T-tail, variable-geometry supersonic model at Langley
Model of variable-geometry supersonic aircraft concept is readied for low-speed tests at Langley Research Center 30 x 60-ft. tunnel.

Special Report: Advanced Aircraft Research and Planning

Go-Slow Decision Undercuts U. S. Research

Washington—Congressional decision to hold Fiscal 1974 funding for the National Aeronautics and Space Administration’s Advanced Supersonic Technology (AST) program to the same $11.7-million as in Fiscal 1973 will force the level of activity in the program to fall below that necessary for it to be technologically self-sustaining.

As a result, NASA is being forced to consider a number of decisions that could impact directly on the U. S. aerospace industry’s capability to compete with Europe and the Soviet Union during the balance of this century.

Among the decisions that NASA faces are:

- Whether to cutback or eliminate systems studies contracts with industry. These are the nuclei around which Boeing, Lockheed-California and McDonnell Douglas have put together their research teams studying advanced supersonic transport technology. They also have been called the “glue” which holds together the AST program. But at the rate of funding voted for Fiscal 1974 and expected for the next several years, insufficient technology could be generated to warrant NASA’s continued support. This, in turn, could hamper U. S. manufacturers in their efforts to remain competitive in the decade of the 1980s and beyond.

- Whether to fund testing now needed in such fields as materials and engine technology at the expense of such things as sonic boom research. For example, a full-scale experimental variable cycle engine is needed now for laboratory and ground testing if the AST program is to remain a viable one. “It’s still in our thinking, but not possible at $11.7 million [funding per year],” Roy P. Jackson, associate NASA administrator for aeronautics and space technology, told AVIATION WEEK & SPACE TECHNOLOGY. Instead, engine designs will continue to be analyzed only through Fiscal 1974, although, Jackson said, engine technology is the key to the AST program.

- Whether to continue pushing technological research aimed at permitting development of a Mach 2.7-3 aircraft by 1990, or to consider more strongly switching to work aimed at a Mach 4-6 aircraft at a somewhat later date, around the turn of the century. “Right now, we have no Hypersonic Technology Program, only a research program—that’s a couple of steps removed from any sort of development,” Dr. George Low, NASA deputy administrator, said.

- Whether to continue work on engines which derive power from fossil fuel or to push more toward the use of non-
fossil fuel and that liquid hydrogen development work was on a lower level of effort.

He noted that the alternate fuel studies now being conducted by and for NASA are not limited to supersonic or hypersonic aircraft. Rather he said, they are aimed at answering the question: How will fuel affect air transport in the 1980-90 period?

One possibility, he noted, is that fossil fuels may be reserved for public air transport and military use. Another is that it may be possible to produce fossil fuels for existing aircraft from coal, of which the U.S. has an abundant supply.

In wake of the decision to hold AST funding to $11.7 million for Fiscal 1974—and with the understanding among top NASA officials that no political changes are likely for at least two to three years—NASA has asked the Academy of Engineering to conduct a study and recommend courses of action in this field for the late 1970s and early 1980s.

Originally, NASA had two plans for the AST program. One would have been a shorter-duration program, peaking at about $75 million in the late 1970s. The other was a longer-term program, with funding more nearly level in the $20-25 million range over a period extending into the 1980s.

NASA now is in the process of assembling its first requests for the Fiscal 1975 budget. These will go to the Office of Management and Budget by the end of September.

“No given level of funding is essential to getting the technology expected from the AST program,” Low said. With any amount, specific segments of the technology can be developed in time.

“But we may already be so far behind that we will never be able to catch up to the European and Soviet industries," he said.

Prior to the advent of the now-canceled U.S. supersonic transport development program, NASA devoted approximately $20 million per year to supersonic research, with the bulk of it going toward propulsion technology.

Most of this was submerged into the supersonic transport program and was canceled with the death of that program. Now, NASA is faced with the problem of at least getting back to a similar funding level at a time when, politically, it is much more difficult.

“The subcritical level for the [present AST] program is around $20 million per year,” Jackson said. That much is needed, he said, to develop the technology necessary for an economically viable and ecologically acceptable supersonic aircraft ready by the decade of the 1980s.

“We can get by on less if we are ready to accept less than complete economic viability or ecological acceptability,” he added.

NASA planners see some benefits from joint programs with the military in furthering the development of advanced aircraft, but at the same time have reservations about the structure and direction of such programs.

“Jointly funded programs are hard to manage,” Jackson said. He prefers jointly sponsored programs which receive single-agency funding.

Whether or not this will lead to greater cooperation with USAF and/or the Navy will be determined in meetings to be held between the different agencies over the next year.

Both NASA and the aerospace industry involved in the AST and other advanced research programs give indications of still being in a state of flux stemming from the supersonic transport program cancellation two years ago.

The urge to maintain a “low profile” so as not to draw criticism from potential opponents was evidenced to AVIATION WEEK & SPACE TECHNOLOGY editors researching this special report on advanced aeronautical research in these ways:

- A high NASA official asked that nothing controversial be mentioned “because our appropriations bill for this year isn’t through Congress yet.”
- Boeing Co., which saw a multi-million dollar supersonic transport development program cut out from under it two years ago when critics raised questions that could not be answered readily, was reluctant to answer questions about its work for NASA in the AST program. Instead, it referred the questions to NASA, although that agency had no objections to the company discussing its efforts.
- A NASA official declined to make available copies of a drawing of a supersonic transport concept on the grounds that “there’d be hell to pay if Sen. [William] Proxmire [D.-Wis.] saw that.” The model was built by an airframe company to show what an aircraft embodying NASA-developed technology might look like. Neither the technology development effort nor the model were a part of the AST program.

