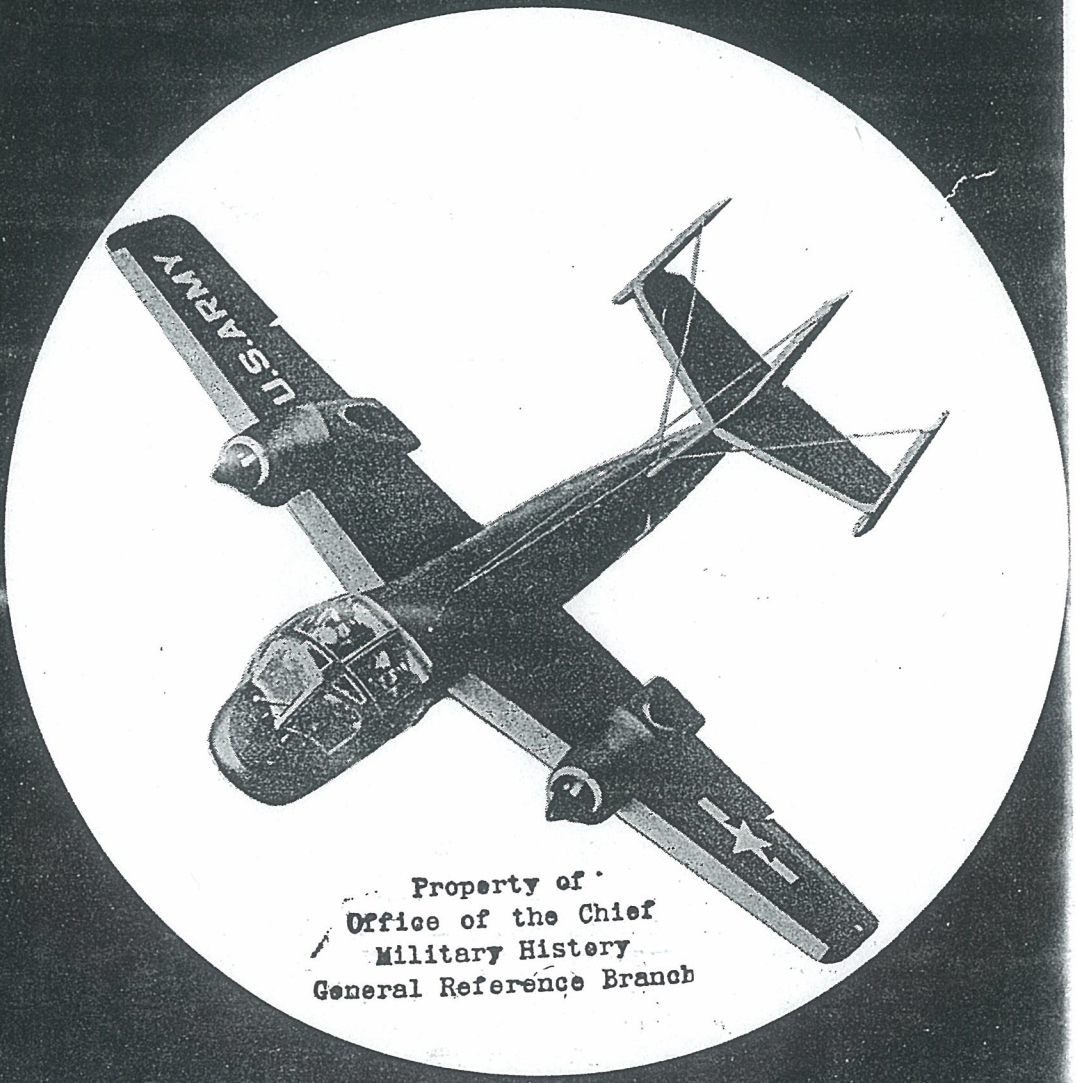
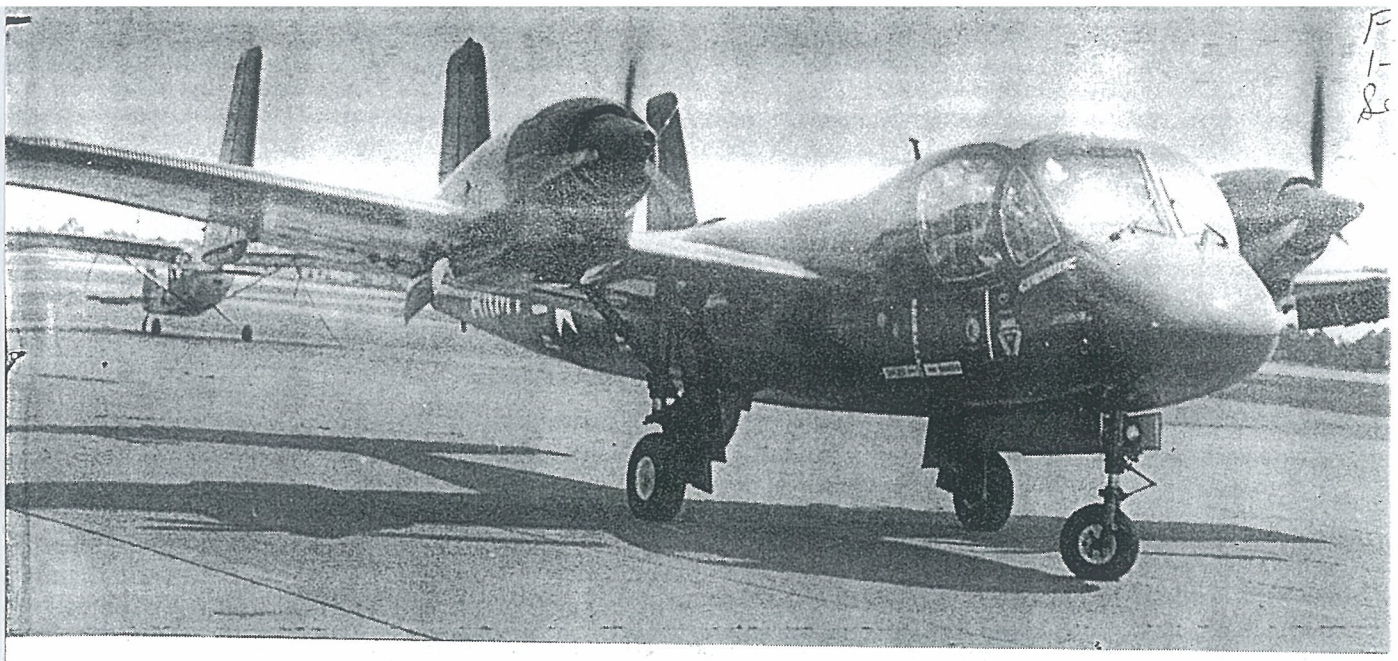
# UNITED STATES ARMY AVIATION DIGEST






