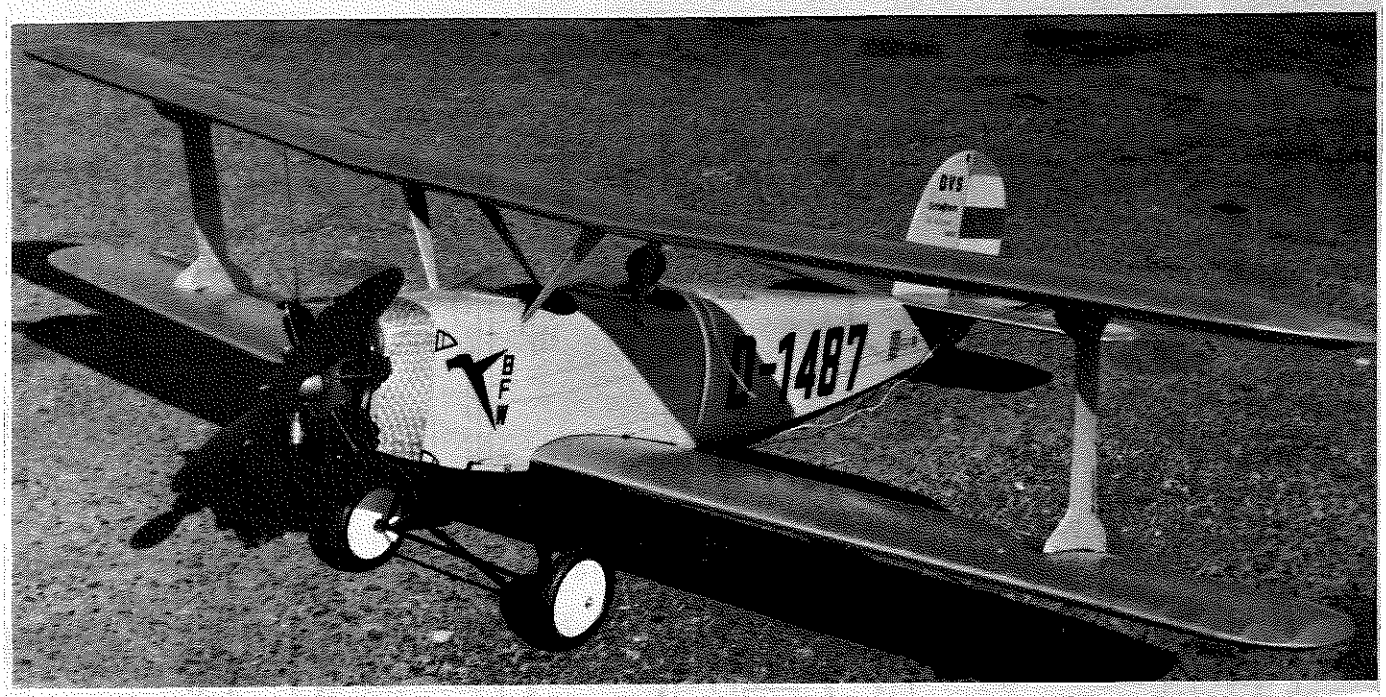

UDET U-12 FLAMINGO

By ROLAND BALTES . . . The sprightly U-12 Flamingo was the brainchild of Ernst Udet, legendary WW-I German ace and top aerobatic pilot of the '20s and '30s, and to this day is regarded as one of the best light aerobatic aircraft ever built. Our author's Sport Scale version has performance to match the full-size ship.

• If you are a WW-I aviation buff, the name Ernst Udet probably rings a bell, as he was one of the famous German fighter pilots of that war. That he was involved in aircraft design and building in the 1920's may not be such common knowledge. Were it not for Aircraft Profile No. 257, I seriously doubt that the Udet Flamingo would ever have made my list of models to build someday. Like many scale modelers, I have over the years collected a large library of scale information, including most of the Profile Publications. These booklets, which unfortunately may be hard to find nowadays, are a real boon to scale modelers since they provide a wealth of info including a colored 3-view and lots of pictures. The impetus for actually building the model came as a result of a flying buddy having built a Concept Models "Fleet" Barnstormer, which meant that I had to have a bipe also, plus a discussion with ye ol' editor, whose eyes lit up when the word "Flamingo" was mentioned. He also happens to be a pushover for biplane articles, which in this case took longer to prepare than actually building the model.

