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West Europe Report

SCIENCE AND TECHNOLOGY

(FOUO 5/81)

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SCIENCE POLICY

GOVERNMENT TO AID AUTOMATION OF SMALL, MEDIUM INDUSTRIES

Paris AIR & COSMOS in French 4 Apr 81 p 11

[Article by RoNo: "Automation of Production: Financial Aid to PME]

[Text] In a press conference organized on 24 March at Montrouge by the National Agency for the Development of Automated Production (ADEPA) Mr Pierre Gadonneix, director of the metallurgical, mechanical, and electrical sections in the Ministry of Industry explained the government's policy for 1981 in the area of production automation. His discussion was complemented by a general presentation about ADEPA, its goals, means, and activities since its creation in 1968, by Messrs Michel Barba and Christian Sauvaire, respectively president and director of the agency.

As a result of a Council of Ministers meeting which took place on 11 March, the government decided to take measures along two main lines: a priority effort toward automation, with the indispensible educational effort; and a renewed effort in research and innovation.

The objective of this policy is twofold: to strengthen the competitive position of manufacturing industries in the area of mass production in terms of productivity increase, product quality and reliability, and improvements in working conditions; to create a national robots and automatic machinery industry.

The government has therefore taken a number of measures in this direction. These measures support the action previously undertaken in this area and take into consideration three main factors: the obstacle created by the 30 to 50 percent excess cost of the equipment as compared to traditional equipment and the psychological reluctance of small and medium industries because of the upheaval created by the changeover to new production methods; the necessity to act not only on the demand but also on the supply in order to avoid a takeover of the market by imports; the very short turnaround time available to achieve this industrial and technological changeover due to the headstart in some foreign countries (Japan).

The actions taken on the users' side consist of increasing the industries' awareness of the possibilities offered by automation; increasing the availability of low interest loans for industry; and providing assistance for personnel training. As an example, we can point to the more than F60 million

budget for 1981 provided for the MECA procedure (advanced machinery and equipment) managed by ADEPA.

All these measures apply mainly to small and medium manufacturing industries mass-producing products in small and medium quantities and also, in the aeronautics area, to equipment manufacturers and vendors.

ADEPA is a non-profit organization (according to the 1901 law) created in 1968 by the administration. As a public works auxiliary its mission is to promote and assist in the development of automation of production equipment and systems in the industrial areas of equipment production, manufacturing, and small and medium industries. GIFAS, SCFMO (French Association of Machine-Tool Manufacturers), and others are represented in the managing committee. ADEPA employs 70 workers at its headquarters, plus 15 in a regional technical assistance network, and its technical support equipment includes three data processing centers, an automatic processes laboratory, six classrooms, and a numerical control machine-tool workshop. Through ADEPA, about 500 companies have already received the benefits of the MECA [Advanced Design Machines and Equipment] process.

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TRANSPORTATION

SFENA DEVELOPS IMPROVED AVIONICS FOR A 310

Paris AIR & COSMOS in French 28 Mar 81 p 26

[Article by G. C.]

[Text] The attached table provides a comparison between the automatic flight control avionics (CADV) of the present A.300 B2/B4 Airbus, and the upcoming A.310 and A.300-600. The comparison shows a significant evolution in these avionics, based on the massive contribution of computer technology and digital circuitry, materialized in the Arinc standards of the series 700. Significant improvements can be seen in the number of units (LRU = Line Replaceable Unit), in the weight and consequent volume, in electric consumption, and in reliability. A gain of four to five is estimated for the latter parameter. Equally notable is the systematic use of the ATLAS test language for ground bench control of these avionics. Another important evolution has been the introduction of an intelligent monitoring unit for the CADV.

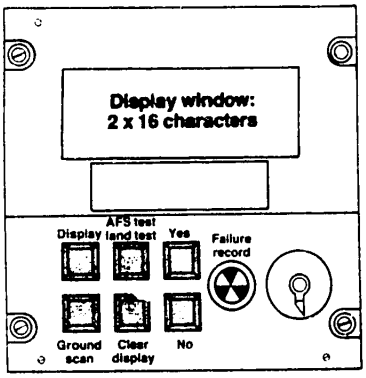
MTP or Maintenance Test Panel

The A.310 and the A.300-600 will have a unit for complete monitoring of the flight control avionics, known as MTP or Maintenance Test Panel. This unit is located on the lateral panel of the FFCC (Forward-Facing Crew Cockpit) pilot seat, because it is normally not used in flight. It is essentially used on the ground to prepare necessary maintenance actions.

