Pilot Flight Check: The Mitsubishi MU-2L

This executive turboprop — a long-bodied version of the original design — combines high speeds with comfort and versatility

by ROBERT I. STANFIELD / AOPA 155494

■■ Since its U.S. introduction ten years ago this month, the Japanese-designed, high-wing twin turboprop MU-2 has gained many friends among pilots and passengers. It has, in the decade, made many gains for itself.

The then five-to-seven-place executive twin was engineered for high speeds and short-field operations. It was, at the time, the fastest corporate turboprop, with cruise speeds to 310 mph, generated by the two AiResearch TPE 331-25A powerplants—each rated at 605 eshp for takeoff.

Mitsubishi still has the fastest corporate turboprops flying today (some nine models have been produced), with cruise speeds varying, for instance, from 365 mph, for the seven- to-nine-place MU-2M model, to 340 mph for the eight- to eleven-place MU-2L, the latest and largest in the series.

The turboprop engines for the "M" and the "L" are still AiResearch—both TPE 331-6-251M. Those powering the "M" model produce 724 eshp each; those pushing the larger "L" model produce 776 eshp each. To boot, where the early turboprops were programmed at 600 hours between overhauls at the time of the MU-2's introduction, the current engines are running at 3,000 hours—a figure expected to jump to 3,500 hours before year's end.

Designed and built by Mitsubishi Heavy Industries, Ltd. (Nagoya, Japan), the MU-2 is assembled and equipped at the San Angelo, Tex., facilities of Mitsubishi Aircraft International, Inc. (MAI), a wholly owned subsidiary that has worldwide marketing responsibility for the aircraft.

About 400 MU-2s are flying worldwide, of which more than 300 are in the U.S. MAI, targeting now on four-a-month production, sees an upcoming increase to six a month. Optimistic about the future of the turboprop aircraft, the company is, according to William D. Eikenberry, executive director of marketing, "shooting for 35% to 40% of production international"—meaning 84 aircraft annually, of which 60 would be marketed domestically.

For its flight check, The PILOT chose to fly the MU-2L, a long-bodied version of the original MU-2. The fuselage on the "L" was lengthened a bit over 6 feet, which allowed an 8-foot extension in cabin length. Also included was a gross weight increase of 775 pounds, to 11,575 pounds (max takeoff), and a cabin pressurization increase to 6.0 psi.

A walkaround of the basically red and white N830MA shows a beaut of an aircraft that is obviously rugged in design. The airframe has been structure tested for a service life of 25,000 flight hours. The structural foundation is found in the twin I-beam keels that run the length of the cabin. The landing gear, of military-type construction, retracts into pods (as against into the fuselage, as in other MU-2 models).

Spoilers are utilized, instead of ailerons, for lateral control. The spoiler system allows the use of full-span, double-slotted, Fowler-type flaps. With flaps retracted, the MU-2 has the smallest wing area and the highest wing loading of any aircraft in its class.

Flaps can be extended to 40 degrees. From 5 to 20 degrees provides maximum lift and increases wing area by 24%.

The tastefully furnished, eight-place demonstrator—in standard configuration—included two forward-facing seats

The MU-2L has long "legs." At 25,000 feet, maximum range, with 30 minutes' fuel reserve, is 1,450 statute miles; with 45 minutes' reserve, 1,380 statute miles. Photos by Berl Brechner.

(facing the crew compartment). Backed up to these were two rear-facing seats, which faced another two forward-facing seats. Optimal seating arrangements, of course, are available, including configurations up to 11 seats.

Included within the cabin are stowaway tables between the club-chair seating, ashtrays and drink receptacles at every seat, two refreshment consoles, a private, pull-out, flushing chemical toilet (aft of the main cabin), individual vents and reading lights, etc.

