



F-35A Joint Strike Fighter

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Scope

- Why, where and when?
- F-35 overview
- F-35 sensors suite
- Common myths
- Questions



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Why the F-35?

A vital part of our national security framework

*“Maintaining Australia’s **technological edge and capability superiority** over potential adversaries is an essential element of our strategic planning. The **capability superiority** that Australia has traditionally maintained in the wider region will be **challenged by military modernisation**. Over the next 20 years a larger number of regional forces will be able to operate at greater range and with more precision than ever before. The growth in the capability of **China’s military** forces is the most significant example of regional military modernisation, but **other countries** are also undertaking extensive modernisation programs.”*

Defence White Paper 2016

Chinese J-20



Russian T-50 PAK-FA



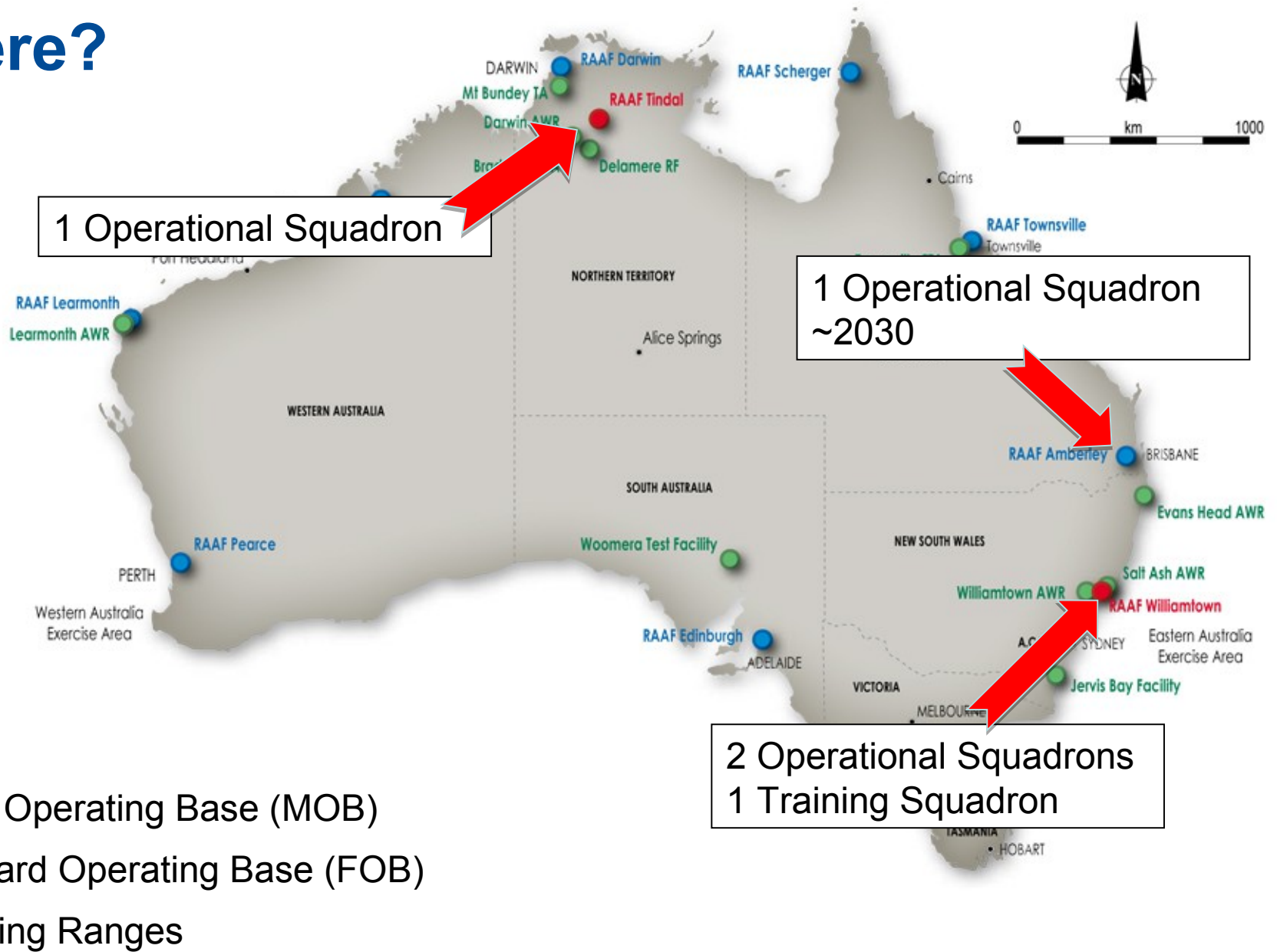
Why Now?

