On the 'Wing... #177

Jochen Haas' *Taborca*

Our "On the 'Wing..." column in the August 2001 issue of *RC Soaring Digest* was devoted to Jochen Haas. Jochen's spreadsheet, formulated to assist in the design of swept wing tailless gliders, remains available in both Excel and AppleWorks formats. As that column was being written, Jochen was working toward getting a kit of the Taborca 3 manufactured by a major firm. This month's column is devoted to examining Taborca in detail and providing an American source for the LET Model kit!

Taborca is an exceptionally beautiful swept wing sailplane designed for slope soaring and F3J flying. The wing utilizes the MH 45 airfoil, is swept back 24 degrees, and uses what has come to be known as a "six flap" control system. T here is no rudder. The winglets increase the effective aspect ratio from 12.8 to 17.

The wing sweep of 24 degrees and the size and location of the various control surfaces are coordinated so the lift distribution can be tailored for separate flight regimes. Control surface deflections are set up so the yaw, pitch and roll functions do not interact.

The included illustration shows the control surface deflections for various flight regimes.

For roll to the left, the elevon of the left wing goes up and the combi-flap of the left wing goes up to a lesser extent. On the right wing, the combi-flap goes down and the elevon goes down to a lesser extent. The idea is to eliminate any pitch change by having the control surface deflections balance each other out in the vertical dimension while at the same time eliminating adverse yaw.

For left yaw, the elevons and combi-flaps operate in opposing directions so that there is no pitch input, only an increase in drag on the left wing.

The elevons and combi-flaps can be deflected slightly upward to increase the speed when traveling between thermals. A small amount of downward flap deflection is used to improve distance performance and thermal climb.

The flaps are used to assist the elevons in elevator mode. The flaps and elevons deflect to maintain pitch stability when the combi-flaps are deflected downward to act as air brakes. This is equivalent

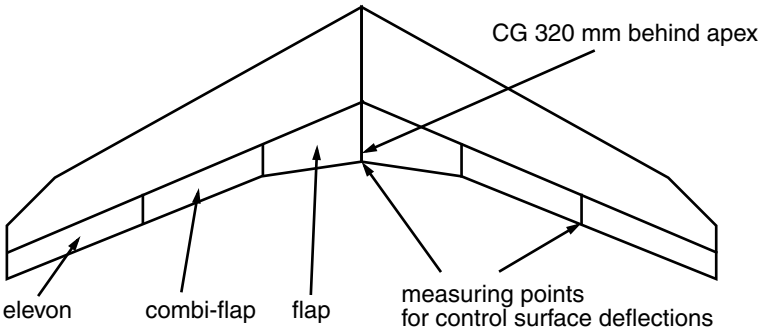
to “crow” on a conventional tailed aircraft, and Taborca will slow down to a crawl and land very easily.

During all flight phases the flight characteristics are very docile. The performance envelope and speed range of Taborca is very close to conventional F3J models. The minimum speed is astonishingly low, and the climb performance when thermalling is even better than conventional models.

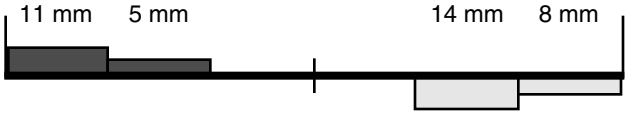
Full utilization of the six-flap control system mandates a sophisticated transmitter with a number of mixing functions. Recommended transmitters include the JR 10X and 8103.

Taborca is a RTF sailplane, ready for installation of servos and other radio gear. It is obeche over foam with carbon fiber spars and Oracover which is professionally applied. The upper surface is white, the bottom surface is of contrasting color. All control surfaces are pre-hinged and servo cables are installed. The transitions and wing-fuselage junction are improved over what’s shown in the included photos, and the winglets have been strengthened.

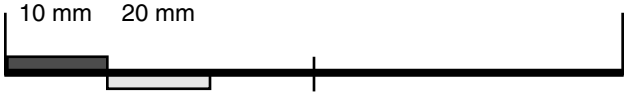
An alternative fuselage for an electric version is also going to be available. The original setup included a Torcman TM 280-20-16 with a Master 40-3P 6-16 NC opto Jeti speed control, 10 cells, and a 12.5x6 folding prop in a tractor configuration. Dieter Mahlein of ShredAir has suggested an improved motor drive system using high quality Lehner equipment: Lehner LMT Basic 5300 motor and Reisenauer Microgear 5:1 with BK/LMT Warrior 7018 controller, 70A



