

civil derivatives, including the 4,000lb-thrust CF700 turbofan and 2,700lb-thrust CJ610 turbojet, both based on the J85.

General Electric's Rocket Engine Section at Schenectady is continuing development of its X405-H engine, based on the Vanguard first-stage motor, despite cancellation of the Vega vehicle for which it was intended. Of greater significance is its pioneer work on plug nozzle engines, which promise to reduce very considerably the bulk of future space propulsion systems.

The Aircraft Nuclear Propulsion Department reported a major success in March, when its Heat Transfer Reactor Experiment No 3 at Idaho Falls, built around two J47 turbojets, completed more than 120 hours of running on nuclear power. Two open-cycle X-211 engines from this Division will power the Convair NX-2 experimental bomber.

Goodyear Aircraft Corp (Subsidiary of Goodyear Tire & Rubber Company), Akron, Ohio. Goodyear has completed delivery to the US Navy of four 1,500,000 cu ft ZPG-3W airborne early-warning blimps (one has since been lost). The APS70 radar fitted to these aircraft includes a 40ft-diameter antenna, mounted inside the envelope. Also in service is the new 132,500 cu ft Mayflower II commercial blimp; and ten Inflatoplane inflatable aircraft, in single and two-seat models, have been built for evaluation by the US Army and Navy.

In the missile field, Goodyear is developing the important Subroc submarine-launched long-range anti-submarine rocket, with optional nuclear warhead, which may be operational next year. It provides the guidance system for the TM-76A Mace and components for the Atlas and Nike-Zeus weapon systems.

Grumman Aircraft Engineering Corp, Bethpage, Long Island, New York. Although production of the F11F-1 Tiger interceptor and F9F-8T Cougar two-seat fighter-trainer has been completed in the past year, Grumman still has nine types of aircraft under development or on the assembly line. The largest contracts are from the US Navy, for the S2F-3 Tracker anti-submarine hunter-killer, its WF-2 Tracer AEW and fighter direction derivative, and additional quantities of S2F-1 Trackers for Italy and the Netherlands.

Development of the interesting A2F-1 Intruder subsonic light attack bomber, with tilting jet-pipes for STOL operation, is being done under a new type "cost plus incentive fee" contract for nearly \$102 million. Not

Redstone missiles and development of supersonic towed targets for infra-red and radar homing missiles. Some 1,200 Hayes employees are responsible for all field-level maintenance of fixed-wing aircraft and helicopters at the US Army Aviation School, Fort Rucker, Alabama.

Helio Aircraft Corp, Boston Metropolitan Airport, Norwood, Massachusetts. Production of the Courier family of five-seat STOL aircraft has been handled since 1956 by Mid-States Manufacturing Corp of Pittsburg, Kansas, a Helio subsidiary. Variants are the standard Courier (260 b.h.p. Lycoming), Super Courier (295 b.h.p. Lycoming) and Strato-Courier (340 b.h.p. supercharged Lycoming) which has a ceiling of over 30,000ft and is intended mainly for high-altitude photography. Total 1959 sales are reported as 12 aircraft.

Hiller Aircraft Corp, 1350 Willow Road, Palo Alto, California. Hiller has now sold over 1,100 of its three-seat commercial Model 12 and military H-23/HTE series of light helicopters, and more H-23Ds have been bought by the US Army this year than any other type. The latest versions offer an overhaul life of 1,000hr and the recent announcement of the Model 12E-4, with four seats, represents a further major advance. Kits are available to convert earlier 12Es into four-seaters and the next stage is foreshadowed by the installation of a Boeing T60 shaft-turbine in an H-23.

Flight testing of the X-18 tilt-wing aircraft continues at Edwards AFB and the US Marines are evaluating five of the YROE-1 Rotorcycles built under licence by Saunders-Roe in the UK. Research programmes include studies of jet-lift designs. Hiller is also collaborating with Continental to produce joint proposals for advanced helicopters of over 25,000lb gross weight powered by blade-tip turbojets.

Howard Aero Inc, PO Box 8247, International Airport, San Antonio, Texas. Formed in 1955, the Manufacturing Division of Howard Aero is producing a 12/14-passenger pressurized executive transport conversion of the Lockheed Ventura. Features of this aircraft, which is known as the Howard 500, include a fail-safe fuselage structure and modifications to the wings and flaps which give a 25 per cent increase in wing area for take-off.

Hughes Aircraft Company, Culver City, California. Main aviation products of this company are the Falcon series of air-to-air missiles and the fire-control systems used in almost all US and Canadian interceptors. Latest version of the Falcon is the GAR-11, with semi-active homing and nuclear warhead, which equips the F-106 and other fighters along with the non-nuclear GAR-1D, -2A and -3. The F-106's MA-1 fire-control system is able to compute course, speed and other factors from data supplied by SAGE and TACAN ground installations, and use this data to perform all control functions from take-off to touch-down, in addition to firing the fighter's armament automatically.

Hughes Tool Company, Aircraft Division, Culver City, California. Following highly successful evaluation of five YHO-2HU military examples of its Model 269A two-seat ultra-light helicopter, Hughes has decided to put the aircraft into immediate commercial production. Deliveries are scheduled to begin next April and to reach a rate of one per day by September 1961. Powered by a 180 b.h.p. Lycoming, the Model 269A carries a useful load of 635lb and has a range of 195 miles at 85 m.p.h.

