AVIATION

Better Jet Engines Needed

Ability to fly fast and high is a prime aviation requisite in modern warfare, lessons from Korea show. Speeds faster than sound must soon be possible.

By A. C. MONAHAN

➤ ABILITY to fly fast and high is a prime aviation requisite in modern warfare, it has been amply shown by experiences in Korea. This means jet planes. Jet-propelled fighters have been found far superior to fighting planes of the conventional types.

Design is important for such planes, but no matter how good the design may be, the fighter is no better than its engine. That is why research work in developing better engines must proceed at full speed. Engines twice as powerful as those in use are required. The hopeful fact is that they may be available in the near future.

Fundamental in aviation is the fact that at high altitudes faster speeds can be made. These speeds mean more safety in surprise attacks for the plane and its occupants. Detection and interception by enemy aircraft or anti-aircraft fire is made more difficult.

Speed Is Essential

Speed makes it possible for a fighter to overtake an enemy plane being followed or to escape from difficult situations when escape is essential. Speeds approaching that of sound are now attainable by fighter planes. But planes of the future must travel faster than sound.

Russia, as well as America, has fast planes. Dr. Hugh L. Dryden, director of the National Advisory Committee for Aeronautics, gave recent warning that in Korea, Russian-built aircraft as fast as the American F-86 Sabre are in action. The United States must make every effort to maintain superiority in aircraft engines, he said.

Jet airplane designers are not satisfied with the 11,000 horsepower engine that drove the Bell X-1 faster than sound, he stated. Engines producing 20,000 to 30,000 horsepower are in the offing. Another important problem to be solved, he added, is to make the jets more economical with their fuel, and to make them entirely of raw material available in America.

Jet planes have other advantages in warfare over those equipped with the ordinary piston-engine besides speed and altitude ability. In a recent statement made by Maj-Gen. Roger M. Ramey of the U. S. Air Force, he indicated that his branch of the armed services is convinced that the jet has proven its worth as a tactical weapon in many ways.

"It delivers its fire power better than conventional aircraft, as the location of the machine gun in the nose of the aircraft gives a far greater concentration of fire than wing guns," he stated. "The jet aircraft provides a steady gun platform, which allows the pilot to hold his fire on small targets without continually having to trim his aircraft for changes of speed and altitude.

"The wide speed range of jet aircraft enables pilots to adjust the speed of their attacks according to prevailing circumstances. The forward and downward visibility in a jet is far better than that of single-seat conventional aircraft, as there is no cowling to obstruct the pilot's view. The absence of engine noise is a boon to the pilot in reducing combat fatigue."

However good present jet planes are, better types are necessary if America is to hold air supremacy. Extensive research in both plane designs and in engine and fuels is a prime necessity. Dr. Jerome C. Hunsaker, chairman of the NACA, said in a recent report of that organization that if air research is curtailed during the present emergency to the same extent that it was during World War II, America's future air power position will be precarious.

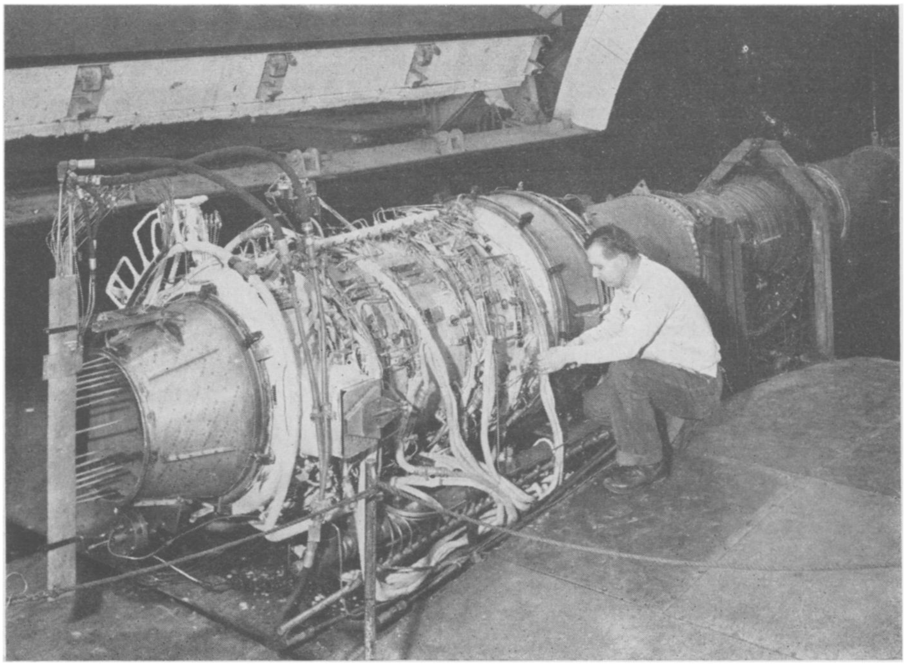
Great improvement must be made in jet engines, the report states, before the Air Force can have really practical combat planes that can fly faster than sound.

The National Advisory Committee for Aeronautics is a government agency for fundamental studies in aerodynamics including aircraft design, power plants and fuels. It maintains three large research centers, including one at Cleveland, Ohio. Work on engines and fuels is concentrated at it. Millions of dollars are invested in equipment at this center. There is no cheap way to develop planes or engines. The essential wind tunnels alone cost millions.

