



*Empty promise? Su-27Ms have been stars of many air shows, but none is any closer to air force service*

fly around ten Su-27M prototypes in various guises. The first aircraft, number 701, is now at the Monino museum – but the Su-27M appears to be nowhere near an in-service date with the air force. Many other Su-27M prototypes have been under test at the air force's trials centre at Ahktubinsk since around the turn of the decade, and several have also become stalwarts of the international air show circuit.

None of this, however, has brought the aircraft nearer entry into service with the air force. What has arguably helped more to achieve this are two critical export sales for Sukhoi, to China and India. While some senior Sukhoi officials still talk enthusiastically about the thrust-vectoring Su-27M, number 711, intended primarily for the Russian air force, its most important role may be as a thrust-vectoring and digital flight-control system testbed for the Indian air force's Su-30MKI canard-equipped and thrust-vectoring two-seat Flankers.

## INDIAN REVELATION

The Indian Su-30MKI programme has revealed the potential to modify basic Flanker airframes. The first Su-30MKI aerodynamic testbed is a basic Su-30 airframe, with a strengthened rear fuselage section, re-configured tail sting, and canards. Thus, while the air force may not be able to afford all-new Su-27Ms or MiG-29Ms, it might be able to pick elements of these programmes to upgrade basic Su-27s and MiG-29s.

In terms of air-combat capability, one of the most significant elements of the Flanker and Fulcrum mid-life upgrades has been a multi-mode, pulse-Doppler radar, coupled with an active-radar-guided beyond-visual-range (BVR) missile. The Fulcrum radar is the N-010 being produced by Phazotron, while NIIP has been developing the N-011 for the Su-27M. The primary active-radar BVR missile for both aircraft is the Vypel R-77 (AA-12 Adder).

The vast majority of the air force's Flanker and Fulcrum aircraft are limited to single-target engagement with the Vypel R-27 (AA-10 Alamo) semi-active radar-guided missile.

A limited number of MiG-29s (Fulcrum Cs) in air-force service may have been modified with the N-019M, an upgraded version of the aircraft's basic radar, providing a two-target engagement capability. Part of the problem for the air force, however, is that Vypel has struggled to establish series production of the R-77.

The break-up of the Soviet Union, and of its stillborn successor, the CIS, shattered the Soviet Union's military-industrial establishment. Overnight, central rule was usurped by national borders and political independence.

In the guided-weapons arena, this posed problems for Russia's Vypel in that the intended production line for the R-77 was to be in Kiev, Ukraine. Given the sensitivity of the programme, and of the friction between the two states, the decision was taken to shift production of the missile to Moscow. Some Vypel sources now suggest that the first few missiles have recently been produced from the Moscow assembly line. It is indicative of Russia's budgetary blight that the Malaysian air force is likely to receive its R-77s at the same time, if not before, the first Adders reach Russia's own air force.

A radar upgrade poses particular questions about the basic Flanker airframe. One of the drivers behind fitting the Su-27M with canards was to try to retain the manoeuvrability of the basic Flanker while allowing for a heavier phased-array radar. The canard configuration offsets the shift in the centre of gravity resulting from greater mass forward of the cockpit.

The air force, given the example of the Indian Su-30MKI prototype, may opt to modify as many basic Su-27s as it can afford, although whether this stretches as far as to include canards remains to be seen.

Another less-ambitious radar option for the air force would be to opt for a mechanically scanned antenna. NIIP and Phazotron, with its so-called Zhuk-27, could both provide the air force with an alternative to an electronically scanned-array radar, which incurs a considerably lower weight penalty. This would allow the Flanker's basic manoeuvrability to be retained, while obtaining a multi-mode, pulse-Doppler radar, with multiple targeting capability.

While Sukhoi's Su-27M programme appears never to have been officially cancelled, in the Russian public's view, at least, the MiG-29M project was shelved publicly by the Government. The irony for the then Mikoyan was that its mid-life upgrade programme was at a more advanced stage of development than that of the Su-27M. While the Su-27M airframe design was relatively mature, many of the avionics and radar subsystems were far from ready.

Despite problems with the MiG-29M and the Article 1.42, MAPO MiG so far appears to continue to harbour ambitions as a fighter house. These hopes, however long term, are being fed by the air force.

## FIFTH-GENERATION AMBITIONS

The air force continues to sustain hopes of eventually acquiring a fifth-generation air-superiority combat aircraft, irrespective of the demise of the Article 1.42, and Mikoyan's Project 701 for a MiG-31M Foxhound B replacement.

MAPO MiG and Sukhoi are carrying out design work into combat aircraft beyond the Article 1.42. MAPO MiG's lightweight frontal fighter (LFI) has once again resurfaced after a decade of somnolence. Information on the project is scant, although some company officials draw parallels with the USA's Joint Strike Fighter project.

An LFI public debut is probably some way off, but what may be unveiled in the nearer term is Sukhoi's S-32. The genesis of this project remains a source of conjecture – but Sukhoi is understood to have built a forward-swept-wing, twin-engined, twin-vertical-stabiliser aircraft which is approaching flight test.

This aircraft may be a technology demonstrator, being used to examine such areas as forward-swept-wing aerodynamics and composite structures.

Sukhoi's former general designer, Mikhail Simonov, may have attempted to push the S-32 to the air force as a genuine contender for a next-generation air-superiority platform. Simonov's pretender to the MFI throne could also make its debut at Zhukovskiy this month.

The activities of Sukhoi and MAPO MiG are the clearest indication that the air force views the Article 1.42 problems as a setback, rather than an end, to its fifth-generation fighter procurement plans. For Sukhoi and MAPO MiG, sustaining projects beyond their current fighter portfolios is also important in maintaining their impetus in the export market.