

#749



Impala-Banshee

■ Allen W. Brickhaus

Profile Classic Stunt model for .40 engines features a different look.

The Classic craze has invaded control line Stunt for the past five or so years, and one model that sticks in my mind is the Impala, by Eddie Elasick Jr. It was published at about the time I was beginning to pick and purchase model magazines.

Discussions with Bill Calkins concerning his desire for a legal model for the annual Sig-sponsored contest in Iowa got the grey matter working again. Bill and I conceived a design that used the majority of the parts in a Sig Banshee kit, but we were searching for a somewhat different look.

If I were to combine the Banshee parts into an Impala look, then I could satisfy our diverse needs. The change to the side-mounted .40 piped engine came to the project when I wanted to try this engine setup on a smaller-than-suggested airplane size. The Impala-Banshee is intended for the smaller .35 and .40 engines. Killing several birds with one stone saves lots of

building time when only a portion of my hours can be utilized for Stunt.

Allow me to pass along the success of the first set of flights for the Impala-Banshee. I am always careful with the first flight, since it is a new airplane, new lines, new handle, old brain and a nervous right hand. The second flight assured us of the tank-engine height. The third flight was the first full pattern on the design (after we were sure that we got the photos for this article).

The next series of flights will feature another .40 pipe and then a light-cased .40 will find a more permanent home for the model's later life. The Impala-Banshee will stay solidly on the lines in all portions of the pattern. It has a nice corner, but is still capable of easy round maneuvers.

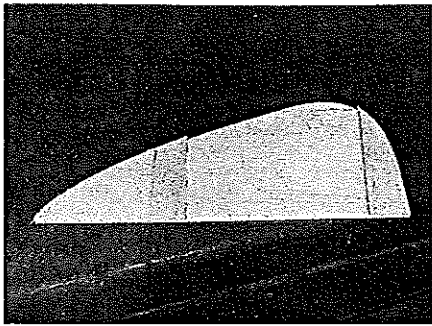
CONSTRUCTION

The construction is of the normal type; anyone who has built one or

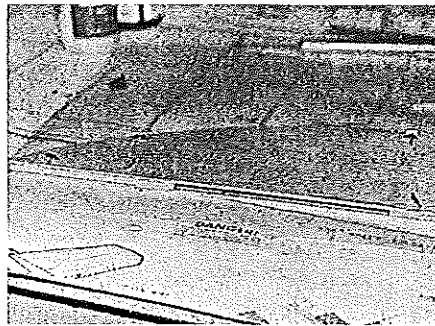
more basic kits will be able to complete this project with little difficulty. I don't intend to give you a glue-A-to-B dissertation, but I do want to explain a few areas of concern, or choices given to you in this design.

Begin with a full Sig Banshee kit (or a wing kit plus extra balsa). The plywood doubler and balsa cheek doubler can be built with the engine pointed inboard or outboard.

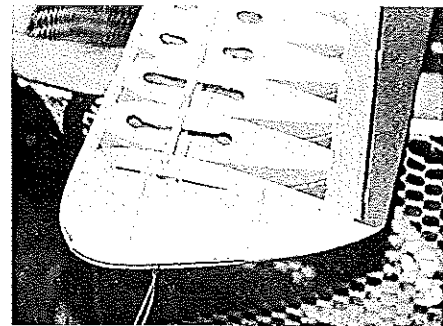
In Frank Williams' Bearcat article (December 1983 *Model Aviation*) he presented the concept that a profile engine can be mounted inboard and run well. The article also discussed how extra fuel can be contained in the passages of the crankcase of the engine of an outboard setup and drop the extra fuel or oil on the plug, thus causing the engine to stumble. A hotter plug and careful mounting of the tank/engine relationship can resolve these problems, both on the inboard and outboard setups. Once the engine runs well, a model with an



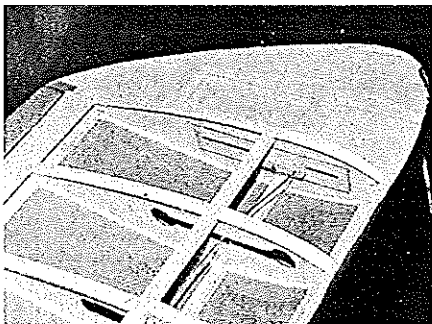
First lamination of Impala-Banshee's inboard adjustable leadout section.