Getting back to the real thing, the Udet Flugzeugbau (aircraft factory) recognized the need for a training bipe in the mid '20s and produced as a result the Flamingo. More accurately known as the U-12 (Udet's 12th design), it came in a variety of versions, including a sea-plane with twin floats. Over 300 were produced, apparently including some in Austria, Hungary, and Latvia. This info plus lots more can be found in the aforementioned Profile, or the book *Messerschmitt, Aircraft Designer*, by Armand van Ishoven (Doubleday & Co., Inc., Garden City, NY, 1975). How Udet and Messerschmitt are related from an aircraft building/design standpoint makes for interesting reading. This book, by the way, also has a bunch of pictures of the Flamingo.

(Udet established fame as an aerobatic pilot between WW-I and II, flying at many air shows in Europe and the U.S.A. For some period of time, he was flying a Bucker Jungmeister. In fact, it was his Jungmeister that was being brought to the U.S.A. aboard the Hindenburg in 1937. Obviously, that was its last "flight." wcn)

The model was scaled up from the 3-views provided in the Profile and is from an outline standpoint as accurate as one can make it by using dividers. Without using any scientific approach, I elected to enlarge the 3-views nine times, which seemed to make the model about the right size for a .40 engine. Besides, it makes it about 2"=1' scale (1/6-scale), allowing the use of various commercial components such as wheels, pilot, etc. Only one concession was made. I incorporated a simplified steerable tail wheel instead of the prototype tail skid. Both are shown on the plans, so take your choice. Being my first R/C scratch-built Sport Scale ship, I was obviously anxious about how well it would fly. Some taxi tests on the driveway revealed excellent ground handling qualities, meaning no nose-over tendencies. Really had to

resist the urge to pour the coals to her for an off-the-street takeoff! Sanity prevailed, however, and the maiden flight was made (with family in tow for encouragement) at the local model airdrome. Flight performance turned out to be excellent, which really isn't surprising considering it only weighs 5-1/2 lbs. with about 900 sq. in. of wing area, putting it into the trainer category. I've had lots of flights with it, including several contests where it gathered 92 and 90 points in static and placed 2nd overall in one. For power I use a K&B .40 with Perry carb and DuBro muffler, which is more than ample power. Neat would probably be the Saito (sold by Hobby Shack) FA-30 4-cycle glow engine, which with its unique sound would be most appropriate.

I don't think the original designers had the modeler in mind when they came up with the real one, even though the fuselage is nothing more than a box. Only real difficulty (if you want to call it that) is caused by the dihedral and sweepback of the wings, which need some care to insure proper alignment. Outer wing struts are extremely simple, while the cabane struts (between fuselage and wing) require some care in installation, again for alignment.

The numerous wing ribs are a nuisance but typical of a vintage bipe. I made most of mine during idle time on a camping trip, after having made a master pattern from 1/8 plywood. Since both upper and lower wing panels are about the same (except for length), one has only to be careful of making a left and right version. The sequence is similar for all wing panels, that is, pin down the bottom front and rear spars and trailing edge, slide the ribs onto the main spar, then pin down over spars. Add the top front and rear spars and then the leading edge. By the way, most strip material used is stock size and can be either hard balsa or spruce. Hot Stuff was used mostly, with Ambroid cement applied at critical joints. Add the various plywood plates for strut attachment, wing tips from sheet balsa, and all the false ribs between the leading edge and upper and lower spars. The upper wing center section can also be built similar to the main wing panels.

Two sets of ailerons are needed, the undersides of which are from 1/16 sheet balsa, then built up with leading edge and ribs. Lower ailerons require plywood plates for aileron horn installation. Tabs for connecting the upper and lower ailerons can be bent from sheet brass or aluminum. A small hole is required in each tab to later allow installation of the aileron connecting rods. These tabs need to be installed pretty solidly; use epoxy and scrap balsa. A lower wing center section is also required and incorporates the wing hold-down dowel, rear gear strut support, and provision for mounting the aileron servo. I used a Kraft style three-servo tray bolted to a plywood plate.