Once seated in the cockpit, the pilot faces a big expanse of glass area ahead and to both sides. The windshield is birdproofed to four pounds, at speeds in excess of 175 knots. Avionics aboard included King Gold Crown, supplemented by a Bendix RDR-1200 radar, a Bendix M-4D autopilot and Sperry's flight director.

American-built components are standard, including engines, air conditioning, wheels, tires, brakes, interior, paint, etc. In fact, approximately two-thirds of the cost of the MU-2 consists of American parts and labor.

Suggested list price of the MU-2L, with standard equipment, is $767,625. The cost of this demonstrator (with added equipment) was set at $790,283. Which meant—to The PILOT—"handle with care." Flying with us were Jerry Bird, manager, customer relations, MAI, and George A. West, eastern region sales manager.

Empty weight of N830MA is 7,665 pounds. With three of us aboard, and carrying about 240 gallons of fuel, the gross weight was close to 9,800 pounds. Takeoffs were made at field elevations ranging from 540 feet (Montgomery County Airpark in Gaithersburg, Md.) to 304 feet (Frederick Municipal Airport, Frederick, Md.). Sea-level pressure was 30.23 in. Hg, and ground level temperatures averaged 82°F. Wind velocity averaged 10 knots.

Key performance features evidenced during these flights included:

- *Takeoff and climb.* Before takeoff, 20 degrees of flaps were extended, 7 degrees of trim set, and throttles were advanced to takeoff power of 100%. (Automatic power limitors prevent overtorquing and over-temping.) At 100% power, the props are turning 2,000 rpm and turbine speed is 42,000 rpm.

Normal ground roll of the MU-2L, at maximum gross, is 1,780 feet. This turboprop moved fast. At 85 knots indicated speed, we were off in well less than half the distance down the 4,200-foot runway.

The airplane was held at 85 knots and flaps were left extended for low-level photography from a Cessna 150 Aerobat at 2,000 feet. The Aerobat set the pace; the speedy MU-2L had little trouble in slowing to a "walk." Once the picture taking was over, we accelerated upward.

At 100% power, ITT (interstage turbine temperature) was 875°C. Indicated speed was 170 knots; rate of climb, 2,500 fpm. Normal climb speeds range from 175 to 180 knots; best angle of climb is 140 knots. Moving through 4,000 feet, fuel flow was 124 gph.

Gradually reducing to 160 knots indicated, the airplane ascended through 7,000 feet still at a 2,500-fpm rate. But fuel flow was now 120 gph. At 10,000 feet, the climb rate was 1,800 fpm; at 15,000 feet it was 1,500 fpm, and fuel flow was 92 gph (46 per engine).

- *Cruise and slow flight.* At 17,500

feet, in normal cruise at 96% power, ITT was 900°C. Fuel flow was 80 gph; the outside air temperature reading was + 5°C. N830MA, in level flight, indicated 205 knots for a true airspeed of 282 knots, or 325 mph.

The lively turboprop is as responsive to slow flight as it is to the higher speeds. Still at the same altitude, power was reduced back to flight idle and 5 degrees of flap were extended, the airplane holding to an indicated speed of 120 knots. Fuel flow was less than 40 gph.

As flap extension was increased to 20 degrees, then to the 40-degree maximum, with gear now extended, the indicated speed bled off to read between 65 and 70 knots. The aircraft was banked both left and right at this low speed, demonstrating the excellence of its spoiler control. The stick shaker, at these speeds, could be felt shaking lightly.

The spoiler system for lateral control negates the need for boost controls at high airspeeds, eliminates adverse yaw common with ailerons, and provides positive control at low airspeeds.

• *Stalls and single-engine flight.* With the right engine shut down and the right propeller feathered, gear and flaps extended, speed was bled off and the MU-2L was held to 80 knots for easily controllable banks, both left and right. Clean, with the good engine at cruise power, the airplane indicates 135 knots.

N830MA was eased up to a full stall, still engine-out, with the left powerplant to cruise power. In "dirty" configuration—everything hanging out—the airspeed was at about 65 knots indicated when the aircraft broke sharply, began a roll to the right, and was pulled out, nose down, speed quickly building up.

