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THE AME HEAT GUN IS A PROFESSIONAL TOOL SPECIFICALLY DESIGNED FOR USE WITH HEAT SHRINKABLE AIRCRAFT COVERINGS.
Modern radio control equipment, besides being a marvel of performance and precision, is fairly rugged. There are certain practical limits as to how much abuse can be withstood. Those things which can cause damage to the equipment include: shock (crash), vibration, moisture, wide ambient temperature changes, manhandling and overload. The majority of the effects of these adverse conditions can be minimized or negated by proper installation of equipment. The rest is a matter of common sense and reasonable care.

The manufacturers have provided some vibration isolation, they are encased in hard plastic. Rubber grommets installed in servos and some receivers provide isolation mounting. Individual power cells are potted within the battery pack to reduce vibration sensitivity. However, many electronic components, mounted vertically on the circuit boards, are susceptible to some vibration modes. Everything solid has some resonant frequency, that is, a frequency at which maximum energy is transferred into the body.

For example, you have heard or seen the story about the opera singer's voice being able to shatter a glass. The theory is that the singer's pitch is at exactly the resonant frequency of the glass allowing maximum transfer of energy into the glass and ultimately—crash! If the glass had been packed in three inches of loose foam, the opera tenor could have gotten a hernia and the glass would have survived. The foam breaks up the sound waves, allowing only a small portion to pass through.

Now think about that rear rotor forty turning up at twenty-three thousand. And there are all those little goodies—resistors, capacitors, transistors, IF cans, etc.—attached to the receiver which is firmly strapped down to the fuselage. The fuselage acts like a funnel to direct all the sound energy of the engine directly to the receiver. The result? You guessed it. I have seen the insides of a receiver literally shattered by vibration.

While on the subject of vibration—a word about flutter. Flutter is aerodynamically induced vibration. Suppose there is a little play in the aileron linkage. You put the bird into a high speed dive. Then, in a turbulent flow, start to buffet. The faster you go, the worse the buffet. If you hit the resonant frequency of the ailerons, you will lose them. If you hit the resonant frequency of the wing—splat! Even if you do not hit resonance, the flutter is fed back through the linkage to the servos. This is a quick and easy way to ruin servo gears. They can fret just enough to hang up the next time you fly a slow roll. Moral: linkage should be free moving but with no play. This goes for hinges, too.

Back to vibration isolation. Packing the glass we talked about in foam isolated or de-coupled the glass from the singer's mouth (sound source). So this is the solution. Isolate the radio from the sound source. The grommets on the servo will do the job provided that (a) you do not cinch down on the mounting screws until all the give is gone from the grommets and (b) the servo is not touching any other component or structure at any point (except the pushrod). The receiver can be isolated by wrapping it with 1/2 to 3/4 of loose foam. Some people wrap the receiver in loose foam, then wind 2.5 yards of masking tape tightly around the outside, compressing the foam to the consistency of concrete. That's a no-no.

Batteries need vibration isolation, too. Although many are potted with silicone compounds, they are encased in plastic cases. Batteries need vibration isolation also provide some crash protection. Additional protection can be gained by adding a layer of dense foam or G-pad outside the light foam. Don't use these dense foams by themselves. Don't use double side foam tape to secure components. Use servo mounting trays recommended by the manufacturer, whenever possible. If you cannot use servo trays, be sure to use sleeves or eyelets inside the mounting grommets so that when you tighten the mounting screw, the sleeve takes the load—not the grommet. Component placement is important too. CG requirements or control rod position forces some limitation on component location.

