TopFlite

Douglas DC-3/C-47

Build it for AMA fun scale competition or IMAA fly-ins.
Flies very nicely on two inexpensive .40 2-strokes.

By Vic Macaluso

PHOTOGRAPHY: VIC MACALUSO & MICHAEL RAMSEY

So ya like to build? Well climb on board for this review, because you'll see that this is *definitely* a builder's kit. Don't let what I just said scare you away by any means. This kit is *not* difficult to build for an experienced builder; it's just a very involved project with several systems that have to be carefully integrated during the construction should you decide to go "full scale". As you will see from the photos, I installed all possible options and scale detail in my C-47 interpretation of the stock DC-3. All of the nacelle scoops and the observation dome were vacuum formed by me to achieve the "late model" C-47 look, but more about that later.

The kit comes packaged in a very colorful (and large) box showing the late '40s early '50s Eastern Airlines colors and includes a gorgeous decal set for that version. But you can build this kit as a C-47, if you want, and there is a decal set included for that as well.

I have to really emphasize that although this kit is not difficult to build, certain system installations, (building the wing should you opt for retracts) can really tax the abilities of the novice builder. This model has a lot of parts to keep track of during building so organizing your building sequence is definitely recommended. Having more than one work table is a *big* help. I hope by now my subtle hints have suggested to you that novice builders "need not apply".

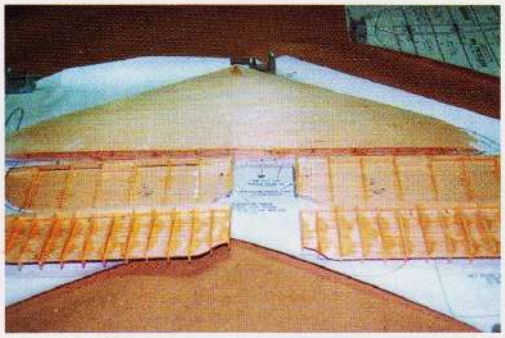
AT A GLANCE

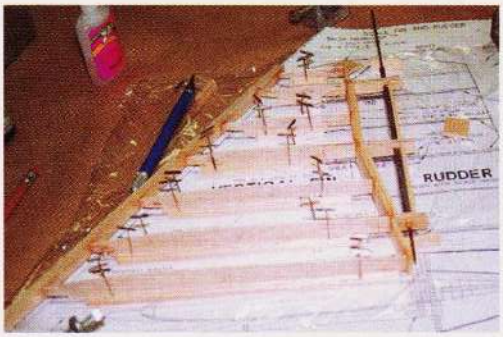
Type:	R/C Sport Scale recommended for intermediate pilots
Construction:	balsa/ply and ABS
Finish (as tested):	fiberglass/paint
Wing span:	82½ inches
Airfoil:	original scale, plus S8037
Length:	55½ inches
Weight:	8–10 pounds
Wing loading (avg.):	30.7 oz./sq.ft.
Wing area:	750 sq. in.
Engine:	.40–.46 two-stroke .40–.56 four-stoke
Radio:	5–7 channel 7–9 standard servos
Manufacturer:	**TopFlite** PO Box 788 Urbana, IL 61803 Phone: 217-398-8970 www.top-flite.com

The good scale outlines of the C-47 beg for detail, and Vic did just that. He vacuformed many of the extra scale details like radome, antennas, door latches, navigation lights, and air scoops. Vic also did a great job adding the panel lines.

