by Carlo Kopp

Ongoing sales of the Su-30 Flanker family of long range fighters in the region are progressively changing the strategic landscape. This will have a profound long term impact across the region as the baseline in regional airpower capabilities rises. Part 2 of this feature explores some of the longer term issues.

Su-30 vs RAAF ALTERNATIVES

Many readers will be asking the obvious question of how the Sukhois stack up against the F/A-18A HUG, the F-35 JSF and possible interim fighters such as the F/A-18E/F.

Against all three types the Su-30 derivatives, especially with later engine subtypes, will always have a significant kinematic advantage – there is no substitute for thrust in the kinematic performance game. There is another factor to consider here, which is the superlative 10 tonnes of internal drag free fuel the Sukhoi carries. When not operating at extended combat radii, the Sukhoi driver has more fuel to convert into energy, and that energy can nearly always be used to an advantage.

With mutually competitive WVR missiles and Helmet Mounted Sights/Displays for close-in combat, all three types will live or die in a close in engagement with an advanced Su-30MK variant by pilot ability and good or bad luck. The Sukhoi combines high alpha manoeuvre capabilities with excellent thrust/weight performance, and is apt to have an energy advantage entering and prosecuting a close-in fight. A JSF driver opting to engage a thrust vectoring late model Su-30MK in a knife fight may not survive to speak of the experience, unless the Sukhoi driver is unable to exploit his advantage properly.

In close-in air combat terms the JSF qualifies as 'double inferior' against the later model Sukhois, since the Sukhois have an advantage in both thrust/weight ratio and in wing loading (interested readers refer R.L. Shaw's *Fighter Combat*), and with its canard and thrust vectoring capability will generally be able to gain a firing solution quicker. Because the JSF is designed within the kinematic performance class of the F/A-18 and F-16, it is right in the middle of the performance envelope of aircraft the Sukhoi was designed to kill.

In Beyond Visual Range (BVR) combat, the Sukhoi will again have a kinematic advantage, which may be exploitable at the bounds of engagement radii, as the Sukhoi can gain separation in and out of the missile envelope of the F/A-18's and JSF's faster – it has the extra thrust and combat fuel to play kinematic games both smaller fighters cannot.

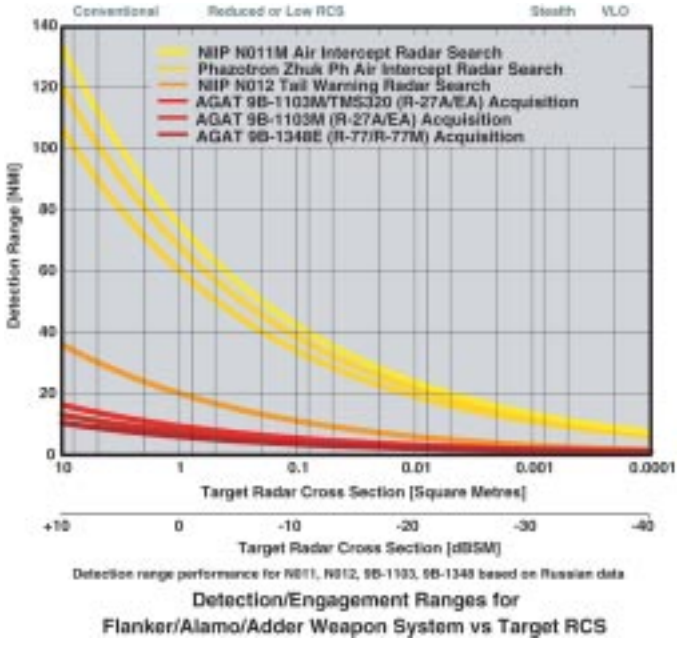
The BVR game is however dominated by sensor capabilities, both onboard and offboard the fighters, and long range missile capabilities. The F/A-18A HUG is wholly outclassed by an Su-30MK with an N011M phased array and R-77M ramjet missile. A late model F/A-18E with minimal external stores and the APG-79 AESA fares much better due to its radar signature reduction measures and better radar power aperture performance, but with external stores its margin of survivability is eroded and it is likely to fall well within the engagement envelope of the Sukhoi and also come to grief (refer radar/missile plot). A post 2010 AESA equipped Sukhoi could almost certainly take on the F/A-18E with confidence as it will have much better power aperture capability in the radar, enough to offset the radar signature reduction measures in the F/A-18E/F, with an advanced IRST to supplement radar data.

A clean JSF will have the advantage of a very low Xband radar signature in the forward quarter which will significantly degrade the Sukhoi's otherwise overwhelming radar power-aperture advantage over other types. However, the JSF is not designed to be a hot supersonic performer and like the F/A-18s will need to generously use afterburner to effect an intercept against a rapidly penetrating Sukhoi.

