



Supplementary Remarks – Dr Dennis Jensen MP

Despite the confidence displayed by the Department of Defence, I am not confident that the Joint Strike Fighter (JSF) will be able to deliver the capabilities promised within schedule and cost parameters.

This belief is well-founded and carefully considered, and is based on my observations of the JSF project over the last decade. For instance, in regard to the delivery schedule, former Chief of the Defence Force (CDF) Air Chief Marshal Angus Houston told the Parliament in 2004 that ‘the expectation is they will begin arriving in Australia in 2012’. In 2005 he stated that jets would begin to arrive in 2012. Despite these assurances, Australia is yet to take delivery of its first two aircraft, and Defence advised the Committee in the course of this review that Australia is ‘less than two years away’ from receiving its first two aircraft.¹ However, current defence plans have these aircraft remaining in the USA for some years!

Furthermore, in 2007, initial operation capability (IOC) was to be achieved by 2014-2015. By 2011, Air Vice Marshal Osley was informing the Parliament that IOC would be achieved in 2018.² In 2013, Vice Admiral Jones informed the Committee that ‘the program is likely to deliver the threshold capability needed for an Australian IOC in 2020’.³ As we can see, the slippage in schedule has been considerable over the life of the project, and there is no reason to believe the situation might improve given more recent disclosures in the USA.

Schedule is not the only area where estimates made by Defence and Lockheed Martin on which Australia’s decisions have been based have proven to be

1 Dr Dennis Jensen, *House of Representatives Hansard*, 13 February 2013, p. 163.

2 Dr Dennis Jensen, *House of Representatives Hansard*, 13 February 2013, p. 163.

3 Vice Admiral Jones, *Australian Defence Force, Transcript*, 16 May 2013, p. 6.

incorrect. The cost of the JSF has also been repeatedly revised throughout the life of the project. In 2004, Air Marshal Houston stated that the flyaway cost would be about \$45 Million per aircraft. By 2007 Air Commodore Harvey was estimating 'approximately \$55 Million' on average. By 2008, Dr Gumley of the Defence Materiel Organisation noted that he would be surprised if the cost was over \$75 Million (in 2008 dollars at an exchange rate of 0.92). By June 2010 the US had revised its cost estimate to \$133 Million per jet.⁴ In 2013, Defence told the Committee that Australia would pay \$130 Million for its initial two jets, with this reducing to \$82 Million by around 2020.⁵

Interestingly in 2006-2007, the independent think tank, Air Power Australia (APA) produced an estimate, based on detailed cost modelling, of between \$136 and \$176 Million for the F-35A JSF across the then planned production program. The APA cost modelling in 2006-2007 also projected that the aircraft unit price Australia would be required to pay for the planned purchases of F-35A CTOL variant aircraft would almost certainly be around \$219.5 Million if not more, particularly for getting fully operational aircraft on the flight line in Australia. In 2009, the Australian Government appropriated some \$3.2 Billion of public funds for the purchase of the first tranche of 14 F-35A JSF aircraft from which funds have been committed under contract for the two aircraft mentioned above. This equates to a cost figure of \$228.57 Million per aircraft but still leaves those aircraft in the USA.

The APA estimates have turned out to be far more accurate than those presented by either Lockheed Martin, the JSF Program Office or our own Department of Defence. Nonetheless, APA has been consistently, repeatedly and, as the data and facts now show, falsely denigrated and defamed by Defence, and not only on cost.

In regard to APA's analysis of the capabilities, and particularly the aerodynamic performance offered by the JSF, in 2012 Air Vice Marshal Osley told the Committee that it was 'inconsistent with years of detailed analysis undertaken by Defence, the JSF Program Office, Lockheed Martin and the eight other partner nations.' Air Vice Marshal Osley claimed that APA's analysis was 'basically flawed' due to 'incorrect assumptions' based on a 'lack of knowledge of the classified F-35 performance information'.⁶

This is inconsistent with the findings of the most recent report of the Director of Operational Test and Evaluation (DOT&E).⁷ The latest DOT&E report on the JSF

4 Dr Dennis Jensen, House of Representatives Hansard, 13 February 2013, p. 163.

5 Vice Admiral Jones, *Transcript*, 16 May 2013, p. 7.

6 Joint Standing Committee on Foreign Affairs, Defence and Trade, *Review of the Defence Annual Report 2010-2011*, p. 78.

