

Russian military aircraft set to take off

For the Russian military aircraft industry, 2004 will be the year of regeneration. After a decade of decline, its prospects are suddenly starting to improve.

For the first time in years, orders for new aircraft are now starting to emerge from the Russian air force. Export business is thriving, with the delivery of Sukhoi Su-27 and Sukhoi Su-30 fighters to China and India, and has been bolstered by new orders from Malaysia.

Perhaps most crucial of all, there are now signs that a path to the future has been built, with a number of strategically important cooperative ventures now under way, most significantly with France. Plans have finally been put in place to move ahead with a new fifth-generation fighter to replace the aging inventory of Mikoyan MiG-29s and Sukhoi Su-27s.

In the last few years the Russian air force has suffered from a series of traumatic cuts in funding and program delays. However, the situation is now stabilizing. Avionics and weapons upgrades are planned, and deliveries of Su-271B tactical bombers will begin in 2005.

Although the amount set aside for defense spending in 2004 is only slightly higher than in 2003 (an increase of about \$664 million), a greater percentage will

go toward equipment modernization. This follows a spate of accidents in 2003, including the September loss of a Tu-160 bomber and its crew outside Saratov. The Su-271B long-range fighter-bomber and reconnaissance aircraft passed its evaluation tests in 2002 and is now set to replace the Su-24 and Su-25, though in far fewer numbers.

Forging new alliances

For the last few years the country's fast jet manufacturers have been able to do little more than survive. Of the big three—Sukhoi, Mikoyan, and Yakovlev—Sukhoi has managed the best, recording a number of significant export orders and signing strategic deals with international partners. At the 2003 Paris Air Show, memoranda of understanding were signed with EADS, MBDA, SAGEM, and Dassault, strengthening ties, in particular with French companies.

The initial business consequences of these links will most probably involve re-equipping Russian platforms with European avionics and weapons—such as the integration of SAGEM systems and MBDA missiles on Sukhoi export aircraft. But beyond the short term, there are plans for joint programs in the uninhabited air vehicle and fighter markets. Russia's UAV capability lags far behind those of Western countries, and Sukhoi and Dassault have developed a joint UAV working group to examine how to make up this deficit.

There is likely to be further consolidation in the months ahead, as Irkut, which



The fifth-generation PAK-FA will probably be a development of this Su-47, without the forward-swept wings.

builds Sukhoi fighters, and the Yakovlev Design Bureau move toward merger. Irkut only recently took over the Beriev company, which makes amphibious aircraft, and last October Irkut and EADS announced they were setting up a joint venture to sell Be-200 aircraft—with the French government likely to be an early customer. EADS opened a Moscow technology office to work with the Russian aeronautical research agencies at the end of last year.

PAK-FA

The most ambitious and strategically important program under way is the "fifth-generation" PAK-FA (Future Air Complex for Tactical Air Forces) fighter. In May 2002 Sukhoi was selected over the Mikoyan Design Bureau to be the prime contractor for PAK-FA, which will probably be a development of the Su-47 without the forward-swept wings. This would mean the aircraft would be a competitor to the F-35, rather than the much larger F-22 Raptor.

The time scale for developing this aircraft is tight: First flight of a prototype is scheduled for 2006, with production beginning in 2010, though more likely in 2012. Both MiG and Yakovlev Design Bureau are playing major roles in the program; funds available from the government will not be sufficient to cover its

development costs, so Sukhoi has brought together a team of aviation technical complexes and aerospace companies to share in investment and production.

Sukhoi's own success in export markets was an important factor in winning the contract; the company will have to invest some of the income from aircraft sales to India and China to keep the program afloat. Sukhoi announced just over \$1 billion in export orders during 2002.

The development team for the new fighter will probably be the same one that successfully worked on the Su-30MKI, Russia's most advanced combat aircraft program to date: NPO Saturn, engines; Technokomplex, avionics; NIIP, radar; KNIRTI, electronic warfare systems; and Vypel, missiles. One of the key challenges facing the development team will be whether there will be enough money available to sustain development—or if non-Russian partners might be considered as potential investors.

Early last October, French Prime Minister Jean-Pierre Raffarin announced that, following talks with Russian Prime Minister Mikhail Kasyanov in Moscow, France and Russia would collaborate on a new fifth-generation fighter. It is not yet clear how this will impact the PAK-FA program or whether any other international collaborators, such as Indian companies, would now be invited to join.

Modernizing...and marketing

Meanwhile, the Russian air force is modernizing its declining assets. Work has started on upgrading the huge fleet of Su-24 tactical bombers to Su-24SM standard by Sukhoi—with



Up to 164 An-70s are currently entering service.

new avionics and self-defense missiles. Modernization is also under way on the Tu-95MS and Tu-160 strategic bombers. Aging Yak-52 piston-engined basic trainers are being upgraded to Yak-52M standard—rather than being replaced by the Su-49, the original plan.

A new generation of transport aircraft is also coming into operation—with the first of up to 164 Ukrainian-built Antonov An-70s currently entering service and a new program, the Indian-Russian Transport Aircraft developed by Irkut in partnership with Hindustan Aeronautics of India, also under way.