This exposes the JSF to detection and tracking by a newer technology IRST, and engagement by long burn heatseeking or optically guided AAMs such as the R-27ET, R-77T or likely future variants with imaging seekers analogous to the AIM-9R and ASRAAM seekers. With the latter seekers an R-77/R-77M acquires many of the capabilities of the RAAF's superlative ASRAAM, especially jam resistance, but in a long range missile with datalink midcourse guidance. A new two-colour infrared seeker with 10.8nm (20km) acquisition range has been announced by the Arsenal infrared systems house, ostensibly for use on the R-77 series. Professionals might contemplate that these are not 1980s 36T series seekers.

Russia and the Ukraine have a competent infrared systems industry – eg Cyclone JSC recently described its QWIP single chip thermal imagers with 128x128 and 320x256 resolution, competitive against the latest EU technology and suitable for missile seekers and thermal imaging IRST detectors. Therefore an advanced derivative of the OLS-30/31 series with capabilities similar to the Eurofighter PIRATE thermal imaging IRST, but with better detection range, will be implementable with Russian hardware in three to five years given the current rate of evolution.

In the beam and aft sectors the JSF may also be quite vulnerable to an active or semiactive radar guided missile shot – its beam and aft sector radar signature reduction is



The NIIP N011M phased array is the most capable fighter radar produced by Russian industry and is designed to support the R-77M family of ramjet missiles. The depicted detection range curves are based on publicly disclosed Russian performance figures for co-altitude BVR engagements. It is evident that inside the 10-20 nautical miles envelope the radar will be able to challenge aircraft with quite good stealth characteristics. The curves for the Agat 9B-1103M and 9B-1348E seekers are based on the most recent Agat data release, and include the TMS320 equipped digital variant. The 9B-1101K has not been included (Author – NIIP, Phazotron, Agat data).

much less refined than that in the forward sector. Another factor for the JSF is its radar emission – making it vulnerable to a long range shot with an anti-radiation seeker equipped R-27P, R-27EP, R-77P or when eventually deployed, ramjet R-77MP. While some Low Probability of Intercept (LPI) techniques may reduce vulnerability to anti-radiation missiles, radar modes for closing missile shots typically require high update rates and favour the anti-radiation seeker. Since the R-77/R-77M has a midcourse inertial package – Agat is developing FOG (fibre) gyro technology to avoid dependency on Western Ring Laser Gyro technology – transient loss of the JSF radar emission may not defeat the R-77P/R-77MP – or late model R-27P/EP.

Soviet and more recent Russian BVR doctrine has always emphasised firing pairs of missiles, one with heatseeking guidance and one with radar guidance, to defeat countermeasures. With the option of active radar, heatseeking and anti-radiation seekers, and by the end of the decade an imaging seeker, the result is a very lethal cocktail from a defensive countermeasures perspective – a defending fighter may only have datalink transmissions to provide warning and no indication of the seeker mix on the inbound missiles. With three of the four seeker technologies passive defeating such weapons is not trivial.

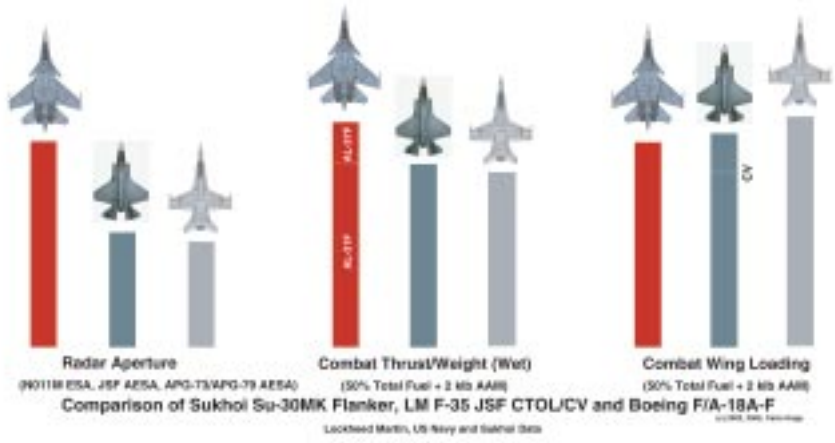
On publicly available data the JSF is likely to be detected and engaged by an N011M ESA equipped Su-30 inside the 10 to 20nm (19 to 37km) head on range envelope, unless the JSF can get the first shot off and successfully kill the Sukhoi. If the Sukhoi can close with the JSF, all bets are off on the JSF's ability to survive the close in engagement.

