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West Europe Report

SCIENCE AND TECHNOLOGY

(FOUO 2/82)



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TRANSPORTATION

AIRBUS FAMILY TO INCLUDE LARGE-CAPACITY, LONG-RANGE TA 9

Paris AIR & COSMOS in French 9 Jan 82 pp 19-21

[Article by Jacques Morisset: "Airbus Industrie's Future TA 9"]

[Text] Between 1969 and 1980, the number of transport aircraft builders dropped from 18 to 8, the ratio of the number of suppliers to the number of airlines from a little less than 3 to a little more than 2, and the average number of types of planes per airline from a little over 4 to 3.4 (source: IATA [International Air Transport Association]).

The massive reshuffling of the cards that is now taking place in the industry, accelerated by Lockheed's decision to abandon the TriStar (despite its evident good points), cannot but speed up the process of concentration. Very shortly, in the over-100-passenger transport plane sector there will be but three builders of groups of builders: Boeing, Airbus Industrie, and McDonnell Douglas jointly with Fokker for the development of the MDF-100. If the latter project does not actually become a program--and there are serious doubts that Fokker will be able to obtain the financial backing it needs and that McDonnell Douglas will want to invest in a new product line--the airlines are likely to find themselves, within a relatively short time, with aging DC-9 and DC-10 families and only two remaining suppliers: Boeing and Airbus Industrie.

The client, however, except for the state-owned airlines, will never rest easy with only one supplier available to him. Now, the only builder in a position to offer a complete line of aircraft, ranging from 100- to 500-passenger models, is Boeing. The conclusion is self-evident: To compete effectively against the Seattle giant, Airbus Industrie must add substantially to its line, which is limited currently to the 200/300-passenger niche and to the short and medium distances. Provided it positions itself to fulfill this need and is able to hammer way at it without interruptions, the European consortium has a bright future ahead of it.

At the lower end of the scale, as is known Airbus Industrie is beginning to develop its new A-320 family (see AIR & COSMOS no 887). At the upper end, starting with the A-300/A-310, a family of planes is in the making to cover higher seating capacities and longer cruising ranges. But, for obvious development-cost

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reasons, Airbus Industrie must limit its innovational effort to the strict minimum. Boeing, on the other hand, is solidly entrenched in the long-haul transport niche, the sole remaining planes competing for it being the B-747 and the DC-10-30.

In the "Meccano" game Airbus Industrie is being compelled to play (see AIR & COSMOS no 888), it is obvious that a capacity increase, in the form of an elongated version of the A-300/A-300-600, is a less risky undertaking than a plunge into the long-haul transport sector, although the development of a common airfoil opens the way to the latter.

Of course, the first question that arises is that of the market; an elongated Airbus will offer a capacity identical to that of the DC-10 and the L-1011. These two, however, are getting along in age: A goodly part of the DC-10-10/15 fleet is now 9-10 years old; the L-1011's are a little younger, their ages pyramiding at a maximum of 8 years. The B-747's, more spaced out in time, peak at 10-11 years, but their renewal has already started (some 100 or so 2-year-old planes).

The need to replace the DC-10-10's and the L-1011's, probably in the absence of direct successors, thus appears certain to begin in the first half of the coming decade. Meanwhile, however, their fabrication having come to a halt, the need is already evident for short- and medium-range plane with a 25-percent higher capacity than the A-300. This need, Airbus Industrie feels, will be filled by the introduction of its new plane during the second half of the present decade; that is, within the relatively near future.

The survey already conducted among the users provides the following two sets of requirements:

--The short-haul airlines require a capacity of 350 seats (tourist class) to 425 seats (high density), capable of being used over distances of 1,000 nautical miles (less than 2,000 kilometers) between stops, carrying freight as well. Recommended length of runway for takeoff at sea level, ISA [International Standard Atmosphere] + 15°C, fully loaded: 7,000 feet (2,100 meters); for landing: 6,000 Feet.

--For the majority of other airlines: 325 seats in mixed arrangement; cruising range at least 3,000 nautical miles (5,500 kilometers) with full load of passengers (and baggage); maximum length of runway for takeoff: 8,850 feet (2,700 meters).

These two sets of requirements are perfectly compatible with the same basic plane: the TA-9; that is, an elongated Airbus (thus offering a high degree of commonality with the A-310 and the A-300-600), capable of covering the same distances, but able to take off at higher loads if necessary, and equipped with a new, larger and more modern wing unit and with 60,000/62,000-lbs (27/28-ton)-thrust engines. A plane like this will be substantially more economical to operate than the current 3-jet types, and will be able to carry more freight in its holds than the B-747.