But it is in the Far East that Russia's military aircraft companies see the major near-term potential. At the end of 2003, Malaysia handed over the first tranche of payments totalling nearly \$1 billion for 18 Su-30MKI fighters ordered in 2002. Bangladesh and Thailand are both interested in acquiring Su-30s, and Indonesia is reported to have shown a similar interest following the delivery of two Su-27SK and Su-27KI aircraft. And in September 2003, South Korea and Russia moved toward agreeing to a \$700-million deal for new helicopters.



The Su-30MKI is Russia's most advanced combat aircraft program to date.

Meanwhile, at the end of the year, India, Russia's best customer in the region, was in the middle of negotiations for the purchase of the Russian aircraft carrier Admiral Gorshkov. In October India signed a \$1-billion deal with Russia and Israel for the manufacture of the Phalcon airborne early warning and control systems—mounted on Russian Il-76 transports—for the Indian air force.

What's ahead

The large number of major deals now completed with countries outside its traditional sphere of influence over the last 12 months has injected a transfusion of cash and morale into the Russian aerospace industry. It remains to be seen whether new strategic links with France will take it to the next stage—as a head-to-head competitor with the U.S. and U.K.

According to the Stockholm International Peace Research Institute, in 2002 Russia remained the world's largest arms exporter by volume—the number of aircraft, tanks, and other systems sold abroad. But in terms of revenues it was a long way behind its Western competitors.

It is also unclear at this stage just how far France is prepared to integrate Russian companies into its future military programs—and the test case for this will be the new fighter. In the meantime, Russia's industry can start to rebuild and is not now forced to rely totally on central government funding for a new generation of combat aircraft. That is perhaps the most significant change of the last 18 months.

Philip Butterworth-Hayes
phayes@mistral.co.uk



Aging MiG-29s will soon be replaced by a new fifth-generation fighter.

Correspondence

Although I agree completely with your editorial **Buying out of "Buy America"** (September 2003, page 3), I must point out that it was the U.K. that were the U.S.' strongest allies during the war in Iraq. For the other members of the United Kingdom (Scotland, Wales, and Ireland), it is a bit of a slip to only identify one of the nations in our democracy.

Lindsay Graham
lindsay.graham@baesystems.com

In the greatest traditions of American industry of the past 150 years, we are finding the lowest cost source for *all* (not just military and aerospace) goods and services. This is true not only for shop workers but also for office workers of all types, including technical. So, as we export our design work, we are no longer developing those skills in our own workers. As our current experts age and retire, their skills will no longer reside in this country.

At that point, there will be little reason for our aerospace industry (among others) to reside here—all of its capabilities will be in other countries. Those foreign workers will have no incentive to buy goods from us, because their countries will have developed all of their own support infrastructure. So, the only jobs left here will be those serving our own population.

Therefore, in order to preserve our aerospace industry and our defense capability, we need far-sighted people to guide business practices in our long-term best interest. Foreign exchange reserves being accumulated (in U.S. trade currency) at a higher rate than in the 1980s by exporting nations are already demonstrating that they have no intention of pursuing reciprocal global trade. [Ref: *Newsweek*, August 25, 2003, "A Crackup for World Trade," by Robert J. Samuelson.]

Douglas G. Culy
dgculy@juno.com

→→→

I applaud you on your well-written editorial, **Returning to flight**, published in

the October 2003 issue. Your concluding statements regarding Congress' and basically the U.S. citizens' view about human exploration of space "hits the nail on the head" as far as I am concerned. I believe human exploration is important, but if my fellow Americans do not, so be it. I can live with that, but as you said, if we are not going to do it right, then I'd rather not do it at all.

Finally, let me also state that the "budgetary dance" phrase you used is unfortunately permeating many other, if not all, programs for which Congress must decide funding allocations. They need to prioritize and get on with it.

Again, thanks for expressing your insight so well.
Lowell McMillen
lowell.d.mcmillen@boeing.com

→→→

I thought your editorial concerning the Gehman Commission report was excellent. It is not easy to say a fine organization like NASA is seriously flawed in its flagship activity, but it needs to be said. Only by facing our failures can we improve. Also, the Congress must decide if they will put their money where their mouth is. With politicians, talk is cheap.

When I read various articles during the last several months concerning the loss of Columbia and her crew, I was struck by a particular article. It was a short article in *Aviation Week* summarizing the courageous staff and management at NASA who tried to call attention to possibly deadly consequences of shuttle damage while Columbia was still in orbit. I thought to myself: these guys had the courage to risk their reputation and prestige, and possibly their careers, to call attention to a *potential* problem.

Most of us would like to think we would do the courageous thing in a high-consequence decision, but we quietly pray that we will never have to know. As with any tragedy, there are always heroes. These heroes should be recognized.

Bill Oberkamp
wlober@sandia.gov

→→→

In **New Life for Comanche** (September 2003, page 26), the first sentence on page 26 reads "...terrorized European settlers." The proper term is probably "American settlers" because: that is the accepted terminology; that is what most settlers during that period considered themselves; and they were, in fact, a heterogeneous group, especially in Texas where the Comanche conflict was fiercest.

