



# Submission No 3

## **Review of the Defence Annual Report 2010 - 2011**

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# ***THE EVOLVING THREAT ENVIRONMENT***

## ***Reference Threat Capabilities versus the Joint Strike Fighter***

***(Materialised Predictions from APA Founders' Threat Assessments dating back to Circa 1998)***

***AIR POWER AUSTRALIA  
DATA SUBMISSION NO 2  
TO  
JSCFADT DEFENCE ANNUAL REPORT (2010/2011) REVIEW:  
HEARING INTO THE JOINT STRIKE FIGHTER (JSF) PROGRAM  
Dated 07 February 2012***

## CURRENT GENERATION AIRBORNE & SURFACE BASED ANTI-ACCESS/AREA DENIAL (A2/AD) REFERENCE THREAT PRÉCIS

***“Performance is fabulous. It is exactly what we need. There are no performance concerns about the JSF in the Australian Defence Force, in the air force, indeed anywhere, . . . It will be a very capable aircraft which will give us exactly what we need.”***

*Air Chief Marshal Angus Houston, Chief of Defence Force, November, 2008*

1. Best practice in the definition of capabilities and force structures is to ensure that the capabilities of likely and/or possible adversaries are understood, and new capabilities defined to outperform such “reference threats”.
2. Over the last decade Russia's defence industry has recovered from the post Cold War slump, and become yet again a major global exporter of advanced high technology weapons, with Asia becoming its single largest market in quantities and revenues.
3. China's defence industry has reverse engineered many Russian weapons, some Western weapons, as well as developed some very advanced systems indigenously, and has initiated intensive competition against Russian suppliers in the global marketplace.
4. The most advanced Russian and Chinese weapons are being exported globally, and are the most likely threat systems the ADF will have to confront either within the region, or in any other coalition operations conducted jointly with the United States.
5. Legacy Soviet era weapons are being replaced and are becoming scarce at this time - the Libyan campaign may well be the last time we ever see a legacy Soviet air defence system pitted against contemporary Western systems.
6. Modern Russian and Chinese weapons take full advantage of the globalised Western digital technology base, often using identical chips to US, EU and Israeli designs; Many Russian systems are known to use Western open source software environments.
7. Over the last decade the Russians and Chinese have closed the gap in most of the technologies used to construct combat aircraft; The US and EU hold only *incremental* advantages now in *some* areas of radar, thermal imaging, passive radiofrequency sensors and stealth – Russian and Chinese designs are now clearly much more advanced in aerodynamic design and integration.
8. Russian design philosophy, emulated by the Chinese, is precisely focussed on exploiting weaknesses in Western designs and force structures, using well thought out and carefully considered technological strategies – the latest Russian and Chinese designs have the performance and capabilities they have *specifically to defeat planned US and EU capabilities*.
9. The F-35 Joint Strike Fighter was defined during the mid 1990s to have “*affordable*” aerodynamic performance, stealth performance, sensor capabilities and weapons loads to be “*affordably*” effective against the most common threat systems of that era past – legacy Soviet Cold War era weapons.
10. *The F-35 Joint Strike Fighter will be ineffective against the current generation of advanced Russian and Chinese systems, detailed below; In any combat engagements between the F-35 and such threat systems, most or all F-35 aircraft will be rapidly lost to enemy fire.*
11. The limitations in the F-35 design cannot be fixed by upgrades or modifications as they are inherent in the basic F-35 design; Even if the F-35 were to meet its mediocre performance specifications or *as-marketed* expectations, it would not be viable in combat against modern Russian and Chinese built threat systems.
12. If the RAAF is to be equipped with the F-35, in times of war it would be cheaper to bulldoze these combat ineffective aircraft into ditches, rather than fly them into combat and waste the lives of Australian pilots, as occurred in 1942 when Wirraways and Buffaloes were flown against then advanced Japanese Zeroes.
13. ***The misguided, ‘group-think’ driven choice of the F-35 & F/A-18E/F by Defence represents the single largest systemic planning failure in ADF history.***

## Sukhoi/KnAAPO T-50 PAK-FA Stealth Fighter



(Image Maxim Maksimov)

**Overview:** The PAK-FA is a high performance supercruising multirole stealth fighter intended to directly compete against the USAF F-22A Raptor; IOC is ~2015; Aero/Propulsive agility and performance considered better than F-22A Raptor; Stealth Performance similar to F-35 JSF; Combat radius superior to F-22A and F-35C; Equipped with AESA radars in X-band and L-band, 5 arrays; Internally carried weapons; 3D thrust vector and advanced flight controls; intended for global exports.