The Kaman Aircraft Corporation, Bloomfield, Connecticut. Kaman reported 50 per cent increases in sales and employment for the year 1959. Its payroll is now over 3,000 and production is devoted exclusively to turbine-powered helicopters. Largest contract is for 116 H-43B Huskie ten-seat crash-rescue helicopters for the USAF. These have twice the payload and cabin capacity of the earlier piston-engined H-43A/HOK series as a result of their greater power and re-positioning of the 825 s.h.p. Lycoming T53 shaft-turbine above the cabin.

Production of the HU2K-1 Seasprite is under way for the US Navy, and it is expected eventually to replace the 250 or so utility helicopters now in service. Powered by a 1,025 s.h.p. General Electric T58, it carries 13 troops, four stretchers or 4,000lb of freight.

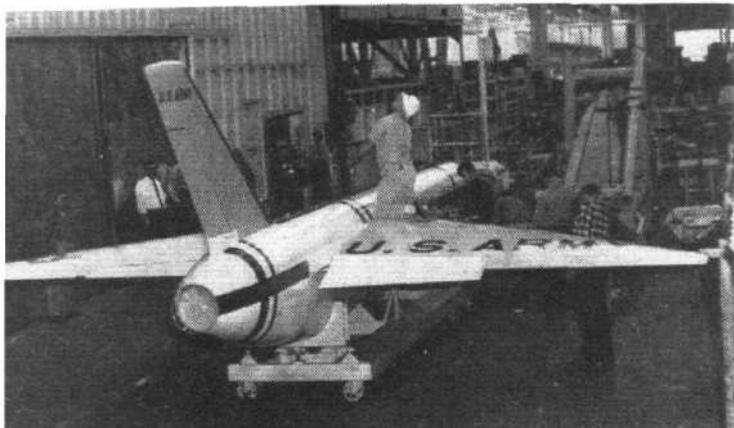
Research projects include the K-16B tilt-wing aircraft, built around the hull of a Grumman Goose amphibian and fitted with two T58s, and the two-seat K-17 helicopter with cold-jet rotor system. Kaman has licence rights in the Westland (Fairey) Rotodyne. Its other activities include the manufacture of aircraft and missile components under subcontract and work in the fields of nuclear ordnance and propulsion.

Kellett Aircraft Corp, PO Box 35, Willow Grove, Pennsylvania. Renewed interest in the autogyro has prompted Kellett to put back in production its pre-war Model KD-1A in two-seat utility or single-seat agricultural versions. Projects include the KD-10 all-metal military general-purpose two-seat cabin autogyro.

Lake Aircraft Corporation, Sanford, Maine. Lake purchased full manufacturing rights in the little Colonial Model C-2 Skimmer amphibian

(Continued on page 252, after double page of production-line pictures)

A transatlantic counterpart of the Turbulent is the Stits Playboy, for home construction, seen in its 1960 form



Fairchild are glad to have a contract with the US Army Signal Corps for the AN/USD-5 combat surveillance drone

yet flown is a fifth naval type, the W2F-1 AEW aircraft with two Allison T56 turboprops, large overhead radar "saucer" and crew of five.

For the Army, Grumman is fulfilling orders for nine YAO-1, 36 AO-1AF, 17 AO-1BF and 24 AO-1CF Mohawk turbine-powered STOL observation aircraft; and the SA-16B long-wing version of the Albatross amphibian is still being built for the USAF. Commercial production is centred on the Gulfstream twin-Dart executive transport, of which 33 had been delivered by mid-year, with the programme geared to three per month. Series manufacture of the Ag-Cat agricultural biplane has been subcontracted to Schweizer Aircraft Corp.

Other Grumman activities include responsibility for the airframe and ground-handling equipment of the Eagle air-to-air missile and construction of an 80-ton hydrofoil boat for the Marine Administration.

Gyrodyne Company of America Inc, Flowerfield, St James, Long Island, New York. Gyrodyne's current aircraft projects had their origin in a 1954 US Navy contract for development of a light, simple, one-man helicopter for the Marines. This led ultimately to the YRON-1 rotorcycle, with 62 b.h.p. Porsche engine and 17ft-diameter co-axial rotors, and three aircraft of this type are being evaluated by the Marines. Variants are flying with 72 b.h.p. Porsche and 62 s.h.p. Solar YT62 engines and an ultra-light model is under development.

Autostabilization and remote-control equipment have been fitted to one airframe, which is serving as a basis for the highly-important DSN-3 anti-submarine drone. Powered by a 270 b.h.p. Boeing 502 shaft turbine and armed with a homing torpedo, the DSN-3 will make its attacks under radio control from a parent destroyer as the airborne part of the DASH (Destroyer Anti-Submarine Helicopter) weapon system.

The forward portion of a YRON-1 airframe also forms the basis for the 6ft-diameter Model 55 ground-effect vehicle, built under Navy contract and first flown in October 1959. Its purpose is to indicate the feasibility of similar craft of several hundred feet dia, cruising at 100kt.

Hayes Aircraft Corp, PO Box 2287, Birmingham, Alabama. After specializing since 1951 in overhaul and modification of military aircraft on a large scale, including conversion of B-50 Superfortress bombers into KB-50J refuelling tankers, Hayes entered the commercial aircraft market in 1959. Current contracts include complete cabin conversions of DC-6A and DC-7 transports, production of components for Jupiter and