



Submission No 20 Part 2

Sub Divided & Low Resolution

Section 2 - Regional Capability and Strategic Risks

+ EndNotes

Inquiry into Australian Defence Force Regional Air Superiority

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2 Regional Capability Growth and Strategic Risk

This section explores the evolving region in terms of capability growth, and the strategic risks which arise as a result.

The ability to achieve and maintain air superiority in any escalated regional conflict is vital to Australia's future. Any regional crisis of substance, whether involving Australia alone or the US, would occur in a strategic environment which has seen the greatest geographically localised sustained long term investment in combat aircraft, guided weapons and supporting capabilities, since the last decade of the Cold War in Europe²².

To put this in context, the aggregate number of new high capability category combat aircraft acquired or ordered across the Asia-Pacific-Indian region since the end of the Cold War numerically rivals the Warsaw Pact during its final decade. Importantly, many of these aircraft are evolved and improved derivatives of the last generation of combat aircraft deployed by the Soviets, and are technologically equivalent and often more advanced than the RAAF's current fleet, and US Navy and Air Force assets in this region²³.

As a result, three considerations become of critical importance to Australia.

The first of these considerations is that the absence of a decisive advantage in Australia's capability over regional nations provides opportunities for Australia to be coerced in any regional dispute. What would the outcome of the East Timor crisis have been if Indonesia had at that time parity or superiority in air power over Australia? In this context China's growth in long range air power is of particular concern.

The second consideration is that any regional dispute which devolves to a shooting conflict leaves Australia in the position where a limited capacity to defend high value economic assets and Navy and Army assets denies options. If the RAAF is unable to extend a protective umbrella over amphibious forces, as it is committed to defending the North West Shelf and Timor Sea energy industry, then amphibious operations are not an option. Air Warfare Destroyers cannot credibly provide such protection in a hostile environment. A future government is placed in the position where it may have to concede a regional dispute.

The third consideration is that Australia's standing and influence across the region will decline, as its capability declines relative to the region. Asia has been historically very competitive, and players who fall behind the majority in the region lose capacity to influence events. This behaviour is a byproduct of the regional cultural environment and cannot be avoided. Australia has for five decades relied upon its superior air power in this region to 'punch above its weight', a capability advantage now being abandoned.

Until recently, Australia has enjoyed an undisputed advantage in modern air power, numerically, technologically and in operational skills, over most nations in the region. This historical advantage is now disappearing as Asian nations buy some of the best products in the market.



Figure 11: *Advanced Flanker variants such as the Su-27SMK Flanker B, Su-33 Flanker D, Su-30MKI/MKK/MKM Flanker G/H and Su-35 Flanker E have key capabilities in common with modern US and EU fighters. These include aerial refuelling probes, buddy refuelling pods, advanced multi-mode radar strike modes, electro-optical targeting systems, digital network modems, glass cockpits and the capability to carry a wide range of smart munitions (Sukhoi, US Air Force).*



Figure 12: Navalised Su-27 Flanker D variants, the Su-27K/Su-33 and Su-27KUB/Su-33UB, are being actively marketed to the PLA-Navy, which last year started to refurbish the former Soviet aircraft carrier *Varyag* in the Dalian shipyard. The single seat Su-27K/Su-33 and dual seat Su-27KUB/Su-33UB are full capability multirole fighters, which were the first to introduce many of the advanced design features now used on export Flanker variants (Sukhoi).



Figure 13: A key development over the last decade has been the emulation of US force structure models by major Asian air forces. Aerial refuelling is now a priority, with the Russian Ilyushin II-78MK Midas adopted by India (upper) and China. Airborne Early Warning and Control Systems have been adopted even more widely than aerial refuelling in Asia. China is now testing an indigenous system, using the Russian Beriev A-50 Mainstay airframe and based on phased array radar technology of the same generation as Australia's Wedgetail system (lower). India has ordered the very similar Israeli A-50I, using a variant of the Elta Phalcon radar bid for Australia's AIR 5077 requirement, previously also bid to China (IAF, via Internet).

2.1 Increasing Wealth in Asia and its Impact

The root cause of the changes in military capability we have been observing across the region is the industrialisation and thus increasing wealth of Asian nations.

What we observe is a pattern not unlike that seen in Europe over one hundred years ago, when rapid industrial growth resulted in an unprecedented concentration of wealth and power in Europe. This wealth fuelled the Great War, and the Second World War. During this period, Japan was the sole power in Asia to industrialise and this provided it with the capability to execute the military campaigns in China, South East Asia and the Pacific, all driven by a need for resources and markets.

Since 1950 we have seen Japan reconstitute its shattered economy, and subsequently climb to the position of Number 2 economic power after the US. More recently, South Korea has followed Japan and is now a significant manufacturing economy on the global scale. Both Taiwan and Singapore, despite their lesser size, have robust modern economies with significant high technology sectors.

The most important development over the last decade has been the rise of China as a major industrialised economy on the global scale. China will surpass Japan and become the world's Number 2 economic power after the US. With an enormous labour force by global standards, and the ability to control labour force costs, China has an unbeatable - and unfair - advantage in the globalised manufacturing economy.

China's rise has had numerous important consequences. The first of these is that the Chinese leadership is becoming increasingly preoccupied with access to materiel and energy resources, and markets for its manufactured products²⁴.

The second important consequence is that China has much more wealth available for military spending. This is reflected in unprecedented qualitative and quantitative changes in China's military capabilities, and an active shift away from the historical doctrines of continental defence, to a doctrine of regional dominance.

This capability growth is arising while China's relationships with other major regional players become increasingly competitive. The ongoing series of disputes between China and Japan is a good example.

With China acquiring a long range strike capability, there is potential longer term for conflicts with China to develop over regional energy resources, over access to distant resources or markets, over sea lanes and regional basing, and over Taiwan.

India is following a similar path of industrialisation to China, albeit more slowly, but with notable successes in areas such as information technology. Not unlike China, it is growing its military capabilities and thus its ability to project its influence and power across the region.

While India enjoys good relations with Western nations at this time, it has a well established history of pursuing its own interests with little regard for global, and especially Western, opinion. India's close relationship with the Soviet Union during the Cold War, and more recent disagreements with

the United States over nuclear weapons policy, should be accepted as good indicators of India's independent pursuit of national goals.

For much of the last decade India and China pursued a 'tit-for-tat' strategy in the acquisition of advanced Russian military hardware, with India often acquiring the most sophisticated products Russia could supply. That relationship now includes Indian co-development and co-production of advanced Russian missile technology. It is likely the established competitive dynamic between China and India will continue through this century.

The growth in wealth across Asia has also been reflected in the increasing quality of education and training across the region. The assumption that regional nations will continue to be weak in training capabilities and acquisition / support capabilities is no longer supportable. In the longer term we must assume that most regional nations will train their militaries to standards similar to the ADF.

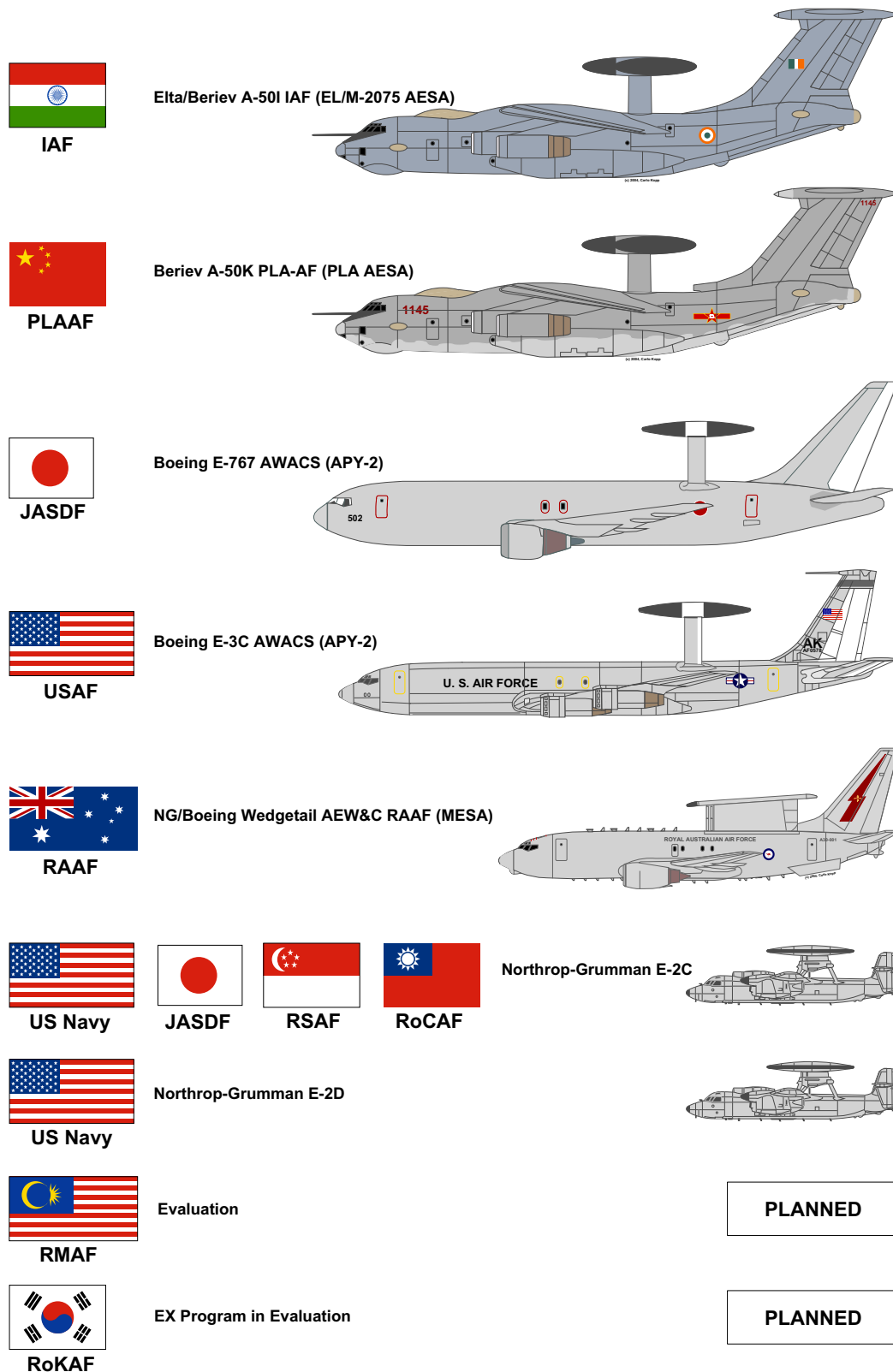


Figure 15: Developing and deployed regional Airborne Early Warning and Control capabilities. Of specific interest is that the systems being acquired by India and China both employ state of the art phased array antenna technology. Final numbers of A-50 Mainstay aircraft to be deployed in the region remain unknown. (C. Kopp)