- Replace the ageing F/A-18A/B Classic Hornet fleet
- F-111C withdrawn in 2010 after 37 years service
- F/A-18A/B will be 37 years old at the planned withdrawal date



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Where?



When?

- First Aircraft Arrival: Dec 2018
- Initial Operational Capability: Dec 2020
- Full Operational Capability: Dec 2023

- RAAF Williamtown then RAAF Tindal
- Most aggressive Squadron standup globally!

F-35 Lightning II – Overview



What Is The Joint Strike Fighter?

- The next generation “family” of strike fighters
 - F-16 / F/A-18C “like” aero performance
- Reduced Signature and Advanced Countermeasures
- Advanced avionics, data links and adverse weather precision targeting
- Increased range with internal fuel and weapons



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One Type To Replace Many

US and UK



F-16

USAF



A-10



F/A-18

USN



F/A-18

USMC



AV-8B



Sea Harrier

RN/RAF



Harrier GR7

**F-35
Joint
Strike
Fighter**



International

Denmark

Norway

Netherlands

Italy

Turkey

Australia

Canada

F-16



F/A-18



Australia

F-111



AMX



Harrier



Tornado



One Type To Replace Many

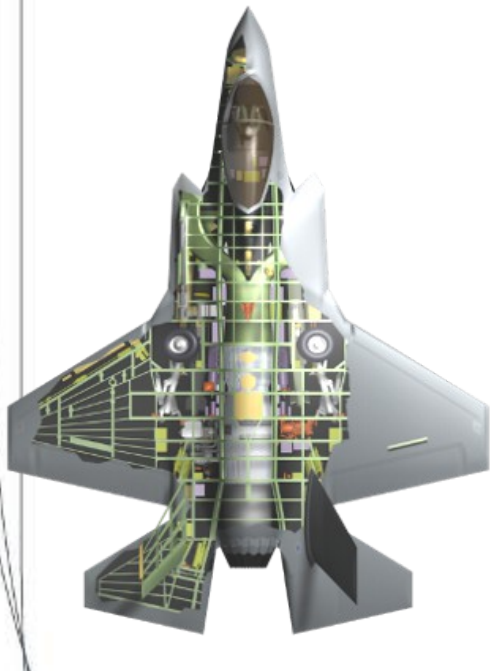
- 9 Partner Nations + Foreign Military Sales countries
 - Production program of record of nearly 3,200 aircraft produced beyond 2040
- Operating the F-35 today:
 - Australia
 - Italy
 - Israel
 - Japan
 - Netherlands
 - Norway
 - UK
 - US
 - Korea and Turkey 2018



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F-35 Variants

F-35A - Conventional Take-Off
& Landing (CTOL)



18,250lbs fuel

>590nm combat radius

2 x 2000lb JDAM internal

Internal 25mm gun

Cheapest

>2000 ordered

F-35B - Short Take-Off
Vertical Landing (STOVL)



13,500lbs fuel

>450nm combat radius

2 x 1000lb JDAM internal

External gun only

Expensive

~450 ordered

F-35C - Carrier Variant (CV)



