

"FASZINATION NURFLUGEL" REVIEW

"Faszination Nurflugel" is a new book on flying wings published by the German firm VTH (Verlag fur Technik und Handwerk GmbH). Hans-Jurgen Unverferth is the editor. Consisting of over 150 pages, it includes many photographs, drawings, 3-views and graphs. Divided into several sections, the book covers planks and swept wings, airfoils, control methods, and various solutions to problems pertinent to tailless aircraft. Additionally, several items dealing with flying wings and F3E (electro-flight) are included. Although the text is entirely in German, this is a valuable work. (A very simple German-English technical dictionary can assist immensely and we'll give you information on an inexpensive one at the end of this column.)

"Faszination Nurflugel" begins with a discussion of the evolution of flying wings, using Curt Weller's appearance at the 1982 Kaltenkirchner flying wing contest with his "Elfe II" as the starting point. This is followed by a brief definition of the term "Nurflugel" ("only wing").

The book really begins in earnest with a description of the plank concept. Included in this section are some airfoils which have sufficient stability for this type of tailless sailplane, some tips on wing geometry to improve efficiency, a simple method of computing the neutral point and CG, and various construction methods which can be used. Reinhard Werner, long a proponent of planks for thermal duration work, has written an entire article on flying techniques and design considerations for this type of glider.

Two members of the LOGO Team, Reinhard Kaufmann and Peter Wick, then explain the evolution of their team's attempts at achieving a competitive F3B 'wing. In all, descriptions for nine swept 'wings are included. Beginning with the "Gnom" in 1983/1984, and ending with the "Holon" in 1988, the entire process of integrating

aerodynamics and increasingly sophisticated RC systems with piloting skills and improved performance can be traced. There are three views for five of the LOGO Team's aircraft.

Hans-Jurgen gives a wonderful description of his CEOZWO series, tracing its development from "Pirx," through "Just In Time," and then continuing with its evolution into a smaller version (CEOZWO-mini), a larger version (4 meters!), and a few electric powered versions. Hans-Jurgen also discusses some interesting construction methods. There are several 3-views in this chapter.

Flying wings nearly always fly well in a straight line. The problems arise when, as Reinhard Werner says, "... we stop letting them fly by themselves and begin stirring the sticks a little." Elevator, aileron, flaps and air brakes are all covered in a chapter written by Dr. Michael Wohlfart. His "six surface" system using one of the newer computer radios is marvelous!

Perhaps the most in-depth section is that dealing with winglets. Three 'wings are described; the first with no winglets, a second with large winglets covering nearly the entire tip of the wing, and a third which consists of a higher aspect ratio fin which covers the rear 50% of the wing tip. A number of graphs, fourteen in all, several pages of interpretation, and a summary table provide very good indication of performance characteristics for these configurations and allow the reader to relate the information to the objectives the designer wishes to obtain.

New airfoils - the MH 45, and EH 1.0/9.0, EH 1.5/9.0, and EH 2.0/10.0 - are described with polars, pressure distribution graphs, and coordinates. Zero lift angles and moment coefficients are given so the reader can reach conclusions regarding their application.

Contrary to the opinion held by many pilots of conventional aircraft, not all 'wings look the same. Horst Pritschow's "Octopus," a scythe-shaped 'wing, is shown and described through photos taken during construction, a good three-view and printed data, plus some

in flight shots. A description of the underlying design philosophy makes for interesting reading. In the same section is a discussion of the implications of increasing the aspect ratio of a design. Sweep angle, wing twist, control methods, and construction techniques are all covered. Beginning with "Sky Diver" (aspect ratio of about 8.5) and ending with "Lotos" (aspect ratio of 20), Robert Schweissgut goes so far as to discuss the problems and implications of high speed stall at the wing tips during control surface deflection.

"Faszination Nurflugel" ends with a well written article by Prof. M. Schonherr. Here are described the seven basic problems of flying wings and how each is solved through the "Stromburg Principle." Control of air flow over the center section, for example, is obtained by a very specific method, and the results are demonstrated with actual in-flight photos of the tuft studies accomplished through use of an onboard camera mounted on the CG! The entire set-up is shown in one photo, and eight excellent pictures show controlled airflow during tow, turns, and a flaps down landing.

A short chapter describing currently available flying wing kits and another listing available literature back to 1984 finishes off the book. Other authors, who we failed to mention above, include Alfons Reiger, Martin Schlott, Curt Weller, and John Yost.

"Faszination Nurflugel" lacks some important items, like a method for calculating wing twist for various stability factors, but all of these missing things are readily available elsewhere. Hans-Jurgen's intent was to outline the progress of flying wing technology during the past several years, and to include "state-of-the-art" items along the way, while not duplicating the work of others. He has managed to do this in most outstanding fashion. "Faszination Nurflugel" is an excellent value and we recommend it highly.

"Faszination Nurflugel" is available directly from Verlag fur Technik und Handwerk GmbH.

Those of you who are looking for a reasonably priced German-English technical dictionary and finding only "big honkers" costing \$60.00 and more, take heart. You will have a hard time bettering the RC sailplane terminology dictionary by Armin Saxer found in SOARTECH #6. It should already be on your library shelf, but if it's not, the complete 150+ page SOARTECH #6 is still available.