After all wing panels are complete, join them with the appropriate center section panels. Insure that the proper dihedral and wing sweep are maintained. Epoxy all joints and reinforce with scrap balsa fillet pieces. Installation of the aileron control system should be next. Temporarily mount the ailerons to the lower wing and install the servo so that the proper pushrod length can be determined and installed. Set the wings aside before covering and turn your attention to the fuselage.

The fuselage sides are from sheet balsa and need to be accurately laid out first. Install the plywood firewall with triangular filler stock, then glue the rear of the fuselage together with a 1/4-in. balsa spacer. Install the remaining formers and fuselage doubler at the lower wing saddle. Cabane struts are bent from 3/32 music wire and attached to plywood plates with "J" bolts. These wing strut plates need to be firmly mounted to the top of the fuselage sides, so reinforce them with balsa triangle stock. Add the cockpit floor, then the fuselage top formers. Plank with soft 1/16 sheet balsa. The underside of the fuselage is covered with 3/32 sheet balsa applied with the grain running across the fuselage.

Nothing much needs to be said about the tail surfaces. The fin and elevators are made from 1/4-in. sheet balsa, while the stabilizer and rudder are built-up construction. The elevator joiner can either be a piece of music wire or a commercial elevator horn. Before joining any of the tail surfaces together or mounting to the fuselage, it's best to cover the parts first. However, before doing so, make sure all nicks, dents, and scratches in the balsa parts are filled in and sanded. Round off any sharp corners on the wings, fuselage and tail surfaces.

Super Coverite (antique color) was used on the fuselage and fin but also required paint subsequently to get to the right shade of tan to duplicate the aircraft that I was building. Wings and tail surfaces other than the fin were covered with silver Permagloss Coverite as is.

After covering, the stabilizer and fin can be attached to the fuselage. Now install the tail wheel bracket (if used) and hinge the elevator and rudder using any commercial hinges such as DuBro or Klett. So far I have had a lot of success with using Wilhold white glue, which seems to have tenacious sticking qualities for installing hinges. This avoids having to pin the hinges and its associated dilemma, i.e., install before covering or after.

When covering the wings, leave the top wing center section for last. This is done to allow access for drilling and installing the blind nuts for the cabane strut hold-down bolts. Being my first bipe with a removable top wing, I really struggled to come up with a scheme to attach the top wing. If you have something better or simpler, go to it. My solution was to drill holes for both front and rear struts in the plywood plates on the underside of the top wing. The struts are free to slide into these holes and are then attached by soldering electrical connectors to the struts themselves, which are then bolted to the plywood plate. The neat part of this is that accurate top wing incidence adjustments can be made while soldering on the connectors. If this doesn't make sense write **RCMB's** editor, he knows it all.

Install the lower wing to the fuselage with nylon bolts, which pass through the gear mount and are tapped into hardwood blocks epoxied to the interior of the fuselage sides. The landing gear struts are bent from 1/8 music wire, wrapped and soldered together, then installed to the slotted landing gear blocks with metal or nylon straps. The outer wing struts are made from 1/16 plywood and installed with Goldberg 90° mounting brackets.

Final finishing consists of mixing up a mustard-tan combination from Aerogloss paints for the fuselage. Medium blue and yellow stripes are used on the rudder and elevator. Large lettering and markings were applied by cutting stencils from contact paper and spraying on flat black Aerogloss. Small lettering was done using press-on letters. The sheet metal around the cowling and over the baggage compartment door was simulated by using self-adhering aluminum foil tape (from auto supply stores). The burnished look was achieved by chucking a pencil eraser in a drill press and lightly contacting the aluminum tape with the eraser. Windshields were made from thin butyrate plastic. To get the desired curvature, heat the material until soft, then quickly drape over a cup or can. Install them with Hot Stuff or Super Jet. Cockpit coaming is made from large black rubber fuel tubing, split open and installed with white glue. The pilot is a two-in. scale bust from Williams Brothers, equipped with a scarf as per suggestion from my wife, who thought it would look neat. The dummy engine is also from Williams Bros. and consists of two-in. scale LeRhone cylinders mounted to a balsa/plywood crankcase. The whole assembly is attached with sheet metal screws to the front of the Kraft engine mount. To further enrichen the Williams Bros. treasury, their wheels were also used.

