Australia's Regional Challenge – The Proliferation of Russian High Technology Weapons in the Region

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Asia's "Creeping" Arms Race

- Rapid large scale industrialisation
- Surplus funds for military modernisation
- Improving standards of education/training
- Emulation of US and Russian doctrine
- Emulation of US and Russian force structures
- Focus on air power, precision weapons
- Control of the air, denial of air/sea access
- Major players – China, India, Japan, US
- Smaller nations confront major shifts in the balance of power across the Asia-Pacific
- Russian high tech weapons principal capability driver

Post Cold War Russian Weapons

- Modern high technology weapons
- Mostly digital processing rather than Cold War analogue hardwired technology
- Exploitation of globalised market for high technology components, materials, software and other basic technology
- Some weapons are evolved from late Cold War era designs
- Some weapons are entirely new post Cold War developments
- Many have no Western equivalents

What New Capabilities?

- Advanced Derivative Fighters – Su-35BM, MIG-35, Su-30MK, Su-27SKM
- Low Observable Fighters – PAK-FA, J-XX
- Advanced Radars – Irbis E, Zhuk AE/ASE
- Cruise missiles – supersonic and subsonic
- Smart Bombs – EO, Laser, Satnav/Inertial
- Electronic Warfare – DRFM Jammers
- High Mobility Surface to Air Missiles
- Advanced Counter-VLO VHF Radars – Nebo SVU, JY-27

PAK-FA – F-22 Class Agility + Stealth

Sukhoi Su-35BM/Su-35-1 Flanker E+

Sukhoi Su-35BM/Su-35-1 Flanker E+

Sukhoi Su-35BM/Su-35-1 Flanker E+

- “Deep” redesign of Su-35 – fully digital weapon system, flight controls, systems
- Supersonic cruise AL-31FU-117S engines
- Large area glass cockpit emulating JSF
- Digital datalinks – TKS-2 and “JTIDS-ski”
- Radar absorbent materials – inlets
- Advanced 20 kiloWatt Irbis E hybrid ESA
- Optional Zhuk ASE 20+ kiloWatt AESA
- R-172, R-77M, RVV-AE-PD, R-27, R-74 AAMs; mostly digital designs

Sukhoi Su-35BM/Su-35-1 Flanker E+

- Khibiny M passive radio frequency surveillance and targeting system
- DRFM self protection jammer
- Missile Approach Warning System (MAWS)
- Electro-Optical targeting system for A/A and A/G
- Tail warning radar system
- Superior to all F-15, F-16 and F/A-18 variants, and Eurocanard fighters
- IOC ~ 2010-2011
- Intended for volume export

RSK MiG-35 Fulcrum

RSK MiG-35 Fulcrum

RSK MiG-35 Fulcrum

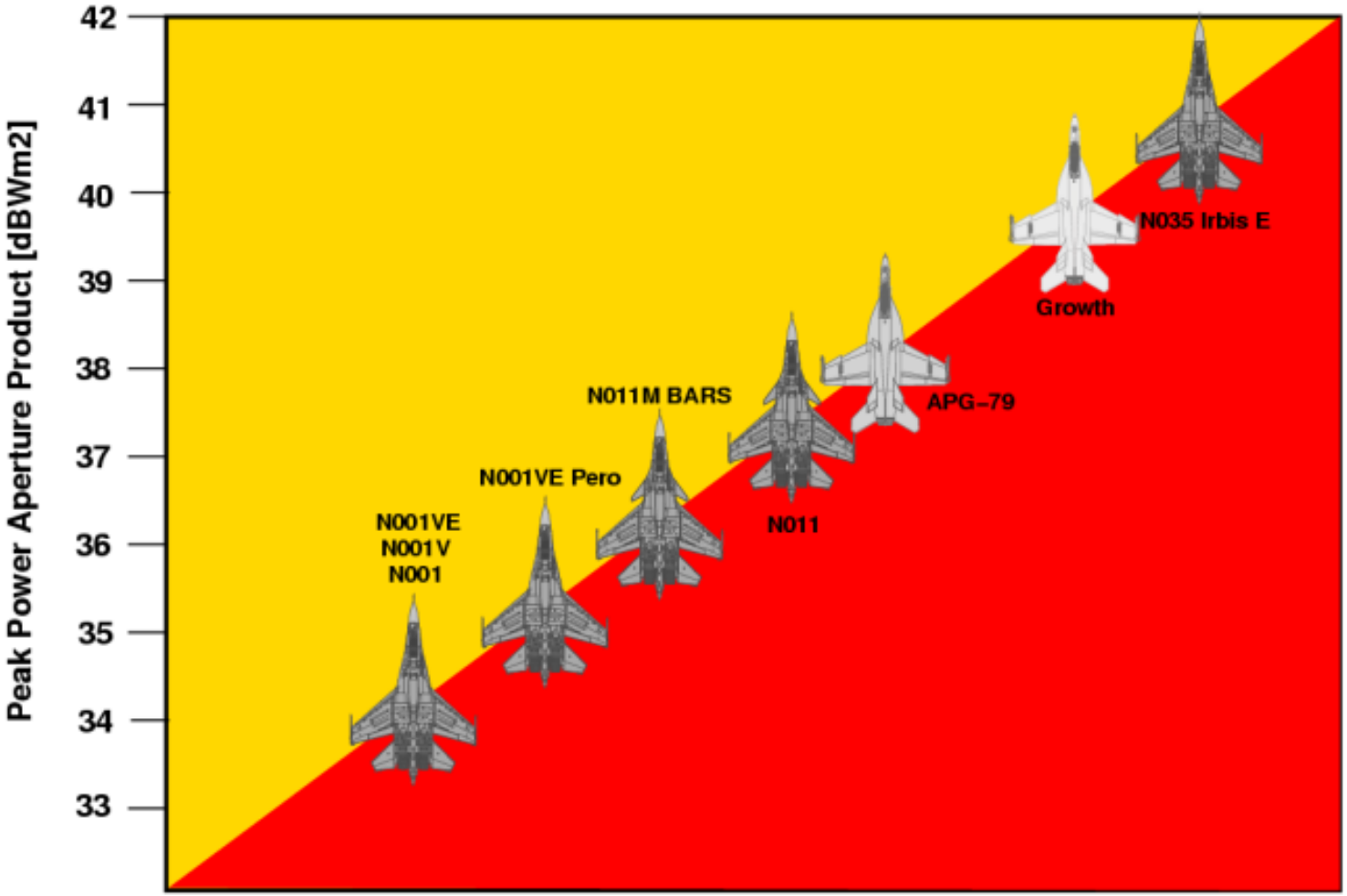
- “Deep” redesign of MiG-29 – fully digital weapon system, flight controls, systems
- Zhuk AE Active Electronically Steered Array radar
- Digital datalinks – TKS-2 and “JTIDS-ski”
- Advanced Electro-Optical targeting system
- DRFM self protection jammer
- Missile Approach Warning System
- R-172, R-77M, RVV-AE-PD, R-27, R-74 AAMs; mostly digital designs

Su-30MK and Su-27SKM

- Digital derivatives of baseline Su-27SK and Su-30K – glass cockpits
- Full range of AAMs and smart PGMs
- Su-30MKI/MKM - digital flight controls and TVC engines – India and RMAF deployed
- Su-30MKK/MK2 – equiv F-15E – PLA-AF, PLA-N, TNI-AU, PAVN
- Many upgrade options especially in radar:
- Irbis E hybrid, Zhuk-ASE AESA, Zhuk MSFE PESA, Pero reflective ESA

Su-30MKM Flanker H TUDM – IOC 2009

How do Russian Radars Compare?