SEPTEMBER 1960



# Mohawk AO-1-AF

THE ARRIVAL of the AO-1-AF Mohawk for testing at the U. S. Army Aviation School marks a significant milestone in Army Aviation.

The Army's new tactical observation plane will be service tested by the United States Army Aviation Board. U. S. Army Transportation Aircraft Test and Support Activity will receive two Mohawks for logistical tests.

The side-by-side two-seater purchased from Grumman is distinctly different from current Army observation craft. For example, the Mohawk has two airspeed brakes, twin Lycoming T-53-L-3 turboprop engines, and a three-tail configuration.

The newcomer also boasts a cruise speed of 200 knots, a top speed in straight and level flight of over 281 knots, a maximum permissible of 350 knots, a cruising altitude of 25,000 feet, and a range of 1,453 nautical miles with drop tanks. The Mohawk weighs 11,859 pounds loaded, but maintains an effective STOL capability — thanks to flaps, slats, speed brakes, and reversible pitch props.

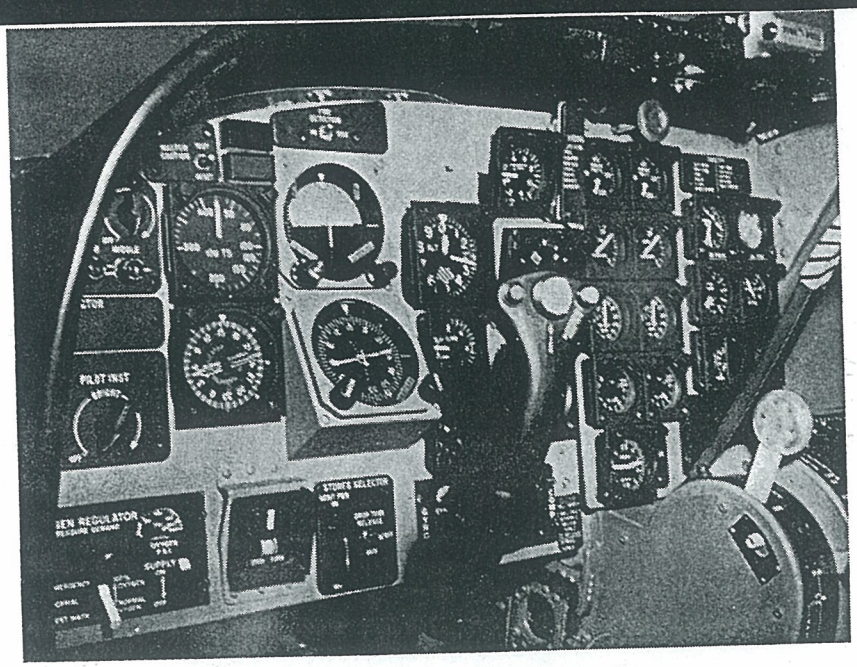
The primary mission expected of the Mohawk is visual observation, with responsibility for the bulk of the Army's AO operations. Secondary missions include utility, resupply, liaison, and day or night photography.

A bubble canopy provides maximum forward and downward visibility for the observers who must search out, detect, identify, and locate targets for the combat zone commander.

Coordinating these functions is a difficult job and will remain so, even for specialized observers the Army hopes to be training soon (see story of "Task Observe," AVIATION DIGEST, July 1959). The many features of the Mohawk should make this job easier and boost the capabilities and potential of the Army Aviation-Ground Force fighting team.

A quick look at the Mohawk's vital statistics may prove helpful. The wing span is 42 feet with a wing area of 330 square feet. The plane's overall length is 41 feet and the tail stands 12 feet, 8 inches high.

The Mohawk weighs approximately 9,519 pounds empty



**Instrument panel as seen by pilot**

and holds 1,950 pounds of fuel. Takeoff power is set at 1,005 equivalent shaft horse power for each motor.

This plane underwent extensive testing by Grumman. Landing and takeoff on short fields and turns in an extremely small radius were stressed. Landings have been made in about 300 feet with props at full reverse pitch and employing vigorous braking. The touchdown speed was approximately 55 knots.

Seated side by side in the cockpit with bubble canopy each crewman has unobstructed vision 22° down over the nose of the aircraft along the centerline of the seats. By moving the line of vision outboard, visibility is expanded.

The bubble side hatches increase downward visibility by the extent that the lines of sight of the aviator and observer converge at a point 36 feet below the plane. A transparent, jettisonable hatch allows complete vision overhead. Only 11° of rearward visibility is obstructed by the wing.

Efficiency and comfort have been obtained by maximum utilization of cockpit space. The instrument panel (consisting of the aviator's, observer's and center panels) slopes 15° forward to eliminate partial blocking of the instrument faces by their own bezels.

