stated:

> [T]his struggle to retain or employ skilled staff for a specific capability has been demonstrated by the need to conduct a recruitment action for a radiographer 4 times before a suitable candidate was recruited. The candidate that was ultimately selected was selected on the full understanding that they would require training as they, while being the best applicant, were unqualified in industrial radiography.[9]

The broader PSE workforce

4.9 The capacity of Defence to draw employees from a vibrant and active broader PSE sector in Australia was perceived as an important recruitment issue. For example, the Australian Academy of Science (AAS) highlighted the broader challenges in Australia of maintaining a workforce with expertise in science, technology, engineering and mathematics (STEM). It noted that the number of STEM-qualified graduates has declined from 22 per cent of total graduates in 2002 to 16 per cent in 2012. It stated:

> There are particular challenges for defence science. Currently, workers in Australian defence science are predominantly employed by DSTG. Not only do employees of DSTG need to be capable scientists and engineers, but they must also be Australian citizens and able to obtain a relatively high-level security clearance—usually top-secret negative vetting or higher. These requirements considerably restrict the available talent pool.[10]

4.10 The workforce challenges in relation to the PSE workforce were not seen as unique to Defence. For example, the Department of Industry, Innovation and Science (DIIS) highlighted that employees qualified in science, technology, engineering and mathematics (STEM) 'are highly valued employees in a number of diverse workplaces and, given the exponential growth in and demand for technology and innovation, will only remain so'.[11] DIIS outlined an 'increasing need for STEM qualified people will be

8 *Submission 6*, p. 2.

9 *Submission 14*, p. 3.

10 *Submission 9*, p. 5.

11 *Submission 34*, p. 1.

an issue that will need to be managed across the economy, not just in the Defence sector'.[12]

4.11 The DIIS characterised the ability of Defence to have relevant PSE capabilities to meet future technological needs as largely dependent 'on the transferability of skills across the sector and between sectors':

> Recent workforce statistics for Australia highlight that Defence is not the primary workplace for PSE employees. Rather, employment in PSE occupations is concentrated in five industries: manufacturing (15.9 per cent of employees); professional scientific and technical services (12.8 per cent of employees); electricity, gas, water and waste services (15.3 per cent of employees); construction (7.6 per cent of employees); and mining (31.7 percent of employees). These statistics highlight the importance of transferability of skillsets between Defence and other industries.[13]

4.12 The AAS observed that while the science sector as a whole has significant problems regarding gender equity, the defence science sector appears to have exceptionally low levels of employment of women scientists. It noted that 'women make up only 20 per cent of the DSTG workforce'. The AAS argued that, if the gender imbalance in the science workforce was addressed, employers such as DSTG will have access to a larger pool of high-quality scientists from which to recruit.[14]

4.13 Defence made the point that following the resources boom the labour market has eased with 'softer employment conditions and reduced employment growth in the mining, construction and utilities industries alleviating shortages in most related occupations'. It stated:

> While shortages remain in a limited number of related trade and technician occupations, they are likely to ease in the short term. Employment projections suggest demand for the engineering and related technologies qualified population will remain subdued over the next decade, though growth will continue above trend for some advanced engineering and related technologies skills and in information technology related occupations.[15]

Remuneration and retention

4.14 Remuneration and retention issues for the Defence PSE workforce were frequently highlighted. Several submitters noted the comparatively low pay offered by the APS in comparison to the private sector or the ADF. For example, Mr Christensen stated:

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12 *Submission 34*, p. 4.

13 *Submission 34*, p. 6.

14 *Submission 9*, p. 8.

15 *Submission 28*, pp 8-9.

> The state of payment to APS technical staff within the Department of Defence (DoD) has fallen so far behind their military counterparts that staying in the APS DoD is fast becoming an extremely poor choice of employment.[16]

4.15 Dr Davies highlighted this issue in his evidence to the committee:

> Defence simply has to find a way to engage top quality engineers. One problem, seemingly intractable, is the public service salary levels. The relatively low pay for engineers in Defence has meant that the flow between the public and private sectors has been pretty much one way. Defence's best engineers get better job offers from elsewhere. Surely it is not beyond the wit of man to find a way to pay salaries commensurate with market value. Solving the problem, especially if coupled with the ability to offer contracts over a few years, might make a spell in government an attractive CV addition for top quality engineers looking to move up into senior management positions in the private sector.[17]

4.16 PSE workers currently employed in Defence expressed frustration with the offers to Defence employees as part of the enterprise agreement bargaining process.[18] The Defence Enterprise Collective Agreement (DECA) expired in June 2014 and negotiations for a new agreement under the government's workplace bargaining policy have not concluded. A submission from person who asked for their name to be withheld stated:

> I get really frustrated when as a group, we get numerous amounts of praise for being able, to investigate, improve or modify the vast range of ordinance that is required to support the ADF both here and abroad. But then get informed that we have no integrity when refusing to accept the current miniscule pay increase, along with the substantial reduction in conditions on offer by Defence in the latest DECA negotiations.[19]

4.17 Defence observed that 'retention rates for the engineering and technical, and science and technology, workforce exceed the Defence APS average'.[20] However, Defence acknowledged that 'there is scope to further optimise the existing employment framework, including options for flexible work and where necessary, Building Defence Capability Payments, so Defence best caters for and supports its diverse PSE workforce'.[21] Defence observed that it had a range of options to attract and retain employees with specialist skills:

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16 *Submission 8*, p. 1.