Zhuk ASE

Russian Beyond Visual Range Missiles

Anti-AWACS

Seeker Technology:

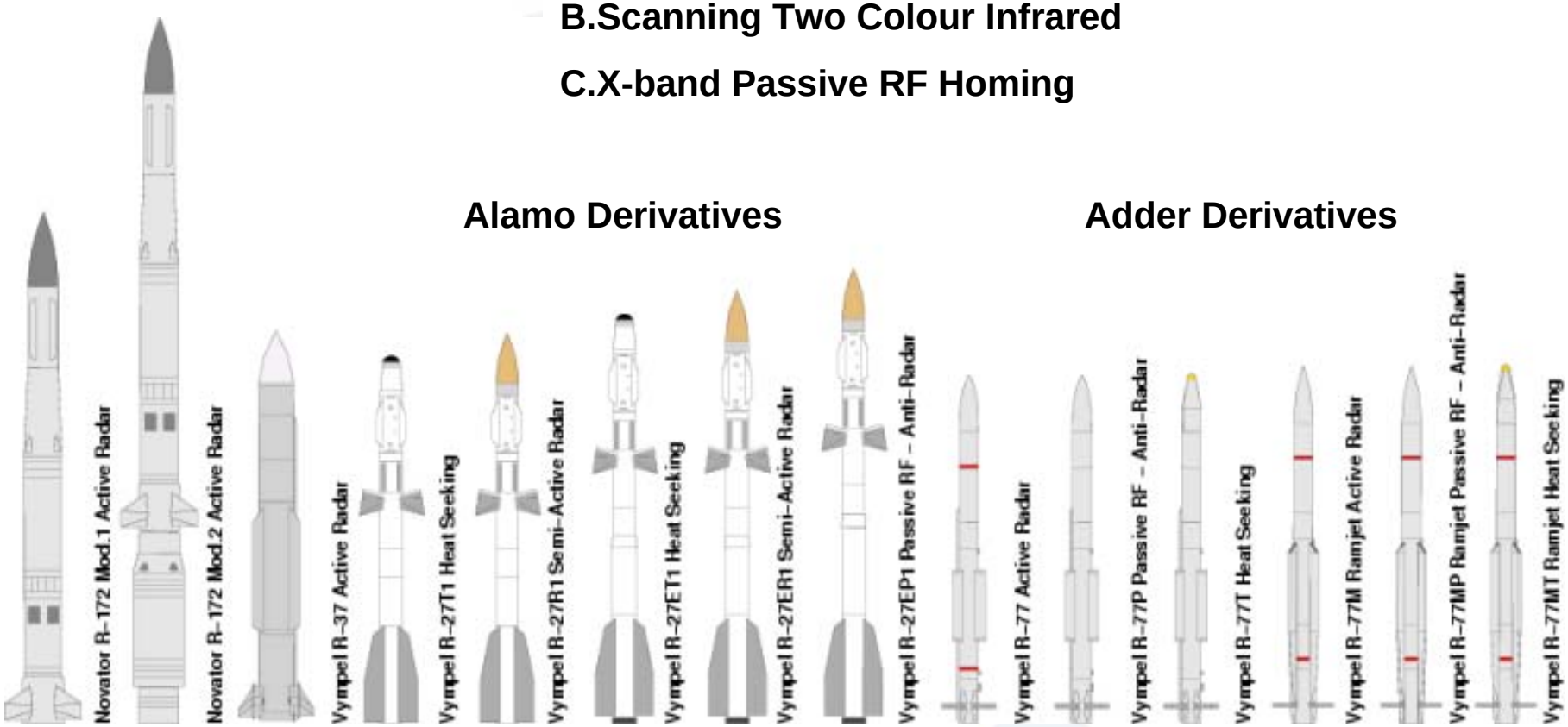
A.Monopulse Active Radar

B.Scanning Two Colour Infrared

C.X-band Passive RF Homing

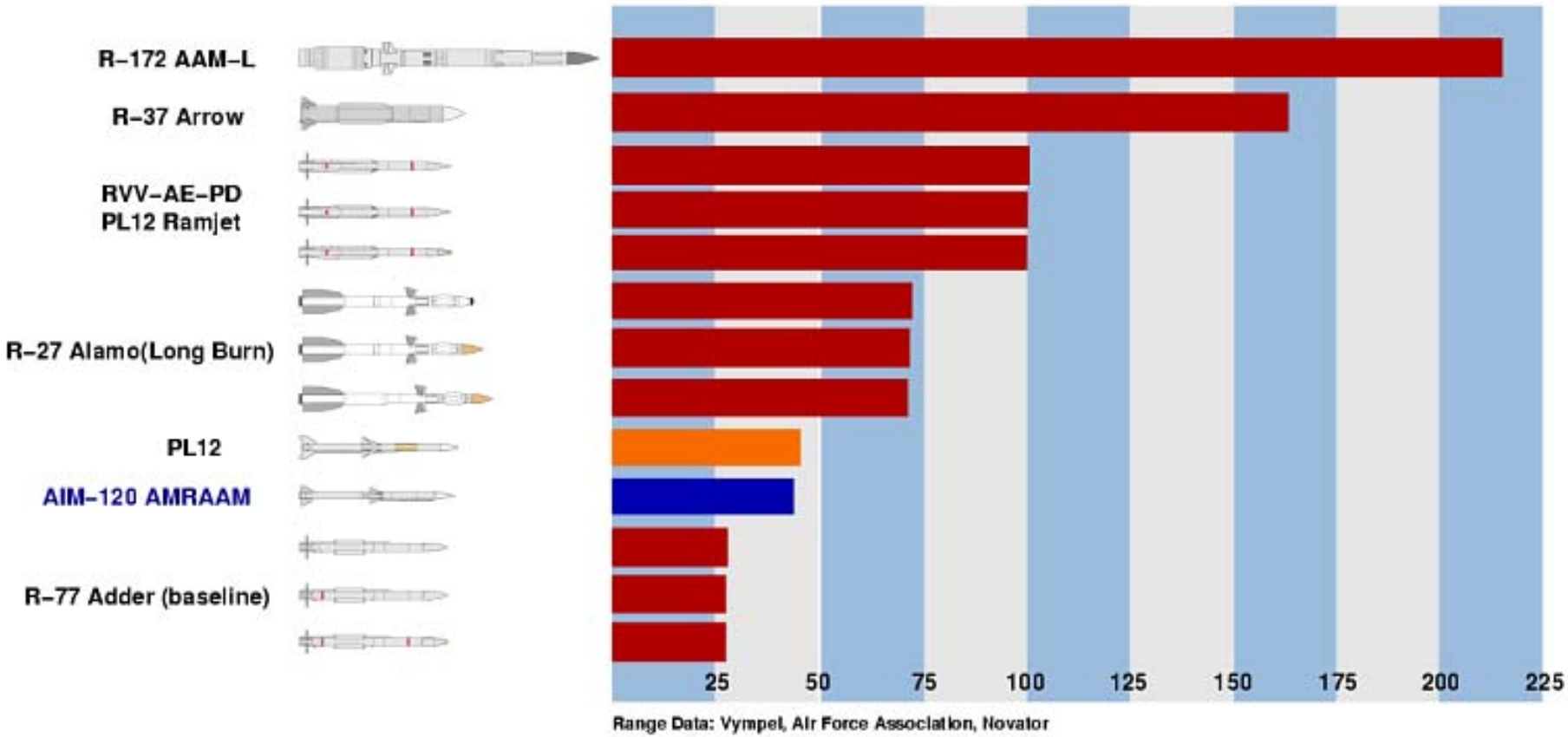
Alamo Derivatives

Adder Derivatives



Ramjet Engine

How do Russian BVR AAMs Compare?



