TECHNOAVIA

NAUCHNO-KOMMERCHESKY FIRMA TECHNOAVIA (Technoavia Scientific and Commercial Firm)

Marketing of the former Technoavia line of aircraft has been taken over by Smolensk.

UPDATED

TUPOLEV

TUPOLEV OAO (Tupolev JSC)

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PRESIDENT: Aleksandr Polikov

Under decree of 30 June 1999, Tupolev JSC formed 30 July 1999, combining Tupolev design bureau and Aviastar production plant at Ulyanovsk, with financial interest from Russian government amounting to 51 per cent, plus 43.6 per cent from Aviastar. JSC also holds intellectual rights to Tupolev designs previously owned by government. New entity was recertified by Interstate Aviation Committee Aviation Registrar in December 2000. Kazan plant will be incorporated later; proposal submitted July 2000.

Other activities include sales and leasing of jet transports, aircraft operation and after-sales support. Tupolev Aviation Leasing Company supplies Tu-204, Antonov An-124 and Yakovlev Yak-40 transports.

Government plans to rationalise Russian aerospace industry, announced May 2001, call for incorporation of Tupolev (with Aviakor, Aviastar and Kazan plants) into RSK 'MiG' grouping, also including Kamov bureau and Sokol, KAPP and Arsenyev plants. ***UPDATED***

AVIATSIONNY NAUCHNO-TEKHNISHESKY KOMPLEKS IMENI A N TUPOLEVA OAO (Aviation Scientific-Technical Complex named for A N Tupolev JSC)

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GENERAL DESIGNER: Igor Shevchuk
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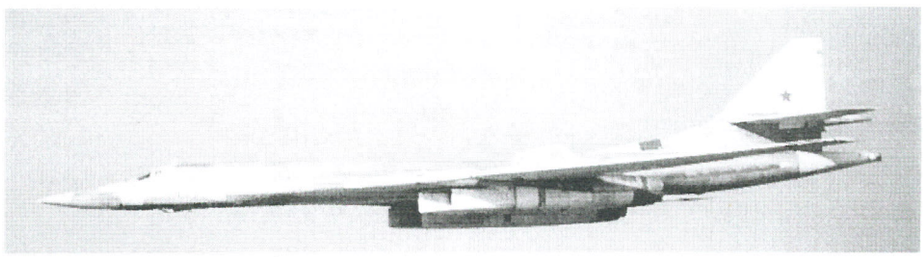
Tupolev Bureau was founded by Andrey N Tupolev (1888-1972) on 22 October 1922 and concentrated primarily on large military and civil aircraft until the early 1990s; Andrey A Tupolev (1925-2000) succeeded his father as General Designer; since 1922, Bureau has designed 300 aircraft, of which nearly 90 were built as prototypes and 35 placed in production; current effort is 80 per cent civil programmes.

It was suggested in 1998 that Tupolev had begun preliminary design of a new bomber to replace the Tu-160 and, probably, Tu-95/142; this would enter service some time after 2010 and may be based on earlier studies, such as the Tu-202 bomber of the 1980s or the more recent Tu-404 700/850-seat airliner. Continued work was confirmed in late 2002, although as a private study and ''based on a new concept'', which ''is at the very earliest stage''. In addition, Bureau remains heavily committed to the development of a civil supersonic transport aircraft and of cryogenic fuels for jet and turboprop transports.

ANTK Tupolev has a 5.4 per cent share in Tupolev AO production group.

Tupolev's head office, main design bureau and experimental facility are in Moscow; Tomilino branch and flight research centre at Zhukovsky; and design offices at Samara, Kazan and Voronezh. Share of 2001 government funds for aviation development was 15 per cent, the largest element for certification of Tu-334 airliner.

UPDATED



Tupolev Tu-160 'Blackjack' *(Yefim Gordon)* ***NEW***/0552738

TUPOLEV Tu-160

NATO reporting name: Blackjack
Unofficial name: Belyi Lebed (White Swan)

TYPE: Strategic bomber.

PROGRAMME: Designed as Aircraft 70 under leadership of V I Bliznuk; programme began 1967, but relaunched following issue of more modest specification in 1970; derived from unbuilt Tu-135 bomber and Tu-144 derivatives; some features from rival Myasishchev M-18. First of two prototypes (70-01) observed by intelligence source at Zhukovsky flight test centre 25 November 1981 (photographed from landing airliner); first flew 18 or 19 December 1981; first exceeded M1.0 February 1985; second (production-standard) aircraft first flew 7 October 1984. Third prototype (70-03) set world records for altitude, speed in a closed circuit and weight-to-altitude on 31 October 1989, 20 of these remaining unbroken in 2001. Further nine closed-circuit records established 22 May 1990 by aircraft '70-304'.

Second production aircraft lost pre-delivery, March 1987; US Defense Secretary Frank Carlucci invited to inspect 12th aircraft built, at Kubinka airbase, near Moscow, 2 August 1988; deliveries to 184th Guards Heavy Bomber Aviation Regiment, Priluki airbase, Ukraine, began April 1987; equipment of 1096th HBAR at Engels from 16 February 1992, but only six received before production at Kazan airframe plant terminated 1992; of 100 aircraft due to be built, at least 32 (including prototypes) accounted for by mid-1990s; unconfirmed reports suggest total of 40 having flown, plus three uncompleted at Kazan.

In 2001, Russia was reported to be formulating a Tu-160 upgrade, to be undertaken at Kazan, which includes provision for a conventionally armed cruise missile. Upgrade of 15 aircraft was agreed late 2001 and formally announced at Kazan on 18 January 2002; work will extend service lives to 2030; first upgrade candidate was delivered to Kazan on 5 April 2002. In October 2002, Tupolev confirmed this to be a two-stage upgrade, the first part (2003-04) concentrating on the addition of new weapons and the second, at an unspecified date, involving new avionics for navigation, attack and electronic warfare, with high degree of commonality with parallel Tu-22M and Tu-142 (Tu-95MS) upgrades.

CURRENT VERSIONS: **Tu-160** ('Blackjack'): Strategic bomber.

Tu-160SK: Commercialised, demilitarised version, as carrier component of Burlak aviation space launch system; Burlak-Diana two-stage rocket, carrying payload, under fuselage on centreline mount. Announced at Singapore Air Show '94; proposed by Russian partners MKB-Raduga, OKB MEI and Tupolev, with German company OHB-System. At the 1995 Paris Air Show, Tu-160 0401 was exhibited statically (the type's Western debut) with a model Burlak rocket below the fuselage. Development of the system continued even after the German government withdrew funding in 1998, and may form the basis of the Ukrainian/PIC HAAL-2000 programme.

Tu-160M: Proposed stretched variant carrying two 2,700 n mile (5,000 km; 3,107 mile) range hypersonic Kh-90 missiles.

Tu-160P: Proposed very long-range escort fighter.

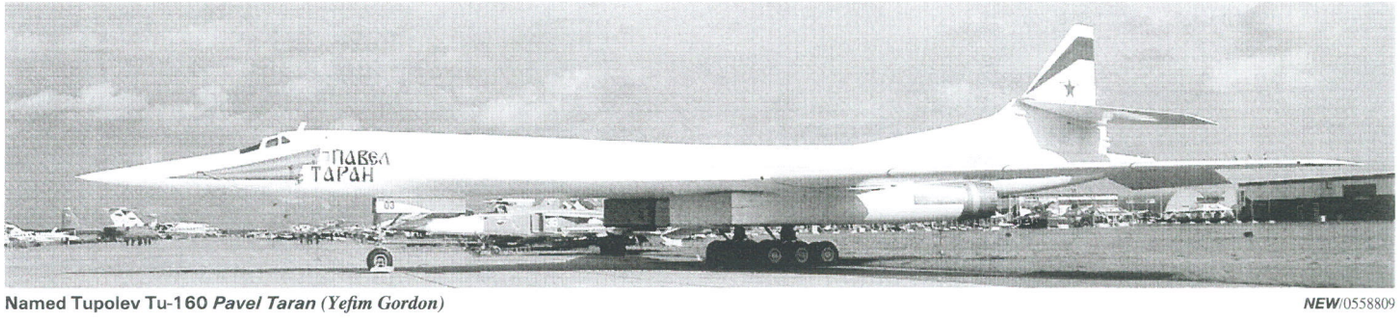
Tu-160PP: Proposed escort jammer.

Tu-160R: Proposed strategic reconnaissance platform.

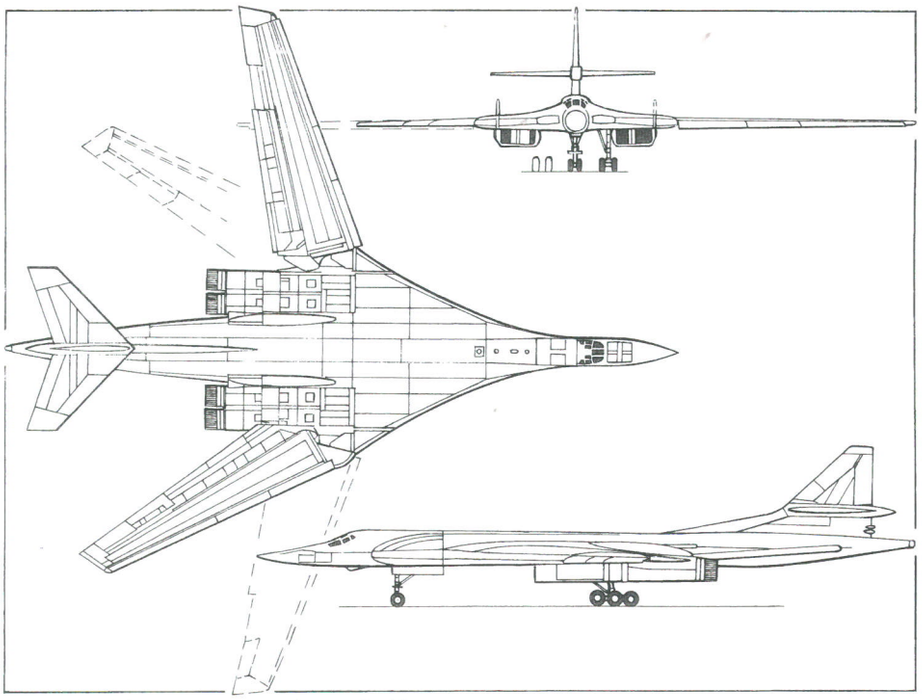
CUSTOMERS: In January 2001, Russia had seven operational Tu-160s; a further eight undergoing refurbishment for delivery over following months; and one under construction.

Of original deliveries, Ukraine government seized 19 at Priluki on achieving independence, pre-empting planned transfer to Engels; purchase of these by Russia was subject to protracted negotiations, and aircraft deteriorated in storage; March 1996 agreement on transfer of 10 best airframes was not implemented; attempts to purchase eight failed in March 1998 and Russia then supposedly abandoned hopes of expanding Tu-160 fleet. However, October 1999 announcement revealed eight to be returned to Russia for refurbishment (together with three Tu-95MSs, for a total of US$285 million) and these were delivered between 5 November 1999 and 21 February 2000. Six others scrapped with US assistance, last being destroyed on 4 February 2001. August 2000 report mentioned further three Tu-160s which Ukraine could return to Russia in part-payment for natural gas deliveries. One further Ukrainian Tu-160 was flown to Poltava Kondratyuk-Shagray aerospace museum on 5 April 2000.

Russia maintained force of six (declared as ALCM carriers under START) at Engels (where 1096th HBAR was redesignated as part of the 121st Guards HBAR, within 22 Air Division, in 1994), plus flying testbed at Zhukovsky; at least four more were derelict at Zhukovsky by 1995. Despite this, 1998 US estimates of Russian combat forces reported total holding of nominally serviceable aircraft as 25, though this would not seem to be possible. Eight more to re-enter service from 2001 after purchase from Ukraine, while plan announced in June 1999 to complete one unfinished Tu-160 at Kazan. This aircraft ('07' *Aleksandr Molodchyi*) was delivered on 5 May 2000. Another, brand new Tu-160 (the first of three more incomplete, unfinished aircraft at Kazan) was due to be delivered in late 2002 (although this was not achieved, because of funding shortage), and the remaining two will follow, increasing the fleet to 18. At one time there were plans to refurbish some (perhaps four) of the grounded aircraft at Zhukhovsky. Ex-Ukrainian aircraft failed to enter service when planned due to poor condition and need for extensive refurbishment; requirements were still being discussed in early 2002. Tu-160 may re-enter limited production, to meet a stated requirement for 25 operational 'Blackjacks' by 2003, allowing formation of a second regiment. Original six at Engels are also named: '01' *Mikhail Gromok*; '02' *Vasily Retsetnikov*; '03' *Pavel*



Named Tupolev Tu-160 ***Pavel Taran*** *(Yefim Gordon)* ***NEW***/0558809



Tupolev Tu-160 strategic bomber *(James Goulding)*

Taran; '04' *Ivan Yargin*; '05' *Il'ya Muromets* (1) and '06' *Il'ya Muromets* (2). The 10th Tu-160 (fleet number '16') was named *Aleksey Plokhov* on 17 April 2003.