17 *Committee Hansard*, 5 February 2016, p. 2.

18 For example, Name withheld, *Submission 20*, pp 2-3; AMWU, *Submission 17*, Attachment 1, p. 30.

19 *Submission 7*, p. 1.

20 *Submission 28*, p. 1.

21 *Submission 28*, p. 11.

> For example, broadbands allow for two or more adjacent classifications to be combined into a single, broader classification that allows employees to progressively undertake duties of a higher work value as the employee builds knowledge, skills and experience. To be competitive with market changes in remuneration, the option for management to initiate a Building Defence Capability Payment (BDCP) is available for an individual employee, or for a group of employees in an occupational discipline that is critical to Defence capability.[22]

4.18 However, some of the methods used to retain Defence PSE staff were seen as having unintended consequences. For example, a submitter noted:

> Inability to attract and retain engineering workforce expertise due to major deficiencies in salary. Therefore, many APS engineers are acting in higher level roles (mostly at EL1/EL2 levels) which is then misrepresenting the managerial numbers across the organisation leading to the recent voluntary redundancies (VRs) offers to cull them back.[23]

4.19 It was also highlighted the Defence PSE workforce was not only motivated by monetary considerations. For example, Mr Callinan and Mr Gray noted:

> While wage disparities between the private and public sectors has government scientists, engineers and technologists at a disadvantage, the opportunity to work at the cutting edge of Australia's defence has innate appeal. However, national interest must be combined with cutting edge. Science and Engineering professionals are motivated by discovery and design.[24]

Career paths

4.20 The lack of clear career paths was seen as a major disincentive to both recruitment and retention of PSE specialists. For example, Mr Jonathan Laird stated:

> APS technical career progression does not exist. Period. We badly need technical broadband positions to allow staff to naturally develop and be compensated accordingly. We need additional technical specialist employment streams to be raised (not extinguished).[25]

4.21 Mr Garry Duck, a senior engineer with 29 years of experience, articulated a common view in relation to the retention of engineers in Defence:

> There is no difficulty in attracting inexperienced Graduate engineers (APS4-5).

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22 *Submission 28*, p. 4.

23 Name withheld, *Submission 20*, p. 2.

24 *Submission 16*, p. 11.

25 *Submission 3*, p. 1.

> There is no difficulty retaining these Graduates for the 3 years or so to develop them into productive and valuable Junior PSE Practitioners (APS6).
>
> Unless there are available APS6 positions it is difficult to retain Engineers past 3 years.
>
> Unless there is a clearly available EL1 opportunity it is difficult to retain Engineers past 5 years.
>
> It is next to impossible to attract highly skilled EL1 and EL2 engineers due to the poor pay rate compared to Industry.
>
> Retention of the EL1 and EL2 PSE workforce is largely influenced by work – life balance considerations and the falling morale level of the remaining senior engineers.[26]

4.22 Dr Klovdahl noted that 'subject matter experts' were frequently unable to progress beyond APS6 without transferring to a management stream. To resolve this situation he advocated that the career paths for talented 'technical experts' with high levels of education and experience should reach to include Senior Executive Service levels.[27]

4.23 The absence of sufficient opportunities for professional development was also highlighted as a problem for the retention of PSE workers. Dr Davies stated:

> Defence does not actually do much engineering in the sense that practitioners of the art would recognise. Instead, it is a customer for engineering expert advice rather than having engineers design and build stuff, which is what they really like to do. That makes it hard for Defence to retain really good engineers…

Building Defence Capability Payments (BDCPs)

4.24 Building Defence Capability Payments are aimed at assisting Defence to develop, attract and retain employees with the required skills, knowledge and experience which are essential to meet Defence capability. However, the AWMU considered that BDCPs had not had widespread application. Mr Nicholaides stated:

> The anecdotes that come back to us are that it is very difficult bureaucratically to get authorisation for it. It is quite a lengthy period and there are blockages in the system, because you are actually paying more money and things are tight.[28]

4.25 Mr Grimm also described access to the BCDP as inconsistent 'even for staff with the same sets of skills'. Further, he became aware that 'the additional salary paid

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26 *Submission 32*, p. 3.

27 *Submission 33*, p. 2.

