

Chapter 5

Effects of the F-35 Program on Australian industry

Introduction

5.1 This chapter considers the effects of Australia's participation in the F-35 Program on local industry, including the cost and benefits of the program for Australian industry and the Australian economy.

5.2 The Australian F-35 Program has two fundamental goals:

- to deliver a new air combat capability that will meet Australia's air combat needs; and
- to deliver a strong industry base that supports the global F-35 capability and provides Australia with long-term economic benefits.¹

The cost of the F-35 Program

5.3 The Department of Defence acknowledged that, historically, the F-35 Program has 'attracted significant public attention regarding cost and schedule', but assured the committee that it has 'stabilised and remained within the approved budget since the program was re-baselined in 2012'. Defence assured the committee that acquisition affordability 'remains one of the highest priorities for the F-35 Program', and that the Joint Program Office and prime contractors are working with F-35 partners and their participating industries in a Blue Print for Affordability Program, which 'aims to reduce the unit recurring flyaway cost of the F-35 to a price that compares with current fourth-generation fighters'.²

5.4 Defence advised that Australia's current F-35 Program total approved budget is AUD\$17.1 billion (due to exchange rate updates). Within that, AUD\$2.6 billion is contingency funding and the remaining AUD\$14.5 billion includes the cost of the 72 F-35A aircraft, the support systems, training, weapons, and infrastructure, but not sustainment costs.³

5.5 Air Vice-Marshal Chris Deeble (Retd), Program Manager, Joint Strike Fighter, advised the committee that Defence has expended approximately \$1 billion on the program to date, including the early Memorandum of Understanding (MoU) payments and the two stages of the program that have been approved by government to date.⁴ The total approved budget also includes AUD\$1.5 billion for F-35 facilities

1 Department of Defence, *Submission 55*, p. 2.

2 Department of Defence, *Submission 55*, p. 12.

3 Air Vice-Marshal Chris Deeble (Retd), Program Manager, Joint Strike Fighter, Department of Defence, *Committee Hansard*, 22 March 2016, pp 66–70.

4 Air Vice-Marshal Chris Deeble (Retd), Program Manager, Joint Strike Fighter, Department of Defence, *Committee Hansard*, 22 March 2016, p. 66.

at RAAF Bases Williamtown and Tindal and other forward operating and support bases.⁵

5.6 Defence informed the committee that the Australian aircraft recurring flyaway cost 'is reducing significantly' and that 'based on current projections, the expected average unit cost of an Australian F-35 is US\$90 million'. Defence noted that this is similar in price to the 'less capable fourth-generation aircraft' such as the latest version of the F/A-18 Super Hornet.⁶

5.7 Although the program has experienced delays and cost increases since it was first approved, the Sir Richard Williams Foundation pointed out that development cost increases are not passed on to partner countries.⁷ As a partner nation, Australia pays an annual membership but does not incur research and development increases.⁸

5.8 Although the program's early cost overruns and schedule slippage were corrected in 2012 and the outlook now appears more stable, submitters raised concerns that the acquisition and through-life costs of the aircraft still remain unclear.⁹ This may be due to a number of factors, some still unknown, including:

- annual production rates;
- design flaws;
- Australia-specific modifications;
- whether the total number of aircraft built will be less than expected; and
- whether estimated maintenance costs will be higher than expected.¹⁰

5.9 There are also difficulties regarding the various definitions of 'cost' as it is not always clear which definition is being used. As discussed in the submission from Mr Alan Williams, there is the 'unit recurring flyaway cost', the 'total unit flyaway cost', the 'procurement unit cost', the 'acquisition unit cost' and the 'life-cycle cost'.¹¹

5.10 In terms of sustainment, there also remains the question of whether Australia will opt to sustain its aircraft in-country or choose a more global approach.¹² As previously mentioned, the global support solution for the F-35 fleet is still being

5 Air Vice-Marshal Chris Deeble (Retd), Program Manager, Joint Strike Fighter, Department of Defence, *Committee Hansard*, 22 March 2016, p. 66.

6 Department of Defence, *Submission 55*, p. 12.

7 Sir Richard Williams Foundation, *Submission 17*, p. 6.

8 Dr Andrew Davies, Australian Strategic Policy Institute, *Committee Hansard*, 22 March 2016, p. 22.

9 David Archibald, *Submission 8*, p. 6; Geoffrey de Looze, *Submission 38*, p. 4; Medical Association for Prevention of War, *Submission 50*, p. 3.

10 Air Power Australia, *Supplementary Submission 9.2*, p. 3; Mr Alan Williams, *Submission 20*, p. 58; Australian Strategic Policy Institute, *Submission 47*, pp 29, 35 and 37.