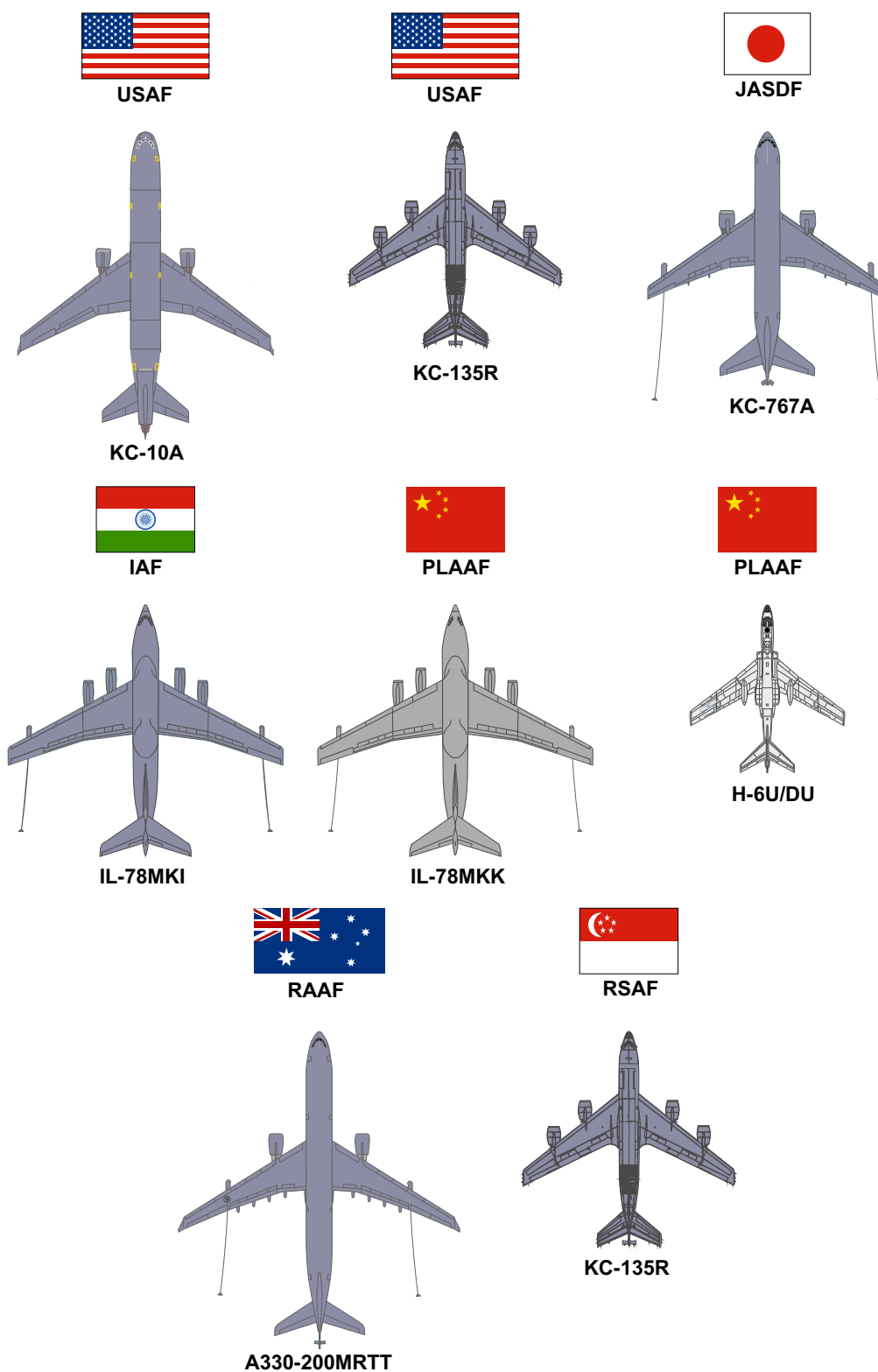


Figure 16: *Developing and deployed regional aerial refuelling capabilities. Of interest is that the IL-78MK systems being acquired by India and China both match the offload performance of US KC-135R. Final numbers of IL-78MK tankers deployed in region the remain unknown (C. Kopp).*

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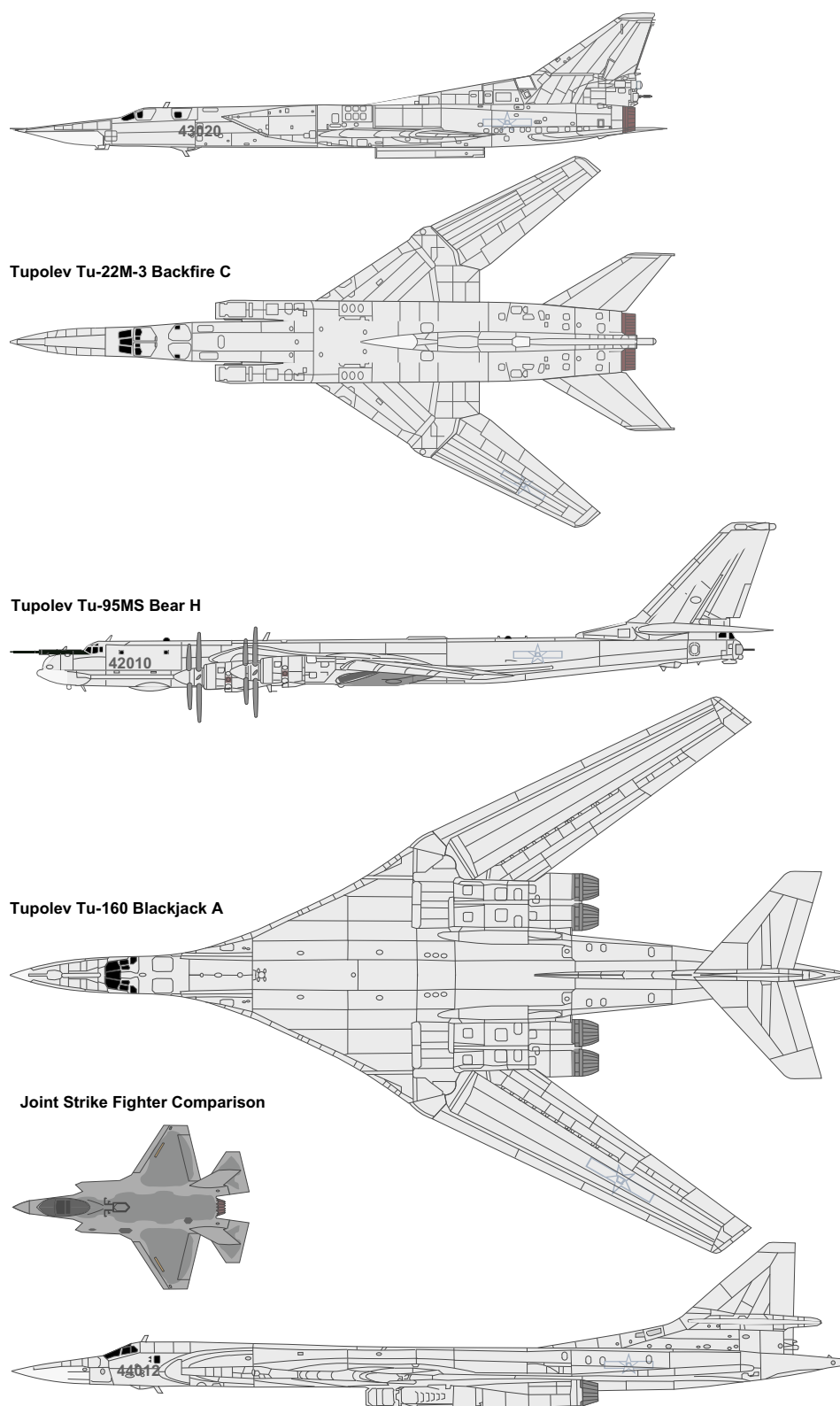


Figure 17: Relative size comparison of the Tu-160 Blackjack A, Tu-95MS Bear H and Tu-22M-3 Backfire C strategic bombers against the Joint Strike Fighter. The Tu-160 carries up to twelve long range cruise missiles, the Tu-95MS up to sixteen, and the Tu-22M3 has the capacity to carry eight such weapons. The F-111 could carry four, the Joint Strike Fighter only two (C. Kopp).

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2.2 Increasing Capability in Asia and its Impact

The rapid growth in regional investment into modern air power, including key supporting capabilities historically used only by the US and NATO, indicates that Asian nations are doing their best to emulate established US doctrine on air power, and related force structure planning ideas.

US air power was for four decades unique in that it combined the use of combat aircraft with aerial refuelling tanker aircraft, large airborne surveillance systems such as AWACS/AEW&C for tracking hostile air activity, RC-135 Rivet Joint for surveilling hostile radar activity and communications, and airborne radar jammers such as the EF-111A and EA-6B Prowler. This force structure model was designed to support combat aircraft with additional fuel, with information on hostile movements, and to deny an opponent information by jamming.

The pattern of purchases across Asia observed since the end of the Cold War closely emulates the US model. We have seen not only large high performance fighter aircraft acquired, but also aerial refuelling tankers and AWACS/AEW&C platforms. These choices by Asian buyers are clearly not arbitrary and reflect careful observation of US military doctrine and force structure.

