

AERONAUTICS

Machines for Future Wars

Human pilots will not be needed for planes streaking through atmosphere at hypersonic speeds as automatic machines are being developed to do the job.

See Front Cover

► **FUTURE WARS** a decade or more from now will be fought by high-flying automatic machines unmanned by human pilots. Devastating bombs will be chased by intercepting missiles at speeds, heats and altitudes that the human body cannot stand.

This is evident from the aeronautical research results obtained at the Ames Aeronautical Laboratory of the National Advisory Committee for Aeronautics, Moffett Field, Calif.

The fastest that man has flown is probably in excess of the 1,300 miles per hour achieved last year with a Navy NACA experimental plane, the Douglas D-558-II Skyrocket at Muroc, Calif. This is twice the speed of sound. Not long ago sound's speed was considered the mysterious and unsurmountable barrier to rushing through the air. Our combat planes can do or are about to do spurts of somewhat better than the speed of sound.

This is obviously only the beginning. In the NACA wind tunnels where the planes and missiles of the future are being born, the hypersonic region is being explored.

The hypersonic region begins at Mach 5, which means five times the speed of sound.

At more than five miles aloft, where superplanes must fly, Mach 5 is 3,300 miles per hour.

There are barriers to piloted flight at such speeds. Man may never fly at such speeds except momentarily for the sake of science. He will not have to. His machines, devised by skill and brains, will do it for him.

Heating is the newest formidable barrier when planes and missiles are pushed through the air. At three times sound's speed, the friction of the air produces a 600 degrees Fahrenheit temperature. At five times sound, the temperature may reach 1,600 degrees.

This would melt most metals to flabbiness, roast the crew and burn up the equipment.

This heat is created in the thin boundary layer of air around the aircraft. For short spurts of ultraspeed it will not soak into the craft. But for sustained flight, even test planes such as the experimental Skyrocket must be virtually flying refrigerators with enough cooling for a large theater.

Remodeling the human body to withstand high temperatures is impossible but titanium and other such metals will be used to beat the heat effect on the structure. Already a stainless steel research airplane has

been built, the Bell X-2. It is another big job to remodel the electronics of the guiding mechanical brain, radar and communications to withstand the high temperatures. Fuel must be protected from evaporating and boiling away. Control becomes more difficult. Drag produced by the skin friction of the craft limits range. It is a tough problem but not impossible.

Secrecy has been lifted enough to make it sure that the future's flying will be rigidly impersonal. Machines will be pilots. Men on the ground will merely start things. Those who risk their lives will be the millions at whom the future's super bombs are aimed.

The potential air battles of the 1960's are being fought in our aeronautical laboratories today. Science fiction may glibly talk of other worlds and space ships. The realities of future aeronautics are more exciting, more important and much, much tougher.

Shown on the cover of this week's *SCIENCE NEWS LETTER* is a model missile streaking through an Ames' wind tunnel at 2,500 miles per hour. The shadowgraph shows shock lines streaming back from the model's needle nose and tail surfaces.

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ELECTRONICS

Boom in Requests for Educational TV Channels

► **AN UNEXPECTED** boom in applications for non-commercial educational television broadcasting licenses has surprised some Federal Communications Commissioners since the FCC took television station construction permits out of the deep freeze last April.

FCC Commissioner Frieda B. Hennock told *SCIENCE SERVICE* that nine applications for educational video stations already have come in from California, Florida, Kansas, New York and Texas. The FCC has set aside 242 channels for educational TV.

Miss Hennock said she is "thrilled" so far at the educational television boom. She said the Emerson Radio and Phonograph Corp. helped get the ball rolling when it announced it would give a \$10,000 grant to the first 10 educational licensees to begin regular operation.

Apparently the boom still is gaining momentum. The state of New York, trying to forge an educational TV network, already has applied for reserved UHF channels in Albany, Buffalo, Rochester, Syracuse and New York City.

The New York educational network will be used by public schools and colleges on a cooperative basis. Programs will originate all over the state and will be relayed to other network stations. Programs to be screened locally also are being planned.

Other applications have been filed for educational stations which are to serve the San Francisco-Oakland area in California; Miami, Fla.; Manhattan, Kans., and Houston, Texas.

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SWEPT-BACK WINGS—With models such as this, aeronautical engineers of the National Advisory Committee for Aeronautics are gaining advanced knowledge concerning the performance of highly swept-back airplane wings at speeds faster than sound.