Flight instruments are duplicated for both crewmen; engine control instruments are located in a center panel, allowing both occupants to monitor them with ease. Each man also can easily reach all trim controls and a central throttle, propeller quadrant — making solo operations possible if necessary. A newly designed stick grip makes the left and right control sticks interchangeable.

Equipment for communications, navigation and photography is contained on a console between the occupants. Three overhead consoles provide for all the engine, fuel, and electrical master panels. It also includes the engine fire extinguishing switches.

Regulators for the oxygen system are located on the outboard side of the aviator's and observer's instrument panels. A first aid kit is mounted on the sloping bulkhead, along with pyrotechnic pistol, binoculars, a spotlight, and important circuit breakers.

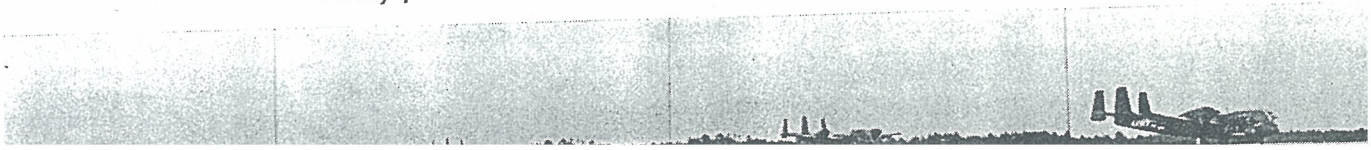
The cockpit is heated by engine bleed air cooled in a heat exchanger. Ventilation is provided by diverting ram air used to cool engine bleed air. The air conditioning system further provides air blast defogging of all transparent areas, camera compartment heating, and ram air cooling of electronic equipment.

The Mohawk's crew can feel a bit more secure observing the enemy than Army Aviators could when flying missions in Korea and during World War II. Unlike its forerunners, the Mohawk contains 246 pounds of armor to protect its crew. This armor provides the cockpit with a 1-inch, bulletproof windshield, a ¼-inch thick aluminum floor, a ¼-inch aluminum side panel, and removable flak curtains above the floor on the fore and aft bulkheads.

The Mohawk's basic configuration reduces vulnerability. The self-sealing 295-gallon fuel cell and the engines are mounted above the wings. Other protection factors include dual longitudinal controls runs, separated as much as possible throughout the fuselage, and a cockpit area designed for 20 g's vertically and 40 g's fore and aft.

If the Mohawk is hit and

**Army personnel who see this maneuver shake their heads at the**



**Crew can eject at all attainable speeds**

has to be abandoned, the seats can be easily ejected to provide the crew a safe escape at all attainable speeds.

After ejection the parachute opens automatically and lifts the occupant from his seat. At high altitudes a barostatic control on the seat delays the opening. The occupant remains strapped to his seat and is steadied by a duplex drogue parachute while he descends to a warmer altitude. At high ejection speeds the opening is delayed by a g switch. The seat is fitted with a face curtain firing control that protects the occupant as he is ejected through the overhead hatch. An alternative firing handle is positioned in the leading edge of the seatpan. The overhead hatch can be jettisoned only by a control located in the overhead console. The seats are not ejected by this control.

The main parachute is stowed in a "horseshoe roll" shaped pack behind the occupant's shoulders and is combined with a back pad and harness system compatible with an integrated torso suit. Bail-out oxygen is automatically actuated on ejection.

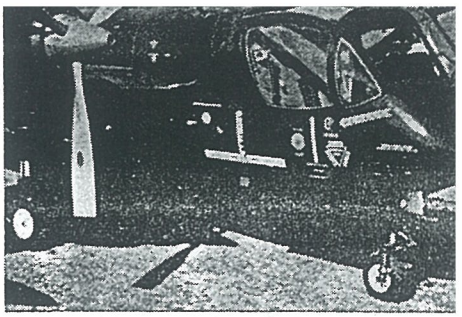
Army Aviation is getting its first turboprop aircraft in the Mohawk. Each engine has a takeoff rating of 960 shaft horsepower and approximately 100 pounds of jet thrust at a gas producer speed of 25,240 rpm. The propeller shaft speed is approximately 1,678 rpm. Gear ratio between the power turbine and propeller drive is 12.46:1.