Key air and missile capability acquisitions over the last 15 years, or currently in progress, include:

1. China acquiring up to 380 or more Sukhoi Su-27SK/SMK/J-11 Flanker B and Su-30MK Flanker G high capability category long range fighters;
2. China acquiring up to 1,000 indigenously developed Chengdu J-10 lightweight air combat fighters.
3. China acquiring Russian Ilyushin Il-78MKK Midas aerial refuelling tankers, similar in capability to the US Boeing KC-135R;
4. China developing an indigenous derivative Beriev A-50 Mainstay AWACS using similar radar technology to Australia's Wedgetail;
5. China manufacturing a range of indigenous cruise missiles, and illegally acquiring samples of the Russian Kh-55SM/AS-15B Kent strategic cruise missile;
6. China negotiating to buy surplus Russian strategic bombers, specifically the Tupolev Tu-22M3 Backfire, Tu-95MS Bear, and possibly new build Tu-160 Blackjack, similar to the US B-1B Lancer;
7. China restarting production of a sub-strategic cruise missile carrier variant of the Soviet era H-6 Badger bomber;
8. China acquiring a significant fleet of 3M-54 cruise missile armed Kilo class diesel-electric submarines;

9. China refurbishing the former Soviet aircraft carrier Varyag for sea trials; requests for flight demonstrations of navalised Su-27K/Su-33 and Su-27KUB/Su-33UB Flanker D carrier capable long range fighters.
10. China acquiring Russian smart bombs including the KAB-500 and KAB-1500 weapons, developing indigenous laser guided bombs, and acquiring the Russian Kh-59MK standoff weapon, similar to the AGM-142 weapon now carried by the ADF's F-111;
11. China acquiring the advanced Russian R-77 Adder Beyond Visual Range air to air missile, and developing an indigenous equivalent to the AMRAAM missile used by the US and the ADF;
12. China acquiring the Russian Kh-31P Krypton anti-radar missile;
13. China acquiring twelve or more batteries of the Russian S-300PMU Grumble long range mobile Surface to Air Missile system, equivalent to the US Patriot.
14. China funding development of the Russian S-400 Gargoyle long range mobile Surface to Air Missile system, which outperforms the US Patriot.
15. India acquiring 180 Sukhoi Su-30MKI Flanker H high capability category long range fighters;
16. India initiating a program to replace up to 400 or more legacy Soviet era fighters with new aircraft;
17. India acquiring A-50I Mainstay AWACS surveillance aircraft, using a derivative of the Israeli radar bid for the ADF's Wedgetail program;
18. India acquiring Russian Ilyushin Il-78MKI Midas aerial refuelling tankers, similar in capability to the US Boeing KC-135R;
19. India licensing the Russian Yakhont supersonic cruise missile as the indigenous Brahmos;
20. India buying into the development of the Russian R-172 'anti-AWACS' long range air to air missile;
21. India acquiring the Russian Admiral Gorshkov aircraft carrier and an air wing including MiG-29K Fulcrum air combat fighters and Russian Kamov AEW&C helicopters;
22. India tendering to upgrade and arm with cruise missiles its fleet of Tupolev Tu-142 Bear F maritime patrol aircraft;
23. India acquiring a significant fleet of 3M-54 Sizzler cruise missile armed Kilo class diesel-electric submarines;
24. South Korea acquiring 40 Boeing F-15K Strike Eagle high capability category long range fighters;
25. South Korea tendering to acquire AEW&C aircraft;
26. Japan acquiring Boeing E-767 AEW&C aircraft;
27. Japan acquiring Boeing KC-767 aerial refuelling tanker aircraft;

28. Singapore acquiring Boeing KC-135R aerial refuelling tanker aircraft;
29. Singapore acquiring Northrop Grumman E-2C AEW&C aircraft;
30. Singapore acquiring 20 or more Boeing F-15SG Strike Eagle high capability category long range fighters;
31. Vietnam acquiring a mix of Russian Su-27/30MKV Flanker B/G high capability category long range fighters;
32. Malaysia ordering Russian Su-30MKM Flanker H high capability category long range fighters;
33. Malaysia tendering to acquire AEW&C aircraft;
34. Indonesia acquiring an initial batch of Russian Su-27/30MK Flanker B/G high capability category long range fighters, publicly stating that up to 48 are being sought;
35. Russia actively marketing L175V / KS418 high power standoff jamming pod equipment in Asia;
36. Russia actively marketing airborne networking equipment in Asia;

While the growth in capabilities observed spans the whole region, China is by far the most prominent in the scale and scope of its military growth.

This reflects a deep shift in China's strategic doctrine. Historically China oriented its military aviation force structure around direct defence of the mainland, and to a lesser extent toward striking at targets in the 'first island chain' encompassing the Aleutians, Kuriles, Japan, Okinawa, the Ryukyu island chain, Taiwan, the Philippines and South East Asia.

China's recently adopted 'second island chain' strategy extends the footprint of China's offensive air capabilities to cover a geographical area across an arc between the Bonins, Guam, Marianas, Palau and northern coastline of Australia, all identified as 'US basing sites'. Specific capabilities being acquired to support the new 'second island chain' strategy include aerial refuelling for the Sukhoi Su-27SMK/30MK long range fighters, strategic bombers, air launched cruise missiles and additional cruise missile armed submarines.

As these capabilities mature over the coming decade, there will be a fourfold strategic impact upon all smaller nations in the region.

Impact 1 - The PLA acquires the capability to coerce regional nations including Australia using strategic bombers and/or submarines armed with cruise missiles;

Impact 2 - The PLA acquires the capability to threaten shipping lanes in/out of the Far East including the northern approaches to Australia, using strategic bombers and/or submarines armed with cruise missiles;

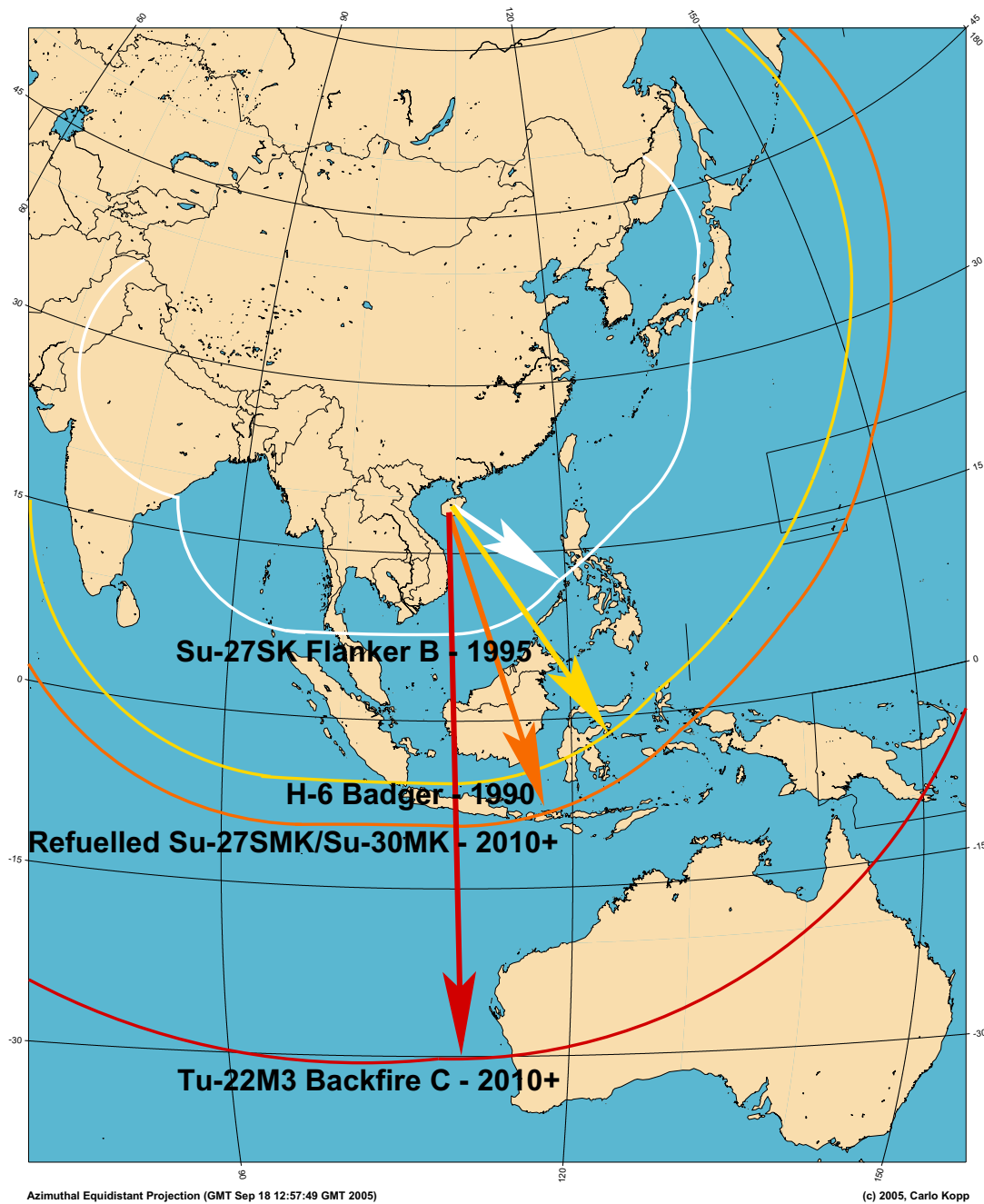
Impact 3 - The alignment of some smaller regional nations will shift away from US to China, ie the effect known as 'Finlandisation' after Finland's submission to the Soviets during the Cold War era;

Impact 4 - The PRC will continue its current program aimed at isolating the US from its regional allies long term.

It is clear at this time that China will have a capability, by the end of this decade, to project air power using aerial refuelling and most likely strategic bombers, to the full footprint envisaged by the 'second island chain' strategy.

