

## Air capability and procurement

- 3.1 The Committee is cognisant of the position air capability holds within the larger context of ADF force readiness. We also acknowledge the unprecedented changeover of platforms that Defence is managing across its air capability and elsewhere. Successive White Papers have flagged air superiority as a key element in Australia's strategic doctrine and there has been lively debate on how to achieve this objective.
- 3.2 At the same time, there has been concern over particular projects such as replacement of the Navy's Sea Hawk helicopters, as discussed in Chapter 4. This has helped to highlight the importance of rotary aircraft in the ADF, including Tiger helicopters considered later in this chapter.

### **Wedgetail AEW&C**

#### Introduction

- 3.3 Wedgetail (Project AIR 5077) is an Airborne Early Warning and Control (AEW&C) platform based on the Boeing 737-700 airframe. It is intended to provide situational awareness and targeting information for all ADF elements, and as a result commentators have characterised Wedgetail as 'a crucial force multiplier for the Australian Defence Force as a whole'.<sup>1</sup>

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<sup>1</sup> Thomson, Mark, *Cost of Defence 2008-09*, p.185.

- 3.4 Meeting timeliness has been a problem for the project. According to the *Defence Annual Report 2007-08*, Defence placed its initial order for four Wedgetails with prime contractor Boeing in December of 2000. In April 2004 the order was expanded to include a further two aircraft.<sup>2</sup>
- 3.5 In early 2007 Boeing advised of a 'two-year slip in the program', and subsequently presented a 'schedule replan' to the Commonwealth.<sup>3</sup> In June 2008 Boeing advised Defence of a 'further schedule delay of 10 months to the delivery of the first fully mission capable aircraft', and undertook to deliver the first aircraft in January 2010.
- 3.6 The *Defence Annual Report 2007-08* notes that delivery on this date would represent 'a total delay of 38 months against the contract baseline.'<sup>4</sup> To off-set this, Boeing have undertaken to 'deliver two aircraft in July 2009 with sufficient capability to enable the ADF to commence training and bed-down its logistics support systems'.<sup>5</sup>

## Current status

- 3.7 In public hearings, Defence told the Committee that while time-lines continued to be a central concern for the project, there was also significant concern over whether the project was likely to deliver contracted capability.
- 3.8 Defence informed the Committee of two 'fundamental areas' that were considered problematic: 'the radar performance in particular modes' and 'the electronic surveillance measure system'.<sup>6</sup>
- 3.9 Defence advised the Committee that these difficulties stemmed from decisions made early in the project. Wedgetail was intended to supply the ADF with an AEW&C capability with reduced operating costs compared with similar platforms then available. This led to a requirement for a smaller, lighter radar capability for the aircraft, and the adoption of the novel design MESA (Multi-Role Electronically Scanned Array) radar, a 'new L-band radar capable of being carried on ... the 737'.<sup>7</sup>

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2 ANAO, *DMO Major Projects Report 2007-08*, p.110.

3 ANAO, *DMO Major Projects Report 2007-08*, p.110.

4 *Defence Annual Report 2007-08*, Vol 2, pp. 26-27.

5 *Defence Annual Report 2007-08*, Vol 2, p. 27.

6 Mr King, *Transcript*, Thursday 16 April 2009, p.32.

7 Mr King, *Transcript*, Thursday 16 April 2009, p.32.

- 3.10 These decisions increased the level of the risk for the project. Defence told the Committee that the combination of an 'aerospace project with a new developmental radar' resulted in the project having 'all the hallmarks of a technically challenging project'.<sup>8</sup> A key aspect of this was that, as a 'developmental radar', the MESA package could not be tested until the project had advanced sufficiently to produce a working system.<sup>9</sup>
- 3.11 At the public hearing on 16 April 2009, Defence advised the Committee that although the project had been running for some time, these risks were still outstanding. Important questions about its effectiveness of the MESA radar had not yet been fully resolved. These included questions over whether the MESA radar was a 'fundamentally sound radar', and if 'it does not work to full specification at the moment will it over time grow into being everything we expected?'<sup>10</sup>
- 3.12 A key concern was the capacity of the MESA radar to reject clutter and represent objects clearly as it scanned terrestrial environments:
- Radar like this looks down on the ground and everything that is on the ground and is a legitimate target for a radar like that. It comes down to the software to be able to sort real targets or air targets above the ground from the ground behind it. That is fundamentally the issue with the radar.<sup>11</sup>
- 3.13 Defence told the Committee that measures had been taken to manage risk. Defence had initiated a review of the MESA radar's capability with a reputable independent assessor, the MIT Lincoln Laboratory.<sup>12</sup> The results of this review should lead, Defence told the Committee, to a resolution of outstanding questions over the MESA radar. Defence also initiated a test program, discussed below, that had allowed the project to regain momentum.
- 3.14 At the public hearing on 21 August 2009, the Chair asked Defence for an update on progress with the Airborne Early Warning and Control System:
- The current contract was based on the fact that the aircraft would perform in all areas to the contracted level at delivery. Boeing and we agree now that there are some aspects of the aircraft performance that will not meet the contracted level at initial delivery, in particular some elements of the radar performance

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8 Mr King, *Transcript*, Thursday 16 April 2009, p.32.