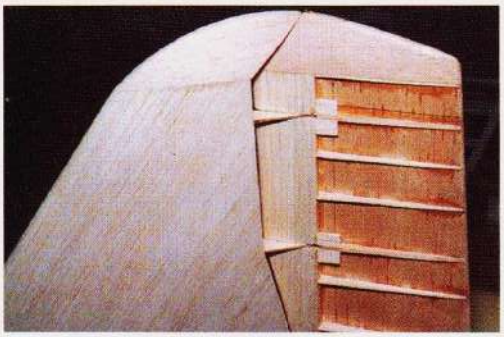
To give you an idea of the level of detail that can be added to the C-47/DC-3, look at the cargo door detail **(above)** that's a combination of panel lines and hinge fairings. The base for the paint finish **(at right)** was ¾-ounce glass cloth applied with water-based clear polyurethane. The paint was alcohol thinned latex Benjamin Moore housepaint.

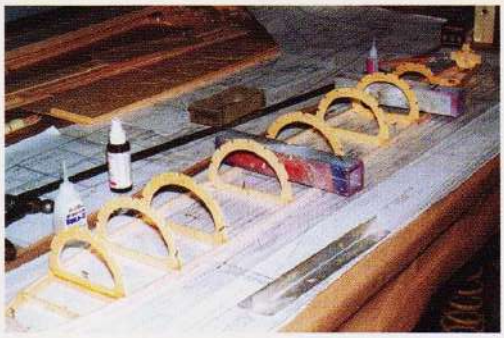
Douglas DC-3/C-47



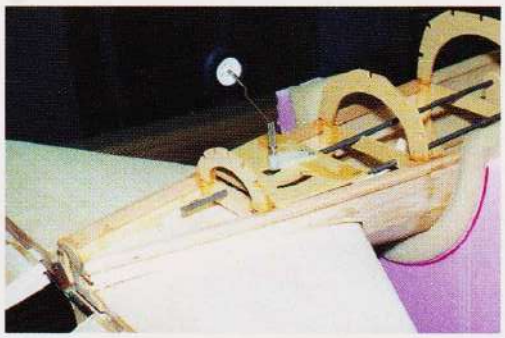


The kit offers the option of building a more scale, or a sport version of the plane. For example, you can build elevators with scale rib spacing or sport spacing **(above left)**. You also can build a straight hingeline rudder or a scale version as Vic did **(above right, below left)**. The fuselage begins by building the top half frame **(below right)**.





The rudder torque rod comes through the stabilizer **(above left)**. After the top fuselage half is framed, the stabilizer and fin are aligned and glued in, then the fuselage sheeted **(above right)**. Once that's done, the bottom half of the fuselage is framed over the top half **(below left)**. The tail wheel mounts on a plate **(below right)** and has its own pushrod.



Now to the goodies! As with every TopFlite kit I've ever seen, the plans are printed blackline on excellent paper. Because of the size and potential complexity of this kit four sheets of very detailed plans are supplied. On these sheets you'll find every subassembly plan printed in such a way that you can cut it away from the sheet to build in separate locations. This way you can be working on more than one subassembly at a time. Also detailed are the installation views for both the fixed and retract gear assemblies.

For the seasoned builder it presents a platform on which you can put all of the scale detail you want in a package that won't break you financially and you won't need a warehouse to store it in. At 82½-inch wing span it's not a small model but certainly not as massive as an aerobatic model of the same size. As a sport model it's large but as a scale C-47 it's a "nice" size. At 11½ pounds dry this model won't strain your back or you wallet.

Another nice touch about these plans is that all of the skins for the tail surfaces and the fuselage are shown full sized. My experience with this kit showed that cutting these skins as shown on the plans will give you just the right amount of material to cover the surface with enough to nicely finish to the structure edge. This feature really came in handy when sheeting the engine nacelles.

Another very nice touch is that TopFlite supplies another reduced size plan that is 8½ × 23-inch and shows the entire set of plans on both sides. Many times during the construction of this model I found myself needing to make a quick reference to some part of the plan sheets that were not readily available. A quick look at this smaller plan was much easier than searching for the piece I needed. This rates a 10 for convenience.

