S

oviet design bureau Yakovlev is devel-oping a family of derivatives of the Yak-42 tri-jet airliner with signifi-
cantly improved payload, range and fuel-efficiency, for entry into Aeroflot service from 1994.

The derivative aircraft, using turbofan, ducted and unducted propfan powerplants, are designed to comply with US FAR Part 25 airworthiness regulations and, if offered for export to the West as planned, would pose new competition in the medium-range 150-to 170-seat market.

The first derivative to fly will be the Yak-42M, a re-engined Yak-42 with supercri-tical-section wing, winglets, "glass" cockpit and fly-by-wire flight controls. The aircraft will be capable of carrying up to 168 passen-gers, according to Vladimir Dmitriev, deputy chief designer at Yakovlev.
The Yak-42M will be followed by a more advanced derivative, the Yak-46. This will share many technical features of the Yak-42M but dispenses with its three turbofans in favour of two propfan engines to give a further improvement in fuel efficiency over the basic Yak-42 now in service.

An intermediate derivative with wing-mounted ducted propfan engines to bridge the gap between the Yak-42M and the Yak-46 may also be developed.

PROPFAN CONFIDENCE

The emergence of these new designs is doubly significant. Firstly, it signals continu-ing Soviet confidence in the propfan con-cept—shelved in the West, because of low fuel prices—with Yakovlev now the second Soviet bureau designing a propfan-powered airliner (Tupolev was first). A tractor version of the pusher-propfan engine to be used was run for the first time last month and is a production prototype, not merely an experi-mental engine, according to Yakovlev. Secondly, it puts Yakovlev in the running to join the exclusive international club of

Yak-42: derivatives will be more fuel-efficient

YAKOVLEV STRIKES BACK
Propfan and other high-technology derivatives of the Yak-42 airliner (NATO codename Clobber) are planned. Alan Postlethwaite reports, w pictures by Janice Lowe.
design teams with digital fly-by-wire aircraft,
today's icon of high-technology civil aviation.
Only fellow Soviet bureaux Tupolev and
Ilyushin, along with the West's Airbus Indus-
trie, have fly-by-wire airliners flying.
The original Yak-42 entered service with
Aeroflot in 1980, and typically carries 120
passengers in a tourist layout over sectors of
up to 1,700km (l,030nm) although it can
carry payloads of up to 12.8t over a shorter

Yak-48 business jet under study
Y

akovlev is aiming to enter the busi-
ness-jet market with an eight- to 12-
passenger aircraft powered by a pair of
Western turbofans.
The twin-turbofan aircraft, designated Yak-48, would weigh 12-15t and have a range of at least 4,500km (2,430nm) cruis-ing at 430kt (800km/h).
The wing would be a supercritical-sec-tion design with winglets and an area of 35m2

. A high level of comfort and low level
of noise would characterise the business jet, says Yakovlev.
The design bureau is performing a market study but indicates that the aircraft is likely to be primarily for export. Yakovlev last designed a small jet airliner more than

20 years ago—the Yak-40 27-seater went into service in 1968.
No turbofan suitable to power the aircraft is manufactured in the Soviet Union and Yakovlev is seeking a joint venture with a Western firm, involving Soviet manufac-ture of the 3t-thrust powerplant.
Ilyushin is studying a similar business jet and Sukhoi is developing a supersonic business jet, while many Soviet bureaux are moving into the business, utility and re-gional aircraft sectors to compensate for slumping military work.
Ilyushin is also studying a seven- to eight-seat executive/19-passenger regional twin-turboprop similar to the Embraer/ FAMA CBA-123.

range of 1,300km (720nm). The other ex-treme, Yak-42 with a first-class cabin and 104 passengers, can cover 2,300km (l,240nm). Three Lotarev D-36 three-shaft turbofan engines (take-off thrust 6.5t each) give the Yak-42 a Mach 0.75 cruise and a cruise fuel burn of 0.65kg/kg-thrust/h.

YAK-42 EXPORTS
The Yak-42 was designed to Soviet airworthi-ness regulations and, on Dmitriev's admis-sion, does not meet all aspects of US FAR Part 25, but this has not stopped Italy, India and China buying the aircraft. Deliveries to China started last month. It is still produced; and 70 aircraft have been built since 1984.

The Yak-42M derivative is a substantially new aircraft built around a Yak-42 fuselage stretched by 4m to accommodate 156 passen-gers in a typical layout or up to 168 passen-gers in a higher-density configuration. Several cabin layouts are to be offered for the derivative aircraft, which will usually fly 90-120min sectors. They include: 168 pas-sengers; 156 passengers in a looser layout; 150 passengers plus galley; 114 tourist-class and eight business-class passengers; and 72 tourist-class, 30 business-class and eight
first-class passengers.
Three-abreast seating pitched at 78cm
either side of a single aisle is standard, with
passengers boarding by a front-fuselage door
and stairs under the rear fuselage.

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