Russian Missile Capabilities

- Diversity in missile seekers – active radar, infrared, passive X-band anti-radiation
- Diversity in missile airframes:
- R-27 Alamo family short and long burn
- R-77 Adder family AIM-120 AMRAAM class
- RVV-AE-PD family MBDA Meteor class
- R-37 Arrow – 160 NMI – no equivalent
- R-172 – 200 NMI – no equivalent
- Jam resistant seekers, digital controls, midcourse datalinks

Su-35 Flanker – BVR Missiles (MAKS2007)

Smart Bombs - KAB-500/1500

- Fusion of Paveway and HOBOS technology
- Modular design – warheads and seekers
- Equivalents to Paveway/GBU-15/JDAM
- Warheads – blast/frag, concrete piercing, Fuel Air Explosive / Thermobaric
- ElectroOptical Correlator – cf US DSMAC
- ElectroOptical Datalink – cf US EGBU-15
- Semiactive Laser – cf US Paveway II/IV
- GPS/Glonass – cf US JDAM and SDB
- 1,000 lb and 3,000 lb standard warheads

Smart Bombs - KAB-1500 ~3,000 lb

1500 kg ElectroOptical Correlator Seeker (Datalink Optional)

1500 kg Laser Seeker

Smart Bombs - KAB-500 ~1,000 lb

Cruise Missiles

- Novator 3M54E/3M14 Sizzler – air, sub, ship and ground launched; subsonic and supersonic terminal stage variants; anti-ship and land attack variants;
- Kh-61 Yakhont/PJ-10 Brahmos A/S air, sub, ship and ground launched supersonic
- Raduga 3M80/81/82 Sunburn – air and ship launched supersonic ASCM
- Raduga Kh-55SM – eq US AGM-86
- DH-10 – eq US Tomahawk
- YJ-63 – eq US Tomahawk MRASM

Cruise Missiles – 3M54/SS-N-27 Sizzler

Kilo SSK; DDG/FFG SLCM

Su-27/30/35; MiG-29/35 ALCM

MZKT-7930 8 x 8 GLCM

Cruise Missiles – Yakhont/Brahmos / SS-N-26

Tatra 815 8 x 8 GLCM

Su-27/30/35 ALCM

SSK, DDG/FFG SLCM

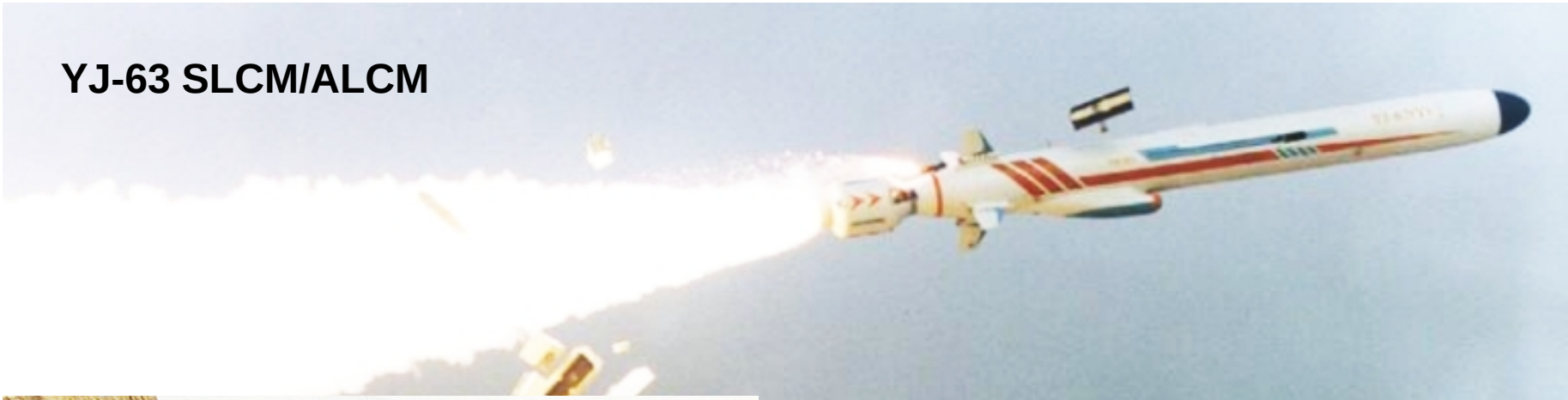
3M80/81/82 Moskit / SS-N-22 Sunburn

Ship Launch – Type 956 DDG

Air Launch – Centreline Su-33/Su-35BM

Thermobaric or Shaped Charge W/H

Cruise Missiles – Kh-55, DH-10, YJ-63



S-400 Triumf / SA-21 Growler – 200 NMI

92N2E Grave Stone Engagement

4/16 Round 5P85TE1 TEL

96L6 Cheese Board – Acquisition

Missiles 48N6E2, 48N6DM, 9M96E/E2

Equivalent Patriot PAC-3 / ERINT

S-300PMU1/2 / SA-20A/B Gargoyle – 80-110 NMI

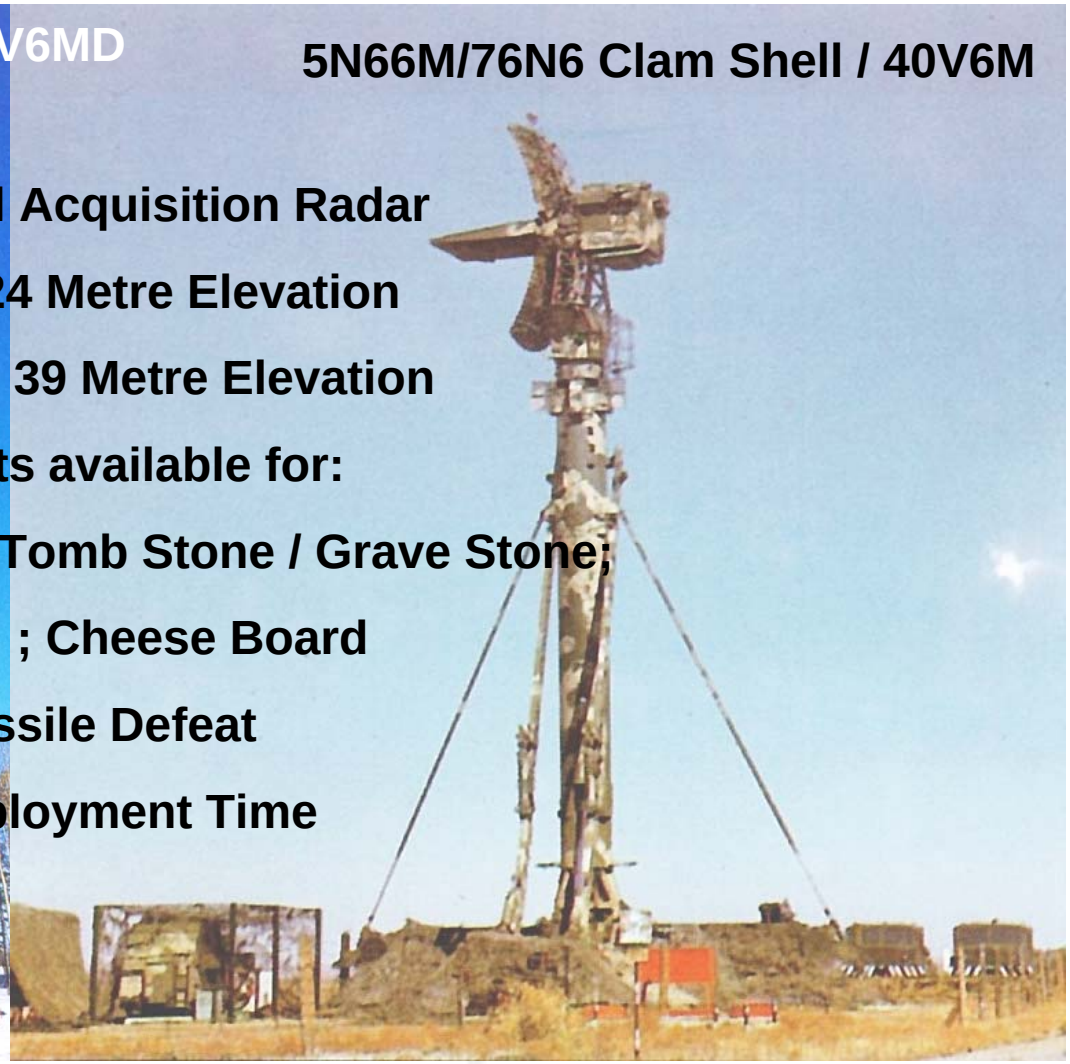
30N6E/E2 Tomb Stone Engagement

4 Round 5P85TE TEL

64N6E/E2 Big Bird Acquisition

48N6E/E2 Missiles

S-300PMU1/2 / SA-20A/B Gargoyle – 80-110 NMI



Low Level Acquisition Radar

40V6M – 24 Metre Elevation

40V6MD – 39 Metre Elevation

Both masts available for:

Flap Lid / Tomb Stone / Grave Stone;

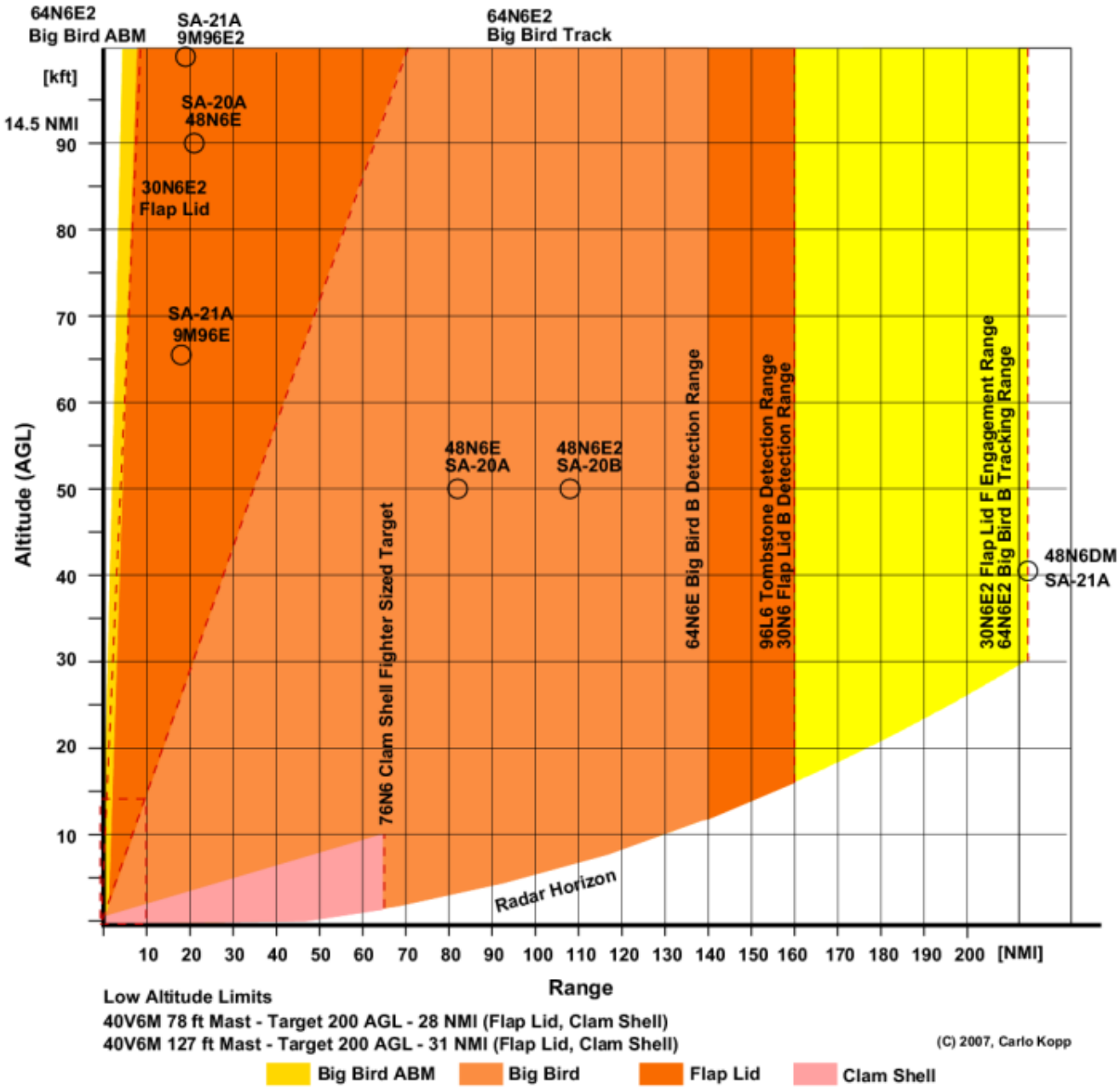
Tin Shield ; Cheese Board

Cruise Missile Defeat

2-4 hr Deployment Time

S-300PMU2 vs Aegis/Patriot - Comparisons

S-300PMU-2 Favorit (SA-20 Gargoyle) Engagement Envelope
S-400 Triumf (SA-21 Growler) Engagement Envelope



Tor M2E / SA-15D Gauntlet D

Tor M1 / SA-15C Gauntlet C

Pantsir S2 / SA-22B Greyhound B

2S6M1 Tunguska M / SA-19C Grison C

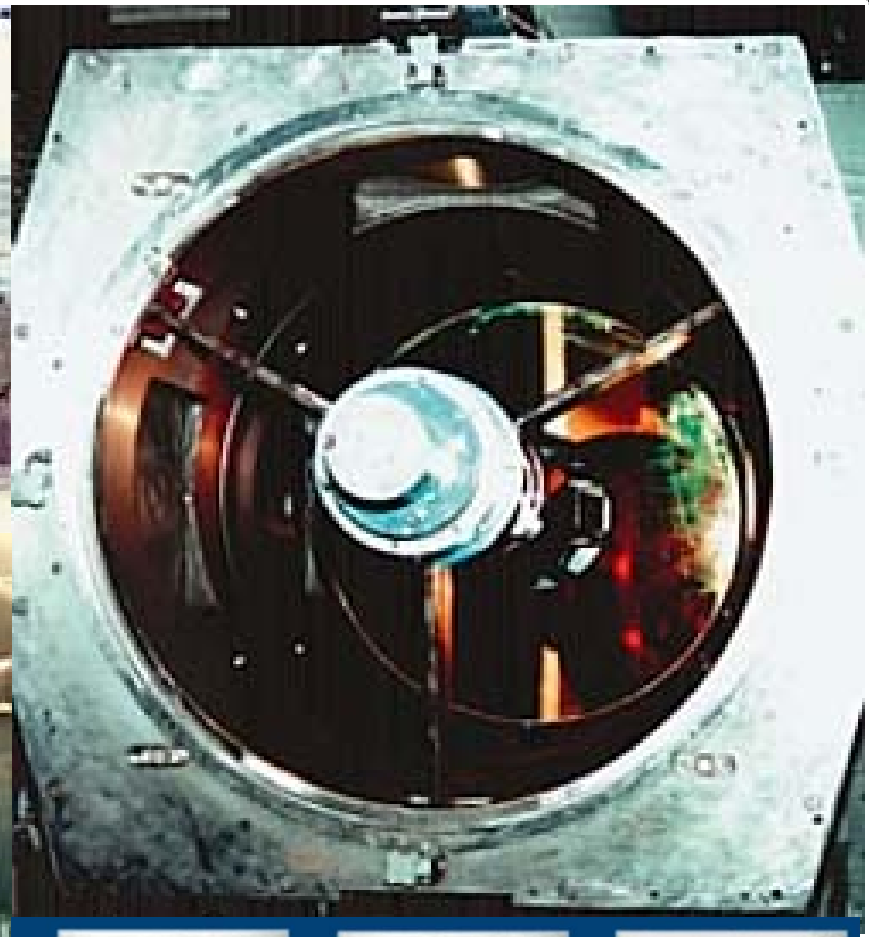
Almaz-Antey Laser Directed Energy Weapon

Beam Director on MAZ-7930

Development Project

Modelled on US THEL, but mobile.

