



Ultra Dart

By DAVE LINSTRUM

• The race is over, AMA Racer (you remember the Racer... the original Delta Dart by Frank Ehling), and you can go back to Mama Bear, AMA Cub. Even the Thermal Dart is in a big down-draft, now that the Ultra-Dart is here. Super is not the word for it, even though it is able to leap tall buildings (the nemesis of the small field flyer) in a single flight, and spectators have been heard to shout "Look, up in the sky... it's a bird, it's a plane, it's the Ultra-Dart!"

Very simply stated, this ship is the largest Delta Dart anyone would ever care to build (*Bet you started something with that comment! wcn*). The flying

surfaces are proportioned similarly to the original AMA Racer and the Thermal Dart, but the motor stick has been elongated tremendously to accommodate a long motor. This gives very long prop runs, making the model a competitive Unlimited rubber design for the neophyte Junior flyer. However, due to its light weight, it is not suitable for windy weather flying. The idea was not to make a plane for all seasons, but a special model good for early morning contest flying before the wind is up, or for gentle evening sport flying. It is not fitted with a dethermaliser, since it is considered so simple to build that it is ex-

pendable. Also, early morning ground risers and weak thermals are seldom strong enough to carry the model far (Famous last words!).

The prototypes were constructed by my son, Carl, as his entries in the Unlimited event at the 1974 Lake Charles Nationals. He simply did not have time to attempt anything more time-consuming to build. Making two models at once was a fast-track technique and allowed for the loss or damage of one in the contest. We chose silvery mylar covering because it is humidity-proof (Louisiana was expected to be wet) and easily applied with aerosol rubber cement. No watershrink or doping processing makes quick completion possible. This is a technique picked up building Pennyplanes and covering them with Microlite polycarbonate plastic film. Normal modeling tissue, such as Marlow, or one of the plastics such as Monokote or Crystal Cover could also be used, but they should not be shrunk in any way. No finish is used on the model (for lightness and anti-warp reasons), but the fins of the prototypes were given a quick spurt from a Pactra Dayglo can to aid in recovery... the glowing fin is easy to spot in tall grass or Louisiana underbrush.

If the idea of building the largest Delta Dart (at least until Erv Rodemsky builds a Class D Indoor version to fly in Cardington Airship Shed) within sight turns you on, then send off to MODEL BUILDER for a set of full size plans and gather a few strips of Ecuador Gold (balsa in today's economy) needed to fabricate the airframe. A Williams Brothers nylon prop bearing and Peck Polymers 9-1/2 red plastic prop are also required, although you could adapt a North Pacific bearing and a KeilKraft plastic or Paulownia wood (from Old Timer Models) for propulsion. A carved balsa prop can also be used (fit with free wheeler), but this defeats the purpose of having a quick-bilt, expendable model. Read these building instructions and study plans thoroughly before commencing construction.

FLYING SURFACES

We always start here, so glue joints can dry while the motor stick is being built. However, if you choose to use one of the cyanoacrylate adhesives, waiting time is nil. We feel these are too dangerous for a youngster to handle, so Carl used Tite-Bond on the joints. Tape the plans down to your building board after sweeping away the debris from the last model you built (how many modelers have cluttered workbenches like that in Northrop's editorial column?) and then stretch a sheet of Saran Wrap or dry-cleaner bag over them to prevent glue adhesion.

Wing: Cut the LE and TE to length from medium weight 1/8 squares, beveling the joint at center for later dihedral glue joining. Then cut and fit all the

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1/16 x 1/8 ribs, gluing in place after pre-gluing the end grain. This is a trick to make stronger joints . . . just apply glue to ends of ribs, wipe off excess and then apply more glue before inserting in place. Deep penetration of glue into balsa without depleting glue at joint is the result.

Stab: Cut the LE, TE and spar from medium 1/16 x 1/8 and lay them flatwise for assembly. Note that the stab has no ribs . . . the boom serves as the center rib.

Fin: Cut the boom from light to medium 1/8 x 3/8 and taper before pinning to plans, then build the fin on to it. The fin is pinned flat against the plans. Rather than pin through the wood, we prefer to use "Pin-Downs" or "Pin Clamps" to hold the fragile members in place. Cover all surfaces on one side only after adding dihedral and gussets to wings as shown in detail on plans. Let joint dry thoroughly.