Importantly, this capability will be bounded by two key force structure constraints. The first is the number of strategic bombers acquired and supporting warstocks of cruise missiles. The second is the number of aerial refuelling aircraft, which limits how many Sukhoi fighters can be used as long range escorts or strike platforms. Unless China can acquire secure basing in South East Asian nations for its Sukhoi fighters, it will be numerically limited in what firepower it can project into Australia's sea-air gap and northern geography.

The broader and deeper strategic consideration arising from China's developing capabilities is that the region is now transitioning from capabilities which are limited in geographical reach, to capabilities with significant geographical reach. Therefore, placing arbitrary geographical constraints on what constitutes Australia's area of regional interest, or indeed what constitutes the 'region' is now irrelevant. *For all intents and purposes the definition of the 'region', in defence strategic planning, must encompass all nations in the Asia-Pacific-Indian region which have or will have the capability to project military power, especially air and missile power, into Australia's immediate geographical vicinity.* ADF force structure planning should henceforth be predicated on this definition of the 'region', not the now historical definition which encompasses only South East Asia.



EVOLUTION OF PLA-AF STRIKE CAPABILITIES

Figure 18: China has made significant investments in strike capability over the last 15 years. In 1990 China was limited to the H-6 Badger (yellow), by 1995 China had acquired long range Su-27SK fighters (white). In 2005 China has ordered Il-78MCK aerial refuelling tankers, to support Russian supplied Su-30MCK strike fighters and indigenously assembled Su-27SMK strike fighters (orange). At this time China is negotiating a buy of the Tu-22M3 Backfire strategic bomber (red) and possibly the Tu-95MS cruise missile carrier. This represents the fastest growth in strategic strike capability, globally, since the onset of the Cold War in Europe (C. Kopp).

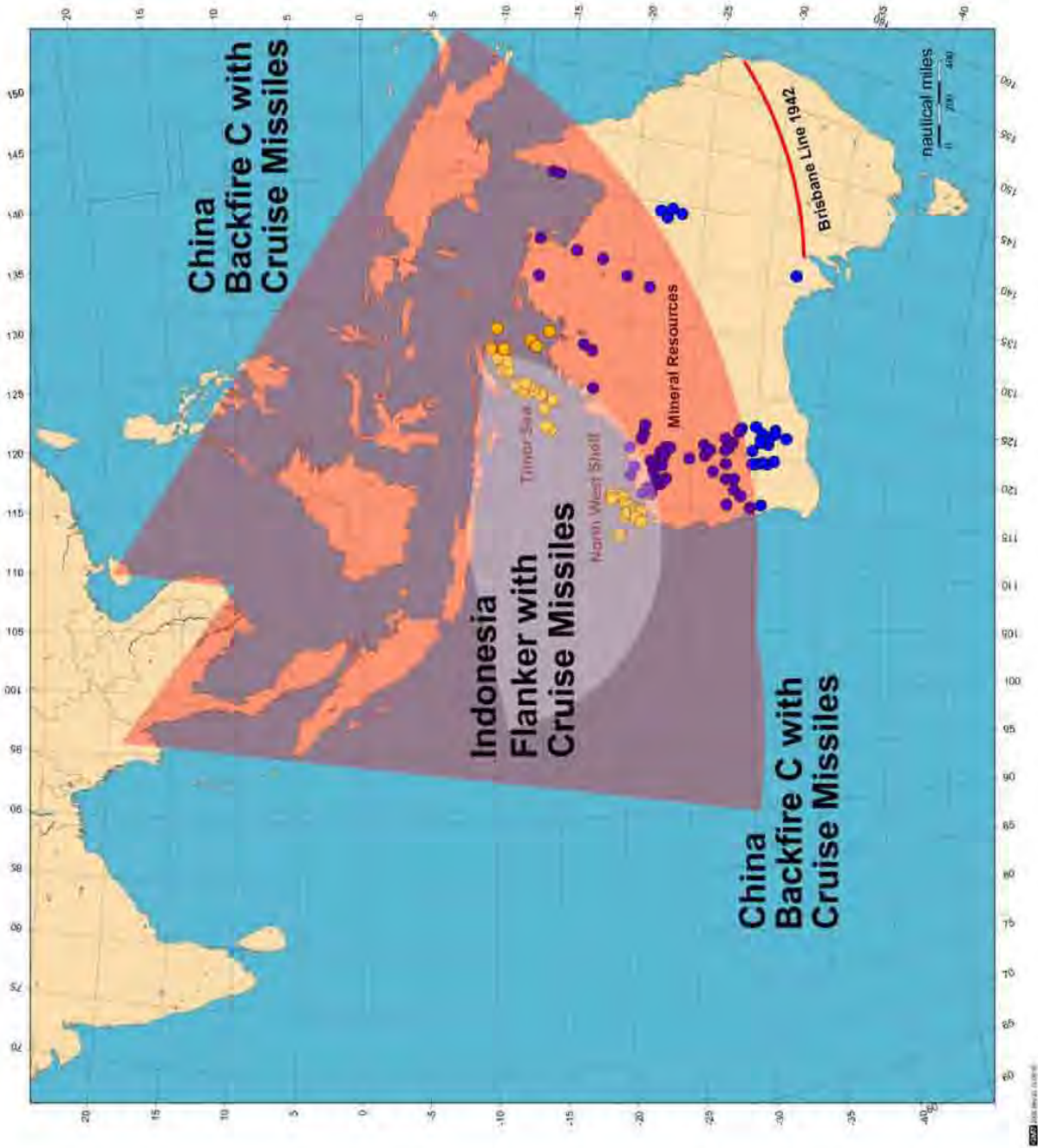


Figure 19: This chart displays the coverage footprints of representative weapon systems being sought, acquired or operated across the region, against Australia's landmass. Resource sites are current as of early 2005 (C. Kopp).

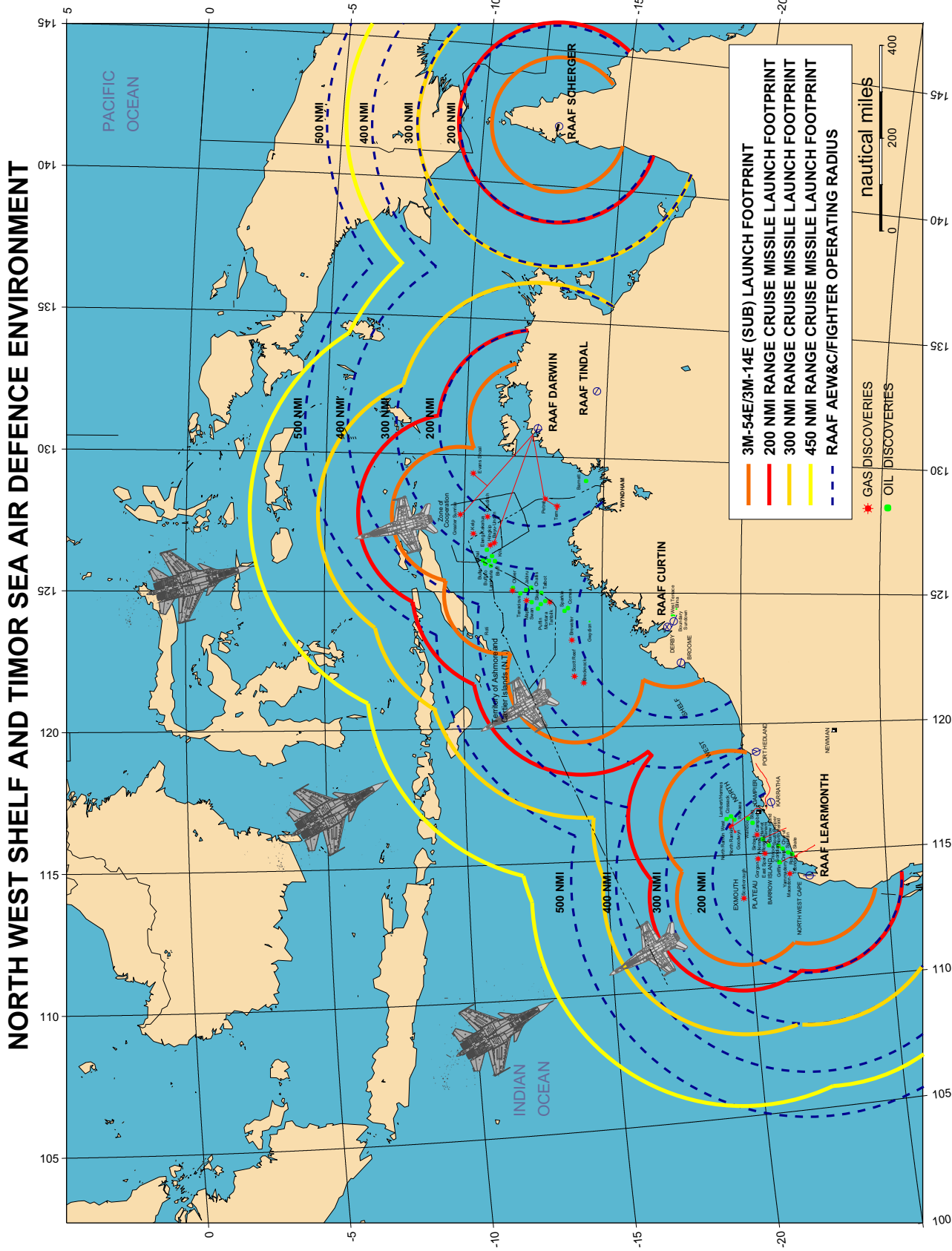


Figure 20: This map depicts key features of the North West Shelf and Timor Sea air defence environment, comparing cruise missile launch footprints against Australian targets with operating radii from RAAF basing (C. Kopp).

2.3 Dealing with Strategic Risks to Australia

We define a strategic risk as an event or situation which may arise in the future, which has some strategic impact or consequences, and some chance of occurring. An event of low strategic risk is such, that the chances of it occurring may be low, modest or high, but its strategic impact or consequences are not critically important. Conversely, an event of high strategic risk is such, that it has a large strategic impact or consequences, even if its chances of arising are low or modest. Finally an event of very high strategic risk is such an event, which has large strategic impact or consequences, and the chances it may arise are very strong.

