Don Funke, IAHF project leader, and Matt Quinney, volunteer, prepare to start the Scout’s Le Rhone rotary engine. The machine’s fuselage is protected from oil by plastic sheet, with a hole cut in the side where Mr. Funke worked the ignition switch and fuel and air valves while watching the tachometer and pulsometer.

In *WW1 Aero* issues 214 and 215 we reported on our restoration work on a Thomas-Morse S-4B Scout, and the differences we documented between the B model (the first production model) and the more common C model. We have a lot of progress to report since then, the most dramatic being the first start of its 80 hp Le Rhone engine in 75 years.

Our S-4B came to us with C model wings and elevators, and some modifications to the fuel tank and controls to accommodate them. In order to restore our B back to its original condition we have relied heavily on the Old Rhinebeck Aerodrome, which has the only complete, original S-4B in the world. They let us spend many hours examining and measuring the aircraft and recently Old Rhinebeck’s director of aircraft maintenance, Ken Cassens, visited our shop and gave us some important tips that helped us start our engine.

The propeller was restored by Fred Murrin, and a new distributor was built by Burr Ripley, former owner of Ithaca Plastics, who donated his time. We also made
new spark plug wires, rebuilt the magneto and oil pump, made new air intake tubes, and built a buzz coil after an initial attempt to start the engine failed.

Mr. Quinney swings the propeller. The Le Rhone performed its first test in 75 years on October 4 during IAHF’s open house, which also showcased the organization’s new home at Ithaca’s Tompkins County Airport. A video of the test can be found at http://earlyaero.com/ithaca-group-showcases-thomas-morse-scout-project-at-open-house-video/.

The cowl, which we believe was from the prototype, needed extensive work. Dents were taken out by a panel beater, cowl latches were fixed and re-installed, the felt seal and its fittings were replaced, and a new firewall was fabricated. New cheek cowls and the belly pan below the fuel tanks have also been made.

The instrument panel was rebuilt and authentic instruments, including altimeter, tachometer and airspeed indicator, were bought and rebuilt.

The cockpit with restored instruments and an instrument panel built from scratch.

An additional view of the Scout’s cockpit, showing (from left) the pulsometer, altimeter, fuel gauge, and tachometer.
The Scout’s uncovered forward fuselage, showing the restored oil and fuel tanks in place, new air intake tubes, new cowl cheek fittings, and a new B type control column that was made from scratch. The seat and its leather covering are original. All of the metal fittings and nearly all of the wood in the fuselage are original as well. Every piece has been taken off, stripped and re-finished.

Pitot tubes were installed on the port lower wing, and were probably a deviation from the original B model (they were used in the prototype and in the C model). We added them for safety, as the plane is intended to fly.

The tailskid had clearly taken a lot of abuse, and the tail post was broken when we received the plane. Therefore, as an additional safety measure, we improvised a stronger mount for the skid which is designed to resist side forces. We have noticed, even on surviving C Scouts, that modifications in this area were not uncommon.

Above Left: Our modification to the skid mount, in order to protect the skid from side forces. Above Right: Volunteer Ray Coolbaugh forms sheet aluminum for the area at the tail where the skid projects from the fuselage.
The wheels that came with our Scout were 24 inches in diameter, which was too small, so we had exact replicas, 26x3 inches, made by John McLaren of McLaren Mfg, Inc. We obtained new tires in the proper size from Coker Tire and made up new bungee cords for the axles.

Before we obtained our aeroplane we had built a new set of wings on the assumption that any aircraft we might eventually obtain would most likely be a C model. But when we finally got our Scout and realized that it was a B fuselage with C wings and elevators substituted, we started down a long road to make the wings and flying surfaces authentic B types.

The shapes of the B ailerons and elevators have distinctive curves that give the type a different look from the C. We relied on careful measurements of the Rhinebeck Scout to develop plans that we could use to build these control surfaces from scratch.

The trailing edges of the ailerons have a V-shaped cross section and had to be made from sheet metal using custom-made roller dies. Ribs are fastened to the trailing edge with copper which is soldered to the trailing edge and nailed to the ribs. A steel crossbar is welded at each end to the trailing edge. These methods were inferred from examining the Rhinebeck B Scout and from two elevator frames salvaged from our own Scout. The elevators are built in the same fashion, except that the trailing edge is made from 3/8” tubing, a detail we were able to see on the Rhinebeck Scout.
Above: A drawing of the B type aileron and elevator made using measurements from the Rhinebeck Scout and the structure found on the elevators that came with our machine. The B type elevators also had to be built from scratch because the ones on our machine were C type. Below Left: Mr. Funke welds tubing for the trailing edge of an elevator. Drawings and blocks screwed to the table give the proper shape. Below Right: An example of a B elevator. Steel fittings will be welded to each of the tubing and riveted to the spruce leading edge.
Our drawing of a B type elevator superimposed on a C drawing made by Jim Kiger.
The C wings that came with our Scout had ailerons controlled by torque tubes, in the manner of a Nieuport 17, but the ailerons of the B model were operated by cables. Much of the cable control system had to be inferred by examining the exterior of the Rhinebeck Scout, although some internal examination was done with a scope. The wings we had already built then had to be modified with cable and pulley controls. Most of the flying cables, landing cables, and control cables are currently being made from new material.

The joy stick system; the black tubing at the bottom runs to the front of the firewall and terminates in a crank that operates the aileron cables.

Above Left: The crank that operates the aileron cables, located on the firewall just behind the engine. Above Right: The cable system for aileron control can be seen here, with a completed B type aileron attached with hinges.
The cockpit controls also differ between B and C models. We built the B model joystick system from scratch based on exact measurements we took from the Rhinebeck Scout. The mechanism, which uses pulleys to enable both fore and aft elevator control cables to attach above the pivot point, is completely different from that used in the C model. The tube that rotates to actuate the ailerons extends all the way to the front of the firewall where a crank attaches to move the aileron cables. These parts were drawn in CAD by David Waterman, who donates his time, and made by Judd Bailey of Cayuga Tool, who also donated his time. Some of the associated parts were also made by Incodema, an Ithaca-based metal fabricating company that has donated much valuable work to the project.

We expect to cover and finish our Tommy this year. Our intention is to fly it in 2017, 99 years after it left the Thomas-Morse factory in Ithaca. Our work is attracting a great deal of attention and support from the local community. One reflection of this is that we are now doing our restoration in a building at the Tompkins County Airport in Ithaca with full support of the Airport Director. We are very grateful for the support we are receiving, and very excited to be closing in on a flight of our Tommy.