Regional Developments 2005

Dr Carlo Kopp

The region has continued to rapidly evolve this year, reflecting the realities of mostly quite wealthy regional economies but a darker thread has emerged in recent years – the competitive impact of China's ongoing military buildup. This situation is manifest in recent buys by South Korea and Singapore of advanced Boeing F-15 variants, but also in a shifting focus in the United States/Japanese alliance along with further US infrastructure development.

South Korea's F-15K is the most advanced production variant of the F-15E to date. It incorporates all of the incremental upgrades developed for US F-15C and F-15E aircraft, in addition to F110 engines and SLAM-ER/Harpoon capability (USAF).

South Korea's F-15K F-X

South Korea embarked on a plan to acquire a new strike fighter in 1999, reflecting in part concerns about the obsolescence of its large fleet of legacy F-4 variants, plus concerns about growing capabilities in China.

The F-X competition aimed to provide the RoKAF with this replacement aircraft. Requirements included maximum endurance to permit combat air patrols without aerial refuelling, a payload of eight AAMs, an internal gun, and the ability to carry a wide range of air to ground munitions, including cluster weapons and precision guided munitions.

The initial shortlist of contenders included Boeing's F-15E, Rafale, Su-35 Flanker and Eurofighter Typhoon. This contest soon distilled down to a flyoff between the F-15 and the Rafale. The French invested considerably since they desperately needed an export sale for the Rafale. Boeing's proposal was the F-15K, an evolution of the late production F-15E for the US Air Force.

In late April 2002 the RoKAF announced that the F-15K was the winner, and an order was soon placed for 40 aircraft, valued at US$4B, with an US$2.8B industry support package offered. The first aircraft was to be delivered late this year, with the first full production configuration aircraft to deliver mid 2006, reflecting the significant integration effort resulting from sensor and weapons enhancements.

The offset arrangement includes manufacture in South Korean of a wide range of subsystems, including Samsung Techwin Company manufacturing the GE F110-129A engines, and Korea Aerospace Industries (KAI) manufacturing forward fuselages and wings.

In technological terms, the F-15K is the most advanced production variant of the F-15 series to date.

The baseline APG-70 multimode radar of the F-15E is replaced with the enhanced APG-63(V)1, which has been further modified to include the air to ground modes inherent in the APG-70 series. Additional modes for Ground Moving Target Track, Sea Surface Search/Track, and Enhanced High-Resolution Ground Mapping were also added.

The F-15K is fitted with a wide field of view Head Up Display and the JHMCS helmet mounted display for weapon cueing – in addition to seven Kaiser Electronics cockpit AMLCD displays, which replace the legacy CRT displays in the F-15E.

A new core computing package centres on the COTS-derived Honeywell Advanced Display Core Processor and a VxWorks COTS operating system. The ADCP will be introduced on US F-15s in 2006. The Operational Flight Program for the ADCP merges legacy ADA code with industry standard software including the OpenGL graphics environment and C++ language.

Additional software has been included in the mission computers to accommodate the new radar, but also to support the most extensive weapons package on any F-15 variant. In addition to legacy weapons cleared on US F-15Es, such as the Paveway series and AGM-130, the F-15K will carry the JDAM, and uniquely, the AGM-84 Harpoon and SLAM-ER stand-off missile.

The legacy ALR-56M warning receiver is replaced with an advanced Lockheed Martin ALR-56C(v)1, while an evolved Northrop Grumman ALQ-135M replaces the legacy ALQ-135 internal jammer. A terrain following capability is provided, likely using a variant of the LANTIRN TFR pod, of which more than 800 have been built to date.

In terms of offensive sensors, the F-15K is to be equipped with a Lockheed Martin 'Tiger Eyes' sensor suite, comprising a third generation FLIR/TV/Laser targeting pod, and a passive longwave Infra-Red Search and Track (IRST) pod, derived from the AN/AAS-42 carried on US Navy F-14Ds.

The aircraft is credited with a deep strike unrefuelled combat radius of about 1,000 nautical miles, three hours on station CAP endurance at 300 nautical miles, and a maximum weapon payload of 25,000 lb – or 29,000 lb should the RoKAF opt to use the additional outboard 1 and 9 wing stations.

What the F-15K will provide South Korea with is the most capable strike fighter in North Asia.