On 3 March 1999, the Russian Commonwealth Aerospace Technology Consortium (RCATC) was authorised by the Ukrainian government to sell three demilitarised Ukrainian Air Force Tu-160s, plus spares, to Platforms International Corporation of the USA, with which it has finalised a strategic partnership. The US$20 million deal includes a 20 per cent interest in Orbital Network Services Corporation, which plans to use the aircraft as reusable communications satellite launchers in its HAAL-2000 High-Altitude Air Launch programme. The aircraft would probably be modified to Tu-160SK standards and continue to be based at Priluki, maintained and flown by Ukrainian crews, but flown to customer countries for individual space launch missions.

DESIGN FEATURES: Intended for high-altitude standoff role carrying ALCMs and for defence suppression, using short-range attack missiles similar to US Air Force SRAMs, along path of bomber making low-altitude penetration to attack primary targets with free-fall nuclear bombs or missiles; this implies capability of subsonic cruise/supersonic dash at almost M2 at 18,300 m (60,000 ft) and transonic flight at low altitude. About 20 per cent longer than USAF B-1B, with greater unrefuelled combat radius and much higher maximum speed; low-mounted variable geometry wings, with very long and sharply swept fixed root panel; small diameter circular fuselage; horizontal tail surfaces mounted high on fin, upper portion of which is pivoted one-piece all-moving surface; large dorsal fin; engines mounted as widely separated pairs in underwing ducts, each with central horizontal V wedge intakes and jetpipes extending well beyond wing centre-section trailing-edge; manually selected outer wing sweepback 20, 35 and 65°; when wings fully swept, inboard portion of each trailing-edge flap hinges upward and extends above wing as large fence; unswept tailfin; sweptback horizontal surfaces, with conical fairing for brake-chute aft of intersection.

FLYING CONTROLS: Quadruplex fly-by-wire with mechanical reversion. Full-span leading-edge flaps, long-span double-slotted trailing-edge flap and inset drooping aileron on each wing; five-section spoilers forward of flaps; all-moving vertical and horizontal one-piece tail surfaces.

STRUCTURE: Slim and shallow fuselage blended with wing-roots and shaped for maximum hostile radar signal deflection; 20 per cent titanium, including leading-edges and wing centre-section spar box.

LANDING GEAR: Twin nosewheels retract rearward; main gear comprises two bogies, each with three pairs of wheels; retraction very like that on Tu-154 airliner; as each leg pivots rearward, bogie rotates through 90° around axis of centre pair of wheels, to lie parallel with retracted leg; gear retracts into thickest part of wing, between fuselage and inboard engine on each side; so track relatively small. Nosewheel tyres size 1080×400; mainwheel tyres size 1260×425.

POWER PLANT: Four purpose-designed Samara NK-321 turbofans, each 137.3 kN (30,865 lb st) dry, 245 kN (55,115 lb st) with afterburning. In-flight refuelling probe retracts into top of nose. Fuel in centre-section spar box and in outer wings.

ACCOMMODATION: Four crew members in pairs, on individual Zvezda K-36LM zero/zero ejection seats, in pressurised compartment; one window each side of flight deck can be moved inward and rearward for ventilation on ground; flying controls use fighter-type sticks rather than yokes or wheels; crew enter via extending ladder in nosewheel bay. Cooking facilities and lavatory.

AVIONICS: Systems utilise around 100 digital processors and eight digital nav computers.

Radar: Obzor (NATO 'Clam Pipe') nav/attack radar in slightly upturned dielectric nosecone with separate Sopka radar providing terrain-following capability.

Flight: K-042K astro-inertial nav with map display.

Instrumentation: Analogue instruments. No HUD or CRTs.

Mission: OPB-15 strike sight fairing with flat glazed front panel, under forward fuselage, for video camera to provide visual assistance for weapon aiming.

Self-defence: Baikal self-protection system, with integrated RHAWS, chaff/flare dispensers in tailcone and active jamming.

ARMAMENT: No guns. Internal stowage for free-fall bombs, mines, short-range attack missiles or ALCMs; two tandem 12.80 m (42 ft) long weapon bays; MKU-6-5U rotary launcher for six (or up to 12) Kh-55MS (AS-15 'Kent') or RKV-500B (AS-15B 'Kent-B') ALCMs or 12 to 24 Kh-15P (AS-16 'Kickback') SRAMs in each bay. Aircraft upgraded from 2002 onwards have ability to launch Kh-555 missiles; later plans envisage carriage of up to 12 non-nuclear Kh-101 ALCMs, when available.

DIMENSIONS, EXTERNAL:

Wing span: fully spread (20°)	55.70 m (182 ft 9 in)
35° sweep	50.70 m (166 ft 4 in)
fully swept (65°)	35.60 m (116 ft 9¼ in)
Wing aspect ratio: fully spread	8.6
Length overall	54.10 m (177 ft 6 in)
Height overall	13.10 m (43 ft 0 in)
Tailplane span	13.25 m (43 ft 5¼ in)
Wheel track	5.40 m (17 ft 8½ in)
Wheelbase	17.88 m (58 ft 8 in)

DIMENSIONS, INTERNAL:

Weapons bay (each): Volume	43.0 m³ (1,518 cu ft)

AREAS:

Wings, gross: fully swept	360.00 m² (3,875.0 sq ft)
fully spread	approx 400.00 m² (4,305.6 sq ft)
Wings, moving areas, fully swept (total)	approx 180.00 m² (1,937.5 sq ft)

WEIGHTS AND LOADINGS:

Weight empty	110,000 kg (242,505 lb)
Weight empty, equipped	117,000 kg (257,940 lb)
Max fuel	171,000 kg (376,990 lb)
Max weapon load	40,000 kg (88,185 lb)
Normal T-O weight	267,600 kg (589,950 lb)
Max T-O weight	275,000 kg (606,260 lb)
Max landing weight	155,000 kg (341,710 lb)
Max power loading	280 kg/kN (2.75 lb/lb st)

PERFORMANCE:

Max level speed at 12,200 m (40,000 ft)	M2.05 (1,200 kt; 2,220 km/h; 1,380 mph)
Cruising speed at 13,700 m (45,000 ft)	M0.9 (518 kt; 960 km/h; 596 mph)
Max rate of climb at S/L	4,200 m (13,780 ft)/min
Service ceiling	15,000 m (49,200 ft)
T-O run at max AUW	2,200 m (7,220 ft)
Landing run at max landing weight	1,600 m (5,250 ft)
Radius of action at M1.5	1,080 n miles (2,000 km; 1,240 miles)
Max unrefuelled range	6,640 n miles (12,300 km; 7,640 miles)
g limit	+2

UPDATED

TUPOLEV Tu-44

TYPE: Light utility twin-prop transport.

PROGRAMME: Announced at Moscow, August 2003; joint venture by Tupolev (design) and SKB ATIC (programme management); production jigs by ATIC and Composite-Avia. Four flying prototypes, plus two static/fatigue test airframes, planned for completion in 2004; certification targeted for third quarter of 2005. Twin-float version also planned.

CUSTOMERS: First two aircraft reportedly ordered by unidentified Russian customer by January 2004.

COSTS: Development costs estimated at approximately US$3 million (2003).

DESIGN FEATURES: Robust passenger and cargo transport suitable for operation from semi-prepared airstrips. Adaptable for paramilitary support, with provision for light armament or weapons on two underwing pylons. High wing braced by single strut each side; taper on trailing-edges. Sweptback fin with fillet; tapered tailplane. Engines attached below inboard wing.

FLYING CONTROLS: Conventional and manual. Flight-adjustable trim tabs in rudder, each elevator and each aileron. Rudder and elevators horn-balanced. Three-section flaps each side, two inboard components divided by engine nacelle.

STRUCTURE: Metal fuselage main framework; up to 90 per cent of remainder in "modern composite materials" by SKB ATIC; final assembly by VASO at Voronezh.

LANDING GEAR: Tricycle type; fixed. Wide-track cantilever mainwheel legs. Floats for future seaplane version already wind-tunnel tested at CAHI (TsAGI).

POWER PLANT: Two LOM M337C piston engines, each 184 kW (247 hp) and each driving a two-blade propeller. Normal fuel capacity 350 litres (92.5 US gallons; 77.0 Imp gallons). Optional underwing auxiliary tanks for additional 120 litres (31.7 US gallons; 26.4 Imp gallons).

ACCOMMODATION: Pilot plus up to seven passengers. Cargo door port side, behind wing trailing-edge; emergency exits opposite, and above flight deck. Baggage compartment behind cabin.

DIMENSIONS, EXTERNAL:

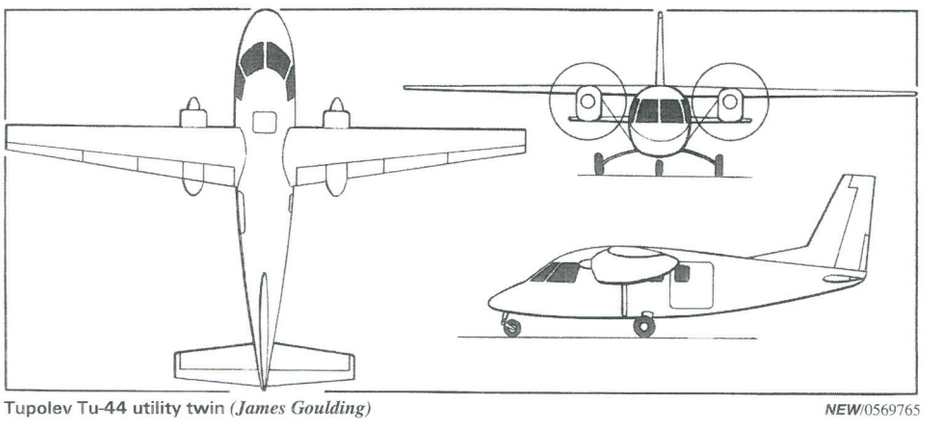
Wing span	13.40 m (43 ft 11½ in)
Length overall	10.10 m (33 ft 1½ in)
Height overall	4.40 m (14 ft 5¼ in)
Wheel track	3.20 m (10 ft 6 in)

DIMENSIONS, INTERNAL:

Cabin: Length	4.40 m (14 ft 5¼ in)
Max width	1.56 m (5 ft 1½ in)
Max height	1.50 m (4 ft 11 in)
Baggage compartment: Length	1.80 m (5 ft 10¾ in)
Max width	1.20 m (3 ft 11¼ in)
Max height	1.10 m (3 ft 7¼ in)

WEIGHTS AND LOADINGS:

Max payload	600 kg (1,333 lb)
Max T-O and landing weight	2,100 kg (4,629 lb)



Tupolev Tu-44 utility twin *(James Goulding)*

NEW/0569765

PERFORMANCE (estimated):
Max level speed 194 kt (360 km/h; 224 mph)
Max certified altitude 6,000 m (19,680 ft)
Range at 167 kt (310 km/h; 193 mph) at FL30:
with five passengers 648 n miles (1,200 km; 745 miles)
ferry with normal fuel
1,187 n miles (2,200 km; 1,367 miles)

NEW ENTRY

TUPOLEV Tu-156

TYPE: Technology demonstrator.

PROGRAMME: Flight trials of Tu-155, a Tu-154B modified with the starboard Kuznetsov NK-88 turbofan operating on liquid hydrogen fuel, began on 15 April 1988; aircraft then modified to use liquefied natural gas (LNG), first flight in this form taking place 18 January 1989. Was world's first aircraft to fly using cryogenic fuels, most of which contained in 17.5 m³ (618 cu ft) tank in rear of passenger cabin.