Consider the typical installation with the battery forward, then the receiver, then the servos. In a crash, the receiver, normally the most delicate component, is sandwiched between the batteries and the servos. The receiver normally loses such a confrontation. There's not much you can do about temperature, but there are some considerations. Don't lubricate the servo mechanisms unless specifically recommended by the manufacturer. In cold weather the lubricants stiffen and the servos become sluggish. Some of the older equipment utilizing germanium transistors is subject to thermal runaway. That is, in hot weather, the transistors heat up uncontrollably and eventually fail. In the case of some output transistors they will, under certain circumstances, explode. Temperatures on concrete or asphalt in the summertime can easily exceed 110°F. The temperature inside a dark colored fuselage can also be very high. The use of a light colored cover or a tent canopy over your model in the summertime is recommended.
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CARL GOLDBERG MODELS INC.
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More on lighter than air ships

I have been following your "Modeler Mail" letters about airships with some interest. I have been interested in building model airships for three or four years since I found an article in AAM on the RC Los Angeles. I felt rather disheartened when it wouldn't fly, but I continued to work on it and am still doing so.

In the meantime, I have built a small free flight rigid dirigible, three ft. in length, 1.5 cu. ft. volume. The gas is held in a polyethylene plastic bag sealed by a soldering iron. The plastic is available as a drop cloth in any hardware store. The bag is fitted inside the balsa wood frame after being carefully fitted to avoid snapping the frame in case of over-inflation.

The bag alone can be used for a model blimp. Without the rigid frame, weight is not such a big problem and the difference can be put to use however the modeler wishes.

Remote control airships are not an impossibility. I've seen a flying model of the Hindenburg with rudder-only control and the possibility for up and down, but for economic reasons. It was powered by two electric motors that drove it at a speed of 3 m.p.h.

The U.S. Navy used a remote control blimp 17 ft. long for recruiting purposes. A photograph of it is in The Complete Book of Model Aircraft, Spacecraft and Rockets written by Louis H. Hertz.

Diligibles 15 ft. or smaller are really only good for indoor use. Unless radio controlled and sufficiently powered to fight against the wind, a thermal will take away and you will never see it again (at least not in one piece).

Remote control gear suitable for airships is available. In the August, 1969 issue of AAM you published an article entitled "RC Mini Scale," in which you stated that the gear weighed 3/4 oz., a weight that I use as ballast on my blimp. RC impossible? Hardly.

I would like to correct a mistake that Dennis Lenehan made in his letter in the September issue. Real airships used a material called Gold Beaters Skin, not Goat Beaters. It is the inside of an ox's intestine and was named that because goldsmiths used it to cover gold when they beat it into thin leaves. It was used primarily in German airships like the Graf Zeppelin and Hindenburg. Americans found new fibers and treatments to use instead of Gold Beaters Skin because of its cost.

Helium may seem expensive, but its cost can be brought down by buying a tank and having it refilled when you run out. Small cans of helium are available, two 20 oz. cans for $3.00. This size is nice for experiments or temporary trials in lighter than air.

Practical, flyable airship

In your September issue you published a letter from Dennis J. Lenahan remarking as to the impracticality of a lighter than air ship. I too have been interested in these long forgotten monsters of days gone by. As a result, I have done some research on these craft and believe that the following formula proves that they will fly and are quite practical: $rac{\pi R^2 L}{2}$ divided by 16, where $R$ is the radius in inches, $L$ is the length in inches divided by 12.

The numbers are derived by the following: Sixteen cu. ft. of gas will lift 1.2 lb. of material at atmospheric pressure. With this formula, you will wind up with 55,189.64 cu. in. or 31.938449 cu. ft. Division by 16 gives an answer of 1,996.125 and upon multiplication by 1.2, the total lift will be 2.3 lb.

A 40 cu. ft. blimp filled with helium (don't use Hydrogen as it has very bad habits of exploding) will cost about $16. The

Californian who cares

Lt. Richard Jacobs wrote from Fort Leavenworth, Kansas ("Modeler Mail!" October 1972 AAM) detailing some of the problems modelers there are experiencing in their efforts to pursue our very fine hobby. I would like to buy them a one year subscription to American Aircraft Modeler to be sent to "The Aircraft Modelers," c/o Lt. Jacobs.