Singapore selects F-15SG

Singapore's long running fighter contest has been won by the Boeing F-15SG, although details of the bid and contracts have yet to be disclosed. As with the Korean bid, the final contest was between Boeing and Dassault, with the Rafale losing again. The Singaporean bid has been the subject of lengthy speculation in the analysis community, with most agreed that the F-15 was more suitable both as a counter to regional Flanker buys but also in terms of its range and endurance, which are vital for a maritime nation with vulnerable sea lanes.

The F-15SG is expected to resemble the RoKAF's F-15K, but with the addition of the AN/APG-63(V)3 phased array radar, replacing the legacy planar array used in the F-15K. The APG-63(V)3 is an evolution of the APG-63(V)2 phased array carried by a modest number of US Air Force F-15Cs. The second generation phased array design retains much of the existing radar design, but the antenna is re-engineered to use Transmit Receive module technology developed for the newer APG-79 phased array in the F/A-18E/F. Raytheon claim a weight reduction of 240 lb against the (V)2 variant, and it is likely that peak and average power ratings are higher. Whether the RSAF is provided with the full APG-63(V)3 capability, in both radar modes and power ratings, remains to be seen.

Media reports claims that the initial order will be for 12 and 20 F15S6 aircraft, as replacements for obsolescent A-4S Skyhawks. With other legacy types and early F-16s now becoming due for replacement, it remains to be seen whether the RSAF opts for a different aircraft or extends its planned F-15SG fleet. If the experience of other export F-15 users is any indicator, it is likely that Singapore will invest in further F-15SGs.

If the AESA is supplied on the F-15SG, then it will be technologically the most advanced multirole fighter in the wider region. The aircraft will certainly allow the RSAF to punch above its weight, and once Australia's F-111s are retired, rather than upgraded, Singapore will have the most capable strike force in the near region.

Singapore is expected to now acquire the F-15SG, an incrementally improved derivative of the F-15K. It is expected that Singaporean aircraft will be equipped with a variant of the APG-63(V)2 phased array radar (USAF).

Varyag under refit

Reports emerged earlier this year that the former Russian Navy aircraft carrier Varyag, moored at Dalian harbour in China, has been moved into a drydock for a refit. This ended many years of speculation about the future of the ship, but also started a new round of speculation about its new future in the PLA Navy fleet.

The 67,000 tonne ski jump CTOL aircraft carrier Varyag is a sister ship to Russia's Admiral Kuznetsov, the latter remaining in service and embarking an airwing of Su-27K/33 navalised Flankers, MiG-29K navalised Fulcrums, Kamov Ka-27PL Helix A ASW helicopters, Ka-29 Helix B assault/vertrep helicopters and Kamov Ka-31 Helix AEW&C helicopters, the latter equipped with the E-801 Oko surveillance radar. To date the dual seat Su-33KUB has not been embarked. These Izdeliye 1143.5 Orel Tyazholiy Avionosnyy Kreyser (TAKR) carriers are derived from the earlier 1143 Admiral Gorshkov design, the latter vessel recently acquired by India.

The Gorshkov/Varyag were designed for a comprehensive mission suite, and in addition to the offensive capability in the air wing carry a battery of twelve P-500/ SS-N-19 Shipwreck / Granit long range supersonic anti-shipping missiles. Defensive AAW capability is provided by the Klinok system, built around a large phased array radar, a battery of 24 Kinzhal Vertical Launch Systems with 192 9M-330/SA-N-9 Gauntlet SAMs rounds, eight CADS-N-1/Kortik terminal defence SAM launchers with 256 9M-311/SA-N-11 Grison SAM rounds, and eight 30 mm gun mounts. Other defensive systems include the UDAV-1 ASW and anti-torpedo system with ten barrels, designed to launch 111SG depth charges, 11SZ mines and 111SO anti-torpedo charges. The Gorhskov carried a mid/low band hull sonar, in addition to the ASW complement of the Ka-27PL detachment.

Construction of the Varyag started during the mid 1980s, but ceased with the collapse of Russia's defence budget in 1991, upon which the 70 per cent complete warship was transferred to the Ukraine. Estimates put the sunk investment in the Varyag at US$2.4 billion, with about US$0.5 billion remaining to complete the fitout. The partly stripped and ransacked Varyag was sold in 1998 for US$20 million to the Hong Kong based Chinluck (Holding) Co. Ltd, ostensibly for use as a floating casino, less engines, rudders and other hardware removed by black market scrap merchants while dormant at the Black Sea Nikolayev dockyard. After lengthy negotiations with Turkey, the new owners were finally allowed to tow the Varyag through the Bosphorus and Dardanelles in 2001, ostensibly to its new home in Macao. The Varyag however ended up moored at the Dalian naval shipyard, quietly rusting until this year.

