

## AERONAUTICS

# New U. S. Wind Tunnel

National Advisory Committee for Aeronautics now operating the world's most advanced wind tunnel for testing tomorrow's aircraft. It took five years to build.

## See Front Cover

➤ ANY KIND of airplane or missile of the future can be given a test flight in the world's most advanced wind tunnel that has now started to roar at the National Advisory Committee for Aeronautics Lewis Flight Propulsion Laboratory, Cleveland.

It is a \$33,000,000 research plant that can test engine, rocket, airplanes and other flying structures at up to 2,400 miles per hour, and under conditions equivalent to as much as 100,000 feet altitude.

It can test full scale jet engines in full operation. Its test area is ten feet square. It is probably better and bigger than the Russians have. No one seems to know or at least no one will say. It cannot be assumed that the Soviet aeronautical research is necessarily lagging, but our Government's aeronautical research agency has certainly built more wind tunnels than any one else.

Missiles and airplanes that will start flying five years from now are now being developed fundamentally in the new wind tunnel.

It took five years actually to build the great testing device and Government plans were first made as much as 12 years ago. The research development will have an important bearing on keeping America supreme in the air and in guided missiles in the years to come.

Lewis Laboratory staff engineers made more than 100 design studies before selecting the configuration of the Lewis unitary plan wind tunnel. They built and tested a small scale model of the selected proposal before making final plans.

Design studies began in 1950, construction of equipment was started in early 1952, and ground was broken for the buildings July 31, 1952. The project was completed and the tunnel put into operation in May, 1956. NACA engineers supervised the construction job, which was carried out by more than 450 contractors, engineering firms and suppliers.

Shown on the cover of this week's SCIENCE NEWS LETTER is an aft view of a 16-inch ramjet in test position, seen through a floor opening of the Lewis unitary plan wind tunnel. The body of revolution downstream of the ramjet nozzle is a movable plug, used to simulate the changes in internal flow that would take place during engine combustion.

The continuous-flow wind tunnel has a Mach number range from 2.0 to 3.5, and is operational either in closed circuit for aerodynamic tests or an open end cycle for combustion propulsion research.

In operation, the tunnel draws air through the dryer and the flexible wall nozzle into the test section, where the engine or airplane model is mounted.

For speeds above Mach 2.5, the two compressors are operated together. For lower speeds, the secondary compressor is shut down and the air flow is valved around it through a bypass circuit.

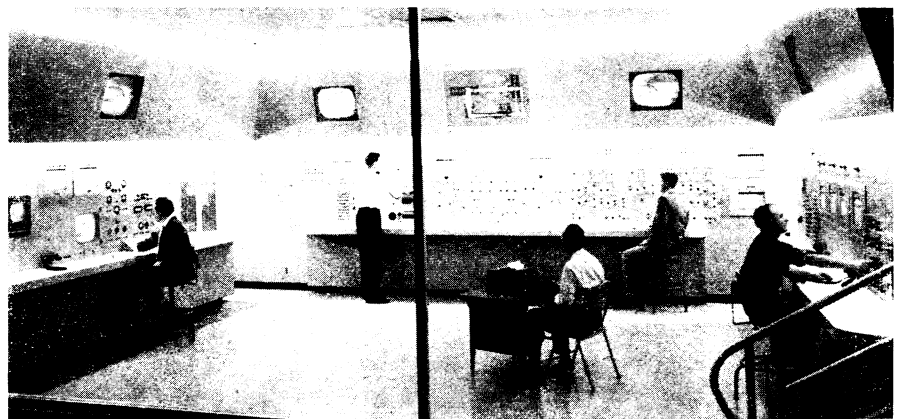
The altitude simulated in the test section where the model is located is regulated by means of exhausters located near the flexible nozzle. Air temperature is controlled by a water cooling tower separated from the main tunnel structure.

Elaborate systems for safety and for remote control of all elements of this huge research tool are included, and soundproofing reduces external noise to acceptable levels. For the propulsion cycle, duration of a single test is limited by capacity of the air dryer to less than an hour on a humid summer day and to about ten hours in the winter. Operation of the facility on the closed-circuit aerodynamic cycle, however, is not time limited.

Complete test information is recorded automatically by electronic devices for immediate processing or for later computing in a unique central data handling system. This center, located in the tunnel offices, handles not only the data produced in the unitary tunnel but that of four other major research facilities on the laboratory grounds.

The new tunnel is the highest powered of three designed and built by the NACA.

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**WIND TUNNEL CONTROL ROOM**—The control room of the Lewis unitary plan wind tunnel. The tunnel diagram (top, center) provides a pictorial indication of the position of each of the major valves controlling tunnel operation. Each of the 24-inch television monitors (near ceiling) can be connected to any of the three TV cameras that survey the tunnel.

## ● RADIO

Saturday, June 9, 1956, 1:45-2:00 p.m., EDT  
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Renato Contini, research coordinator, research division of the College of Engineering, New York University, will discuss "Medical Engineering."

## GENERAL SCIENCE

### Government Publishes Russian Atomic Papers

➤ THE WORK of Russia's atomic energy experts is now available in English translation from the U. S. Government.

Eighty-seven technical and scientific papers, originally presented at a conference in Moscow sponsored by the U.S.S.R. Academy of Sciences in June, 1955, have been published by the Government Printing Office.

The papers, printed in four volumes, can be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

The first volume, priced at \$1.25, consists of 23 papers covering such topics as nuclear properties of heavy elements, theoretical and experimental work on uranium-graphite, reactors and lattices, and radiation effects.

The second volume, selling for \$1.00, has 19 papers on radiochemical studies of high energy fission and spallation, effects of ionizing radiation on chemical reactions, and application of nuclear techniques on chemical structure and reactivity.

Volume 3, priced at \$1.00, has 18 papers describing the application of nuclear technology to industrial processes and prospecting.

The fourth volume, priced at \$1.00, has 21 papers dealing with biological, biochemical effects of ion radiation, and the application of nuclear techniques in biochemistry.

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