C.A. VanParre Jr., San Jose, Calif.

Your subscription has been entered and American Aircraft Modeler would like to match your generous contribution so the men at Fort Leavenworth will soon be receiving two copies of AAM each month. Your humanitarian effort will certainly be appreciated and admired by all modelers in all walks of life.

—Editor

If you are interested in lighter-than-air ships, this is the place to write and let us know. We have a lot of readers who would like to share their ideas and experiences with other modelers.

Tony Avak, El Segundo, Calif.
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We pay postage on all orders accompanied by check or money order. Satisfaction guaranteed or money refunded. Phone 615/834-2323 Store hours: 9 a.m. - 5 p.m. except Sundays.
Here's a beautiful stunt trainer with a 46" span. The Taipan 15R/C will make flying easy for you.

The figures given for the diameter and length come pretty close to one-in. scale for the Hindenburg! They ain't perfect, but the sight of a dirigible in the air is well worth the sacrifice in scale deviation.

Robert Jones, Everett, Wash.

P.S. The formula was derived by the head cryogenic engineer for Scott Paper Co., so it is correct.

Cardboard wing saves the day

A few evenings ago I was flying my Midwest Tri-Squire when a friend turned on his transmitter for a ground check and very neatly put my plane into a wire fence which completely shattered the wing. I remembered reading "Danny-
"mite" by Tom Abberger (November 1971 AAM) where he described the construction of a corrugated airplane. I decided to try his method of construction to build a new wing for my Tri-Squire.

Well, it took me about six hours to cut the ribs and scribe the wings which I built in two halves for the 2½" total dihedral required. I coated the raw cardboard with three coats of clear dope and used filament tape spanwise to insure a strong center joint. Right after the last coat of dope dried, I strapped on the wing and went out into my backyard for a test flight. Very much to my surprise, the plane flew beautifully. My thanks to AAM and to Tom Abberger for a very useful construction article. I am a newcomer to RC and have learned a lot in the past year or so.

Dick Swartwout, Penn Laird, Va.

Reader poll on rocketry
We are writing this letter in hopes that we may convince you to consider our request that AAM publish a monthly feature about model rocketry. We are certain that if you were to publish such a feature, many people would be pleased.

Tony Poteet, Mark Longwith, Cleveland, Tenn.

Your request is under consideration at AAM. How many other readers would like rocketry regularly?

—Editor

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New Products Check List

Jerobee/Dodge body. Class A stock car Challenger 1/12-scale body is now available separately or as a complete engine-body-chassis unit. Available in red, black, yellow, or orange with clear windshield, full decals, $5.95. Complete car with RC, $119.95; without radio, $39.95. Jerobee Industries, Inc., York Center, Redmond, Wash. 98052

Tatone/Donut Wheels. From Flight Line, 2½ dia. wheels (shown) are made of low-bounce neoprene rubber. With snap-on nickel-plated hub caps, bushings, axon nuts; nothing extra needed. Durable long-lived equipment. 2½" set, $2.99; other sizes from 3 to 3½. Spare hardware parts also available. Tatone Products, 1209 Geneva Ave., San Francisco, Calif. 94112

Ek-logictrol/New L'il Red Brick system. For simplified installation of two- or three-channel systems, 1972 LRB system is hard to beat. Precision control sticks with adjustable tension, airborne weight of only eight oz., with two servos, low 25 MA current drain, 1½ control accuracy, $119.95 for two-channel installation. For additional information, write Ek-logictrol, 3233 W. Euless Blvd., Hurst, Texas 76053

Sonic-Tronics/Electric fuel pump. Mk II pump can be driven by anything from a 1½ volt starting battery up to the 12-volt supply in your car. Pump has two-way controlled action, fits in empty tank or at touch of rocker switch. Centrifugal pump, high-impact case of fuelproof plastic, heavy-duty motor with low current drain. $11.95. Sonic-Tronics Inc., 8017 Craig St., Philadelphia, Pa. 19136