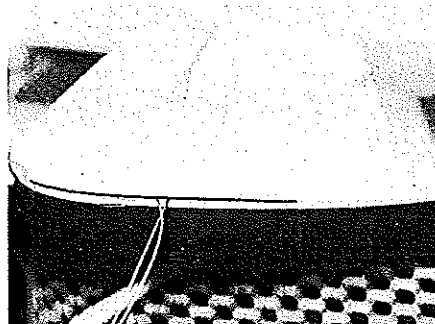
Second step, inboard wingtip. Wing is built with equal-length panels.



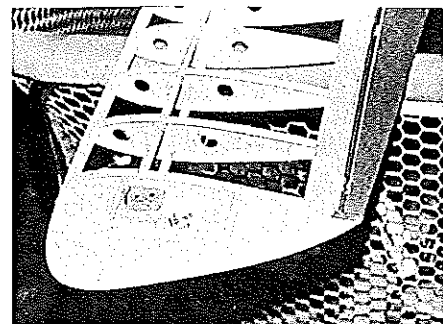
Leadout detail. Install bellcrank with leadouts and flap pushrod connected.



Adjustable leadouts clearly visible here. Tip braces are 1/8 balsa.



Leadout gap is 1/8 inch. Tip is 1/8 balsa sandwiched between 1/16 sheets.



Wingtip weight box has 1 1/2 ounces of lead. Add weight for unequal-panel wing.

inboard-mounted engine will need a little more wingtip weight than one that is outboard-mounted.

Use a four-inch bellcrank with a $1\frac{3}{16}$ pivot hole for the flap pushrod. The flap horn should be $1\frac{1}{4}$ inches above the flap pivot center line. The flap to elevator ratio is 1:1, with the pushrod pivot hole being located one inch from the elevator and flap pivot center line. A handle with a four-inch spacing and very little overhang should work well for the above combination. If you should decide to use a three-inch bellcrank, I would recommend a flap pivot hole located $\frac{5}{8}$ or $1\frac{1}{16}$ from the center pivot hole. The $\frac{5}{8}$ hole will soften the pattern, while the $1\frac{1}{16}$ will quicken the corners. Remember that a full Stunt pattern is made of smooth rounds and hard corners. You must make a decision as to what style of flying fits your needs and desires.

The wing is built with equal panel lengths, as well as equal flap areas.

This trims out very well with a little extra wingtip weight. If you want to fly with less wingtip weight, build the inner wing $\frac{1}{2}$ -inch longer and the outboard wing $\frac{1}{2}$ -inch shorter. I would suggest that you keep the flap areas equal, to aid in trimming the model.