9 Mr King, *Transcript*, Thursday 16 April 2009, p.36.

10 Mr King, *Transcript*, Thursday 16 April 2009, p.32.

11 Air Vice-Marshal Thorne, *Transcript*, Thursday 16 April 2009, p.32.

12 Mr King, *Transcript*, Thursday 16 April 2009, p.32.

and some subsystems. We are going through that standstill deed period at the moment, which included an in country demonstration, which was conducted a few months ago in Australia with, I might add, satisfactory results, and a bridge test and trials program at the moment. On satisfactory completion that will allow us to take initial delivery of the aircraft at initial capability, which is not the final capability. That capability has been determined by the Air Force that will allow them to start operating the aircraft in Australia and commence training aircraft crews in the use of this aircraft. Of course, it is a brand-new capability for the Air Force and it takes quite some time to learn to use all of its features.

The current plan is that this trial period will complete in November of this year and soon after the first two aircraft will transition back to Australia. It is certainly my belief that it is unlikely that we will meet that November date – it will not be missed by much, maybe by a few months. On completion of that program those first two aircraft will come back to Australia and then in the following period the additional aircraft will return to Australia.<sup>13</sup>

3.15 Defence went on to update the Committee on the difficulties being experienced with the radar:

...the radar will not meet its full contracted capability. There are about 10,000 requirements on this aircraft. That some standards are not met is probably rational given that there are 10,000 specifications. However, this area of radar performance is important to us. We engaged the Massachusetts Institute of Technology to look at this issue for us. Their conclusions were very similar to ours, which is that there will be this shortfall in this aspect of the radar performance. We are now doing studies to determine operationally what that means. It is one thing to have a technical limitation, but what does it mean operationally in reality?

The conclusion is that there is no technically viable solution for that element of performance to date, so we have to recognise that. Part of our negotiations with Boeing at the moment is to determine a settlement for the delivery of the aircraft in relation to the

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13 Mr King, *Transcript*, Thursday 21 August 2009, p.2-3.

lateness of the delivery and this performance shortfall and what plan we will put in place to incrementally improve that performance when the technology to solve that becomes available.<sup>14</sup>

- 3.16 The Chair summarised his understanding of the Project's position – 'So we are going to get (the aircraft) three years later than we thought and it is going to (do) less than we thought.'
- 3.17 In response to a further question from the Committee, Defence summed up the current situation as follows:

The current planning is that IOC and initial operational release of the full capability would be in 2011. That is highly dependent on, in particular, recognising that there is this area of the radar shortfall that will not be fixed in that time frame. We are still assessing what the full operational impact of that is. But all other aspects of the aircraft should be ready: the picture compilation, the system stability so that it does not crash, data links and radios. In particular, the one area that is causing us trouble and is needed for the complete capability is the ESM system, the electronic surveillance system. That work is being undertaken in Australia by BAE, and it is behind – obviously the whole program is. But it is probably, after this radar performance, our most worrying area. So, from the point of view of having a fully capable system that will be able to make sure we have really competent Air Force crews, that can be achieved.

Where the ESM becomes most critical, of course, is when you want to put these aircraft in an absolute battle environment. I think that, in terms of getting fully competent and trained Air Force crew, we will be right for that 2011 time frame. The exception, the worrying bit and the bit that we are putting a lot of focus on is: will we have all the electronic protection that we need so that these aircraft could at that time be deployed into an absolute hostile environment?<sup>15</sup>

### Contract style and administration

- 3.18 Defence told the Committee that the 'second thing that is causing us a lot of difficulty is the contract': that is, that some difficulties stemmed from the style of contract employed for the project. This contract is a fixed-price

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14 Mr King, *Transcript*, Thursday 21 August 2009, p.3.

15 Mr King, *Transcript*, Thursday 21 August 2009, p.7.

contract with milestone payments and provision for penalties if the contractor should fail to deliver on scheduled items over the term of the project.

