

## THE AMERICAN INDUSTRY . . .

(TF33) turbofan versions for the B-52H and Boeing and Douglas jet transports. In parallel production is the larger J75, also in civil and military form, to power the Republic F-105, Convair F-106, Lockheed U-2 and long-range versions of the Boeing 707 and Douglas DC-8.

Other engines in current production include the small high-performance J60 (JT12), used in the North American T-39 Sabreliner, Lockheed JetStar, McDonnell 119, Canadair CL-41 trainer and the Republic SD-4 and Fairchild SD-5 surveillance drones; the medium-size J52, fitted in the Grumman Intruder, Hound Dog missile and an advanced version of the Douglas Skyhawk; and the T34 turboprop for the Douglas C-133 transport.

**Radioplane Division of Northrop Corp., 8000 Woodley Avenue, Van Nuys, California.** Since it delivered its first radio-controlled target aircraft some 20 years ago, Radioplane has manufactured more than 45,000 drones. Most sophisticated of the current models is the Type Q-4, powered by a General Electric J85 turbojet which puts it in the M2 class. Its radar augmentation system simulates a bomber and it was developed to meet a specific requirement for radar appearance compatibility with the Bomarc-SAGE air defence system.

Another high-speed target, which is in production to give firing practice to Nike-Ajax and Nike-Hercules launch crews, is the M0.9 rocket-powered RP-76 of which an additional 300 have just been ordered. Most produced of all, over a period of ten years, and still being delivered in large numbers to the US and foreign services (including the Royal Navy) is the OQ-19/KD2R-5 with a McCulloch engine that gives it a max speed of 222 m.p.h.

The present range is completed by the 416 m.p.h. RP-77D target, powered by a Boeing 502 turboprop, and the 184 m.p.h. SD-1 surveillance drone, which is in service with the US Army.

**Rawdon Brothers Aircraft Inc., PO Box 1119, Wichita 1, Kansas.** Rawdon has been producing for some years an all-metal two-seat cabin monoplane designated T-1. Various refinements have been introduced from time to time and the current model is available either as a standard tourer/trainer, as the T-1S agricultural sprayplane, or as the T-1SD with dust/spray gear. All versions have a 150 b.h.p. Lycoming O-320 engine.

**Raytheon Company, Waltham 54, Massachusetts.** Missile Systems is the largest of Raytheon's 12 operating divisions, with production plants at Lowell and Andover, Mass, and Bristol, Tenn. It is prime contractor for the Sparrow III semi-active radar homing air-to-air missile which arms the McDonnell F3H and F4H naval fighters, and for the US Army's surface-to-air Hawk, which is the only available US missile capable of intercepting a fast low-flying enemy aircraft.

**The Republic Aviation Corp., Farmingdale, Long Island, New York.** Almost all of Republic's resources are concentrated on production of the mighty F-105D Thunderchief supersonic tactical fighter. Most complex and versatile single-seat military aircraft ever built, it is powered by a Pratt & Whitney J75 turbojet, giving 26,500lb s.t. with afterburning, and carries up to 12,000lb of weapons underwing and internally. One of the earlier F-105Bs now in service set up a 100km closed-circuit speed record of 1,167.35 m.p.h. last December, but this has since been beaten by a Soviet aircraft.

The company's Missile Systems Division is developing the SD-4 Swallow surveillance drone, with Pratt & Whitney J60 turbojet, for the US Army. Its Helicopter Division is handling sales and assembly of the Sud-Aviation Alouette II helicopter in the USA and hopes eventually to manufacture this aircraft. Another major link with Europe is Republic's substantial minority interest in Fokker.

**Rocketdyne Division of North American Aviation Inc., 6633 Canoga Avenue, Canoga Park, California.** Engines produced by Rocketdyne's Liquid Propulsion Operations power some 80 per cent of the high-thrust ballistic missiles operational outside Russia and its satellites, and have boosted almost all of America's successful space projects. In current

production are liquid oxygen/RP-1 engines for the Atlas, Thor, Jupiter and their space vehicle derivatives. Under development are the 6,000lb s.t. AR-2-3 engine which has been fitted experimentally to an F-86F Sabre fighter to give greatly improved climb and combat performance; the 400,000lb s.t. E-1 research and development engine; the F-1 single-chamber 1,500,000lb s.t. engine; and the H-1, eight of which will be clustered in the 1,500,000lb s.t. booster for the Saturn space vehicle.