17,750lbs fuel

>600nm combat radius

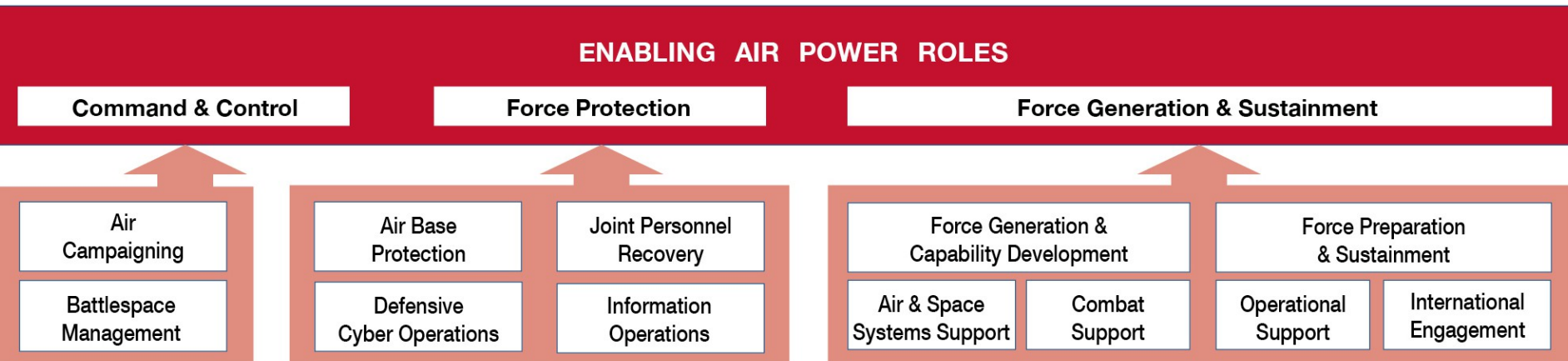
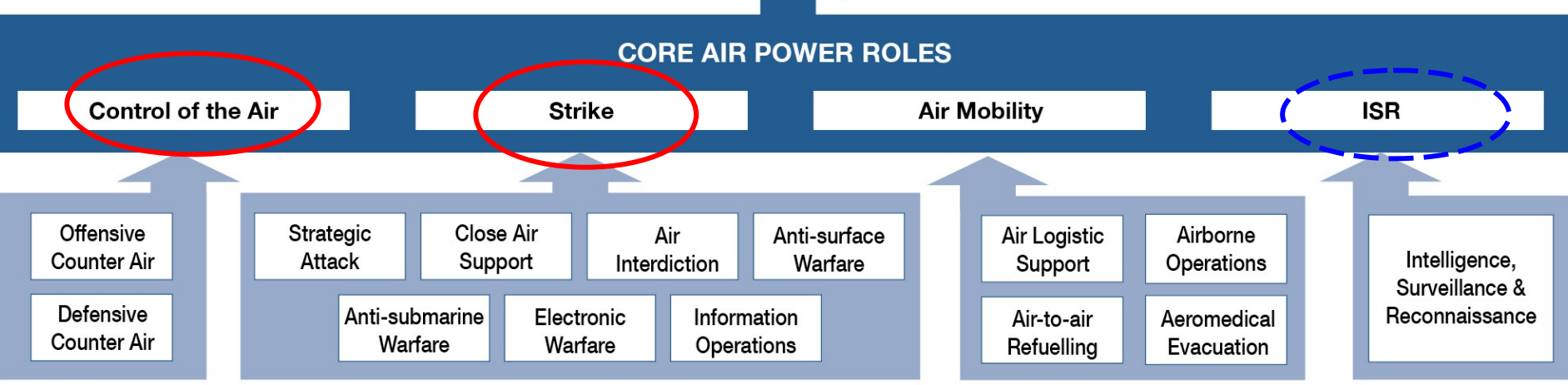
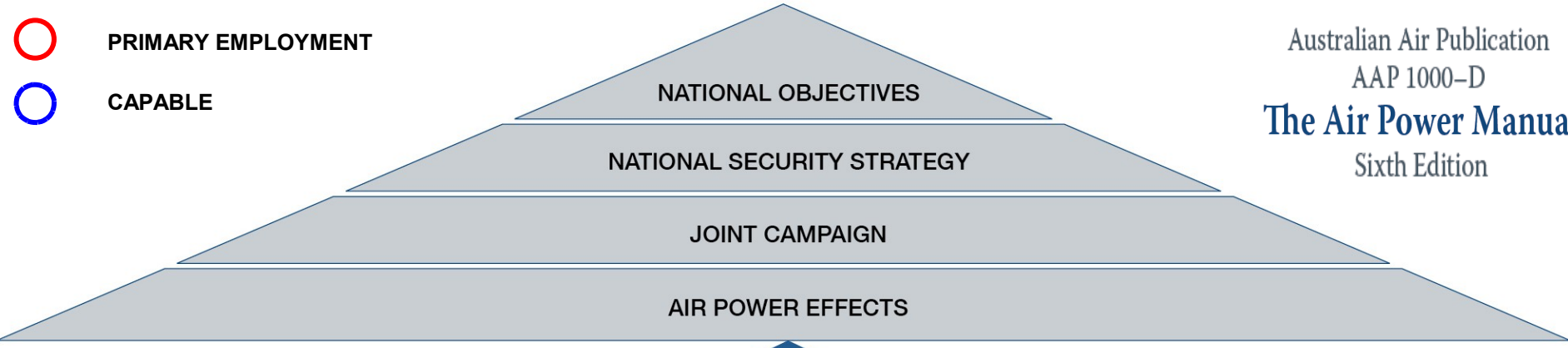
2 x 2000lb JDAM internal

