

AERONAUTICS

America's Fastest Plane

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► TWO revolutionary types of jet engines made possible America's fastest plane, the Army P-80 Shooting Star, headquarters of the Air Technical Service Command at Wright Field has revealed. The engines are designated as the I-16 and the I-40.

The I-16, created by General Electric Company and Army engineers, was used in the P-59 trainer in which jet pilots were trained. From it was developed the more powerful I-40, sometimes called the super G-E jet.

The basic principle of the two engines is the same. The chief difference lies in an improved line of gas-flow through the main turbine.

In both engines, air is drawn through an intake duct in the front and forced into the combustion chamber by means of a centrifugal compressor. This is simply a high-speed fan.

Kerosene is used for fuel. It is injected into the combustion chamber where it is atomized, mixed with air, and burned. Continuous combustion of the kerosene occurs at approximately a constant high pressure, resulting in a stream of high-velocity gas which is released through the rear nozzle, thus driving the plane forward. The turbine, a fan-like wheel, is activated by this stream of gas and provides power for the compressor.

In the I-16 the course of the stream of gas is reversed twice in this process, while in the I-40 the flow is direct, resulting in less loss of power. This is the main difference. Both engines are developments from the British jet engine invented by Air Commodore Frank Whittle.

Rigid flight tests of the I-40 jet engine are now being made by the General Electric Company, with the engines installed in converted B-24 Liberators. This was revealed by N. F. Frischhertz, one of the company's engineers, at the recent New York meeting of the American Society of Mechanical Engineers. This is for the future development and testing of the jet engine under actual flying conditions.

The converted Liberators are called "flying laboratories" and are used be-

cause they provide a great number of facilities and advantages of a ground test cell, or wind tunnel, at considerably less cost and with greater availability. Their use also allows flight space for design engineers to observe operation under flight conditions.

At the same meeting of mechanical engineers, Dr. William F. Durand, formerly chairman of engineering and industrial research, National Research Council, declared that future development of jet propulsion demands continuing detailed research into design and construction, both in the jet engine and the plane on which it is to be used. The jet engine "will undoubtedly occupy a highly important place in the field of aircraft propulsion," he said.

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Improved Methods Needed For Airplane Traffic

► AIRLINERS are now spanning oceans and continents with a volume of traffic which creates serious hazard situations calling for vastly improved methods for handling arrivals and departures at established terminals, engineers were told at the Chicago meeting of the Society of Automotive Engineers. International air traffic, they were informed, already has reached proportions that make airways control and air navigation problems of the first magnitude, demanding prompt solution.

Navigation aids for long-range flights, developing far beyond those available to other transportation media, were said to contribute to the efficiency of aviation operation, with war-developed electronic and radar devices widely applicable. Contrast was drawn between the ease and safety en route over the ocean, and the delays, difficulties and dangers created by congestion at the air terminals.

The development of a comprehensive system of air navigation, control and communications was proposed by Capt. S. P. Saint of American Airlines. It should include, he said, every known principle of safety engineering. He as-

serted that such a system would provide flexibility of movement for all planes, have no limitations other than air space, and would automatically coordinate air traffic and maintain separations.

Self-checking communication devices, he continued, would establish continuous two-way channels between each airplane and the automatic control system and handle all routine clearance, thus freeing normal voice communication for special services. He proposed to aid navigation by using self-checking radar ground beacons affording all pilots precise holding patterns, but permitting ground control to change routings when necessary.

Air-conditioning airplanes by the installation of air turbine refrigeration was described by Bernard L. Messinger of the Lockheed Aircraft Corporation. The advantages of this system, he said, are simplicity, lightness, compactness, and a highly effective use of air as a refrigerant.

Vapor-compression cycle refrigeration, generally used commercially on the ground, was reported to be unsatisfactory for aircraft, he stated, because of mechanical complications, excessive

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