The unprecedented growth in regional military capabilities, especially air power and cruise missile capabilities, represent at this time a high long term strategic risk for Australia, as the consequences of any regional shooting war would be significant, especially in the potential for economic damage, civilian casualties, and loss of ADF assets and personnel. Should the currently difficult relationships between China and Taiwan, China and Japan, or China and the United States degrade further over time, then this would represent a very high strategic risk for Australia, given the gravity of the resulting consequences.

The ability to achieve and maintain air superiority within regional areas of strategic interest to Australia, such as the air-sea gap, is critical to containing or limiting the possible consequences of developing strategic risks in the region, or circumstance permitting, pre-empting such risks.

The ideal situation given the developing regional environment is that Australia can wholly deter the use of regional air power and missile capabilities against Australian interests or territories. Successful deterrence, however, is critically dependent upon potential opponents' perceptions of Australian capabilities, and Australia's willingness to use those capabilities. If a potential opponent sees the capability equation in a way in which Australia is unable to credibly achieve air superiority, then deterrence will fail and conflict becomes an option to be pursued.

Therefore a well planned force structure for the RAAF must not only be capable of dealing with the developing strategic risks, by defeating opponents in combat, but also be visibly seen across the region to be capable of inflicting unacceptable losses and defeating any operation conducted by a regional nation.

It is fashionable in some Australian circles to see the United States as the principal provider of capabilities required to deter or defeat any significant regional campaign against Australia. This line of reasoning provides a rationale for not equipping the ADF with critically important capabilities, especially those required for achieving air superiority, or performing counterforce strikes against regional air power and missile basing.

The ongoing debate in the United States over defence funding, which has unfolded over the last two years, reflects an inevitable reality. The United States is suffering 'strategic overstretch', with sustained military expenditures in Iraq, Afghanistan, Africa and other theatres in the Global War on Terror, draining resources. Funding these campaigns and attempting to avoid significant long

term growth in deficits presents genuine issues. The Quadrennial Defense Review conducted in 2005 reflects this reality, with unprecedented short, medium and long term reductions in force structure investments. Paying for the present and near future is eroding long term United States capabilities, especially in air power. The United States Air Force currently faces the unpalatable realities of not having funds to fully 'recapitalise' key force structure components, built up during the decades of the Cold War era.

In strategic terms the US faces two challenges in the early 21st century. The first of these is the Global War on Terror, the second of these is balancing the growing strategic weight of China, and to a lesser extent, India in the Asia-Pacific-Indian Ocean regions. Maintaining the required qualitative advantage in force structure capabilities, while maintaining credible numbers, will be unusually difficult. Key systems under threat include replacements for the tanker fleet, large surveillance assets, and larger unmanned surveillance platforms.

If we are to assume that a future US administration is prepared to deploy significant air power to support Australia in a regional contingency involving the use of modern air power and cruise missiles on the part of the aggressor, the difficulty which arises is that of numbers of available assets the US can deploy, and how soon these can be deployed. The United States Air Force will have a shortage of aerial refuelling tankers, high capability category air superiority and strike fighters such as the F-22A, surveillance systems like the AWACS, Rivet Joint and JSTARS, standoff jamming aircraft and large surveillance systems like the Global Hawk. The United States will be much more easily able to deploy less capable lower tier assets, such as the Joint Strike Fighter and legacy fighter aircraft. However, the utility of such assets in the types of conflicts which might arise within Asia is questionable.

It will be strategically unsafe for Australia to rely upon the United States to provide key high capability category assets for the defence of Australian interests and territories. The United States may find itself in the position where it cannot meet such needs at short notice, simply due to shortages in available numbers of such assets, or it may be presented with a genuinely difficult conflict of interest. The consequence is that Australia must properly invest in key assets, these including high capability category fighters, aerial refuelling tankers, surveillance and jamming aircraft and other supporting capabilities.

It is in Australia's interests to maintain the capability to act unilaterally and independently within the region, a capability which will be lost if current Defence planning is pursued. This does not preclude maintaining a close relationship with the United States. Clearly it enhances the relationship with the United States as it reduces the number of assets the United States would otherwise have to budget for this region to cover Australia's currently developing strategic weakness, and provides Australia the option of offering high capability category assets for future coalition operations with the United States. There is considerably more political gain in providing a United States' led coalition force with the kinds of capabilities which the United States does not have in abundance.

The character of capabilities now being developed in Asia is of forces designed for coercion, rather than seizure of territory. This is a model which emulates the United States' use of air power as a coercive weapon, demonstrated in the air campaigns of the 1990s. By inflicting heavy damage on an opponent's military and civilian infrastructure, the opponent is forced to concede a dispute.

Australia's ability to generate economic wealth has evolved since the 1940s, when New South Wales and Victoria were the nucleus of the nation's wealth generating economy. Today and in the future increasingly so, Australia's wealth in mineral and especially energy resources will become central to national wealth. These resources are mostly concentrated in the northern and western parts of Australia's landmass, and its continental shelf.

This accident of geography leaves Australia highly exposed to the coercive use of air power and cruise missiles against key economic targets.

In a future dispute with a regional nation, much of Australia's wealth generating resource industry could be shut down, crippled, or even destroyed, for a modest expenditure in smart bombs or cruise missiles. The oil and gas industries are especially vulnerable, due to their highly combustible product. It is worth observing that the Burrup Peninsula and planned Gorgon Liquefied Natural Gas storage facilities each, when full, store energy equivalent to a Megatonne class nuclear warhead.

Given the enormous economic cost, and likely significant collateral environmental damage, arising from a smart bomb or cruise missile attack on an energy industry target, a future government may be faced with very difficult choices if a dispute arises with a regional nation, in possession of smart bomb or cruise missile equipped combat aircraft. Unless the RAAF can credibly defeat such capabilities in combat, the government may well be compelled to capitulate on the day.

Defeating or deterring the use of cruise missile or smart bomb equipped combat aircraft, supported by aerial refuelling tankers, or submarine launched cruise missiles, is not an easy task.

Defeat of an attacker requires the aircraft carrying smart bombs or cruise missiles must be intercepted well before they reach the release point for the weapon, possibly hundreds of miles for a cruise missile, and destroyed. Moreover, any cruise missiles which have been launched must be intercepted and destroyed. If cruise missiles are launched by submarine, interception of the missiles is the only option.

Deterrence of an attacker requires that the attacker understand that most of their assets used in such an attack would not survive an encounter with ADF defensive assets, or offensive assets. If the ADF develops the capacity to project striking power to distances of thousands of nautical miles, then deterrence by the threat of a 'counter-force' strike becomes an attractive option. This is the model which served Australia well during the pre-Timor era, when F-111s were available to effect long range 'counter-force' strikes.

Given the geographical constraints Australia faces, and the growing importance of regional sea lanes to the many Asian economies, control of these sea lanes will become a major issue in the medium and long term. At this time only the United States Navy have the ability to robustly control these sea

lanes, but China's developing naval capabilities and stated doctrine indicate that control of regional sea lanes is becoming a priority.

If Australia is to deny control of its northern sea lanes to another power, such as China, then Australia needs the capability to attack surface shipping across the nearer region. In practical terms this means combat aircraft and enough supporting aerial refuelling tankers to saturate an opposing surface fleet's defences with anti-shipping cruise missiles. Australia cannot play in the game of sea control since the nation's economy cannot support the size of naval surface fleet required.

Should Australia develop its future air power following a rational and well structured model, then its influence in the region will grow, as it will be robust ally who is not easily swayed in a dispute.

Other dividends accrue, as noted, as a reduced dependency on US assets takes a burden off the US taxpayer, otherwise placed in the position of having to hold assets in reserve to attempt to cover Australia's weakness, or decline assistance at short notice in a crisis situation.