Unless you just intend to admire your model, the radio gear obviously needs to be installed. As a final touch, the wing and tail wires can be added using thread, fishing line, or as I did, control line wire (.012). Unless your tail assembly came out real heavy, little nose weight should be needed. Balance as shown on the plans. Control surface movements are 3/8 in. up and down for ailerons, 1/2 in. up and down for elevator, and 3/4 in. left and right for rudder. The best technique for takeoff is to slowly apply power with the elevators at neutral until the tail lifts by itself, then add more power and up elevator. Takeoff into the wind is essential; as a matter of fact, with the large fin and rudder, it will weathervane by itself. Overall flying qualities are extremely tame, so have lots of fun. ●

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MAMA MIA!

• The "MAMA MIA" is a big aircraft, especially so for a pattern ship. However, don't let the name, or the size fool you.

The design is capable of every maneuver in the FAI schedule (including the snap maneuvers), with clean, precise accuracy.

Even though it is a big aircraft, its flight characteristics are such that the 60-sized engine with tuned pipe used in today's pattern ships will do the job.

When I first observed Dean Koger flying the EU-1, I was impressed by its flight characteristics and ability to fly an accurate FAI pattern. This started me thinking about designing and trying out a larger size pattern ship to see what it would do, and indeed to see if the large size was the way to go.

During construction of the model, I soon had second thoughts about its size, and that its performance would not be up to my expectations. However, when we finally flew the "MAMA MIA" we were astounded by its flying characteristics.

Despite its size, it is an exceptionally easy handling aircraft, with good, clean, accurate, and precise maneuvers. Because of its size, we felt that the aircraft's speed would be on the slow side, thereby allowing us to set up our maneuvers in close. However, its speed was such that after several flights, we were out in our normal maneuver placement position (the 13% airfoil contributes to the low drag for a ship of this size).

The prototype sported a Webra .61 rear exhaust with a Rossi pipe, and a Zinger 10-1/2x7-1/2 prop. This proved to be a winning combination, as the vertical maneuvers were clean, with ample available power.

Rolling maneuvers are good, with its best feature being rollouts on the Top Hat, etc. Double Immelmans and spins are a pleasure to do and watch. The snaps are slow and precise with aircraft heading easily maintained. With 975 square inches and 11 pound weight, the landings are a piece of cake.

With a plane of this size, it is important that care be taken to keep construction as light as possible in order not to go over the 11 pound, 3-1/2 oz. maximum weight limit (FAI). Our prototype model weighs exactly 11 pounds. A careful choice of balsa, retracts, and finish must be observed so as not to exceed the 11 pound weight.

BUILDING THE "MAMA MIA"

Keep in mind that this aircraft, due to its size and engine displacement, must be built as light as possible. The prototype shown in these photos weighed in at 11 pounds, complete with Webra .61 Speed, rear exhaust with mixture control, Rossi tuned pipe, Kraft Signature Series radio and Giezendanner heavy duty retracts.

Remember, a great deal of care should be taken in the selection of the balsa wood. Plywood parts in this aircraft consist of a 3/8 firewall, 1/64 wing fillets, and two 1/16 fuselage doublers. The design of this aircraft calls for very little plywood, and the weight can be kept down.

All materials, such as epoxy, glass cloth, and whatever glue you may choose, should be used sparingly if you intend to fly this aircraft in competition.

WING

Ribs were cut from soft 3/32 balsa and sanded to exact size on plans. Wing is built one half at a time directly over the plans, starting with the 3/32x2 rear bottom sheeting pinned in place. The 3/8x1/2 bottom main spar is now set in place, shimming it up approximately 3/8 inch above the building board. All ribs can now be glued in place except for the No. 1 center rib, which is glued in place when the wing halves are put together. Glue 3/8x3/4 leading edge in place and let dry. Proceed with top rear sheeting and top main spar.

Remove wing panel from plans and place 1/16 shear webbing behind main spar and between all ribs; the grain must be vertical. This will ensure maximum strength to the wing and at the same time will add very little weight.

