THE UMG III GLIDER

CAA Glider Type Certificate No. 3G1
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Some time before the war, the University of Minnesota Flight Club built two successful gliders for their own use and each of these gliders was licensed as an individual plane for the club uses. The type of glider, namely two-place training glider, or single place soaring glider for beginners, was favorably commented upon by people prominent in gliding and soaring activities. In 1939 and 1940, considerable interest was expressed in the State of Minnesota in gliding activities by young people's clubs. However, a glider was not available which could be given wide use. Finally, the Minnesota State Aeronautics Department asked the Department of Aeronautical Engineering at the University of Minnesota to design and build a prototype for a training glider. The intent was, that upon completion of the project an approved type certificate would be obtained and plans for the craft would be made available to flying clubs, high schools and vocational schools throughout the state, desiring to build an identical glider. With this in mind, the design was kept as simple as possible so that the students could perform the major part of the work of construction. It was also decided that a composite type of structure would give the maximum amount of experience to the builders.

With the advent of the war, the picture was completely changed but design and construction of the glider continued at a reduced pace. In the fall of 1947, the project had been completed to the point where extensive flight testing was in progress. At about this same time, the Project Engineer, Assistant Professor George M. Baggs, changed his affiliations and moved out to the West Coast. The author then inherited the task of seeing the project through to the final phase. Although Mr. Baggs was no longer associated with the University of Minnesota he continued to give a great deal of his time and experience toward the completion of the design work.

In anticipation of rough usage as a training glider, a set of fairly high load factors was incorporated. The maximum values being 5.33 positive and 2.67 negative. This has resulted in an unusually rugged structure. The conventional 2 spar wings are fabric covered. The leading edge torque box is of plywood and conforms to the wing contour. The cockpit portion of the fuselage is a welded, steel-tube structure covered with fabric with a generous amount of Plexiglass. A plywood monocoque shell completes the aft portion of the fuselage structure. Vertical and horizontal tail surfaces are of conventional wood construction with fabric covering.

As may be seen from the photograph, the landing gear consists of a single mainwheel and a tail skid. Protection of the forward part of the fuselage at landing is afforded by a spring-loaded wooden skid. Substantial metal wing tip skids provide support and protection when at rest and after landing. The low stalling speed of 28 miles per hour permits easy take-off and landings to be made by even a comparatively inexperienced pilot.

It is in place to mention that during the extensive flight tests considerable improvement in the performance of the glider was achieved, and therefore amply justified the adherence to the CAA rigid flight test requirements. For example, in order to decrease aileron stick force required by the large ailerons near the stalling speed, various schemes were tried with the final solution consisting of the addition of flat strips of aluminum alloy to the trailing edges of the ailerons. No satisfactory analysis of the theory of action of these strips has as yet been found but the strips gave amazingly satisfactory results.

To enable the rudder to center itself readily, after pedal forces were released, and to avoid a tendency for adverse rudder displacements to take place during sideslips, it was found necessary to add rudder bungee springs.

During the spin test program it was discovered that it was difficult to put the glider into a left spin. A slight but very definite wing rigging corrected this condition.

It was also necessary to re-design and develop a special release mechanism until the test performance was satisfactory under all conditions before the final approval of the CAA could be granted on the release mechanism.

Employment of a long span aileron in the design necessitated splitting each aileron into two separate units to avoid hinge binding due to deflections of the wing. Simultaneous displacement of both aileron halves is obtained by means of tow push-pull rods and bellcranks in each wing, actuated by the main aileron-push-pull rod system.

Elevator control is achieved by means of a conventional cable system. Longitudinal trim is accomplished through adjustment of the horizontal stabilizer

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