

aerospace notes

ACOUSTICS

Guinea pigs measure rocket noise effects

Caged guinea pigs placed near test firings of Saturn 5 rocket engines are helping Tulane University doctors evaluate the effects of rocket noise on hearing. The studies, being conducted at NASA's Mississippi Test Facility, may aid in determining how close humans can live to such noise without suffering some permanent damage to their ears.

The animals are placed 75, 150 and 300 feet and one mile from the engine test stands during the six-minute firings. Afterward, they are first tested for general response to a given sound stimulus, then measured more precisely by using electrodes in their ears to plot the electrical patterns produced by their auditory nerves.

Rocket noise is unusual as a cause of hearing loss, points out Dr. Clifton Istre, because it is largely of low frequencies, whereas most harmful noises cause hearing losses in the middle range around 4,000 cycles per second, an area which Dr. Istre says is not vital to speech intelligibility.

Most of the damage suffered so far by the guinea pigs, some of whom are believed now to be totally deaf, is apparently caused by blockage of the blood supply to the hair cells of the inner ear, according to the project's director, Dr. Gerardo Gonzalez. The researchers plan to check this theory later in the year by microscopic examination of the cellular structure of the pigs' ears.

The doctors also plan to expose a number of cats under the influence of drugs to the rocket noise, to see if the drugs can offer any protection.

SPACECRAFT STERILIZATION

Mobile cleanroom for space agency

To prevent contamination of sterilized interplanetary spacecraft in case they have to be worked on during the countdown, a mobile cleanroom is being built for the space agency at a cost of \$1.4 million.

The unit will be a prototype, designed to let NASA work out procedures for removing a spacecraft from its booster and transferring it inside the unit, all the while without risking contamination. Conditions both in the room and during transfer will be aimed at meeting the quarantine standards of the Committee on Space Research of the International Council of Scientific Unions.

Built on wheels for transfer between launch sites and other facilities, the unit is being constructed by Avco Corp.'s space systems division in Lowell, Mass.

NOISE FORECASTING

Airports surveyed for noise

Except for the sonic boom, aircraft noise problems are concentrated in and around airports. In an effort to measure the problem and thus aid remedial efforts, the Federal Aviation Administration is supporting a project to calculate the total amount of noise from aircraft at 29 representative U.S. airports.

The airports have been selected to include a cross-section of those handling light, medium and heavy traffic

in general and commercial aviation. The study is being carried out for the FAA by Bolt, Beranek and Newman Inc., of Cambridge, Mass.

Data from the survey will be used to develop a noise-forecasting system that can be applied at other airports. Various approaches to noise reduction will also be evaluated, along with their effect on noise predictions. Among the ideas are changes in engine frequency spectrum and modifications of takeoff and approach power and routing profiles.

COMMUNICATIONS

Increasing tacsat's talk-power

A 20-fold or more increase in the message-handling capability of a tactical communications satellite is reported possible with the aid of an electronic device developed for the Air Force by the Massachusetts Institute of Technology's Lincoln Laboratory in Lexington.

Called a Tactical Transmission System, the device operates by converting a voice or teletype message into a series of pulses that rapidly change frequency all over the width of the radio band being used. Several stations can use the same channel at once without causing interference, and pairs of stations (if their frequencies change in different patterns) can send and receive simultaneously.

The system has been tested successfully over a distance of more than 8,100 miles, with the Lincoln Experimental Satellite, LES-5, linking the laboratory on the East Coast with an Air Force C-135 aircraft near Guam in the western Pacific. Ordinarily, LES-5 can operate on a single channel in any given frequency band. With the new modulation system, however, the laboratory researchers report, it should be able to handle 20 or more, and satellites with more powerful transmitters (enabling wider bandwidths) should do even better.

NOISE CONTROL

Airbus engine gets soft touch

A major effort to reduce noise in the engines powering the tri-jet Lockheed 1011 airbus is being conducted by the engines' builder, Rolls Royce Ltd., in Derby, England.

Some 176 of the 1011's have been ordered so far, all of them to be powered by the RB-211 turbofan, rated at 40,600 pounds of thrust for takeoff. To handle planned future payload and range increases, Rolls Royce is working to uprate the engine to 46,500 pounds of thrust by 1975 and 50,000 pounds later on.

The RB-211 is already a quiet design, but the company's quieting plans are elaborate enough to have inspired the construction of several new facilities, including what is reportedly the world's largest anechoic chamber.

To cut down the whine of the engine's turbine during landing, it will be fitted with special flaps which will partially close the exhaust nozzle. A special cowling is also being designed with an acoustically insulated lining. The engine's first test run is now set for September. The first flight test, according to Rolls Royce, will take place in a specially modified Vickers VC-10 jetliner, in which a pair of RB-211's will replace two of its standard Con-way powerplants.

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