It makes it possible to:

Supervise the entire CADV system during flight, and identify any failing unit;
Test a new unit after replacement;
Test the availability of the automatic LAND landing mode.

The design constraints placed on this equipment are rather severe, since no more than 10 percent of the recorded data must be unjustified, while the test confidence level in a replaced unit must be better than 90 percent; the same is true for the LAND mode. On its front panel, the unit has an alphanumeric display window that can show the defects and information developed by the system. The window displays 32 characters in two lines, using liquid crystals. The MTP makes it possible to record



Front view of the MTP developed by SFENA for the A.310

	NBR	Weight KG
AP FD Longitudinal	2	26
AP FD Lateral	2	28
AP FD Logic	2	28
S.R.S.	1	5
Yaw damper	2	18
Trim computer	2	17
& trim computer	2	10
Autothrottle	1	7.5
N1 limit	1	8
Test	2	19
Total	17 LRU	166.5

Digital units	NBR	Weight KG
Flight control computer	2	30
Flight augmentation computer	2	14
Thrust control computer	1	8
None (bite)		
	5 LRU	52

Comparison of the CADV avionics of the present A.300 B2/B4 (on the left) and the A.310 (on the right). A three-fold gain can be seen in the number of units and in weight.

and store in memory a maximum of 30 failures for the previous six flights. The dialog keyboard below the window makes it possible to successively recall these failures. In case of ambiguity on the origin of the failure, the system can present its diagnosis by classifying the presumed origins in order of decreasing probability.

And finally, it is possible to connect a printer to the unit by means of the connector on the front panel; the printer then makes it possible to retain a written record of failures, and to extract from the system further information on the circumstances surrounding failures, their nature, and so on. The MTP, as well as the CADV installation of the A.310 and the A.300-600, was designed by SFENA [French Air-Navigation Equipment Co.] and will be built cooperatively by the group SFENA/Smiths Industries/Bodenseewerk.

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TRANSPORTATION

EASTERN AIRLINES ORDERS MORE AIRBUSES

Paris AIR & COSMOS in French 28 Mar 81 p 9

[Unsigned article]

[Text] Eastern Airlines and Airbus Industrie announced at the beginning of this week that Eastern's options on nine Airbus A 300 B 4's have become firm orders, bringing to 34 the total number of firm orders from Eastern to Airbus Industrie for A 300 B 4's.

Eastern's new order involves approximately 335 million dollars. Eastern is presently adding 19 Airbus planes to its fleet, including 17 B 4's and two B 2's. Six more A 300 B 4's will be delivered to the company this year, five next year, and four in 1983. The 34 Airbuses placed on firm order by Eastern will be equipped with CF 6-50 C 2 General Electric turbojets.

In addition, Eastern has announced that it has taken options on 26 additional A-300's, out of which five will be B 4 200's and 21 will be B 4 600's. These will be equipped with General Electric CF 6 80 C 1 turbojets, and ready for delivery starting in 1984. Counting these options, Eastern's total order involves 60 Airbus planes.

Commenting on this order, Frank Borman, general manager at Eastern, emphasized once again the fuel consumption savings achieved thanks to Airbus, which uses about 30 percent less per seat-kilometer than smaller aircraft, and whose operating cost is about 20 percent below that of a large capacity three-engine jet aircraft.

In addition, Frank Borman again indicated that his company is now awaiting builders' proposals for a 150 seat short haul craft, designed to service 700 to 900-kilometer routes: "We estimate our requirements to be about 100 aircraft, ready for delivery in about four to five years from now, and we hope that Airbus Industrie, Boeing, and perhaps McDonnell Douglas will undertake aircraft design projects to fit these requirements." It should be remembered that for this category of aircraft, Airbus Industrie offers the A 320 and Boeing has the B 787.

An announcement was expected at the end of this week, concerning an Airbus 310 order placed by an important company from the North American Continent.

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TRANSPORTATION

FIRST A-310 WING PANEL LEAVES BAe ASSEMBLY LINE

Paris AIR & COSMOS in French 11 Apr 81 p 16

[Article by J. M.: "First A-310 Wing Panel Comes Out of the British Aerospace Shop at Chester"]

[Text] A brief ceremony last Tuesday, 7 April, marked the unveiling of the first Airbus A-310 wing panel at British Aerospace in Broughton, near Chester.