### *Key Observations on the Data & Facts:*

Development initiated during 1990s and well publicised in Russian media post 2000;

2015 IOC; flight test progressing very rapidly;

Designed from the outset to defeat the F-22 in close combat, match F-22 in long range supersonic combat, outperform F-22 in range/persistence;

Advanced second generation supercruise engine and high stealth rectangular nozzle in development;

High volume export production intended, planned replacement for established Flanker series fighters in global marketplace;

Advanced digital avionics: X-band radar modelled on F-22 APG-77, unique counter-stealth L-band radar, infrared sensor optimised for long range aerial combat, cockpit modelled on Su-35S, internal weapons, large internal fuel load, networked; Highly evolved aerodynamics & structure; “Extreme plus” agility;

*F-35 has no stealth advantage vs. PAK-FA and is grossly inferior to PAK-FA in sustained speed, altitude, agility, combat radius and weapons load payload;*

### *Some Questions for Testing the Evidence:*

Why is Defence even considering the strategically obsolete F-35 & F/A-18E/F Super Hornet given that both aircraft are absolutely inferior to the PAK-FA?

Why has Defence failed to address the PAK-FA and its future derivatives in any strategic planning?

Why has Defence not addressed “counter-stealth” capabilities in any strategic planning?

## Chengdu J-20 Stealth Fighter



(Image Chinese Internet)

**Overview:** The Chengdu J-20 is an “F-111 sized” high performance supercruising multirole stealth fighter intended to directly compete against the USAF F-22A Raptor; IOC is ~2017; Aero/Propulsive agility and overall performance intended to be competitive against F-22A Raptor; Stealth Performance will be superior to F-35 JSF; Combat radius superior to F-22A and F-35C; To be equipped with AESA radar in X-band; Internally carried weapons; advanced aerodynamic flight controls; export status yet to be disclosed.

### *Key Observations on the Data & Facts:*

Development initiated during 1990s but not publicly disclosed until 2011;

2017 IOC disclosed; flight test progressing very rapidly;

Designed from the outset to defeat the F-22 in close combat, match F-22 in long range supersonic combat, outperform F-22 in range/persistence;

Stealth shaping modelled on F-22 design rules with potential to match extant F-22A stealth through in-place Evolutionary Design/Development doctrine;

Expected to become replacement for established J-11 Flanker series fighters in PLA force structure;

Advanced digital avionics intended but not yet disclosed, internal weapons, large internal fuel load;

*F-35 JSF is grossly inferior to a production J-20 in stealth shaping, sustained speed, altitude, agility, radius and weapons payload;*

China has always exported indigenous fighter designs, and has yet to rule out future exports of the J-20 in global marketplace.

### *Some Questions for Testing the Evidence:*

Why is Defence even considering the strategically obsolete F-35 & F/A-18E/F Super Hornet given that both aircraft are absolutely inferior to the J-20?

Why has Defence failed to address the J-20 and its future derivatives in any strategic planning?

Why has Defence not introduced “counter-stealth” capabilities in any strategic planning?

## Sukhoi/KnAAPO Su-35S Flanker



(Image KnAAPO)

**Overview:** The Su-35S is a high performance supercruising multirole fighter intended to defeat all Western fighters lesser than the USAF F-22A Raptor; IOC is ~2012; Aerodynamic / agility performance comparable to or better than F-22A Raptor, stealth performance similar to F/A-18E/F Super Hornet; Combat radius “F-111 class” - superior to F-22A and F-35C; Equipped with PESA radar in X-band and AESA in L-band, 3 arrays; advanced RF surveillance and DRFM jammers; Externally carried weapons; 3D thrust vector and advanced flight controls; intended for global exports.

### ***Key Observations on the Data & Facts:***

Development initiated post 2000 as Su-35BM “deep upgrade” of extant Su-27M fleet, but changed to new production circa 2008;

2012 IOC intended; flight test progressing very rapidly;

Designed from the outset to compete with the F-22 in close combat, outperform F-22 in range/persistence;

Aircraft uses radar absorbent materials extensively, modelled on Super Hornet signature reduction;

Intended as high volume export product to supplement PAK-FA in Flanker replacement market;

Advanced digital avionics: X-band IRBIS-E phased array radar, unique counter-stealth L-band radar, infrared sensor optimised for long range aerial combat, cockpit modelled on F-22/F-35, networked, large internal fuel load, external fuel tanks, highly evolved aerodynamics & structure, “Extreme” agility;

*F-35 is grossly inferior to the Su-35S in sustained speed, altitude, agility, radius and weapons payload;*

Initial Su-35S builds for Russian Air Force, but aircraft is now actively marketed for global export.