28 *Committee Hansard*, 5 February 2016, p. 15.

for the BDCP for some staff had to be offset by a reduction in number of APS positions'.[29]

Retirement and redundancy

4.26 A common view was that a large portion of Defence's PSE workforce was approaching retirement age. Mr Alan Gray and Mr Martin Callinan stated:

> DSTG is in a difficult position as a significant cadre of scientists and engineers recruited in the 1980s and 1990s is reaching retirement age…Indications are that PSE personnel with 20, 30 or 40 years experience have taken advantage of redundancy packages on offer to leave the DSTG workforce.[30]

4.27 Succession planning by Defence was considered insufficient. RINA noted that 'the current environment means that even where staff are replaced, absence of career or succession planning means that there are now more limited opportunities for one generation to pass on their experience and "lessons learnt" to the next generation'.[31]

4.28 The point was repeatedly made that once capability within the Defence PSE workforce is lost can be difficult to replace or rebuild. For example, Mr Keenan commented:

> A critical role a skilled Defence PSE workforce with [reliability, availability and maintainability] training, can deliver is enhancement of through life support for existing and future platforms, in a very cost effective manner. The loss of this important capability may in the short term appear to be a cost saving however, the long term aspect is that once a capability like the PSE is lost, the ability to retrain and rebuild the skills and knowledge can take many years.[32]

4.29 Defence outlined that it had implemented a transition-to-retirement program which 'facilitates the retention of critical knowledge by Defence of retiring staff':

> 62 staff are participating, or have participated, in the transition to retirement initiative. 58 individuals have exited, 24 have completed a 12 month Senior Fellowship and there are 11 current Senior Fellows.[33]

4.30 On 15 November 2015, it was reported that Defence was cutting middle manager numbers by accepting 565 applications for voluntary redundancy. In particular, the executive level workforce was reported to be reduced by 10 per cent as

29 *Submission 23*, p. 4.

30 *Submission 16*, p. 6.

31 *Submission 27*, p. 12.

32 *Submission 6*, p. 1.

33 *Submission 28*, p. 9.

the Defence bureaucracy addressed 'span of control' issues by increasing the number of employees under each of its managers:

> The breakdown of voluntary redundancies from Defence include 214 from the [CASG], 42 from the [DSTG], 29 from the vice-chief of the defence force group, 19 from the air force and five from the navy.
>
> Among those taking redundancies are 60 project managers, 55 engineers, 34 scientists and 40 information technology professionals.[34]

4.31 Witnesses told the committee that the redundancies in Defence were taking away personnel in critical areas of capability development such as submarines and the Joint Strike Fighter.[35] Mr Smith from Professionals Australia considered it was 'almost mind boggling' that Defence was undermining its internal expertise for projects critical to Australia's ongoing defence capability with 'a significant cost to the taxpayer'. As an example, he noted that 'there are at best…three APS civilian engineers with senior expertise in submarine naval architecture':

> SEA 1000 has one senior naval architect from the APS in an organisation that is generally full of contractors. The Collins class sustainment also has one senior naval architect. Both of those senior naval architects have been offered redundancy in a very recent round of executive level redundancies…
>
> We are going from a position where, 10 years ago, we had probably about 95 years worth of experience in naval architecture. We had still not a big group in submarines. There was probably about eight to 10. Five years ago, we had about four or five. If both of these senior engineers take redundancy, we will have no experience and we will have no internal expertise.[36]

4.32 Ms Skinner from Defence highlighted that the separation rates, which measure the percentage of employees who left the organisation, were lower for CASG and DSTG than the average for Defence.[37] In relation to Defence's redundancy program she stated:

> [S]uccessive governments have been concerned about the size of the middle management—that was again raised in the first principles review—and enhancing spans of control and things like that. We have focused our voluntary redundancy program on those levels, but it is primarily focused on what we would call the enabling functions—so not primarily focused on our technical workforce. However, we do consider people in that category

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34 Phillip Thomson, Defence hands out 500 voluntary redundancies: 1200 put up their hand'[, *Canberra Times*, 15 November 2015, available at http://www.canberratimes.com.au/national/public-service/defence-hands-out-500-voluntary-redundancies-1200-put-up-their-hand-20151113-gky55d.html (accessed 16 November 2015).

35 *Committee Hansard*, 17 November 2015, p. 23.

36 *Committee Hansard*, 17 November 2015, p. 22.

37 *Committee Hansard*, 5 February 2016, p. 20.