Demonstrator with CO_2 GDL



Nebo SVU VHF AESA Radar

2 Metre Band Operation

Defeats VLO Shaping in JSF

High Accuracy – Midcourse Guidance of Missiles

Passive Emitter Locating Systems

Passive Detection;

2/3D Triangulation

Midcourse Missile Guidance:

S-400 Growler Trial Target Tracking

Observations

- F/A-18A/B HUG not survivable post 2010
- F/A-18F Super H not survivable post 2010
- F-35 JSF not survivable post 2015
- Long range AAMs put AEW&C and AAR tanker aircraft at very high risk
- Long range SAMs deny airspace at high altitudes
- Short range SAMs deny low altitudes and threaten aircraft and PGMs
- ***No currently planned ADF capabilities credible vs advanced Russian systems***

Conclusions

- If Australia continues down the current force structure planning path, then it:

1. Loses its capability to control airspace
2. Loses its capability for independent operations
3. Loses strategic credibility in region
4. Becomes a strategic liability to the US
5. Expends ~A$30B without useful effect

Further Reading: http://www.ausairpower.net/region.html

Russian / PLA Point Defence Weapons
Warsaw Pact / Russian / PLA Emitter Locating Systems / ELINT Systems
NNIIRT 1L119 Nebo SVU: Assessing Russia's First Mobile VHF AESA
Flanker Radars in Beyond Visual Range Air Combat
The Russian Philosophy of Beyond Visual Range Air Combat
Russian Low Band Surveillance Radars
Hard Kill Counter ISR Programs
Soviet Maritime Reconnaissance, Targeting, Strike and Electronic Combat Aircraft
Tupolev Tu-95/142 Bear
Tupolev Tu-22M3 Backfire C
The PLA-AF's Airborne Early Warning & Control Programs
The PLA-AF's Aerial Refuelling Programs
Sukhoi Flankers - The Shifting Balance of Regional Air Power
Supercruising Flankers?
Bypassing the National Missile Defence System - The Cruise Missile Proliferation Problem
Almaz S-300PT/PS/PMU-1/2, S-400 Triumf, S-400M Samoderzhets
Antey S-300V and S-300VM
Sukhoi Su-34 Fullback
Chengdu J-10 Fighter
Regional Precision Guided Munitions
Xian H-6 Badger

BACKUP SLIDES

NNIIRT Nebo UE Tall Rack 3D VHF Radar

- Relocatable
- Long Range 3D VHF Radar
- Digital MTI Processing
- Intended Use vs VLO Targets
- Integrated with S-400 Batteries