In addition to these excellent plan sheets is an equally informative and necessary construction manual. I use the word construction and not instruction because you don't assemble this model, you *build* it! You'll notice I also use the word "necessary". Trust me gang, I've built just about every type of model plane around from the simplest ARF to very complicated original designs but I would not want to build this model without the aid of this manual. In several areas of both wing and fuse construction, if you don't follow the very specific building sequence, you will build yourself into a corner.

The construction manual is 68 pages of all and any information you need to build, set up, finish, and trim this model. In addition to the very detailed building procedure, this manual also has drawings of all the die-cut sheets to help you identify the many die-cut parts in both balsa and ply. You *will* find yourself referencing these drawings often. Also in this manual are many photos showing virtually all of the construction sequence.

Between the plans, manual, and photos you won't find any part of this plane difficult to build, but because of the nature of building an all wood model of this size and complexity you might find it a bit tedious at times. Another nice touch is the 2-view drawings on the last page. They show all of the "significant" skin and hatch/door outlines to aid in reproducing these details should you wish to do so. Again, another 10!

Going ever deeper into the box I next came across an item that we all have seen in most kits and have said "oh yeah" and then threw it aside, the parts list! Do *not* toss this one aside. Although TopFlite does a nice job of separating most of the wood strips into subpacs to be used in associated subassemblies, these sometimes get separated. Should that happen, and because many of the wood sizes are similar, you will find yourself looking through the trash for this detailed sheet. Save yourself some grief and just keep it handy.

Vic referred to the kit as a lumber yard **(above left)** because of the great amount of wood in it. All the die-cut wood is well-selected, and includes the parts for scale or sport assembly. The decals are provided but the rest of the items **(above right)** show what needs to be purchased for the all-out scale version of the kit.

Seeing as this is an all-wood kit, let's talk about that for a while. For the most part the wood was all clear grain and very well selected for its intended purpose. I was very impressed with the quality of the strip balsa used for stringers, spars and leading and trailing edges. While stiff enough for its intended structural strength, you definitely could *not* build a deck with it as I've seen in some kits! The die-cutting was also very good and most of the parts fell out without much coaxing. Although most of the die-cut parts have the part number stamped on them, it might be a good idea, especially with the smaller parts to write the number on the part with a soft pencil because many of the smaller pieces look similar, especially in the nacelles.

Except in areas where the strength was needed (wing mount, servo hatches, etc.) most of the plywood is lite-ply. Again, as with the balsa, the die-cutting was very clean and the parts needed very little effort to remove from the carrier sheet.

Digging deeper into the "wood pile" I found the 1/16- and 3/32-inch sheeting was excellent quality and weight. While not contest grade (you really don't want wood that soft for wing and fuselage sheeting) it was very light and just the right hardness to tolerate some finish sanding. I'd rate the sheeting a solid 9.5. If the edges didn't have to be trimmed to glue up the wing/stab/fin skins a 10 would have been given!

As with every TopFlite kit I've seen, the hardware package is very high quality and has all the necessary parts for any configuration you decide to build. In addition to the hardware, solid steel pushrods are supplied which run in an outer plastic sleeve. This system is still light and almost friction free.

Going still deeper you'll find some very impressive vacuum formed ABS plastic parts. The cowl parts are what you would expect but the tail cone and the complete cockpit/upper nose molding was a very pleasant surprise. These two items alone will save you hours of work. Also included in the plastic package are the wing fillets. These too will save you hours of cutting, filling, and sanding. And they are very light. When carefully trimmed and fitted these parts "look like they belong on this model", and will save a tremendous amount of time.

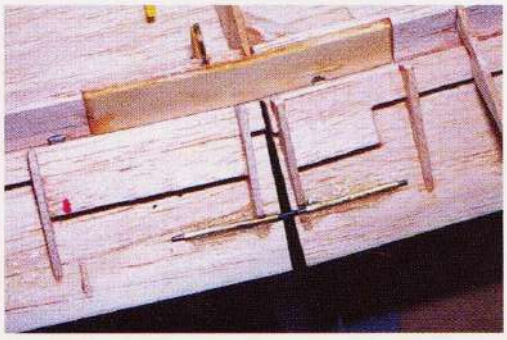
One last item in the hardware package are the two glass-filled plastic engine mounts. These are adjustable and will accommodate any motor intended for this plane.