But will the use of the Wedgetail AEW&C to provide offboard targeting for the JSF provide a decisive advantage over the Sukhois, will 'Network Centric Warfare' offset all other deficiencies in the force structure and platform capabilities? This argument is clearly contingent upon a great many 'ifs' – if the Sukhois do not shoot very long range missiles at the Wedgetail to force it to shut down or indeed kill it, if the Wedgetail MESA is not jammed, if the JTIDS/MIDS or other datalinks to the fighters are not jammed, if the Sukhois are not carrying advanced IRSTs or X-band homing receivers, and if the Sukhois are not supported by HF or low VHF band radars.

If a JSF were deployed today with a supporting Wedgetail and existing Su-30 capabilities, then the argument probably holds most of the time. However, in a post 2010 environment it is most likely not going to hold up most of the time. If Iraq could acquire smuggled Russian GPS jammers during a UN arms embargo, there is no guarantee that equipment like high power L-band jammers, advanced IRST, ESM receivers, long range ramjet powered anti-radiation missiles and low band radars will not proliferate into the region – the Kh-31R has been already reported in use with the PLA-AF. Given the mistrust of the US and its allies we see in many regional players, be it the PRC or lesser nations, the odds are very good that the existing

Notes: O/B – seeker off-boresight acquisition angle; IRH – heatseeking, single or dual colour scanning seeker; SARH – semi-active radar homing seeker; DL – datalink for midcourse guidance corrections – either analogue or digital; IMU – inertial package for midcourse guidance; Passive RF – passive radio frequency anti-radiation seeker; ARH – active radar homing seeker; Acquisition Range is that at which the seeker can acquire its target; Kinematic Range is A-pole or F-pole; Target G – max load factor of target vehicle; Launch G – max load factor of launch aircraft; APU – Aviatsionnaya Puskovaya Ustanovka (rail launcher); AKU – Aviatsionnaya Katapultnaya Ustanovka (ejector); This is a current open source compilation based on manufacturers' and third party data therefore figures should be treated with appropriate caution (Author).

Type	Seeker	Model	Acquisition Range	Kinematic Range	O/B	Target G	Launch G	Length	Dia	Weight	Adaptor
Units	-	-	[NMI]	[NMI]	[deg]	[G]	[G]	[in]	[in]	[lb]	-
R-73	IRH	MK-80	5.4-8.0	16	45	12	8	114.2	7.0	232	APU-73
R-73M	IRH	MK-80M	8.0	21	60	12	8	114.2	7.0	232	APU-73
R-73R	IRH	MK-80M	8.0	5.4-6.5	60	12	8	126.0	7.0	253	APU-73
R-73E	IRH	MK-80E	8.0	16	75	12	8	114.2	7.0	232	APU-73
R-74ME	IRH	MK-80ME	8.0	21	75	12	8	114.2	7.0	232	APU-73
R-27R1	SARH/DL/IMU	9B-1101K	~16.0	43.2	-	8	5	157.5	9.0	560	AKU/APU-470
R-27T1	IRH	MK-80/M	5.4-8.0	38.9	45/60	8	5	145.7	9.0	561	AKU/APU-470
R-27P	Passive RF	9B-1032	-	38.9	-	8	5	157.5	9.0	560	AKU/APU-470
R-27A	ARH/DL/IMU	9B-1103M	10.8-13.5	43.2	-	8	5	157.5	9.0	560	AKU/APU-470
R-27ER1	SARH/DL/IMU	9B-1101K	~16.0	70.2	-	8	5	185.0	9.0	773	AKU/APU-470
R-27ET1	IRH	MK-80/M	5.4-8.0	64.8	45/60	8	5	177.2	9.0	753	AKU/APU-470
R-27EP	Passive RF	9B-1032	-	64.8	-	8	5	185.0	9.0	773	AKU/APU-470
R-27EA	ARH/DL/IMU	9B-1103M	10.8-13.5	70.2	-	8	5	185.0	9.0	773	AKU/APU-470
R-77	ARH/DL/IMU	9B-1348E	8.6	54.0	-	12	8	141.7	7.9	386.3	AAKU/AKU-170
R-77T	IRH/DL/IMU	MK-80M	8.0	54.0	60	12	8	141.7	7.9	386.3	AAKU/AKU-170
R-77P	Passive RF	9B-1032	-	54.0	-	12	8	141.7	7.9	386.3	AAKU/AKU-170
R-77M	ARH/DL/IMU	9B-1348E	8.6	86.5	-	12	8	145.7	7.9	496.7	AAKU/AKU-170
Kh-31R	Passive RF	L-111E	-	59.4	N/A	N/A	N/A	185.0	14.2	1324.5	AKU-58
Kh-31RA	ARH/Passive RF	-/L-111E	~10.0/-	59.4	N/A	N/A	N/A	185.0	14.2	1324.5	AKU-58
K5-172	ARH/DL/IMU	-	-	215.0	N/A	N/A	N/A	291.3	20.0	1656.0	-



