Tupolev Tu-204 makes first flight

by Peter Middleton
The Tupolev Tu-204 airliner
made its first flight on January
2, after delays attributed by the
Soviets to the late delivery of its
Soloviev PS-90A turbofans.
The 214-seat, twin-engined
medium-haul airliner, whose
nearest Western equivalent is
the Boeing 757, features a
range of modern technologies,
including triplicated digital
fly-by-wire flight controls
with three-channel analogue
backup. Like those of the
Airbus A320, they are designed
to prevent the aircraft being
flown outside its normal flight
envelope, but the Soviets have
released insufficient informa-
tion for the sophistication of the
system to be assessed.
The Tu-204 combines
reduced static stability (and
hence lower trim drag) with a
supercritical wing section and
winglets to optimise cruise
economics. Fuel is pumped,
under digital control, into a fin
tank to move the e.g. rearwards
by up to 10 per cent of wing
chord during cruise. Fin fuel is
transferred back to wing tanks at
the top of descent, to increase
stability margins.
The cockpit is designed for
two-crew operation, but
provision is made for a forward-
facing flight engineer. Tupolev
has moved towards the side-
stick controls of the A320
by mounting small-deflection
"ramshorn" controls between
the pilots and their full-colour
digital electronic flight instru-
mentation system.
The flight control system
provides for fully automatic
operation from take-off to
touchdown, with Category III
blind landing capability.
Conflict-alert and ground-
proximity warning systems are
also fitted, along with auto-
mated checklists and what the
Soviets describe as the

Tu-204

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The Tupolev Tu-204, which recently made its maiden flight, is powered by 16-tonne-thrust Soloviev P

"automatic search-free" estab-
lishment of communications
with air traffic control. It has a
"dark" cockpit philosophy,
under which lighting is "zoned"
to reduce crew stress and
switchlights are illuminated
only to warn of failures.
The passenger cabin, seating
between 174 and 214, will be
furnished to the latest fire-safety
standards, say the Soviets.
Tupolev says that the Tu-204
matches its flightdeck and
aerodynamic efficiency with
advanced lightweight struc-
tures, using not only new high-
strength aluminium alloys and
steels, but also aluminium-
lithium and "carbon, glass,
organic and hybrid
composites". Carbon brakes
contribute to a total weight
saving of 1,200kg from the use
of composites.
Tupolev says that the struc-
tural efficiency and resulting
low empty weight of the Tu-204
contributes to its sprightly take-
off. Its makers claim that it can
fly from a 2,500m runway at an
elevation of 1,200ft, on a 30°C
day, while meeting Inter-
national Civil Aviation
Organisation noise regulations.
Assisting this performance are
full-span leading-edge slats,
combined with double-slotted
flaps which have substantial

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Fowler extension at low
deflection angles, requiring
complex guide rails.
The Tu-204's engines are
16-tonne-thrust Soloviev PS-
90A turbofans. The engine is a
modern, efficient, electronically
controlled unit with a bypass
ratio of 4 • 7:1, a pressure ratio of
33-8:1, turbine gas temperature
of 1,292°C, and specific fuel

consumption of 0-58kg/kg/hr
in Mach 0-8 cruise at 36,000ft.
Figures for the 18-2 tonne-
thrust Rolls-Royce RB.211-
535E4 are 4-3:1, 25-8:1, and
between 1,250°C and 1,350°C,
with a comparable specific fuel
consumption.
The Soloviev engine, which
weighs in at 2,800kg, compared
with 3,295kg for the -535E4,

BMA 737's 'engines
Double engine failure is
suspected in the January 8 crash
of a British Midland Airways
Boeing 737-400. The aircraft,
on a scheduled flight from
London Heathrow to Belfast
Aldergrove with 117 passengers
and eight crew on board,
crashed half a mile short of East
Midlands Airport near Derby at
2010hr local time. There were
43 fatalities.
British Midland chairman
Michael Bishop says that the
pilot had reported "severe
vibration" in one of the 737's
General Electric/Snecma
CFM56 engines when the
aircraft was about lOmin out of

Heathrow. He shut the engine
down, satisfactorily extin-
guished an engine fire, and
requested diversion to East
Midlands. At this point every-
thing seemed to be under
control, with the aircraft flying
satisfactorily on one engine.
About 20min after take-off
from Heathrow the 737 began
the approach to Runway 27 at
East Midlands. At some stage
during the approach the captain
reported trouble with the
"other" engine, an apparent
reference to the port CFM56.
Witnesses on the ground
reported hearing a banging
sound from the engine, and on

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