The panel in question, weighing 5.25 tons, has a surface of 40.6 square meters and is 22 meters long. It is characterized, mainly near the socket by a highly complex exterior shape and a high thickness/chord ratio (15 percent). With a span about equal to that of the A-300 wings (44 meters compared with 45) the A-310 wings will have slightly less total surface, by 15 percent (219 square meters compared with 260), a geometric aspect ratio increased from 7.73 to 8.8, the same sweepback (28 degrees, at one quarter of the chord depth), a structural mass which is 17 percent lower, and available internal volume (full tanks) only 8 percent less.

The improved aerodynamic characteristics of the new wing enable it to contribute considerably to the gain in fuel economy (about 20 percent) which the A-310 affords. The aerodynamic study of the A-310 wing, on the computer and in the wind tunnel, was in fact particularly painstaking. As for fabrication, it was distinctly simplified: to such extent that at the steady production rate the wing panel will be on the assembly line only 4.5 weeks, compared with 7 for the present A-300 wing. British Aerospace, responsible for the wings within the Airbus Industrie consortium, is striving to accelerate assembly operations by making use of subassemblies fabricated in the other plants of the group (Brough, Chadderton, Filton, Hamble, Hatfield, and Hurn) and is benefiting from highly developed preparation.

After certain parts are added, and it is tested for being watertight, the wing panel is sent to VFW at Bremen aboard the "Super Guppy" for installation of equipment, various circuits, and moving elements (flaps and slats). The finished wing is then sent to Toulouse to be joined to the central fuselage upon the assembly line operated by Aerospatiale [National Aerospace Manufacturing Company].

In order to bring this first wing panel, which will be assembled on the first A-310 to fly (airplane No 162 destined for Swissair), the workers and technicians of British Aerospace exerted great efforts in these last few months. The second panel half was to be unveiled this 8 April. Upon our visit we were able to observe that there was intense activity at Chester in the 8 double assembly bays used to assemble A-300 wing panels: those for airplane No 170 (model B4, destined for Iberia) were under construction in bay No 8 (compatible with the A-310 wing); bay No 9, from which the first A-310 wing panel has come, is now receiving the panels destined for a static test wing; in bay No 10 were the wing panels for the A-310 No 172 (also destined for Swissair) and which will be the second A-310 to fly.

Four other A-310 assemblies are planned (the third is already under construction). Therefore the Chester plant will have available a total of 14 double assembly bays: 8 for the A-300 and 6 for the A-310. It will thus be in position later on to deliver up to 10 pairs of wings per month (A-300 + A-310). For this year it is planned that this plant will deliver 43 A-300 wing sets and 4 A-310; in 1984 the rate of 8 will be attained.

About 2,000 employees at British Aerospace are at present engaged in the Airbus program, of whom more than 500 are at Chester itself. Between 1978 and 1985 British Aerospace will have devoted from 200 to 250 million pounds sterling to the A-310 program, expenditures which cover studies, development, fabrication, tooling, employee training, etc.

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TRANSPORTATION

AIRBUS INDUSTRIE: MARKET STUDIES, DETAILS ON FUTURE A-320

Paris AIR & COSMOS in French 11 Apr 81 p 18

[Article by J.M.: "Airbus Industrie: Market Studies and New Details on the Future A-320"]

[Text] The very latest long term market studies made by Airbus Industrie and its associates in the field of new generation short and medium range transports have provided the preliminary results shown in the following tables.

	Number of Aircraft in service in the year 2000		
Category	Present customers of Airbus Industrie	Other customers	Total
A-320-100/200	768	1,573	2,341
A-310	347	1,263	1,610
A-300	360	344	704
TA-9	604	873	1,477
Totals	2,079	4,053	6,132

The studies are based upon the assumption of an average annual traffic growth of 5.5 to 6 percent, which corresponds to a level of traffic, in the year 2000, three times as great as the present level.

To be noted:

The very great impact of the elongated version of the A-300--the TA-9 (more than 300 seats).

The limitation of the A-300 to 360 units (316 airplanes sold to date, the A-300-600 included). But with the future TA-9 being directly derived from the A-300-600, one could just as well show 964 A-300 units, all versions included, and 347 A-310 units. This is a total of 1,300 Airbus medium-range wide body transports in service in the year 2000.