On 23 April 1994, Russian government allocated funding for conversion of three Tu-154s to Tu-156 standard, delivery of 12 NK-89 turbofans and six cryogenic fuel systems; an installation to supply LNG will be established at Samara. Order reduced to one Tu-156; delivery originally scheduled for 1998, but had not taken place by mid-2003; federal funding of Rb7.5 million and Rb17 million was planned for allocation in 2001 and 2002 respectively to cover construction of a ground test rig for the cryogenic fuel system; total cost of development programme estimated at Rb200 million to 2005, to be funded by Rosaviakosmos (70 per cent), with balance shared equally between Tupolev and Kuznetsov. According to a March 2003 report, half the required funds had been allocated to the Tu-156 programme by that time, but the completion date had been further extended.

CURRENT VERSIONS: **Tu-156S:** Initial kerosene/LNG-powered conversion of Tu-154B, carrying 13,000 kg (28,660 lb) of LNG at rear of cabin and 3,800 kg (8,378 lb) in two underfloor tanks, plus 10,200 kg (22,487 lb) of kerosene in wing tanks; payload 14,000 kg (30,865 lb) or 130 passengers; range 1,403 n miles (2,600 km; 1,615 miles).

Tu-156M: Developed version converted from Tu-154M, carrying 135 passengers; fuel load and performance as Tu-156S.

Tu-156M2: Proposal only; converted from Tu-154M2; 20,000 kg (44,092 lb) of LNG only, carried in two tanks above centre-fuselage allowing passenger load increase to 160; two NK-94 engines; range 2,159 n miles (4,000 km; 2,485 miles).

POWER PLANT: Experimental power plant is 103.0 kN (23,150 lb st) Samara NK-89; tanks for cryogenic fuel mounted in rear of cabin and in forward baggage hold of Tu-156S/M. Aircraft will operate on mixed LNG/kerosene, as Tu-155, kerosene being used for flights out of non-LNG aerodromes and for emergencies, when in-flight switch from LNG can be made in 5 seconds. Tu-156M2 would have only two NK-94 engines, wholly LNG powered.

UPDATED

TUPOLEV Tu-204 and Tu-214

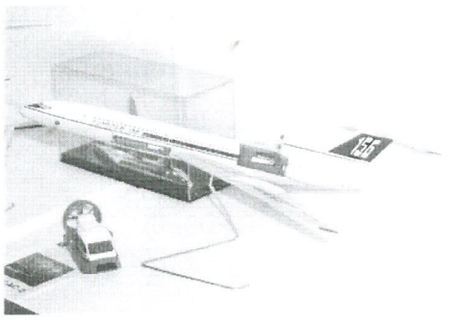
TYPE: Twin-jet airliner.

PROGRAMME:

DEVELOPMENT MILESTONES

Tu-204	
Design began	1983
Programme launched	1986
First flight	2 Jan 89
Production go-ahead	1990
Certification	12 Jan 95
Entered service (Vnukovo Airlines)	23 Feb 96
Subsequent versions:	
Tu-214	
First flight	21 Mar 96
Public debut	Sep 96
Certification	29 Dec 00
Entered service (Dal'avia)	23 May 01
Tu-224	
First flight	8 Jul 00
Tu-234/Tu-204-300	
First flight	17 Aug 03

Development, to replace Tu-154 and Il-62, announced 1983; preliminary details available 1985; programme finalised 1986; first prototype (SSSR-64001), with PS-90AT engines, flown 2 January 1989 by Tupolev chief test pilot A Talalakine; two more prototypes (RA-64003 and 004) followed, plus two (002 and 005) for structural and fatigue testing. Second version, with RB211-535E4-B engines, flew 14 August 1992 (fourth flying prototype, RA-64006) and was demonstrated at Farnborough Air Show in following month.



Model of Tupolev Tu-156M cryogenic aircraft *(Paul Jackson)* 0015138

Production of basic Tu-204 series by Aviastar at Ulyanovsk began 1990, Tu-214 by KAPO at Kazan in 1994; Russian certification of basic Tu-204 received 12 January 1995; used initially only for freight services. First revenue-earning passenger flight, Moscow to Mineralnye Vody, operated by Vnukovo Airlines 23 February 1996. Restrictions on PS-90-engined Tu-204s were eventually removed in mid-1998. Deliveries outside CIS began on 2 November 1998 with handover of -120 and -120C freighter to Air Cairo on seven-year lease.

Avionics upgrade under discussion with NII in mid-2000; goal is six LCD, two-pilot flight deck; estimated cost US$5 million to US$8 million. First application on Tu-204-300.

CURRENT VERSIONS: **Tu-204:** Basic medium-haul airliner for up to 214 passengers or maximum payload of 21,000 kg (46,295 lb); 158.3 kN (35,580 lb st) Aviadvigatel PS-90A turbofans. Marketed 1989. RVSM approval granted 28 December 2000.

Tu-204C: Cargo version of basic Tu-204. (Western marketing designation is Tu-204C, but correct Cyrillic designation, used in Russian literature, is **Tu-204S**.) Certification reportedly imminent in mid-2003.

Tu-204-100: Extended-range passenger version: additional fuel in wing centre-section; dimensions, payload and power plant unchanged; maximum T-O weight 103,000 kg (227,070 lb). Marketed 1993. First flight 9 August 2001.

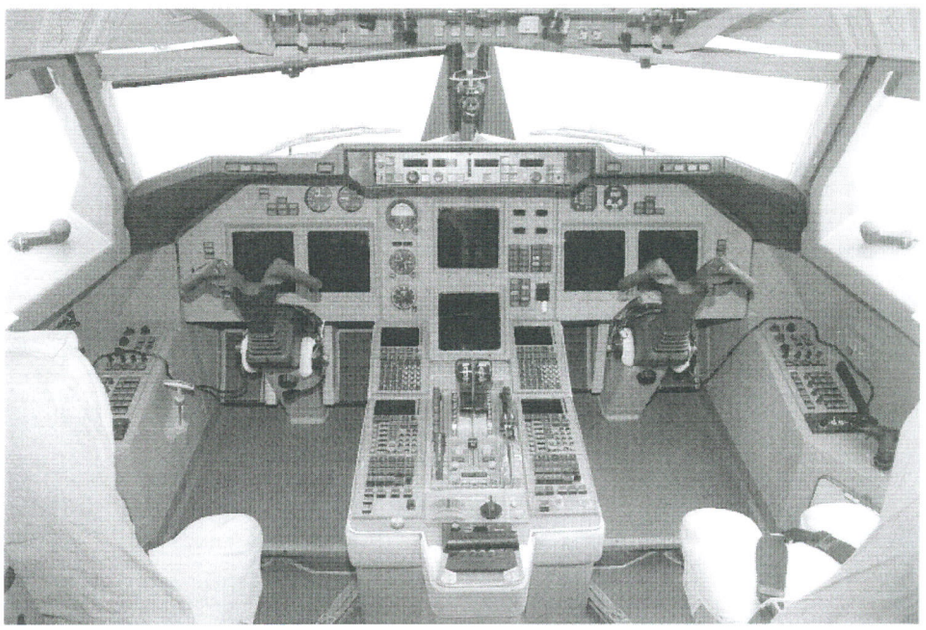
Tu-204-100C: Freighter, as Tu-204-100. Payload increased at expense of reduced maximum range. Marketed 1994. Bulk freight volume 180.0 m³ (6,357 cu ft), not including fore and aft underfloor holds.

Tu-204-120: As Tu-204-100, but with Rolls-Royce RB211-535-E4 turbofans; maximum T-O weight 103,000 kg (227,070 lb); Russian avionics; prototype (RA-64006) flew 14 August 1992. First production aircraft (RA-64027) flew 7 March 1997; gained limited Russian certification on 16 July 1997 and full certification 12 months later. JAA certification effort began May 2001. First five Sirocco 120/120Cs have Russian avionics; later aircraft are Phase II with Honeywell items, including VIA 2000 suite.

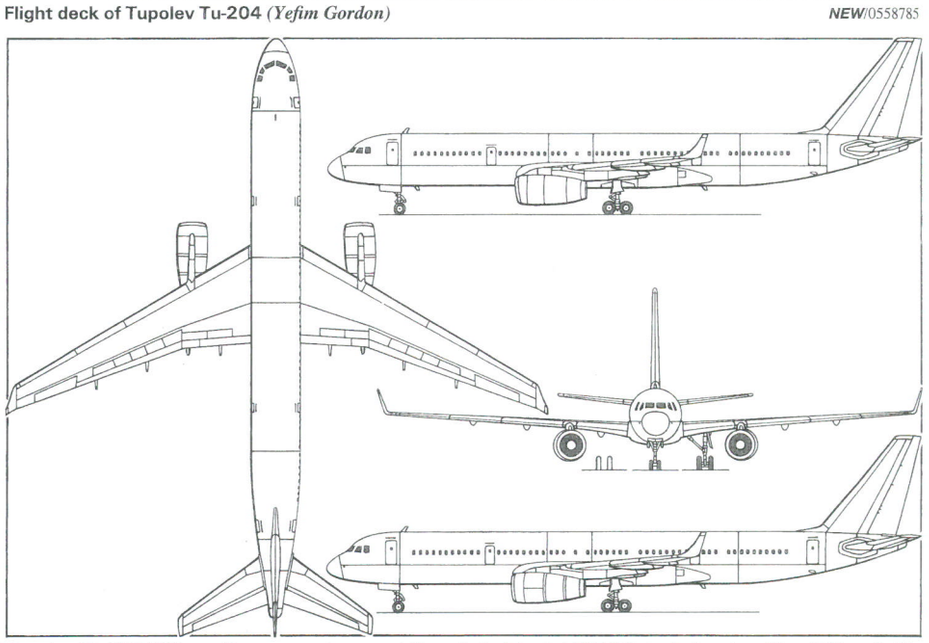
Tu-204-120C: As -100C, but RB211 engines; two for Air Cairo (via Sirocco). First aircraft (RA-64028) flew 10 November 1997; domestic certification completed by August 1998. JAA (now EASA) certification effort began May 2001 and had completed initial testing by beginning of 2004; approval anticipated by end of that year. First delivery 2 November 1998. High gross weight version, with 30,000 kg (66,139 lb) payload, was due for roll-out in August 1999 and Russian certification in May 2000.

Tu-204-122: As Tu-204-120, but with Rockwell Collins avionics. None produced.

Tu-204-200: Further increase in payload and T-O weight; small increase in fuel in wing centre-section and adjacent baggage hold; dimensions and power plant as



Flight deck of Tupolev Tu-204 *(Yefim Gordon)* ***NEW***/0558785



Tupolev Tu-204-200 medium-range transport (two Aviadvigatel PS-90A turbofans), with additional side view (top) of Tu-204-220 *(Jane's/Mike Keep)*



Tupolev Tu-204C air freighter *(Yefim Gordon)* NEW/0558783

Tu-204-100; strengthened landing gear; marketed 1994. First example of Series 200 was a Tu-214 freighter, first flown in March 1996; first true Tu-204-200 (RA-64036) was nearing completion at Ulyanovsk in late 1998; PS-90 engines. By mid-2000, **Tu-214** designation was being used for this version.

Tu-204-200C: As Tu-204-200. Payload increased at expense of reduced maximum range. Marketed 1994. Also designated **Tu-214C**.

Tu-204-200C[3] (Cargo, Converted, Containerised): Combi version, marketed as **Tu-214C**[3].

Tu-204P: Proposed military patrol (*patrulnyi*) version of Tu-204-200. It was reported in January 1997 that the Russian Navy had approved an anti-submarine version of Tu-204 to replace its Il-38 'May' and shorter-range Be-12 'Mail' patrollers. Leninets Novella (export name Sea Dragon) surveillance suite. By 2002, reported that interest declining in favour of reinstated Beriev A-40 flying-boat.

Tu-204-220: As Tu-204-200, but 191.7 kN (43,100 lb st) Rolls-Royce RB211-535E4 or RB211-535F5 turbofans; Tupolev-funded variant with 185.5 kN (41,700 lb st) Pratt & Whitney PW2240 turbofans; promotion began 1998. Is Tu-214 variant, designated **Tu-224** by KAPO.

Tu-204-220C: Cargo version of Tu-204-220.

Tu-204-222: As Tu-204-220, but with Rockwell Collins avionics.

Tu-204-230: With 176.5 kN (39,683 lb st) Samara NK-93 turbofans. At initial project stage.

Tu-204 Business Jet: Scheduled to fly in 1998, but had failed to do so by mid-2003.

Tu-204-300: See Tu-234. Aviastar prototype (PS-90P engines) in final assembly May 2003; maiden flight (RA-64026) 17 August 2003 and public debut at MAKS 2003 following day.

Tu-204-400: Version for 240 passengers; digital avionics; uprated PS-90A2 turbofans for 120,000 kg (264,550 lb) MTOW. Aviastar production.