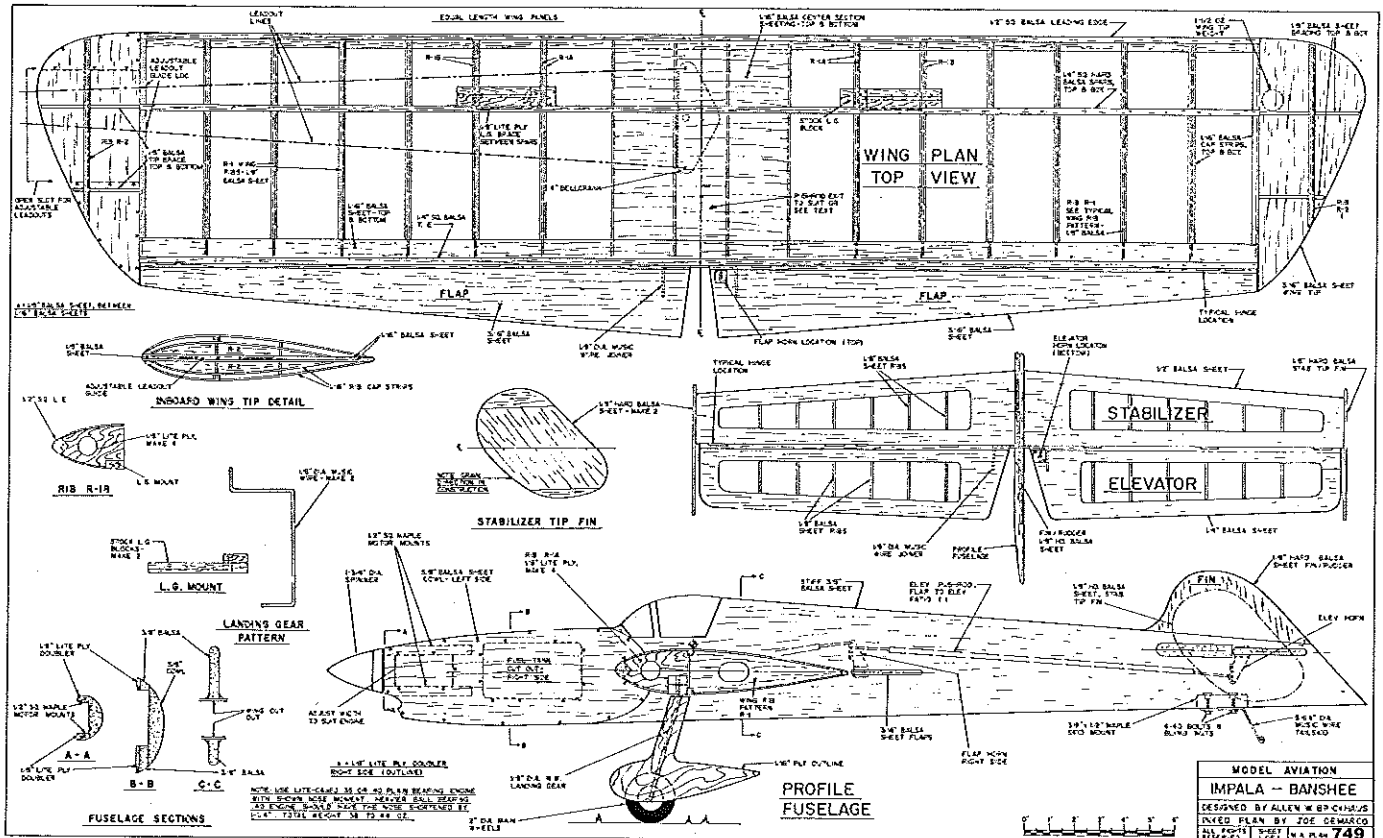
The percentage of flap area to total wing area and the tail surface percentage have been calculated to give you a balance of smooth rounds and crisp corners. If you desire a softer pattern, add some chord to the flaps and decrease the span of the tail assembly. For a harder corner (but with rounds that are more difficult to fly) decrease the chord of the flaps and increase the span of the tail assembly.

One of the reasons that the Impala-Banshee will hold level flight so well is that the stab thickness has been increased to $\frac{1}{2}$ inch. The elevators are built of $\frac{1}{4}$ -inch balsa, and they hide in the thickness of the stab. Slight adjustments to level flight are done

with flaps, without having the elevator come out of this neutral blanketing of the stab. This causes the airplane to rise and fall instead of pitch up or down. This semblance of little or no change of the level flight will help your scores on the takeoff and level flight maneuvers, as well as in inverted flight.

