

The Horten H XIII

In 1943, Reimar and Walter Horten constructed a rather unique glider to investigate the stability and control of a highly swept wing. This was done in preparation for construction of a high speed fighter, as seen in the H X and H XIIIb projects. A secondary goal was to determine the effect of sweep on the "middle effect" (see *RCSD*, November 1995). Designated H XIII, the resulting aircraft was successfully flown several times and provided substantial information regarding control authority at various speeds. The airframe was relatively simple and would make a rather unique project for the scale modeler.

The H XIII had a sleek, highly swept wing and a gondola style pilot enclosure. The wings were taken from an H XIIIb which had a leading edge sweep angle of 24.3 degrees. The H XIII fuselage was constructed such that the wing junction was set at an angle, increasing the leading edge sweep angle to 60 degrees. This change in sweep angle had the effect of lengthening the chord and decreasing the section thickness. The span was reduced from 20.5 meters to 12.4 meters. A spoiler was mounted on the top center of the wing, but it was not effective due to inherent turbulence in that region.

The gondola was mounted below and behind the trailing edge of the wing. The pilot could eject himself from the aircraft by jettisoning the tail cone and attached seat, and pushing himself backward through the opening. Visibility to the front was limited because of the shape of the gondola and the front landing strut, and while this did not severely affect piloting the aircraft in normal flight, it did make landing somewhat difficult.

Overall flight performance was not spectacular, but certainly good considering the planform and construction methodology. The overall L/D was 12, but could be pushed to 16. Aileron control was good at low speeds (around 70km/h), but nearly non-existent at higher speeds (150 km/h). The elevator seemed to always have a heavy feel.

The single H XIII was destroyed by liberated Russian prisoners at the end of WWII.

As a scale project, the H XIII offers several challenges to the builder. To maintain the internal structure of the original requires an incredibly large number of diagonal joints. Because of the planform, all of the control surfaces meet at a severe angle to the hinge line. The edges must therefore be made to clear each other regardless of the extent of deflection. The gondola easily serves as a place for receiver and battery pack, and the wing is thick enough for internal servos. With care, winch launching should be possible, but for a spectacular sight, and to be historically accurate, a scale H XIII should be towed behind a Henschel Hs 126A of the same scale.