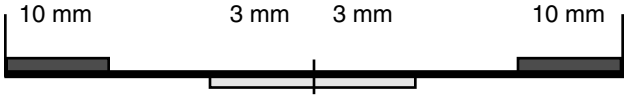
left aileron



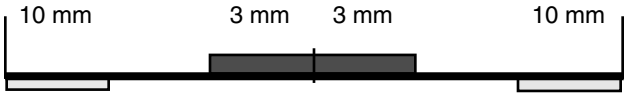
left rudder



up elevator

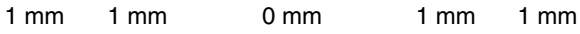


down elevator

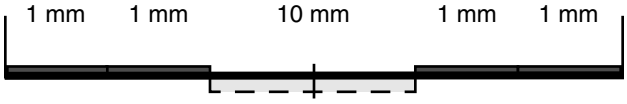


<u>flight phase:</u>

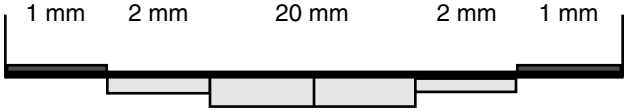
high speed flight



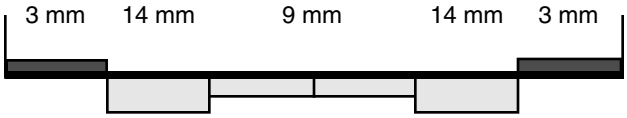
distance



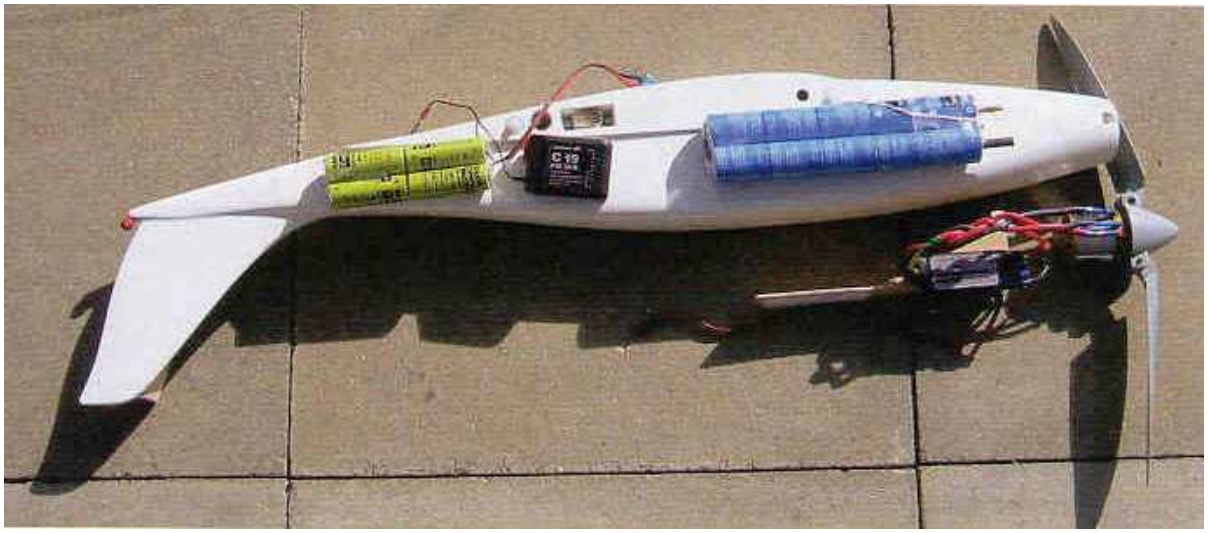
slow flight — launch, thermal, landing



speed brake fully deployed



Taborca 6-flap control system



continuous and eight CP-3300 NiMH cells, zapped, in two sticks of four cells, soldered end-to-end. This system would drive an RFM 14x10 carbon propeller with a clamp-on Norbert Meyer Lightspinner (diameter to be determined). The Lehner system offers good performance at a relatively low cost of under $400 without the battery.

There will be a molded version of Taborca in the future. There is no weight or structural advantage to a molded wing — the only real difference is in the finish. The foam and wood wing is of course more easily repaired, an important consideration.

John Derstine/Endless Mountain Models is the U.S. importer for this design via LET Model. The sailplane configuration will be priced between US$750 and US$900; no price range for the electric version as yet. You can obtain information from the Endless Mountain Models web site news page <http://www.scalesoaring.net/EMM/emm news2.htm>. If you have an interest in purchasing a Taborca kit, contact John through <Taborca@scalesoaring.net>, a special e-mail address.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Resources:

Derstine, John/Endless Mountain Models. RD#3 Box 336, Gillett PA 16925. Phone: 570-596-2392, weekday evenings 7:00 to 10:30 PM Eastern Time. Weekends any time. <johnders@npacc.net> <http://www.scalesoaring.net/>

Kuhlman, Bill and Bunny. The flying wings of Jochen Haas. RC Soaring Digest, August 2001. Available at <http://www.glide.dyndns.org/on-the-wing3/156-Jochen-Haas/156-Jochen-Haas.pdf>, software at <http://www.glide.dyndns.org/on-the-wing3/156-Jochen-Haas/Haas-software-Windows/> and <http://www.glide.dyndns.org/on-the-wing3/156-Jochen-Haas/Haas-software-Macintosh/>.

—. Six-flap control systems. RC Soaring Digest, July 1995. Available in On the 'Wing... the book, Volume 2 <http://www.glide.dyndns.org/on-the-wing2/OTW-Vol-2.pdf>, 9.9 MB.

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