3.19 Defence described resulting difficulties in this way:

Clearly, we know that this program has cost Boeing a lot of money. I want to stress that we will ultimately pay the contracted fee less any adjustments, and no more. The real issue for us in the military sense is that we do not have the capability that we expected. One of the problems with the way in which the contract was structured-it is a legitimate way for the contract to be structured-is that once the company acknowledged that the system would not meet all the requirements, basically we had a problem.<sup>16</sup>

3.20 Defence told the Committee that the implications of this form of contract were that:

Because of the way in which the contract was structured we would not go into acceptance testing unless we had completed development testing. But once we had a statement that only confirmed our belief that the system would not meet all the requirements at delivery we could not go into acceptance testing. We were caught in a stand off, if you like. If we had gone into acceptance testing we would have been tacitly accepting that it had met all requirements so there was a catch. We implemented a standstill deed. Boeing is saying, 'We cannot progress if you do not let us progress' and so on.<sup>17</sup>

3.21 Defence advised the Committee that its response, ultimately, had been to 'step aside' from 'the contracts with all contract rights retained' and to institute a test program, in Australia for some partially-completed aircraft 'without accepting on our behalf that it meets all requirements'. The object of testing was 'to see what it could do'. Once in place, the program had 'reinvigorated' prime contractor Boeing, and the project regained momentum.<sup>18</sup>

3.22 At the end of the test program, Defence told the Committee, it would make decisions not only about the future of the project, but about avenues for remediation under the contract:

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16 Mr King, *Transcript*, Thursday 16 April 2009, p.33.

17 Mr King, *Transcript*, Thursday 16 April 2009, p.33.

18 Mr King, *Transcript*, Thursday 16 April 2009, p.33.

One is the avenue of liquidated damages, which is for a pre-agreed amount of money for a delayed arrival of a capability, and the other is the normal compensatory claims for failure to deliver full capability.<sup>19</sup>

## Committee comment

- 3.23 It is of great concern to the Committee that a project of this importance, size and scope remains uncertain. The central role of an AEW&C capability in completing the air defence 'package' is a serious issue.
- 3.24 The unique security environment for which Australian defence assets are acquired, will from time to time require tailored or special design solutions. That said, many Australian defence needs can be properly met with Military-Off-The-Shelf (MOTS) acquisitions. The case for adopting high risk first-of-type acquisitions such as Wedgetail needs to be made. In the absence of a clear strategic case for such purchases, MOTS should be the default option. Recommendation 1 refers to this matter.
- 3.25 It is the Committee's view that the most important objective is for the ADF to acquire needed AEW&C capability in the shortest time practicable. This will entail a renewed focus by Defence on managing the Wedgetail contract in an effective and efficient manner and dramatically improved outcomes from the prime contractor.

## Tiger Armed Reconnaissance Helicopter - AIR 87

### Introduction

- 3.26 AIR 87 is a project to acquire 22 Eurocopter Tiger helicopters on behalf of Army. They will operate as Armed Reconnaissance Helicopters (ARH).
- 3.27 The Tiger ARH is considered:
- ... a key element of Australia's emerging Hardened and Networked Army. Its suite of sensors and tactical data links, along with its gun and missile armament, bestow a significant airborne

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<sup>19</sup> Mr King, *Transcript*, Thursday 16 April 2009, pp.35-36.

reconnaissance capability along with the ability to escort other helicopters and provide fire support when required.<sup>20</sup>

- 3.28 The helicopters will replace 'obsolete, Vietnam-era' elements of Army's current helicopter fleet, consisting of Bell UH-1H gunships and Bell 206 Kiowa reconnaissance helicopters.<sup>21</sup>
- 3.29 The full scope of the AIR 87 project is to acquire the 22 helicopters, training systems for flight and ground crews; a software support capability; systems to support operational communications, electronic warfare missions and maintenance; and 'facilities and ammunition'.<sup>22</sup>

### Time-lines

- 3.30 AIR 87 began with a government endorsement of a Capability Proposal (1994). A preferred tender was approved by Cabinet in 2001.<sup>23</sup>
- 3.31 Since then, there have been significant changes to project time-lines. The original In-Service Date was in December 2004. Currently, Initial Operational Release is scheduled for March 2010, and Full Operational Capability for December 2011.<sup>24</sup>
- 3.32 The *Defence Annual Report 2007-2008* shows that the project is 24 months overdue on achieving 'delivery of operational capability'.<sup>25</sup>
- 3.33 The ANAO *Defence Major Projects* report shows a delay of 21 months for acceptance of the first 11 ARH aircraft, and a delay of 28 months for the remaining 11 aircraft of the order. It also shows that the project is overdue on a number of other components, including 43 to 56 month overruns for Cockpit Procedural Trainers. There is a projected 53 month overrun for the Full Flight Mission Simulator (Full Training capability).<sup>26</sup>

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20 Thomson, Mark, *The Cost of Defence: ASPI Defence Budget Brief 2008-09*, ASPI, viewed 23/02/09, [http://www.aspi.org.au/publications/publication\\_details.aspx?ContentID=170&pubtype=-1](http://www.aspi.org.au/publications/publication_details.aspx?ContentID=170&pubtype=-1), p.182.

21 Thomson, Mark, *Cost of Defence 2008-09*, p.174.

22 *Projects: AIR 87 - Armed Reconnaissance Helicopters*, viewed 18/03/09, <http://www.defence.gov.au/dmo/asd/air87/main.cfm>.

23 *Projects - AIR 87 - Armed Reconnaissance Helicopters*, <http://www.defence.gov.au/dmo/asd/air87/main.cfm#history>.