11 Mr Alan Williams, *Submission 20*, p. 18.

12 Australian Strategic Policy Institute, *Submission 47*, p. 35.

developed. Until a model is decided, it isn't possible to define support costs; however, the Australian Strategic Policy Institute did provide the following commentary:

If Australia opts for support as part of a global arrangement, economies of scale should be possible. The more 'sovereign' the support model, the higher the cost. But in any case it's expected that facilities for in-country F-35 operations and support will cost well over \$1 billion. The best guess—and it's admittedly little more than that—is that the fixed costs for F-35 operations would be around \$2 billion initially, with an annual ongoing cost of about 10% of that figure, or \$200 million per year. In comparison, and providing a 'sanity check' on that estimate, the support cost of the initial tranche of 24 Super Hornets was initially budgeted at \$230 million per year, after 'set-up' costs of around \$1 billion.¹³

5.11 Defence advised that sustainment costs for complex capabilities are usually two to two-and-a-half times the cost of the acquisition. Through-life sustainment costs were estimated at \$43 billion; however, further estimates will occur post-2020.¹⁴ Defence also advised that 'similar to acquisition affordability, there is a program to reduce operating and support affordability cost by 30 per cent compared to 2012 estimates'.¹⁵

Australian Government Industry Support costs

5.12 One of the main outcomes of the F-35 Program is 'to deliver a strong industry base that supports the global F-35 capability and provides Australia with long-term economic benefits'.¹⁶ In order to achieve this, the Australian Government has provided support to industry participants through a variety of programs, including:

- Financial investment support provided by the Export Finance and Insurance Corporation;
- Skilling Australia's Defence Industry Program, which aims to create pathways into the Defence sector and address any skills capability gaps which exist;
- Research and Development Tax incentive, which provides a tax offset for eligible spending on Research and Development registered with the Department of Industry, Innovation and Science;
- The 'Next Generation Manufacturing Investment Programme' and 'Automotive Diversification Programme', which were established to support Australian industry impacted by the closure of the car manufacturing industry by 2017;
- Early Stage Commercialisation, which is part of the Commercialisation Australia program providing funding and resources to accelerate the business

13 Australian Strategic Policy Institute, *Submission 47*, p. 35.

14 Air Vice-Marshal Chris Deeble (Retd), Program Manager, Joint Strike Fighter, Department of Defence, *Committee Hansard*, 22 March 2016, p. 70.

15 Department of Defence, *Submission 55*, p. 12.

16 Department of Defence, *Submission 55*, p. 2.

building process for Australian businesses, entrepreneurs, researchers and inventors looking to commercialise innovative intellectual property;

- Researchers in Business (Enterprise Connect), which provides funding to support the placement of researchers from universities or public research agencies into businesses where it is identified that such a placement would help to develop and implement a new idea with commercial potential; and
- Research and Development Start Program, which provides funding to support the development of new or improved products, processes, or services.¹⁷

5.13 Additionally, support has been provided by state governments, including:

- South Australian Innovation and Investment Fund, which provides grants to innovative job creation projects to strengthen South Australia's manufacturing and technology base following Mitsubishi Motors Australia Limited ceasing manufacturing operations in Adelaide; and
- Geelong Region Innovation and Investment Fund, which provides funding to support new investment to create new or additional business capacity.¹⁸

5.14 Furthermore, the Defence Industry Innovation Centre offers advice to Australian businesses on winning F-35 opportunities and the New Air Combat Capability Industry Support Program provides funding to support the development of new or improved capabilities.¹⁹

Australia's participation in the program

5.15 As an international partner in the F-35 Program, the Australian supply industry has the opportunity to compete for business with other partner nations on a 'best value' basis in F-35 global supply chains.²⁰ The program's industrial participation model ensures that industrial opportunities for Australian companies span across the life of the program—from production and sustainment through to follow-on development.²¹ In effect, Australian companies can win work on the program as a result of a limited competitive process, but the work is contingent on Australia continuing with its planned purchase of the aircraft.²²

5.16 International participation in the F-35 Program is divided into three levels according to the amount of money a country contributes to the program—the higher the amount, the greater the nation's voice with respect to aircraft requirements, design, and access to technologies gained during development.²³ Level 1 partner status,

17 Department of Defence, *Submission 55*, p. 26.

18 Department of Defence, *Submission 55*, p. 26.

19 Department of Defence, *Submission 55*, p. 27.

20 Department of Defence, *Submission 55*, p. 10.

21 Lockheed Martin, *Submission 46*, p. 12.

22 Australian Strategic Policy Institute, *Submission 47*, p. 23.

23 Mr Alan Williams, *Submission 20*, p. 4.

entered into by the United Kingdom (UK), requires approximately a 10 per cent contribution to aircraft development and allows for fully integrated office staff and a national deputy at director level. Level 2 requires an investment of US\$1 billion and was entered into by Italy and the Netherlands. Australia, Denmark, Norway, Canada, and Turkey joined the F-35 Program as Level 3 partners, with contributions ranging from US\$125 million to US\$175 million.²⁴