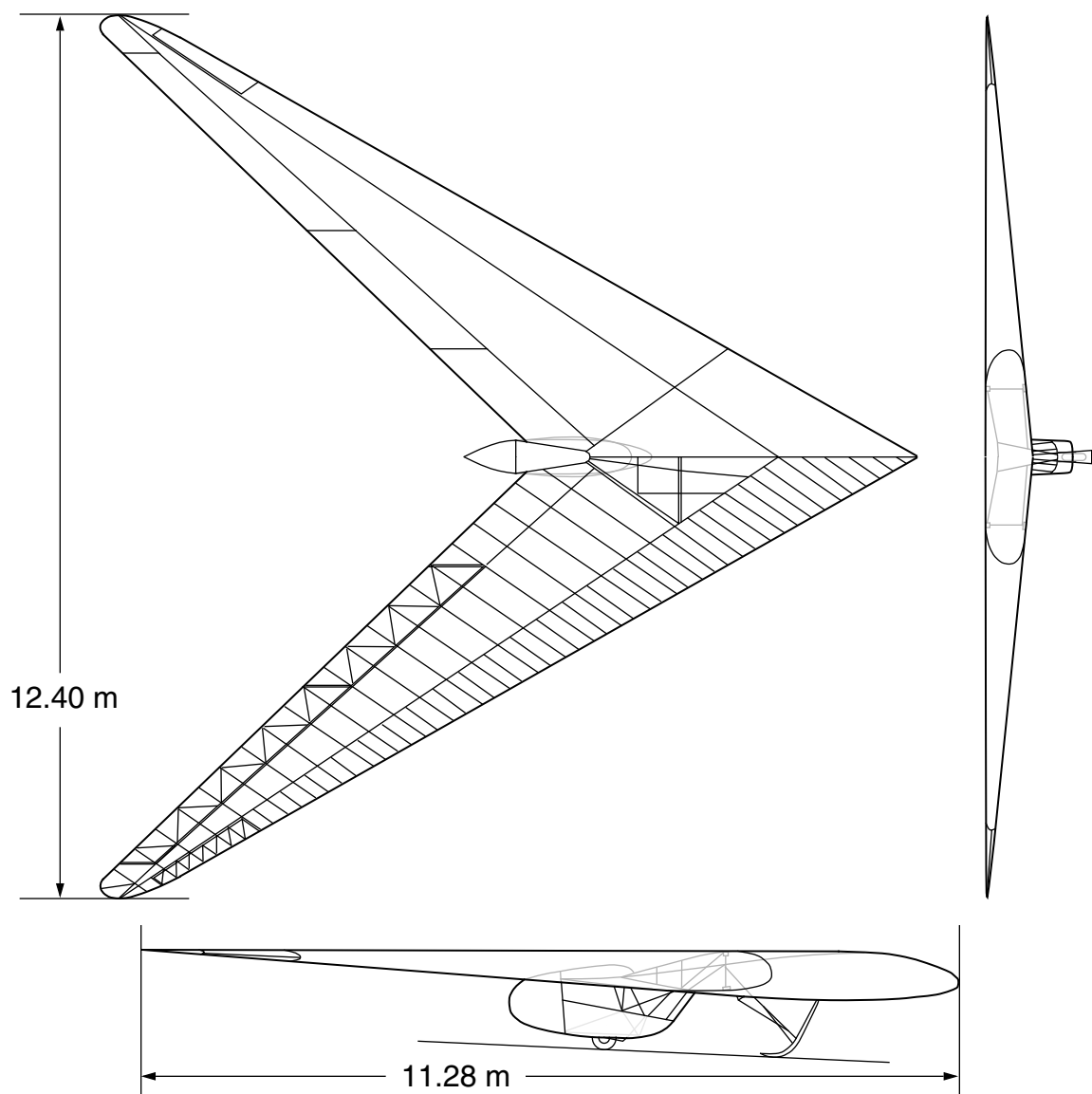
Suggestions for future columns are always welcome. We can be reached at P.O. Box 975, Olalla WA 98359-0975 or <bsquared@halcyon.com>.

Resources:

Dabrowski, Hans-Peter. *Flying Wings of the Horten Brothers*. Schiffer Military/Aviation History, Atglen Pennsylvania, 1995.

Green, William. *Warplanes of the Third Reich*. Galahad Books, New York. 1990.

Horten, Reimar and Selinger, Peter F. *Nurflügel, Die Geschichte der Horten-Flugzeuge 1933-1960*.



HORTEN H XIII
Hersfield, 1943

Drawing based on a 3-view in *Nurflügel, Die Geschichte der Horten-Flugzeuge 1933-1960*
by Reimar Horten and Peter F. Selinger

Herbert Weishaupt Verlag, Graz Austria, 1993.

Horten H XIII

	Parameter	Dimension
Wing	Span	12.4 m (40' 8.2")
	Sweep angle	60 degrees at leading edge
	Thickness, root	12%
	Chord, root	5.2 m (17' 0.7")
	Thickness, tip	7%
	Chord, tip	0.4 m (1' 3.7")
	Area	36 m ² (387.5 ft ²)
	Twist	6 degrees
	Aspect ratio	4.0
	Surface loading	9.2 kg/m ² (1.88 lbs/ft ²)
Airframe	Total length	11.28 m (37' 0")
	Gondola:	
	Length	2.4 m (7' 10.5")
	Width	0.6 m (1' 11.62")
	Height	1.0 m (3' 3.37")
	Weight	250 kg (551 lbs) empty 400 kg (882 lbs) max.
	Design C _L	0.4 at 400 kg (882 lbs)
CG location	~4.725 m (15' 6") aft of leading edge apex	
Flying characteristics	Stall/landing speed	44 km/h (27 mph)
	Lowest sink rate	1.1 m/sec (3' 7.3") at 60 km/h (37 mph) and 9.2 kg/m ² (1.88 lbs/ft ²)
	Best L/D	16 at 80 km/h (50 mph) and 9.2 kg/m ² (1.88 lbs/ft ²)
	Maximum speed (V _{NE})	180 km/h (112mph)
First flight	27 November 1944	Approx. 20 flights total