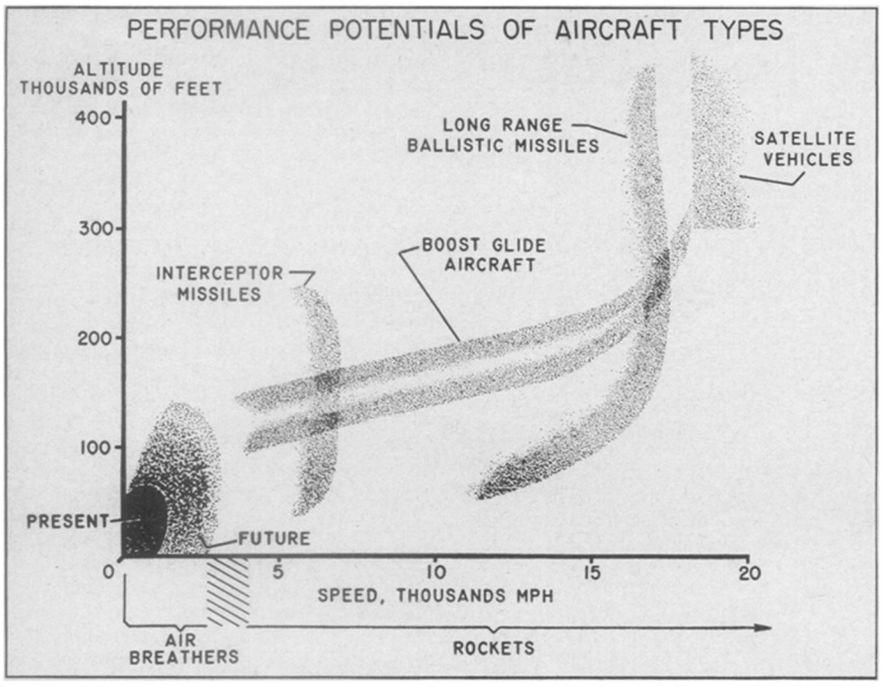

AERONAUTICS

Shrink Globe to One Day

See Front Cover

➤ IT IS STILL "blue sky" but the aeronautical scientists and engineers of the National Advisory Committee for Aeronautics, who are producing the research information for future flight, foresee these possibilities:

1. Airplanes speedy enough to shrink the globe until any two points will be within a comfortable day's journey.

2. Ballistic missiles that can travel the required distances at the desired velocities without being destroyed by aerodynamic heating.

One possibility for the future is an aircraft that would be propelled by rocket high above earth at speeds about ten times that of sound and then glided down to arrive at some desired destination.

At the triennial inspection of the NACA's Langley Aeronautical Laboratory at Langley Field, Va., prime consideration was given to methods of flying faster and yet survive the effects of heating caused by the "friction" of the plane with the air.

Conversion of kinetic energy into heat takes place in the area of the shock wave and in the boundary layer where the air velocity is slowed as it approaches the structure.

Temperature increases as the square of the velocity. At Mach number three (three times velocity of sound), about 2,000 miles per hour at altitude, the temperature would be about 660 degrees Fahrenheit. At Mach 20, about 13,000 miles per hour, it woud be above 20,000 degrees Fahrenheit, far hotter than the surface temperature of the sun.

Already a four-stage research rocket launched from the NACA's field station at Wallops Island, Va., has climbed over a million feet high and reached Mach 10.4, or 6,864 miles per hour at the altitude achieved.

In addition to such studies in flight, aerodynamic heating is being studied in the laboratory by use of electric carbon rod radiators that produce rates up to 100 B.T.U. per square foot per second, and by quartz-tube heat lamps that heat up and cool quickly.

Supersonic air jets are being used to produce true aerodynamic heating. A wind tunnel for this purpose with a test area of eight and three-quarters by six feet and reaching Mach two to three is being constructed.

A new Langley Field tunnel has two four-by-four-foot test sections with ranges up to Mach five. It was build under the unitary plan for supersonic wind tunnels to give large-scale information for designing faster-than-sound aircraft.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows the air passages to the two test sections of the Langley unitary plan tunnel.

Thousand-mile-per-hour tactical airplanes are now going into military service. The NACA scientists are working on the problems of designing controls that will be effective for over triple these speeds (Mach five) to be reached in the not too distant future.

Even at the present jet airliner speeds, there is need for reducing the length of both take-offs and landings so that the jets can fit onto present airfields.

One method being investigated directs the exhaust of the engines spanwise along the trailing edge of the wing. This thin jet stream directed downward by a flap produces a large increase in lift. Applications promise to cut the runway requirements of jet airliners in half.

Larger landing gear loads in modern airplanes have made necessary a new landing loads testing track just completed at Langley Field.

A waterjet, seven inches in diameter under 3,260 pounds per square inch pressure, accelerates the test vehicle. The power is equivalent to bringing a B-29 up to take-off speed in one and a half seconds.

Because the rocket carries its own oxygen supply, it has no altitude limit and, in fact, its thrust increases with altitude. Compared to the thrust it produces, the rocket is very light in weight. A 500-pound rocket can produce 50,000 pounds thrust.

The speeds possible from using rocket engines are almost unlimited when compared to air-breathing engines. It is the power potential of the rocket that enables scientists to plan for the design and construction of intercontinental ballistic missiles with speeds of Mach 20 and the satellite vehicles of tomorrow, and of the space craft that will come soon after with speeds of Mach 30.

Science News Letter, October 20, 1956

SURGERY

Graft Skin by Spray To Cover Large Area

➤ SKIN GRAFTS will be sprayed on in the future, if a method reported at the American College of Surgeons meeting in San Francisco is adopted. It is expected to be particularly useful for burn victims who have lost skin over large areas and have not enough left for suitable grafts by other methods.

The skin for grafts is put into an electric kitchen blender which divides the material into tiny particles suspended in salt solution. The suspension of skin particles is then sprayed by syringe onto a piece of fine mesh gauze that has been cut to fit the area needing a graft.

The skin particles are deposited as a thin layer over one surface of the gauze. This is then inverted and placed over the graft area. By the third week after, the numerous scattered islands of skin have grown to cover completely the entire area.

Success with the method in all but three of 32 rabbits on whom it was tried was reported by Drs. John S. Najarian and Horace J. McCorkle of the University of California, San Francisco.

For best protection against flash burns, wear snug-fitting clothing of wool, nylon or Dacron, or clothing treated with flame retardants, advised Dr. George D. Zuidema and associates of the Aero Medical Laboratory, Wright Patterson Air Development Center, Dayton, Ohio.

The advice is based on tests of 33 different fabrics against flash burns.

Science News Letter, October 20, 1956