Rocketdyne's Solid Propulsion Operations (the former Astrodyne Inc), with headquarters at McGregor, Texas, is producing JATO units. These range in size from the 1,000lb s.t. 16NS-1,000 to the 130,000lb s.t. M-34 used for zero-length launching of supersonic fighter aircraft.

**Rotor-Craft Corp., 7900 Clybourne, Sun Valley, California.** Rotor-Craft's RH-1 Pinwheel, nearest practical approach yet to a strap-on helicopter, lifts more useful load in relation to its own empty weight (165lb) than any other rotary-wing aircraft. Its rotor is tip-driven by rocket units which weigh about 8oz each and give 25lb s.t. when run on hydrogen peroxide monopropellant. Over 300 test flights have been made, revealing a max speed of 100 m.p.h., vertical rate of climb of over 2,000ft/min and ability to hover at up to 15,000ft. The even-smaller Sky Hook, under development, will weigh under 75lb, have a useful load of 400lb and pack into an "oversize suitcase."

**Ryan Aeronautical Co., Lindbergh Field, San Diego, California.** Under a USAF design study contract, Ryan is collaborating with the General Electric Company to develop a "Vertifan" aircraft. In this, lift for VTOL will be provided by fans, mounted horizontally within the wings and driven by the exhaust of the main propulsive turbojets. Vanes, above and below the fans, will deflect the slipstream to provide a forward thrust moment for transition to forward flight. In cruising flight, with the fans stopped, they will completely enclose the fans within the wings.

NASA is rebuilding the company's VZ-3RY Vertiplane deflected-slipstream research aircraft, which crashed in February after demonstrating its ability to take off in 30ft, hover in flight at zero airspeed and convert from hovering to forward flight. Ryan is producing major assemblies for this.

Production of various versions of the Firebee jet target drone will continue until at least mid-1961 as a result of USAF orders for a total of 315 of the new transonic Q-2C, which can be air or ground launched. Ryan is also in the research rocket business through its Aerolab subsidiary.

Major airframe components manufactured under subcontract include 60ft rear-fuselage sections of the Boeing KC-135 and engine pods and pylons for the DC-8.

**Schweizer Aircraft Corp., County Airport, Elmira, New York.** Schweizer, whilst still maintaining its leading position as a sailplane manufacturer, is continuing to expand its work on powered aircraft. It has begun delivery of the Ag-Cat agricultural biplane, which it is building for Grumman. Component production includes tail sections and ailerons for the Grumman Gulfstream, doors for Bell helicopters, spare control surfaces for the Fairchild C-119 and C-123, and MAD booms for the Grumman S2F.

Highlights on the unpowered side include delivery of the 100th 1-26 single-seat high-performance sailplane and completion of the prototype all-metal 1-23H, which came twelfth in the Standard Class at this year's World Gliding Championships.

**Sikorsky Aircraft (Division of United Aircraft Corp.), Stratford, Connecticut.** Production of Sikorsky's new range of amphibious helicopters is under way, and twin-turbine HSS-2s for anti-submarine duties with the US Navy should begin to come off the line in December—the Navy's first rotary-wing combined hunter/killers. They will be followed by the basically similar HR3S-1, a 22/27-seat transport for the Marines, with a rear loading ramp for vehicles. Also due to fly soon is the prototype of a commercial version, the 25/28-seat S-61, of which six have been ordered by Chicago Helicopter Airways and five by Los Angeles Airways for service in 1961. The smaller single-turbine S-62, first of the amphibians to fly in May 1958, entered commercial service with Petroleum Helicopters Inc last month. All these models have GE T58 engines.

The 154th and last of the twin-engined S-56 series—an H-37—was

*Not particularly large or impressive, the re-entry vehicle of an ICBM represents the outcome of many tens of millions of dollars of R & D cost. These are Mk 4s, for the J-model Titan; design was handled by Avco's research and advanced development division in Wilmington, Mass, and production (below) is the responsibility of the Lycoming division at Stratford, Conn*