This chart compares some cardinal design parameters for the Su-30MK series, the JSF and the F/A-18 family, using manufacturer's data. The effective wing loading of the Su-30 is better than depicted, since the aircraft's configuration delivers a considerable amount of body lift. While in the near term the AESAs in the JSF and F/A-18E/F will be competitive, in the longer term the retrofit of AESA technology in the N011M series radar will see the advantage in power aperture go to the Sukhoi – both the JSF and F/A-18E/F are aperture size and cooling capacity limited in growing AESA performance (Author).

trend will persist and the most advanced Russian hardware, and indigenous equipment, will be widely used. While this will not put a dent into the US Air Force's stealthy supercruising F/A-22A fleet, it is likely to make life very difficult for the USN with a planned force structure of F/A-18E/Fs and JSFs. If the RAAF opts for the JSF as its single type solution it is likely to experience similar grief.

In the long term the Russians will find a growing market for 'Counter-ISR' (ISR - Intelligence, Surveillence, Reconnaissance) weapons – the 215nm (398km) KS-172, 160nm (296km) R-37 and 60nm (111km) Kh-31 series. In any engagement against a western air force, the first wave of Sukhois would shoot long range 'AWACS-killer' weapons such as the KS-172, R-37, Kh-31 – or types as yet unknown – to either destroy the AEW&C/AWACS or force it to shut down and retreat – the 'AWACS-killer' theme is frequently seen in Russian marketing literature and statements.

The result is that forward defending CAPs have to then light up their radars to attempt to function autonomously – in turn making them vulnerable to detection by ESM and shots by anti-radiation missiles like the R-27EP or R-77P/MP. This Russian doctrine of a deluge of long range missiles is not new – it is a variation on their proven theme of attacking naval task forces with long range missiles. It is an evolutionary adaptation to the growing dependency of western air forces on large and vulnerable ISR platforms – the E-3 AWACS, RC-135V/W Rivet Joint, E-8 JSTARS, E-10 MC2A and of course the RAAF's new Wedgetail.

The reality is that of an evolving technological landscape in which advanced conventional weapons and supporting technologies proliferate often very rapidly. The rate of Su-30 uptake in the region is a good case study – any nation with the cash can acquire very quickly large numbers of top-tier combat aircraft often with the latest western avionics and Russian weapons and sensors fitted.

STRATEGIC IMPACT OF Su-30 IN THE REGION

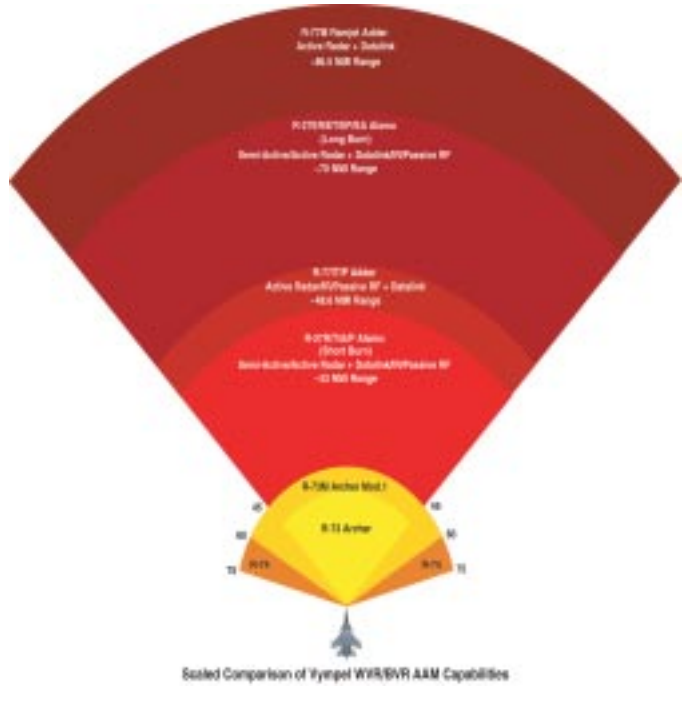
We have yet to see the full strategic impact of the Su-30 proliferating in the nearer and wider region. India and China will not have most of their Sukhoi force structures deployed until 2015 or later, and it is unclear how many Sukhois both Malaysia and Indonesia will ultimately operate.