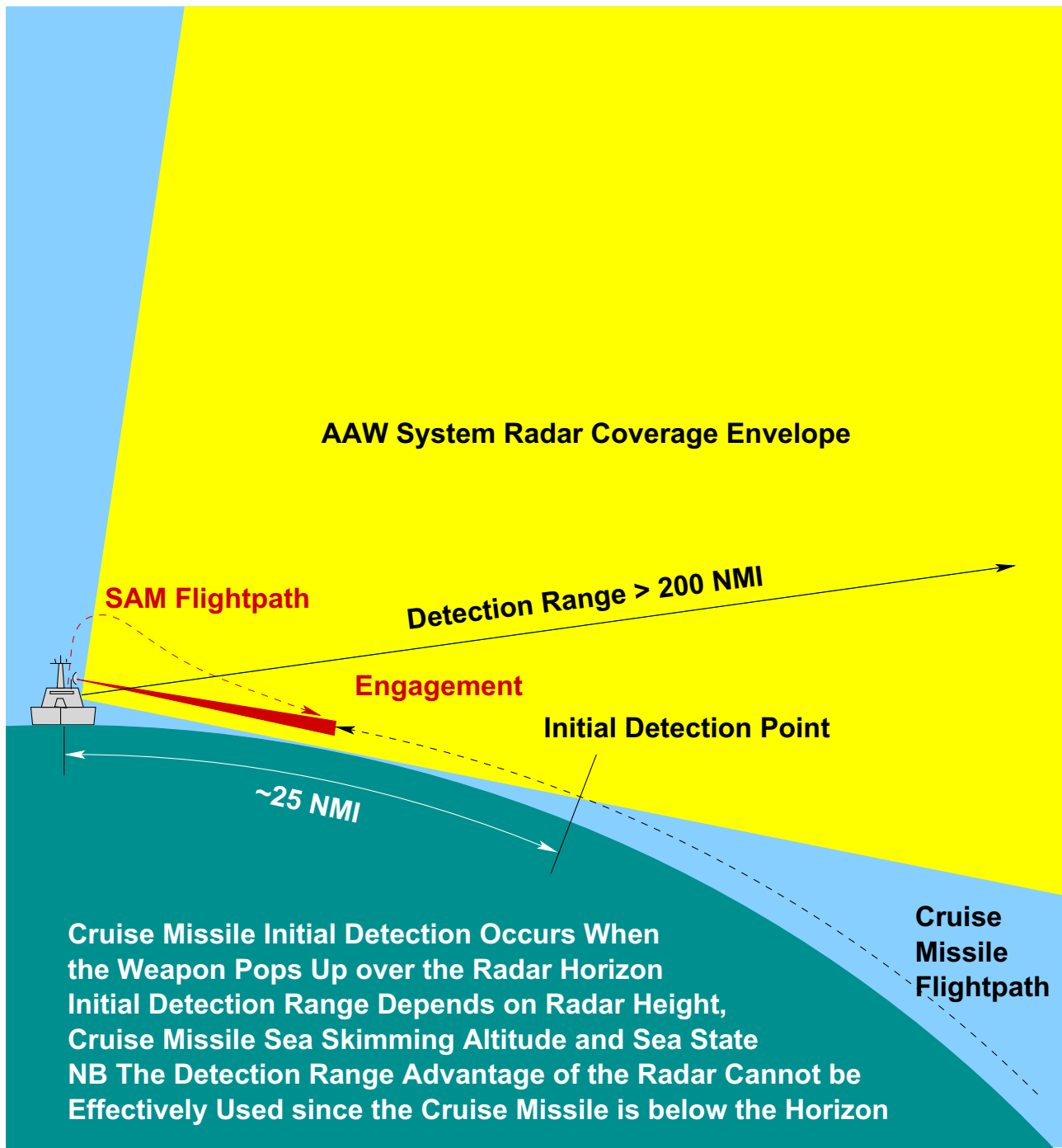


Figure 21: *The notion that the Air Warfare Destroyers can significantly contribute to Australia's capability to defend airspace is predicated on completely unrealistic assumptions about regional capabilities. The most likely weapons which will be used for maritime strikes and attacks on land targets will be low flying cruise missiles. While the long range radar system on a warship has the potential to detect high flying targets from 200 nautical miles distance, its capability to detect low flying cruise missiles is limited to the radar horizon of the warship, typically around 25 nautical miles or less distance away. In practical terms the Air Warfare Destroyer can cover a low altitude footprint with only 1/100th the area covered by a single Wedgetail Airborne Early Warning and Control system (C. Kopp).*

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2.4 Achieving Credible Regional Air Superiority

Achieving air superiority in any strategic context requires that an air force have better capabilities than potential opponents, in credible numbers relative to opposing capabilities.

The developing regional environment presents Australia with many challenges which have not been seen since the period of the 1940s, when Japanese forces were able to strike at northern Australian targets. Until later in that conflict, Australia had a very limited capability to challenge or defeat Japanese bombers and their supporting escort fighters.

Unlike the period of the 1940s, Australia now derives significant national wealth from natural resources in the north. The North West Shelf and Timor Sea gas and oil industry plant, offshore and onshore, represents a lucrative target for air attack using smart bombs or cruise missiles, and thus is a key strategic vulnerability in a time of conflict.

Other key targets across Australia's north include the chain of RAAF airfields, specifically Learmonth, Curtin, Tindal, Darwin and Scherger. Relatively isolated, repair and reconstitution of most of these bases following attacks could present genuine difficulties.

In any serious conflict, initial attacks would be directed at RAAF bases and where opportunities arise, RAN surface warships in the area. The aim would be to at least cripple operations, and if possible render the basing unusable and inflict attrition on aircraft and other assets. The weapon of choice for such attacks would be the cruise missile, launched in large numbers. For instance, a Sukhoi Su-27/30 fighter supported by aerial refuelling has the capacity to carry up to four conventional cruise missiles, or a smaller number of supersonic cruise missiles. A strategic bomber would carry between four and sixteen cruise missiles, subject to bomber and missile types, and would not require aerial refuelling for such strikes.

The often cited argument that the Air Warfare Destroyers could play a major role in defending against such a strike is nonsense, as each of these vessels could at best defend a circle of about 30 nautical miles diameter against a low altitude cruise missile attack, assuming the warship itself does not become the focus of an attack. The operational and propaganda effect of sinking one or more of the Air Warfare Destroyers makes them an attractive target, one which is implicitly susceptible to a saturation attack with anti-ship cruise missiles²⁵.

Given these considerations, defining key capabilities to achieve and maintain air superiority within Australia's areas of interest is not unusually difficult. Developing regional capabilities provide a very clear and easily understood benchmark for future RAAF capabilities. NATO and United States experience during the Cold War era provides a wealth of applicable case studies.

Key capabilities which Australia must acquire can be summarised thus:

1. Capability to defeat Sukhoi Su-27SK, Su-27SMK, Su-30MK Flanker and future growth variant fighters, including models equipped with supersonic cruise engines. The Sukhoi must be defeated in both Beyond Visual Range and close combat, the latter to account for situations

where Beyond Visual Range combat is not feasible.

2. Capability to defeat strategic bombers such as the H-6 Badger, Tu-95MS Bear and Tu-22M3 Backfire. Fighter aircraft must have the supersonic performance to effect intercepts against supersonic bombers, and be supported with sufficient refuelling capability to engage the bomber before it can launch cruise missiles.
3. Capability to defeat cruise missiles, including the Tomahawk-like Kh-55SM, and supersonic weapons like the Yakhont. Fighters must have the aerodynamic performance, radar performance and weapon payload to credibly intercept low flying cruise missiles in flight. Sufficient aerial refuelling must be available to provide the necessary persistence in an area of operations.
4. Capability to perform long range 'counter-force' strikes to pre-emptively defeat regional offensive capabilities in a crisis. This capability can be implemented by delivering cruise missiles, or by employing a penetrating stealth aircraft. Sufficient aerial refuelling capability must be available to permit a significant number of aircraft to reach targets at distances of 2,500 nautical miles or greater.

These basic capabilities must exist, and sufficient numbers of aircraft be available for the capability to be credible. For instance, having the capability to strike to 2,500 nautical miles using only eight aircraft is not a credible capability.

Additional and important considerations also include:

1. Achieving sustainability in operations - the RAAF must be capable of sustaining these capabilities, at a credible rate of effort, for at least two months. This means not only having sufficient aircrew and ground personnel, but also having the airfield aviation fuel replenishment capability and critical munitions warstocks to sustain the effort.
2. Achieving persistence and reach - aerial refuelling aircraft of suitable size must be available in credible numbers to support persistent air combat and battlefield support tasks, but also to permit credible numbers of aircraft to strike at long range, or sustain Combat Air Patrols over the sea air gap.
3. Achieving situational awareness - sufficient numbers of intelligence, surveillance and reconnaissance systems must be available to provide persistent coverage of areas of operation. Having world class systems like the Wedgetail AEW&C is not adequate if the number of aircraft is not sufficient to cover all key Australian territorial targets.
4. Achieving network robustness - while networking capabilities are highly valuable in combat, they represent a single point of failure for the force if they are degraded or crippled by hostile jamming. Sufficient redundancy must exist within networks to provide high resilience to hostile jamming.
5. Jamming opposing networks and intelligence, surveillance and reconnaissance systems. All successful air campaigns executed over the last three decades have included intensive jamming of an opponent's radar and communications systems. This capability is essential given developing regional capabilities.

6. Coalition interoperability issues - communications, digital networks, radars and jamming equipment must be interoperable with United States forces.

Current planning for the RAAF, articulated in a range of public documents, is wholly unrealistic given the developing strategic environment, and regional capabilities.

If we test planned capabilities against the previously stated criteria, several key inadequacies become immediately apparent.

1. The F/A-18A HUG is outclassed by the Sukhoi fighters on a number of key criteria, including combat radius, aerodynamic performance, radar range and weapon carrying capabilities.
2. The Joint Strike Fighter is outclassed by the Sukhoi fighters on a number of key criteria, including combat radius, aerodynamic performance and weapon carrying capabilities. The United States intend to use the F-22A to defeat Sukhoi fighters in air combat.
3. The F/A-18A HUG lacks the supersonic performance to reliably effect intercepts against high performance strategic bombers like the Tu-22M3 Backfire.
4. The Joint Strike Fighter lacks the supersonic performance to reliably effect intercepts against high performance strategic bombers like the Tu-22M3 Backfire - the United States intend to use the F-22A for this role.
5. The F/A-18A HUG lacks the persistence and weapon carrying capability to be an effective cruise missile defence asset, and its radar lacks the range performance to perform this role effectively.
6. The Joint Strike Fighter lacks the persistence and weapon carrying capability to be an effective cruise missile defence asset - the United States intend to use the F-22A for this role.
7. Current planning to acquire five A330-200 aerial refuelling tankers addresses around 25% of the developing capability needs of the RAAF.
8. Current planning to acquire six Wedgetail AEW&C aircraft addresses around 66% to 75% of the developing capability needs of the RAAF.
9. There is no planning to acquire a long range ground surveillance platform with capabilities similar to the US E-8 JSTARS.
10. There is no planning to acquire a long range electronic and signals surveillance platform with capabilities similar to the US RC-135V/W Rivet Joint or EP-8A.
11. There is no planning to acquire support jamming aircraft to suppress opposing radar, network and communications systems.

It is abundantly clear that current planning for the future of the RAAF is predicated on unrealistic and obsolete assumptions about regional capabilities and their impact. As a result it should be wholly revised to account for the evolving region and developing strategic risks. To retain the existing plan for future air force capabilities is to invite significant problems for Australia over coming decades.