Tu-204-500: PS-90A2 engines and fuselage stretch to 52.00 m (170 ft 7¼ in); possible wing redesign for higher cruising speeds; private venture outside government's aviation plan. Aviastar production. Designation first reported in early 2000.

Tu-204K: Projected dual-fuel version. Previously known as Tu-204-600, then Tu-206.

TUPOLEV Tu-204 OPERATORS*
(at 31 August 2003)

Airline	Variant	In service	On order
Air Cairo	204-120	3	
	204-120C		1
Atlantic Aviation	204-120C	2	
Aviast Air	214		3
	214C		1
China Northwest	204-120C		2
China Southwest	204-120C		3
Dal'avia	214	2	3
KMV	204-100	2	
Kras Air	204-100	2	3
Omsk Airlines	214		4
Rossiya	214	2	
Sibir	204-100	2	
Transaero	204-100/200/300		10
	204-300		4
Totals		**15**	**34**

* *Include long-term leases*

Tu-304 and **Tu-306**: Projected 400-seat versions, latter fuelled by LNG. Not built.

Tu-214: Longer-range, increased-weight version of Tu-204, produced by KAPO. Prototype (RA-64501) rolled out at Kazan 5 February 1996; first flew 21 March 1996; public debut at Farnborough Air Show, September 1996. Provisional certification awarded 1998. PW2037 being assessed as an alternative to PS-90A. By early 2000, Kazan stock included seven partly complete Tu-214s from initial production batch of 18. Flight testing of prototype suspended after some 300 sorties, but resumed in May 2000 with further series of 85 flights leading to 'second class' AP-25 certification in March 2000 and full approval on 29 December 2000. First of two aircraft for Dal'avia (s/n 64502) made its first flight on 10 April 2001, and was delivered on 23 May 2001, for service on routes between Moscow and Asia; second received 20 October 2001.

Tu-214C[3]: Combi version, based on Tu-204-200C[3]; also designated Tu-214-200C[3]; announced 1995. Typical loads in main cabin (additional to those in underfloor compartments) comprise 16 LD3 containers and 30 passengers; or six containers and 130 persons; or 18 LD3s only.

Tu-214C (alternatively Tu-214-200C): Dedicated cargo version; 3.405 × 2.18 m (11 ft 2 in × 7 ft 1¾ in) door. Alternative designation **Tu-214F** quoted in 2002. Atlant-Soyuz may become launch customer.

Tu-214D: Long-range, 150-passenger version, first mentioned mid-2002. Auxiliary fuel tanks in underfloor holds, potentially extending range to 4,967 n miles (9,200 km; 5,716 miles). Certification anticipated in mid-2003.

Tu-214VSSN: VVIP version (*vozdushnoe sudno specialnogo naznacheniya*) for Russian president. Fourth production Tu-214 (RA-64504) is in this configuration; first flight 22 June 2002.

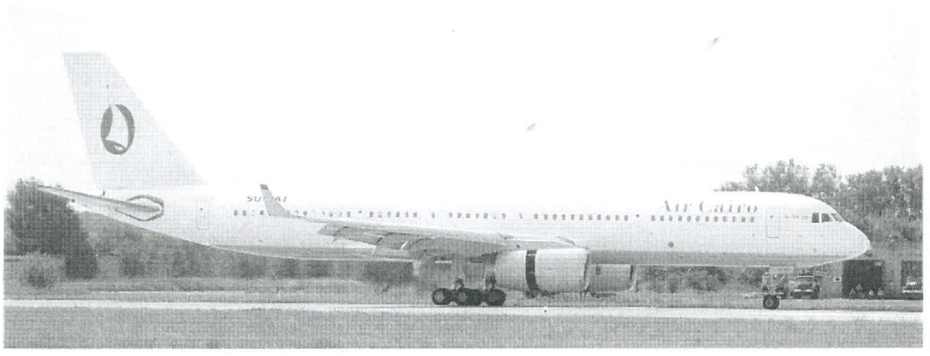
Tu-216: Dual-fuel KAPO counterpart of Tu-204K.

Tu-224 and **Tu-234**: KAPO equivalents of Tu-204-220 and Tu-204-300 respectively. Announced 1994; trunk route versions with fuselage shortened by 5.80 m (19 ft 0¼ in): 3.00 m (9 ft 10 in) forward and 2.80 m (9 ft 2¼ in) aft of wing; short-range and mid-range models for 166 passengers, long-range model for 99 to 160 passengers; Tu-224 has RB211-535E4 engines; Tu-234 has 158.3 kN (35,580 lb st) PS-90A engines. Prototype Tu-234 (rebuild of original Tu-204 prototype RA-64001) rolled out on 24 August 1995 at Moscow Air Show, but used only for static testing. First production aircraft (RA-64026, built by Aviastar at Ulyanovsk) rolled out, minus engines, in mid-1996; fitted with PS-90s in early 2000 and first flew 8 July 2000 (ahead of prototype). RA-64026 later became Tu-204-300 prototype. Option for 20 Tu-234s signed by Transaero at MAKS air show, August 2003. **Tu-234C** cargo version planned.

CUSTOMERS: Current operators are given in the table. There have been many more commitments and announced intentions which have failed to materialise. According to KAPO announcements in 2003, orders for the Tu-214 were received during the year from the Russian MoD (three), GTK Rossiya (three), Dal'avia (two), Omskavia (four), Aviast (four, including one cargo), and the Bulgarian Carriers Air Sofia and BH Air (total of four).



Prototype Tupolev Tu-204-300 (Tu-234) at Moscow in August 2003 *(Yefim Gordon)* NEW/0558782



Air Cairo Tupolev Tu-204-120 *(Paul Jackson)* ***NEW***/0558567

Many early Tu-204s have changed ownership since delivery. In addition, Tupolev has four aircraft, while two were used only for static testing. KMV (Kaminvodyavia) aircraft owned by Perm engine plant, which took two Tu-204s in lieu of cash payment for PS-90s; one Perm aircraft sold to Sibir in December 1999. Siberia Airlines also planning to acquire three Tu-214s from Kazan line.

COSTS: With PS-90 engines and Russian avionics US$27 million (2001); with RB211-535 engines US$38 million (1996).

DESIGN FEATURES: Conventional low/mid-wing configuration, with all surfaces swept back, and winglets; wing dihedral from roots; semi-monocoque oval section pressurised fuselage; torsion box of fin forms integral fuel tank, used for automatic trimming of CG in flight; design life 45,000 flights, 60,000 flight hours or 20 years.

Wing section supercritical; sweepback 28°; thickness/chord ratio 14 per cent at root, 9 to 10 per cent at tip; negative twist.

FLYING CONTROLS: Triplex digital fly-by-wire, with triplex analogue back-up; conventional 'Y' control yokes selected after evaluation of alternative sidestick on Tu-154 testbed; inset aileron outboard of two-section double-slotted flap on each wing trailing-edge; two-section upper surface airbrake forward of each centre-section flap; five-section spoiler forward of each outer flap; four-section leading-edge slat over full span of each wing; conventional rudder and elevators; no tabs.

STRUCTURE: Approximately 18 per cent of airframe by weight of composites; three-piece two-spar wing, with metal structure, part composites skin; carbon fibre skin on spoilers, airbrakes and flaps; glass fibre wingroot fairings; all-metal fuselage, utilising aluminium-lithium and titanium; nose radome and some access panels of composites; extensive use of composites in tail unit, particularly for leading-edges of fixed surfaces and for rudder and elevators.

LANDING GEAR: Hydraulically retractable tricycle type; electrohydraulically steerable twin-wheel nose unit (±10° via rudder pedals; ±70° by electric steering control) retracts forward; four-wheel bogie main units retract inward into wing/fuselage fairings. Rubin KT-196 wheels on all units. Carbon disc brakes, electrically controlled. Tyre size 1,070×390 on mainwheels, 840×290 on nosewheels. Original Russian (NIIShP) or Goodyear radial tyres progressively replaced from 2000 by Michelin M12601-01 type.

POWER PLANT: Two turbofans (see notes on versions), underwing in composites cowlings. Tu-204-200 series carries fuel in six integral tanks in wings, in centre-section and adjacent baggage hold, and in tailfin, total capacity 40,730 litres (10,760 US gallons; 8,960 Imp gallons); torsion box of fin forms integral fuel tank for automatic trimming of CG in flight, as well as for optional standard use.

ACCOMMODATION: Can be operated by pilot and co-pilot, but Aeroflot specified requirement for a flight engineer; provision for fourth seat for instructor or observer. Three basic single-aisle passenger arrangements in Tu-204-200 series: (1) 184 seats, with 30 business class seats six-abreast at pitch of 96 cm (38 in) at front, and 154 tourist class seats six-abreast at pitch of 81 cm (32 in) at rear; (2) 200 six-abreast tourist class seats at pitch of 81 cm (32 in); (3) 212 seats six-abreast at tourist class pitch of 81 cm (32 in). Tu-234 has 162 seats in short-range version, 145 seats at same pitch in mid-range and 102 seats in long-range version, all at 81 cm (32 in) pitch. All configurations have buffet/galley and lavatory immediately aft of flight deck; 184-seat and 200-seat configurations have two more lavatories in tourist cabin and a further large buffet/galley and service compartment at rear of passenger accommodation; 212-seat configuration has two lavatories and galley at rear; overhead stowage for hand baggage. Other layouts optional, with increased galley and lavatory provisions.

Passenger doors at front and rear of cabin on port side; service doors opposite. Type I emergency exit doors fore and aft of wing each side; inflatable slide for emergency use at each of eight doors. Tu-204-200 has two underfloor baggage/freight holds for total of eight LD-3-46 international class containers, three in forward hold, five in rear hold (AK-07 containers in Tu-204 and 204-100). Fully automatic container loading system; manual back-up.

SYSTEMS: Triplex fly-by-wire digital control system, with triplex analogue back-up; Barco Display Systems selected in 2000 to supply FMS computers. Three independent hydraulic systems, pressure 207 bar (3,000 lb/sq in). Ailerons, elevators, rudder, spoilers and airbrakes operated by all three systems; flaps, leading-edge slats, brakes and nosewheel steering operated by two systems; landing gear retraction and extension by all three systems. Electrical power supplied by two 200/115 V 400 Hz AC generators and a 27 V DC standby system. Type TA-12-60 APU in tailcone.

AVIONICS: Avionics of Russian design or, optionally, integrated by Sextant Avionique or Honeywell, with standard nav/com equipment by Rockwell Collins.

Comms: VHF and HF radio, intercom.

Radar: Weather radar.

Flight: KSPNO-204 triplex automatic flight control and navigation system (being upgraded in 2002), VOR, DME, automatic approach and landing system, for operation to ICAO Cat. IIIa minima; Series 100/200 have RLG INS (Litton LTN-101 or Honeywell HG115OBD02), GPS (Litton LTN-2001) and TCAS II (Honeywell).

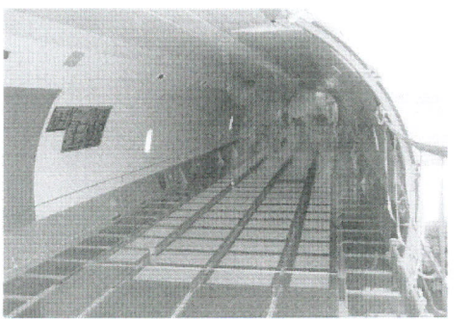
Instrumentation: EFIS equipment comprises two colour CRTs for flight and nav information for each pilot, plus two central CRTs for engine and systems data. All six to have been replaced by LCDs by end of 2002.