MOTOR STICK AND PROP

The motor stick is simply a hollow box, terminated at the front by an insert of 1/8 x 3/8 from which the bearing hangs, and at the rear by the boom, with a few strip formers in between at stress points. Pin down one side on your board (due to the length, it is not shown full length on the plans) and add the top and bottom strips, gluing well. Then add formers and nose insert, gluing latter very well, as nose takes a beating. Add boom with fin attached, propping up rear with a 3/8 wide strip so that a built-in left turn is achieved. Then cap the whole mess with the left side, pinning lightly or taping down with a few strips of masking tape. Let this assembly dry at least two hours to avoid warps. Then lift from board and build up wing mount on the stick, to get a precise fit. Do not glue it to stick . . . pin it in place (with Saran separator) while glue sets.

Bend a shaft from music wire, insert in bearing, add a couple of brass washers (or teflon if you can find them at Bahrman Studios) and the plastic prop. Make

a 90 degree bend in front of free-wheeler hub and snip off the wire. No winding hook is needed . . . this model is wound from the rear like an indoor model. Bend the rear rubber hook and "can" (simply a device to contain the motor and prevent stick bowing) from music wire, insert them through stick, bend ends and glue in place. The rear hook should be bound with thread and glued well. Glue stab to boom bottom. Note that the covering should be on underside, to allow balsa-to-balsa glue joints. Add the prop assembly to nose, make up a motor from 4 strands of 3/16 rubber strip (tie the ends in a square knot, tightly). Now add the motor and balance the whole assembly on your extended finger, marking the point on the bottom of body. Note the balance point on plans and mark the point for LE and TE of wing on body. This will give you a reference point for later adjustments. Now glue wing to top of mount, keeping it level to stab.

After this is dry, unpin the mount sides from motorstick and slide it off (here is where you will see if you were successful in not gluing it to stick) so you can add the mount bands. Remove the bearing and double up two short rubber bands so that they are a fairly tight fit on stick. Then slide them along until they bracket the wing mount markings. Slip the mount on and slide the bands over the mount, thus clasping it tightly to stick. It should be loose enough to slip forward and back for adjusting, but not so loose as to allow unintentional shifting. Now spray the fin with a light mist of dayglo orange and you are ready to fly.

FLYING

After all, this is what it is all about, so grab your winder and bring a friend along to hold the model during winding. If you do not have an outdoor type winder, make one from a small hand drill with a screw eye or heavy cup hook firmly anchored in the chuck. Solder or

epoxy it in place. The screw eye should be opened up slightly so the loop of motor can be attached.

Have your helper firmly grip the prop shaft between his index finger and thumb, holding body up at about a 30 degree angle. Then remove motor from rear hook and can. Motors should be lubed in advance with Sig rubber lube or Johnson's Baby shampoo. Keep lube away from knot. Attach the motor to winder hook, then stretch it out horizontally about 3 to 4 times slack length. Begin winding, moving in as you wind. Only put in 50 to 75 turns on the winder (3.75 to 1) for test flight. When your winder hook approaches the rear hook, stop winding, grasp the motor just in front of winder, and let off a few turns. Like magic, a small loop will appear which can be easily removed from winder and attached to rear hook. Now you are ready for your first power flight (test gliding is pointless with this design, since it flies so much like an indoor model), so grasp model under wing (make sure motor is inside can) and release prop a moment before you let model go. Climb will be very slow and majestic, with nose high. If model stalls, try moving wing back a bit at a time, or bending the bearing for side thrust. The built in left turn and stab incidence should not be changed. Once climb is smooth, you can pack in the turns for long motor runs. Rotate motors for longer life.

Since this model is so different in appearance and flight from most large rubber models, it is a real crowd pleaser. We hope you get as many startled looks as we did when we brought Ultra-Dart out to fly. For the next Nats, we might even try one built to the Unlimited area limit of 300 square inches. That would be enough to lift Carl right off the ground, making it the first man-carrying Dart. Frank Ehling, what have you started with this madness of enlarging Delta Darts? ●

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