NNIIRT Nebo SV 2D VHF Radar

Mobile ~1 hr Deployment

Long Range 2D VHF Radar

Digital MTI Processing

Intended Use vs VLO Targets

CETC JY-27 2D VHF Radar

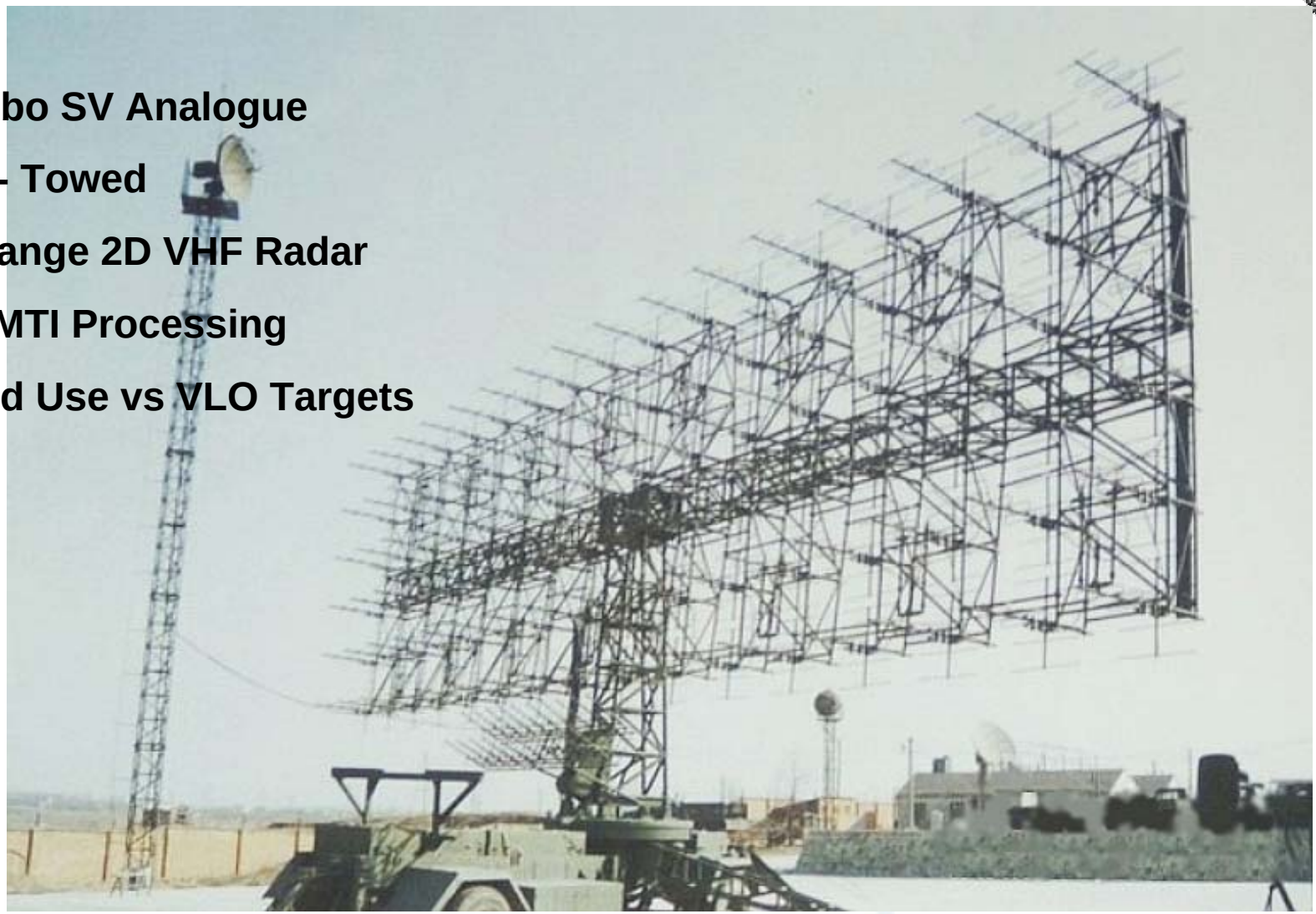
PLA Nebo SV Analogue

Mobile - Towed

Long Range 2D VHF Radar

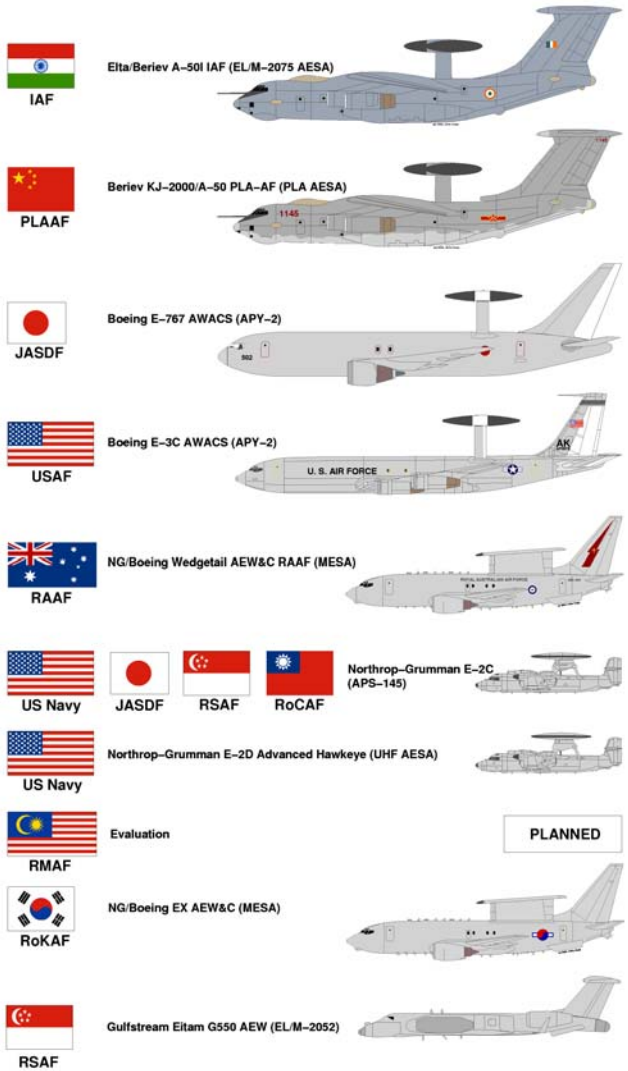
Digital MTI Processing

Intended Use vs VLO Targets



KJ-2000 AWACS – AESA Technology

AEW&C vs Region



Sukhoi Su-33/33UB Flanker D - CV

Su-33 Navalised Flanker

PLA-N – 48 Ordered

Tailhook/Ski-Jump

