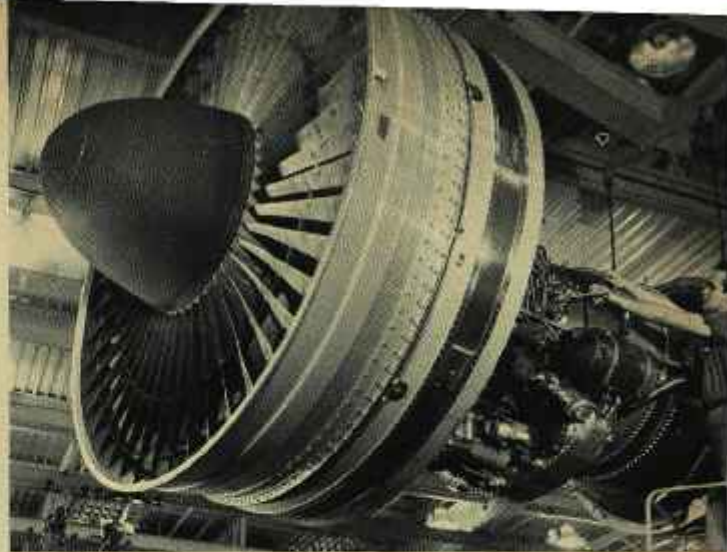


Making up the most comprehensive survey available in any publication, the products of the international turbine aero-engine industry are individually described in the following 17 pages. Powerplants are listed alphabetically under company names, with the turbines categorised in the sequence of turbofans, turbojets, liftfans, liftjets, turboprops and turboshafts. A brief review of the likely aero-engine scene through the 1970s is given on page 13 of this issue.

# AERO ENGINES 1970



Heading picture: The Pratt & Whitney JT9D turbofan, power plant for the Boeing 747

## AIRESEARCH

(AirResearch Manufacturing Company, Garrett Corporation, subsidiary of Signal Companies Incorporated). Division headquarters: Los Angeles, California, USA

**ATF3** Civil three-shaft turbofan. Private venture project founded by Signal Companies, started development testing in May 1968 to power business, utility and commuter aircraft. Unique reverse-flow layout provides low cruise s.f.c. and low noise generation. Flight test in Sabreliner Series 60 scheduled for March 1970. FAA certification early 1971 with initial deliveries later in year. Thrust bracket 4,000lb to 5,000lb with growth potential to 9,000lb.

*Applications* Beech F3 commuter project, 3×ATF3A. Dassault Falcon G/Mystère 20, 2×ATF3A. HFB 330 Hansa Fanjet, 2×ATF3 (4,050lb). Lockheed JetStar 3, 3×ATF3A-3 (5,300lb). North American Rockwell Sabreliner Series 60, 2×ATF3 (4,050lb) retrofit engines.

(ATF3) Single-stage 1-p fan (driven by i-p turbine), six-stage i-p compressor (driven by i-p turbine), single-stage (single-sided) centrifugal h-p compressor, annular reverse-flow combustor, single-stage h-p turbine, two-stage i-p and i-p turbines. Accessories mounted in turbine exhaust cone. Take-off 4,000lb; b.p.r. 3:1; mass flow 162lb/sec; pressure ratio 25:1; length 94in; diameter 33.5in; weight 800-850lb.

(AirResearch Manufacturing Company of Arizona, Garrett Corporation, subsidiary of Signal Companies Incorporated). Division headquarters: Phoenix, Arizona, USA

**TFE371** Civil and military two-shaft geared turbofan. A new private venture project announced in April 1969. Designed as a high performance engine for civil and military transports to enable six-to-ten seat aircraft to have trans-continental range at high subsonic speeds. Utilises building-block core engine for McDonnell Douglas DC-10 APU. Component testing started March 1969 with first engine run scheduled for February 1970 followed by flight testing in July. FAA certification planned for August 1971 with production towards end of year. Growth potential to 4,000lb.

*Applications* Dassault Mimifalcon 10/Mystère 10, 2×TFE731-2 (3,406lb). Gates Learjet 25B-GF & 25C-GF, 2×TFE731-2 (3,406lb). Swearingen SA-28T, 2×TFE731-2 (3,406lb).