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From the technical standpoint, Airbus Industrie obviously plans also to make the most extensive possible use (applying the experience it has acquired on the A-310) of composite materials based on carbon fibers and Kevlar fibers, and of modern systems which will also have proven themselves in actual use on the A-310 (digital avionics in particular, interchangeable cathode-ray screens, new-generation Garrett GTCP 331-250 APU's [Auxiliary Power Units], etc). One of its most interesting features, however, will be the use of a flight-control-and-fuel-transfer system enabling flight with a retracted equilibrium trim point (see related schematic diagram), designed to reduce trim-compensation drag, lighten the plane (smaller tailplane), improve its lift, and thus to increase its aerodynamic efficiency (+1 percent at takeoff), all while reducing by 2.5 percent its cruise-rate of fuel consumption. The debut of CCV [variable cruise burn rate] thus envisaged, on which all the big aircraft builders are currently working, can hardly be expected to take place in the very near term; it is perfectly projectable, however, into the 1985-1990 timeframe.

The curves and graphs we reproduce here represent results of calculations and preliminary evaluations that have been made by the design departments concerned. As to the number of seats, the TA-9, with four type "A" doors on each side, could be certificated to carry up to 440 passengers (based on emergency evacuation criteria). In fact, however, the number of seats would be limited by the floor area and could not exceed 420 (in "high density" arrangement, 9 seats per row at 30 inches between rows). But with 344 seats at 33/34-inch spacing, the TA-9 will offer the same seating capacity as a DC-10 or an L-1011.

A study of its "payload range" criteria indicates that with a payload of over 45 tons, the TA-9, with the customary reserves, will have a cruising range of over 3,000 kilometers; with a payload of 38 tons, or 425 passengers and their baggage, a cruising range of 2,400 nautical miles (4,450 kilometers); and with 325 passengers, 3,200 nautical miles (close to 6,000 kilometers). Thus, it would be usable on virtually all the existing medium- to medium/long-haul routes.

Lastly, the calculation of fuel consumption and DOC [Direct Operating Cost] over distances of the order of 1,850 kilometers show to what extent the TA-9 will be superior to the current twin-, 3-, and 4-engine jets. Moreover, it will have no competitor, since a B-767, even in an extensively elongated version, could obviously not offer comparable capacity.

In its next issue, AIR ET COSMOS will examine the Airbus long-range subfamily: the TA-11 and TA-12.

New Airbus Industrie Balance Sheet

Egyptair has just increased from 7 to 8 its firm orders for A-300's. The additional plane, an A-300 B4-200, powered by General Electric CF6-50C2 engines is scheduled for delivery in the summer of 1983.

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The Egyptian airline is currently using five A-300's, two of which are under lease to it. Its own fourth and fifth planes will be delivered this summer, and its sixth and seventh in the spring of 1983.

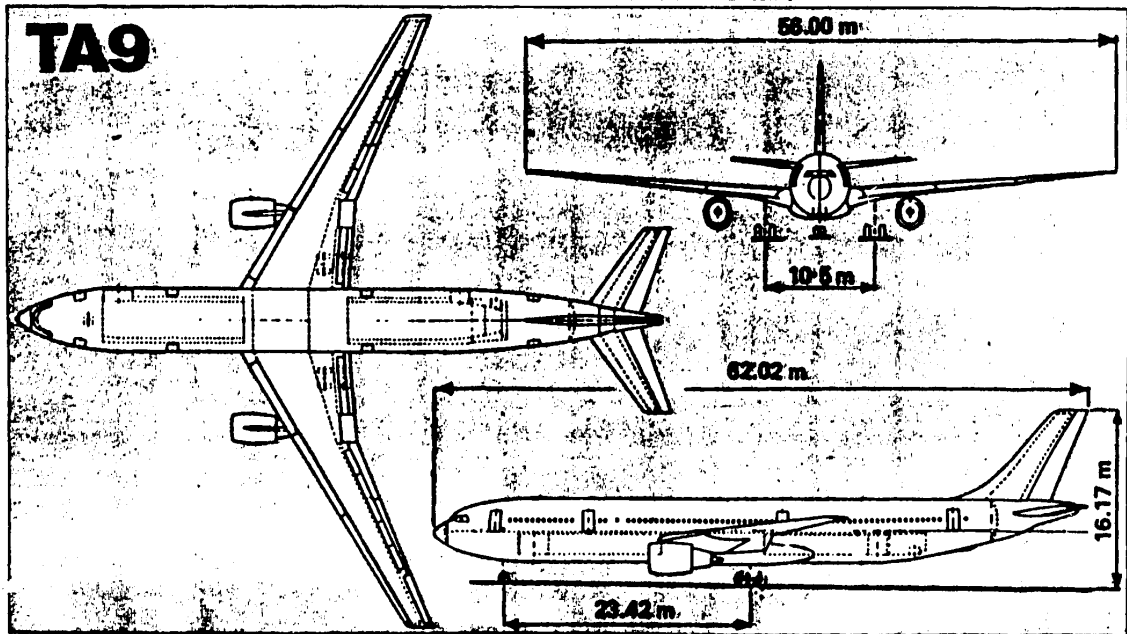
As of 4 January, Airbus Industrie had booked orders on hand for a total of 503 planes, of which 344 are firm orders and 159 are options. Of this total, 325 orders (256 + 69) are for A-300's and 178 orders (88 + 90) are for A-310's. As of that date, the number of planes yet to be delivered totaled 345.