Full Su-30MK Capabilities

Single/Dual Variants

Su-33UB Navalised Flanker

Zhuk MSFE PESA / TVC

Sukhoi Su-34 Fullback – LRIP for RuAF

Chengdu J-10 Sino Canard Fighter

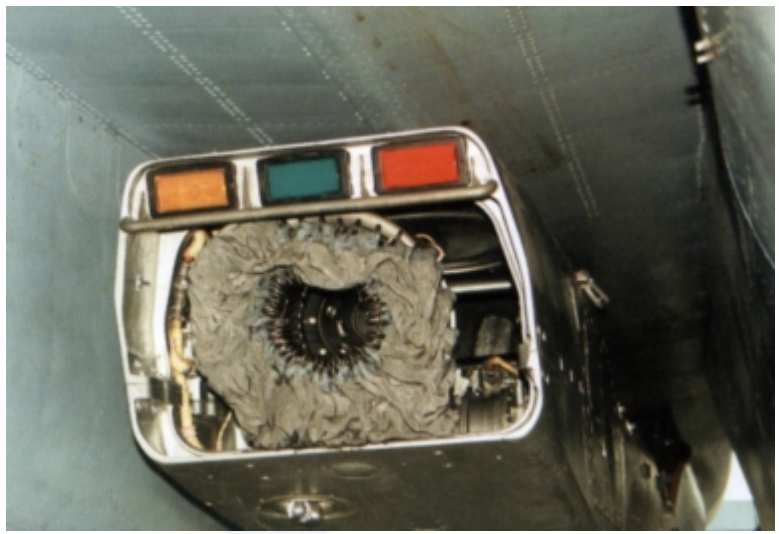
Xian H-6K Turbofan Badger ~2000 NMI

New Build ALCM Carrier

Turbofan D-30KP - ~2,000 NMI Radius

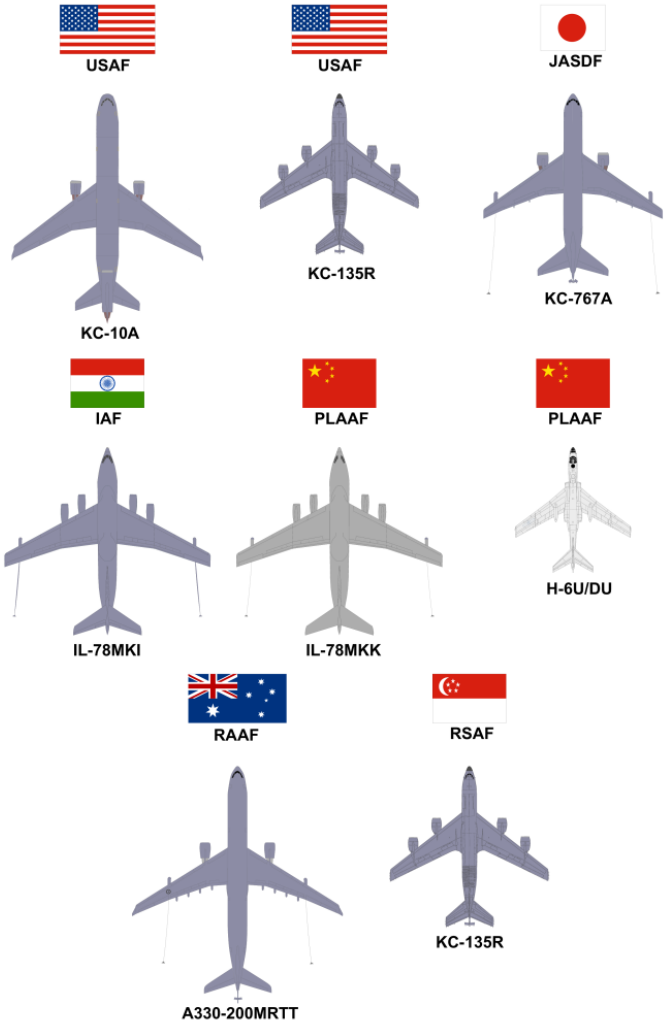
Revised Nose, Wing Designs

Su-33/35 Buddy Refuelling Capability

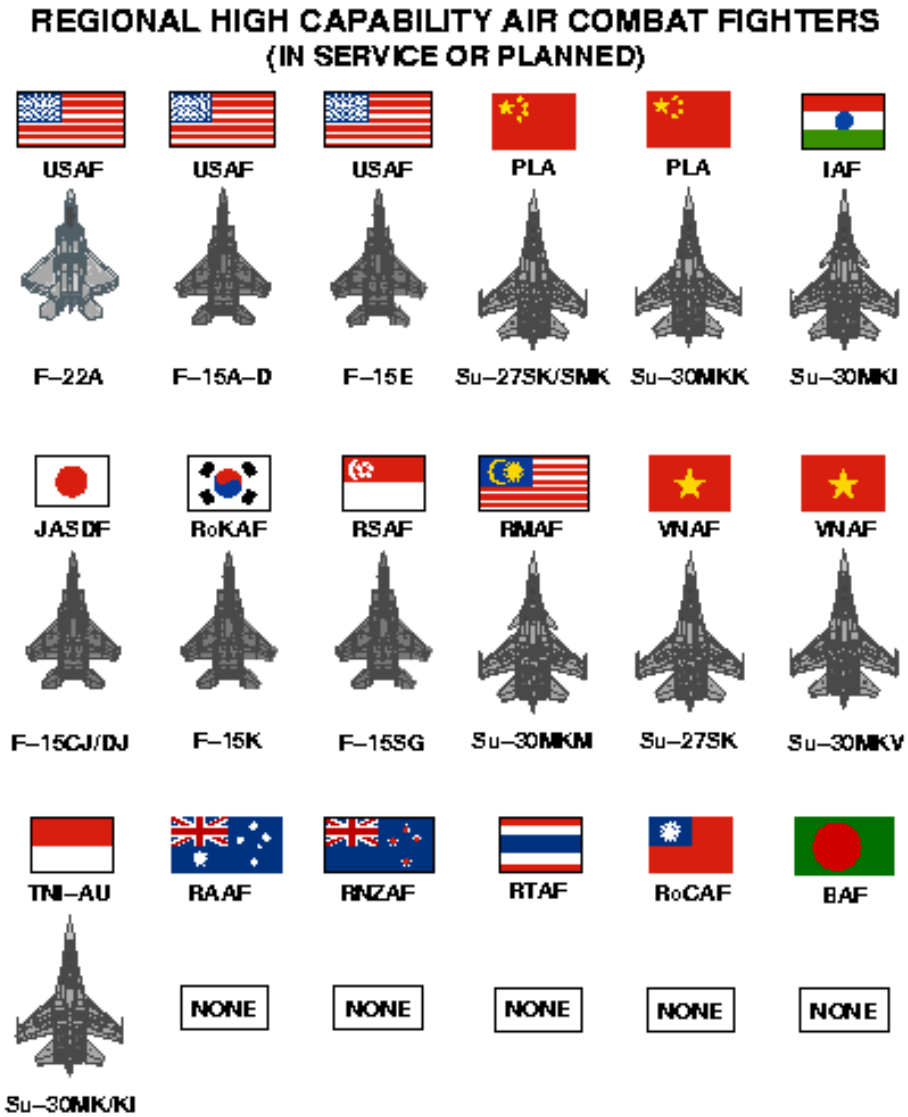


Il-78 Midas Tanker

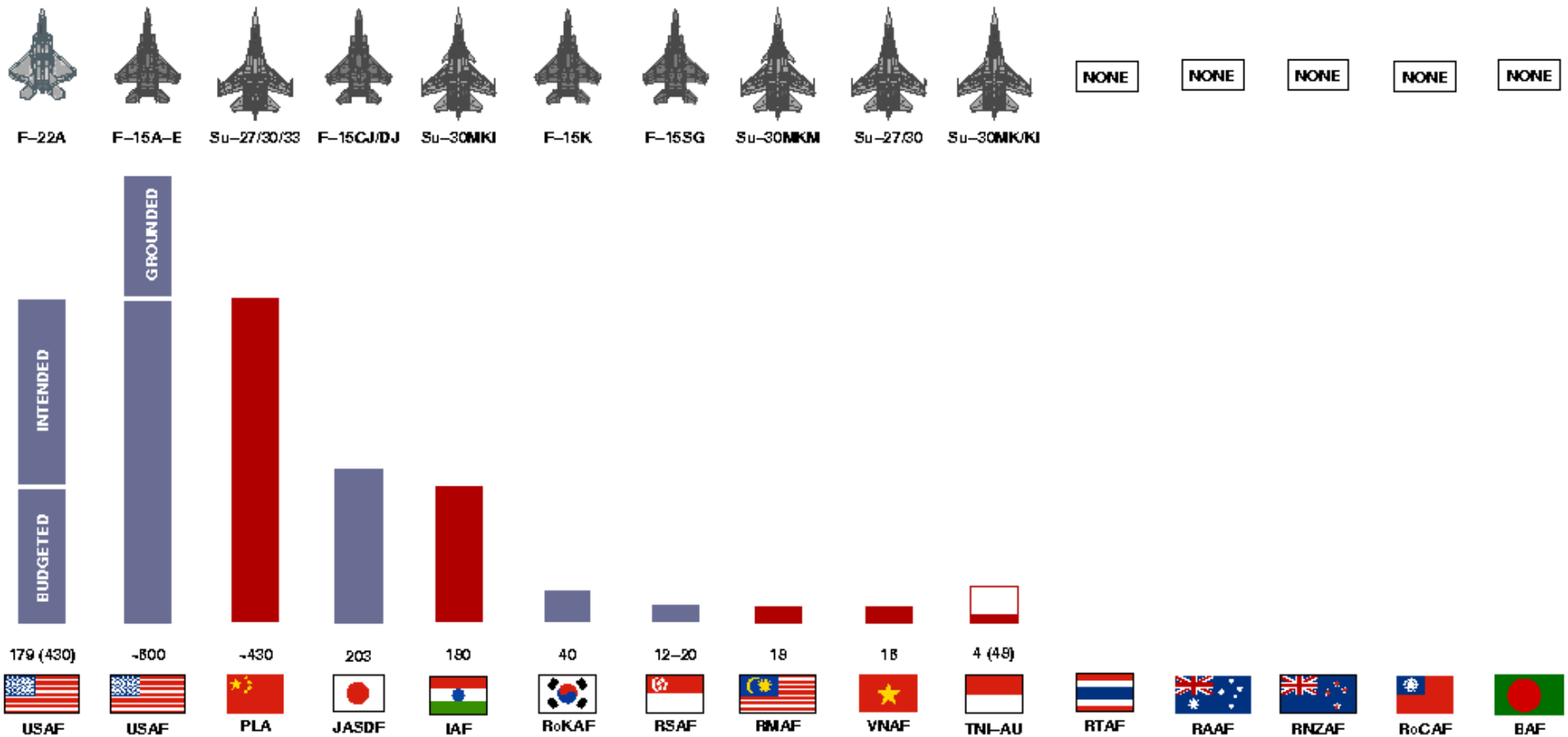