DIMENSIONS, EXTERNAL (A: 204, B: 204-100 (and 204C unless otherwise stated), C: 204-120 (and 204-120C unless otherwise stated), D: 204-200 and Tu-214, E: 204-220, F: 234 short-range, G: 234 mid-range, H: 234 long-range, J: 224):

Wing span: all	41.80 m (137 ft 1¾ in)
Wing aspect ratio: all	9.6
Length overall: A, B, C, D, E	46.16 m (151 ft 5¼ in)
F, G, H, J	40.20 m (131 ft 10¾ in)
Fuselage cross-section:	
all	3.80 × 4.10 m (12 ft 5½ in × 13 ft 5½ in)
Height overall: all	13.90 m (45 ft 7¼ in)
Tailplane span: A, B, C, D, E	15.00 m (49 ft 2½ in)
Wheel track: A, B, C, D, E	7.82 m (25 ft 8 in)
Wheelbase: A, B, C, D, E	17.00 m (55 ft 9¼ in)
Passenger doors (each): Height: all	1.85 m (6 ft 0¾ in)
Width: all	0.84 m (2 ft 9 in)
Service doors (each): Height: all	1.60 m (5 ft 3 in)
Width: all	0.65 m (2 ft 1½ in)
Cargo door (appropriate versions):	
Height	2.18 m (7 ft 1¾ in)
Width	3.405 m (11 ft 2 in)
Emergency exit doors (each):	
Height: all	1.44 m (4 ft 8¾ in)
Width: all	0.61 m (2 ft 0 in)
Baggage holds:	
Height to sill: all	2.71 m (8 ft 10¾ in)

DIMENSIONS, INTERNAL:

Cabin, excl flight deck:	
Length: A, B, C, D, E	30.18 m (99 ft 0 in)
Max width: all	3.57 m (11 ft 8½ in)
Max height: all	2.28 m (7 ft 6 in)
Fwd cargo hold:	
Height: all	1.16 m (3 ft 9¾ in)
Volume: A, B, C	11.0 m³ (388 cu ft)
Rear cargo hold:	
Height: A, B, C, D, E	1.16 m (3 ft 9¾ in)
Volume: A, B, C	15.4 m³ (544 cu ft)



Interior of Tupolev Tu-204C *(Yefim Gordon)* ***NEW***/0558784

AREAS:

Wings, gross: all	182.40 m² (1,963.4 sq ft)

WEIGHTS AND LOADINGS:

Operational weight empty: A	58,300 kg (128,530 lb)
B	58,800 kg (129,630 lb)
C	59,300 kg (130,735 lb)
D, E	59,000 kg (130,070 lb)
Tu-214 freighter	57,000 kg (125,665 lb)
Max payload: A, B, C	21,000 kg (46,296 lb)
204C	27,000 kg (59,524 lb)
204-120C	25,000 kg (55,116 lb)
D, E (weight limited), J	25,200 kg (55,555 lb)
Tu-214 freighter	30,000 kg (66,139 lb)
F, space limited (196 seats)	19,565 kg (43,132 lb)
F, G	18,000 kg (39,682 lb)
H	12,000 kg (26,455 lb)
Payload with max fuel: 204C	13,900 kg (30,644 lb)
204-120C	13,200 kg (29,101 lb)
Max baggage/freight:	
fwd hold: E	3,625 kg (7,990 lb)
rear hold: E	5,075 kg (11,190 lb)
Max fuel: A	24,000 kg (52,910 lb)
B, C, D, E, J	32,700 kg (72,090 lb)
F	24,300 kg (53,572 lb)
G, H	35,000 kg (77,162 lb)
Max ramp weight: E	111,750 kg (246,360 lb)
Max T-O weight: A	94,600 kg (208,550 lb)
B, C	103,000 kg (227,075 lb)
D, E, J	110,750 kg (244,155 lb)
F	88,000 kg (194,005 lb)
G, H	103,000 kg (227,070 lb)
Max landing weight: B, C	89,500 kg (197,310 lb)
F, G, H	88,000 kg (194,005 lb)
Max zero-fuel weight: E	84,200 kg (185,625 lb)
Max wing loading: A	518.6 kg/m² (106.23 lb/sq ft)
B, C	564.7 kg/m² (115.66 lb/sq ft)
D, E, J	607.2 kg/m² (124.36 lb/sq ft)
F	482.5 kg/m² (98.81 lb/sq ft)
G, H	564.7 kg/m² (115.66 lb/sq ft)
Max power loading: A	299 kg/kN (2.93 lb/lb st)
B	325 kg/kN (3.19 lb/lb st)
C	269 kg/kN (2.63 lb/lb st)
D	350 kg/kN (3.43 lb/lb st)
E	289 kg/kN (2.83 lb/lb st)
F	278 kg/kN (2.73 lb/lb st)
G, H	325 kg/kN (3.19 lb/lb st)

PERFORMANCE:

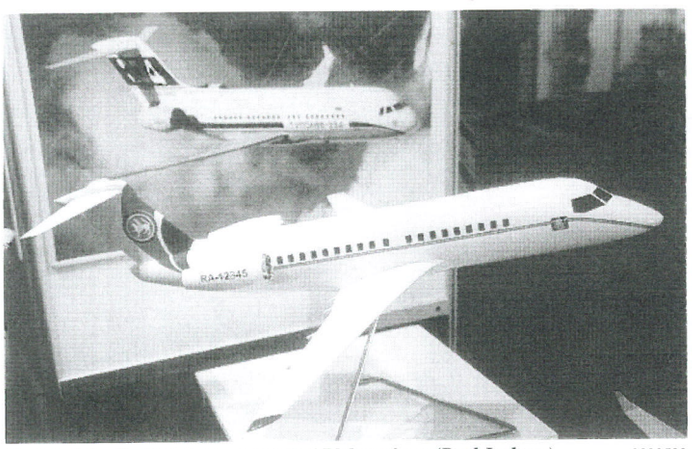
Nominal cruising speed at 11,100-12,100 m (36,400-39,700 ft):	
A, B, C, D, E	437-459 kt (810-850 km/h; 503-528 mph)
F, G, H	448-459 kt (830-850 km/h; 515-528 mph)
Approach speed: F	119 kt (220 km/h; 137 mph)
G, H	122 kt (225 km/h; 140 mph)
Cruising height	12,100 m (39,700 ft)
T-O run: F	1,450 m (4,760 ft)
G, H	2,050 m (6,725 ft)
Required T-O runway at max T-O weight:	
A	2,030 m (6,660 ft)
B (except 204C), D, E	2,045 m (6,710 ft)
204C	2,160 m (7,090 ft)
C	1,830 m (6,005 ft)
J	2,630 m (8,630 ft)
Required landing runway: F, G, H	2,000 m (6,565 ft)
Range:	
with max payload:	
A	1,312 n miles (2,430 km; 1,509 miles)
B	2,321 n miles (4,300 km; 2,671 miles)
Tu-204C	2,321 n miles (4,300 km; 2,671 miles)
C	2,213 n miles (4,100 km; 2,547 miles)
Tu-204-120C	1,808 n miles (3,350 km; 2,081 miles)
D	2,591 n miles (4,800 km; 2,982 miles)
Tu-214 passenger	3,374 n miles (6,250 km; 3,883 miles)
E	2,483 n miles (4,600 km; 2,858 miles)
with design payload:	
B	3,509 n miles (6,500 km; 4,038 miles)
F	1,403 n miles (2,600 km; 1,615 miles)
G	3,617 n miles (6,700 km; 4,163 miles)
H	4,990 n miles (9,250 km; 5,750 miles)
with max fuel:	
Tu-204C	3,671 n miles (6,800 km; 4,225 miles)
Tu-204-120C	3,542 n miles (6,560 km; 4,076 miles)
J	3,617 n miles (6,700 km; 4,163 miles)

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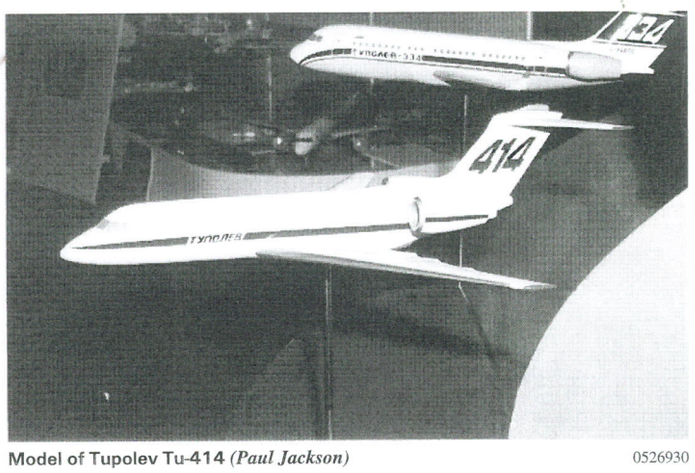
TUPOLEV Tu-324 and Tu-414

TYPE: Regional jet airliner.

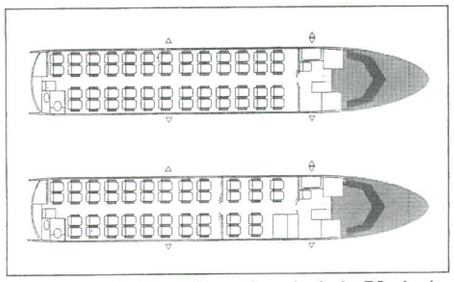
PROGRAMME: Announced at 1995 Paris Air Show; proposed manufacture by KAPO at Kazan, Tatarstan, from 2003. Specification revised 1996 and further refined in 1997 when governments of Russia and Tatarstan agreed on 20 August to 50:50 sharing of development costs, to which latter had contributed some US$70 million by late 2002. Tatarstan placed symbolic first order for a presidential transport (since superseded by Tu-214 VSSN, which see). Mockup completed by late 1997; technical documentation issued 2000. Both versions entered for 2002-03 national RRJ competition staged by Rosaviacosmos and eventually won by Sukhoi. Tupolev and KAPO plan to continue



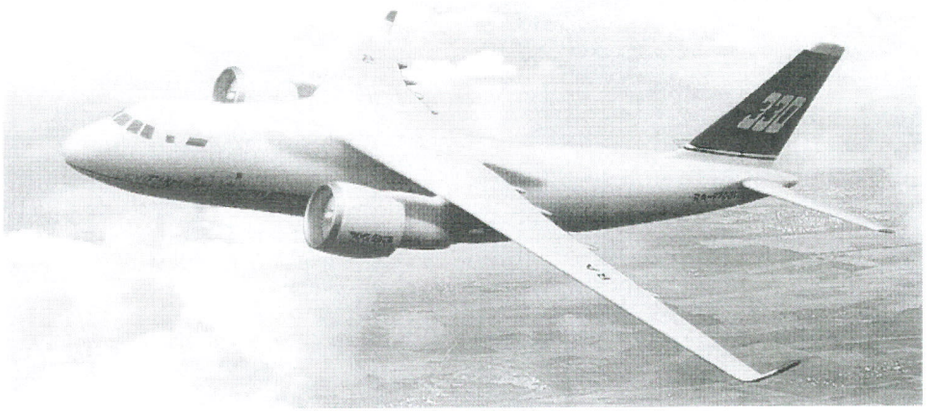
Model of the Tu-324A project with CF34 engines *(Paul Jackson)* 0092533



Model of Tupolev Tu-414 *(Paul Jackson)* 0526930



Tupolev Tu-324R configurations include 50 single-class passengers (top) and 10 business-class plus 34 or 36 tourist-class passengers (bottom) 0024039



Artist's impression of the Tu-330 0525832

development provided non-federal funding can be found; however, reported in March 2003 that Tu-324 had by then been allocated some US$38 million in state funding. Further investment of US$70 million by Tatarstan government reported in July 2003, coupled with statement that prototype manufacture was about to begin. Five prototypes planned; certification targeted for 2005. Is first Russian aircraft programme designed entirely with use of computers.

CURRENT VERSIONS: **Tu-324A**: (*Administrativny*: executive) VIP transport, carrying up to 10 passengers.

Tu-324R: Regional airliner: 52 seats in single-class configuration: 10 + 34 or 36 in two-class.

Tu-414: Long-term project for stretching to 70-seat airliner, possibly with Ivchenko Progress D-436T1 or Rolls-Royce Deutschland BR710-48 turbofans.

CUSTOMERS: Estimated market for 400 to 450, including 150 Tu-324A.

COSTS: Estimated total programme cost US$330 million; Tu-324A US$10 million, export versions US$15 million to US$20 million (2001).

DESIGN FEATURES: Wings scaled down from Tu-204; illustrations show the aircraft with and without winglets.

LANDING GEAR: Messier-Dowty main contractor.

POWER PLANT: Two General Electric CF34-3B1 turbofans, each 41.0 kN (9,220 lb st), in pods on sides of rear fuselage. Alternatives under consideration include Progress AI-22 and Soyuz TRDD R-126-300.

AVIONICS: Honeywell main supplier.