There aren't many twins that can be intentionally stalled with one engine out (the other at cruise power) and recover as neatly as the MU-2L. This airplane is most stable and responsive at slow speeds and in unusual conditions.

• *Descent and landing.* The MU-2L can move down at speeds and rates to taste. With power to flight idle, full flaps and gear extended, and holding to 120 knots indicated, the rate of descent was 3,500 fpm. Increasing the indicated speed to 250 knots, the airplane moved down at a 4,500-fpm rate. Add a little power and the altimeter stops unwinding.

Several landings were made at Frederick Municipal. The good slow-flight characteristics of the MU-2L were well in evidence during approach and landing.

Maximum gear extension speed (as well as max speed for the first 5-degree flap increment) is 175 knots. We had the gear down at 160 knots, began the flap extension at 130 knots, and turned on base with full flaps—40 degrees—

MITSUBISHI MU-2L

Specifications

Engines	2 AiResearch TPE 331-6-251M, 776 eshp each
Seats	8–11
Wingspan	39 ft 2 in
Length	39 ft 5 in
Height	13 ft 8 in
Wing area	178 sq ft
Cabin length	19 ft 8 in
Cabin width	4 ft 11 in
Cabin height	4 ft 3.2 in
Baggage compartment	38 cu ft
Usable Fuel:	
Internal tanks	186 gal
Tip tanks	180 gal
Weights:	
Standard equipped:	7,570 lb
Max ramp	11,625 lb
Max takeoff	11,575 lb
Max landing	11,025 lb
Useful load	4,055 lb
Payload (full fuel)	1,603 lb

Performance

Max cruise	340 mph
Normal cruise	317 mph
Rate of climb (10,350 lb):	
Two engines	2,630 fpm
One engine	675 fpm
Service ceiling (10,350 lb):	
Two engines	29,600 ft
One engine	15,450 ft
Stall speed (10,350 lb):	
Flaps up	115 mph
Flaps down	88 mph
Max range (25,000 ft, 45 min reserve)	1,380 sm
Takeoff over 50 ft (11,575 lb)	2,170 ft
Landing over 50 ft (9,473 lb)	1,880 ft

MU-2 SUPPORT

To Mitsubishi, in the words of W. D. Eikenberry, executive director, marketing, "The customer is most important . . . we're going to provide him service—both in product support and service support."

Parent to MAI is Mitsubishi Heavy Industries in Japan. And the parent company has granted MAI $17 million in financial assistance to strengthen and expand sales efforts for the MU-2, worldwide. The money will also help provide a better financing program for new aircraft sales.

In line with expanding product support, Mitsubishi has 38 service centers, including 28 in the U.S. Three of the company's European centers are serviced through a bonded warehouse of spare parts in Geneva. Mitsubishi also has three distributors in the U.S., one in Canada, and a number of district offices throughout the country. Nine dealers operate out of distributors' territory.

On the training side, Flight Safety International, Inc. (FSI) is now handling flight training, ground instruction and maintenance training for MU-2 pilots and maintenance crews, in San Angelo, Tex.

Meanwhile, FSI is building a new training center, at Hobby Airport in Houston, that should be completed before next spring. Training is provided cost-free to customers buying new MU-2 aircraft.

The airframe of the MU-2L has been structure tested for a service life of 25,000 flight hours. Engine time-between-overhauls is 3,000 flight hours.