24 *Projects - AIR 87 - Armed Reconnaissance Helicopters*, <http://www.defence.gov.au/dmo/asd/air87/main.cfm#history>.

25 *Defence Annual Report 2007-08*, Vol. 2, p.34.

26 Australian National Audit Office 2008, *Defence Materiel Organisation Major Projects Report 2007-08*, viewed 18/02/09, [http://www.anao.gov.au/uploads/documents/2008-09\\_Audit\\_Report\\_09.pdf](http://www.anao.gov.au/uploads/documents/2008-09_Audit_Report_09.pdf), p.202.

## Delays and risks

- 3.34 The certification process for the Tiger helicopter has contributed to project delays. To be considered air-worthy, aircraft need to be assessed and certified by appropriate authorities. For Tiger, Defence decided to rely on certification in France, obviating the need for a separate certification process in Australia.
- 3.35 However, as the French certification process did not run according to plan, this has exposed the Australian project to considerable delay. This has also led to delays for simulation and training equipment.<sup>27</sup>
- 3.36 These delays have resulted in a reduced capacity to train instructors, and therefore pilots, for the ARH.<sup>28</sup> There are also fewer ADF pilots who are in a position to conduct acceptance testing, due to high operational tempos in the ADF. As a result, 'Initial Operational Capability (IOC) with a cadre of trained aircrew for the first of the two Squadrons has been delayed significantly'.<sup>29</sup>
- 3.37 There continue to be ongoing levels of risk for the project. The *Defence Annual Report 2007-08* suggests this stems from challenges with 'qualification and certification for aircraft and systems'.<sup>30</sup>
- 3.38 The ANAO *Major Projects* report identifies further elements of risk for the project. It agrees that certification is an identified risk for the project, particularly in relation to 'schedule slippage', but it also notes other risks.
- 3.39 The ANAO report also suggests that skilled personnel 'particularly in engineering and Test and Evaluation, are at a critical level', and flags this as 'the highest priority risk under management'. Another risk is that a 'sustained high rate of effort is required to complete aircrew training and introduce the operational capability'.<sup>31</sup>

## Current status

- 3.40 In relation to timelines, Defence told the Committee that the project was on a 'tight schedule' to achieve one of its milestones in September 2009. This was 'a test and certification to finalise the aircraft to hand them over in a complete stage to army for its initial operational test evaluation'.<sup>32</sup>

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27 ANAO *Major Projects Report 2007-08*, p.202.

28 Thomson, Mark, *Cost of Defence 2008-09*, p.174.

29 Thomson, Mark, *Cost of Defence 2008-09*, p.175.

30 *Defence Annual Report 2007-08*, Vol 2, p.34.

31 ANAO, *DMO Major Projects Report*, p.205.

32 Major General Fraser, *Transcript*, Thursday 16 April 2009, p.8.

- 3.41 It is necessary to amass a certain number of flying hours to achieve certification. Defence told the Committee that it had based three of the ARH helicopters in Darwin, and this had been 'successful' in providing a sufficient 'rate of effort' toward certification. However, for aircraft based in Adelaide the rate of effort had proved not 'as high as we would like'.<sup>33</sup>
- 3.42 Defence did not discuss project delays for the ARH with the Committee in a broader sense. However, it raised two matters that were relevant to this issue.
- 3.43 First, Defence told the Committee that there were indicators, such as the speed and effectiveness of a recent software upgrade, which showed that the ARH had 'reached a level of maturity that I would regard as off the shelf'.<sup>34</sup>
- 3.44 Other indicators of project maturity were successful integration of weapons systems, in particular mounted guns and Hellfire missiles. For Hellfire, integration had been sufficiently successful that it had paved the way for their adoption on the Tiger/ARH platform in France.<sup>35</sup>
- 3.45 Defence also informed the Committee that there were also other advanced capabilities integrated into the Australian Tiger /ARH, such as the ability to slave mounted guns to helmet systems, which 'is above what the others in the world are using in Tiger'.<sup>36</sup>
- 3.46 From this point of view, Defence told the Committee, the project was progressing well. It was 'now just a matter of keeping up with the work rate in order to achieve the milestones'.<sup>37</sup>
- 3.47 Second, Defence told the Committee that it had responded to problems in the progress of helicopter projects by ensuring that sufficient resources were devoted to them. Two years previously DMO had created 'a specific helicopter systems division' to 'answer that question about resourcing, ensuring that we have that important capability, which our helicopters required for the ADF'.<sup>38</sup>
- 3.48 This division, 'with those resources led by an experienced general in army aviation, and with a team of aviators and senior project managers who are managing that area' has, Defence told the Committee, produced the 'sorts

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33 Major General Fraser, *Transcript*, Thursday 16 April 2009, p.8.