5.17 Australian industry participation in the F-35 Program commenced under the banner of the System Design Demonstration MoU in late 2002. Subsequently, the Production, Sustainment and Follow-on Development MoU was agreed between partner nations in 2006.²⁵ Prime contractors Lockheed Martin and Pratt & Whitney are not signatories to the Production, Sustainment and Follow-on Development MoU; however, in December 2006 the Department of Defence signed MoUs with both companies.²⁶

5.18 Each MoU is supported by an Industry Participation Plan, a best-value model agreed upon by all program partner countries which contains potential design and production opportunities to be pursued in partnership with industry.²⁷ The best-value model is a program requirement to ensure the F-35 Program delivers an affordable aircraft solution to customers with rigorous quality standards, and competitive evaluations and business arrangements.²⁸

Test and evaluation program

5.19 At the committee's public hearing, concerns were raised over the Australian component of the F-35 developmental test and evaluation program. In 2002 and again in 2009, Australia chose not to make a contribution to the developmental test and evaluation program but instead relied on other countries, such as the US and UK, to uncover technical and operational risks. According to Dr Keith Joiner, the decision to not place testers into the program outsourced Australia's sovereign insight into the program and wasted opportunities for Australians to work on the aircraft.²⁹

5.20 In 2016, the US Director of Operational Test & Evaluation (DOT&E) released a report which identified F-35 testing issues across software, weapons integration and cybersecurity. DOT&E also acknowledged that the validation of the simulation model for the F-35 aircraft was incomplete, lacked leadership and was subjected to only a small percentage of testing.³⁰ Dr Joiner suggested to the committee that Australia

24 Mr Alan Williams, *Submission 20*, p. 4.

25 Department of Defence, *Submission 55*, p. 21.

26 Department of Defence, *Submission 55*, p. 21.

27 Department of Defence, *Submission 55*, p. 21.

28 Lockheed Martin, *Submission 46*, p. 13.

29 Dr Keith Joiner, Private capacity, *Committee Hansard*, 22 March 2016, p. 27.

30 Dr Keith Joiner, Private capacity, *Committee Hansard*, 22 March 2016, p. 27.

should increase its participation in the developmental test program and 'offer strongly to lead the validation of the JSF simulation model'.³¹

5.21 Defence informed the committee that two Australian Defence officials have been involved in the test and evaluation program since 2010, and that there are currently:

- four personnel at Eglin Air Force Base supporting the joint operational test team;
- two personnel at Lockheed Martin Fort Worth in engineering and logistics support roles; and
- two Australian pilots and one maintenance engineer operating at the Luke Air Force Base.³²

5.22 Air Vice-Marshal Deeble assured the committee that personnel working within those environments provide Defence with significant insight into the program. Defence stated that it is confident that work is being done to address the issues raised in the DOT&E report.

Benefits to Australian industry

5.23 As a result of being able to compete for business on global F-35 Program supply chains, and with the support of government programs, Australian companies have won a number of significant contracts and secured over US\$554 million worth of design and production work.³³ This figure is a combination of contracts awarded by Lockheed Martin and its suppliers, contracts awarded by Pratt & Whitney, and investments made by the Australian government to advantage Australian industry to win these contracts.³⁴ This figure is expected to increase significantly over the life of the program as it matures, resulting in rising production volumes and future sustainment opportunities.³⁵ The nature and scale of the contribution is illustrated in the table below.

31 Dr Keith Joiner, Private capacity, *Committee Hansard*, 22 March 2016, p. 28.

32 Air Vice-Marshal Chris Deeble (Retd), Program Manager, Joint Strike Fighter, Department of Defence, *Committee Hansard*, 22 March 2016, p. 66.

33 Lockheed Martin, *Submission 46*, p. 13.

34 Lockheed Martin, *Submission 46*, p. 13.

35 Quickstep Holdings Ltd, *Submission 26*, p. 1.

Table 5.1—Source and value of Australian industry contracts to date

Source	Value of contracts (USD, millions)	Number of existing/completed contracts
System Design and Development (SDD)	\$171.9	62
Contracts arising from SDD opportunities: Lockheed Martin	\$151.9	13
Production opportunities: Lockheed Martin	\$199.7	34
Production opportunities: Pratt & Whitney	\$21.6	7
Production opportunities: Other	\$9.1	2
Sustainment	\$0.3	1
Total	\$554.5	119

Source: Department of Defence, *Submission 55*, p. 23.

5.24 The F-35 Program affords Australian industry the opportunity to compete for business to produce parts on all of the aircraft in the program—presently more than 3100 aircraft through to 2040.³⁶ All of these opportunities consist of direct work on a wide range of F-35 components. Contracts range from the provision of treated raw materials to high-end manufacturing of components and sub-assemblies, as well as software development and production of sensitive technologies.³⁷

5.25 Many submitters agreed that the impact of the F-35 Program on local Australian industry, and subsequently the Australian economy, has been positive. However, it should be noted that Australia has made significant efforts to artificially support local companies to become part of global supply chains.³⁸ This has been in the form of a variety of government programs, such as financial investment through the Export Finance and Insurance Corporation, innovation grants, and tax offsets. A full list is provided at the end of the chapter.