The three-bladed, variable pitch C.F.E. Hamilton Standard Hydromatic propellers are 10 feet in diameter, full feathering and have reverse pitch.

The engine nacelle is easily accessible. Two side cowl panels hinge up and a lower panel hinges forward, providing 360° accessibility.

All fuel control adjustments are easily reached. The powerplant, propeller, engine accessories and mount are movable as a unit and interchangeable between wings.

Engine anti-icing is provided by a flow of hot compressor bleed air through the engine



**3-blade reversible props**

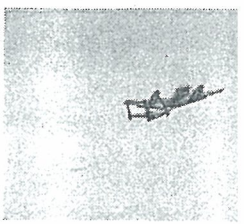
inlet struts and inlet guide vanes, and by electrical heating for the propeller blades, spinner, and engine inlet cowling.

The Mohawk is started by a starter-generator used with the plane's batteries or external power. The same system is used for air starts.

Photography promises to be one of the Mohawk's most important secondary missions. The plane can be equipped with one of three KA-30 cameras with lens cones of either 3, 6, or 12 inches. The magazine capacity in each case is 100 to 250 feet of film. The KB-10a camera (3-inch lens with 50 to 100 feet magazine capacity) also can be installed, but requires a special adaptor.

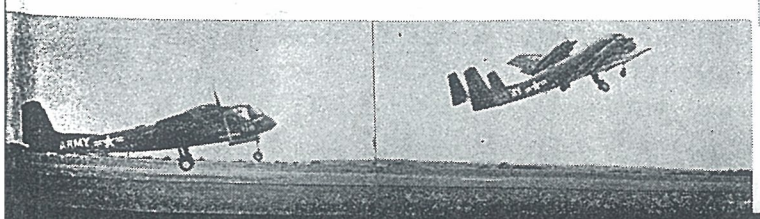
The camera mount is located in the fuselage midsection. It is remotely controlled by either crewman who can rotate it to the left or right, 15° or 30°