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Characteristics of the TA-9-200

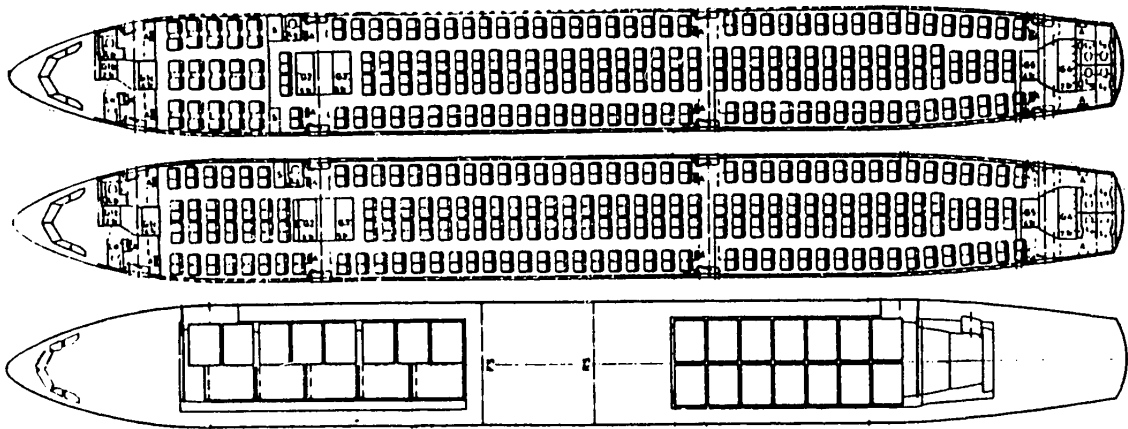


Wing span: 56 m; wing area: 330 m²; geometric aspect ratio: 9.5
overall length: 62.02 m; overall height: 16.17 m; nose-wheel
gauge: 10.5 m; wheelbase: 23.42 m.

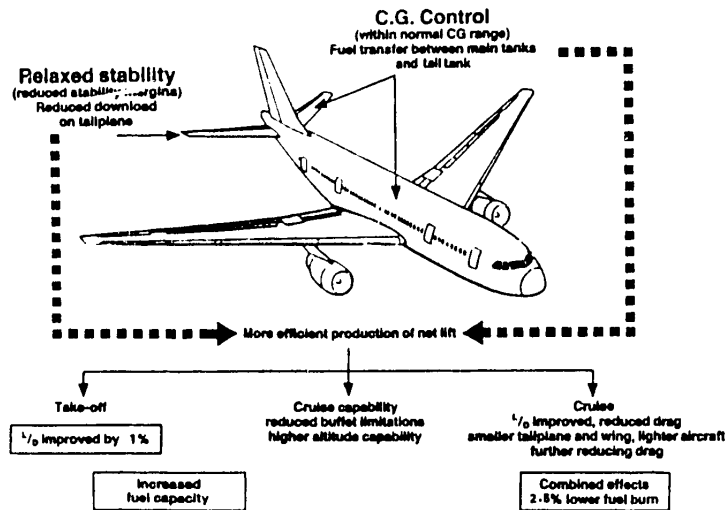
Operational empty weight: 105.6 tons; maximum takeoff weight:
184 tons; maximum landing weight: 163 tons; maximum payload:
46.4 tons; fuel (max): 64.9 tons.