In April, 2005, work crews were photographed on the deck of the Varyag, and shortly thereafter it was hauled into a naval drydock for a refit. There were no public announcements. Jane's Defence Weekly reported in August that the Varyag had been repainted in PLA Navy colours and markings. After years of neglect there is little doubt that the PLA has a major task ahead in refurbishing and rebuilding the vessel, and retrofitting missing equipment and systems. However, China has a robust shipbuilding industry and the only obstacles will be budgetary.

Whether the Varyag becomes a trials vessel and template for future indigenously built carriers, or is rebuilt into a fully operational warship, remains to be seen. It is unlikely the latter could materialise until 2010, given the effort required. As an established user of the Su-27SK/Su-30, any air wing on the Varyag will be equipped with Su-27K/33 and Su-27KUB Flankers.

After many years in limbo, China has moved the former Soviet carrier Varyag to a drydock for a major refit. At 67,000 tonnes this carrier is designed to embark Su-33 and Su-27KUB navalised Flankers.

The Su-27KUB is a specialised dual seat naval variant of the Su-27, intended for a wide range of roles including carrier conversion training (Sukhoi).

The Peace Mission 2005 exercise was an unprecedented collaboration between Russia and China. While presented as a peace enforcement exercise, the reality is that the exercise comprised blockade busting, air strike, and opposed amphibious assault components (Xinhua).

Peace Mission 2005 Joint Exercise between PLA and Russia

In August 2005 Russia and China conducted a major joint military exercise, Peace Mission 2005, in Shandong Province. This exercise is the first of its kind and elicited much comment in analysis circles. The decision to conduct the exercise was first announced in 2004, and presented as an opportunity for Russia to showcase its latest weapons and systems in a simulated combat environment.

The rhetoric surrounding the exercise put its purpose as peace enforcement and peacekeeping, which is very much at odds with the actual units and hardware active in the exercise. The scenario was described as an intervention to restore order in an imaginary nation experiencing unrest and ethnic conflict. General Colonel Vladimir Motenskoi, deputy commander of Russia's Infantry Troops, was quoted in MosNews.com: 'After receiving a mandate from the UN an operation to separate the conflicting sides and to establish order will begin.' Russian analyst Sergei Karamayev was sceptical, observing that 'Preventing a local conflict, just as the war against terrorism that was also mentioned by Russian military officials, doesn't exactly call for the use of TU-95 and TU-22M bombers. Instead, the Peace Mission's scenario looks more like a strategic landing operation against a well-fortified region that is occupied not by terrorists, but by a regular army of a presumptive foe. In other words, the military aims of the upcoming manoeuvres clearly contradict the propagandistic side, calling into mind the Cold War era.'

Whatever the rhetoric, the exercise involved the deployment of 10,000 troops, Russian strategic bombers and AWACS, a wide range or warships, plus amphibious forces.

The eight-day exercise had several phases. One involved a large air strike exercise, involving an A-50 AWACS, two Tu-95MS Bear bombers, four Tu-22M3 Backfire bombers, and eighteen PLA-AF Sukhoi fighters, followed by a drop of PLA and Russian paratroops and their vehicles. Another phase involved a 'blockade drill' during which the PLA-N deployed three destroyers, three frigates, two submarines and 20 aircraft, with the Russians contributing multiple A-50 AWACS, and two destroyers. This effort included air and missile strikes against would be hostile warships.

Of no less interest was the 'amphibious landing drill'. This phase involved air strikes against coastal missile and artillery batteries, supported by naval gunfire, followed by heliborne Special Forces insertion, and paratroop insertion using Il-76 Candid airlifters. The amphibious assault involved a PLA Marine battalion, a Russian Marine company with 40 amphibious armoured vehicles, supported by attack helicopters, followed by a second wave assault in which three landing craft delivered 32 armoured vehicles.

There can be little doubt that the Peace Mission 2005 exercise was a limited demonstration of offensive and power projection capabilities, and the intended audience being Taiwan, Japan and other regional nations.

China's Strategic Bomber Ambitions

While much of the discussion of the PLA's interest in strategic bombers has to date centred in analysis of various public statements and reports in the Russian media, earlier this year the first detailed analysis of the issue emerged from Chinese sources.