NASA obviously feels constrained by the congressional decision on funding as to how far it can go.

“We got the clear intent of Congress in Fiscal 1974 on spending for technology.”

Capability

fossil fuels, such as liquid hydrogen or liquid methane. NASA has asked the National Academy of Engineering to study the various types of fuels that can be used by aircraft and to make recommendations. Similar studies are being conducted in-house at NASA headquarters and at various research centers, but results from these studies are probably two to three years away.

There is divided opinion—or at least uncertainty—within NASA leadership over what type of fuel will be best for use in the later years of the century.

Low, for example, said that any advanced supersonic aircraft may not use fossil fuel because of efficiency, energy consumption or environmental considerations.

Jackson, on the other hand, pointed out that the technology being developed in the AST program is keyed to the use of joint programs with the military in furthering the development of advanced aircraft, but at the same time have reservations about the structure and direction of such programs.

Research Coverage

This special report on advanced aircraft research and planning was written by an AVIATION WEEK & SPACE TECHNOLOGY editorial team headed by David A. Brown, Washington bureau chief, and including Barry Miller, Los Angeles bureau chief; Michael L. Yaffee, technical editor; Richard G. O'Lone, San Francisco bureau chief; Donald E. Fink, management editor; William A. Schumann, space technology editor, and Clarence A. Robinson, Jr. military editor.
Low said, "and we have to abide by it."

He said there would be no major push on NASA's part for higher funding for the AST or other similar programs in the foreseeable future. Instead, he said, NASA will have to pick a reasonable rate of effort and try to stretch the funding available to maintain it. With political sentiment at present adverse and unlikely to change for two to three years and with the aerospace industry "down," Low said it is probably five to ten years before any major change in the technological development pace can be expected.

Congress Cool to Budget Hikes For Advanced Aircraft Research

Washington—Chances are remote that Congress will significantly increase funding for advanced supersonic aircraft research within the next few years.

By overwhelming margins, both the House and Senate cut the Nixon Administration's Fiscal 1974 request for supersonic research from $28 million to $11.7 million, the amount appropriated the previous year (AW&ST July 9, p. 43). Consensus on Capitol Hill is that there is no need to increase many other programs being cut.

There is little doubt, however, that Congress will continue to support advanced research to keep abreast of aeronautical technology and to study the environmental aspects of supersonic transports. The Senate Appropriations Committee, while cutting the appropriation, specifically recommended that the National Aeronautics and Space Administration continue its noise, pollution and sonic boom studies.

Congress Opposed

Congress is strongly opposed, however, to funding any effort that would lead to U.S. government development of a supersonic transport. Underlying this stance are the House and Senate votes two years ago that killed the Boeing 2707 supersonic transport (AW&ST Mar. 29, 1971, p. 14).

The decision to cancel the SST is brought up inevitably in congressional debate and hearings whenever NASA's supersonic research work is discussed. Most members believe Congress decided the issue of development of a supersonic transport two years ago, and there is little sentiment for raising the question again, now or during at least the next three years.

"What is the rationale of spending a penny for supersonic technology if you assume that the decision of the Congress is going to be permanent and that we are not going to develop an American commercial SST?" Sen. Charles McC. Mathias, Jr. (R.-Md.) asked during hearings on NASA's Fiscal 1974 budget.

"Well, ... we are not working on a supersonic transport," NASA Administrator Dr. James C. Fletcher replied. "We have no plans for starting up a supersonic transport at NASA again, but if some day the Congress and the country decide to go ahead, we have to be in the best position we know with current technology for such a program," he added.

But this explanation of NASA's supersonic technology effort encounters two difficulties in Congress:

• First, a significant minority in both houses believes the U.S. will not develop a commercial supersonic transport for airline service in this century. Hence there is no justification for the NASA research, it is argued.

• Second, the distinction between research into the concepts of supersonic aircraft and development of a specific transport two years ago, and there is little sentiment for raising the question again, now or during at least the next three years. Congressmen believe Congress decided the issue of development of a supersonic transport two years ago, and there is little sentiment for raising the question again, now or during at least the next three years.

Congressional refusal to fund supersonic research at a higher level include:

• Economics. Current supersonic transports are considered to be economically risky: airlines may not be able to afford the additional capital expense, and the current U.S. financial situation is such that supersonic research gets a low priority.

• Airline reluctance. Congress in large part reacts to outside influences and pressures, and it has detected no airline support for a higher level of supersonic research. Congress senses that quieter engines and improved STOL transports are more important to the carriers in the short term than would be a supersonic transport.

• Little foreign competition. There is widespread opinion in Congress that the Concorde will not be an economic success. Thus there is little urgency to a program that would compete with the British and French.

The Tu-144 is not believed to be a competitive threat to the U.S., largely because Western airlines are unlikely to buy it.

Most of the support for more supersonic research comes from the Nixon Administration. Congress is aware that supersonic research was the only item in the NASA Fiscal 1974 budget that was increased over the space agency's funding request to the Office of Management and Budget.

President Nixon is a strong supporter of the supersonic transport program. Many congressional sources expect that NASA's Fiscal 1975 budget request will include more than this year's $11.7 million for supersonic research.

But it currently appears unlikely that Congress will vote a substantial increase.

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