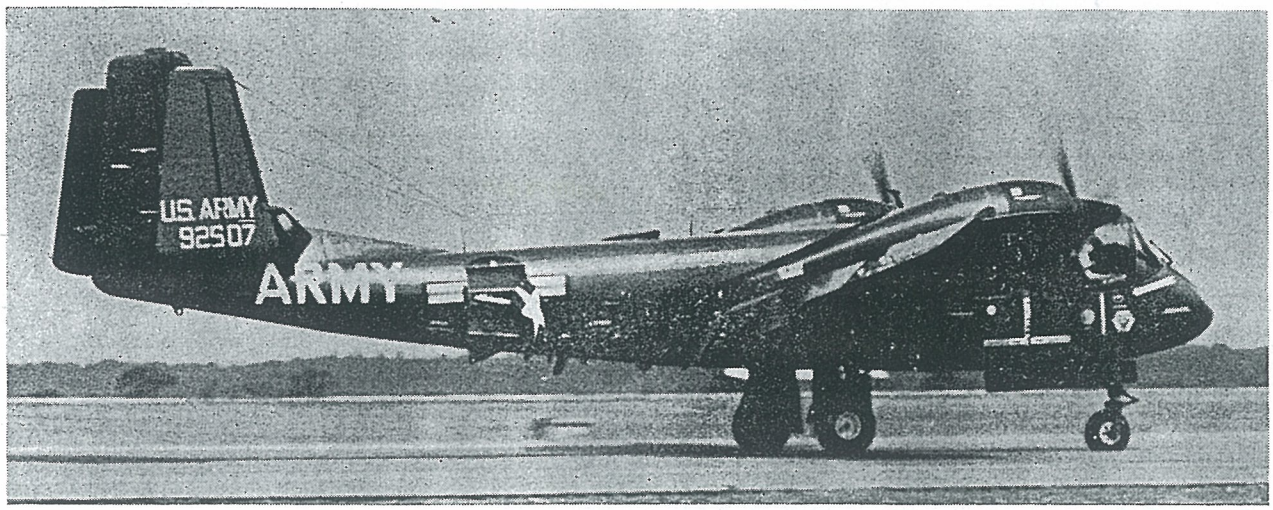
**. . . obstacle is 793 ft.**



**Takeoff distance over 50 ft.**

**. . . maximum performance.**






**STOL characteristics are aided by speed brakes**

oblique and vertical positions. The control system consists of a cockpit console. During night photo missions flares may be fired individually or salvoed from pods attached above the wings between the engine and fuselage. Each pod holds 52 flares.

Items that may be carried under the wings are either two drop tanks capable of carrying 150 gallons of JP-4 each, resupply containers with a capacity of 1,000 pounds each, or wire dispensers.

Other versions of the Mohawk will carry either infrared mapping equipment or side-looking airborne radar (SLAR). The radar antenna is carried on an 18-foot cylinder externally mounted on the lower right side of the fuselage. The mapping equipment is carried internally. These surveillance systems are interchangeable between planes, but only one can be carried at a time.

A good STOL capability is provided by hydraulically actuated slats (integral with wing flap control) and speed brakes. The wing slats are arranged in four mechanically interconnected sections along the wing span. The slats operate in conjunction with the flaps. Flap movement can be continued independent of the slats to 45 degrees. A lock is provided for the zero degree position. At the outboard end of each flap a pushrod is attached to operate the inboard aileron droop incorporated with flap action.

The synchronized speed brakes are located in the aft section on the sides of the fuselage and swing on vertical hinges. Each is extended or retracted in three seconds by its own hydraulic cylinder and may be locked in any position. The brakes add greatly to the maneuverability of the Mohawk and are expected to play a major role evading enemy fighter planes. The gust lock lever which locks all flight controls in neutral is located so that the throttles cannot be advanced for takeoff when the controls are locked.

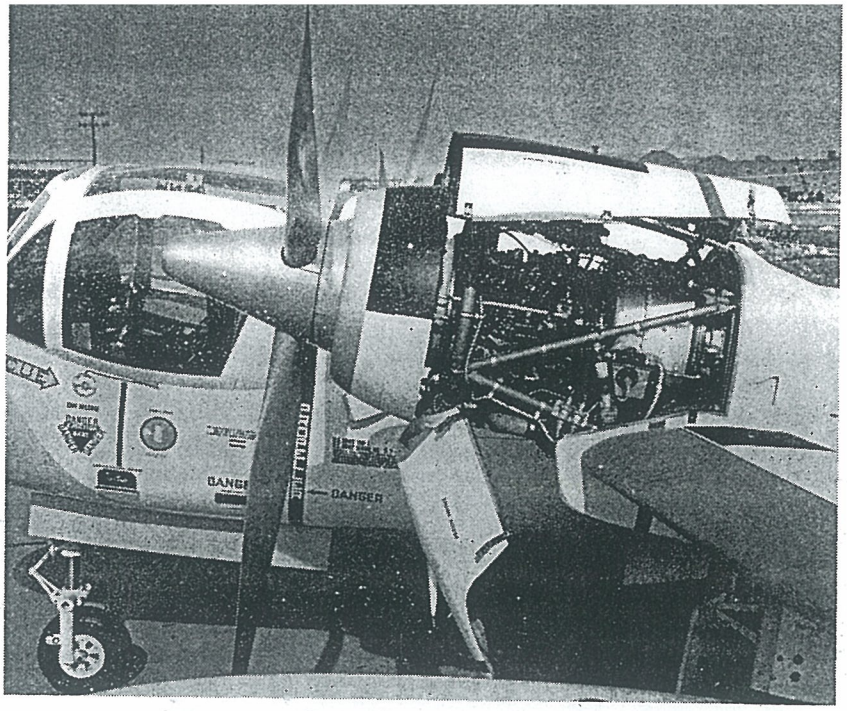
The retractable, tricycle landing gear with pneudraulic shock struts are equipped with low pressure tires to facilitate operation on unimproved airfields. The nose wheel rotates through 360°. Gear retraction is accomplished hydraulically with mechanical up and down locks.