> where there might not be organisational fit and where they do not meet organisational requirements. So people were invited to express an interest in a voluntary redundancy. We very carefully went through each individual request. There were around 1,100 requests, and we made around 575 offers. But we kept regard to our critical occupations. We kept regard to people's organisational fit.[38]

4.33 However, others such as Mr Bussell from Professionals Australia described the devastating impact on the organisational culture of DSTG of recent changes to the workforce:

> I have been a member for 34 years. I have never seen the staff in such a state of disillusionment. Our morale is low and decreasing. The confidence we have in our senior management team is decreasing. The trust we have in our senior management team is decreasing. The only thing that is increasing is the number of people that want to leave the organisation. For an organisation that has an historical exit rate, a separation rate, of five per cent, it is now sitting at something like 27 per cent.[39]

Training and development

4.34 An identified problem for Defence engineers was the limited opportunities to undertake practical and on-hands work to develop their expertise. For example, Dr Davies argued that there was a risk that the relatively long-term nature of employment in Defence could mean that parts of the PSE workforce have failed to maintain up-to-date skills and expertise. He argued that Defence needed to make 'a spell in government attractive for an engineer who has extensive experience—probably gained in the private sector, where they get to design and build stuff, but they then go and work for government for a while to bring that expertise into being a smart buyer'.[40]

4.35 In relation to engineering, Dr Davies noted that Defence had outsourced many parts of its engineering requirement to private sector contractors. In practice, Defence engineers spend little of their time engaged in exploratory or research work and instead are helping Defence be a 'smart buyer' of goods and services from the private sector. Dr Davies identified this as a challenge:

> Defence needs experienced and skilled engineers to be a smart buyer, but doesn't offer the same professional opportunities. In effect, Defence engineers have to second guess the work of their private sector counterparts in areas that they have little ongoing exposure to. When dealing with state of the art technologies, currency matters.
>
> One possible way to manage the engineering workforce would be to have lower transitional barriers between Defence and private sector employment,

38 *Committee Hansard*, 5 February 2016, p. 21.

39 *Committee Hansard*, 17 November 2015, p. 24.

40 *Committee Hansard*, 5 February 2016, p. 4.

> so that part of an engineering career could be spent in government service, bringing high level private sector expertise with it. Perhaps the biggest impediment to such movement is the salary differential between private sector and government positions. During the resources boom in particular, it was very much one way traffic in engineers from Defence to the private sector. Today it's probably easier to have a two way flow—the trick will be to make a stay in Defence attractive enough to entice the best engineers.[41]

4.36 Mr Bussell from Professionals Australia stated:

> The issue on smart buyer advice is having the expertise in-house to interpret claims from manufacturers and industry about the performance of their products. Industry does a wonderful job of developing technologies and they also do a wonderful job of marketing those technologies. Unless have you the in-depth detailed expertise to question those marketing claims, you are putting yourself at risk of buying a product that does not perform to a specification that you thought it might. It takes a long time for defence scientists and engineers to develop a degree of expertise that allows them to look through the cracks of those marketing brochures and identify just what is a realistic level of performance for this technology.

4.37 The RINA submission noted:

> The current PSE workforce appears to be highly dissatisfied with the way in which the engineering profession is underutilised and managed. Engineers are by nature practical people, and it is obvious to them that the current arrangements do not economically solve engineering issues, rather they often create more work for them further down the track. Generally there is a lack of morale and a feeling of frustration, including that numerous previous reviews have not led to significant improvements or full implementation of their sensible recommendations.[42]

4.38 There was support for programs to encourage Defence staff with PSE expertise to rotate back to Defence after a period in the private sector or to continue their association with Defence following completion of their service.[43]

4.39 Mr Lovell from Northrop Grumman stressed the need for Defence engineers to have practical experience.

> [A] graduate program that brings an engineer out of university into an organisation like the Capability Acquisition and Sustainment Group is actually bringing in somebody who has never done anything. I believe that the only way an engineer can become effective is by designing and building things. So in an ideal world, what we would prefer, and I think the service

41 *Submission 19*, p. 3.

42 *Submission 27*, p. 8.

43 For example Rear Admiral Doolan, RSL, *Committee Hansard*, 17 November 2015, p. 3.

> would prefer, is to have people on the inside who have done some serious work on the outside.[44]
>
> It's time to change the current policy of attrition and recruit new people to the organisation so that our knowledge, capabilities and research can be carried on into the future. There's still a need for technical people which is largely unmet by the current university and TAFE systems. DSTO in the 50's through to the 90's had the best technical apprentice training facilities in Australia but these were closed in 1993. Two decades on and competent technical people are hard to find so it would be beneficial to consider some sort of Defence apprentice training scheme once more.[45]

4.40 Witnesses from the AMWU highlighted the importance of growing and developing PSE expertise from within Defence. Mr Hunter, a delegate with the AMWU stated:

> Many of our members have started as apprentices, have become technical officers, have gained degrees and have even gone on to get PhDs, et cetera. So there is a progression up. If you buy a technician at the start, you can actually grow that person to become someone who then moves up through the organisation….
>
> The advantage of a long-term relationship with an employee is that they get a deep knowledge of your particular area. Therefore, they can foresee things when they come through and know if something is not going to work. Then they can go back and justify their actions. It is that deep knowledge that we need to retain, but which we are losing at a rapid rate.[46]

4.41 Defence outlined that in 2014-15 it invested approximately $10.6 million and $6.2 million in training the then Defence Materiel and Defence Science and Technology APS workforces.