In the near term, both Indonesia and China will have difficulties with fully exploiting the aircraft as they have steep learning curves to climb in training and support – India and Malaysia are apt to fare much better with western based training systems. We can expect to see regional users of the Su-30 maturing their capabilities to use the aircraft in the latter part of this decade. Much has been said about China's difficulties in recruiting and training competent Sukhoi drivers – with a population base of over a billion it is however only a matter of time before they learn to do this properly.

Much has been made of the serviceability and support problems experienced by the IAF and the PLA-AF with their initial Sukhoi aircraft, indeed the Indian government audit public report lists a litany of contractual problems and Su-30K/MK servicabilities as low as 50%. These problems should be seen in the proper context as they represent the transient state experienced when introducing a radically new piece of technology and supporting systems. The Sukhois are a generation beyond the MiG-29s flown by the IAF and two generations ahead of the 1950s technology which makes up the backbone of the PLA-AF.

With HAL and Shenyang to perform domestic assembly and part production, in time both nations will have the ability to domestically manufacture high failure rate components, and perform factory/depot deep overhauls. As a result what we see now in the support base for the aircraft will not persist and should not be used as an indicator of the long term supportability of the aircraft. With large fleet sizes even a large proportion of grounded aircraft still leaves strategically significant numbers to cause mayhem with.

Another factor in time will be the availability of third party Indian and Chinese made spares to other Sukhoi users in the region. Bottlenecks in the supply of Russian made spares may not persist past 2010 since the commercial incentives to bypass Russian suppliers are considerable – and many regional Sukhois will use substantial fractions of western avionics hardware. In time we can expect to see more bilateral deals, of the ilk seen between India and Malaysia for MiG-29 support, emerging between regional play-



ers and this will change the support environment seen by smaller regional users of the aircraft.

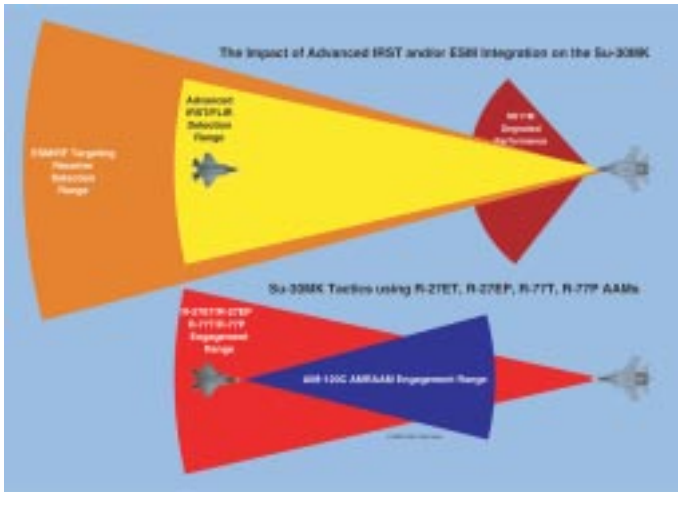
With four sources of spare component supply rather than one – Irkut, KNAAPO, HAL and Shenyang lines and subcontractor pools – market forces will have their impact. To assume that historical case studies of Russian aircraft support will be representative of the longer term future in this region is arguably to misunderstand the developing dynamic across the region. The era of Cold War technology monopolies is long gone – only the US can sustain such due to its commanding lead in stealth, propulsion and computing technologies. This model is not a valid one for assessing the longer term regional situation in Russian and third party hardware.

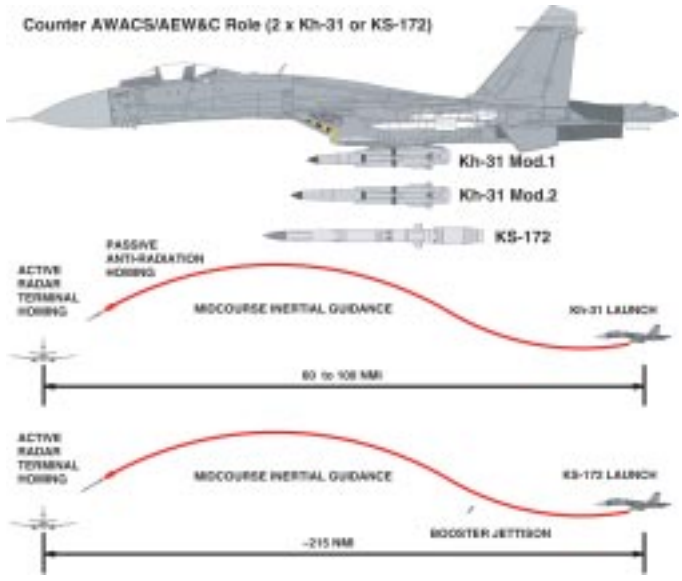
The Su-30s are 'honest' 700+ nm (1300+km) radius class fighters, with plenty of combat gas to burn at shorter radii. This provides all of the Sukhoi operators with a much larger air defence footprint than we have ever seen before. India is now taking delivery of its six Il-78 Midas tankers and will be able to robustly project its Sukhoi force well beyond its borders – China has had a long standing interest in tanking but no firm orders are reported as yet.