Wood for the fuselage is six- to seven-pound stock. If the wood is any lighter, there will be an unwanted twisting of the fuselage during maneuvers. If you choose to use an iron-on film for the flying surfaces, you should choose wood that will add strength to the part being built without adding excess weight. If you paint all the surfaces, then lighter wood can be selected, since the painted-on coverings and finish add quite a lot to the total strength.

Spars need to be of dense stock. For stiffness, the stab should be a little more dense than the elevators.



Note the grain direction as marked on the plans. This is very important. Adjustable leadout guides, bellcranks, horns, and pushrod material can be purchased from a variety of sources. Other hardware can be purchased at many standard hobby stores throughout the country.

I would suggest building the wing, flaps, stab, and elevators as completely as possible prior to cutting fuselage parts. The fuselage can be cut and

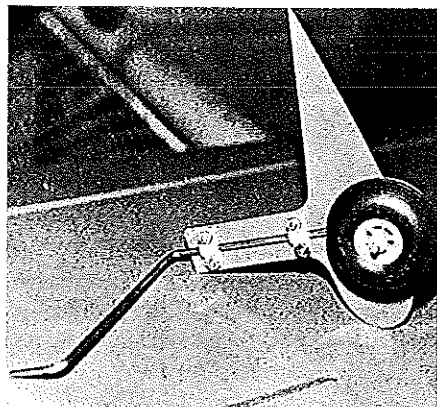
assembled in one night's work, and it is nice to have the reference parts ready before working of the fuselage.

If you use an iron-on film, cover the wing with one full piece on the bottom and one full piece on the top. Do the same with the stab. Fit the fuselage over the wing, mark the glued areas, and remove the wing.

Carefully cut small diamonds of the iron-on film from the area where the wing and fuselage join. Each diamond

should be slightly wider than the fuselage, and they should be about 1 1/2 inches from each other. This allows the fuselage and wing to have wood-to-wood areas, so better glue bonds are formed. The stab installs in a similar fashion.

If you choose to paint the flying surfaces, have them completed to the end of the primer stage prior to



Removable landing gear helps with repairs and establishing proper gear angles for takeoffs and landings.



At left is designer Allen Brickhaus; at right, builder Bill Calkins, with Impala-Banshee. Ken Simmons photo.

Impala-Banshee

Type: CL Classic Stunt

Wingspan: 53 inches

Engine: .35-.40

Flying Weight: 38 to 44 ounces

Construction: Built up

Covering/finish: Iron-on film/epoxy base

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3/32 x 2	.40	1/16 x 3/8 .11
1/8 x 2	.43	1/16 x 1/2 .15
3/16 x 2	.49	3/32 x 1/4 .12
1/4 x 2	.56	3/32 x 3/8 .13
1/32 x 3	.37	3/32 x 1/2 .17
1/20 x 3	.37	1/8 x 1/8 .09
1/16 x 3	.37 .49 .31	1/8 x 1/4 .12 .18
3/32 x 3	.44 .58 .37	1/8 x 3/8 .13 .19
1/8 x 3	.55 .74 .45	1/8 x 1/2 .18 .24
3/16 x 3	.63 .84 .55	3/16 x 3/16 .12 .19
1/4 x 3	.75 .98 .61	3/16 x 3/8 .18 .21
5/16 x 3	.87 .115	3/16 x 1/2 .22 .31
3/8 x 3	.90 .128 .71	1/4 x 1/4 .18 .26
1/2 x 3	1.14 .160	1/4 x 3/8 .21 .28
3/4 x 3	1.70 .200	1/4 x 1/2 .22 .32
1/16 x 4	.58 .76 .48	1/4 x 3/4 .34 .45
3/32 x 4	.72 .97 .56	1/4 x 1 .42 .57
1/8 x 4	.82 .109 .66	5/16 x 5/16 .23 .30
3/16 x 4	.96 .126 .75	3/8 x 3/8 .29 .39
1/4 x 4	1.15 .139 .84	3/8 x 1/2 .33 .49
3/8 x 4	1.70 .235 .144	3/8 x 3/4 .44 .58
1/2 x 4	2.35 .273 .200	3/8 x 1 .54 .73
MATCHED SHEETS 42"		1/2 x 1/2 .38 .55
3/32 x 4	1.09	1/2 x 3/4 .48 .66
1/8 x 4	1.29	1/2 x 1 .60 .82
3/16 x 4	1.44	5/8 x 5/8 .52 .70
1/4 x 4	1.55	3/4 x 3/4 .76 .98

