

From Frankfurt to New York in an hour

by Laurent Rosenfeld

The French weekly *Le Point* revealed in its March 16 issue a secret which was heretofore well guarded: About 30 engineers from France's SNIAS (Aérospatiale) and other agencies have been working for two years on a hypersonic airliner which will be officially unveiled at the Le Bourget air show in June. The plane, nicknamed AGV for *Avion à Grande Vitesse* (high-speed plane—a reference to the high-speed train, TGV, which links Paris to Lyon at almost 300 km/h) would fly at Mach-5, carry 150 passengers, and could cover 12,000 kilometers on a one-leg flight. It would take about an hour to reach New York from Frankfurt.

Various possible plans for higher speed passenger planes were known to exist on the drawing boards of the Aérospatiale—ranging from a so-called Super-Concorde, i.e., a Concorde with a slightly higher velocity and a longer autonomy, to hypersonic planes. But it was not known how far along this project was—namely, to the point of defining quite precisely the performance parameters of the projected aircraft.

After the unfortunate commercial failure of the Franco-British Concorde, a failure largely due to commercial malpractice of the U.S. administration and a strange alliance between the environmentalist lobby and the large U.S. aerospace manufacturers, drawing up plans for a new super-plane may appear hazardous. But possibly, Concorde was not an

adequate technological leap forward to ensure the adherence of people who may have used it. Therefore, the reasons for studying this project, which would be a real technological breakthrough, are strong:

- It is necessary to plan second generation space planes which would cost less than the U.S. Space Shuttle or Hermes. This leads almost automatically to studying hypersonic planes of the Sänger type (see *EIR*, Vol. 14, No. 9, Feb. 27, 1987), which could also be used for air transport. For this reason, the French CNES is also taking part in the development of the AGV.

- There has been and will be a formidable increase of long-range air transport between the main industrial powers of the globe: North America, the Far East, and Europe.

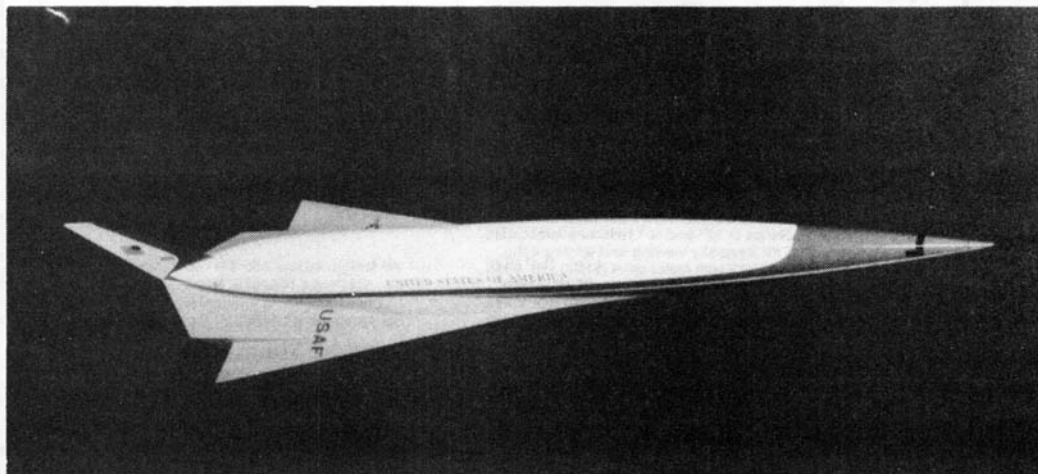
- In his State of the Union message of Feb. 4, 1986, after the Challenger disaster, President Reagan announced the launching of the Orient Express project, a hypersonic plane whose goal is to link New York to Tokyo in just over two hours.

The ramjet

But there is a more important reason, involving technological know-how. The French SNIAS and ONERA have just started industrial production of a ramjet engine, which powers the new, medium-range, air-to-surface ASPM nuclear missile. ASPM is to replace the free-fall bombs of the Mirage-IV as the air component of France's independent nuclear force (*Force de Frappe*). The ASPM flies at velocities of between Mach-2 and Mach-4.