7 The Office of the Director, Operational Test and Evaluation website, *DoD Programs: F-35 Joint Strike Fighter*, viewed 24 June 2013, <<http://www.dote.osd.mil/pub/reports/FY2012/pdf/dod/2012f35jsf.pdf>>.

demonstrates that APA's analyses of the performance of the JSF, much like the results of their analysis of the cost of the JSF, were correct from the outset.

For instance, over the past decade or so, both Lockheed Martin and Defence have waxed lyrical before the Australian Parliament (and elsewhere) about the fighter performance of the JSF, claiming it to be a '9g fighter aircraft with comparable fighter performance to the F-16 and F/A-18 legacy aircraft'.

However, in 2006, APA's analysis projected that the F-35A variant of the JSF would struggle to sustain 4.7 g when attempting to turn at 15,000 feet, when the specification of the JSF (the Joint Operational Requirements Document or JORD) required the F-35A to be able to sustain a 6.0g turn as the target Objective Specification under these conditions, with a bare minimum acceptable Threshold Specification of 5.3 g. Furthermore, APA calculated that the F-35A would take more than 60 seconds to accelerate from 0.8 Mach to 1.2 Mach at 30,000 feet, while the JORD had set a target Objective Specification of less than 40 seconds with the bare minimum acceptable Threshold Specification to be, at most, 55 seconds. Failure to meet the bare minimum Threshold level of any specification means the design fails to meet specification.

According to the 2012 DOT&E report, the JSF program office 'announced an intention to change performance specifications for the F-35A, reducing turn performance from 5.3 to 4.6 sustained g's. Furthermore, the JSF program office also sought an increase of eight seconds on the acceleration bare minimum acceptable Threshold level specification, from 55 seconds to 63 seconds.⁸ Crucially, these requested changes accord exactly with the analysis conducted by APA in 2006-2007. This, put simply, refutes the statement made by Air Vice Marshal Osley that APA's analysis is 'basically flawed'.

Since it is said a picture is worth a thousand words, the following summary of the APA advice to Defence, successive Defence Ministers, and successive Parliaments in relation to the aero/propulsive performance of the JSF aircraft is provided.

8 The Office of the Director, Operational Test and Evaluation website, *DoD Programs: F-35 Joint Strike Fighter*, viewed 24 June 2013, <<http://www.dote.osd.mil/pub/reports/FY2012/pdf/dod/2012f35jsf.pdf>>.

APA Analysis & Assessment of JSF ORD Maneuverability KPIs

X Likely Fails to meet even Threshold Specification

Maneuverability

DOT&E Report, December 2012

JSF ORD, March 2000 - Change 3

Air Power Australia (APA) 2006 Assessments/Estimates in RED
Copyright(c)APA, PGAA, Peter Goon : January 2013, 2006-2012

		Threshold	Bare, Minimum Accept.	Objectives	Target Specifications
Corner Speed	CTOL/CV	F-16 like		F/A-18 like	
Instantaneous G	STOVL (At 15K feet)	+7.0	320 KCAS @0.76M, ISA	+7.5	305 KCAS
Sustained G	CTOL	+5.3	+4.6g	+6.0	X +4.7g
	CV	+5.1	+5.0g	+6.0	X +4.0g
	STOVL (At 15K feet/.8 Mach)	+5.0	+4.5g	+6.0	X +4.3g
Sustained G (< 1.15 G)	CTOL ¹	Sustained 30 degree bank turn		Sustained 45 degree bank turn	
Mil Power performance at 30K ft ≤0.9M	CTOL ¹	1000 fpm climb (straight and level).		2500 fpm climb (straight and level). X < 27 degree	
Acceleration: +8 = 63 secs more than 43 = >108 secs +16 = 81 secs	CTOL	≤ 55 sec	F-16C Blk50 + 2 x BVR + 2 x WVR + 50% Internal Fuel ~28 secs Source: LMC/F/AD	≤ 40 sec	X 60+ secs
	CV	≤ 65 sec		≤ 45 sec	X 95+ secs
	STOVL (At 30K feet/0.8 to 1.2 Mach)	≤ 65 sec			X 69+ secs
Ps	STOVL (At 15K feet/0.8 Mach)	550 feet/sec	X < 490 ft/sec		
G at Maneuver Weight	CTOL ²	+9.0/-3.0 (Mach ≤ 1.05)	X	Will be N ₂ W Limited!!!	
	CV	+7.5/-3.0 (Mach ≤ 1.05)			
	STOVL	+7.0/-3.0 (Mach ≤ 1.05)			
Note: The only "comparable fighter performance" metric sought was 'Corner Speed' which, not surprisingly, are different for F-16C and F/A-18C.	CTOL ²	+7.0/-2.0 (Mach > 1.2)	X		
	CV	+6.5/-2.0 (Mach > 1.2)		+8.0/-3.0	
	STOVL	+6.0/-2.0 (Mach > 1.2)		+8.0/-3.0	