DIMENSIONS, EXTERNAL:

Wing span	23.20 m (76 ft 1½ in)
Length overall: Tu-324A	23.00 m (75 ft 5½ in)
Tu-324R	25.50 m (83 ft 8 in)
Height overall	7.10 m (23 ft 3½ in)

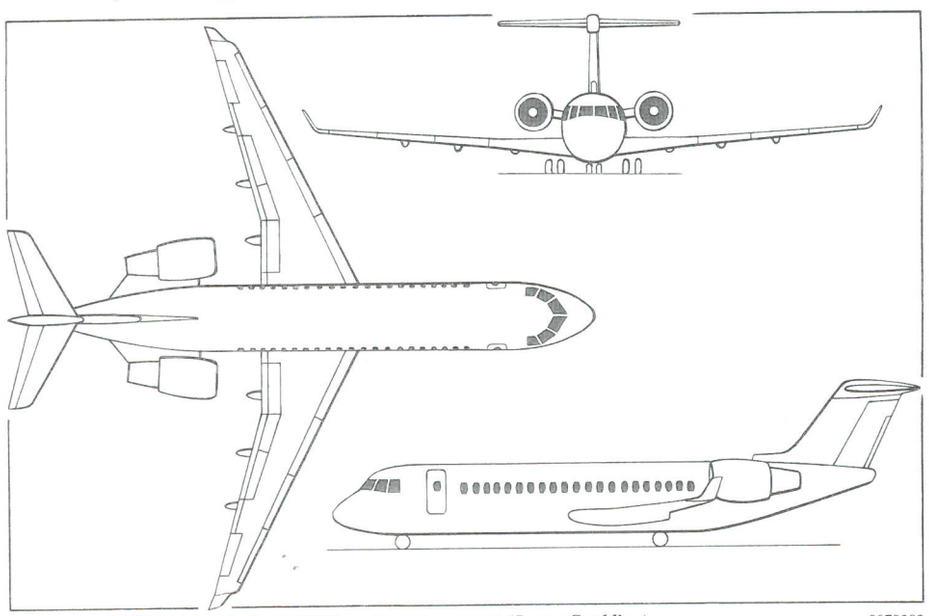
WEIGHTS AND LOADINGS:

Max payload: Tu-324A	1,800 kg (3,968 lb)
Tu-324R	5,500 kg (12,125 lb)
Max T-O weight: Tu-324A, Tu-324R	23,700 kg (52,249 lb)

PERFORMANCE (estimated, AI-22 engines):

Max cruising speed	448-459 kt (830-850 km/h; 516-528 mph)
Max certified altitude	11,600 m (38,060 ft)
Balanced runway length	1,800 m (5,910 ft)
Range:	
Tu-324R: with 52 passengers	1,349 n miles (2,500 km; 1,553 miles)
with 46 passengers	1,619 n miles (3,000 km; 1,864 miles)
Tu-324A, 8 passengers	4,022 n miles (7,450 km; 4,629 miles)

UPDATED



Tupolev Tu-324R twin turbofan (AI-22) regional transport *(James Goulding)* 0079303

TUPOLEV Tu-330

TYPE: Twin-jet freighter.

PROGRAMME: Announced early 1993 as replacement for Antonov An-12; government support announced April 1994; first 10 to be built at Kazan; first flight scheduled 1997, for service from 1998; neither target achieved. Production at both KAPO and Samara. Stated by commander of Russian Military Transport Aviation to be one of three basic types to be operated by his force in 21st century. Production drawings released by Tupolev to KAPO at Kazan in late 1997 and construction then begun. By early 2000 the venture was being offered as a potential partnership.

Tu-330 included in federal plans for civil aviation up to 2015, requiring investment of equivalent of US$340 million over seven years. Tupolev expenditure to early 2000 totalled Rb80 million. Kazan plant hoped for production launch in 2002, but funding still awaited in mid-2003. However, Russian Air Forces' reluctance to accept An-70 seen to improve Tu-330's chances of go-ahead, and named in 2003 as one of two main contenders (with Il-214) to replace An-12.

CURRENT VERSIONS: **Tu-330**: *As described.*

Tu-330K (previously Tu-338): Proposed cryogenic-fuelled version with Samara NK-94 engines and 20,000 kg (44,092 lb) of liquid natural gas.

COSTS: Unit price US$25 million to US$35 million (2000, estimate). Estimated cost of two flying and two ground test aircraft, plus certification, US$100 million (2003).

DESIGN FEATURES: See accompanying three-view drawing: said to have 75 per cent commonality with Tu-204. Wing design basically similar to Tu-204; engine pylons as Tu-204; rear-loading ramp. Potential secondary applications include refuelling tanker and maritime patroller.

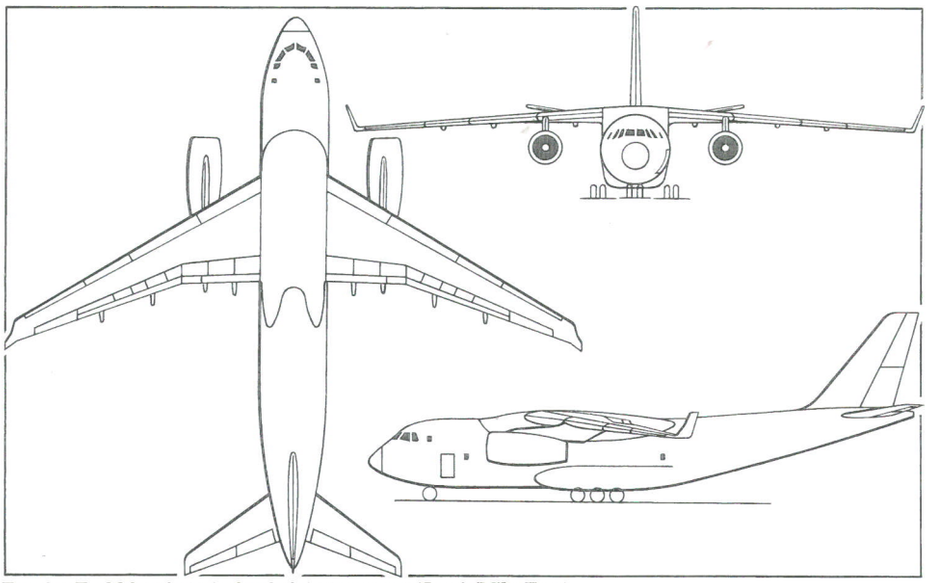
FLYING CONTROLS: Each wing has four-section leading-edge flaps, three-section trailing-edge flaps, eight spoilers forward of flaps, and aileron. Elevators and rudder each in two sections.

LANDING GEAR: Retractable tricycle type; twin-wheel, rearwards-retracting nose unit; each main unit has three pairs of wheels in tandem. Able to operate from concrete or grass.

POWER PLANT: Two Aviadvigatel PS-90A turbofans. Rolls-Royce and Pratt & Whitney turbofans under consideration for export sales. Tu-330K is projected for LNG transportation, with three tanks in the cabin for 22,800 kg (50,265 lb) of LNG.

DIMENSIONS, EXTERNAL:

Wing span over winglets	43.50 m (142 ft 8½ in)
Wing aspect ratio	9.7
Length overall	42.00 m (137 ft 9½ in)
Height overall	14.00 m (45 ft 1¼ in)
Rear-loading ramp: Length	4.00 m (13 ft 1½ in)
Width	4.00 m (13 ft 1½ in)



Tupolev Tu-330 twin-turbofan freight transport *(Jane's/Mike Keep)*

DIMENSIONS, INTERNAL:

Cargo hold:	
Length: excl ramp	19.50 m (63 ft 11½ in)
incl ramp	23.50 m (77 ft 1¼ in)
Width at floor	4.00 m (13 ft 1½ in)
Height: min	3.55 m (11 ft 7¾ in)
max	4.00 m (13 ft 1½ in)
Volume	350.0 m³ (12,360 cu ft)
AREAS:	
Wings, gross	195.50 m² (2,104.3 sq ft)
WEIGHTS AND LOADINGS:	
Payload: in hold	30,000 kg (66,139 lb)
on ramp	5,000 kg (11,023 lb)
max	35,000 kg (77,162 lb)
Max T-O weight	103,500 kg (228,175 lb)
Max wing loading	529.4 kg/m² (108.43 lb/sq ft)

PERFORMANCE (estimated):

Nominal cruising speed at 11,000 m (36,000 ft)
431-458 kt (800-850 km/h; 497-528 mph)
T-O and landing distance 2,200 m (7,220 ft)
Nominal range:
with 15,000 kg (33,069 lb) payload
3,779 n miles (7,000 km; 4,349 miles)
with 20,000 kg (44,090 lb) payload
3,020 n miles (5,600 km; 3,480 miles)
with 30,000 kg (66,139 lb) payload
1,620 n miles (3,000 km; 1,865 miles)

UPDATED

TUPOLEV Tu-334, Tu-336 and Tu-354

TYPE: Twin-jet airliner.

PROGRAMME: Launched 1986, with target first flight in 1991 and service entry in 1995; chief designer Igor Kaligin. First prototype Tu-334 (RA-94001) eventually rolled out at Zhukovsky during Moscow Air Show, 25 August 1995; then scheduled to fly 1996 with D-436T1 engines, but delayed by funding shortages. Refinancing by Ukrainian government in early 1997 resulted in new target date of May/June 1997 for first Tu-334s built by Aviant at Kiev; this also missed; second and third identical, but non-flying, prototypes under construction at Zhukovsky by 1996; second used for static tests at CAHI (TsAGI) 1996; unidentified test airframe delivered to Aviatest LNK at Riga from Kiev in mid-2000 to simulate 20 year fatigue life; further two prototypes and three production aircraft under construction at Kiev by early 1999 (three for full assembly by Aviant; part of fuselage and wings of other two for delivery to RSK 'MiG' at Lukhovitsy). RA-94001 eventually flown 8 February 1999 and had achieved eight sorties by time of public debut at Moscow in August 1999. Plans for 200 flights in 2001 not achieved (114 only), and total of only some 180 hours in 144 flights logged by April 2002. Only about one-quarter of planned 900 test and certification flights achieved by mid-2003, at which time second flying prototype (Aviant-built 005) said to be more than 90 per cent complete; was rolled out 2 August 2003 and scheduled to make maiden flight in late September. Completion of third development aircraft (003, first by RSK 'MiG'), anticipated by June 2003, has also slipped, but hoped to be achieved in fourth quarter of 2003.

AP-25/FAR Pt 25 certification programme was due for completion in 2001, but victim of above-mentioned delays, created by erratic funding and delayed delivery of D-436 engines; certification and deliveries now seen as unlikely before 2004 at earliest. TANTK at Taganrog was to have been second source for -100, but Russian government decree of 5 October 1999 nominated RSK 'MiG' (which is to contribute half of certification costs, first payment being made in January 2002); first Taganrog fuselage transported to Voronin Production Centre, Moscow, arriving 7 April 2000. Completion and final assembly was to have been in second quarter of 2001, but this not achieved (see above); Taganrog horizontal tail delivered early 2002. Half of all assemblies and components for RSK 'MiG' production to be supplied by Aviant; other components supplied by Kazan and Ulyanovsk factories.

On 16 June 1997 Rolls-Royce Deutschland agreed loan of BR710 engines to build prototype of Tu-334-120; first flight of -120 had been expected late 1998, but delayed by funding shortages. Revised plans for BR710s to go into -100 prototype, after short test programme with D-436s, also thwarted by aircraft's continued grounding. R-R support now directed at versions powered by BR715 engines.

During mid-1997, AIO of Iran showed interest in establishing a kit assembly line at Esfahan for 100 Tu-334s over 15 years. Negotiations still proceeding in 2002, based on eventual fuselage detailed assembly in Iran, with complete wings from Ukraine and empennage from Russia; peak production of 12 per year envisaged.

CURRENT VERSIONS: **Tu-334-100**: Basic version, with D-436T1 engines, for 72 mixed class or 102 tourist class passengers. Prototypes are of this version.

Tu-334-100C: Combi version of -100; up to six 2.24 × 3.17 m (88 × 125 in) pallets in underfloor compartments.

Tu-334-100M: Variant of -100; MTOW 47,700 kg (105,160 lb); range 1,684 n miles (3,120 km; 1,938 miles). Possibly superseded by -100D.

Tu-334-100D: Extended-range version, announced at Moscow Air Show '95. Basically similar to Tu-334-100, but with increased wing span and uprated D-436T2 engines; increased fuel and maximum T-O weight; 102 seats.

Tu-334-100DS: Cargo version of -100D; max payload 15,000 kg (33,069 lb).

Tu-334-120: As Tu-334-100, but two 88.9 kN (19,995 lb st) Rolls-Royce Deutschland BR715-56 turbofans. Third flying prototype to be in this configuration.

Tu-334-120D: Rolls-Royce Deutschland BR715-56 engines; increased weight and range. Announced 1998.

