FLIGHT CHARACTERISTICS OF THE PHOENIX SAILPLANE

by AUGUST RASPET

(Editor's note: This is a letter written by the author to his sailplanist son, David.)

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Dear Son:

Today I had the real pleasure of flying the Phoenix. She is just as beautiful in flight performance as the pictures indicate. I made one flight in airplane tow after Herr Naegele first flew Phoenix to show me her characteristics.

The Phoenix as described in the July-August, 1958, SOARING is designed with both aerodynamic and structural finesse. In fact, the trailer and sailplane are designed as an entity so that the wing can be mounted on the fuselage as it rests on the trailer. Then when this is done, the tail is lifted with a special wood bar placed in the horizontal tail fittings. The trailer can then be rolled back from the sailplane. All that needs to be done after this is to set the tail in place and turn a lever fitting. The whole assembly can be done unhurriedly in twelve minutes by three crewmen.

First, the cockpit is beautifully laid out. The reclining position is used but with an adjustable head rest. A side release near the skid, good for winch as well as airplane tow, is used. For the towplane we used a Klemm 107 with an 150 HP Lycoming engine. The acceleration was rather poor and made the skid take-off on the rough field rather shaky. Not that I minded it but every shock I felt for Phoenix.

The take-off is with 40° of flap which assists in the longitudinal stability. At 50 feet altitude the flap is retracted and then I noticed the sensitivity of the elevator which Dr. Eppler had mentioned. I later found this to be due to the center of gravity being almost on the neutral point.

From 50 feet the going got rough because the windscreen has a wavy spot right in the line of sight of the towplane. Twice in trying to get the towplane into the good region of the canopy I got into the propeller slipstream. The ailerons were sufficient to correct for the roll induced by the rotating slipstream.

The climb after discovering that I would have to put up with a distorted image of the towplane was straightforward to 2000 meters (6560 feet). However, I did notice a glare on the low angle windshield which resulted from the deck ahead of the instrument panel reflecting light onto the glass. A piece of black silk velvet would do the job of reducing the reflection to 0.05%. Needless to say, during the tow I strove to find good landmarks so that I could get back to the same field. I found Wolf Hirth's plant at Nabern-Tech and the Autobahn, as well as the hill called Tech, good markers.

At 2000 meters the towpilot signalled release. I gave a good pull and I thought we were free and turned off to the right. However in a short time I noted that we were being pulled off to the left. Another tug on the release and we were free. Now came the nice sensation of real silent flight. I closed the ventilator on the side of the fuselage and slowed the bird down to 54 km./hr. (33.6 mph), at which speed a distinct turbulent noise was emitted by the canopy. At first I thought it occurred on the top rear but later investigation showed me that the source was a sharp corner on the openings admitting air to the canopy at the front.

Next in the stall procedure came a light buffet at the tail at 50 km./hr. (31 mph). Shortly thereafter, the left wing dropped gently and the nose fell simultaneously. It was out of the stall in no time. Even at 52 km./hr. (32.3 mph) just before the stall the ship still had a sinking speed of only 0.5 m./sec. (1.64 ft./sec.). This indicates that the airfoil has no separation even at high lift coefficients, just as Dr. Eppler designed it.

I then tried the stall with 30°, 60° and 90° of split flap. The stall was even better, stalling right in her nose and recovering simultaneously. This test assured me I could use 90° of flap for the landing without worry of wing dropping.

During the foregoing flying and on tow I noticed that the aileron control force was not linear with deflection. It felt like a rough spot in a bearing but actually on the ground I previously found the controls to have smooth action. I concluded that it was aerodynamic. I must write Dick Johnson who is using a similar airfoil to tell him that Dr. Eppler plans to reduce the aileron differential to 1:1 from 2:1. This should remove the kinks in the aileron control forces. (Note after talking to Dick: The non-linearity must be due to aerodynamic flow changes near neutral deflection. Because of this, change in differential may not suffice.)

To reduce the sensitivity of the elevator the c.g. needs to be moved forward. This would best be done by simply putting a few cushions behind a short, light-weight pilot. The ship appeared to be almost neutrally

Raspet just prior to take-off. Note adjustable head rest and smooth wing fillets.