BALSA TRIANGLES 36"

1/4 x 1/4	.25
3/8 x 3/8	.30
1/2 x 1/2	.35
3/4 x 3/4	.45
1" x 1"	.55

BALSA PLANKS 36"

1 x 1	.90
1 x 2	1.57
1 x 3	2.19
1 x 4	2.83
1 1/2 x 3	3.02
1 1/2 x 4	3.95
2 x 2	2.31
2 x 3	3.35
2 x 4	4.75
3 x 3	5.15
3 x 4	7.15

TAPERED SHEETS 36"

1/4 x 2	.65
1/4 x 3	.85
3/8 x 2	.68
3/8 x 3	.98
1/2 x 3	1.20

LIGHT 4-6 LB WOOD 36"

1/32 x 3	.78
1/20	.78
1/16	.78
3/32	.93
1/8	1.14
3/16	1.32
1/4	1.57
3/8	1.88
1/2	2.38
3/4	3.75
1	5.32
1/16 x 4	1.23
1/32	1.49
1/8	1.69
3/16	1.97
1/4	2.37
3/8	3.57
1/2	4.82

BASSWOOD 48"

3/16 x 3/16	26
3/16 x 1/4	30
3/16 x 3/8	38
3/16 x 1/2	46
3/16 x 3/4	60
1/4 x 1/4	42
1/4 x 3/8	49
1/4 x 3/4	80
3/8 x 3/8	60
3/8 x 1/2	70
3/8 x 3/4	90
1/2 x 1/2	90
1/2 x 3/4	100

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3/8 x 1/2	50
3/8 x 3/4	58
1/2 x 3/4	68

BIRCH DOWELS 36"

1/8	.17
3/16	.12
1/4	.19
5/16	.25
3/8	.32

SPRUCE STICKS 36" 48"

1/8 x 1/8	.17 .25
1/8 x 1/4	.20 .26
1/8 x 3/8	.22 .32
3/16 x 3/16	.28 .38
1/4 x 1/4	.34 .50
1/4 x 3/8	.40 .55
1/4 x 1/2	.45 .65
3/8 x 3/8	.49 .69
3/8 x 1/2	.60 .77
1/2 x 1/2	.66 .88
1/2 x 3/4	.75 .97

3 PLY BIRCH 48"

1/64 x 12	8.35
1/32 x 12	5.50
1/16 x 12	5.50
1/8 x 12	4.96

5 PLY BIRCH 48"

3/32 x 12	7.25
1/8 x 12	8.25
3/16 x 12	6.25
1/4 x 12	6.50
3/8 x 12	7.50
1/2 x 12	9.00

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10-1/8x4x36	7.75
15-3/16x3x36	9.40
10-3/16x4x36	8.99
10-1/4x3x36	6.99
10-1/4x4x36	10.90
10-3/8x3x36	8.90
5-3/8x4x36	6.55
5-1/2x3x36	5.40
5-1/2x4x36	11.10
10-3/32x4x48	9.30
5-1/8x4x48	5.25
5-3/16x4x48	6.20
5-1/4x4x48	6.80

TRAILING EDGE 36"

1/4 x 1"	.32
5/16 x 1 1/4	.39
3/8 x 1 1/2	.46
1/2 x 2"	.70

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1/2 x 1/2	.64
3/4 x 3/4	.81

LITE PLY 48"

1/8 x 6	1.75
1/8 x 12	3.50
1/4 x 6	2.75
1/4 x 12	5.50

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3/8 x 3/4 (1/8)	.45
3/8 x 3/4 (5/32)	.45
1/2 x 3/4 (3/16)	.50

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attaching them to the fuselage. There is less to bang on the end of a table, hit on the ceiling, or insert in a running ceiling fan while the model is in an early stage of construction.

