
A35 – Lockheed Martin Lightning II



Lockheed Martin F-35A Lightning II A35-11 of No 3 Squadron
departs for a night sortie from RAAF Williamtown, April 2019.
Source: Department of Defence



A pair of F-35A Lightning II aircraft (A35-015 and A35-024) in formation along the Newcastle region coastline during Exercise *Lightning Storm*. Source: Department of Defence

The arrival of the first two Lockheed-Martin F-35A Lightning II aircraft at RAAF Williamtown on 10 December 2018 not only marked the beginning of operations in Australia of the Air Force’s first fifth generation fighter, but also established the catalyst for the transformation of the Air Force into a fifth generation fighting force.

Possessing speed, agility, stealth technology, advanced datalinks, mission systems and sensor fusion; the F-35 is the most advanced multi-role stealth fighter in the world. With seventy-two aircraft and associated weapons, support equipment and logistics systems on order, the Australian F-35 Program is the largest acquisition activity in the history of the RAAF and forms a key element of the Australian Government’s \$200 billion build up in Defence capability.

The genesis of the F-35 can be traced back to 1993 and the United States Joint Advanced Strike Technology (JAST) program, which emerged from the cancellation of the United States Air Force’s (USAF) Multi Role Fighter (MRF) program and the United States Navy’s (USN) Advanced Fighter Attack (A/F-X) program. JAST evolved into the Joint Strike Fighter (JSF) program in 1995, with the intent of developing a concept demonstrator aircraft (CDA).

The CDA would set the basis for future development to satisfy the requirements of the USAF, USN and US Marines Corps (USMC) for an aircraft capable of replacing large numbers of multi-role and strike fighters in their respective inventories. A key requirement for the CDA was the inclusion of a Short Take-Off and Vertical Landing (STOVL) capability.



Lockheed Martin F-35A Lightning II A35-026 prior to departing for a mission at RAAF Williamtown during Exercise *Lightning Storm*. Source: Department of Defence



Lockheed Martin F-35A Lightning IIs A35-010 and A35-009 of No 3 Squadron fly in formation with three F/A-18 Hornets, December 2018. Source: Department of Defence

On 16 November 1996, following the formal evaluation of the CDA submissions by Boeing, Lockheed Martin, McDonnell Douglas and Northrop Grumman, the first two firms were selected to produce prototypes capable of demonstrating conventional take-off and landing (CTOL), carrier take-off and landing (CV) and STOVL. The Boeing and Lockheed Martin prototypes were called the X-32 and X-35 respectively. The X-32 first flew on 18 September 2000, followed by Lockheed Martin's X-35 on 24 October 2000.

Following extensive flight testing, the X-35 was declared the winner of the JSF CDA competition on 26 October 2001, with Lockheed Martin awarded a System Development and Demonstration (SDD) contract. Over the next five years, this SDD phase of the JSF program witnessed the basic X-35 design modified to create the final F-35 design and its three different variants. These variants—designated F-35A, F-35B and F-35C—provided the design solutions for CTOL, STOVL and CV respectively.

The maiden flight of the F-35A took place at Fort Worth, Texas, on 15 December 2006. It would be this version that would be the basis of Australia's acquisition of the aircraft.

In 1999, the Australian Department of Defence established Project AIR6000 to consider the 'whole of capability' options to replace the ageing

F/A-18A/B 'Classic' Hornet and F-111 fleets. In June 2002, Australia joined the SDD phase of the global F-35 program to gain insight into the aircraft's development and initial capabilities. First Pass approval of Project AIR6000 and approval to enter the Production, Sustainment and Follow-on Development phase of the F-35 Program occurred in 2006.

Joining this phase provided Australia with visibility of, and some influence over, the F-35 program with no commitment to buy the aircraft. Second Pass approval in November 2009 authorised the Department of Defence to manage a staged approach to acquisition, with Stage 1 to procure an initial fourteen F-35As and enabling elements to commence training.

In April 2014, the Australian Government approved Project AIR6000 Phase 2A/B Stage 2, comprising an additional fifty-eight F-35As, facilities and support systems required to deliver Initial Operational Capability (IOC) in 2020 and Final Operational Capability (FOC) in 2023. This brought the total approval for Australian F-35A aircraft to seventy-two.

A few months later, Defence celebrated as the first two Australian F-35As rolled off Lockheed Martin's production line at Fort Worth, Texas. These aircraft made their debut appearance on home soil at the

Australian International Airshow in March 2017, piloted by Wing Commander Andrew Jackson and Squadron Leader David Bell, the first Australian pilots to qualify on the F-35A.