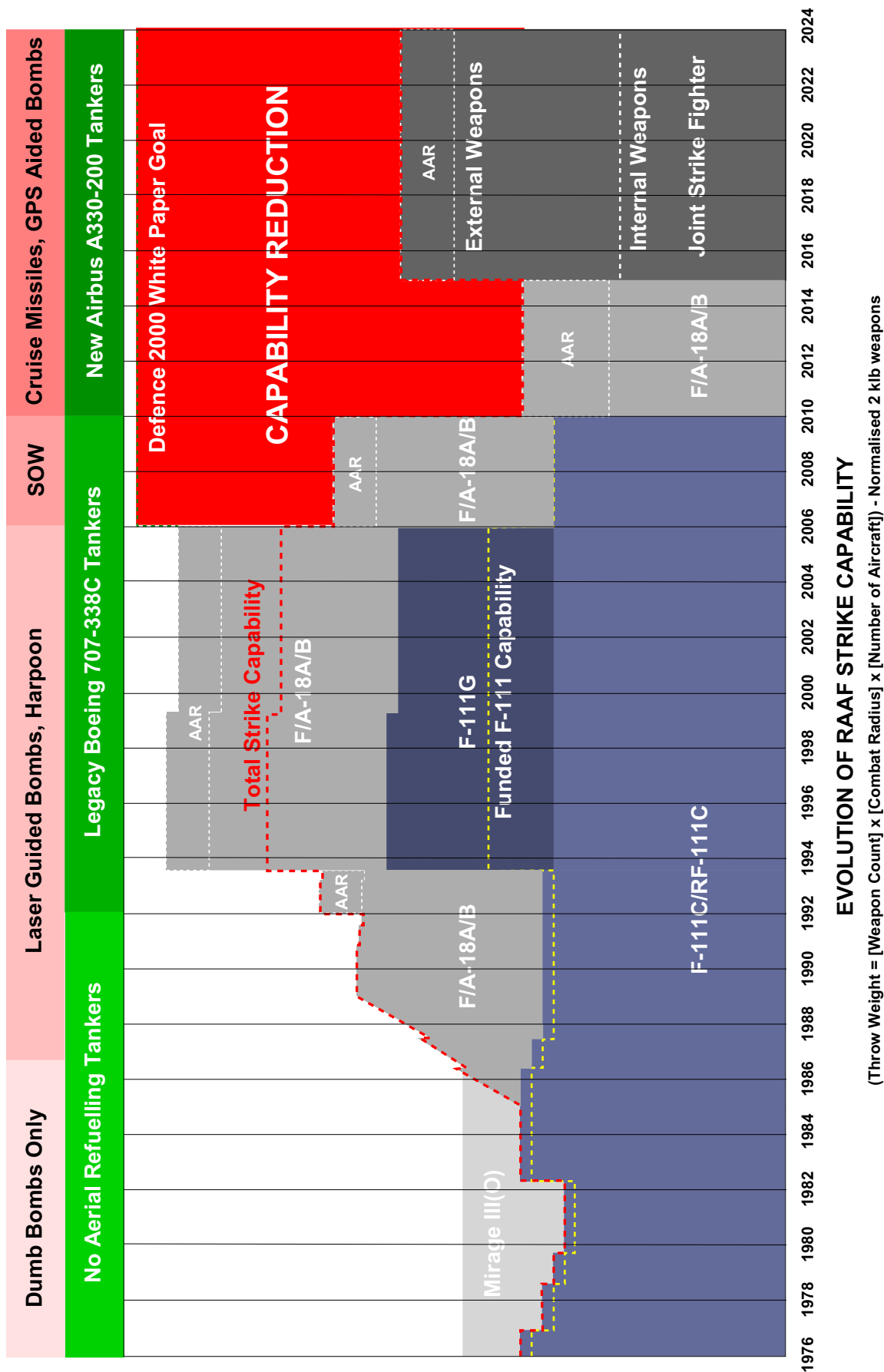


Figure 22: This chart displays the evolution of RAAF strike capability and current planning for the period following 2005 (C. Kopp).

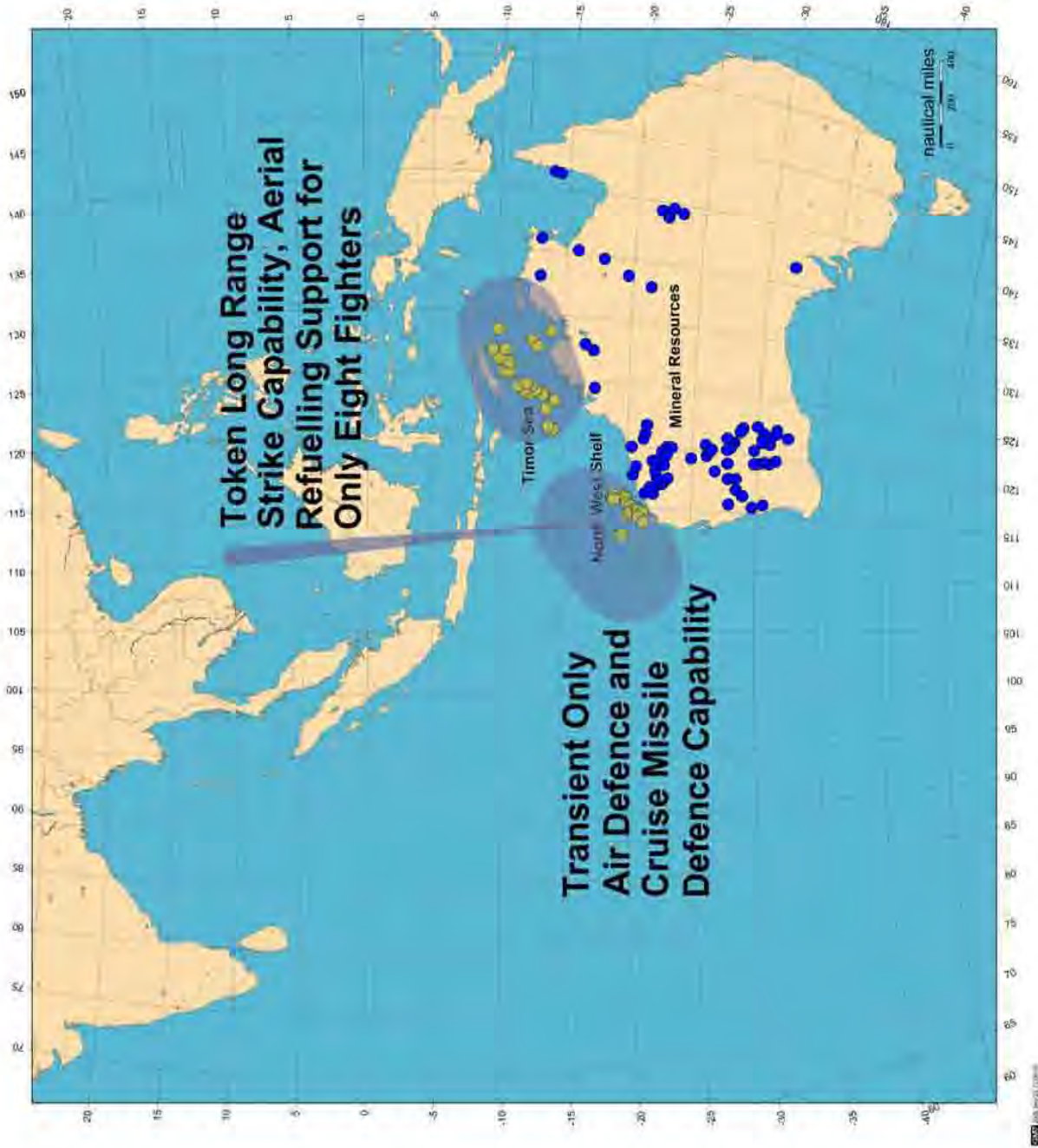


Figure 23: This chart displays the air defence and long range strike capabilities as currently planned for in the interim and final RAAF capabilities. The notable limitations in long range capability arise from inadequate numbers of aerial refuelling aircraft, exacerbated further by a preference for small low capability category fighters such as the F/A-18A and Joint Strike Fighter (C. Kopp).

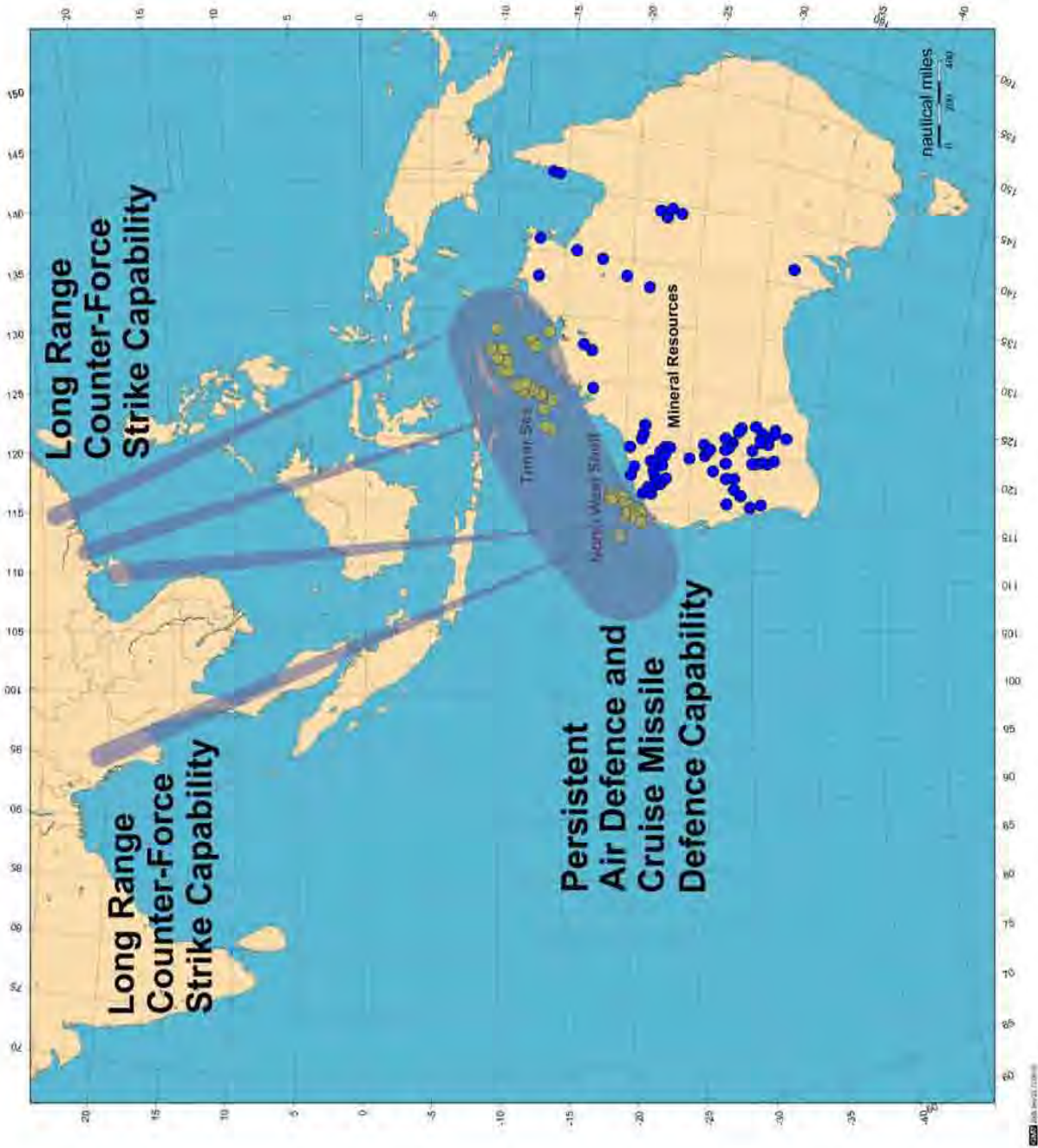


Figure 24: This chart displays the air defence and long range strike capabilities required to effect credible regional deterrence, and to robustly protect key economic assets (C. Kopp).