34 Major General Fraser, *Transcript*, Thursday 16 April 2009, p.8.

35 Major General Fraser, *Transcript*, Thursday 16 April 2009, p.8.

36 Major General Fraser, *Transcript*, Thursday 16 April 2009, p.9.

37 Major General Fraser, *Transcript*, Thursday 16 April 2009, p.8.

38 Mr Gillis, *Transcript*, Thursday 16 April 2009, p.9.

of performances we are seeing now on these new platforms', which 'are a testament to that resourcing'.<sup>39</sup>

3.49 At the 21 August 2009 public hearing, Defence advised the Committee that the latest position was:

We have accepted 16 aircraft at the moment and three of those are in the mature configuration, the final configuration for Tiger, which is a software based platform, as you saw during your visit. We are on schedule to achieve for Army the initial operational test and evaluation milestone later this year, where they will take the aircraft, having been individually trained, and migrate across the collective war-fighting skills to truly fight the aircraft. That is going well. Essentially, we have completed most of the risk areas associated with testing. There is still a little bit to be done to tidy up some certification work for night and for instrument flying of the aircraft, but the gun work was done recently, about three months ago. You might have seen some media associated with the aircraft that flew and fired a live fire demonstration in Darwin, with the Abrams tanks, with the light armoured vehicles and with the soldiers of the 1st Brigade. That was very important, I think, for the capability itself and for embedding it into Army operations... As for the total fleet, we have flown now 4,200 hours and fired about 4,000 rounds out of the cannon, which is an exceptional weapon. I think they briefed you on the accuracy of the hellfire missile. That integration has been a great success. Dr Gumley has provided evidence to you and to other committees previously about the technical challenges we had with the Tiger, as a developmental type aircraft. It certainly was that when we bought it. It was more developmental than we would have liked, but we have been very satisfied with the contractor and with DGA's support to bring us to the capability we are now fielding.<sup>40</sup>

### Committee comment

3.50 The Committee is encouraged to see that the Tiger / ARH project is moving toward a successful conclusion, despite some delays that beset the earlier stages of this project.

3.51 For this project, there have been readily-identifiable risk factors that have contributed to delays. Defence's position as an early-adopter / purchaser

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39 Mr Gillis, *Transcript*, Thursday 16 April 2009, p.9.

40 Major General Fraser, *Transcript*, Friday 21 August 2009, p.7-8.

of Tiger / ARH is clearly one aspect of this. In this context though, we note that the Australian development of the Tiger has outpaced the French parent facility.

- 3.52 However, the Committee notes that there have been certification issues for both the Tiger and Chinook helicopter projects.<sup>41</sup> It is the Committee's view, therefore, that Defence should review its procedures on certification.

## Joint Strike Fighter

### Introduction

- 3.53 Australia's interest in the Joint Strike Fighter (JSF) stems from the identification of a requirement for air superiority fighter capability by the Defence White Paper 2000.<sup>42</sup>
- 3.54 In the 2009 Defence White Paper, the government announced its intention to acquire 'around 100 F-35 JSF' aircraft, and 'not fewer than 72'.<sup>43</sup> This will see Australia move from its present participation in the System Design and Development (SDD) phase of the JSF project to actual acquisition of the aircraft. The DMO project, *Acquiring Leading Edge Air Combat Capability* is dedicated to managing this process.<sup>44</sup>
- 3.55 The JSF acquisition will be the most expensive single acquisition in Defence's history. As our sole or principal air fighting platform, it is also arguably our most important defence acquisition.
- 3.56 The JSF is regarded as a technologically-advanced aircraft. Claims for it are that, to an advanced degree, it will be able to identify hostile and friendly forces, provide a single, fused stream of information on 'situational awareness', and track and attack a wide range of targets in real-time.<sup>45</sup> This is regarded as a significant advance over previous military aircraft.

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41 Major General Fraser, *Transcript*, Thursday 16 April 2009, p.4.

42 *Defence 2000: Our Future Defence Force*, 2000, Commonwealth of Australia, viewed 27/03/09 <http://www.defence.gov.au/publications/wpaper2000.PDF>, p.85.

43 Department of Defence 2009, *Defending Australia in the Asia Pacific Century: Force 2030*, [http://www.defence.gov.au/whitepaper/docs/defence\\_white\\_paper\\_2009.pdf](http://www.defence.gov.au/whitepaper/docs/defence_white_paper_2009.pdf), pp.78-79.