> These figures capture Defence wide education assistance schemes that enable Defence public servants to study physical science and engineering courses at a range of institutions, while receiving full or partial fee exemptions, or reimbursement and study time release. There is also sponsorship for specific professional development, such as fully funded training and postgraduate professional studies, and support and funding for membership of and certification by professional bodies.[47]

4.42 Ms Skinner outlined Defence's approach to investing in learning and development for the PSE workforce:

> This includes significant investment in education assistance schemes that enable Defence public servants to study physical science and engineering

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44 Mr Lovell, Northrop Grumman, *Committee Hansard*, 17 November 2015.

45 *Submission 11*, p. 2.

46 *Committee Hansard*, 5 February 2016, p. 13.

47 *Submission 28*, p. 4.

> courses at a range of institutions, while receiving full or partial fee exemptions or reimbursement and study time release. There is also sponsorship for specific professional development, such as fully funded training and postgraduate professional studies, and support and funding for membership and certification by professional bodies. Various training and development initiatives are in place to sustain long-term science and technology capability by attracting new talent and retaining the existing skilled workforce. For example, we do have mobility programs for placing staff with industry, academia and research agencies, PhD studies and graduate transition to retirement retention programs.[48]

4.43 In relation to the opportunities 'for employees to undertake part time and full-time PhD studies' to gain high-level research skills in order to increase long-term Defence Science and Technology capability, Defence outlined there are '13 Leave PhD's and 41 part time PhD's participating in the initiative'.[49]

4.44 However, there appeared to be further scope for staff development with the Defence PSE workforce. The Department of Industry, Innovation and Science observed there were 'noteworthy differences in the PSE qualifications of Defence employees in the public and the private sectors':

> The 2011 Australian Census recorded almost twice as many Defence employees with PSE and information technology qualifications in the private sector as there were in the public sector: 50 per cent and 28 per cent on average, respectively. 11 Additionally, employees in private sector Defence industries achieve a higher level of tertiary education compared to their public counterparts: 47 per cent versus 26 per cent on average, respectively.
>
> There is scope for public sector Defence employees to lift their qualifications and technical expertise to match that of their private sector counterparts. This will help ensure that communication between them, especially in relation to complex defence procurements, is highly efficient and technically sound.[50]

Links with industry, academia and other government agencies

4.45 Many submitters argued there were further opportunities for Defence in closer relationships with centres of PSE expertise in industry, academia and other government agencies. For example, Dr Davies considered it was worth considering 'how innovation in our university sector can be picked up for application in defence when applicable'. Similarly, he identified the 'transition of technologies from

48 *Committee Hansard*, 5 February 2016, p. 21.

49 *Submission 28*, p. 9.

50 *Submission 34*, p. 3.

innovation centres such as [cooperative research centres] to industry [as] fertile ground for inquiry'.[51]

4.46 The AAS also argued that there may be significant opportunities for other research institutions to augment the capability of the defence science establishment. It noted that significant research and development expertise is available in Australia's university sector and suggested that 'utilising it to complement in-house activities could allow Defence to maintain a strong and diverse research program, while working within the constraints of the labour market'.[52] The AAS recommended that Defence and the DSTG expand opportunities for communication and engagement with 'the academic research sector, to assist DSTG's in-house expertise to take advantage of the latest innovations and research'.[53]

4.47 Mr Alan Gray and Mr Martin Callinan argued that 'the decline in a dedicated defence PSE workforce can be mitigated provided Defence is given the tools and the ability to incentivize the broader PSE workforce that exists within Australia's academia, industry and amongst our allies':

> Prudent and sustained investments now in the requisite infrastructure, secure communications links, security clearances and training and funding to allow targeted basic and applied research to be undertaken by Australia's PSE communities resident within Australia's academia will yield returns to Australia defence and well-being for many decades to come. More importantly, a change in mindset is required to allow such a paradigm to occur.[54]

4.48 Mr Gray told the committee that his ASPI paper with Mr Callinan called for 'Defence to establish a human resource model that encourages mobility amongst the defence research and broader Australian PSE community'. He stated:

> The skilled scientists and researchers currently employed are not necessarily the scientists and researchers needed to address the disruptive technologies on the horizon. Consideration also needs to be given to enabling academics and other researchers from other government research agencies and universities to transition employment conditions of both service and superannuation arrangements so that they are not disadvantaged when working on Defence related projects. Security clearances and transfer arrangements for working on Defence projects entails unacceptable delays and impediments in this day and age. Of course, security needs to be maintained, but security measures must not be allowed to impede the employment of talent to tackle the national security challenges.[55]

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51 *Submission 19*, p. 3.