(TFE731-2) Single-stage 1-p fan (driven by gearbox off 1-p rotor), four-stage 1-p compressor, single-stage (single-sided) centrifugal h-p compressor, annular reverse-flow combustor, single-stage h-p turbine, three-stage 1-p turbine. Take-off 3,406lb; length 54.4in; width 32.6in; height 38.3in; weight 620lb.

**TPE331** Civil single-shaft turboprop. Design is based on AirResearch's extensive small gas-turbine APU experience. Total flight time in excess of 800,000hr. In production for numerous applications including recent \$11 million contract for engines for Swearingen Metro. Development potential to 1,000 s.h.p.

*Applications* Aero Commander Turbo Commander 11, 2×TPE331-43BL (605 e.h.p.). Aero Commander Interceptor 400, 1×TPE331-1-101 (400 s.h.p.). Air Parts Fletcher FU-1160, 1×TPE331 (530

s.h.p.). Beech Model 499 project, 4×TPE331. CASA/HFB CASA-212 Aviocar, 2×TPE-331-201 (715 s.h.p.). Carstedt Jet Liner 600, 2×TPE331-100 (665 e.h.p.). Conroy Stolifter, 1×TPE331-25A (605 e.h.p.). de Havilland of Canada DHC-7, 4×TPE331-300 (800 s.h.p.). de Havilland of Canada DHC-2 Turbo-Beaver, 1×TPE331 (575 s.h.p.). de Havilland of Canada/SWP Aircraft Engineering Beaver Conversion, 1×TPE331. DINFIA AX-2, 2×TPE331-3U-303 (904 e.h.p.). Fairchild Hiller Heli-Porter PC-6/C-H2, 2×TPE331-250 (575 s.h.p.). Mooney/Mitsubishi MU-2A and -2E, 2×TPE331-25A (605 e.h.p.). Mooney/Mitsubishi MU-2F & MU-2G, 2×TPE331-151A (705 e.h.p.). North American Rockwell Hawk Commander, 2×TPE-331-43-BL (575 s.h.p.). Pacific Airmotive PAC-1, 2×TPE-331. Pilatus PC-6-C1/H2 Turbo-Porter, 1×TPE331-25D (575 s.h.p.). Saab 1017, 4×TPE331-201 (715 s.h.p.). Short Skyvan Srs 3, 2×TPE331-201 (715 e.h.p.). Swearingen Metro Commuter, 2×TPE331-303 (895 e.h.p.). Swearingen Merlin IIB, 2×TPE331-151G (665 e.h.p.). Volpar Super Turbo 18, 2×TPE331-47 (575 s.h.p.). Volpar Turboliner, 2×TPE331-151 (715 e.h.p.).

(TPE331-301) Two-stage (single-sided) centrifugal compressor, annular reverse-flow combustor, three-stage turbine. Integral front-mounted gearbox. Take-off 904 e.h.p.; length 46.01in; width 21.18in; height 26.46in; weight 355lb.

**T76** Military single-shaft turboprop. Derived from TPE331 with application in the North American OV-10A Bronco. T76-G-10 and -12 are similar to TPE331-201 with the same 715 e.h.p. rating but are handed for opposite rotation.

**TSE331** Civil single-shaft turboshaft. First AirResearch propulsion unit and predecessor of TPE331, the TSE331 ran in December 1960 and flew in Republic Lark helicopter. Now resuscitated for retro-fitting to piston-engined Sikorsky S-55 helicopter as Aviation Specialities S-55-T, now flying. With one hundred 840 s.h.p. TSE331-3U-303s on order, first S-55-Ts are scheduled for delivery this month. Configuration is similar to TPE331-301 series and weight is 355lb.

**TSE231** Civil free-turbine turboshaft. Announced in September 1969 as a new helicopter engine, the TSE231 embodies a scaled-down TPE331 compressor. First run is scheduled for August this year and FAA certification in July 1971. Production will follow immediately. Sole application is the new Gates Twinjet helicopter powered by two 474 s.h.p. TSE231-P2400s and planned to fly August 1971.

(TSE231) Two-stage (single-sided) centrifugal compressor, annular reverse-flow combustor, single-stage compressor turbine, single-stage power turbine. Front or rear mounted reduction gearbox. Take-off 474 s.h.p.; length 41.00in; width 20.80in; height 22.93in; weight 174lb.

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