5.26 Industrial participants listed a range of benefits received since their involvement in the program, including: global supply chain opportunities, capability and network development, job creation, long-term investment, increased skills and experience, and opportunities for future work. Some of these are discussed below.

36 Lockheed Martin, *Submission 46*, p. 12.

37 Department of Defence, *Submission 55*, p. 22.

38 Australian Strategic Policy Institute, *Submission 47*, p. 23.

Global supply chain opportunities

5.27 The F-35 Program was recognised in the 2016 Defence Industry Policy Statement as a key example of how a capability requirement can be used to build new global supply chain opportunities for Australian defence industry.³⁹ As noted by Defence:

The Joint Strike Fighter Program is about much more than just the delivery of a new fighter capability. It is a catalyst for change for both Australian Defence capability and outcomes for Australian defence industry...The Program adopted a new capability acquisition strategy that allowed Australian industry to participate in all stages of the capability life cycle, from design through to sustainment. Importantly, Defence's Joint Strike Fighter Program Office includes an industry team which has brought about a cultural shift in the way industry and Defence capability managers engage. As a result, the fifth generation aircraft is providing a pathway for industry to move closer to the heart of capability development and sustainment, effectively positioning industry as a Fundamental Input to Capability. To date, a total of US\$554.5 million in contracts has been secured by Australian defence industry in Joint Strike Fighter design and production, with more opportunities to become available as rates of aircraft production increase and the sustainment model develops. The Joint Strike Fighter will be sustained by a global supply chain that will eventually service over 3000 F-35 aircraft worldwide...

Maximising opportunities for Australian defence industry in the global sustainment system for the Joint Strike Fighter will require an even closer relationship between industry and Defence in the future. The global supply chain opportunities, provided to Australian defence industry through the Joint Strike Fighter Program, are a good example of how largescale capability projects can provide real benefit and growth to Australian small to medium enterprises. Defence will, in collaboration with CDIC [Centre for Defence Industry Capability], seek to develop similar models for Australian industry involvement in future major ADF capability projects.⁴⁰

Capability development

5.28 Significant research and development has been undertaken by industry in order to win work on the F-35 Program. A number of companies have made use of the government's New Air Combat Capability Industry Support Program, which was established to provide funding to Australian companies to support the development of new or improved capabilities that may enhance the ability to win work in the production, sustainment and modernisation phases of the F-35 Program.⁴¹

5.29 Australia's commitment has resulted in significant capability improvements within the industry, including developments in technology, manufacturing and

39 Department of Defence, *2016 Defence Industry Policy Statement*, p. 50.

40 Department of Defence, *2016 Defence Industry Policy Statement*, pp 53–54.

41 Department of Defence, *Submission 55*, p. 27.

staffing, and improved efficiencies and processes. Australian companies are currently providing a range of advanced manufacturing techniques to the supply of F-35 components. These techniques include moulding, curing, casting, plating, vacuum brazing, laser welding, close tolerance machining and complex assembly.⁴²

5.30 Innovative technologies have been developed in thermal processing, and in-country commercial chemical processing has been established.⁴³ Some companies have gained Nadcap (industry approved) accreditation and improved their chances of winning future aerospace work.⁴⁴ Heat Treatment Australia observed:

Expansion of facilities and processes at HTA are a direct result of involvement in the F-35 program, specifically the new processes are required to fill gaps in F-35 supply chains and to ensure Australia is able to compete on all available work packages. The expanded facility at HTA will also fill identified gaps in Australia's advanced manufacturing industrial framework.⁴⁵

5.31 Exposure to upskilling has improved overall capabilities and efficiencies of companies involved in the F-35 Program. According to submitters, training provided by Defence contractors to Australian companies has improved manufacturing quality and speed, as well as business processes and systems.⁴⁶ Marand Precision Engineering noted:

Both BAE Systems and Lockheed Martin have provided considerable training, assistance, guidance and coaching in areas such as Quality Systems, Proposal Preparation, Lean Manufacturing, Supply Chain Management, Relationship Management and Cyber Security. This has made Marand more robust, capable and professional.⁴⁷

5.32 Efforts to transfer technology such as advanced composite manufacturing and high-speed metal machining between companies were also highlighted by submitters as building long-term industrial capability.⁴⁸

Network development

5.33 As a result of winning F-35 supply contracts, Australian companies with previously limited exposure to the defence aerospace sector, have been able to

42 Quickstep Holdings Ltd, *Submission 26*, p. 3.

43 Lovitt Technologies Australia and Technomold Australia, *Submission 31*, pp 4–5; Heat Treatment Australia Pty Ltd, *Submission 32*, p. 2.