External gun only

Most expensive

~340 ordered

- PRIMARY EMPLOYMENT
- CAPABLE



Why Stealth Matters



Two key components:

Survivability and Lethality

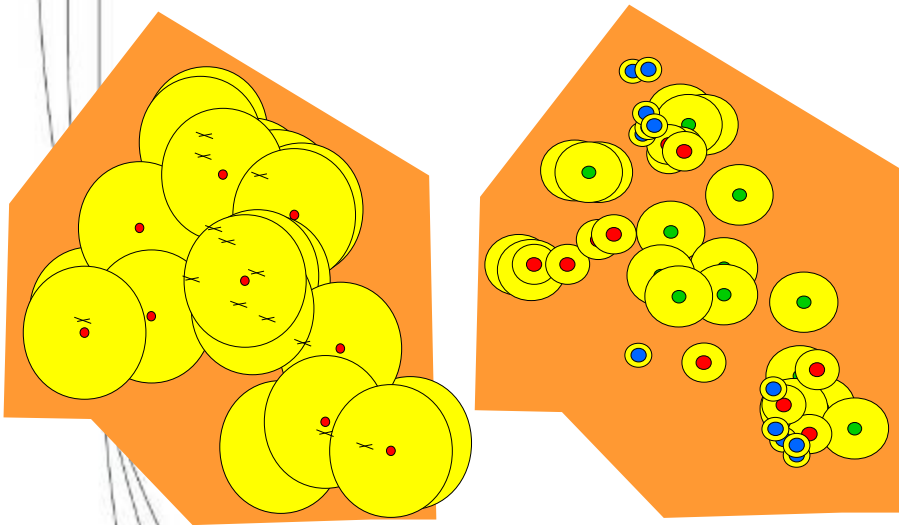
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Stealth - Survivable & Lethal

The F-35A can conduct the same roles as legacy fighters, but in a higher threat/less permissive environment

Against surface-air threats

F-35 brings survivable theater access...

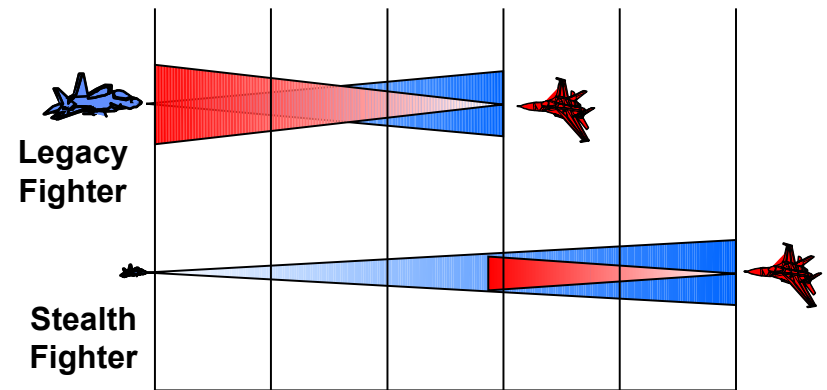


Legacy Fighter

Stealth Fighter

Against air-air threats

First detect = first shot = first kill



Inherent Air-to-Air Capability

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Interoperability – Integrated Forces

- F-35 designed to share everything it can see with others to maximise situational awareness
- F-35 can support legacy aircraft and other F-35s
 - Stealth
 - Electronic Warfare
 - Information Sharing, etc.