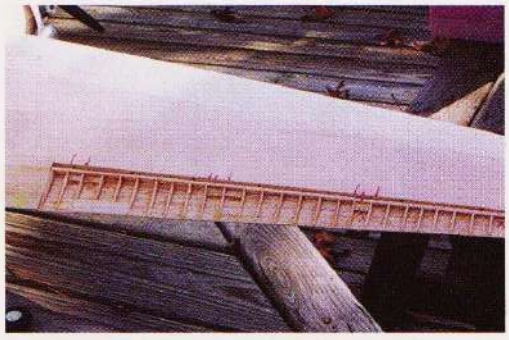
Lastly you come to the gorgeous set of self-adhesive decals supplied with this kit. Two of the sheets will duplicate the Eastern Airlines motif shown on the box cover. The third sheet has the basic decals to duplicate the military C-47 version of this plane. With the addition of specific markings I was able to duplicate the model shown on the box art for the plastic 1/48 scale kit of Monogram's C-47 *Skytrain "Buzz Bunny"*.

TopFlite has scale retracts available for this model and not only do they look great but when used with a metering valve operate at scale speeds. These retracts are very strong and simple and easily handle the weight of this model. I've flown the C-47 off grass and these retracts operated flawlessly every time. Should you not opt for retracts all of the prebent wire parts to duplicate the scale gear are supplied in the kit. Be aware that these have to be soldered together for strength.

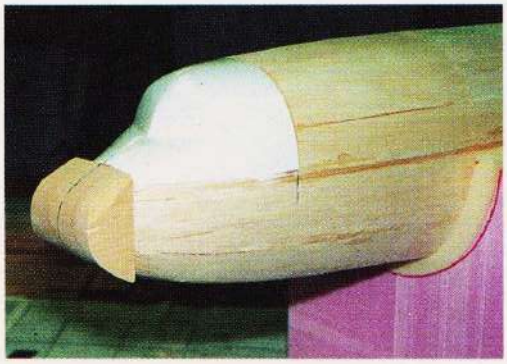
To power this model a pair of O.S. 40 LA's were selected and seemed to be a perfect blend of power and size. Although this is a fairly large model, it's only 1/4 scale and by the time you get to the engine cowls there really isn't much room to play with. As far as power is concerned, these two engines have more than necessary. The first flight of this model was after only one tank of fuel through these engines. They literally ran "out of the box" with only having to peak the needle valves for a slightly rich run. From start-up to shut-down neither of these motors varied 100 rpm from each other!

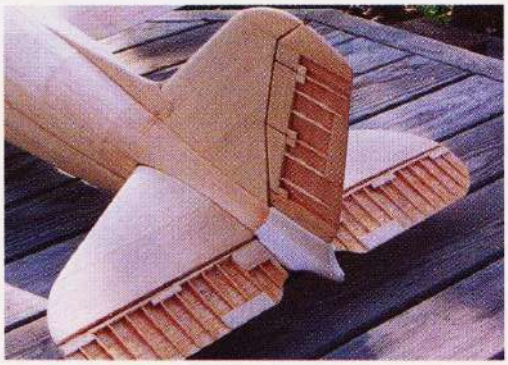
You'll notice on the plans, and in the construction manual, recommendations are made to use specific brands and types of hardware and various other parts. (fuel tanks, wheels, fittings, etc). After building this model, I strongly suggest you follow these recommendations. Even though it's called a "sport scale" model, this DC-3/C-47 has a lot goin' on. When you put two motors, flaps, retracts, and coupled tailwheel/rudder on a model this size you'll come to realize just how much engineering went into this design and you really don't want to mess with it! TopFlite *knows* what works on this model.