Tu-334-200: Basically similar to Tu-334-100D and alternatively known as **Tu-354**; D-436T2 engines; fuselage lengthened by 3.90 m (12 ft 9½ in) to accommodate up to 126 passengers at 81 cm (32 in) pitch; increased wing span; four-wheel bogies on main landing gear units. Construction of four by Aviacor in Samara reportedly begun by early 1997, but no recent news from this quarter and Aviacor no longer mentioned in connection with Tu-334 programme.

Tu-334-200C: Variant of -200; combi with same payload.

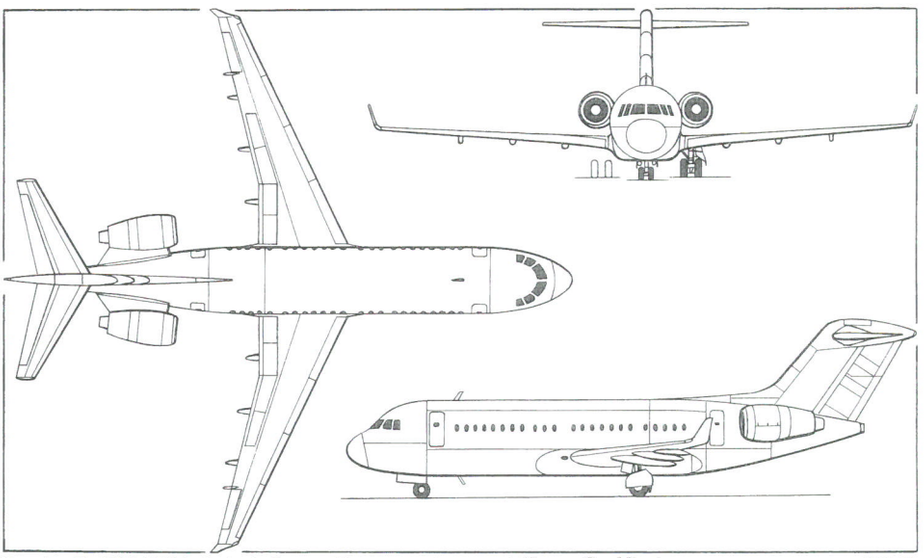
Tu-334-220: Further increased MTOW; BR715-56 engines. Announced 1998.

Tu-334-220D: Extended-range version of -220.

Tu-334C: Cargo version; at design study stage 1995.

Tu-336: Cryogenic-fuelled version of Tu-334 with 13,000 kg (28,660 lb) of liquid natural gas in two faired tanks extending full length of cabin roof; Ivchenko Progress D-436T2 engines; 102 passengers; range 1,457 n miles (2,700 km; 1,677 miles). Revealed 1998; still planned eventually, but no recent news.

CUSTOMERS: Provisional orders in 1995 for approximately 40 aircraft, for Rossiya Airlines, Bashkiri Airlines, Tyumen Airlines and Tatarstan Airlines; total increased to 300 from 24 airlines by 2003. MoU for 20 Tu-334-120s signed by Aeroflot in June 2000; other letters of intent from Atlant Soyuz (two) and Pulkovo (15 to 20) during first half of 2002. First firm orders (five Tu-334-100s each for Aerofraht and Atlant Soyuz Airlines) announced by RSK 'MiG' at MAKS air show, August 2003; deliveries, to latter, to begin in 2005. CIS market estimated as about 350 by Rosaviakosmos; by 1999. Iranian airlines committed to purchase 50 from local assembly.



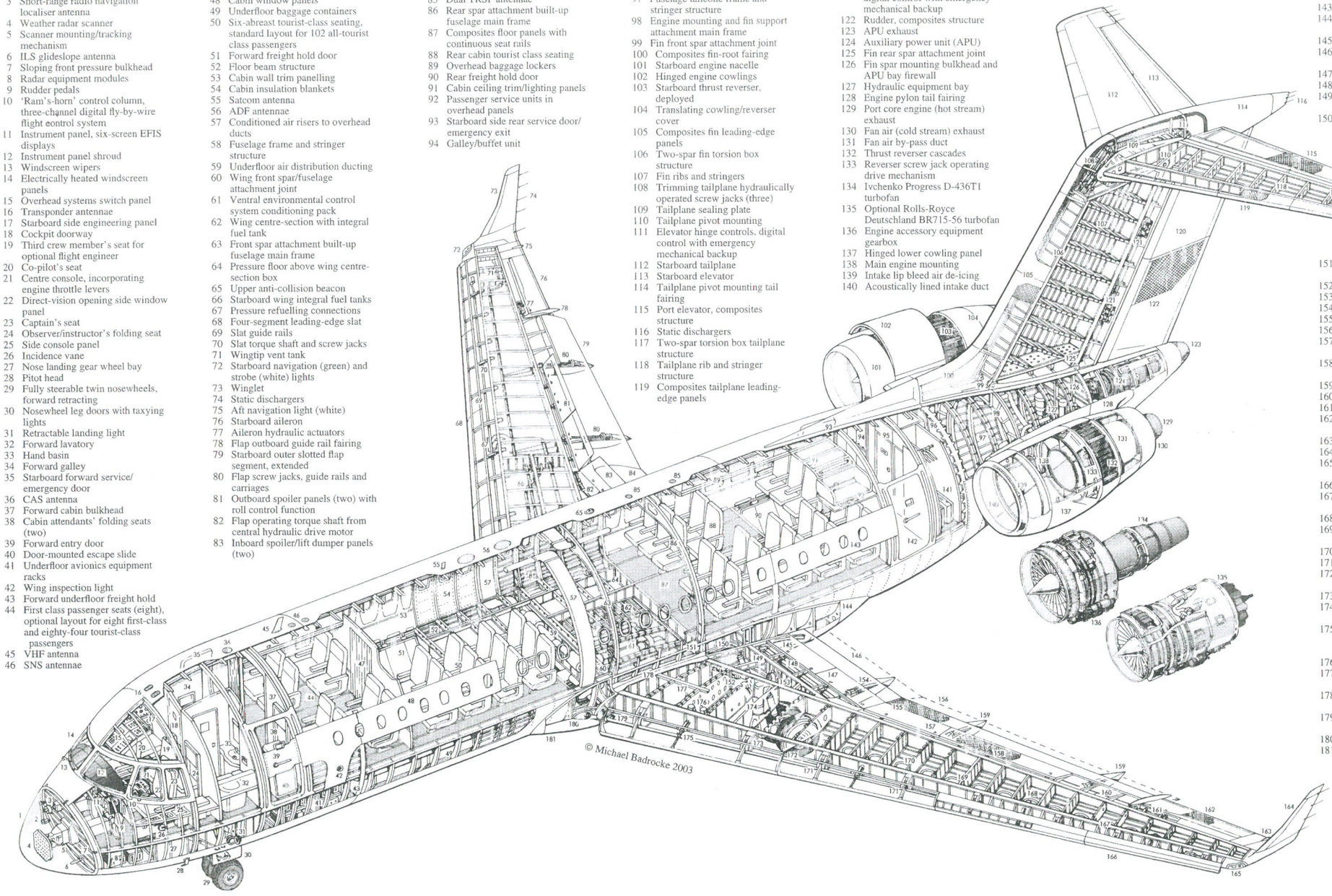
Tupolev Tu-334-100 twin-turbofan medium-range transport *(James Goulding)* 0084429



Prototype Tu-334 RA-94001 displaying at Moscow salon *(Paul Jackson)* 0525760

Tupolev Tu-334, cutaway drawing key

1 Glass fibre radome
2 Radome hinge, opens to starboard
3 Short-range radio navigation localiser antenna
4 Weather radar scanner
5 Scanner mounting/tracking mechanism
6 ILS glideslope antenna
7 Sloping front pressure bulkhead
8 Radar equipment modules
9 Rudder pedals
10 'Ram's-horn' control column, three-channel digital fly-by-wire flight control system
11 Instrument panel, six-screen EFIS displays
12 Instrument panel shroud
13 Windscreen wipers
14 Electrically heated windscreen panels
15 Overhead systems switch panel
16 Transponder antennae
17 Starboard side engineering panel
18 Cockpit doorway
19 Third crew member's seat for optional flight engineer
20 Co-pilot's seat
21 Centre console, incorporating engine throttle levers
22 Direct-vision opening side window panel
23 Captain's seat
24 Observer/instructor's folding seat
25 Side console panel
26 Incidence vane
27 Nose landing gear wheel bay
28 Pitot head
29 Fully steerable twin nosewheels, forward retracting
30 Nosewheel leg doors with taxying lights
31 Retractable landing light
32 Forward lavatory
33 Hand basin
34 Forward galley
35 Starboard forward service/emergency door
36 CAS antenna
37 Forward cabin bulkhead
38 Cabin attendants' folding seats (two)
39 Forward entry door
40 Door-mounted escape slide
41 Underfloor avionics equipment racks
42 Wing inspection light
43 Forward underfloor freight hold
44 First class passenger seats (eight), optional layout for eight first-class and eighty-four tourist-class passengers
45 VHF antenna
46 SNS antennae
47 Curtained cabin divider, removable
48 Cabin window panels
49 Underfloor baggage containers
50 Six-abreast tourist-class seating, standard layout for 102 all-tourist class passengers
51 Forward freight hold door
52 Floor beam structure
53 Cabin wall trim panelling
54 Cabin insulation blankets
55 Satcom antenna
56 ADF antennae
57 Conditioned air risers to overhead ducts
58 Fuselage frame and stringer structure
59 Underfloor air distribution ducting
60 Wing front spar/fuselage attachment joint
61 Ventral environmental control system conditioning pack
62 Wing centre-section with integral fuel tank
63 Front spar attachment built-up fuselage main frame
64 Pressure floor above wing centre-section box
65 Upper anti-collision beacon
66 Starboard wing integral fuel tanks
67 Pressure refuelling connections
68 Four-segment leading-edge slat
69 Slat guide rails
70 Slat torque shaft and screw jacks
71 Wingtip vent tank
72 Starboard navigation (green) and strobe (white) lights
73 Winglet
74 Static dischargers
75 Aft navigation light (white)
76 Starboard aileron
77 Aileron hydraulic actuators
78 Flap outboard guide rail fairing
79 Starboard outer slotted flap segment, extended
80 Flap screw jacks, guide rails and carriages
81 Outboard spoiler panels (two) with roll control function
82 Flap operating torque shaft from central hydraulic drive motor
83 Inboard spoiler/lift dumper panels (two)
84 Starboard inboard slotted flap segment, extended
85 Dual TRSP antennae
86 Rear spar attachment built-up fuselage main frame
87 Composites floor panels with continuous seat rails
88 Rear cabin tourist class seating
89 Overhead baggage lockers
90 Rear freight hold door
91 Cabin ceiling trim/lighting panels
92 Passenger service units in overhead panels
93 Starboard side rear service door/emergency exit
94 Galley/buffet unit
95 Rear lavatory compartment
96 Rear pressure bulkhead
97 Fuselage tailcone frame and stringer structure
98 Engine mounting and fin support attachment main frame
99 Fin front spar attachment joint
100 Composites fin-root fairing
101 Starboard engine nacelle
102 Hinged engine cowlings
103 Starboard thrust reverser, deployed
104 Translating cowling/reverser cover
105 Composites fin leading-edge panels
106 Two-spar fin torsion box structure
107 Fin ribs and stringers
108 Trimming tailplane hydraulically operated screw jacks (three)
109 Tailplane sealing plate
110 Tailplane pivot mounting
111 Elevator hinge controls, digital control with emergency mechanical backup
112 Starboard tailplane
113 Starboard elevator
114 Tailplane pivot mounting tail fairing
115 Port elevator, composites structure
116 Static dischargers
117 Two-spar torsion box tailplane structure
118 Tailplane rib and stringer structure
119 Composites tailplane leading-edge panels
120 Two-segment rudder
121 Rudder hydraulic actuators, digital control with emergency mechanical backup
122 Rudder, composites structure
123 APU exhaust
124 Auxiliary power unit (APU)
125 Fin rear spar attachment joint
126 Fin spar mounting bulkhead and APU bay firewall
127 Hydraulic equipment bay
128 Engine pylon tail fairing
129 Port core engine (hot stream) exhaust
130 Fan air (cold stream) exhaust
131 Fan air by-pass duct
132 Thrust reverser cascades
133 Reverser screw jack operating drive mechanism
134 Ivchenko Progress D-436T1 turbofan
135 Optional Rolls-Royce Deutschland BR715-56 turbofan
136 Engine accessory equipment gearbox
137 Hinged lower cowling panel
138 Main engine mounting
139 Intake lip bleed air de-icing
140 Acoustically lined intake duct
141 Crew wardrobe
142 Rear door with emergency escape slide
143 Rear cabin window panels
144 Wingroot composites trailing-edge fairing
145 Inboard flap track
146 Port inboard slotted flap segment
147 Inboard spoilers/lift dumpers
148 Spoiler hydraulic actuators
149 Main landing gear mounting auxiliary spar
150 Mainwheel bay
151 Wing rear spar/fuselage attachment joint
152 Hydraulic jack
153 Main leg pivot mounting
154 Inboard flap carriage and track
155 Flap, composites structure
156 Flap extended position
157 Port outboard spoilers with roll control function
158 Spoiler panel composites structure
159 Flap track fairings
160 Flap shroud panel
161 Aileron hydraulic actuators
162 Port aileron, composites structure
163 Aft navigation light (white)
164 Port winglet
165 Port navigation (red) and strobe (white) lights
166 Four-segment leading-edge slat
167 Two-spar torsion box wing structure
168 Wing rib structure
169 Wing bottom skin/stringer panel with access covers
170 Port wing integral fuel tank
171 Leading-edge slat guide rails
172 Twin mainwheels; four-wheel bogie on Tu-334-220
173 Trailing link axle beam
174 Mainwheel leg strut and shock-absorber
175 Leading-edge slat screw jack, torque shaft operated from central hydraulic drive motor
176 Immersed fuel pumps
177 Fuel venting channel box section stringer
178 Wingroot machined cruciform section skin joint fitting
179 Conditioning system ground connection
180 Landing light
181 Composites wingroot leading-edge fairing



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COSTS: Tu-334-100 US$16 million to US$18 million; Tu-334-200 US$20 million (both 2003). Break-even at 48th aircraft, according to RSK 'MiG'.