- Configuration: 2 x empty external 370 gallon tanks internal fuel for 540nm combat radius, 4 x JDAM Mk-84, 2 x AIM-120, gun with 150 rounds. Airspeed ≤0.9M. **Specifies 'useful' Combat Ceiling Limit for this configuration!!!**
- With 60% of internal fuel load required for 540nm combat radius and JDAMs jettisoned/released. **Maneuver Weight = NTE + 1,200lb (2 x AIM-120 + SSE) + 10,800lb fuel = 41,371lb, but... with WE (Max Nz) @ 28,948lb, Maneuver Weight = 40,948lb. So data point (60% fuel load and 540nm combat radius) likely not achievable. As empty weights increase, as predicted & happening, performance will degrade even further!!!**

Tom Burbage, the Lockheed Martin Vice President and JSF Program Integration General Manager, on 20 March 2012, stated 'the airplane will continue to be well in excess of its basic requirement. The airplane is meeting all of the other requirements today', which is clearly contradicted by the DOT&E report and also a July 2009 Aviation Week and Space Technology article by Andy Nativi 'F-35 Air Combat Skills Analyzed' that stated the acceleration time from Mach 0.8 to 1.2 at 30,000 ft was 61 seconds, and sustained turn was 4.95g at 15,000 ft.⁹ This clearly demonstrates that the aircraft was not reaching its performance requirements, and that the data was available as early as 2009, preceding the evidence given by Burbage. Burbage also stated that: 'The STOVL weight has been very stable and the airplane is meeting all of its performance requirements'.

In response to a speech I gave in Feb 2013, Burbage wrote a letter to the Committee¹⁰ attempting to justify his assertions. On APA's analysis of

9 F-35 Air Combat Skills Analyzed by Andy Nativi. www.aviationweek.com/aw/jsp_includes/articlePrint.jsp?...

10 Letter to Committee by Mr. Tom Burbage, 26 February 2013 CTB: tb: 13-003

aerodynamic performance (which were proven correct by the DOT&E Report and the JPO request of the JROC to reduce the specifications as stated previously for turn and acceleration) he claimed that 'Air Vice Marshal Osley is correct in his assessment that APA's criticisms of the F-35's aerodynamic performance is inconsistent with years of detailed analysis undertaken by Defence, the JSF Program Office, Lockheed Martin and eight other partner nations'. One cannot have too much confidence in all of this 'consensus' analysis given that the flight test program has shown them to be wrong, yet a small non-profit organisation, comprising mostly highly experienced engineers, without access to the much vaunted 'classified data', has been proven correct repeatedly.

Lockheed Martin CEO Marilyn Hewson, when asked to respond whether her company fully supported the claims made by Mr. Burbage in both testimony and correspondence, attempted to deflect attention away from the key point, by making points that were irrelevant to the specifics of the incorrect information Mr. Burbage provided.¹¹ She also tried to explain away the performance contradictions by rationalising that Mr. Burbage was only talking about the JSF KPP's, whereas this was never stated by Mr. Burbage, either in his original testimony, nor his subsequent communication, responding to my speech of Feb 2013.

Performance specifications are not the only area where the Committee has received evidence from Defence and Lockheed Martin that is directly contradicted by the DOT&E report. At a public hearing in 2012, Lockheed Martin told the Committee that weight was not an issue in the JSF project. Mr. Burbage informed the Committee that only the F-35B variant was sensitive to increases in weight, and that the F-35A and F-35C were 'several thousand pounds away from the first compromise of the performance requirements.'¹²

Of note here is the several thousand pounds of margin, and the statement of 'performance requirements', where the A-model only has one performance KPP, that being range. If Ms. Hewson were correct that Mr. Burbage, in terms of performance was specifically speaking of performance KPP's, then there is only one!