44 Lovitt Technologies Australia and Technomold Australia, *Submission 31*, p. 4; Heat Treatment Australia Pty Ltd, *Submission 32*, p. 1.

45 Heat Treatment Australia Pty Ltd, *Submission 32*, p. 2.

46 Marand Precision Engineering Pty Ltd, *Submission 23*, p. 3; and Levett Engineering Pty Ltd, *Submission 39*, p. 3;

47 Marand Precision Engineering Pty Ltd, *Submission 23*, p. 3.

48 Northrop Grumman Australia, *Submission 41*, p. 2; Bae Systems Australia, *Submission 49*, p. 3.

develop industrial networks locally and internationally.⁴⁹ For example, local networks have arisen between BAE Systems Australia and its supply chain companies, including:

- Sutton Tools for the supply of cutting tools;
- Vipac Engineers to optimise machining efficiency;
- Axiom Diemold to provide roughing operations; and
- Heat Treatment Australia for the treatment of components.⁵⁰

5.34 International relationships have also developed between Australian companies and Original Equipment Manufacturers, aerospace companies, and defence organisations.⁵¹ As Quickstep Holdings noted, Northrop Grumman has provided it with new F-35 orders every year since the program's inception.⁵²

Job creation

5.35 Many submitters asserted that the F-35 Program has delivered considerable employment opportunities to Australian industry.⁵³ Marand Precision Engineering told the committee that the F-35 Program has helped to offset declining employment rates in the automotive manufacturing industry by engaging a large number of people out of its engineering and manufacturing workforce.⁵⁴ Many submitters described the need to increase staff numbers to meet the demands of the program, as well as the need to hire a range of other services, for example to build facilities, supply equipment or transport goods.⁵⁵

5.36 In the case of Levett Engineering, the ability to secure contracts on the F-35 supply chain transformed the business from a small machine shop which operated one shift a day, five times a week for domestic customers, to an aerospace exporter

49 For example: Defence Materials Technology Centre, *Submission 24*, p. 3; Quickstep Holdings Ltd, *Submission 26*, p. 3; Lovitt Technologies Australia and Technomold Australia, *Submission 31*, p. 3; Ferra Engineering Australia, *Submission 43*, p. 2.

50 Defence Materials Technology Centre, *Submission 24*, p. 3.

51 Chemring Australia, *Submission 18*, p. 1; Lovitt Technologies Australia and Technomold Australia, *Submission 31*, pp 1–5.

52 Quickstep Holdings Ltd, *Submission 26*, p. 3.

53 For example: Marand Precision Engineering Pty Ltd, *Submission 23*; Quickstep Holdings Ltd, *Submission 26*; Lovitt Technologies Australia and Technomold Australia, *Submission 31*; Heat Treatment Australia Pty Ltd, *Submission 32*; Levett Engineering Pty Ltd, *Submission 39*; TAE Gas Turbines Pty Ltd, *Submission 45*; BAE Systems Australia, *Submission 49*.

54 Marand Precision Engineering Pty Ltd, *Submission 23*, p. 4.

55 For example: Marand Precision Engineering Pty Ltd, *Submission 23*, p. 2; Quickstep Holdings Ltd, *Submission 26*, p. 1; Lovitt Technologies Australia and Technomold Australia, *Submission 31*, p. 2; Heat Treatment Australia Pty Ltd, *Submission 32*, p. 2; Levett Engineering Pty Ltd, *Submission 39*, p. 3; TAE Gas Turbines Pty Ltd, *Submission 45*, p. 2; BAE Systems Australia, *Submission 49*, p. 3.

running three shifts a day, six days a week and which struggles to keep up with demand.⁵⁶ Similarly, Heat Treatment Australia stated:

As a direct result of the F-35 program, HTA has experienced significant growth leading to expansion of our facilities in Brisbane and Melbourne. To date our additional investment in aerospace and defense projects has included new equipment, expanded facilities, improved quality systems, increased employment and increased employee skills sets. These efforts are targeted at fulfilling Australian industry supply chain requirements for the F-35 program.⁵⁷

5.37 Many submitters also expressed their expectations of future expansion and job creation as the program matures towards peak production and sustainment.⁵⁸ BAE Systems predicted that:

A holistic approach to JSF sustainment, in particular Component MRO&U, will maximise job opportunities in the high technology sector, likely requiring specialists in sensor fusion, electronic warfare, digital technology and advanced communications systems.⁵⁹

5.38 However, it was pointed out by the Medical Association for the Prevention of War that 'putting billions of dollars into any sector of society will create jobs'.⁶⁰

Long-term investment

5.39 As the life of the F-35 Program is expected to extend over a significant number of years, Australian companies involved in supply chains have advised that they have been able to make long-term capital investments in factories and equipment.⁶¹ For example, over the past seven years, BAE Systems invested significantly in its local facilities in Williamstown, Edinburgh, Melbourne and Canberra, to ensure it was ready for the production of F-35 aircraft as well as long-term sustainment.⁶²

5.40 Other companies have experienced growth over a number of years and invested in high-tech machinery.⁶³ Lovitt Technologies Australia has been

56 Levett Engineering Pty Ltd, *Submission 39*, pp 2–3.

57 Heat Treatment Australia Pty Ltd, *Submission 32*, p. 3.

58 For example: Marand Precision Engineering Pty Ltd, *Submission 23*, p. 2; Quickstep Holdings Ltd, *Submission 26*, p. 1; Lovitt Technologies Australia and Technomold Australia, *Submission 31*, p. 2; BAE Systems Australia, *Submission 49*, p. 3.