Largest in the World

A notable tunnel at this laboratory, largest of its type in the world, has a test chamber six feet wide and eight feet high, big enough to hold a full-size jet engine under operating test. It is a supersonic tunnel in which air velocities up to 1,500 miles an hour can be obtained.

This is about twice the speed of sound at sea level. It picks up at one end as much as 2,000,000 cubic feet of air per minute and returns it to the atmosphere at the other. Ordinary wind tunnels for testing models of planes and plane parts are "closed" affairs in which the same air is used over and over again. That type can not be used with operating engines be-



JET ENGINE—Full-size turbojet engine, a type used in speedy jet planes, is installed for testing in the test chamber of an Altitude Wind Tunnel at NACA Lewis Flight Propulsion Laboratory, Cleveland. The hinged curved cover is closed before test runs.

cause the air becomes polluted with the discharge of combustion.

Cold air is big business, important business, at this NACA Lewis Flight Propulsion Laboratory at Cleveland. Without the enormous quantities of refrigerated air made each day, it would be impossible to carry on the vital research needed to help America's aviation industry to build the more powerful jet engines of tomorrow.

Jet engines of today and tomorrow will have to be completely dependable at altitudes of 50,000 feet and higher. They will have to function at temperatures of 65 degrees below zero Fahrenheit as well as at surface temperatures. At an altitude high enough to give this low temperature, the air is so thin that a man would suffocate immediately. Ordinary electric circuits just will not work at such altitudes.

Biggest Refrigerating Plant

To supply the cold air needed in engine development, the Lewis Laboratory has four costly cold-making installations. One of these is the biggest refrigerating plant in the world. It can produce at capacity the equivalent of 30,000,000 pounds of ice every 24 hours.

This installation contains a battery of 14 centrifugal compressors, each rated at 1,500 horsepower. A total of 30 tons of Freon 12, a non-toxic refrigerant, is required. A centrally-located control room rations out the cold air to more than 100 test installations at the laboratory which require it. Temperatures involved in testing range from 90 degrees above zero Fahrenheit to 108 degrees below zero. The installation was made by Carrier Corporation, Syracuse, N. Y.

The Lewis Laboratory at Cleveland is, of course, not the only agency conducting fundamental research in aviation engines. Both the Air Force and the Navy have laboratories doing important and outstanding work. Also there are many educational institutions, private organizations and aviation industrial laboratories making important contributions to the future of flying.

Notable among aviation laboratories in research work are those of the U. S. Air Force at the Wright-Patterson Air Base, Dayton, Ohio. Included in its equipment is what is called an all-weather laboratory which can produce any type of weather found anywhere around the globe and simulate altitudes up to 150,000 feet.

Weather Conditions Simulated

This Environment Laboratory, as it is called, contains 14 weather chambers. Most of these chambers are cubical affairs about eight feet in size into which airplane and engine parts, and instruments, can be placed for testing under conditions ranging from Sahara dry to jungle wet and Arctic cold. Plate glass fronts aid observations.

Each chamber is for particular tests. Some are low-temperature chambers in which temperatures down to minus 112 degrees Fahrenheit can be obtained. In one, the temperature can be dropped from that of the ordinary room to 65 degrees below zero in five minutes.

Then there is an all-weather chamber with extreme range in temperature but in which 100% relative humidity can be made. A sand and dust chamber has relatively no humidity and its temperature range extends from 70 degrees to 185 degrees Fahrenheit. A salt fog chamber simulates coastal conditions. A fungus chamber maintains conditions favorable to the growth of fungus encountered in various parts of the world and permits testing of plane parts in a fungus-laden atmosphere.

The sun and rain chamber is of particular interest. Within it, rain from a quarter of an inch to four inches an hour can be provided under various temperatures. "Sun" is provided by a strong mixture of ultraviolet and infrared radiation. Within the chamber, conditions can be reproduced equivalent to the sun's rays at noon when the sun is just over the equator.

Brine Circuits Maintain Cold

Important in this all-weather laboratory is the refrigeration system supplying low temperature brine for cold weather testing. Extreme low temperatures are achieved by operating three Carrier Corporation centrifugal refrigeration machines in series. Two independent brine circuits are maintained, one of which is kept constantly at ultra-low temperatures. The other provides brine at a maximum of 30 degrees above zero. In both, the brine is methylene chloride, dyed with red oil so that leaks can be detected.

The need of continuous research in military planes and their engines is emphasized by the fact that these weapons must be always in condition to operate in any part of the world. Also that the plane taking off from a tropical desert or jungle at high temperature may within a few minutes be high above the earth at temperatures far below zero. Engines that function under all conditions are essential.

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MEDICINE

New Drugs Combat Effects Of Deadly Chest Disease

➤ A NEW disease, a result of our increasingly complex industrial life, has been retarded by the new drugs ACTH and cortisone. A pulmonary chest disease, it is called chronic berylliosis.

It attacks the lungs and occasionally other parts of the body. Small amounts of beryllium, a metal now being used in copper and other alloys, sometimes get into the bodies of workers and others who have contact with it.

The new treatment was reported by Dr. H. E. Tebrock of Sylvania Electric Products, Inc., at the Industrial Health Conference in Atlantic City, N. J.

Dr. Tebrock reported that other treatments had been unsuccessful, but that patients responded well to first ACTH and then cortisone.

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