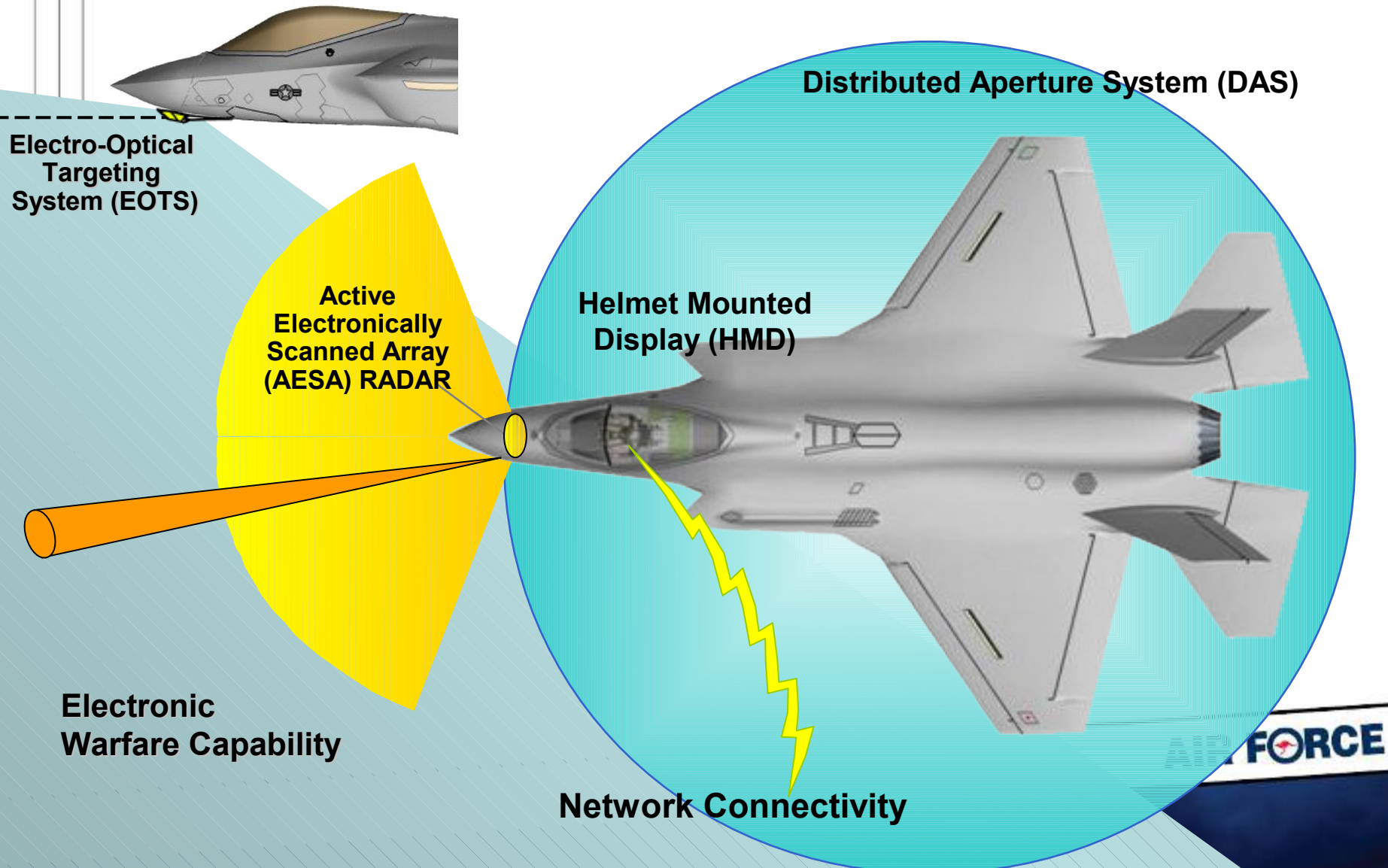
F-35 Sensors



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Integrated Avionics



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AN/APG-81 AESA Radar



- Long range air and surface target engagement
- Electronic v mechanical = effective & reliable
- Enhanced situational awareness