Once again, Mr. Burbage's testimony is contradicted by the DOT&E report, where it is stated 'The latest F-35A weight status report from November 2012 showed the estimated weight of 29,098 pounds to be within 273 pounds (0.94 percent) of the projected maximum weight needed to meet technical performance required per contract specifications in January 2015.' This is hardly 'several thousand pounds of margin'. Mr. Burbage, in response to my speech, once again states 'The F-35 has significant weight margins in the F-35A and C.' Once again, Mr. Burbage knows at

11 Letter to Committee by Ms. Marilyn A. Hewson, April 16, 2013

12 Mr Tom Burbage, Lockheed Martin, *Transcript*, 20 March 2012, p. 7.

this stage of the DOT&E report, as he referred to it in this communication, but persists with the incorrect weight margin.

Ms. Hewson attempts to obfuscate by stating in her letter that 'In reference to "margin", the DOT&E report accurately stated the weight margin that then existed against the internal weight design target.' As can be seen from the direct quote from the DOT&E report, this is clearly not the case, it is the weight margin to the aircraft not meeting its technical performance.

Of major concern is that, during the recent live fire tests at the Navy Test Centre at China Lake in the US, the F-35 demonstrated serious design problems. Burbage, in his Feb 2013 communication to the Committee makes a further incorrect statement. He stated 'The F-35 has unprecedented survivability features incorporated in its basic design, a fact which is being verified in live fire testing at the Navy Test Center in China Lake. Certain equipment was removed from the F-35 in the early design phase as it was deemed unnecessary redundancy to other installed systems'. This claim was in response, again, to my speech of Feb 2013.

This statement is completely at odds with the DOT&E report which states 'The program's most recent vulnerability assessment showed that the removal of fueldraulic fuses, the PAO shutoff valve, and the dry bay fire suppression [system], also removed in 2008, results in the F-35 not meeting the Operational Requirements Document (ORD) requirement to have a vulnerability posture better than analogous legacy aircraft.' It is clear that 2008 is not 'in the early design phase', and the aircraft certainly does not have unprecedented design features when it cannot even match the vulnerability of current fighter to hostile weapons fire.

Further, Burbage does not state the correct reason for the removal of these mission critical safety features. He simply states 'deemed unnecessary'. The DOT&E report states 'In 2008, the JSF Executive Steering Board (JESB) directed the removal of the PAO shutoff valves from the F-35 design to reduce aircraft weight by 2 pounds.' Also 'As a result of the weight reduction initiative, the JESB directed the removal of fueldraulic fuses from the production design in 2008 to provide a weight saving of 9 pounds'. So Burbage is incorrect in stating the survivability of the aircraft to ballistic damage, is incorrect in stating the reason for the removal of the equipment, and it is clear that his claim of significant weight margins, of around 'several thousand pounds', is completely false given that the aircraft is significantly more vulnerable than it should be, for a saving of a mere 11 pounds of weight.¹³

In light of this reduction in performance specifications and the increase in vulnerability, both incurred to meet weight requirements, there is cause for major concern. Essentially, the revised performance specifications place the JSF on par with legacy fighters such as the long retired Vietnam era F-4 Phantom, which is

13 For comparison, 11 pounds is the weight of a typical housecat.

currently more than 50 years old by design. Furthermore, the JSF is unable to achieve the JORD requirement to have vulnerability to ballistic damage that was better than legacy fighters.

I have serious questions and deep concerns about how both Defence and the prime contractor, Lockheed Martin, might expect the F-35 JSF to credibly compete with other, highly capable, Russian and Chinese fighter jets currently being developed to compete with the far more capable F-22 Raptor.¹⁴ In light of these concerns, it is my view that Australia should immediately reconsider its decision to purchase the F-35 JSF.

In conclusion, we might reflect on the extent to which we, the Parliament of Australia, have allowed this situation to develop, by repeatedly accepting evidence from Defence and their prime contractors, which is clearly at odds with reality and irrefutable material hard fact. Every time we accept evidence which is either of dubious quality, or intentionally false, we reinforce these inappropriate and unlawful behaviours by Defence and their contractors. I am reminded of Jackman's famous statement 'In God we trust. All others must bring data.'¹⁵

Dr Dennis Jensen MP

14 There is ample unclassified public data on these new Russian and Chinese aircraft, including footage of demonstration flights, which clearly shows these aircraft were designed and built from the outset to compete against the F-22.

15 Professor Simon Jackman accurately predicted the electoral victory of Barack Obama in November, 2012, by scientifically analysing polling data.

