"SCHWANZLOSE FLUGZEUGE" REVIEW

A review of "Schwanzlose Flugzeuge: Ihre Auslegung und ihre Eigenschaften" ("Tailless Aircraft: Their Layout and Qualities"), a new book written in German by Dr. Karl Nickel and Dr. Michael Wohlfahrt and published in 1990 by Birkhauser Verlag of Basel, Germany.

Dr. Karl Nickel, a test pilot for several of the Horten designs, and Dr. Michael Wohlfahrt, designer of RC flying wings for the Swiss LOGO F3B Team, have written what is advertised as "the bible" for anyone interested in tailless aircraft. "Schwanzlose Flugzeuge" does not focus on models, although an immense amount of material of use to modelers is presented. Rather, it lives up to its title by covering all sizes of tailless aircraft. The book is dedicated to the memory of Franz Xaver Wortmann, designer of the FX series of airfoils.

As objectively written books are becoming more difficult to find, it was a welcome surprise to find the statement, "Das Nurflugelflugzeuge ist der Flugzeug der Zukunft." ("The wing-only aircraft is the aircraft of the future.") followed by, "Wir, die Autoren deises Buches, sind davon nicht uberzeugt!" ("We, the authors of this book, are about this not convinced!").

This hardcover book consists of 616 pages divided into 12 chapters plus a forward, literature list/bibliography, a complete listing of terms as used in formulae, and a comprehensive index. Each chapter is divided into several sections, averaging six to seven per chapter, and all formulae, drawings, and photographs are serially numbered. It is written, then, in the style of a textbook. The main thrust of the book is to fully illuminate problems, construction, and flying characteristics of all types of tailless aircraft. The authors' goals are assisted throughout by headings denoting special consideration: problems, goals, history, explanations and descriptions, applications, cautions, and additional material. Boldface type is used to increase the reader's attention to important points.

"Schwanzlose Flugzeuge" does not assume the reader to be knowledgeable, and in fact begins with a definition of tailless aircraft and an explanation of their physical relationship to conventional tailed aircraft. The second chapter, in explaining basic aerodynamics and associated terminology, carefully examines aerodynamic theory as related to tailless aircraft. The aim here is to provide the reader with the information needed to understand the polar diagrams, lift distribution curves, and formulae given later.

Stability, control surfaces and their effects, and flying characteristics are covered in the next three chapters. Stability is related to the neutral point and several other measureable parameters, and the effects of control surface movements on stability are examined, including aileron differential, flaps, and air brakes. Chapter 5, concerned with flying characteristics, provides some details about the effectiveness of wing twist, boundary layer fences, and slots.

Once a preliminary design is chosen, the next logical step is to optimize it. Maximizing lift, minimizing drag, and the use and design of winglets is examined of achieving greater efficiency and better control. Chapter 7 continues this discussion through an examination of various wing profiles, sweep, twist, winglets, and flaps. Of particular note is a complete quotation of Barnaby Wainfan's article on reflexed profiles which appeared in the December 1988 issue of Kitplanes magazine.

The problems of tailless aircraft are in some cases unique while others are similar to those seen in conventional tailed aircraft. Flutter and boundary layer drift are of course associated with swept wings of any kind, but increasing elevator function without adverse effect and moving the CG to increase performance pose special problems for tailless aircraft.

Perhaps the most surprising part of "Schwanzlose Flugzeuge" is Chapter 9, in which hang gliders are described as ideal tailless aircraft! Radio controlled models

are covered in Chapter 10, with many photographs and a most interesting profile of an F3B winch launch trajectory.

"Stories, misjudgements, prejudice and fairy tales" is the title of Chapter 11. It is here we learn the truth about such things as the bell shaped lift curve, the middle effect, and wandering of the boundary layer.

The final chapter describes in some detail both full sized aircraft (Lippisch Delta I and Horten I, Fauvel AV 36, Horten II, III, IV and VI, the SB 13 "Arcus", and the Rochelt "Flair 30," an ultralight sailplane), and Wohlfahrt's "Sapperlot," the 'wing he's designed for the Swiss LOGO-Team.

As you can see from the above outline, "Schwanzlose Flugzeuge" covers its material in logical order. Information is provided in an easily comprehended way, with later concepts always easily related to those presented earlier.

The literature list/bibliography is quite extensive, with several citations credited to Dr. Nickel, and several more to Dr. Wohlfahrt. We should also mention the first citation, which is out of alphabetical order, and which Nickel and Wohlfahrt describe as "the well detailed literature list" for tailless aircraft. That citation is for Serge Krauss' "Tailless Aircraft - An Extensive Bibliography for Subsonic Types." This is quite an honor for Serge, and it is well deserved.

"Schwanzlose Flugzeuge" lives up to its billing as the bible of tailless fans. Although published by Birkhauser, copies are available through Verlag fur Technik und Handwerk, GmbH, the publisher of the German magazine FMT. The cost is DM78,00. While this totals something over US$50.00, we consider the book to be of significant value and there is no question ordering through VTH is the least expensive method of acquiring it. Orders are shipped immediately upon receipt, but delivery takes roughly five weeks as items are sent by surface mail. Again, "Schwanzlose Flugzeuge" is written entirely in German.

"Faszination Nurflugel," edited by Hans-Jurgen Unverferth, was reviewed in this column in the April 1990 issue of RCSD. Less expensive (DM29,50), a focus on models only, more easily understood graphs, relevent photographs, and quite a bit of construction information in the form of drawings make "Faszination Nurflugel" the more practical choice if your knowledge of German is less than good. "Faszination Nurflugel" is also available directly from Verlag fur Technik und Handwerk, GmbH, under the same terms as outlined above.