The transformational aspects of the F-35A capability reside not only in the aircraft platform but also in the background systems and infrastructure that support it. Essential infrastructure at RAAF Williamtown represents almost AU\$1 billion of the facilities investment in the Australian F-35A Project.

These facilities include the Off-Board Information Systems Centre (OBISC) which is unique to Australia and a critical component in the operation of the F-35 fleet's Autonomic Logistics Information

System (ALIS). ALIS provides the essential off-board information system infrastructure (hardware, software and data) that performs maintenance management, fault diagnostics, supply support, mission planning, and training management across the F-35A weapon system

In addition to ALIS and OBISC, Australia has partnered with the United Kingdom and the United States to establish a laboratory to develop and test the Mission Data Files that program the F-35A to be a 'smart' aircraft. The establishment of an effective reprogramming solution is critical to realising the aircraft's fifth generation capabilities and meeting Australia's operational requirements at IOC.



Lockheed Martin F-35A Lightning II A35-016 of No 3 Squadron performing an aerial handling display over RAAF Williamtown, November 2019. Source: Department of Defence

During 2018, Australia's next eight F-35As were accepted by the RAAF and began flying operations at USAF's Luke Air Force Base in Arizona. These aircraft had Block 3F mission system software installed, delivering the next increment of warfighting capability and meeting the requirement for the Australian IOC declaration. This was a significant milestone for the Australian F-35A project, demonstrating the maturity of the United States-led global F-35 program.

The current F-35 partner nations are the US (as project lead), the United Kingdom (UK), Italy, Netherlands, Australia, Canada, Denmark and Norway. The F-35 is also being acquired under the US Foreign Military Sales arrangements by Israel, South Korea, Japan, Belgium and Poland, with Singapore acquiring four aircraft initially for evaluation purposes.

Currently the F-35 is in service with the USAF, USN and USMC as well as the United Kingdom, Italy, Norway, Israel, Japan, South Korea, the Netherlands and Australia. It is operating from twenty different

locations across the US, Italy, Norway, Israel, Japan, UK, United Arab Emirates, Germany, South Korea, the Netherlands and Australia. Collectively, the F-35 has flown more than 275 000 flight hours with more than 1000 F-35 pilots and over 9000 aircraft maintainers trained to date.

For the RAAF, the F-35 journey has only just begun with verification and validation activity underway, leading towards (at the time of writing) the achievement of IOC in December 2020. With twenty-six aircraft delivered to the RAAF by mid-2020, the majority are in service with No 3 Squadron and No 2 Operational Conversion Unit at RAAF Williamtown with a small number remaining at Luke Air Force Base in Arizona at the international Pilot Training Centre. Beyond 2020, all operations will be based in Australia as No 77 Squadron transitions to F-35A and the Australian fleet increases beyond thirty-three aircraft. The fleet will build steadily to a size of seventy-two aircraft at FOC at the end of 2023.



A pair of Lockheed Martin F-35A Lightning II aircraft, A35-015 of No 3 Squadron and A35-024 of No 2 Operational Conversion Unit, fly in formation along the Newcastle region coastline during Exercise *Lightning Storm*. Source: Department of Defence



Lockheed Martin F-35A Lightning II A35-011 of No 3 Squadron departs for a night sortie from RAAF Williamtown, April 2019. Source: Department of Defence



Lockheed Martin F-35A Lightning II A35-008 of No 3 Squadron at RAAF Williamtown, New South Wales. Source: Department of Defence

TECHNICAL DATA: Lockheed Martin F-35A Lightning II

DESCRIPTION:

Single-seat multi-role fighter.

POWER PLANT:

One 128.1kN (28 800lb) dry thrust or 191.3kN (43 000lb) thrust with afterburner Pratt & Whitney F135-PW-100 turbofan.

DIMENSIONS:

Span 10.67m (35ft 0in); length 15.57m (51ft 5in); height 4.38m (14ft 4.5in).

WEIGHTS:

Empty 13 290kg (29 300lb); max loaded 31 751kg (70 000lb).

ARMAMENT:

AIM-120C air-to-air missiles, AIM-9X Sidewinder short range air-to-air missiles, GBU-31 Joint Direct Attack Munitions (JDAM) guided bombs, GBU-39 small diameter bombs, laser-guided bombs, internal 25mm GAU-22/A cannon.

PERFORMANCE:

Max speed Mach 1.6 (1700km/h/1056mph) at altitude; ceiling 15 240m (50 000ft); radius of operation 1092km (679 miles); range (internal fuel) 2222km (1380 miles).