44 *Acquiring Leading Edge Air Combat Capability*, viewed 27/03/09, [http://www.defence.gov.au/dmo/lsp/Joint%20Strike%20Fighter%20\(JSF.cfm](http://www.defence.gov.au/dmo/lsp/Joint%20Strike%20Fighter%20(JSF.cfm)

45 Houston, Angus 2004, *Is the JSF good enough? - Can Australia's air combat requirements be met by the JSF, or do we need the F/A-22?* ASPI, viewed 30/03/09

- 3.57 In current terminology, the JSF is a 'fifth generation' aircraft, that is: it embodies stealth (low visibility to radar) characteristics pioneered in the F-117, B-1 bomber and F-22 aircraft. Stealth characteristics provide such aircraft with an advantage due to a lower vulnerability to enemy guided weapons and sensing.<sup>46</sup>
- 3.58 Further interest in the JSF is created by the prospect of elements of the Australian defence industry being contracted to supply products to the project.<sup>47</sup>

## Surrounding debates

- 3.59 This is one of the most controversial defence procurement projects of recent years. This is due to several factors. There are two essential areas of debate. One which can be characterised as relating to business processes and a second that considers JSF technical capabilities.
- 3.60 Firstly, business arguments focus on the original decision in 2002 for Australia to take part in the SDD phase made outside existing procurement protocols.<sup>48</sup> This appears to work against undertakings that defence procurement will increasingly take place under strong conventions of process and review.
- 3.61 Secondly, the JSF is a high-risk project that entails early acquisition of an unproven product. A number of authoritative sources indicate that taking this role as a 'lead customer' correlates with higher levels of risk in defence acquisitions.<sup>49</sup> This combination could bring significant levels of risk to the project.
- 3.62 A further dimension of risk is that the number of JSFs to be acquired by other nations remains unknown, particularly in view of the Global Financial Crisis. It has been suggested that lower numbers from other

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[http://www.aspi.org.au/publications/publication\\_details.aspx?ContentID=56&pubtype=6](http://www.aspi.org.au/publications/publication_details.aspx?ContentID=56&pubtype=6), p.4.

46 These matters are covered in greater detail in the report of the Joint Standing Committee on Foreign Affairs Defence and Trade, 2007, *Inquiry into Australian Defence Force Regional Air Superiority*, Parliament of Australia, viewed 09/04/09, <http://www.aph.gov.au/house/committee/jfadtd/adfair/report/fullreport.pdf>.

47 Wright, Christopher 2006, 'The Joint Strike Fighter: a global supply chain with local impact', in *The business of defence: sustaining capability*, ed. Marsh, I., CEDA, Melbourne, pp.66-67.

48 Wright, Christopher, 2006, 'The Joint Strike Fighter', p.65.

49 ANAO, *DMO Major Projects Report 2007-08*, p.52.

purchasers – including the US – could result in a higher cost for Australia.<sup>50</sup>

- 3.63 ‘Technical arguments’ focus on the extent to which the JSF is the best means available to fulfil the identified requirement for an air superiority fighter. On one side there are those who see the JSF as the technologically-capable fighter that it is promised to be,<sup>51</sup> or that it is simply ‘the only 5<sup>th</sup> generation aircraft available’.<sup>52</sup>
- 3.64 In essence, these views focus on an asserted technological superiority for the JSF, particularly in the realm of sensing and targeting.<sup>53</sup> If they prove to be valid, claims for JSF capability – such as the ability to track multiple targets simultaneously, to fuse information streams into a single picture, and to share information with other aircraft and systems – puts the project squarely within the domain of Network Centric Warfare.
- 3.65 There are also critical views on JSF. Some suggest that the JSF is too small to provide an adequate air superiority capability. This, it is suggested, limits the JSF in terms of range, capacity to carry weapons, and prevents the JSF from being fitted with improved radar facilities as they become available.<sup>54</sup> These limitations have been supported by war-game simulations against possible antagonists.<sup>55</sup>
- 3.66 A further criticism is that the JSF has inferior flight characteristics to other aircraft currently being acquired by other nations in Asia and South-East Asia, notably aircraft of the Sukhoi Su-35 family.<sup>56</sup> Debate over this encapsulates differences between those in favour of the JSF and those against. Pro-JSF opinion asserts that technological superiority in stealth, sensing, targeting and data capabilities makes this unimportant,<sup>57</sup> or less

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50 Kopp, Carlo 2007, ‘Lockheed-Martin F-35 Lightning II Joint Strike Fighter - Assessing the Joint Strike Fighter’, *Air Power Australia*, viewed 30/03/09 <http://www.ausairpower.net/APA-JSF-Analysis.html>; Kerr, Julian 2009, ‘JSF consortium pricing on the cards?’ *Australian Defence Magazine*, vol. 17, no. 3, p.84.\*

51 Gubler, Abraham S 2009, ‘Gauging the Lethality Edge of the F-35’, *Australian Defence Monthly*, vol. 17, no. 3, pp.36-40.

52 Air Marshal Errol McCormack in *The Defence White Paper - Balancing Competitive Demands*, 2008, Royal United Services Institute of Australia (RUSI), viewed 27/03/09 [http://dpl/Books/2008/RUSI\\_DWP\\_Forum\\_Proceedings.pdf](http://dpl/Books/2008/RUSI_DWP_Forum_Proceedings.pdf), p.22.