Even without a proper tanking capability, lesser regional players have the option of buddy refuelling Su-30s with the UPAZ hose/drogue pod – at the expense of half of the force committed to tanking sorties. On a buddy refuelling sortie the shooter gains around 200-250nm (370-464km) of radius – yielding a radius very close to 1000nm (1850km). With a 200nm (370km) class standoff missile such as a 3M-54E or Kh-41 variant, both advertised on Sukhois, this provides a limited strike capability beyond a 1000nm (1850km) radius. While such a strike refuelling technique is not viable for sustained high intensity operations, it is feasible for nasty pinprick raids against very high value assets, such as airfields, petrochemical/gas plants, shipping, aircraft carriers and other targets, the destruction of which could be highly politically embarrassing to the victim.

What this means in practical terms is that Su-30 users will have the potential to contest airspace up to 500nm (925km) or further from their runways, and launch limited strikes out to around a 1000nm (1850km) radius. While the latter is not the kind of heavy iron 1000nm (1850km) radius capability Australia possesses in its F-111 fleet, it is nevertheless enough capability to cause considerable mayhem, if used cleverly.

What happens when the existing OLS-27/30/31 series IRST is replaced with a newer longwave Focal Plane Array device – such as a single chip QWIP device? The result will be a capability to engage opposing aircraft under clear sky conditions regardless of RCS reduction measures. While the supercruising F/A-22A can defeat such techniques by kinematics alone, fighters in the teen series performance envelope will have to contend with BVR shots using the R-27ET, R-77, R-77T and R-77M cued by the thermal imaging search and track set. Similar issues arise with the deployment of modern ESM receivers on the Su-30MK, analogous to a number of existing Western systems. The Su-30MK series can then launch long range BVR missiles such as the R-27ET, R-77T with infrared seekers, or the R-27EP and R-77P with passive radio-frequency anti-radiation seekers. If cued by such sensors or offboard sources, these weapons will permit the Su-30MK to engage the JSF despite the JSF's good forward sector radar stealth performance (Author).





Recent overseas reports claim the existence of an enhanced variant of the Kh-31R, which combines an active radar seeker with passive anti-radiation homing. This weapon is specifically built to kill AEW&C aircraft – if the AEW&C aircraft shuts off its radar, the missile switches to active radar terminal homing. The weapon is credited with a standoff range of around 60 to 100 nautical miles. The Novator KS-172 is a 200+ nautical mile range active radar guided missile, also intended to kill AWACS and AEW&C aircraft, and promoted on Sukhoi fighters. Such 'Counter ISR' weapons have evolved in response to overwhelming Western superiority in ISR systems (Author).

In the longer term the Sukhoi will have several strategic effects. The first is that it will provide its users with the ability to threaten or intimidate neighbours with lesser capabilities, if they fall within the footprint of the Sukhoi. The second is that the US Navy's carrier battle groups will lose much of their ability to intimidate by gunboat diplomacy – the ability to threaten a CVBG with a mixed package of shooter and escort Su-27/30s to radii essentially greater than that of the F/A-18E/F and JSF mix on a carrier deck drives up the risk for the US Navy in a nasty political stand-off. Unless the US is prepared to take the gloves off early in a dispute and deploy the F/A-22A centric US Air Force Global Strike Task Force, the US Navy may cease to be a viable tool for coercive diplomacy.

Even for the US Air Force the Su-30 presents some interesting challenges, since it has the radius to threaten both tankers and large ISR platforms in a shooting contest. While the F/A-22A would deal with the Sukhois quickly and effectively, in many scenarios the Sukhois could create genuine complications by forcing a relatively high ratio of F/A-22A escort sorties to F/A-22A strike sorties, thus diminishing the strike sortie rate – a major issue for the dual role tasked F/A-22A fleet.