On profile models, the horns can be fitted at the aft end of the wing or stab slot prior to fitting the wing or stab. This reduces unsightly or excess fuselage holes, which may have to be filled and finished later. Use of two nylon horns mated together (as Custom Models kits do) will add strength without excess weight.

Equal and neutral settings with the leadouts, bellcrank, horns, pushrods, flaps, and elevators are necessary for the success of this or any other Stunt airplane. Install the bellcrank with the leadouts and flap pushrod connected. Hold the bellcrank in neutral, put the leadouts where suggested on the plans, and cut the leadouts to equal length eight inches from the last part of the wingtip.

Mount the wing, flap, and flap

horn in the fuselage. Hold the flaps in neutral, and this will show you how long the flap pushrod should be. Bend the pushrod correctly and install in the flap horn. Connect the elevator horn. Move the elevator slightly forward or aft until a desired neutral setting is found, then glue the stab in place.

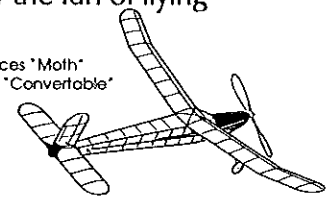
Use plenty of straightedges, lines, and incidence meters to be sure all thrustlines are parallel to each other. No moving surface can be put in any kind of neutral position if the main parts of the structure are askew.

The ability to remove the landing gear helps with repairs and setting of gear angles for proper takeoffs and landings. The main gear was put in the wing to best recapture the flavor of the Classic Stunt airplanes. Aluminum fuselage gear may be used when your flying surface is rough, with uneven ground, large rocks, and high grass.

The wing gear is mounted like a Chipmunk or Akrobat. The tail gear

Enjoy the fun of flying

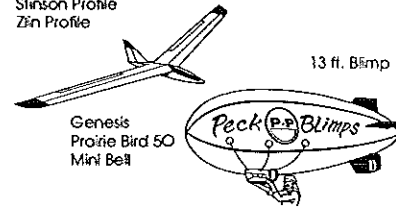
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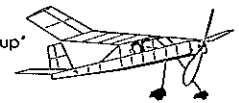
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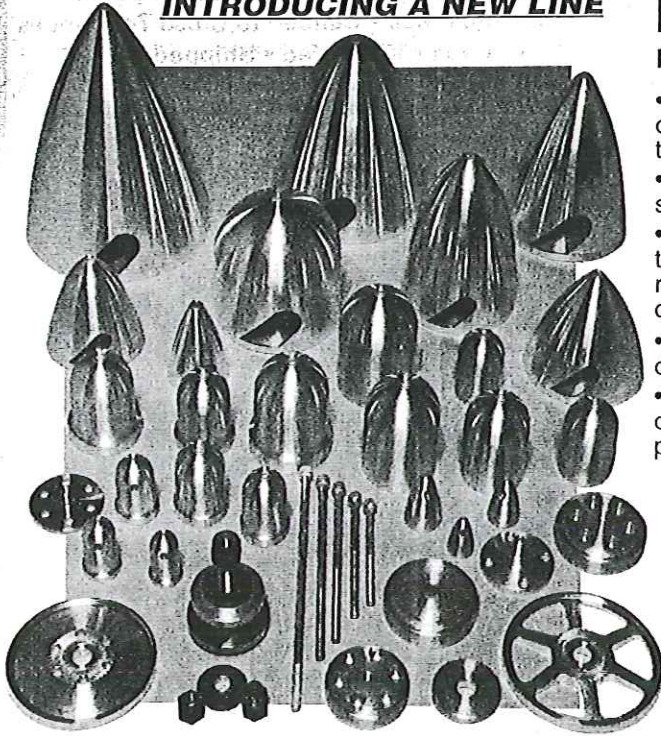