Sterling Models/New beginners’ series kits. Shown are Skystring and P47 Thunderbolt, two recent additions to Sterling’s “S” Series CL kits. Fly them on O49 power, kits come complete with hardware (less lines and handles) motor mount, scale decals, gear and wheels. Easy to build, planes are only six to nine die-cut parts. 21" span. Also available, colorful low-wing Cherokee. $2.99 each. Sterling Models, Berfield and Wister St., Philadelphia, Pa. 19144

Exposition Press/Amelia Earhart—The Myth and the Reality. One of the most technical, detailed, and non-sensationalist books on Earhart, most notable because author Dick Strippel has resisted temptation to add to the "Amelia was captured" theory. This is a book which describes detail not only her life but also the tiniest. One is left with the feeling that author Strippel did outstanding research to justify his thesis. Hardbound. $5. Exposition Press, Inc., 50 Jerico Turnpike, Jericho, N.Y. 11753


Fly-Line Models/J3 Cub. 1/4A RC or free-flight, 1938 Cub uses true 15/16" to 1 scale throughout, including scale wing rib spacing. Built-up wing and fuselage, sheet tail, total weight without radio is only 10 oz. Dummy engine and prop detail, all parts pre-cut, labeled and packaged. Well-written instructions and detailed plans. Plans only, $3. Full kit, $14.95. Herb Clukey, Fly-Line Models, 10742 Ashley Dr., Fairfax, Va. 22030

14 November 1972
Cox/Two-stage Saturn rockets. New line features high-impact plastic kits of 33½" Saturn V and 21" Saturn IB. 1/125-scale with NASA decals and re-entry parachutes. Saturn V, about $8.15; Saturn IB, about $5. Write Cox, 1505 E. Warner Ave., Santa Ana, Calif. 92705

Sig/Mustang 450. Sig balsa and plastic molded cheek cowling and fuselage top, foam core wings with balsa sheeting skin, this scale racer has turned in an impressive list of honors during 1972, both in appearance, performance, and handling ease. Special instructions included for application of high-gloss fiberglass-resin finish. $29.95. Sig Mfg. Co., 401 S. Front St., Montezuma, Iowa 50171

Fiber Foam Products/1/4 Midget Racer. Inspired by Lindberg's Spirit of St. Louis, 1/4 Midget has 30½ sq. in. wing area, foam core wing, top quality balsa throughout. Flying weight only 2½ lb. $29.95. With veneer-covered wing, $39.95. Additional info, write Fiber Foam Products, 6370 E. 22nd St., Tucson, Ariz. 85710

Long Island Hobbycrafters/Phoenix 5. Big 60-powered RC Pattern aircraft has 62" swept-back, fiberglass body and bellypan, glasskin wing and stab, pre-shaped ailerons and rudder, pre-mounted landing gear. Flying weight, 6½ to 7 lb., $89.95. Can be fitted with Rom-Air retracts, not included. Long Island Hobbycrafters, Inc., 7609 Shorefront Parkway, Arverne, N.Y. 11692

Du-Bro/RC helicopter. Four-channel 46½" dia. rotor, 3½' overall length, kit has been extensively engineered for ease of assembly and flying. All parts machined for accurate, smooth fit. Flying weight, four lb., flight duration, about eight minutes. Flying instructions included. Approx. $125. Du-Bro Products Inc., 480 Bonner Rd., Wauconda, Ill. 60084

Kraft-Hayes/Sponge wheels. In both standard and slim-line design (shown), wheels are lightweight, true-running and fit standard axles without drilling. Exceptional good looking. From 2½ to 2½" dia. $2.69 to $3.19/pr. Kraft-Hayes Products Inc., 450 W. California Ave., Vista, Calif. 92083