52 *Submission 9*, p. 6.

53 *Submission 9*, p. 1.

54 *Submission 16*, p. 8.

55 *Committee Hansard*, 17 November 2015, p. 27.

4.49 His submission with Mr Callinan recommended that a 'security clearance and terms and conditions framework fit for purpose in the 21st century needed to support a PSE workforce that moves frequently (eg. 2 -3 years) between our academic sector, industry sector and defence department to allow them to work on defence and national security issues'.[56]

4.50 The Australian Nuclear Science and Technology Organisation (ANSTO) noted that it had a strong record of research collaborations and projects undertaken with Defence. It noted that ANSTO had worked independently as well as in collaboration with DSTO on national security science and technology projects and highlighted ANSTO's unique materials engineering capability, which has proved important in the development of more effective armour for personnel carriers and naval surface ships.[57] It stated:

> ANSTO believes that the optimal solutions for shortages in Defence PSE capabilities will need to take into account other national investments in science and engineering infrastructure as well as the non-defence science and engineering workforce. By utilising the unique capabilities offered through pre-existing national investments in scientific infrastructure and personnel, Defence can more effectively plan and budget to develop new and complementary PSE capabilities. ANSTO represents a good example of the benefits of this approach.[58]

4.51 However, Northrop Grumman was cautious about links outside of Defence. It noted:

> Given the specialised nature of this work, and the fact that there are few relevant applications outside the environment of the Australian Defence Organisation, the scope for crossover between defence research science and commercial industrial science is limited. Whilst historically some institutional relationships have developed between defence science and academic institutions, these relationships have generally developed from either a close organisational relationship in a specific science discipline, or have arisen from a long standing precedent.[59]

4.52 Engagement with the defence science and engineering expertise of our allies was also stressed.

> Having DSG tied into US military research organisations like DARPA and some of the think tanks such as Jet Propulsion Laboratory and Los Alamos laboratories et cetera enables them to assess what else is happening. Are we on our own with a particular problem?[60]

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56 *Submission 16,* p. 12.

57 *Submission 29*, p. 1.

58 *Submission 29*, p. 2.

59 *Submission 26*, p. 3.

60 Mr Lovell, Northrop Grumman, *Committee Hansard*, 17 November 2015, p. 9.

4.53 While the FPR concluded that, while wholesale outsourcing of DSTG function would not be wise, there were opportunities for increasingly linking its work to the broader scientific community, particularly in industry and academia:

> We recommend that strong partnerships be established with key academic and research institutions to leverage the knowledge of scientists and create pathways into and out of academia and industry…
>
> The Chief Defence Scientist should examine the methodology utilised to prioritise blue sky research versus the applied research program. The Defence Science and Technology Organisation has a niche role to play in a much larger global scientific research program and it is vital that its blue sky research focuses on matters of special relevance to Australia.
>
> We recommend that Defence, in partnership with academia and industry, review its developmental research priorities, their alignment with future force requirements and capacity to leverage allied partners, in order to promote innovation and make the most valuable contribution to future Defence capability.[61]

4.54 However, Dr Zelinsky, the Chief Defence Scientist, described DSTG as 'probably the best engaged public research agency with the university sector'. He stated:

> Last September [DSTG] won the Creative Engagement Strategy Award from Knowledge Commercialisation Australasia, the peak body supporting research commercialisation and transfer of technology, for our engagement with universities. We have struck an agreement with 28 universities that is quite novel. It allows us now to conduct work where, instead of taking 86 days on average to strike an agreement, it is now down to 38. The amount of money we are investing with the universities has moved from $12 million to $16 million per annum, just in that 12 months.[62]

4.55 The ANAO's report outlined DSTG's links with other public research orgnaisations:

> DSTG has established strategic relationship agreements with several publicly funded research entities—the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in June 2013, the Australian Nuclear Science and Technology Organisation (ANSTO) in 2006, and the Bureau of Meteorology (BOM) in August 2013. These strategic relationship agreements involve sharing resources, personnel and facilities to perform collaborative projects and are overseen by a senior steering committee. To date, DSTG has undertaken a number of joint research projects with CSIRO and ANSTO, exchanged staff with CSIRO through a secondment program,

61 FPR, p. 42 [emphasis in original].

62 *Committee Hansard*, 5 February 2016, p. 30.