Another factor to consider is the ongoing proliferation of advanced guided munitions and other hardware produced by competing Russian vendors. Just as we have seen Irkut and KNAAPO competing in the sales of Sukhois, we have seen a wide range of Russian weapon makers like Vympel, Zvezda, Raduga and others selling their products across the accessible market. Many of these products incorporate modern western digital COTS technology, an example being the upgraded second generation 9B-1103M active radar seeker for the Vympel R-27A/EA missile, which is built around a Texas Instruments TMS320C44 digital signal processor chip and achieves a 25% acquisition range improvement over the baseline seeker, derived from the R-77's first generation 9B-1348E – a second gen-

eration '9B-1348ME' will almost certainly carry the same TMS320C44 digital signal processor.

Some of the air-surface weapons being offered for the Sukhois are genuinely capable. The Raduga Kh-41 Moskit (3M-80/82 SS-N-22 Sunburn) has been integrated on the Sukhois' centreline station (refer AA 9/2000) and is considered to be one of the most lethal supersonic sea skimming anti-ship weapons in existence. The NPO Soyuz/Turayevo TKMB ramjet powered Mach 4 class Zvezda-Strela Kh-31 (AS-17 Krypton) is offered on Sukhoi variants, both in the active radar anti-shipping A model (PLA-N) and anti-radiation R model (PLA-AF). The latest advertised Kh-31 variant includes a dual mode air-air seeker, incorporating an active radar seeker and passive anti-radiation seeker, optimised for engaging 'non-maneuvering airborne targets such as AWACS' out to 100 nautical miles. Both the supersonic OKB-52 P-800/3K-55/3M-55/Kh-61 Yakhont (SS-N-26) and Novator 3M-54 Alfa (SS-N-27) have been publicly discussed as options for the Sukhoi fighters, especially the Su-34 series, but it is unclear whether any integration work has taken place to date.

For strikes against land targets, the 1500lb class Molniya Kh-29 (AS-14 Kedge) is available in television (Kh-29T), thermal imaging contrast lock homing (Kh-29D) and semi-active laser homing (Kh-29L) variants – the weapon is a direct equivalent to the very effective French Aerospatiale AS.30 series, with the television and thermal imaging guided variant seeker equivalent to the AGM-65 Maverick series. The smaller semi-active laser homing S-25LD and Zvezda Kh-25ML (AS-12 Kegler) are also on offer. An equivalent to the RAAF's AGM-142 is available in the 2000lb class 50nm (93km) range turbojet sustained Raduga Kh-59M (AS-18 Kazoo), which uses a conceptually similar TV/datalink guidance scheme, using an APK-9 Tekon datalink guidance pod carried on the left inlet pylon. An anti-radiation variant, the Kh-59 (AS-13 Kingbolt) is available but has not been advertised on the Sukhoi – the newer Kh-31R series appearing to be favoured by the market.

The Russians are also actively marketing guided bomb kits for the Sukhoi fighters. The KAB-500L is a direct equivalent to the GBU-16 using the 27N series laser seeker, the KAB-500Kr is equivalent to a TV contrast lock guided 1000lb GBU-8 HOBOS fitted with a bunker busting or fuel air explosive warhead. The KAB-1500 is a family of guidance kits for 3000lb class dumb bombs, available with unitary or bunker busting warheads. The KAB-1500L is a semi-active laser homing kit, the KAB-1500TK a TV command link guided kit

Su-27/30/35 FLANKER CAPABILITY GROWTH

Su-30MKK vs Su-30MKI Crew Stations (KNAAPO/Irkut)

analogous to the GBU-15 but 50% bigger, and the KAB-1500Kr a TV contrast lock guided system. Either three of the 1500kg weapons, or six of the 500kg weapons can be carried by an Su-27/30 with suitable avionics.

To date most regional users have invested in Sukhois primarily to provide air superiority capabilities. The availability of a wide range of competitively priced Russian guided weapons is likely to result over time in an increasing broadening of the role of regional Sukhoi fleets. The principal impediment to the wider use of Russian laser guided bombs has been a shortage of good targeting pods – with suitable laser coding modifications third party pods are likely to evolve to fill this niche over the next decade. The impact of the US GBU-12 in Afghanistan and Iraq will not have gone unnoticed.

The television guided KAB-500Kr and KAB-1500Kr kits are also worth closer scrutiny, since they provide a fire-and-forget capability very similar to the long retired GBU-8, or a GBU-15 used in lock-on-before-launch mode – highly accurate and devoid of the need for a targeting pod. With the potential for a pre-programmed scene matching correlation capability (ie pre-loading the bomb with a digitised target image not unlike the early Tomahawk DSMAC), a technology the Russians do have, this presents the prospect of a 'JDAM-like' capability to attack multiple aimpoints on a single pass, albeit daylight limited. The large volume of the KAB series seekers would easily permit a lot of evolutionary growth in the design, and low cost commodity processing chips and QWIP thermal imagers would facilitate this. It is likely that we will see more of this family of bomb seekers in time.