Installed thrust: 2 x 28 tons (CF6-80C).

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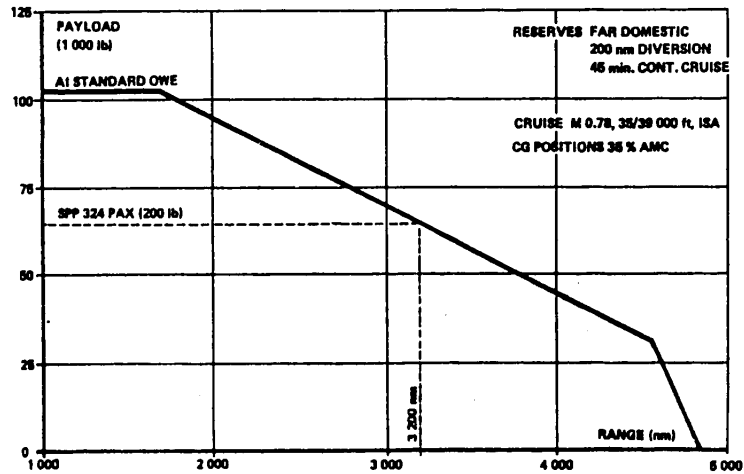


Examples of type seat arrangements: First class (30 seats) and tourist class (294 seats), total 324 seats; or, single class at 33/34-inch row-spacing (344 seats). As regards cargo, the holds can accommodate, for example, 30 LD3-type containers plus loose cargo (17 m³).

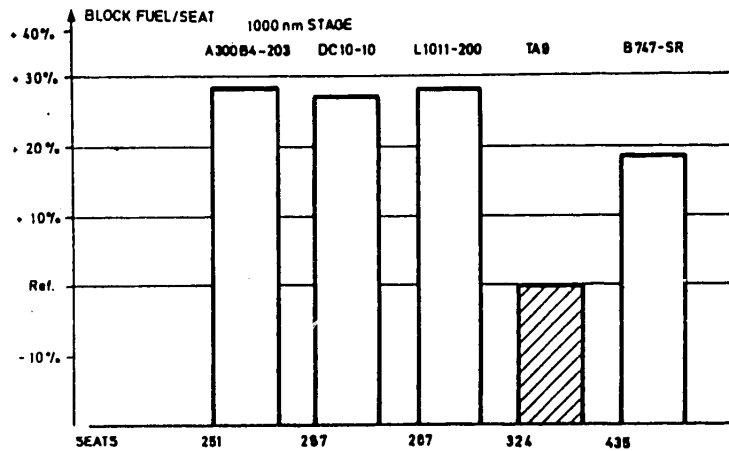


Reduction of stability margins (retraction of equilibrium trim point) to increase efficiency of future TA-9: lowered drag, greater fuel capacity, higher altitude capability owing to reduced buffet limitations...

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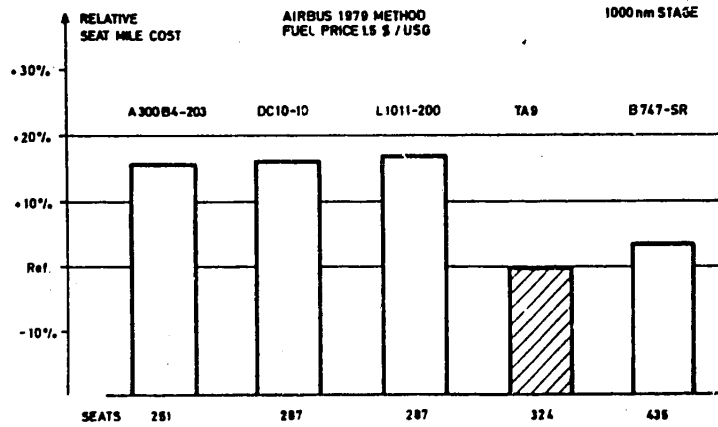


Cruising range as a function of payload.



Comparative fuel consumptions per seat over distances of 1,000 nautical miles (1,850 km).

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Comparative direct operating costs (DOC) over distances of 1,000 nautical miles. Only the B-747 SR can (almost) compete.

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