This simple joiner works well connecting and actuating the three-segment split flats **(above left)**. The long span ailerons **(above right)** ready for covering. A good supply of ABS molded parts like the cockpit/nose cone reduce shaping chores, but the nose cone must be carved **(below left)**. ABS tail cone makes finishing the tail easy **(below right)**.





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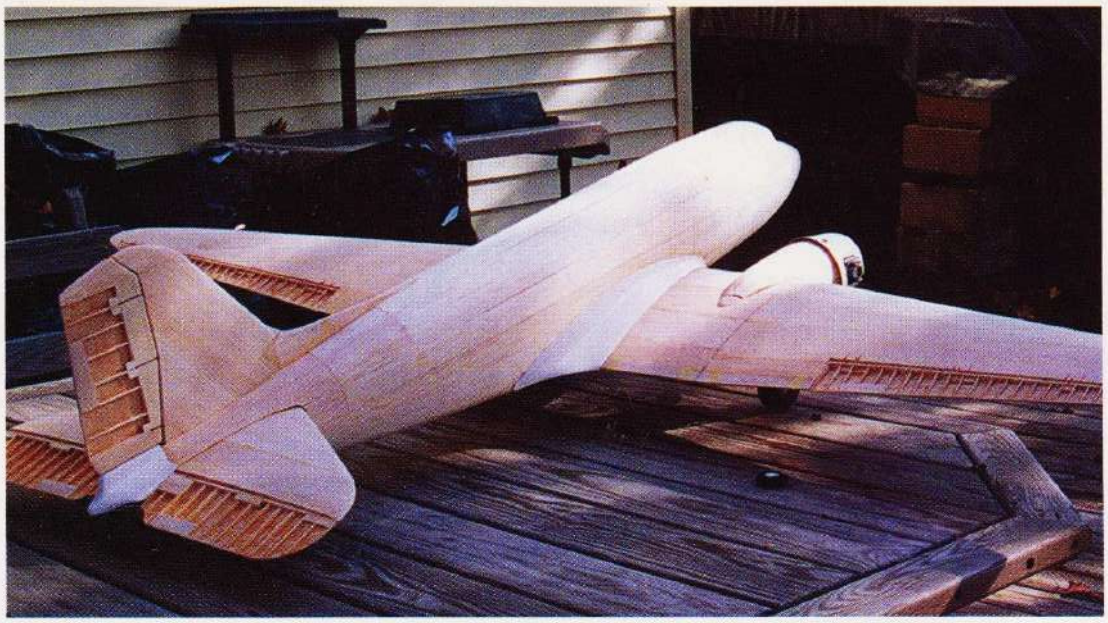


The fuselage is framed and ready for finish. The real aircaft had fabric covered control surfaces, so Vic used WorldTex covering to simulate the effect on the model.

To the building board

I really enjoy building and making things work, so I chose to go "full scale" and include all of the options available for this model. The airframe construction is very straightforward and should not challenge you in any way. As I mentioned before, there are some neat time saving features incorporated into the construction and you'll actually find these fun. Once again, I must emphasize that the building sequence is there for a reason. Follow the manual!

Starting with the stab/elevator assembly you'll find that this is built directly over the plan as is most of this model. Early on in the construction process you'll have to decide if you want to go sport or go for that really scale look. On the plans you'll find two rib spacing options for the elevator ribs. (These, the rudder, and the ailerons, are fabric covered on the real DC-3). Because I decided to go as scale as possible I went with the "scale" rib spacing. You'll notice in one of the photos there are two sets of elevators, one set showing the "sport" rib spacing, the other the scale spacing.