Wing halves are assembled with 1-13/16 inches dihedral under each tip. A 1/2x1 hold-down block is now glued in place along with the top and bottom leading edge sheeting and capstrips. At this time, installation of fixed gear or retracts is accomplished. A 3/8 I.D. plastic tube was routed through ribs to wheel well so electrical connection was accessible. Center section of wing is glassed for added strength. Wing tips and ailerons may also be installed at this time. Center section of wing is left open and set aside until partial completion of fuselage.

FUSELAGE

Cut 3/16 sides from equal hardness balsa. The 1/16 plywood doublers are installed along with the 3/4x1 triangle stock. Also, the 5/8 triangle stock is glued to the top nose area and a 1-inch triangle stock is glued to the bottom.

The two balsa bulkheads are assembled and the 3/8 balsa vertical triangle braces are glued in place. We are now ready to assemble the fuselage, using bulkheads C and D. This is done directly over the top view of the plans in order to ensure proper alignment of tail surfaces. Tail section of fuselage is then glued together along with adding the 1/4x3/4 cross braces.

Engine is now mounted to firewall and epoxied in place (note 1-1/2° downthrust). Holes for fuel lines, throttle control and mixture control are now drilled. The 1/2x1-1/4 and 1/2x1 inch wing hold-down hardwood blocks are glued in place, along with 3/8 triangular supports. The 1/64 plywood wing fillet is now cut to shape and epoxied to fuselage. The wing is now put in place at 0° incidence on the fuselage, and the three nylon hold-down bolts installed. Belly pan can now be assembled to bottom of wing. Top and bottom fuselage sheeting can now be glued in place, along with the nose block. Nose of fuselage is sanded to shape.

Micro-balloons and K&B resin were used to form fillets around wing, fin and stabilizer. Nose is glassed one inch past the firewall for added strength. You will note in the photos that a groove is cut in top of fuselage at firewall to accommodate header pipe.

CANOPY

Canopy may be constructed of fiberglass, or carved from a block of light balsa, as on the prototype. The wall on the balsa canopy is 1/4-inch thick and is reinforced on the inside with fiberglass cloth and resin. Six wood screws secure the canopy to the fuselage, making for easy access to the tuned pipe. Side exhaust may be used on this model, but it is highly recommended that the through-the-canopy method be used for less drag.

FIN AND RUDDER

Fin and rudder are built directly over plans using 3/8x1-1/4 and 3/8x1-inch light balsa. Sand to shape and hinge rudder to fin.

STABILIZER AND ELEVATOR

The stab is built over the plans, much the same as the wing. Pin down the untrimmed 1/4x1/4 main spar and the 1/4x3/8 mid-spar, shimming it up to compensate for the thickness taper. Glue on the 3/8x1/2 leading edge. Remove from plans and sheet top and bottom with 3/32 balsa. As finished model was slightly tail-heavy, you might consider leaving out the 1/4x3/8 mid-spars. Stab would be plenty strong without them.

The 3/32 elevator bottom sheeting is pinned in place, followed by the trailing edge, leading edge and ribs. Top sheeting can be added before removing from plans. Just don't close in any pins with the sheeting!

FINISHING

In order to keep the weight to a minimum, I chose the silkspan paper and dope method on the prototype.

First the wood is sprayed with water to raise the grain. When dry, surface is sanded with No. 400 sandpaper. Four coats of nitrate dope are then applied and the structure set aside for two days. Medium grade silkspan paper, available at most hobby shops, is cut to shape, leaving two or three inches overlap around edges. Now mix 50/50 dope and thinner. Apply silkspan on the area to be covered and lightly spray with water, working out all wrinkles. Now apply 50/50 mix directly to wet silkspan and let dry. Trim edges and seal with dope.

Apply one more coat of 50/50 mix to surface; this will penetrate through silkspan and into dope on wood and give you a solid bond. In order to save weight silk is applied over silkspan, but only to open bays in wing and to built-up rudder and fin. The rest of aircraft is covered with silkspan.

Two coats of baby powder and dope are then applied by spraying or brushing. Brushing will require a considerable amount of sanding, so if you have access to a spray gun, use it. K&B epoxy primer was then applied, along with K&B gloss paint. •

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