Tankers vs Region



Regional Tier 1 Fighters



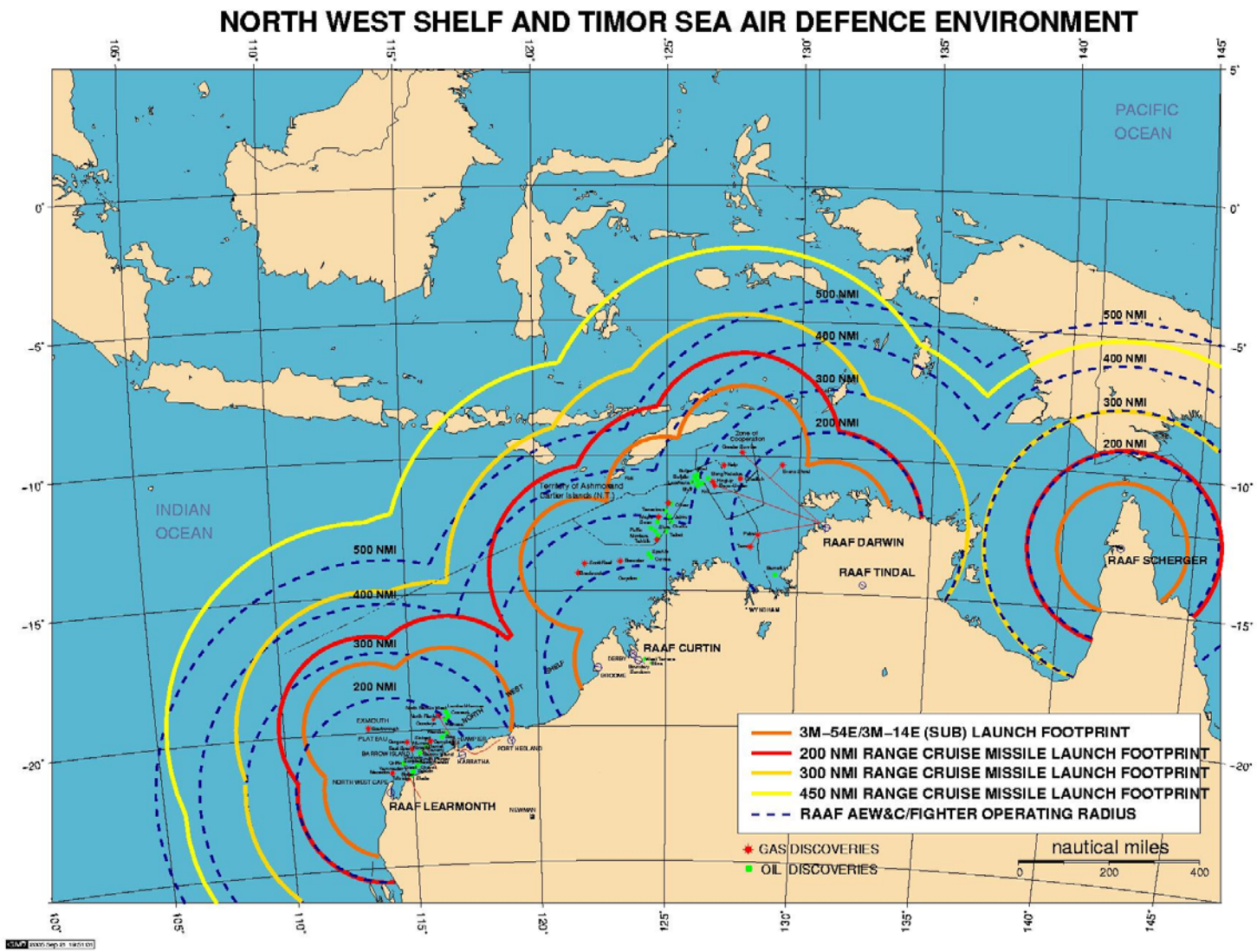
Regional Tier 1 Fighters



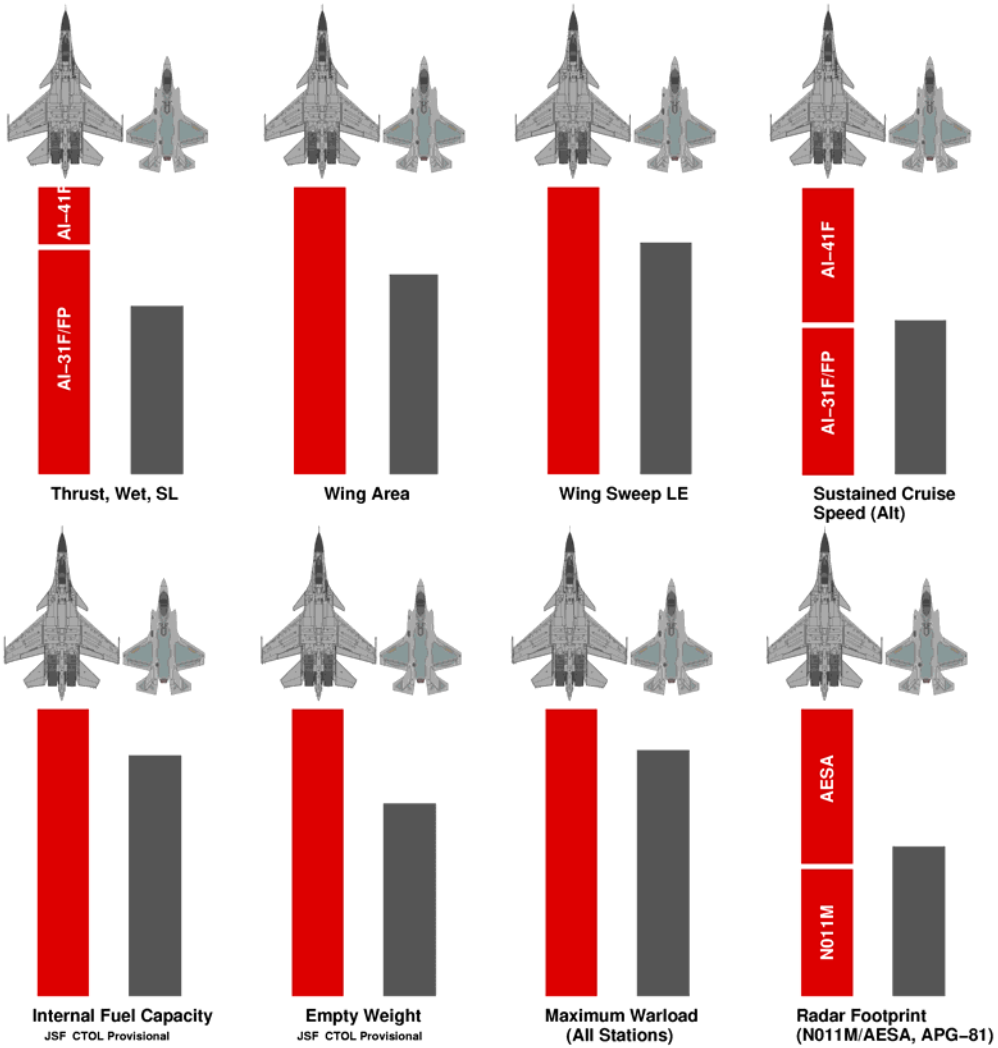
REGIONAL HIGH CAPABILITY AIR COMBAT FIGHTERS
(IN SERVICE OR PLANNED)

AIR POWER AUSTRALIA

Cruise Missiles vs Deep North



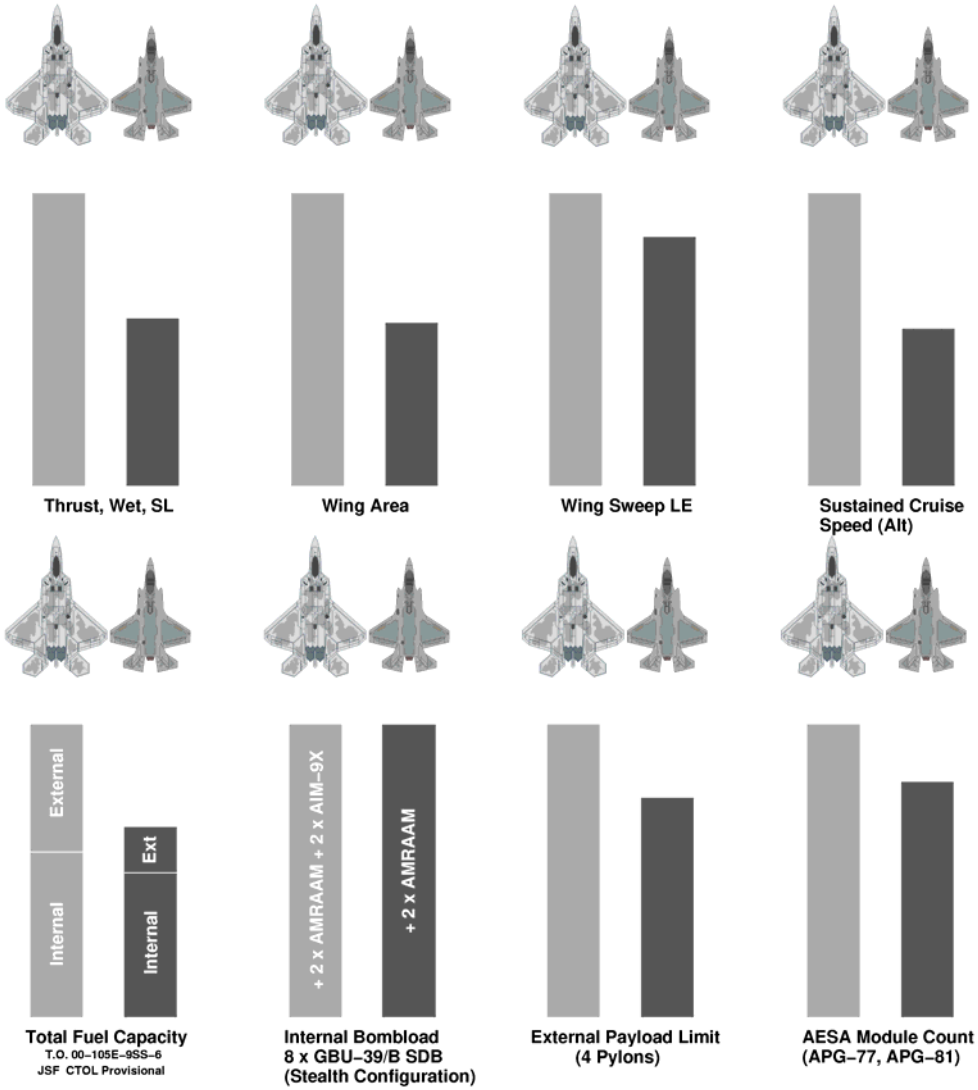
Flanker vs JSF



owth Su–30 Derivative vs Joint Strike Fighter – Parametric Compa

(Provisional Data)

F-22 vs JSF



F–22A vs Joint Strike Fighter – Parametric Comparison

(Provisional Data)