Next in the sequence is the fin rudder assembly. Here again you'll be asked to decide sport or scale. Only this time it's the fin/rudder hinge line that's in question. If you have any affection for DC-3s/C-47s this one is a "no brainer"! It just wouldn't be a "Gooney Bird" with a straight hinge line. While making the scale hinge line is considerably more work than the "sport" line, the action and look is definitely worth the wow factor! Just follow the directions and you will be rewarded with a very scale effect, and it's really not that much more work. Parts are supplied for either version.

On to the fuselage

With the tail surfaces completed it's now time to get down to some serious building. The fuselage does have to be built *exactly* by the book. The top of the fuse is built directly over the plans using a crutch and former construction with longitudinal stringers keeping everything lined up. Very early in the fuselage construction you'll have to assemble the stab and fin to the fuselage before you can sheet the top half of the fuse. (That's why you had to build them first!).

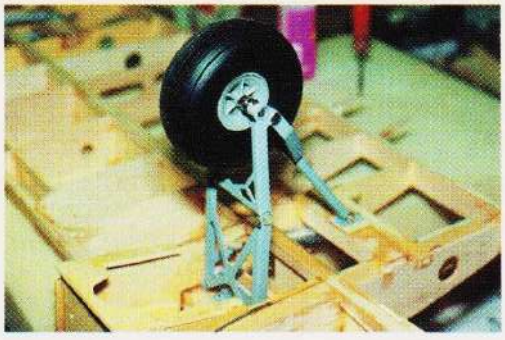
Once this is done and all of the top sheeting is in place, you now have a very rigid (and light) structure that's turned over so that the bottom half can be built onto the top. I found this to be very easy and fast. Following the sequence in the manual will take you through all of the linkage and fairing aspects easily and logically. You might find the coupled rudder/tailwheel linkage a little tricky to set up but it certainly won't baffle you.

One of the potentially difficult areas of this fuselage has been simplified by TopFlite with the premolded canopy/nose section. This can be either permanently attached and faired into the fuse or can be made into a removable hatch for access to the radio. Because of the cavernous room in the fuse and wanting to maintain the scale look I chose to permanently attach and blend this unit into the fuse. The cockpit windows can be cut out or simulated with trim MonoKote®. Either way looks good. I used the MonoKote® and trimmed the windows with aluminum tape to simulate the frames. Once again, you'll find that using the full-sized patterns for the fuselage sheeting will save you much time, material, and aggravation. These too were just the right size to do the job with just enough to properly trim to the stringers. A very good testimonial to the accuracy of the plans.

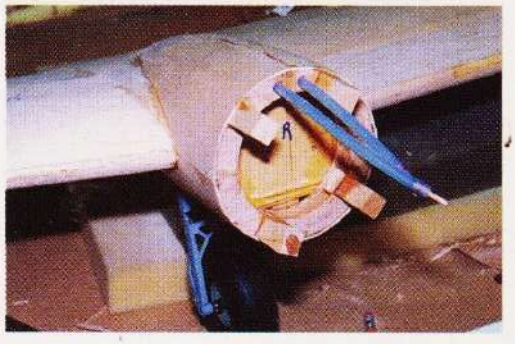
Once you've fully sheeted the fuse, faired the tail surfaces, and attached, carved, and blended the nose cone into the fuse, you are ready to really start building the DC-3/C-47!

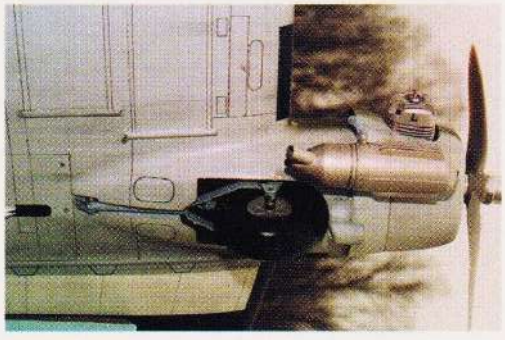
Before starting the wing construction you must decide several things. Retracts? Flaps? Should you decide as I did to go "full scale", keep in mind that out of a total of nine servos required for all the features, seven will be in the wing! It really all happens in the wing! Here is where you definitely want to follow the construction manual.