Submission Endnotes

¹ Refer to the Department of Defence Answers to Questions on Notice, Supplementary Budget Estimates Hearing, 2005-06

² **Base Year (BY)** - A reference period that determines a fixed price level for comparison in economic escalation calculations and cost estimates. The price level index for the BY is 1.000. US DoD Glossary of Acquisition Acronyms and Terms, 12th Edition – July 2005

³ US Department of Defence Glossary of Acquisition Acronyms and Terms, 12th Edition – July 2005

⁴ Norman R. Augustine – Past President of Martin-Marietta, Former Chairman and CEO of Lockheed Martin and author of “Augustine’s Laws”, 1983 – Sixth Ed. 1997.

⁵ Clarence “Kelly” Johnson – one of the most highly acclaimed and honoured aircraft designers in history and principal driver behind the development of Lockheed Skunk Works and the aircraft that bear this pedigree.

⁶ Department of Defence Answers to Question W6, Senator Bishop, on the Joint Strike fighter Development and Procurement, Pages 20 – 31, Questions on Notice from the Supplementary Budget Estimates Hearing of 02 November 2006.

⁷ Letter from the Office of the Minister of Defence in response to an E-letter dated 21 Nov 05 concerning “the meaning of terms related to cost, and the cost of the Joint Strike Fighter”.

⁸ Including Department of Defence Answers to Question W6 on the JSF Development and Procurement, Pages 20 – 31, Questions on Notice from the Supplementary Budget Estimates Hearing of 02 November 2006.

⁹ “The best way to make a silk purse from a sow’s ear is to begin with a silk sow. The same is true of money.” – Norman Augustine, former President of Martin Marietta and CEO of Lockheed Martin.

¹⁰ “If a sufficient number of management layers are superimposed on top of each other, it can be assured that disaster is not left to chance.” and
“Most projects start out slowly - and then sort of taper off.” and
“Simply stated, it is sagacious to eschew obfuscation.” Norman R. Augustine

¹¹ The ‘product rule’ or ‘Lusser’s product law’ is a simple mathematical relationship, discovered during the late 1940s, which is widely used in risk analysis and reliability engineering. Both authors have used it extensively in industry, and one of the authors taught it at university level.

¹² Refer Defence Annual Report 1999-2000; URL - <http://www.defence.gov.au/budget/99-00/dar/full.pdf>

¹³ “In fact, the high cost of keeping the F111 currently is distorting our Air Force’s capability to transition to a networked systems based force.” - AM Geoff Shepherd, Chief of Air Force, Senate Supplementary Budget Estimates Hearing, 02 November 2005, Hansard Page 87.

¹⁴ RAAF Air Combat Capability Paper for Joint Standing Committee on Foreign Affairs, Defence and Trade, AM Angus Houston dated 03 June 2004, Para 37.

¹⁵ 'A Farewell to Arms Revisited', P A Goon, 26 January 2005, Air Power Australia Web Site URL: <http://www.ausairpower.net/FTAR-PAG-180404.pdf>.

¹⁶ Specifically, the US 'Bomber Roadmap' or *US Air Force White Paper on Long Range Bombers*, dated March, 1999. In this document the US Air Force maps out long term plans for its fleet of heavy bombers. The B-52H was to remain in service until 2038, the B-1B until a similar date. The significance of this model is that the B-1B uses similar construction techniques, and is similar in performance, to Australia's F-111s. While the current US Quadrennial Defense Review identifies a need for a new long range bomber, to enter service in 2018, historical experience suggests this program may not survive budgetary pressures, or may only result in partial replacement of the existing fleet. The B-1B for instance was to replace the B-52 with around 250 to be built, but only 100 were made. The B-2A was to replace the B-52, with 132 to be built, but only 21 were funded.

¹⁷ The naval F-111B was to have been a dedicated interceptor for fleet defence against long range bombers armed with cruise missiles. This variant was cancelled, but shared nearly all of its airframe design in common with Air Force variants - in part the reason why the F-111 airframe has such longevity. Provision of this capability requires a new radar and software to support suitable missiles such as the AIM-120 and AIM-132.

¹⁸ Application of this technique two years ago identified significant economies in fuel burn if legacy B-52 aircraft were to be re-engined, as the reduced demand for aerial refuelling support rapidly offset the cost of the new engines. During the early 1990s, following the 1991 Gulf War, this technique showed the compelling cost advantages enjoyed by the F-117A stealth fighter and F-111 in combat operations, compared to the Tier 2 F-16 fighter. F-117A required few supporting assets due to its stealth, saving money, the F-111 required less aerial refuelling support, also saving money.

¹⁹ For all intents and purposes this is the same internal payload typically envisaged for the planned Joint Strike Fighter, which is a purpose designed bomber.

²⁰ The high power rating of the F-22's APG-77 radar makes it the most difficult US fighter radar to jam by opposing defences, and the radar's power also allows it to surveil or map ground targets from greater ranges than any other fighter radar.

²¹ This comparison applies also to the Joint Strike Fighter, which is being designed around the limited performance and speed capabilities of legacy fighters, specifically the F-16 and F/A-18.

²² The Soviet buildup commenced during the late 1970s, as a range of new military technologies were introduced. In part these included systems patterned after US designs introduced during the 1970s, and in part systems based on US technology acquired from Vietnam and Iran. Of significance is that the Soviets deployed hundreds of new generation Su-27 and MiG-29 fighters, S-300 Surface to Air Missile systems, new radar systems like the 64N6 series, and a wide range of land and naval warfare systems.

²³ During the 1980s and 1990s Australia operated the F/A-18A and F-111C, while no regional nation operated comparable capabilities until the introduction of limited numbers of the MiG-29,

comparable to the F/A-18A. During the mid to late 1990s hundreds of Su-27 and Su-30 Flanker fighters were ordered across the region, with orders ongoing since.

²⁴ Hale provides an exhaustive survey and analysis in 'China's Growing Appetites', *The National Interest*, also see Kenny in 'China and the Competition for Oil and Gas in Asia', *Asia-Pacific Review*.

²⁵ While modern anti-ship missile defence systems can be highly effective against small numbers of subsonic or supersonic anti-ship cruise missiles, they are all limited in how many inbound missiles they can engage and destroy concurrently. Accordingly, the Soviets developed a tactic during the Cold War based on saturating a warship's defences with more cruise missiles than the system could defend against. This tactic has been actively exported in Asia and is detailed in contemporary Russian marketing materials.

²⁶ Contemporary literature often uses the terms 'air dominance' or 'air supremacy' rather than 'air superiority'. The condition of air dominance or air supremacy is one where an opponent will not even attempt to contest for control of the air, or no longer has the capability to do so. In a condition of air superiority, an opponent may contest control of the air, but cannot achieve it. Some definitions of air superiority identify it as limited in time and geographical extent, ie air superiority exists only when the more capable force is present, and not otherwise. For instance, following this definition the UK achieved air superiority in the Falklands conflict, but only in those areas patrolled by Royal navy fighters. The practical consequence was that in areas not patrolled by fighters, the British fleet suffered significant losses to Argentinian air attack.

²⁷ High resolution radar mapping techniques using Synthetic Aperture Radar (SAR) technology can now produce ground maps with feature sizes of centimetres, whilst penetrating cloud, rain, haze and sandstorms, providing the capability to detect, identify, track and engage even small ground force units. Ground and Maritime Moving Target Indicator (GMTI, MMTI) capabilities are designed to detect slow moving surface targets, through weather, and thus provide the capability to detect, track and engage, and often identify, ground vehicles and even small boats. The expectation is that such radars will become the defacto standard in most combat aircraft over the coming decade. Advanced production variants of the Su-27 and Su-30 are being provided with or already have SAR, GMTI and MMTI capabilities.

²⁸ It is important to observe that this problem arises with all low capability category fighters, examples including the F-16C, F/A-18E/F, Eurofighter Typhoon, Dassault Rafale and SAAB Gripen. All of these have been canvassed or proposed at various times as replacements for the F/A-18A and all are now wholly non-viable choices.

²⁹ A major survivability issue now arising is the emergence of multiple seeker types in Russian long range air to air missiles. While radar stealth capability can defeat radar guided missiles, it is ineffective against heatseeking and passive anti-radar missiles. Russia is now exporting the semi-active radar homing R-27R/ER/ER 1 Alamo A/C, the heatseeking R-27T/ET/ET1 Alamo B/D, the anti-radiation R-27P/PE Alamo E/F, and the active radar guided R-77 Adder. The heatseeking R-77TE and anti-radiation R-77PE Adder variants have been reported. A fighter with limited stealth is exposed to long range shots using these weapons, and neither the heatseeking nor the anti-radiation seekers are easily defeated.