DESIGN FEATURES: Replacement for Tu-134 and Yak-42, to meet requirements of Russian Federation and Associated States (CIS) airlines. Wings have much in common with those of Tu-204 and the fuselage is shortened version of Tu-204, with identical flight deck. Configuration is all-swept low/mid-wing, with rear-mounted engines and T tail; circular-section semi-monocoque fuselage; wings have dihedral from roots. Short-stroke landing gear for minimal door sill height, to facilitate baggage handling at airports with limited loading capabilities. Service life 60,000 hours.

Wings have supercritical section, 24° sweepback, with winglets.

FLYING CONTROLS: Main and standby fly-by-wire; emergency hydraulic and mechanical back-up, except for ailerons. Two-section, single-slotted, trailing-edge flaps, two-section airbrakes forward of inner flap and two-section spoilers forward of outer flap on each wing; four-section leading-edge slat over full span each wing; conventional ailerons, elevators and two-section rudder; no tabs. Variable-incidence tailplane.

STRUCTURE: Composites and other lightweight materials make up 20 per cent of structure by weight. Metal alloy wing, fin and horizontal tail, each constructed on two spars, have composites leading-edges and covered by milled panels. Elevators, ailerons, airbrakes, spoilers, flaps, rudder and floor panels of composites honeycomb. Fuselage of metal alloy with riveted skin. Final assembly at Aviant (Ukraine) and RSK 'MiG' at Lukhovitsy.

LANDING GEAR: Retractable tricycle type; twin wheels on each unit of Tu-334-100, four-wheel bogies on main units of Tu-334-200; main units retract inward into wing/fuselage fairings; trailing-link mainwheel legs on Tu-334-100; nosewheels retract forwards, forward elements of two-section door each side remaining closed except during cycling. Some recent Tupolev illustrations have shown all versions of Tu-334 with four-wheel main bogies. Tyre size 1,070×390-480R on mainwheels; 680×260-355R on nosewheels. Stout grille behind mainwheels of prototype to prevent ice and slush entering turbofans.

POWER PLANT: *Tu-334-100:* Two Ivchenko Progress D-436T1 turbofans, each rated at 73.6 kN (16,535 lb st).

Tu-334-100D/-200: Two D-436T2 turbofans, each rated at 80.4 kN (18,078 lb st).

Tu-334-120/-120D/-220: Rolls-Royce Deutschland BR715-56 turbofans each rated at 88.9 kN (19,995 lb st). D-436T1 production by consortium of Motor-Sich at Zaporozhye (Ukraine), Salyut and UMPO.

Fuel in integral wing tanks, total capacity (Tu-334-100) 10,100 kg (22,267 lb).

ACCOMMODATION (Tu-334-100 and -120): Crew of two (optionally three) on 'Tu-204 compliant' flight deck; provision for fourth seat for instructor or observer. Three basic single-aisle passenger arrangements: (1) 72 seats, with 12 seats four-abreast in first class cabin at front, at pitch of 102 cm (40 in) and with 73 cm (28.75 in) aisle, and 60 tourist class seats six-abreast at 81 cm (32 in) pitch with 49.5 cm (19.5 in) aisle; (2) 102 seats, all tourist, at 81 cm (32 in) pitch; and (3) 74 seats, with eight business class and 66 in economy class. All three configurations have buffet/galley, coat compartment and lavatory immediately behind flight deck, a further lavatory and service compartment at rear; 72-seater has additional galleys at front and rear; overhead stowage for hand baggage. Other arrangements at customer's option. Passenger doors at front and rear of cabin on port side; service doors opposite. Underfloor baggage/freight holds; doors on starboard side.



Second Tu-334, pictured in August 2003 at Kiev *(Yefim Gordon)* **NEW/0558589**

ACCOMMODATION (Tu-334-200/Tu-354): Flight deck unchanged. Two basic single-aisle passenger arrangements: (1) 110 seats, with eight seats four-abreast in first class cabin at front, at pitch of 99 cm (39 in), and 102 tourist class seats six-abreast at 81 cm (32 in) pitch; (2) 126 seats, all tourist, at 81 cm (32 in) pitch. Facilities as Tu-334-100/120, plus emergency exit over wing each side.

SYSTEMS: APU in tailcone. Hydraulic system for actuation of flying controls. Air conditioning unit in wing centre-section.

AVIONICS: *Radar:* Nose-mounted weather radar.

Instrumentation: EFIS standard, with six CRTs. Satcom optional. Equipment for landings in ICAO Cat. IIIa conditions.

DIMENSIONS, EXTERNAL:

Wing span: 100, 120	29.77 m (97 ft 8 in)
100D, 120D, 200, 220	32.61 m (107 ft 0 in)
Wing aspect ratio: 100, 120	10.2
100D, 120D, 200, 220	10.6
Length overall: 100, 120, 120D	31.26 m (102 ft 6¾ in)
100D	31.80 m (104 ft 4 in)
200, 220	35.16 m (115 ft 4½ in)
Fuselage cross-section:	
all	3.40 × 4.10 m (11 ft 1¾ in × 13 ft 5½ in)
Height overall: all	9.38 m (30 ft 9¼ in)
Wheel track (c/l shock struts): all	4.80 m (15 ft 9 in)
Wheelbase: 100, 120	11.75 m (38 ft 6¾ in)
Baggage door:	
forward: Height	1.03 m (3 ft 4½ in)
Width	1.165 m (3 ft 9¾ in)
Height to sill	1.26 m (4 ft 1½ in)
rear: Height	0.95 m (3 ft 1½ in)
Height to sill	0.93 m (3 ft 0½ in)

DIMENSIONS, INTERNAL:

Cabin: Length: 100, 120	17.84 m (58 ft 6¼ in)
Height:	
above aisle: all	2.185 m (7 ft 2 in)
beneath hand baggage racks: all	1.70 m (5 ft 7 in)
Max width: all	3.57 m (11 ft 8½ in)
Volume: 100, 120	118.0 m³ (4,167 cu ft)
Baggage holds:	
Max length: 100, 120, forward	4.10 m (13 ft 5¼ in)
100, 120, rear	3.00 m (9 ft 10 in)
Max width: 100, 120	2.50 m (8 ft 2½ in)
Max height: 100, 120	1.20 m (3 ft 11¼ in)
Volume: 100, forward	11.7 m³ (413 cu ft)
Total volume: 100, 120	16.2 m³ (572 cu ft)
100D, 120D	15.8 m³ (558 cu ft)
200, 220	23.3 m³ (823 cu ft)

AREAS:

Wings, gross: 100, 120	83.23 m² (895.8 sq ft)
100D, 120D, 200, 220	100.0 m² (1,076.4 sq ft)

WEIGHTS AND LOADINGS:

Operating weight empty: 100	30,050 kg (66,249 lb)
100D	31,920 kg (70,371 lb)
120	28,350 kg (62,501 lb)
200	34,375 kg (75,784 lb)
Max payload:	
100C	9,690 kg (21,363 lb)
100, 100D, 120, 120D	12,000 kg (26,455 lb)
200, 200C, 220	11,970 kg (26,389 lb)
Max fuel: 100, 120	10,100 kg (22,267 lb)
100D, 120D	15,700 kg (34,613 lb)
200, 220	13,790 kg (30,400 lb)
Max T-O weight: 120, 120C	46,100 kg (101,630 lb)
100	47,900 kg (105,600 lb)
120D	53,750 kg (118,498 lb)
100D	54,420 kg (119,975 lb)
200	54,470 kg (120,085 lb)
220	54,800 kg (120,815 lb)
Max landing weight: 100	43,500 kg (95,900 lb)
Max wing loading:	
120D	537.5 kg/m² (110.09 lb/sq ft)
120	553.9 kg/m² (113.44 lb/sq ft)
100	575.5 kg/m² (117.87 lb/sq ft)
200	544.7 kg/m² (111.56 lb/sq ft)
100D, 120D	544.2 kg/m² (111.46 lb/sq ft)
220	548.0 kg/m² (112.24 lb/sq ft)
Max power loading: 100	325 kg/kN (3.19 lb/lb st)
120	334 kg/kN (3.27 lb/lb st)
100D	338 kg/kN (3.31 lb/lb st)
120D	302 kg/kN (2.96 lb/lb st)
200	339 kg/kN (3.32 lb/lb st)
220	308 kg/kN (3.02 lb/lb st)

PERFORMANCE (estimated):

Nominal cruising speed at 10,600-11,100 m (34,775-36,400 ft): 100, 100D, 200	431-442 kt (800-820 km/h; 497-510 mph)
Balanced runway length at 30°C:	
100	2,100 m (6,890 ft)
Range with max payload, 60 min reserves:	
100	1,101 n miles (2,040 km; 1,267 miles)
100D	1,630 n miles (3,020 km; 1,876 miles)
200	529 n miles (980 km; 608 miles)
Range with design payload:	
100, 100C	1,700 n miles (3,150 km; 1,957 miles)
100D	2,213 n miles (4,100 km; 2,547 miles)
120	1,685 n miles (3,122 km; 1,939 miles)
120D	2,267 n miles (4,200 km; 2,609 miles)
200, 220	1,187 n miles (2,200 km; 1,367 miles)

OPERATIONAL NOISE LEVELS (ICAO, estimated):

T-O	85.8 EPNdB
Approach	97.4 EPNdB
Sideline	92.0 EPNdB

UPDATED

UNIKOMTRANSO

UNIKOMTRANSO AO (Unicomtranso JSC)

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GENERAL DIRECTOR: Oleg N Voronkov

Established 1990 as Unikomtrans, a production co-operative operating an An-12 and An-74 on air freight operations. Became Unikomtranso AO on 6 April 1994 and made first issue of shares in 2000. Business includes aircraft upgrades, light aircraft design, construction of lightplane prototypes and flight- and technical training on light aircraft. Manufacture in series assigned to Progress Scientific & Technical Complex under agreement of 16 March 2000.

First aircraft, the Model 11 Frigat, was exhibited at Moscow Salon in August 1995; remains available. Don was first shown in August 2001. On 3 March 2003, Unikomtranso JSC and Express Aircraft Company LLC of USA signed five-year agreement covering Russian manufacture of Express 2000, first five kits being due to arrive from USA in mid-2003. Unikcomtranso to complete 90 aircraft as agricultural sprayers for use in Samara region.

UPDATED



Prototype Unikomtranso Don on display at Moscow in August 2001 *(Paul Jackson)* 0525059

UNIKOMTRANSO DON

TYPE: Agricultural sprayer.

PROGRAMME: Designed by S F Tsarkov, whose previous products included Leader, Frigat and Flamingo lightplanes. Production at Progress plant, Samara. Two-seat prototype (c/n 1010101; registration pending) shown at Moscow, August 2001. Following flight tests during early 2002, modified as **Don-M** and entered production as such in June 2002.

CURRENT VERSIONS: **Single-seat:** With 300 litre (79.3 US gallon; 66.0 Imp gallon) chemical tank. Starboard side pilot's door.