Bachmann/Scale model catalog. Beautiful full-color catalog illustrates complete scale line from Bachmann, people who have been fabricating plastics in some form or another since 1853. For railroaders, a complete line of N and HO-scale equipment, ready-built plastic "mini-planes," nature crafts, plus complete Fujimi scale model line. Write Bachmann, 1400 E. Erie Ave., Philadelphia, Pa. 19124

Hobby Capitol U.S.A./Scale-Like Wheels. A permanent pneumatic, unbreakable wheel in a diamond tread, regular bounce or a smooth, low-bounce style. Inner hub is removable for brake installation. Sizes range from 1½ in. to 3 in. Prices range from $1.40/pr. to $2.00/pr. Hobby Capitol U.S.A., 903 Church St., Nashville, Tenn. 37203
The Silvertone MK VII, used in the Du-Bro Whirlybird is a four-channel digital proportional set manufactured in Australia by Silvertone. The system is imported and distributed by Strato Model Products (Route 6, Blakely, Penn. 18447).

The system is also available on five or six channels. We obtained a second transmitter on loan to demonstrate use of the buddy system. The test set was a four-channel unit, while the second transmitter was a five-channel unit. Either four, five or six units may be operated as a buddy system; however, only four channels of a six-channel receiver would be active, and so on.

Included in the system is the transmitter, receiver, battery pack, four servos, buddy cord and an external, transformer-isolated, dual-output charger. The dimensional and statistical characteristics of the system are tabulated for easy reference. Also included with the test set was an in-line failsafe unit for use on any one channel, normally throttle. The system is available at 27 MHz and will soon be available on 72 MHz.

The transmitter and receiver are housed in copper-tone anodized aluminum cases. The transmitter uses a pair of Orbit stick assemblies for primary control. The fifth channel is controlled by a small lever at the upper left edge of the case. Recessed female sockets are provided at the bottom for charging and for the buddy cord.

Electronically, the repetition rate is controlled at approximately 60 frames per second via a free running multivibrator. This is followed by the typical half shot multivibrators which provide the series (four for our four-channel set) of control pulses. The differentiated, gated control pulse outputs operate on a three transistor modulator. The pulse train is routed to a "click" type control switch which permits selection between the instructor output of student transmitter. The modulation signal is routed to the RF section, which utilizes inductive oscillator tuning. The output network is inductive-capacitive (LC) with tuning achieved via a rather large piston-trimmer capacitor.

A small part of the output RF is coupled to a demodulator and used to drive the RF output indicator meter. During battery charge, with the transmitter off, this same meter indicates battery charging. A buddy-box arrangement is provided which permits control in either of the following modes: a) RF emitted by the instructor's transmitter and controlled by either the instructor or the student or b) RF emitted by the student's transmitter and controlled by either the student or the instructor. This permits the student to fly the instructor's aircraft with his own transmitter with the instructor all set to save it from destruction or for the student to fly his own aircraft with the instructor available to save the student's aircraft.

The preceding discussion is provided to show how a buddy system works. The MK VII instructions indicate quite clearly the procedures which should be followed in flying with a buddy-box. It (Continued on page 69)
PART II

THAT "GOOFY THING" DAVE GREY DESIGNED,
DU-BRO'S WHIRLYBIRD 505, BUILDING AND FLYING
THIS MODEL WAS PURE FUN AND CHALLENGE

BOB BECKMAN AND ED SWEENY

Building the Du-Bro Whirlybird was sheer delight, for two reasons: First, it was a new experience in modeling. Helicopters are about the last "frontier" left in RC modeling, and it is fascinating to dig into the details of their construction and operation. Second, it's difficult to see how one could improve on the kit itself. It's not an ARF, and several enjoyable hours can be spent building it.

The quality of the many metal, wood and plastic parts is excellent; the instructions are complete and easy to follow.