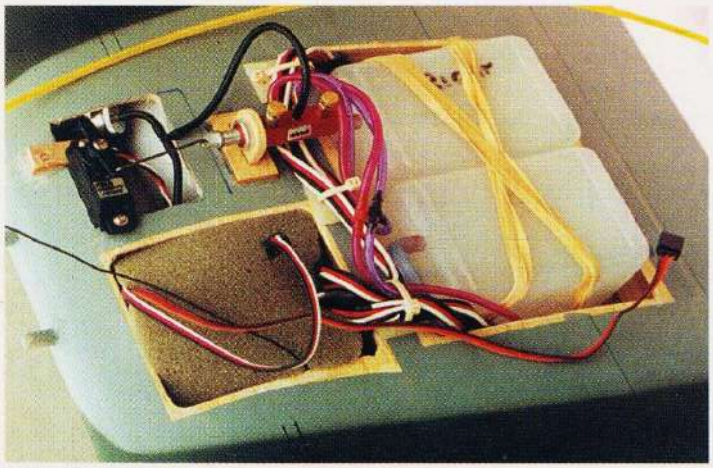
After faithfully building to the plans, fitting the aileron and flap servo hatches to the wing bottom was simply a matter of screwing

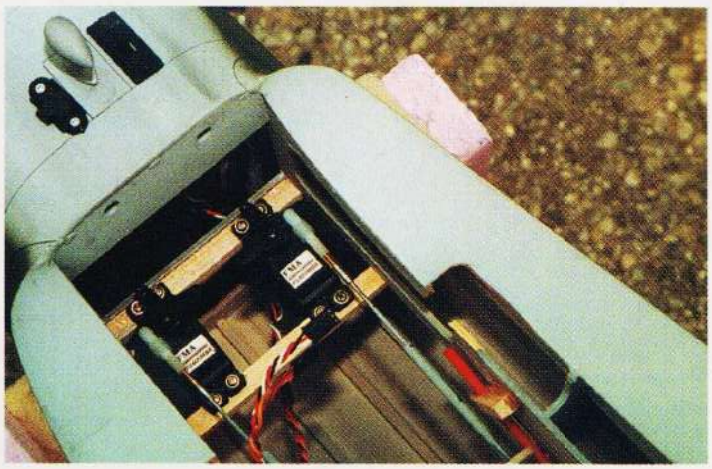


Almost everything happens in the wing. Note the amount of plumbing, for the fuel tanks and the retracts **(above left)**. Robart makes the optional scale retracts **(above right)** for the model. One nacelle completed **(below left)**, ready for the engine mount. Clean installation of wheel in the well, the cylinder head, and the muffler **(below right)**.









Fuel tanks, retract servo, retract valve, battery, and receiver are housed in the wing's center section **(above left)**. Flap, aileron, and throttle servos are located outboard in the wing. The elevator and rudder/tailwheel servo look lonely in the wing saddle compartment of the fuselage **(above right)**. Vic used FMA servos.

them into place. The fit was almost perfect, requiring practically no trimming or fitting.

Carefully follow the plans and mount each servo in the exact location shown or you won't be able to fit the previously mentioned hatches into place. Another thing; use the servo size suggested. While this might be a relatively large model, it's a small scale, so room is at a premium and if you use larger servos you will have some very non-scale lumps on your model.

The actual construction of the wing is fairly standard for this type of model and should not challenge the builder in any way. One very nice touch is all of the lightening holes in the ribs. These not only lighten the structure but provide the necessary routing holes for all of the servo leads, air lines and fuel lines. The wing is built in three sections and joined when the main structures are complete. Very simple and easy.