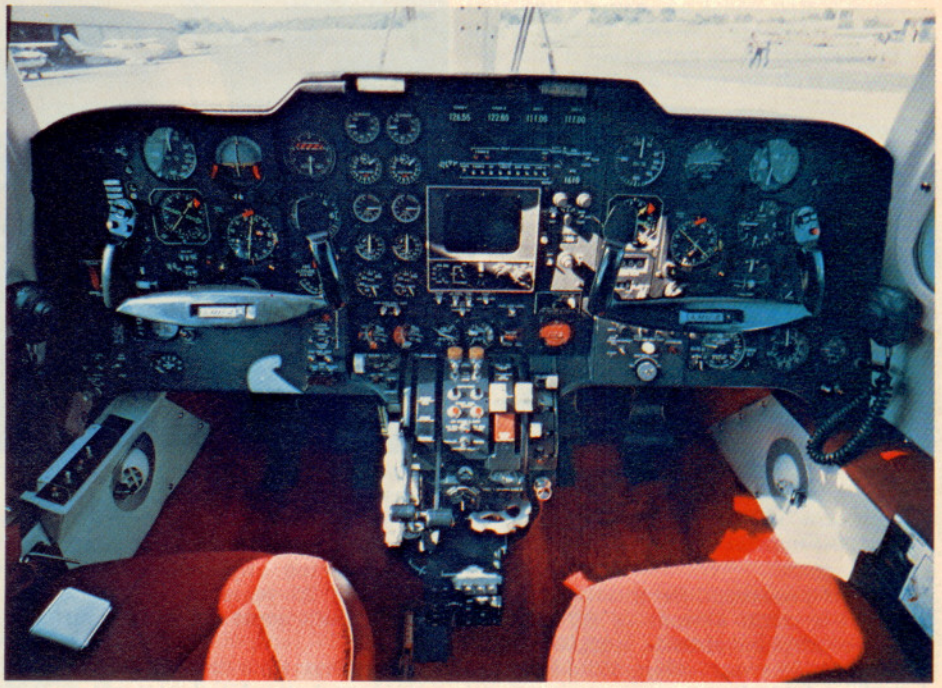
and holding but 92 knots indicated. Final approach was flown at 85 knots.

There's no doubt about the short-field characteristics of the MU-2L. The propellers, with reverse pitch installation, act as brakes. Thus, landing rolls are short. We were in and out of the 4,000-foot runway three times, in all instances rolling just short of a full stop, then off again, all in all using no more than half the runway length.

The short-field capabilities of the MU-2 were no better evidenced than by an MU-2 series aircraft in Ecuador which operated out of a jungle strip of 1,215 feet, carrying a full load and half fuel.

• *Pilot-passenger comfort.* From the pilot's point of view, the MU-2 is a responsive, stable aircraft with a firm "feel" at all speeds. From the passenger's viewpoint, the seating is comfortable and noise level moderate. The three-blade props, for instance, went from "paddle blade" to rounded blade for better noise control.

Air conditioning, of course, adds to the comfort level, as does the pressuriza-



Standard equipment includes an avionics package with integrated flight director/autopilot, weather radar, encoding altimeter, and dual flight and nav instruments.

Two stabilizing fins are attached to the underside of the aft fuselage section to improve low-speed stability. Fiberglass reinforced plastic is used for tail cone, dorsal fin, and stabilizer tips.

Standard executive cabin configuration of N830MA. A variety of seating arrangements is possible, and optional or custom furnishings are available.

tion. The pressure differential of 6 psi provides a cabin altitude of 6,700 feet when the airplane altitude is 25,000 feet. At 15,000 feet our cabin altitude was less than 4,000 feet.

All in all, the MU-2 models are rugged, reflecting the engineering capabilities of Mitsubishi. The Japanese corporation began producing airplanes in 1920 and, in its first 25 years up through World War II, built some 18,000 aircraft and engines.

Since that time it also has been licensed to build North American F-86 Sabrejets, to manufacture various Sikorsky helicopters, and to turn out Lockheed F-104 Starfighters and McDonnell Douglas F-4 Phantoms. It has also designed and built its own supersonic jet trainer.

Add to the above the U.S. contributions to this airplane and it's no wonder that MAI states, "Always one of ours in the sense that we take a personal pride in every MU-2 we build and sell." □