59 BAE Systems Australia, *Submission 49*, p. 3.

60 Medical Association for Prevention of War, *Submission 50*, p. 3.

61 For example: Lovitt Technologies Australia and Technomold Australia, *Submission 31*, p. 3; Heat Treatment Australia Pty Ltd, *Submission 32*, p. 3; Levett Engineering Pty Ltd, *Submission 39*, p. 3; BAE Systems Australia, *Submission 49*, p. 2.

62 BAE Systems Australia, *Submission 49*, p. 2.

63 For example: Quickstep Holdings Ltd, *Submission 26*, p. 1; Lovitt Technologies Australia and Technomold Australia, *Submission 31*, p. 3; Ferra Engineering Australia, *Submission 43*, p. 1.

manufacturing parts on F-35 aircraft for Lockheed Martin since 2006, investing in high-tech machinery previously unavailable in Australia:

Among these investments has been the installation of a Makino T1 machining centre, the only one of its kind in Australia and the tenth installed worldwide. This machine is specifically designed for efficient machining of large titanium components and runs around the clock. Another investment has been the installation of a Mitutoyo Coordinate Measuring Machine (CMM) with an inbuilt laser scanner, this has allowed us to measure complex assemblies in minutes rather than hours without even touching the part...Since 2013 Lovitt has employed 23 new staff members and invested \$4.9M in the latest, most efficient machines in Australia.⁶⁴

5.41 Submitters advised that participation in F-35 global supply chains has delivered considerable growth to Australian companies in staffing, equipment and revenue and that future growth is anticipated as the program reaches its peak production and sustainment cycles.⁶⁵

Ongoing benefits to industry

5.42 The F-35 Program has increased Australian industry's ability to win future work by creating transferable skills and capabilities. Several submitters noted that many of the skills and capabilities developed in the strategic context of the F-35 Program are readily transferable to other sectors within and outside the defence arena.⁶⁶ As the Defence Materials Technology Centre explained:

...it is worth noting that key elements of the industrial sector development arrangements in the JSF program are being investigated for replication elsewhere in Defence, for example for the Future Submarine Program. Industries who have the enterprise and technical capability to participate in one program will have clear advantages in moving into programs in another domain. The JSF program, as one of the early examples of Australian industry participation at scale in a global supply chain, has provided Australian industry with critical tools for participation in other programs.⁶⁷

5.43 Submitters also asserted that Australian companies have been provided with a significant marketing tool to demonstrate their work to potential customers. One Australian company has already taken advantage of the networks and capabilities developed to meet F-35 production standards and secured additional work with other areas of Lockheed Martin. As Lockheed Martin noted, 'the Australian company

64 Lovitt Technologies Australia and Technomold Australia, *Submission 31*, p. 3.

65 For example: Quickstep Holdings Ltd, *Submission 26*, p. 3; Heat Treatment Australia Pty Ltd, *Submission 32*, p. 3; Levett Engineering Pty Ltd, *Submission 39*, pp 2–3.

66 For example: Chemring Australia Pty Ltd, *Submission 18*, p. 1; Marand Precision Engineering Pty Ltd, *Submission 23*, p. 2; Defence Materials Technology Centre, *Submission 24*, p. 1; Quickstep Holdings Ltd, *Submission 26*, p. 4; Heat Treatment Australia Pty Ltd, *Submission 32*, pp 2–3; Levett Engineering Pty Ltd, *Submission 39*, p. 3.

67 Defence Materials Technology Centre, *Submission 24*, p. 5.

Quickstep has applied skills acquired through JSF participation to win contracts for exporting composite aircraft parts to Lockheed Martin's international C-130J Super Hercules program'.⁶⁸ Similarly, Levett Engineering commented that its bids for non-JSF work were successful because companies such as Boeing were aware of Levett's work for Lockheed Martin.⁶⁹

5.44 By working on F-35 supply chains, Australian companies have been able to demonstrate their technical and manufacturing capabilities to a range of potential contractors.⁷⁰ As Marand Precision Engineering pointed out:

Demonstrated ability in producing state-of-the-art F35 products certainly gives Marand and other Australian companies significant leverage when marketing their capabilities overseas and has led to previously unforeseen opportunities being secured on the strength of potential customers seeing what we have done on F35. Within the global aerospace industry the relationships that have been developed as a result of Marand's participation in the F-35 program are already resulting in new opportunities being identified and pursued both within and outside of F35.⁷¹