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40 Vought Cors F4U	20*520	30*526	60*545		
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16 Standard J-1 Tr	22*522	32*530	65*545		
29 Vaco Taper-Wing	15*514	22*520	45*534	60*548	90*562
36 Westlnd Lysander	25*518	37*524	75*538	100*552	
35 Doug O-46-A Obse	23*524	34*532	68*546		
29 Boeing 100 Sport	15*516	22*524	45*536	60*548	90*562
33 Steir A Tri motor	30*530	45*538	90*562	120*575	
39 Lock Lightng P8	27*519	39*526	78*545		
39 Cur P-36A Fighter	18*515	28*520	56*531	112*556	
25 Vgt Cors O2U-1/4	18*520	27*528	54*564	72*56103	568
38 Con Catalna P8Y54	52*548	78*560	104*572		
19 Curtiss NC-4 *	62*566	96*589	127*607		
17 Fokker D.7 Ftr	14*512	21*516	42*530	84*549	
31 Bayles Gee-Bee	11*512	17*514	35*532	47*544	70*556
13 Supermarine S.6B	15*510	22*513	44*526	60*538	89*552
16 Grum "Gulfhawk"	14*514	21*518	43*538		
35 Lock Electra #11	27*525	41*536	82*558		
43 Grum Avenger TB8	30*528	40*538	80*552		
42 Boe B17G Flyfort	51*540	77*552			
38 Bw Mitchell B-25	36*537	55*552			
34 Macell-Curtis B7C	15*515	23*522	46*535		
37 Cur Navy S03C-1	19*518	28*524	57*536		
25 C. Kacer R3C-1 A2	11*515	16*520	33*530		
34 Doug Transp DC-3	47*540	71*550			
33 Curt Hawk P-6E *	15*515	23*522	46*535		
32 Doolittle GB11	12*517	18*522	37*535		
31 Boe F4B-36A P12B	15*516	22*520	44*532		
32 Sprfid Bull-Dog	13*516	20*520	40*532		
32 Howard IvesMike	10*512	15*515	31*526		
34 Turners WW Hacer	13*512	19*522	38*538		
35 How Mr. Mulligan	16*515	23*520	47*532		
33 Boe P26A Low Wng	14*515	21*520	42*532		
15 Stinson T-4 SR *	20*516	31*525	62*545		
42 DH Mosquito Boat	37*524	61*535	81*550		
37 Stearcan PT-17 *	16*518	24*522	49*538		
43 N Bk Widow P-61	33*540	49*550	99*575		
30 TANS Hwks Tex.13	14*513	21*518	43*536		
42 C. Heildiver B7C	25*525	37*532	74*546		
26 Ford Trimor 4AT	38*538	57*546	114*572		
31 Bellanca Air Bus	32*522	48*530	96*552		
33 Grum J2F Duck *	19*528	29*540	58*555		
27 C. Seahawk F7C-1	15*518	23*524	47*538		
28 Sik. Amphib B-38	36*534	54*548	108*578		
16 H-Pge O-400 Bomb	50*545	75*558			
31 Lindy's L. Strius	21*516	31*522	63*536		
31 Howard MacPete *	10*512	15*515	30*530		
31 C. Sparhawk F9C-2	12*515	18*522	36*535		
33 Aerona C-3 Spt	18*510	27*514	53*526		
38 Turners Pesco Sp	12*516	18*520	37*530		
43 Wright "Flier"	20*518	30*524	60*538		

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is attached with two 4-40 bolts, with blind mounting nuts imbedded in the motor mount.

The landing-gear area is further braced with 1/8 Lite Ply sections. One piece fits behind the landing-gear blocks and between the top and bottom spars; four others copy the airfoil shape and double the two ribs holding the landing gear blocks forward of the spars.