The fact that Airbus Industrie is still manifesting its ambition, in practical terms, to capture a third of the world market.

The necessary observation that Airbus Industrie's forecasts involve solely those airlines which already are customers of the European consortium--about 40 carriers.

An intermediate forecast relating to the worldwide fleet of wide-body short and medium range transports on the horizon of 1993 predicts that, of 2,600 airplanes in these categories, Airbus Industrie can hope to sell 1,200 units of the A-300/A-310.

As far as the future A-320 is concerned, it was recently confirmed at Toulouse that studies have reached a highly advanced stage, as much for manufacture of the airplane as for its technical aspects. The "short" version (basic configuration 130 seats), or A-320-100, corresponds, of course, to the former SA-1 while the "long" version (A-320-200) corresponds to the former SA-2 (basic configuration 160 seats).

One of the most interesting points is the adoption of a double lobe fuselage, which makes possible both greater width at the elbows (upper lobe reserved for passengers) as well as more space for the cabin baggage compartments (above the seats) and a cargo compartment (lower lobe) which is wider and capable of holding sizeable containers (of LD-3 type, but not so high, nevertheless compatible with container-handling equipment for wide body aircraft).

The cross section of the fuselage adopted will thus be 155.3 inches (3.94 meters) wide and 163 inches (4.14 meters) high.

The use of a piloting and stabilization system compatible with very low margins of static stability enables the size of the horizontal stabilizer to be reduced.

Also underway are highly advanced studies of better integration of the engines into the airframe; the engines are to have thrust of about 25,000 pounds (11.5 tons) and to offer fuel economy.

The engine candidates are:

--SNECMA [National Aircraft Engine Study and Manufacturing Company]/General Electric CFM-56-X (see AIR & COSMOS, No 854);
--Anglo-Nippon RJ-500;
--a Pratt and Whitney engine of the new PW 2000 family; and
--a possible new General Electric engine.

The future A-320, which will of course benefit from other advanced technologies (cockpit, avionics, composite materials), is being described by Airbus Industrie as, first of all, an airplane capable of replacing the B-727-200 and DC-9-80. It will enable Airbus Industrie to have complete credibility, the European consortium thus being able to offer a full range of short and medium range

transport aircraft. It will be available in 1985 with a decision to start production immediately. But the priority which must be assigned to it in relation to the other Airbus Industrie projects (TA-9 and TA-11) depends exclusively upon market demand.

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TRANSPORTATION

FOUR-COUNTRY COOPERATION IN AERONAUTICAL R & D

Paris AIR & COSMOS in French 25 Apr 81 p 10

[Article: "Four-party Cooperation in Aeronautical Research and Technology"]

[Text] Last week the General Delegation for Armament announced that a formal agreement concerning cooperation in aeronautical research and technology among France, the Federal Republic of Germany, the Netherlands, and the United Kingdom became effective on 6 April 1981.

Designated by the acronym GARTEUR (Group for Aeronautical Research and Technology in Europe), this cooperation had its beginnings in 1973 with some exchanges of information among France, West Germany, and the United Kingdom. The Netherlands joined the GARTEUR in 1977. The four countries intend to go beyond exchanges of information and to make official a framework for joint activities involving research and manufacturing establishments. This agreement will be made operative by an organization described in a chart attached to the agreement. This organization consists of three elements:

A council, composed of representatives of the member countries named by the governments, which will establish procedures and make the major decisions;

Groups with various responsibilities, organized according to the major aeronautical disciplines (aerodynamics, flight mechanics, structures and materials, helicopters) which will propose joint activities and supervise them; and

Working groups which will undertake such activities, with well defined tasks to be executed within specified periods.

At present the following working groups are active:

Aerodynamics --

Aerodynamics of the wing-to-fuselage attachment in the trans-sonic regime. This group is charged with perfecting the methods of calculating the aerodynamic flows around the wing-to-fuselage attachments of transport aircraft; and

Methods of testing two-dimensional bodies in the trans-sonic regime: these test methods, particularly important for defining supercritical profiles, will be the subject of especially close cooperation among research institutes of the four countries.

Structures and Materials -- Tolerance of damage due to impact of composite materials. This study of the behavior of composite materials after sustaining damage due to impact (hail, accidental damage) is being undertaken by several laboratories in cooperation.