5.45 As a result of its involvement on the F-35 Program, Ferra Engineering has expanded its operations by opening a facility in Oklahoma in 2013. While the facility was initially established to support the program, it presented the company with additional business opportunities that resulted in further work being performed in Australia.⁷²

5.46 Furthermore, the requirements of F-35 production have necessitated advancements in capabilities that will allow companies to take on more advanced projects in the future. For example, Heat Treatment Australia has received international recognition for its pioneering work in thermal processing, and accessed international markets, new revenue streams, and new marketing opportunities.⁷³

Follow-on modernisation, regional maintenance and global support solution

5.47 Aside from the industrial design and production opportunities, there are also opportunities for Australian companies to participate in the follow-on modernisation, regional maintenance, and global support solution of the aircraft.⁷⁴ The follow-on modernisation program includes: adding new weapons, more efficient systems, lighter

68 Lockheed Martin, *Submission 46*, p. 13.

69 Levett Engineering Pty Ltd, *Submission 39*, p. 3.

70 For example: Marand Precision Engineering Pty Ltd, *Submission 23*, pp 1–2; Heat Treatment Australia Pty Ltd, *Submission 32*, p. 1; Ferra Engineering Australia, *Submission 43*, p. 2; Lockheed Martin, *Submission 46*, p. 13; BAE Systems Australia, *Submission 49*, p. 3.

71 Marand Precision Engineering Pty Ltd, *Submission 23*, pp 2–3.

72 Ferra Engineering Australia, *Submission 43*, p. 2.

73 Heat Treatment Australia Pty Ltd, *Submission 32*, p. 3.

74 Lockheed Martin, *Submission 46*, p. 13.

structures and newer tools, and will evolve over the life of the global fleet.⁷⁵ According to Lockheed Martin, the modernisation program will be shared by partner nations, as detailed in the Industrial Participation plan, and opportunities will evolve throughout the service life of the global fleet.⁷⁶

5.48 In 2015, the US Government assigned Australia regional F-35 depot maintenance responsibilities for airframes and engines.⁷⁷ BAE Systems (assigned airframe maintenance), and TAE Gas Turbines (assigned engine maintenance) have begun planning in order to meet the expected increases in volume and capability.⁷⁸ The Joint Program Office has indicated that as more aircraft arrive in the Asia-Pacific region, Australia's depot maintenance capability may eventually be supplemented by Japan.⁷⁹

5.49 A global support solution for sustainment of the aircraft is still being developed; however, the Department of Defence stated that it expects Australia's defence industry base will be used to contribute to an affordable F-35 global support solution.⁸⁰

Benefits to the Australian economy

5.50 According to submissions from industrial participants,⁸¹ the F-35 Program has provided a range of flow-on benefits to the Australian economy, including:

- growth in employment;
- expansion of facilities and equipment;
- transferable skills and capabilities;
- export opportunities;
- innovation;
- extension of supply chain opportunities to other Australian businesses; and
- research and development.

5.51 However, the committee was told that at least one Australian company has already been forced into liquidation due to delays and reductions in its F-35

75 Lockheed Martin, *Submission 46*, p. 13.

76 Lockheed Martin, *Submission 46*, p. 13.

77 Department of Defence, *Submission 55*, p. 3.

78 TAE Gas Turbines Pty Ltd, *Submission 45*, p. 2; and BAE Systems Australia, *Submission 49*, p. 1.

79 Department of Defence, *Submission 55*, p. 11.

80 Department of Defence, *Submission 55*, pp 11–12.

81 For example: Chemring Australia Pty Ltd, *Submission 18*; Marand Precision Engineering Pty Ltd, *Submission 23*; Defence Materials Technology Centre, *Submission 24*; Quickstep Holdings Ltd, *Submission 26*; Lovitt Technologies Australia and Technomold Australia, *Submission 31*; Heat Treatment Australia Pty Ltd, *Submission 32*; Levett Engineering Pty Ltd, *Submission 39*; Ferra Engineering Australia, *Submission 43*; BAE Systems Australia, *Submission 49*.

contracts.⁸² Although the strength of the Australian dollar and slow-down in Defence spending contributed to the company's voluntary administration, the company cited the cancellation of F-35 engine contracts as a major factor.⁸³

5.52 One submitter expressed uncertainty as to the value Australia would gain from future potential F-35 contracts.⁸⁴ In 2007, it was reported by the media that Australian industry would reap potential earnings of AUD\$9 billion over its three decade involvement in the F-35 Program.⁸⁵ In 2010, it was reported that Lockheed Martin estimated that, 'over the 20 year production life of the JSF, the Australian share of work is currently projected to be somewhere between \$11.5 and \$12 billion, with further opportunities to follow'.⁸⁶ In 2015, Air Vice-Marshal Deeble, Program Manager, Joint Strike Fighter, estimated that 'Australian industry stands to win in excess of \$1.5 billion in JSF-related production and support work over the life of the JSF program'.⁸⁷ Now in 2016, Defence has estimated that:

...the potential total contracted value of the opportunities currently being worked by Australian industry could reach US\$2 billion by 2023, assuming businesses are able to maintain globally competitive levels of performance on price, schedule and quality. If Australian companies continue to remain competitive in production then contracts to the value of US\$4 billion are feasible out to the end of production in 2035.⁸⁸

5.53 A forecast of the cumulative value of contracts secured by Australian Industry for F-35 design and production is illustrated in the table below.