The inboard wingtip is not as complicated as the drawings suggest. The purpose is to create a hole or slot for the leadouts. The two 1/16 inboard wingtips are separated by a 1/8-inch piece near the leading edge, and another at the trailing edge. This allows a 1/8-inch gap for the leadouts.

Once this is glued in place, it is treated like the outboard wingtip construction. Add the half ribs R-2, capstrip them and then glue in place the extra 1/8 balsa tip braces as shown.

Approximately 1 1/2 ounces of weight was installed at the location shown on the plans. If you decide to

build an unequal-panel wing, adjust the amount of tip weight accordingly.

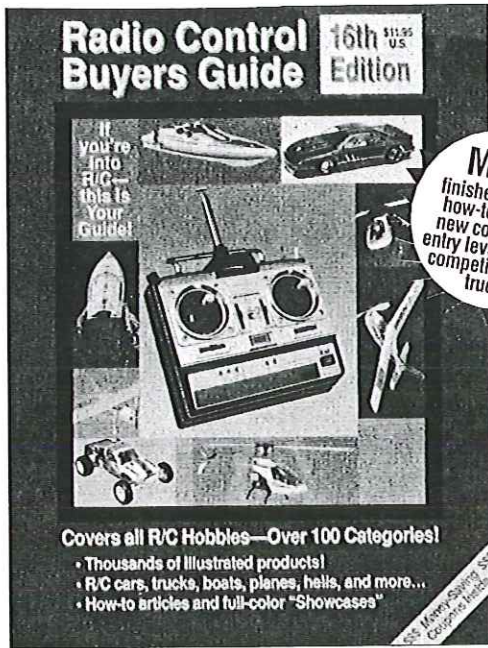
FINISH

The finish you desire is your choice. My Envoy article (June 1986 *Model Aviation*) outlines one method I have used. The premise is the same: Hobby epoxy II glue can still be used, as well as the Sig Epoxolite fillet material. Hobby epoxy Stuff, Super Poxxy primer, or Dap spackling compound can be used for a surface primer over the glue base.

I have since found that Formula U, Rust-Oleum, and X-O Rust from a spray can are compatible when given a little time to cure before adding the next color. The Rust-Oleum silver is not fuelproof, and Rust-Oleum does not make a clear. Formula U clear has been used for a final gloss coat over all of these products.

If you use iron-on covering, design a paint scheme such that it's not necessary to tape over any paint that

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has film underneath. Try to have 1/4-inch separation between colors.

FLYING

The first flights were careful, and the model required little further trimming. Bill Calkins did a fine job of carrying out the design ideas brought forth in our pre-project discussions. As a result, the Impala-Banshee will give you a fine-flying profile Stunt model that will do well for you on the contest circuit—or perhaps you'll want to simply enjoy flying it. Either way, it is sure to bring back thoughts of the Golden Age of Stunt.

MATERIALS

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Aero Products
1880 Scenic Hwy
Snellville, GA 30278

C.F. Slattery
2101 Logan Ave
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Sig Manufacturing
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STROKE : 5mm
VOLUME : 0.063 cc
WEIGHT : 10 grams
RPM'S : 600-2400
RUNNING TIME : ... 60 sec.



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BORE : 5 mm
STROKE : 6mm
VOLUME : 0.12 cc
WEIGHT : 18 grams
RPM'S : 600-2400
RUNNING TIME : ... 60 sec.



GM-300 \$59.95

BORE : 8 mm
STROKE : 6 mm
VOLUME : 0.30cc
WEIGHT : 28 grams
RPM'S : 500-2400
RUNNING TIME : ... 90 sec.



GM-120 TWIN CYLINDER \$64.95

BORE : 2 x 5mm
STROKE : 2 x 6mm
VOLUME : 2 x 0.12cc
WEIGHT : 20grams
RPM'S : 600-2400
RUNNING TIME : ... 60 sec.



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