This is admittedly a minor comment, but since writing is your business, I wanted to let you know.

Chris Rodenbeck
roden@ee.tamu.edu

→→→

I personally very much favor AIAA taking a look forward into what's next and providing a vision for what the future of aviation might hold. However, we need to provide to the reader some means to distinguish between fact and vision. On the cover of the September issue and within the story **Pegasus: UCAVs look seaward** (page 36), there are artist's renderings that, with today's technology, could easily be confused as being pictures of real events. The caption for the cover does identify the picture as an artist's rendering, but the one later in the article does not. I wonder if we could simply mark such renderings as "Artist Rendering" in a corner of the picture whenever such a rendering is used. I would like to see *Aerospace America* clearly delineate between the vision of what is to come and the reality of what has been done—and to celebrate both.

I have to admit that my Boeing colleagues have some concern over the "marketing" nature of the pictures used in the article and on the cover. I don't necessarily share their concern. The pictures get across the concept and the focus of the story very clearly, almost without words. However, I do have a problem with the ability to generate photo-realistic graphics of events that have not yet occurred. If you have a better alternative to

the one I suggest, I'm willing to hear it, but please take to heart the concern that drives this note.

Thanks for a magazine that attempts to put the vision of aerospace in front of people. Don't be afraid to stretch minds toward the art of the possible, but don't fail to discern between fact and vision.

Charley Saff
charles.r.saff@boeing.com

→→→

I just discovered an error in our article **Steady course for civil space in 2002** (October 2003, page 6). In the text, it says that ESA spent approximately \$8.9 million on its civil space program in 2002. The correct number is \$3.5 billion. Sorry that none of us picked that up in the proofreading process.

Henry R. Hertzfeld
hrh@gwu.edu

→→→

In the November **Out of the Past** (page 40) there is an entry for Nov. 18, 1978, stating that the F/A-18A was "...intended to replace the Grumman A-6 Intruder in the attack role and the Grumman F-14 Tomcat in the fighter role." Those of us in the 'Grumman division' of the U.S. Navy were under the impression that the Hornet was intended to replace the aging McDonnell Douglas F-4 Phantom II and the Vought (LTV) A-7 Corsair II. My contemporaries from the F-4/A-7 communities were under the same impression, and that is exactly what happened. Super Hornets were subsequently designed to displace Grumman iron—much later than 1978—after the A-12 Avenger was cancelled.

The Intruder has received some bad press ever since it got into the movies. As the maintenance coordinator for Attack Squadron One One Five (VA-115/now VFA-115) during Operation Desert Storm, I was appalled to hear and read news reports that it was too bad the A-6 wasn't capable of carrying smart bombs. How many tons would one have to carry to be considered capable?

If the A-6 was limited in any way, it was aesthetically not the prettiest airplane you ever saw. Fatigue life ended its role, not tactical disadvantages. We do not have a "replacement" aircraft today. One of the greatest strengths of our defenders

lies in their ability to make do with what they have.

As for the Tomcat, 30 years ago I witnessed a demonstration in which the announcer declared that it had virtually no vertical stall limit (because it would reach air too thin to support combustion before it succumbed to gravity). I cannot

attest the truth of that claim, but it looked good trying. Granted, it is quite heavy, and consumes almost as much acreage as the RA-5 Vigilante. But I'm not quite certain that we have a "replacement" for it either; we're just replacing it with the best we have.

Brett Hawks
behawks@rockwellcollins.com

Events Calendar

JAN. 4-7

Habitation 2004, Orlando, Fla.
Contact: Bob Miranda, 914/592-7720.

JAN. 5-8

Forty-second AIAA Aerospace Sciences Meeting and Exhibit, Reno, Nev.
Contact: 703/264-7500.

JAN. 26-29

Annual Reliability and Maintainability Symposium, Los Angeles, Calif.
Contact: Dr. William R. Robertson, 703/550-9436.

FEB. 3-5

Strategic and Tactical Missile Systems Conference, Monterey, Calif.
Contact: 703/264-7500.

FEB. 8-12

Space Technology and Applications International Forum 2004, Albuquerque, N.M.
Contact: Mary Bragg, 505/277-4950.

FEB. 8-12

Fourteenth AAS/AIAA Space Flight Mechanics Meeting, Maui, Hi.
Contact: Bob Glover, 719/277-4935.

FEB. 10-11

AIAA Defense 2004, Washington, D.C.
Contact: 703/264-7500.

FEB. 23-26

2004 Planetary Defense Conference: Protecting Earth from Asteroids, Orange County, Calif.
Contact: 703/264-7500.

MARCH 7-10

Earth & Space 2004—Ninth ASCE Aerospace Div. International Conference on Engineering Construction and Operations in Challenging Environments, Houston, Texas.
Contact: Ramesh Malla, 860/486-3683;
www.asce.org/conferences/space04

MARCH 14-18

SPIE International Symposium on Smart Structures and Materials, San Diego, Calif.
Contact: Scott Walker, 360/676-3290.

MARCH 22-26

Second Missile Defense Conference and Exhibit, Washington, D.C.
Contact: 703/264-7500.