### ***Some Questions for Testing the Evidence:***

Why is Defence even considering the strategically obsolete F-35 and F/A-18E/F Super Hornet given that both aircraft are grossly inferior to the Su-35S in close combat, and challenged in long range combat?

Why has Defence failed to address the Su-35S in any strategic planning?

Why has Defence not introduced long range air-air missile capabilities in any strategic planning?

## NNIIRT 55Zh6M Nebo M Mobile “Counter Stealth” Radar



(Image Rosoboronexport)

**Overview:** The Nebo M is an advanced digital solid state 3D multiple band radar intended to detect and track stealth aircraft at all altitudes and long range; VHF-Band, L-Band and C-Band antenna elements with digital track fusion modelled on the US Navy CEC system and STAP modelled on E-2D Hawkeye; Nebo M components carried by high offroad mobility 8x8 BAZ-6909 vehicles; Stow and deploy times ~15 minutes, possibly less, for evasion of guided munition attacks; Advanced processing algorithms for track fusion, and Space Time Adaptive Processing (derived from Nebo SVU design).

### *Key Observations on the Data & Facts:*

Development initiated late 1990s leveraging experience in Nebo SVU VHF-Band AESA radar;

2012-2013 IOC intended;

Designed from the outset to detect stealth fighters and provide early warning and track data to missile batteries and fighters;

The VHF component will provide a significant detection and tracking capability against fighter and UCAV sized stealth targets;

High off-road capability permits placement well away from built up areas, enabling concealment;

Rapid deploy and stow times permit evasion of air attacks by frequent movement, defeats cruise missiles like JASSM;

Initial Nebo M builds for Russian Air Defence Forces, but expected like other “counter-stealth” radars to be marketed for global export to arbitrary clientele.

### *Some Questions for Testing the Evidence:*

Why is Defence even considering the strategically obsolete F-35 and F/A-18E/F Super Hornet given that both aircraft will be easily tracked by Nebo M and thus engaged by fighters or SAMs?

Why has Defence failed to address the Nebo M in any strategic planning?

Why has Defence not considered the impact of counter-stealth sensors in any strategic planning?

## Almaz-Antey S-400 / SA-21 “Growler” SAM System



(Image Yevgeniy Yerokhin)

### *Key Observations on the Data & Facts:*

Development initiated late 1990s leveraging experience in S-300PMU2 / SA-20B Gargoyle;

Two S-400 batteries operational near Moscow, more in production;

Designed to engage all classes of aerial target in high tempo high density combat;

The S-400 is networked, and designed to accept track inputs from external sensors such as “counter-stealth” radars and Emitter Locating Systems;

High off-road capability permits placement well away from built up areas, enabling concealment;

Rapid deploy and stow times permit evasion of air attacks by frequent movement, defeats cruise missiles like JASSM;

Deployment of S-400 batteries in South East Asia could deny the ADF much of the sea-air gap;

Warning times to regional deployment and IOC very short;

Initial S-400 builds for Russian Air Defence Forces, export approved to Belarus, expected like other modern Russian SAM systems to be marketed for global export.

TNI stated interest in these SAMs some years ago.

### *Some Questions for Testing the Evidence:*

Why is Defence even considering the strategically obsolete F-35 and F/A-18E/F Super Hornet given that both aircraft will be susceptible to the S-400 system?

Why has Defence failed to address the S-400 in any strategic planning?

Why has Defence not considered the regional impact of advanced SAMs in any strategic planning?

**Overview:** The S-400 is a high mobility long range SAM system, designed to engage and destroy aerial targets at all altitudes, and providing a capability to engage high altitude targets at 400 km range; 48N6E3 missile to 250 km range, 40N6E missile to 400 km range; most S-400 components carried by high off-road mobility 8x8 BAZ-6909 vehicles; Stow and deploy times less than 5 minutes, for evasion of guided munition attacks; jam resistant digital C-band 92N6E Grave Stone multimode “agile-beam” ESA engagement radar (with SPARC COTS digital processing); digital S-band LEMZ 96L6-1/96L6E acquisition radar; digital S-band NIIP 91N6E Big Bird “agile-beam” ESA battle management radar; radars networked with covert “pencil beam” millimetre wave data-links; four round 5P90S/SE self propelled and 5P85TM/TE2 towed launchers with digital networking; interfaces for data inputs from various external radars and passive Emitter Locating Systems; integrated capability to cue /control S-200VE and S-300PMU2/SA-20B missile batteries; compatible with 48N6E and 48N6E2 war-stocks.