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Electro-Optical Targeting System (EOTS)

- Forward-looking infrared (FLIR)
- Infrared search and track (IRST)
- High-performance, lightweight, multi-function system
- Precision air-to-air and air-to-surface targeting capabilities



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AN/AAQ-37 Distributed Aperture System (DAS)

- 360 degree spherical situational awareness system
- Six electro-optical sensors
- Missile detection and tracking
- Launch point detection
- Situational awarenessIRST & cueing
- Fire control capability (weapons support)
- Precision tracking of friendly aircraft for tactical manoeuvring
- Day/night vision

- Recent demonstration: DAS & APG-81 RADAR autonomously detected, tracked and targeted 5 simultaneously airborne ballistic missiles (from launch to past second stage burnout)

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Helmet Mounted Display (HMD)

- HUD projected onto visor
- Real-time DAS stream
- Integrated camera – infrared night vision



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Electronic Warfare

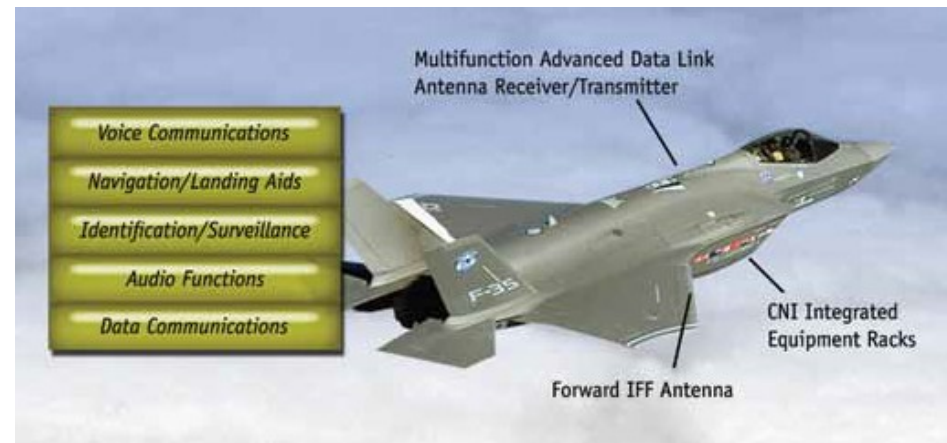
- 360 degree coverage
- Core processor >400 billion operations per second.
- Data collection
- Enemy radar and EW emission identification
- Target attack recommendation

Multifunction Advanced Data Link (MADL)

- Shares situational awareness data between fighters
- High data rate
- Directional = secure
- Coordination of tactics and engagement information

Comms, Nav, Identification (CNI) Suite

- Software-defined radio (SDR) technology
- Simultaneous operation of multiple critical functions
 - AM/FM UHF/VHF Clear/Secure
 - HAVEQUICK
 - SINCGARS
 - GUARD
 - Survival Radio
 - IFF Interrogate/Transponder
 - VMF (K-SERIES)
 - RADALT, ILS, TACAN
 - LINK 16, MADL
 - Maintenance Intercom



Cockpit Displays



Weapons

- Precision guided Air-Surface
 - GBU-12 Laser-Guided Bomb (LGB)
 - GBU-31 Joint Direct Attack Munition (JDAM)
 - GBU-39 Small Diameter Bomb (SDB)
- Air-Air
 - AIM-120D Advanced Medium-Range Air-to-Air Missile (AMRAAM)
 - AIM-9X Block 2 Infrared Guided Short-Range Air-to-Air Missile

Software Block Development

- Six key software releases: Block 1A/1B, 2A, 2B, 3i, 3F
- Block 3F = 100% of the software required for full warfighting capability, including but not limited to data link imagery, full weapons and embedded training



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Some F-35 Myths

- The F-35 is not very stealthy
- The F-35 is invisible
- Once the F-35 is located, it can be easily defeated
- The F-35 can't dogfight
- The F-35 has poor aerodynamic performance
- The F-35 will be easily overcome by threat systems currently in service

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Questions?