> developed training programs with ANSTO, and conducted forums with BOM.[63]

4.56 As part of its submission Defence noted that the DSTO (now DSTG) in recent years 'has been active in building partnerships across industry and academia'. It outlined:

> This includes a framework agreement signed with Northrop Grumman Australia in March 2014. The results of research undertaken at centres such as the Defence Science Institute in Melbourne and the Centre of Expertise in Energetic Materials in Adelaide demonstrate the value which is being realised from these partnerships.[64]

4.57 Defence stated it was 'continuing to build and leverage relationships with Australian universities and external organisations, which provide access to centres of technical specialisation'. It noted that in 2015-16 Defence provided $14.2 million to seven organisations to develop and demonstrate technologies to enhance defence technology.[65]

Outsourcing and contractors

4.58 Defence observed that it 'does not outsource projects, but draws on "contractor support" for elements of project management'. It outlined:

> Integrated support contracts are used to outsource one or more project-related functions, but not complete control or management of a project, nor core functions that Defence should retain. Functions that can be outsourced include the transactional elements of commercial, finance or integrated logistics support, as well as project administrative support and engineering services.[66]

4.59 Defence argued that '[d]rawing on the private sector to augment Defence's in-house capabilities has always been essential to enable the Department to deliver its core outputs effectively and efficiently'. However it noted that Defence 'has always, and will continue to, prioritise retaining sufficient PSE expertise in-house to meet its responsibilities to Government'.[67] The Defence Portfolio Budget Statement indicated that there were 352 contractors employed by Defence in 2014-15 with an estimated increase to 484 in 2015-16.[68]

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63 ANAO, 'Managing Science and Technology Work for Defence – Defence Science and Technology Group', *ANAO Report No. 19 2015-16*, p. 15.

64 *Submission 26*, p. 4.

65 *Submission 28*, p. 4.

66 *Submission 28*, p. 11.

67 *Submission 28*, p. 11.

68 Defence Portfolio, Portfolio Budget Statement 2015-16, p. 25.

4.60 Nonetheless, outsourcing and the use of contractors was seen as a significant potential risk to the capabilities of Defence's PSE workforce. For example, Mr Nicholaides from the AMWU stated:

> To set the context, you have to plan the department around peacetime and be ready in case of national emergency. The risk is that you can outsource some things in peacetime that you may need in times of national emergency. You run the risk of getting that balance wrong.[69]

4.61 A key concern with outsourcing the Defence PSE workforce was the loss of skills and intellectual property to Defence.[70] The AMWU highlighted that a Deloitte study of the engineering and technical workforce had included feedback which 'frequently identified increased contracting out of engineering and technical work as a key reason for the loss of skills within the APS engineering and technical job family workforce'.[71] Mr Keenan made a related point:

> The current trend in outsourcing also reduces Defences ownership of any skills and knowledge gained (the Intellectual Property), which is currently retained by non defence organisations (outsourced). The long term effects of this process would increased future budgets for Defence and limit the ability of Defence to control future costs, where I have no doubt there would be an impact on Defences ability to provide state of the art platforms and equipment to meet the Government of the day's commitment due to cost blow out.[72]

4.62 However many submissions identified the outsourcing of Defence PSE capabilities as an area of concern. For example, RINA noted a number of concerns with outsourcing projects to defence industry partners. It considered the outsourcing of many previous internal Defence positions and the commercialisation of naval dockyards had exacerbated the loss of relevant experiential/development positions and suitable competent PSE staff within Defence.[73] It stated:

> Project outsourcing may lead to the perception that the more attractive/interesting jobs are outsourced, thus leading to a reduction in the motivation for PSE staff to stay. It is a serious problem if Defence PSE personnel are not getting the experience of either undertaking the contracted work or managing the contracts.
>
> Skills may be built up by the external contractors, but these skills may then not be available to Defence as and when required – they may be committed to non-Defence projects or otherwise unavailable. Furthermore, Defence cannot control the skills available from the marketplace when outsourcing

69 *Committee Hansard*, 5 February 2016, p. 19.

70 For example, Mr Mark Keenan, *Submission 6*, p. 5.

71 *Submission 17*, p. 6.

72 *Submission 6*, p. 3.

73 *Submission 27*, p. 8.

> tasks; it has to either accept whatever is available or undertake the task internally, if it has still retained the capability to do so.[74]

4.63 Outsourcing was also characterised as inappropriate for some areas. For example, it was noted that the absence of in-house Defence PSE capabilities could inhibit government-to-government transfers of defence technology and cooperation due to sensitive security considerations.[75]

4.64 The efficiency and cost-effectiveness of outsourcing or using contractors was also questioned. It was noted that outsourced or contracted PSE work was frequently undertaken by ex-Defence personnel paid at higher rates. Mr Weaven described how his branch had six different Non Destructive Inspection (NDI) contractors within a ten year period. He observed that the time 'spent re-training each new contractor for our specific requirements was a considerable loss of investment, because each one invariably left as soon as more permanent opportunities were offered elsewhere and took with them the extra skills and knowledge they had gained'.[76]

4.65 Integrated Project Management recommended that greater use be made of reservists with PSE and project management skills rather than outside consultants. It argued that advantages of using reservists (including reduced cost, improved flexibility, military background and the importation of private sector experience) accorded with the recommendations of the FPR that Defence ensure that 'committed people with the right skills are in appropriate jobs'. Integrated Project Management observed:

> Contractors, when hired as Project Managers, can charge $1300 to $1500 per day, or $330,000 to $530,000 per year. A Reservist employed as the project manager, say, of Major rank, would cost the pay scale for that rank, approx $300 per day, or $78,000 for a 5-day-per-week-52-week year.[77]

4.66 In an environment where more work is contracted out, and overseas suppliers are utilised, the importance of maintaining an adequate quality assurance (QA) technical workforce within Defence was also emphasised. Ms Tracey Davis stated:

> The First Principles Review has recommended the contracting out of more work. It is essential that QA staff who ensure Defence materiel is delivered in compliance with our contracts be excluded from the effects of this recommendation. Defence cannot delegate its responsibility to ensure the safety of our ADF men and women…[78]

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74 *Submission 27*, p. 13.

75 For example, Mr Nicholaides, AMWU, *Committee Hansard*, 5 February 2016, p. 19.

76 *Submission 10*, p. 2.

77 *Submission 24*, p. 8.

78 *Submission 12*, p. 2.

4.67 Professionals Australia also considered that, if the Australian Government wished to maintain Australia's position and technological edge, it needed 'to stop focussing on outsourcing or merging capability, and start focusing on strengthening it, improving integration and engaging the science and engineering workforce'. It was aware of 'other examples where outsourcing or partial outsourcing of engineering support for acquisition or sustainment has led to inefficiencies, added bureaucracy, delays and blurred accountabilities for multi-billion dollar programs'. Additionally, it was concerned that critical science and engineering restructures are being determined by contractors that have a conflict of interest in proposing structures that may, or may not, lead to further outsourcing of engineering functions.[79]

4.68 Professionals Australia recommended the Australian Government 'review all existing contracts for engineering services to identify what can be delivered more effectively in-house, what is required to maintain sovereignty of professional expertise and to ensure Defence is a smart customer in both acquisition and sustainment activities'.[80]

4.69 In contrast, Northrop Grumman had a more favourable view of outsourcing certain PSE capabilities. It stated:

> While there is justification to maintain an in-house capability in defence science and research within the Defence Science and Technology Group, there seems no compelling reason to maintain a specialised engineering capability as these skills generally exist across the Australian industrial base. Instead, the Australian Defence Organisation, including the Defence Science and Technology Group, should seek to buy-in these specialised engineering skills from the Australian industrial marketplace.[81]

4.70 At the November hearing, Mr Lovell from Northrop Grumman differentiated the specific engineering expertise to complete tasks that Defence would always need to have 'in-house' with others which could utilise the expertise of large international Defence companies. He argued that industry has 'a distinct advantage, particularly when you are talking about the globalised companies, at the architectural level'.

> [W]here industry starts getting involved in the science side is really to work with governments, particularly DSG, in taking promising research that really may lead to new capabilities or new products, because industry really has more horsepower to do this sort of thing. So when you are talking about product development, you are really talking about engineering.
>
> what we need, as far as looking at the whole of defence capability, is CASG, the former DSTO, to really have the technical expertise to be a smart buyer, to actually understand the art of the possible, not try to build it. Go back to the predecessor organisations of CASG…[W]hat we really need

79 *Submission 25*, p. 9.

80 *Submission 25*, p. 11.

81 *Submission 26*, p. 5.

> from CASG is enough knowledge to be a smart buyer and a smart sustainer of equipment.[82]

4.71 There were a variety of views expressed on whether any of the functions of the DSTG could be outsourced. The FPR considered that there was 'no clear case for outsourcing the Defence Science and Technology Organisation and, in fact, this approach may be detrimental to the support it offers to Defence and its other customers'.[83] Similarly, Professor David Field from AAS noted that DSTG was 'a very unique environment' and that the 'nature of the work that gets done means that some of it is not easily outsourced'. This required maintaining an in-house capability to deal with unexpected situations.[84]

4.72 However, Dr Davies identified that parts of DSTG's work 'at the research end of the spectrum' could be undertaken outside of Defence. He stated:

> The [DSTG] has actively resisted any notion of outsourcing defence science, often citing security concerns and/or the need to protect allied science and technology. As a result we have ended up with what I think is an organisation that is mostly fair to good with outposts of excellence. That is not good enough in a scientific organisation….The Pentagon makes good use of the many fine research schools in the United States including, incidentally, on some highly classified and sensitive activities. Defence does not need to own all of its researchers. In fact, I would argue that the public service tenured employment model is often an impediment to workforce agility and to the ability to apply appropriate resources to new problems and emerging technology.[85]

82 Mr Lovell, Northrop Grumman, *Committee Hansard*, 17 November 2015, p. 8.

83 FPR, p. 42.

84 *Committee Hansard*, 17 November 2015, p. 12.

85 *Committee Hansard*, 5 February 2016, pp 1-2.