

A320F & A321F freighter programme

The A320 and A321 passenger-to-freighter conversion programme has been launched. An initial analysis of payload capacities is made.

In May 2006, Airbus, EADS-EFW, and MIG and Irkut in Russia signed a co-operation letter-of-intent (LOI) for passenger-to-freighter conversion of the A320-200 and A321-100. While the conversion is to be performed in Russia, EADS-EFW in Dresden will perform the majority of conversions, and set up a second facility in parallel.

The LOI goes beyond the agreement signed in July 2001 between EADS and Rosaviakosmos. Airbus plans to place over \$900 million of contracts with Russian companies over a 10-year period.

Airbus already has a regional office in Moscow and a technical staff providing on-the-spot support for airlines. The Airbus engineering centre has operated in Moscow since spring 2003, and employs 150 Russian engineers. Airbus confirmed that the programme would be endorsed, and this would lead to an entry into service planned for 2010/2011.

Payload capacity

The A320-200F will have a maximum zero fuel weight (MZFW) of 133,378-137,788lbs, while the larger A321-100F's MZFW will be 153,220-157,629lbs. The gross structural payload capabilities will be 46,297-50,706lbs for the A320F, and 56,217-60,627lbs for the A321-100F (see table, this page).

The converted A320 freighter would

accommodate 10 main-deck 'AAA' containers, each with a tare weight of 650lbs and volume of 440 cubic feet. The belly section can carry seven LD3-45W containers, which each supply 127 cubic feet and have a tare weight of 165lbs, but the aircraft is analysed here without containers and has 1,322 cubic feet of bulk capacity. This would give the aircraft a total cargo volume of 5,722 cubic feet, and total container tare weight of 6,500lbs.

This would give the A320 a net structural payload of 39,700-44,200lbs and maximum packing density of 7.0-7.7lbs per cubic foot. Volumetric payload with freight packed at 7.0lbs per cubic foot is 40,000lbs (see table, this page). List price for the conversion is \$4.5 million. The A321 also has the option of using LD3-45W containers in the belly, in which case it would carry 10.

The accompanying A321 conversion product would accommodate 13 main-deck AAA containers and 1,650 of bulk volume in the belly. The aircraft would have a cargo volume of 7,370 cubic feet and container tare weight of 8,450lbs.

The aircraft would therefore have a net structural payload of 47,800-52,200lbs and a maximum packing density of 6.5-7.1lbs per cubic foot. Volumetric payload would be 47,800-51,600lbs (see table, this page). List price for the conversion is \$5.0 million.

Payload comparisons

The A320F's and A321F's closest rivals are the 737-300, 737-400 and 757-200F. There are several conversion programmes for the 737-300, while Pemco is the first to offer a programme for the 737-400. On a net structural payload basis, the lower weight A320 is similar to the 737-300, while the higher weight A320 is close to the 737-400. The A321F has a 4,600-9,000lbs higher net structural payload than the 737-400.

The A320, however, has 1,000-1,200 more cubic feet of volume than the 737-300, but is similar to the 737-400 (see table, this page). This gives the A320 6,800-7,900lbs a higher volumetric payload than the 737-300, but similar to the 737-400. The A321 provides 1,600 more cubic feet than the 737-400, giving the A321 a volumetric payload that is 11,200lbs more than the 737-400's.

The 757-200F clearly has an advantage over the A321, with the 757 offering 11,000-17,000lbs higher net structural payload and 7,100lbs higher volumetric payload (see table, this page). The 757-200F also has longer range performance, and is overall larger than the A321.

These differences must be considered in relation to total build costs, payload-range performance, and cash operating costs. Avmark Inc's projected values for 2011 are \$11-12 million for the oldest A320s and \$19-21 million for the oldest A321s. The cost of converting the A320 and A321 is \$0.5-1.5 million higher than the 737-300 and -400. The conversion costs for the 757-200F are \$3.75 million and \$4.65 million; less than the list price for the A321 modification and less than or equal to the A320's conversion programme. [AC](#)

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PAYLOAD SPECIFICATIONS OF

Aircraft type	737-300	737-400	A320F	A321F	757-200F
Gross structural payload lbs	41,000-43,000	48,000	46,300-50,700	56,200-60,600	70,100-72,000
Maindeck containers:	8/9	10	10	13	14.5/15
Maindeck volume-cu ft:	3,520/3,672	4,400	4,400	5,720	6,540/6,600
Lowerdeck bulk volume-cu ft	1,068	1,373	1,322	1,650	1,790
Total volume-cu ft	4,588/4,740	5,773	5,722	7,370	8,330/8,390
Container tare weight-lbs	3,808/4,038	4,760	6,500	8,450	6,964/7,140
Net structural payload-lbs	36,800-39,000	43,200	39,800-44,200	47,800-52,200	63,200/64,800
Volumetric payload @ 7lbs/cu ft	32,116/33,180	40,411	39,800-40,000	47,800-51,600	58,310/58,730