An analysis paper entitled 'China Needs Strategic Bombers To Penetrate "First Island Chain"', written by Dan Jie and Ju Lang, appeared in the PRC journal Zhengzhou Jiandai Wuqi. This paper starts with a discussion of Russian Air Force Chief of Staff General Vladimir Mikhailov's January statement indicating Russia's interest in selling surplus Backfires and Bears to China, follows with a historical survey of bomber technology through the Cold War, and then analyses in detail China's legacy capability in the H-6 fleet, and strategic need for Bears and Backfires.

The strategic analysis is of most interest as it defines a rationale for the use of the Bear and Backfire, positioning them in the PLA force structure. The paper outlines three primary roles to be performed by a PLA Bear and Backfire fleet.

The first is to perform nuclear deterrence in the manner of Russia's strategic bombers, projecting striking power to 4,000 NMI without aerial refuelling, or globally with aerial refuelling.

The second role is to perform 'non-nuclear deterrence' to defeat the 'island chain which the United States and Japan use to bottle up China', this referring to the Japan - Ryukyu - Phillipines - Singapore arc. The paper indicates the Bears and Backfires would be used to hold at risk targets along the 'second island chain', comprising the Aleutians - Guam - Australia - New Zealand arc.

The third role envisaged for the Bear and Backfire is sea control, intended to deter or defeat US Navy carrier forces in the region. The paper specifically refers to Soviet AV-MF style technique: 'these bombers can launch saturation attacks from a commanding height with a large number of long-range anti-ship missiles. If China had these two types of strategic bombers [Bear and Backfire], US aircraft carrier battle groups would have to consider their situation carefully before entering China's coastal waters'.

Given how tightly all formal publications in the PRC are regulated, there is little doubt that this paper has its origins in the PLA analysis community. Its importance lies in the fact that it articulates a well thought out and viable strategic role for a Chinese Bear and Backfire fleet.

This year has seen the PLA articulate a coherent strategic argument and doctrine to justify the acquisition of former Russian Bear H and Backfire C bombers. The strategic model includes the capability to strike 'second island chain' targets including Australia (Russian AF)

PLAAF Flanker Build converted to Su-27SMK

The PLA-AF recently renegotiated the terms of its licence production agreement for Su-27 Flanker fighters. When originally agreed, the arrangement was for the Chinese to partly licence produce and assemble two hundred Su-27SK Flanker B fighters at a Chinese plant. These aircraft were the baseline Soviet PVO and Frontal Aviation variant, providing full air to air capabilities with R-73, R-27, R-77 missiles, but with limited strike capabilities. The baseline Su-27SK can deliver a wide range of unguided munitions, but lacks the smart pylons, weapon system interfaces, cockpit displays and other design features required for the delivery of smart weapons. Effectively the Su-27SK has strike capabilities comparable to the F-15A and F-15C, but not the F-15E or Su-30MK. This limitation of the Su-27SK has been frequently raised by critics of US and Western air power modernisation.

The Su-27SMK (Seriyniy Modernizirovanyy Kommercheskiy) program was launch by KnAAPO during the early 1990s to provide an upgrade path for the Su-27SK, and a cheaper precision strike capable variant compared to the Su-35 and Su-30MK series. The prototype first flew in 1995 but the aircraft missed the first wave of Flanker exports, and was displaced by dual seat Su-30MKs in the second wave of exports.

The Su-27SMK is much more capable than its baseline predecessor. The aircraft adopts the 12-pylon configuration of the Su-30/35, has a 33 per cent greater payload at 17,660 lb, and is fitted with the aerial refuelling probe and floodlights used in the Su-30/35. Unlike earlier Flankers, the Su-27SMK has wing and fuselage stations plumbed for 3,500 lb (2,000L) drop tanks.

China will be the first user of the substantially upgraded multirole Su-27SMK Flanker. This single seat variant provides all of the basic strike capabilities to date inherent only in types like the Su-30MK and F-15E (Sukhoi).

The avionic suite has been comprehensively upgraded and includes a datalink and, according to Russian sources, an internal defensive jammer (the Su-27SK carries external Sorbstiya jammer pods). An enhanced variant of the N-001 multimode radar is used, with additional air-to-ground capabilities. The 'steam-gauge' cockpit is replaced with glass, using three flat panels and a modern HUD.