82 Mr Eric Palmer, *Submission 19*, p. 7.

83 'JSF delays ground Aust parts maker', *The Canberra Times*, 21 September 2011, <http://www.canberratimes.com.au/national/jsf-delays-ground-aust-parts-maker-20110921-1wqdg.html>, (accessed 26 August 2016).

84 Mr Eric Palmer, *Submission 19*, p. 7.

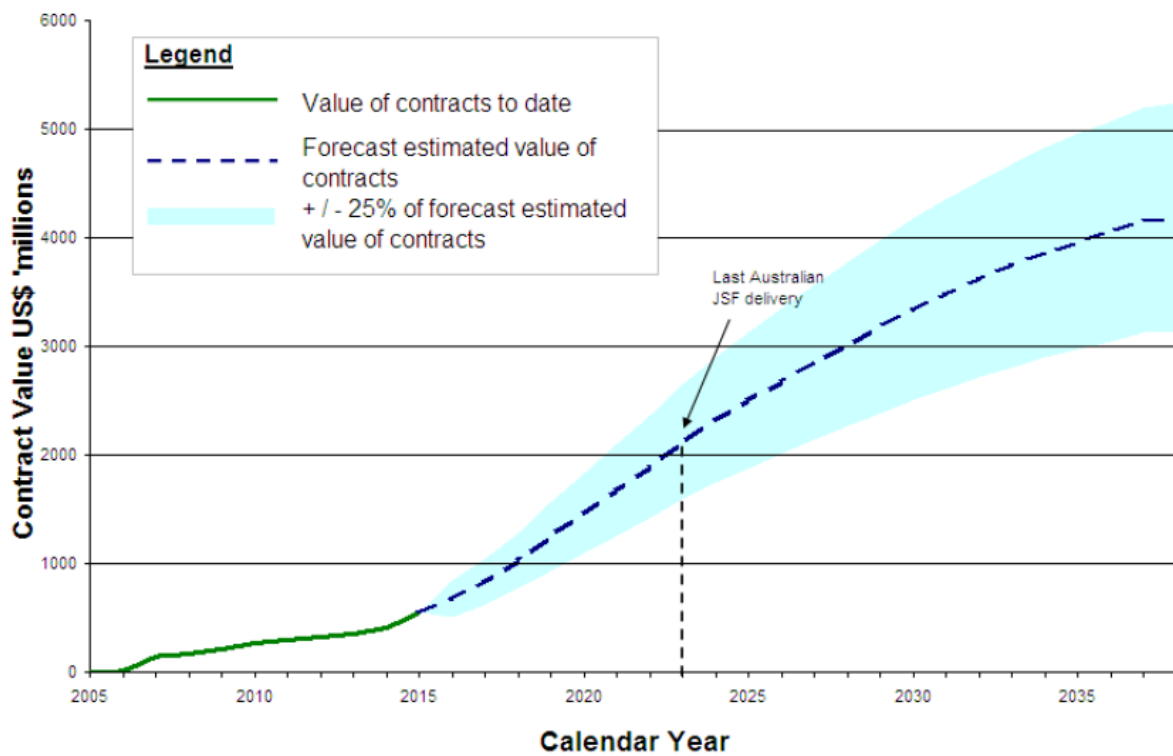
85 '\$9bn bonanza in F-35 deal', *The Australian*, 23 March 2007, <http://www.theaustralian.com.au/business/aviation/bn-bonanza-in-f-35-deal/story-e6frg95x-111113205999>, (accessed 26 August 2016).

86 'JSF – Australia Industry Participation', *Asia Pacific Defence Reporter*, <http://www.asiapacificdefencereporter.com/articles/1/JSF-Australia-Industry-Participation>, (accessed 26 August 2016).

87 'First Australian-made vertical tails installed on F-35', *CASG Bulletin*, <http://www.defence.gov.au/dmo/NewsMedia/DMOBulletin/First-Australian-made-vertical-tails-installed-on-F-35>, (accessed 26 August 2016).

88 Department of Defence, *Submission 55*, p. 10.

Table 5.2—Forecast cumulative value of contracts secured by Australian Industry for F-35 design and production



Source: Department of Defence, *Submission 55*, p. 24.