Russian sources claim China has ordered the Kh-59ME standoff missile, the Kh-29T TV guided missile, the Kh-31R anti-radiation missile, and the KAB-500Kr electro-optically guided bomb kit. PLA-AF Su-27SKs have been seen carrying paired KNIRTI L005-S Sorbtsya wingtip jammer pods designed to defeat the APG-63/65/68/70/73 radars and Hawk/Patriot SAM systems.

CONCLUSIONS

For Australia the Su-30 presents the prospect of a more difficult to defend sea-air gap. While we might choose to argue ad nauseam as to whether a future Indonesian regime might opt to get into a fight with Australia, or debate the likelihood of PLA-AF Sukhois being based in the northern approaches at a future date, or debate India's future role in the near region, the stark reality is that the tyranny of distance which has protected Australia for decades is being rapidly eroded by developing capabilities across the region.

In this context the JSF decision last year, and ongoing lobbying for F/A-18E/F interim fighters, seem both to be quite incongruous. Neither aircraft offers a decisive capability margin against the Su-30 series, especially longer

term as the sensors, avionics and weapons evolve in the Sukhois and regional players possibly acquire AEW&C aircraft and other supporting capabilities.

Indeed, one idea popular in some Canberra circles seems to be that the RAAF is now less needed and should be downsized to save money since Indonesia is in a state of chaos and all the RAAF is needed to do is participate in the odd US coalition force – of course if anything goes really bad in our neighbourhood the US will instantly assist!

This is a particularly lame argument insofar as the US Air Force is already badly stretched with worldwide commitments, and is having genuine difficulties with a poorly ageing tanker and fighter fleet – in a crisis the US may not be in the position to deploy sufficient assets quickly enough, even if the then incumbent US administration wants to do so. There is of course no guarantee that a future US leadership group will have the kind of relationship with Australia which we observe today.

The Americans may not solve their block obsolescence problems until later in the next decade, leaving a genuine window of strategic vulnerability should the more vocal proponents of RAAF capability reduction have their way in Canberra.

The belief in some Canberra circles that the JSF will somehow solve all of the RAAF's force structure problems does not stand up to scrutiny, in the light of the known capabilities and demonstrated growth potential of the Sukhoi Su-30 which is rapidly becoming the 'standard' fighter across the region. Similarly the belief that interim fighters will somehow address the capability gap in the F/A-18A HUG fleet is hard to accept. The belief that the F-111's heavyweight counter-air strike capability is now irrelevant also conflicts with the reality that the best way to fight an Su-30 without an F/A-22A is to shut down its basing from day one of a conflict – and if possible convert the Sukhois to scrap metal in situ – neither achievable with a handful of standoff missile shots.

Strategy has always been a game of positional advantage, and in the modern age this positional advantage lies largely in airpower. If Australia is to retain its relative strategic position in the region it must start thinking realistically about its long term force structure and abandon the quick fix panacea solution mindset which seems to be so prominent in the current Canberra defence debate. There are no quick or cheap fixes in this game.

BOOK REVIEW

Su-27 Flanker Story

by Andrei Fomin

Andrei Fomin's 300 plus page *Su-27 Flanker Story* (translated by Yevgeniy Ozhogin) is by far the best single technical and historical reference text on Sukhoi's T-10 family of fighters, strike fighters and bombers. Making excellent use of access to and direct support from the Sukhoi Bureau, KNAAPO, IAPO and the Russian Air Force, Fomin's glossy reference book provides a comprehensive insight into the history of the aircraft, including its early development, and provides often remarkably detailed descriptions of the various variants and offshoots.

With a reference bibliography of 95 titles, 60 colour profiles, 18 pages of precise scale line drawings, numerous four page wide foldout illustrations and cutaways, and a plethora of mostly colour photographs, the book is by far the most complete and detailed open source reference to date. While the book is a little short on hard technical specifications and detail in places, it makes up for this in its sheer breadth and completeness of coverage, which includes all variants up to the Su-30MKI and Su-30MKK, but excluding the Su-30KN.

The text includes chapters covering development history, production, navalised variants, the Su-35/37 derivatives, operational use, and a chapter surveying air-to-air and air-to-ground munitions carried by the Flanker family. Fomin's text should be not only of interest to a traditional market of enthusiasts, modellers, and lay observers - it is by any measure a good enough basic reference for defence professionals in this country. This reviewer can thoroughly recommend this title to any military aerospace professional with an interest in regional air power.

Su-27 Flanker is published by RA Intervestnik of Moscow, www.airfleet.ru.

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