Evaluation of Aluminum Alloy 7010--This cooperation makes it possible to distribute, among a greater number of laboratories, the evaluation tests of this alloy and to compare the various methods employed, each one cooperating having the benefit of the results of all the tests.

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TRANSPORTATION

AIRBUS: SALES UPDATE, STATUS OF A-310, A-320

Paris AIR & COSMOS in French 25 Apr 81 p 14

[Article: "Airbus Industrie Passes the 40-Customer Mark"]

[Text] In Lagos on Friday, 17 April J.A.B. Smit and George Warde, respectively director general of Nigeria Airways and sales manager of Airbus Industrie, signed a firm contract for sale of four airplanes, model A-310, with an option for four more.

The first two A-310 airplanes will be delivered in the autumn of 1983 and the other two in 1984. Fitted out to transport 225 passengers, 24 of them in first class, these airplanes will be used principally in the interior regional network of the Nigerian Airline, but the A-310 performance will also enable it to link Lagos with the principal European cities, including London.

As a result of this new contract Airbus Industrie now has 40 airline customers who have ordered 469 airplanes (315 firm sales and 154 options) divided between the A-300, 316 units (236 + 80) and the A-310, 153 units (79 + 74).

133 Airplanes Delivered

As for deliveries, 129 airplanes had been delivered by last 31 March, including four in March: the first two A-300 B4-100 airplanes to Iberia, the fourth A-300 B2-300 to SAS, the third A-300 B4-200 to Singapore Airlines, which is three airplanes equipped with Pratt and Whitney JT9D-59A engines and one equipped with General Electric CF6-50C2 engines.

On 20 April the number of airplanes reached 133 (for 24 customers) thanks to deliveries of an eighth one to Air Inter (A-300 B4), a third A-300 B4-100 to Iberia, a fifth A-300 B4-200 to Pakistan Airlines, and a third A-300 B4-100 to Philippine Airlines.

New Cargo Door

The fourth SAS A-300 has a special feature: it is the first to be equipped with a cargo door (forward compartment) 2.69 meters wide, or 0.26 meter more than the doors installed up to now. This wider door will be standard upon all the A-300 airplanes to be delivered starting next summer, therefore upon the A-300-600 to be delivered starting in 1984 and upon the A-310; it offers the advantage of permitting the loading of 2.43 by 3.17 - meter pallets, whereas only 2.23 by 3.17 - meter pallets could,

up to now, be placed in that forward compartment (normally used for cargo transport, baggage being placed in the aft compartment).

Among the airplanes being completed at Toulouse and Hamburg, recently noted were the first A-300 airplanes of TAA, Varig, and Air Afrique, and the airplanes for Iberia (fourth airplane), South African Airways (No 5), Alitalia (Nos 5, 6 and 7), and Thai (No 9). On the assembly line were the 19th and 20th airplanes for Malaysian Airline Systems, the 6th for Olympic Airways, the 10th for Thai, the 3rd for Egyptair, the 2nd for TAA, and four destined for Eastern (Nos 20 to 23).

A-310

While satisfactory flight tests aboard the A-300 of the digital autopilot developed by SFENA in cooperation with Bodenseewerke and Smith Industries have been continuing since December (the first automated landings are now beginning), British Aerospace, which has just completed the first set of wing panels for the A-310 (see AIR & COSMOS No 855) has announced that 5 sets of these panels will come off the line this year, 11 sets in 1982, and 26 in 1983.

A-320

The studies of the future A-320 are continuing, with a two-fold objective, of course: to arrive at specifications for the airplane which best incorporate the requirements of customers and to start the actual program before the end of this year. But in the meantime, and perhaps by the middle of 1981, a problem will have to be resolved: that of distribution of work among those cooperating in the future program.

Such distribution, responsible officials of Airbus Industrie recently reminded us, has in no way at all been settled. The major ones certainly cooperating will be German, British, Spanish, and French manufacturers and the solution adopted will have to be both the best possible from the economic standpoint and respond to the "wishes" of the manufacturers. Now the latter are very hesitant as far as the nature and level of their participation are concerned: the assembly line, for example, could equally well be installed at Toulouse or Bristol, and even at Amsterdam, if the Netherlands and Fokker decide to participate in the program. Of course, in order to equalize work and responsibilities it is out of the question for the same country to be responsible for both the assembly line and fabrication of the wings.