F-35A**F-35B****F-35C**

Length	51.4 ft / 15.7 m	51.2 ft / 15.6 m	51.5 ft / 15.7 m
Height	14.4 ft / 4.38 m	14.3 ft / 4.36 m	14.7 ft / 4.48 m
Wingspan	35 ft / 10.7 m	35 ft / 10.7 m	43 ft / 13.1 m
Wing area	460 ft ² / 42.7 m ²	460 ft ² / 42.7 m ²	668 ft ² / 62.1 m ²
Horizontal tail span	22.5 ft / 6.86 m	21.8 ft / 6.65 m	26.3 ft / 8.02 m
Weight empty	29,300 lb	32,300 lb	34,800 lb
Internal fuel capacity	18,250 lb / 8278 kg	13,500 lb / 6,125 kg	19,750 lb / 8,960kg
Weapons payload	18,000 lb / 8,160 kg	15,000 lb / 6,800kg	18,000 lb / 8,160 kg
Standard internal weapons load	<ul style="list-style-type: none"> • 25 mm GAU-22/A cannon • Two AIM-120C air-to-air missiles • Two 2,000-pound GBU-31 JDAM guide 	<ul style="list-style-type: none"> • Two AIM-120C air-to-air missiles • Two 1,000-pound GBU-32 JDAM guided bombs 	<ul style="list-style-type: none"> • Two AIM-120C air-to-air missiles • Two 2,000-pound GBU-31 JDAM guided bombs
Maximum weight	70,000 lb class	60,000 lb class	70,000 lb class
Propulsion* (uninstalled thrust ratings)	F135-PW-100 40,000 lb Max. 25,000 lb Mil. Vertical N/A	F135-PW-600 40,000 lb Max. 25,000 lb Mil. 40,500 lb Vertical	F135-PW-100 40,000 lb Max. 25,000 lb Mil. Vertical N/A
Speed (full internal weapons load)	Mach 1.6 (~1,200 mph)	Mach 1.6 (~1,200 mph)	Mach 1.6 (~1,200 mph)
Combat radius (internal fuel)	>590 nm / 1,093 km	>450 nm / 833 km	>600 n.mi / 1,100 km
Range (internal fuel)	>1,200 nm / 2,200 km	>900 nm / 1,667 km	>1,200 n.mi / 2,200 km
Max g-rating	9.0	7.0	7.5



F-35A

Length	51.4 ft / 15.7 m
Speed	Mach 1.6
Wingspan	35 ft / 10.7 m
Wing area	460 ft ² / 42.7 m ²
Combat radius (internal fuel)	>590 n.mi / 1,093 km
Range (internal fuel)	>1,200 n.mi / 2,200 km
Internal fuel capacity	18,250 lb / 8,278 kg
Max g-rating	9.0
Weapons payload	18,000 lb / 8,160 kg
Propulsion	F135-PW-100
Thrust*	40,000 lb Max / 25,000 lb Mil

*Maximum Power (Max) = with afterburner
Military Power (Mil) = without afterburner

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F-35 – THE WORLD'S ONLY 5TH GENERATION MULTIROLE FIGHTER

DID YOU KNOW?

- 72 F-35As will join RAAF over next few years
- AU-1 and AU-2 training pilots and maintainers at Luke AFB



F-35 NOW. AND IN THE FUTURE...

200+ JETS FLYING



80,000 FLIGHT HOURS

F-35As ST
AUSTRAL

\$800 Million+ AUD contracted for advanced technology and engineering jobs

50+ Australian companies contributing to design and production

Billions of dollars over the next 25 years



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