In a ramjet, the air is just "rammed" into the engine by the high speed of the plane. The ramjet has no rotating parts and can therefore be operated much more easily than turbojet engines at high speeds; it is basically the only engine (apart from the much less efficient rocket engine) which can operate at more than Mach-3.

It is a relatively old concept: For example, the Griffon, constructed by René Leduc, the father of the ramjet, flew at



MSgt. Ken Hammond

An American scale-model of the hypersonic airliner the French are now in an advanced stage of planning.

Mach-2 in 1959. But it has since been so thoroughly supplanted by the less efficient turbojet—in which a turbine pushes the air into the combustion chamber of the engine—that the ASPM is now the only ramjet in existence in the West.

The only problem with the ramjet is that it must have a minimal velocity to function. Therefore the ASPM has a small rocket engine which gives it the initial high velocity required. For the AGV, however, this rocket-engine solution is most likely to be excluded. The relevant idea would instead consist of a hybrid turbo-ramjet, working in a turbojet mode at low speed, upon taking off and landing, and in a ramjet mode the rest of the time. One of the problems with the

Concorde is that it flies at Mach 2.2, a velocity range where the engines are the least efficient: Concorde is 100% less efficient, in terms of specific fuel consumption, as a Jumbo; but at higher speeds (Mach-4 to Mach-6) and altitudes (80,000 to 100,000 feet), the efficiency goes up to levels comparable to the Jumbo.

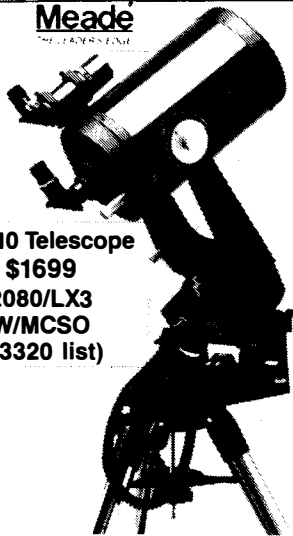
Aérospatiale engineers have good experience in both supersonic flight (Concorde and ASPM), and in ramjet engines. The main area in which advances will be required is materials able to withstand the high temperatures incurred at such speeds: composite materials for the structural elements and ceramics for the engine.

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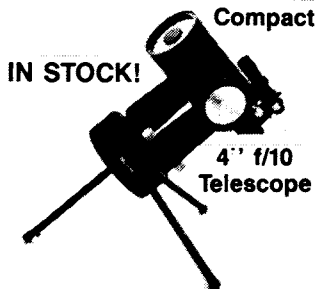
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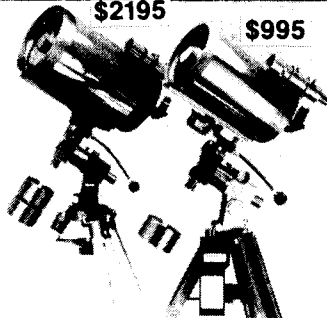
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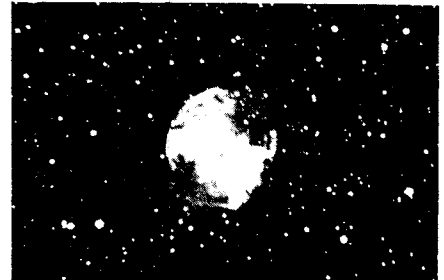
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Clearly, Aérospatiale does not intend to build this project alone. The costs would be too large. European cooperation, either on a bilateral basis, as was the case for Concorde, or possibly in the framework of Airbus or a specialized subsidiary of Airbus, or with the European Space Agency. Whatever the case, it would certainly be useful to combine this project with the next generation of space launchers, for instance, with projects like Sänger, whose only drawback, in the author's view, is reliance on a turbojet engine. Meetings at the European level are already scheduled to explore possibilities for international cooperation.



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