53 Houston, Angus 2004, *Is the JSF good enough?* p.4 ff.

54 Kopp, Carlo, 2007, *Lockheed-Martin F-35 Lightning II Joint Strike Fighter*.

55 Stillion, John & Scott Perdue 2008, *Air combat past, present and future*, Rand Corporation, viewed 30/03/09 [http://reporter.kro.nl/downloads/rand\\_pacific\\_view.pdf](http://reporter.kro.nl/downloads/rand_pacific_view.pdf).

56 Kopp, Carlo 2007, *Sukhoi Flankers - The Shifting Balance of Regional Air Power*, *Air Power Australia*, viewed 30/03/09 <http://www.ausairpower.net/APA-Flanker.html>.

57 Gubler, Abraham S, *Gauging the Lethality Edge of the F-35*, p.40.

important.<sup>58</sup> JSF sceptics, however, say that recent developments (particularly Infra-red sensing) make stealth characteristics a less significant advantage, and that as 'opposition' forces develop technological responses to stealth technology, flight characteristics of aircraft become correspondingly more important.<sup>59</sup>

## GAO report on scheduling and cost

3.67 An important further strand of debate and information on JSF comes from the US Government Accounting Office (GAO). A series of GAO reports have identified or anticipated cost and time-line overruns.<sup>60</sup>

3.68 The most recent GAO report on the JSF identifies a 30 per cent increase in project costs and a two-year delay in the project schedule.

3.69 Importantly, in this report, the GAO expresses strong concerns over decisions to conduct a very high proportion – without precedent – of testing for the JSF in laboratory conditions. The Committee notes that when this concern was put to Defence the response was:

The JSF project officers also looked at that and given the size of the JSF production run they have done some costing based on the F22. They looked at the cost of the retro fit to correct any errors against the size of the JSF program. The business case was that it was far more cost-effective to keep going.<sup>61</sup>

3.70 While accepting that the two projects are very different, the Committee notes a marked contrast with the position Defence took in its evidence at para 2.15 of this report during a similar discussion on retrospectivity and the HF Communications project:

As a part of the program to try to catch up time, they cut corners on their systems engineering process. The cutting of corners and then led to rework. It takes you longer to rework stuff than it does to do it right in the first place.<sup>62</sup>

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58 Houston, Angus, 2004, *Is the JSF good enough?* p.4 ff.

59 Kopp, Carlo 2004, 'F/A-22As, JSFs and 21st Century air combat', *Air Power Australia*, viewed 30/03/09 <http://www.ousairpower.net/0915-ADM-Rebuttal.pdf>.

60 GAO 2006, *Major Weapon Systems Continue to Experience Cost and Schedule Problems under DOD's Revised Policy* (GAO-06-368), GAO, viewed 24/03/09 <http://www.gao.gov/new.items/d06368.pdf>; GAO 2009, *Joint Strike Fighter: Accelerating Procurement before Completing Development Increases the Government's Financial Risk* (GAO-09-303), viewed 27/03/09 <http://www.gao.gov/new.items/d09303.pdf>.

61 Air Vice-Marshal Harvey, *Transcript*, Friday 21 August 2009, p.12.

62 Ms McKinnie, *Transcript*, Thursday 16 April 2009, pp.40-41.

- 3.71 The GAO also notes that under current project time-lines a significant number of aircraft are to be provided to the US military before the full suite of test aircraft come off the production line. In the view of the GAO, both of these factors significantly increase overall risk associated with the project.<sup>63</sup>
- 3.72 The main source of risk for the project, however, is the very considerable task of software development and systems integration whose scale and complexity may be unprecedented. It is notable that commentators both in favour and against the JSF agree that these are pivotal areas for the project.<sup>64</sup>

## Current status

- 3.73 In terms of scheduling, on 21 August 2009 the Committee was informed that:

The JSF is on schedule, I think the test program is running four or five months late. The aircraft are going through the factory and being built pretty much on time but the test program has been delayed by about four or five months. Before we get our aircraft that will be caught up of course because this affects the early delivery of the US aircraft and we are some years behind the US. It is not something I lose much sleep about. About this time last year I gave some estimates and they have not really changed that much on cost.<sup>65</sup>

- 3.74 In terms of costing estimates the Committee received the following advice from the DMO:

The F135 engine though is more expensive than people expect. Lockheed and Pratt and Whitney are working very hard now on how they can get the engine costs down. The airframe itself is coming through at about the same price as we talked about last year. It is not cost that worries us so much, it is the four or five months behind schedule and how that is going to affect the test program.<sup>66</sup> The DMO added:

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63 GAO 2009, *Joint Strike Fighter: Accelerating Procurement*.

64 Houston, Angus, 2004, *Is the JSF good enough?* p.5; Kopp, 2007, *Lockheed-Martin F-35 Lightning II Joint Strike Fighter*.

