

By Dr Carlo Kopp

Media reports indicate Australia may only be permitted to acquire an "export JSF" with reduced stealth. How well is stealth understood in the Defence bureaucracy – especially stealth optimisation?

Radar-defeating stealth performance varies with platform aspect, threat radar wavelength and threat radar power-aperture. Stealth designs will use shaping, radar-absorbent materials and structures to defeat specific radar threats from specific aspects and ranges.

The most widely cited parameter is "radar cross-section", a number which essentially says whether the platform will appear as a ball bearing, a golfball, tennis ball, basket ball or beach ball sized object. But radar cross section is usually cited without defining the aspect or operating wavelength.

Changes in radar cross section,

Stealth: Now you see it . . . ?

with platform aspect, are as important as its size. While head-on performance is seen as most important, operational experience with the F-117A indicates that tail aspect is almost as important in combat. Side-on or beam performance cannot be neglected.

Giving a platform good stealth over the nose alone severely limits how it can be used in combat, if it has to penetrate enemy defences.

No less important is the variation of radar cross section with wavelength. Any stealth shaping scatters impinging energy in a manner which depends on the wavelength. Physics cannot be changed.

A shape which is nearly invisible to a 3cm or X-band radar might appear 10 or more times bigger to L-band or UHF radar. Wavelength

dependency of stealth is critical in terms of which radars can be defeated – be they shorter-range fighter and SAM engagement radars, or long-range surveillance and AEW&C radars. The latter are critical if surprise is to be achieved.

The three US stealth aircraft, the operational F-117A, B-2A and the production F/A-22A, are designed by shaping and materials application to be "wideband, all-aspect" stealthy.

They can defeat hostile radars of widely varying wavelengths, from all azimuths, with best performance head-on. This allows them to penetrate with surprise and near impunity.

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US tanker hassle drags on

WASHINGTON – If speeded up the USAF tanker study – "an analysis of alternatives" – could wind up by the end of this year, according to Michael Wynne, the Pentagon's procurement boss.

He said he expected Defence Secretary Rumsfeld to have taken "on board" a Pentagon advisory panel's conclusions, that the existing fleet's corrosion problems were "manageable," and that there was no need to rush on the Boeing deal.

In the summary of its findings presented to Congress on Wednesday, a Defense Science Board task force said there was "no compelling material or financial reason to initiate a replacement program" before studying alternatives and how the military will use the planes.

The Air Force, listing other options, said it could work with major airframe manufacturers to develop replacement options that might in-

clude aircraft other than the 20-year-old 767.

Rumsfeld has said he would rely partly on the Defense Science Board report to make a decision about the deal. Inspector-General Joseph Schmitz, found last month that the Boeing deal could cost taxpayers as an extra \$4.5 billion.

Boeing must decide whether to close the production line within a few months if the Air Force deal stays stalled, said Alan Mulally, president and chief executive of Boeing Commercial Airplanes.

Twenty-two 767s are on order, or about two years' production.

Wynne told Congress in September that are three other suppliers who could develop and produce a tanker aircraft for the Air Force – Lockheed Martin, Airbus/EADS and "the Russians."

Asked about the possibility of re-opening a competition, Wynne said "I would expect that in the analysis of alternatives everything would be on the table – just like it should be in a major acquisition decision."

Missile defence 'won't work'

WASHINGTON – The Union of Concerned Scientists has told the Pentagon's Missile Defense Agency that the multibillion-dollar US ballistic missile shield – due to start operating by September 30 – can't shoot down incoming warheads.

Its independent technical analysis found "no basis for believing the system will have any capability to defend against a real attack," a 76-page report, *Technical Realities*, said.

The MDA rejected the report. "It will provide a defence against incoming missiles," retorted Richard Lehner, a spokesman for the Missile Defence Agency.

The initial deployment involves 10 interceptor missiles in silos in Alaska and California.

It is designed to protect all 50 US states against a limited strike from North Korean missiles.

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The same is not true for the JSF, optimised for battlefield strike. Its stealth inlet and exhaust nozzle designs are optimised for the centimetric X-band and thus most effective against fighter radars and SAM engagement radars.

Longer wavelength radars will detect it at tactically useful ranges. Unlike the F/A-22A which has exceptional agility and supersonic cruise capability in addition to wideband stealth, the JSF puts all

its survivability eggs into the stealth basket. Take away the stealth and a JSF confronting a more agile and larger Sukhoi Su-30 is hardly better off than any teen series or Eurocanard fighter.

Yet even with the full-stealth capability of US-only variants, the JSF will be exposed to the class of long range surveillance radars which can vector a Sukhoi for a long-range heatseeking missile attack, or cue a SAM battery.

A reduced stealth export

F/A-22A still defeats most threats by kinematic performance alone, and remains "wideband, all-aspect" in its stealth because of its basic shaping.

Defence bureaucracy decisions such as the single type JSF shortlist, and the Air Warfare Destroyer shortlist – which excludes stealthy DD(X) technology – demonstrate poor literacy in stealth technology optimisations and the tactical, operational and strategic impact of such limitations.

Vietnam builds Spratly airfield

HANOI – Ostensibly for tourism, Vietnam has started building a small airport on the disputed Spratly islands, in an area claimed by several Asia countries, including China.

Construction of the airport with a runway of 600 metres (2,000 feet) on the Truong Sa Lon (Large Spratly) island is expected to be completed by the end of this year.

Vietnam already has military facilities and local government officials on the island in the Spratlys, scattered South China Sea atolls where its navy clashed with Chinese ships in 1988.

Against protests from Spratly claimants China, the Philippines and Taiwan, Vietnam last month sent its first group of tourists to the disputed South China Sea islands.

An aviation official in Hanoi said the airport can handle small aircraft such as twin-engine turboprop ATR 72s.

National carrier Vietnam Airlines

has eight ATR 72s in its fleet. Tourism officials have said Vietnam Airlines is expected to offer commercial flights for tours to the Spratlys.

It takes two days to travel by boat to the Spratlys, 250 nautical miles east of Vietnam's central province of Khanh Hoa.

So far only Vietnamese military and the occasional chartered flights by helicopters have been operating the route.

Most of the Spratlys – a cluster of rocks and reefs believed rich in oil and natural gas – are claimed in whole or in part by China, Taiwan, the Philippines, Brunei, Malaysia and Vietnam.

Turkey cancels attack choppers

ANKARA – Turkey has cancelled its purchase of strike helicopters in which US defence firm Textron's Bell Helicopter unit and Russia's Kamov were competing.

The Defence Industry executive committee also cancelled existing tenders for the purchase of unmanned surveillance aircraft and for a tank-modernisation project.

SQ profits soar after costs cuts

SINGAPORE – Singapore Airlines posted a fourfold jump in quarterly profit on Friday, on higher passenger traffic and cost cuts, but warned the outlook was mixed.

The airline's profits are expected to improve this fiscal year as business travel and tourism recover and cost cuts help it weather mounting competition from budget airlines and sharply higher jet fuel costs.

Singapore Airlines earned S\$477.9 million in the March quarter against S\$111.3 million in the same period a year earlier.

The airline was able to fill 76 per cent of its passenger capacity in the fourth quarter, up from 71.5 percent a year earlier.



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