But at Toulouse, as at Bristol, there is difference of opinion on this matter: is it, for example, more attractive for Aerospatiale to manage the A-320 assembly line (which would thus have the benefit of the experience already gained with the A-300 and A-310), or, on the contrary, to be responsible for the wings, which would not displease the study bureau and would enable Aerospatiale to balance its activities harmoniously throughout all its A-300, A-310 and A-320 programs? The same hesitation can be observed at Bristol. Finally, the Germans would like to see themselves entrusted with more important tasks than that of making the fuselage. At the same time the question also arises as to establishing in a similar environment--this is not obligatory--of an assembly line and flight tests. Two or three activities and key responsibilities for four or five partners: this is ultimately the real problem which must first be resolved.

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TRANSPORTATION

NEW MATERIAL FOR A-300 COMPONENTS

Paris AIR & COSMOS in French 2 May 81 p 21

[Article: "'Supral' Adopted by Messier for Use on the A-300"]

[Text] A cost reduction of nearly 50 percent has been achieved in manufacture of protective guards for the servo-valves of the Airbus A-300 landing gear brake system by virtue of adopting stamped one-piece superplastic alloy parts for these components.

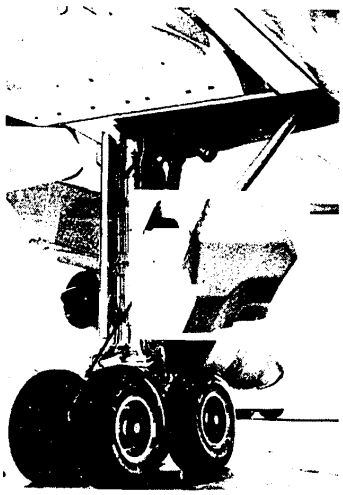
Manufactured by Superform Metals of Worcester, England, from "Supral" superplastic aluminum, the new guards replace units consisting of several pieces of conventional type alloy mechanically welded. According to the company this innovation reduces production time while improving the precision of the guards.

Messier-Hispano-Bugatti, which is manufacturing the Airbus landing gear, has chosen a stamped "Supral" part for this application.

According to Superform Metals the stamping tooling, which is both simple and inexpensive, while needing only a single working surface, has also made it possible to effect improvements in shape (optimization of fit) without high tooling cost.

Two "Supral" guards are assembled upon each Airbus, that is, one upon each of the two legs of the main landing gear; they protect the hydraulic control servo-valves of the breaks against dust and other pollutants.

Let us remember that the "Supral" alloy utilized by Superform Metals was invented in the research laboratories of the TI Group (see AIR & COSMOS No 841). Although it is capable of being elongated to several times its initial length by virtue of the stamping process perfected by Superform Metals, once it has been stamped, the company says, it has the advantages of conventional aluminum alloys: high strength/weight ratio, and low electrical and thermal conductivity, as well as corrosion resistance.



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TRANSPORTATION

BRIEFS

FIRST DORNIER FLIGHT TESTS--The first flight test of Dornier's new 15-seater DO-228 version 100 "Commuter" aircraft took place on Saturday 28 March 1981 at the Oberpfaffenhoffen airfield. This is 4 days ahead of the planned date, and 15 months after the decision to go ahead with the project. This first flight, which was considered a success, included preliminary flight exploration in the following conditions: landing-gear out, flaps extended 20 degrees. The aircraft reached an altitude of 9,500 ft (2950 m) and a speed of 150 knots. Flight time: 1 hour 10 minutes. The aircraft was flown by Dornier's Chief Test Pilot Dieter Thomas, with Dieter Beckmann second in command. Test flights will resume with landing-gear retraction tests, flaps extension/retraction, flight envelope exploration, etc. The next flight was planned to take place last Wednesday or Thursday. Work is progressing concurrently at Dornier on the model 200 (lengthened version). Dornier expects that the craft will be certified next October by the German authorities (LBA) and the first delivery is planned for December. The first orders have been coming from Scandinavia, Africa, Asia, and Australia. The DO-228 models 100 and 200 will naturally be presented at the Le Bourget Air Show where they should be one of the main attractions. [Text] [Paris AIR & COSMOS in French 4 Apr 81 p 17] [COPYRIGHT: A. &. C. 1981] 6445

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