

AERODYNAMICS

Airframe-nozzle interfaces

A 30-month hunt for improved solutions to the problems of interactions between jet aircraft structures and engine nozzles is being conducted for the Air Force by Lockheed-California Co., Burbank, Calif.

The problems are due to the fact that the airflow around a jet aircraft fuselage often interacts with the engine exhaust stream to reduce the plane's operating efficiency. This can mean that widely different nozzle area ratios are necessary for subsonic, supersonic or transonic flight. These changes must be accommodated within the fixed shape of the fuselage.

The compromised fuselage lines, the proximity of large control surfaces and the fairings, if necessary, between dual nozzles combine to produce a nonuniform flow field that can cause wide variations in the pressure distribution and drag on the aft end of the plane.

In seeking ways to predict and minimize these variations, the Air Force Flight Dynamics Laboratory at Dayton, Ohio, has awarded Lockheed a \$2.5 million contract for tests to be conducted at Arnold Engineering Development Center, Tullahoma, Tenn.

WEAPONS TESTING

Firebee II for the Air Force

The Firebee II supersonic jet target, developed in 1965 for the Navy, is to be produced in a modified version for use by the Air Force.

The general performance—speed, altitude and range—as well as configuration of the two versions is to be similar. The Air Force version will include alterations to accommodate different electronic equipment on board as well as to be compatible with different support equipment on the ground.

The Navy uses the device as a target for air-to-air and sea-to-air missiles, and launches it either from land or from aircraft. The Air Force will launch the target primarily from flight and largely for air-to-air missile development.

One difference in the Air Force version is the inclusion of an Increased Maneuverability Kit, which will enable turns at bank angles of up to 78 degrees compared to 45 degrees, with resulting stresses of as much as six g's compared to 2.5.

AIRCRAFT NOISE

Design criteria sought for quieter jets

The growing problem of noise pollution (SN: 1/31, p. 132) is the target of a three-year study by the University of Southern California's School of Engineering, aimed at finding ways to make jet aircraft quieter in their initial design, rather than just tacking on improvements.

"At present, there are no general guidelines in designing jets with minimum noise for a given thrust," says Dr. John Laufer, chairman of the USC Department of Aerospace Engineering. "USC's research effort will concentrate on providing better criteria for designing low-noise jets."

The research program, sponsored by the U.S. Department of Transportation, will include factors such as

upstream flow conditions, jet temperatures and the effect of concentric nozzles in jet engines. Both subsonic and supersonic jets will be studied.

To aid in the research, the Transportation Department will provide a large anechoic chamber, about 25 feet square and 16 feet high, at usc.

AIRCRAFT

STOLplane

Two prototypes of a newly designed short-takeoff-and-landing aircraft will be built by the Australian Government and are scheduled to fly by mid-1971.

To be built by the Government Aircraft Factories at Fisherman's Bend, Melbourne, the aircraft is a twin-turboprop light utility transport. It is designed primarily for use with unprepared airstrips and support facilities requiring minimum maintenance.

Variations of the plane would seat 13 or 14 passengers or carry about 3,000 pounds of freight in 300 cubic feet of interior volume. Maximum range with two 400-horsepower Allison turboprop engines is predicted to be slightly more than 1,000 miles; top speed will be 200 miles per hour.

CANADA

Catch-all space committee formed

An Interdepartmental Committee on Space has been established by the Canadian Government to improve the coordination of planning and allocation of resources of all of the country's federally sponsored space activities.

The task involves overseeing proposals and research in the areas of science, defense, communications, resource management and meteorology. The committee has the power to establish subcommittees including representatives of Government, industry and universities, as necessary.

Chairman of the group is Dr. Donald W. R. McKinley, vice president for Laboratories of the Canadian National Research Council. The committee will report at least once a year to the chairman of the Privy Council Committee on Scientific and Industrial Research.

TEST FACILITIES

Cutting corners on wheels

Hard-pressed by tight budgets, engineers are often driven to strange innovations. One such is the rolling wind tunnel of Lockheed Missiles and Space Co. in Sunnyvale, Calif.

Unable to afford either the cost or the time of using an actual wind tunnel for nearly 300 test runs needed in a small tactical missile test program, two Lockheed engineers instead strapped their missile model atop a heavily instrumented station wagon and drove it repeatedly over airstrips and low-traffic highways. The improvised technique provided the necessary gross data in four days, in contrast to the two weeks or more that would have been required in an actual wind tunnel. The resultant data were used to develop an accurate, detailed missile model that was subsequently tested in a conventional tunnel.