The Mohawk originally was designed with a single T-type tail. However, tests proved that single engine control was not possible with this configuration. Three vertical fins and rudders solved this problem.

Fueling the Mohawk is simple. It is accomplished either through 3-inch gravity filler units or by single-point pressure fueling. Tiptank defueling requires a transfer of the fuel to the main tank. This can be done selectively at the fueling station by switching on one or both of the wing tank transfer pumps. The flow of fuel from the wing tanks can be controlled from the cockpit.

A dual fuel pump system operating from the main tank is a fail safe factor since one pump can supply both engines.

The Mohawk has a 28 volt D.C. electrical system including a parallel 300 amp starter-gen-




**All major assemblies are interchangeable**

erator driven by each engine; two voltage regulators; two reverse current cutouts and a 24 volt, 36 ampere-hour nickle-cadmium battery. Either generator can carry the entire load and the battery adds another safety measure by providing emergency power in event of a double generator failure. Two inverters supply a 115/200 volt A.C. electrical system. Normally the instruments are supplied by a 250 VA inverter. All other A.C. is supplied by a 2,500 VA inverter which can perform the functions of the 250 VA inverter.

The communications system consists of HF, VHF, and UHF transceivers. An intercom system is included.

Navigation equipment includes TACAN, MB receiver, and LF/DF, and new Doppler equipment. Transponder AN/APX-6B (IFF) and Coder Group AN-APA-89 identification are provided in the Mohawk and mark their debuts in Army Aviation.

Considering the missions of the Mohawk, it becomes apparent that the craft often may have to undergo emergency repairs under unfavorable conditions. Every effort has been made for maximum serviceability and maintenance. Quick access is provided to all equipment items.

All major assemblies are interchangeable. The entire wing panel, nose and tail sections, and wingtips are replaceable as units.

Special hoisting equipment provides an easy system for handling propellers and engines in remote areas. This mobile system consists of a hoisting davit, slings, and stands for the engines and props.

The prop sling loops around two of the blades and secures with snap hooks fastened into the sling hoisting ring. The davit forward hoist attaches to the same ring and lowers the prop.

The engine (minus propeller) is handled by fastening the sling to hoist fittings on top of the engine and attaching the davit hoist to the sling. The prop may be included if the hoist is moved further forward. The collapsible engine stand contains bolts for securing the engine.

Space provisions have been made for the ASW-12 automatic pilot, television camera, and recording equipment for forward looking radar.

**The following chart handily sums up the performance of the Mohawk as determined by Grumman:**

**Maximum speed, 5,000 feet, military power, level flight__281 kts**
**Stall speed, sea level, landing configuration, 10% NRP__ 59 kts**
**Takeoff distance over 50-foot obstacle_____793 ft**
**Landing distance over 50-foot obstacle_____847 ft**
**Service ceiling, military power T.O. wt less 20% fuel (1) _____25,000 ft**
**Rate of climb, 2 engines, MRP, sea level, T.O. wt. less 20% fuel 2,950 fpm.**
**Rate of climb, 1 engine, military power, sea level, T.O. wt. less 20%, 1,050 fpm.**
**Endurance at 200 kts, 5,000 ft. 2 hours without drop tanks.**
**Ferry mission: (2)**

| | |
|---|---|
| Range | 1,453 NM |
| Time | 6.96 hrs |
| Cruise speed | 200 kts |
| Cruise altitude | 25,000 ft |

Notes: (1) Engine data extrapolated over 25,000 ft.
(2) With two 150 gal. external tanks