65 Dr Gumley, *Transcript*, Friday 21 August 2009, p.9.

66 Dr Gumley, *Transcript*, Friday 21 August 2009, pp.9-10.

The system development demonstration phase was essentially based on a contribution by the partners, the US government, where they are responsible for about 90 per cent of total development and they have taken on the increased cost of development, other than in one small area where we contributed or proposed to contribute, but otherwise we are protected because the US takes the lead in the development costs.<sup>67</sup>

- 3.75 The Committee notes that, as matters currently stand, there will only be one engine type available for this aircraft:

People say it is good to have two engines, both for strategic reasons – you could only have half the fleet down perhaps – and because it is good to have competition. They have a strategic reason for their base capability in the country to build fighter engines. The counter argument is that it is a lot cheaper to just design one engine, because it is some billions of dollars to design it. With one engine type, you are producing twice as many and you get down the learning curve and it is cheaper. That is still in discussion in Congress at the moment.<sup>68</sup>

- 3.76 The Committee also notes that there are contemporary examples of risks with a single engine type:

...there is the fact that occasionally an engine goes crook and a whole fleet can be grounded, so there might be an argument to have two types of engines. It has happened to our Hawk lead-in fighter aircraft recently, where an engine got crook and we had to ground the fleet for a short period of time. So there are reasons both ways and that is why Congress is tussling with it very carefully at the moment.<sup>69</sup>

## Committee comment

- 3.77 This is a highly complex acquisition with inherent risks that have been highlighted by the GAO. When such issues are raised within the United States Government there are concurrent reassurances from the manufacturer and those involved in the project. From an Australian perspective, such inconsistencies are, at times, difficult to reconcile:

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67 Air Vice-Marshal Harvey, *Transcript*, Friday 21 August 2009, p.10.

68 Air Vice-Marshal Harvey, *Transcript*, Friday 21 August 2009, p.14.

69 Dr Gumley, *Transcript*, Friday 21 August 2009, p.14.

I also have trouble reconciling the two views. I go across to the CEOs conference for the Joint Strike Fighter and we get presented with lots of data and the data looks reasonably positive. I think it is honest – they tell us where there are problems; for example, the four or five months of testing and so on. But what I do is reconcile that against where Australia sits in the program. On Wedgetail, we are the lead customer and we are wearing a three-year delay. On JSF, we take most of our aircraft at years 5 and 6 of the program, so, even if a two- or three-year delay does happen, it affects us a lot less than it affects the Americans.<sup>70</sup>

- 3.78 This is not a project Defence or Australia can afford to get wrong. If the delays and capability shortfalls that have been experienced with Wedgetail are replicated with JSF there will be serious implications for Australia's defence and regional stability.

## Hornet Upgrade

- 3.79 The Committee sought an update regarding the contractual arrangements between British Aerospace (BAE) and Defence:

...the contract with BAE was signed last week, so the matter is now settled. When you last examined the issue, of course, there was some uncertainty about whether or not BAE had the intellectual property to sign a contract and there was some tooling and froing and some examination of the legal contract behind that. We were able to sign that contract with BAE and L3 as a partner in that contract last week.<sup>71</sup>

- 3.80 The Committee asked for an outline on what the upgrade program will contain now that the contract has been assigned to BAE:

There are two contracts that have been let recently, and they may tend to get confused. The first one is the one that has just been signed by BAE with L3 as a partner. That covers the structural refurbishment elements of the Hornet upgrade and some of the routine servicing. That is the contract that was signed last week. Boeing has just been selected as the preferred tenderer for a second contract which is the incorporation of electronic warfare upgrades of the fleet. They are the preferred tenderer and we would expect

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70 Dr Gumley, *Transcript*, Friday 21 August 2009, p.13.

71 Air Vice Marshal Thorne, *Transcript*, Thursday 16 April 2009, p.2.

that worked to commence in May. So both BAE and L3 will be working on Hornets and Boeing, if they are successful with the contract negotiations, will work on the electronic warfare upgrades.<sup>72</sup>

3.81 The Committee is concerned about reports of problems with intellectual property rights within this project.

3.82 The Committee notes the challenges concerning the ongoing structural issues affecting what is now an ageing fleet. The Committee were reassured by Defence's view that:

Our program to upgrade the Hornets – the F18A and F18B models – has been going very well. I think we have probably got F18As and F18Bs that are as good as anybody else's in the world. It is a very capable aircraft and we have kept abreast of the technology that is available. So I am very comfortable with that.

Of course, you would be aware that as we go further downstream we do start to encounter some fatigue management issues and there will be a need to basically replace the centre barrel. The centre barrel is the central part of the fuselage of some of the F18 aircraft that we have in the fleet. But with the introduction of the Super Hornet we have got a little more breathing space than perhaps we would otherwise have had. We should be able to transition into the Joint Strike Fighter quite effectively in the fullness of time. I am very comfortable with where we sit at the moment.<sup>73</sup>

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72 Air Commodore McPhail, *Transcript*, Thursday 16 April 2009, p.3.

73 Air Chief Marshal Houston, *Transcript*, Friday 19 June 2009, pp.6-7.