The guided weapons package available to the Su-27SMK mirrors the dual seat Su-30MK variants, and includes up to six Kh-29TD ASMs, up to six Kh-29L and S-25LD laser guided ASMs, up to four Kh-31P Krypton anti-radiation missiles, up to four Kh-25PD ASMs, or a pair of Kh-59M standoff missiles. The KAB-500 and KAB-1500 TV/IR, laser and GPS/inertial guided smart bombs can be carried.

In simple terms, the Su-27SMK is equivalent to a single-seat derivative of the F-15E or Su-30MK, with full multirole capability.

The terms of the revised Chinese production agreement will see the final 200 aircraft in the current build delivered in Su-27SMK configuration. There have been no disclosures on whether existing Su-27SK/J-11 airframes will be also upgraded to the SMK configuration.

US posture in the Pacific Rim

While most of the visible activity across the region has been associated with Russian arms industry clientele, the US have also been actively upgrading their regional infrastructure.

By far the most notable development was the launch of the General George C. Kenney Headquarters, Pacific Air Forces, sited at Hickam AFB in Hawaii. This new entity was established to '... serve as the premier joint forces air and space command and control organization with a standing 24/7 air operations center to serve both the PACAF commander and the commander (of) United States Pacific Command'.

General Paul V Hester, Commander, PACAF, observed during a briefing at the launch that 'The (headquarters) will arm the Pacific with a fulltime, standing coalition/joint force air and space component commander who is also prepared to command any joint task force, when tasked. It provides a network-centric approach to operations that includes the fusion of globally connected air and space operations centers with intelligence, surveillance, reconnaissance and strike capabilities for real-time visibility and precision execution of all contingency and deliberately planned operations.'

The need for a permanent and full time headquarters element for PACAF emerged as a result of an increasingly strategically active region. Andersen AFB on Guam is undergoing increased investment in infrastructure, estimated last year at US$1-2 billion over the next five years. Situated in the Marianas, just south of more famous Tinian, Guam became a key hub during the Cold War and a key operating base during the Vietnam War, hosting SAC B-52 bombers involved in combat operations for many years. The latest upgrades include improvements to the operating surfaces. The existing 11,200 ft 24/6 parallel runways are among the largest in the Pacrim.

In recent years the operational tempo at Guam has increased, and the base now hosts regular deployments of B-2A, B-52H and B-1B bombers. Guam hosts the single largest US Air Force fuel supply on US territory, and the largest munitions store in the Pacrim. In July this year Guam hosted the Cope North exercise, with 12 US Air Force F-15Es and a JASDF detachment of 10 F-4EJ Kais and two E-2C Hawkeyes from Misawa Air Base, Japan.

Lyulka/Rybinsk AI-41F supersonic cruise engine enters production

This year has been an important milestone for Russia's engine industry, with Low Rate Initial Production of the Lyulka/Rybinsk AI-41F engine initiated.

The AI-41F is Russia's equivalent to the F119-PW-100 engine carried by the F/A-22A, designed from the outset for the supersonic cruise regime.

The AI-41F program was launched in 1985, and the first protoype engine flew in a Tu-16 Badger testbed in 1990. Prototype engines delivered 39,600 lbf (176 kN) of wet thrust, with 45,000 lbf (200 kN) a design target for the engine.

Initially, the engine in the MiG I.42/I.44 MFI (Mnogo-Funktsioniyy Istrebitel') fighter, Russia's answer to the F/A-22A, was to be used. The engine was also to equip the Su-34 Fullback, providing higher thrust rating to the AI-31F in other Flanker derivatives. With the collapse of the MFI effort, Flanker derivatives are now the target market for the AI-41F. The first LRIP engines will be fitted to LRIP Su-34 Fullback aircraft destined for the Russian air force.

Of particular interest is that the AI-41F was designed around the form factor of the AI-31F

This year marked a milestone for Russian industry with the low rate initial production of the AI-41F supersonic cruise engine (Lyulka/RuMoD).

series, and thus is a relatively cheap engine to retrofit. Reports emerged this year that an Su-27S was retrofitted in 2004 with a derated AI-41F for flight trials.

As the Su-34 Fullback is the only production type currently planned to use the AI-41F, Lyulka/Rybinsk will be under significant pressure to export the engine for use on the Su-27/30 series fighters. With suitable low drag external payloads, this raises the prospect of supercruising export Flankers appaearing in the market over the next few years.