Other than the unusually high parts count in this model, the only other pain I had was the sheeting in the outboard wing sections. I assume that TopFlite chose 1/16-inch sheeting for lightness rather than the 3/32-inch used in the center section. The problem I found with this was that the sheeting tended to sink slightly between the ribs during final sanding. This did not happen with the center section.

Another small annoyance was that the sheeting did not match up at the inboard/outboard wing section joint. If you build to scale this is solved by the cuff that goes around this joint on the real plane. I simulated this with split thinwall plastic tubing CyA'd around this joint.

You'll find that most of your construction time will be with the wing. Take your time and focus on one system at a time as the manual suggests, and you will be rewarded with a very scale looking and operating model. Fitting the custom retracts is not complicated but can be a little frustrating if you have large or clumsy hands. It's a tight fit but trust me, it all fits if you just follow the manual.

I chose to finish this model as a C-47 rather than the DC-3 shown on the box. (I'm one of those weirdos that think olive drab is about the coolest color around!) In doing so I had to make several modifications. None to the airframe, but I had to vacuum form several parts to duplicate the scoops on top of the engine nacelles and the observation dome on top of the fuse, behind the cockpit. I also vacuumformed the landing light lenses. Should any of you out there decide you want to build the C-47, send me a photo of the "bare bones" and I'll ship you a set of parts for the shipping cost.

Now, I can go on and tell you all about the flying characteristics of this model but to be honest my twin engine flying experience is somewhat limited, (read that nonexistent!) so I enlisted the help of ***FM***'s Associate Editor, Michael Ramsey, to do the honors.

To sum up my impression of this model I have to include all of the accessories as part of my comments. Should you go "full scale" as I did, don't expect to pump this model out in two weeks! You have quite a build ahead of you, but a very enjoyable one. The DC-3/C-47 really goes together quite easily and logically and although you will see progress from session to session, you will invest time in this project. The finished product is well worth it. You'll spend many moments with this model on a stand just playing with the flaps and retracts. They really work in a very scale manner and look very realistic.

This model looks very real in the air and has a wow factor of at least a 9! (I have to save a 10 for the real thing!)

For the builders out there, try this one, you'll like it!

Flight of the Dakota

PHOTO: GUS PEREZ

Extra time was spent to make sure the engines were tuned just right. This meant that they both had a top speed, transition and idle within 300 rpm. Our control throws matched the recommendations by TopFlite. To our benefit we had a paved runway to fly from; this would allow the C-47 to taxi smoothly and reach take-off speed more quickly.

On take-off, rudder effectiveness is sluggish until about the half throttle position. Throttling up slowly, lift-off was at about the ¾ stick position after a roll-out of about 30 feet. Advancing to full throttle, the C-47 will gently climb and build airspeed which is where right rudder could be removed. No flaps were used on take-off.

Coordinating the turns with aileron and rudder, the C-47 proved smooth. The OS .40LA engines got the *Goony Bird* up there quicker than expected. A few clicks of right aileron, up elevator and left rudder set the model up for hands free flight.

Hearing that the engines were performing well, we brought the C-47 down for a low pass to watch the gear go up. At half throttle, the model descended nicely for the pass, where the switch was hit and the gear glided into the nacelles. No trim changes were noted with the gear up or down. Back up to altitude, experiments with approach to landing tests were performed. Without the flaps, the C-47 stalled predictably to the left at full elevator deflection. As flaps were added, the slower airspeed produced more pronounced tip stalls, but recovery wasn't a problem. Down elevator is necessary from half to full flap. TopFlite's recommendations on this point are about spot on.

With the model trimmed, it was time for some fun. At full power we performed all the sport scale aerobatics and some inverted flight. Control effectiveness quickly built our confidence in the model's ability. High and slow speed tests proved that their authority was comfortable.

For the landing, half flap was all that was required to manage the approach speed. About ⅓ throttle carried the model to the landing zone where a smooth touchdown came naturally. –MICHAEL RAMSEY