One note of caution: If you don't know how to solder, learn before you start constructing the Whirlybird. Most of the mechanical assemblies depend on solder joints; neat, effective soldering is a must. And keep in mind that this is soldering for mechanical strength, not electrical connection. Sta-Brite low temperature silver solder is recommended.

Construction of the chopper is so well covered in the instruction book that only two comments are needed here. The holes for the mounting screws at the lower end of the cyclic pitch servos should be drilled before installing the mounts for the throttle and tail rotor servos. And it is recommended that the horizontal stabilizer be omitted. Experience, confirmed by Du-Bro, indicates that the bird is more stable in windy conditions without the stab.

Early in the construction of the Whirlybird the decision was made to try the OS Wankel rotary piston engine. This engine seemed to be a natural for this application, even though its nominal displacement is less than the 0.40 called for.

Mounting the engine requires fabrication of a new mounting plate. A piece of 1/8" aluminum sheet is turned to the outside diameter of the Wankel's mounting ring, the same diameter as the fuel tank on the Whirlybird. The new

(Continued on page 75)
Plans and designs of all kinds. Great technical features. Full-scale articles and drawings. Enough Radio Control for the most ardent hobbyist. How-to: do-it articles and drawings for the Tenderfoot. Where the action is covers the latest tricks, hints and kinks in free-flight, radio control and control line.

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President's Memo

This was SALUTE and THANKS YEAR to the NAVY, the 25th ANNIVERSARY of cooperation between the NAVY and AMA in providing a national level of competition in the field of model aviation.

It certainly looked like the modelers had caught the spirit, because just over 2,000 contestants and mechanics showed up! "Camper and Tent City" looked exactly that: a city. And most of these were whole families. If no spectators at all had shown up, the contestants alone would have made a good sized crowd, but the spectators DID show up. In fact, somewhere between 20,000 and 30,000 showed up on the final day just to see the AIR SHOW (held this year at a remote part of the field), and ALL MODEL AIRPLANES and the championship trophy awards. It was quite a success.

While mentioning the air show and the thousands who attended, I MUST COMPLIMENT those thousands for their orderliness and cooperation. I mention this because we

Continued on page 2.

Sincerely,
John Worth
AMA Executive Director
Behind the Scenes...

The Incredible 1972 Nats! It survived one crisis after another. It was cancelled once (by the Navy), almost cancelled again (by AMA), then struggled through a series of near-panic situations involving personnel, supplies, equipment and other problems.

But it turned out to be a great Nats—not only bigger than last year's big meet but also generally happy one. Over 2000 participants were registered: over 1400 contestants and more than 600 mechanics. Except for a day and a half the weather was great. Following several days of boiling hot temperatures immediately prior to the Nats, the weather suddenly cooled off with a day of rain, and this was followed by milder temperatures which held through the rest of Nats week.

But when the rains came on the first full day of Nats competition, the outlook seemed dim. Nats officials had just completed a weekend of backbreaking preparations (erecting two miles of snow fence for crowd control, marking circles and event areas on the runways, hauling and putting up tents, tables, chairs, and other Nats gear). This was followed by Nats registration, test flying, Indoor competition, and qualifications for RC Pylon Racing.

Then came the start of the full schedule on Nats Wednesday. Flying began but so did the raindrops—gently at first but building slowly. Up until noon the events managed despite the wet air, but by mid-afternoon many had quitted as the rain got steadily heavier.

But most flyers persisted despite very cold and drenching conditions. Radio Control judges and Free Flight timers could hardly see, scoreboard smeared and blurred, models splashed when they hit the ground. Even so some Free Flighters scored "max" flights despite the terrible conditions.

The next day was windy in the morning as an aftermath of the rain, but there wasn't much waiting around for calmer weather. Unfortunately, the most weather sensitive event was scheduled during the wind—Free Flight Scale took a beating as flight after flight ended up in wreckage.

Otherwise, however, the Nats went booming along. RC Pattern flying operated with great efficiency to get in six rounds of qualifying despite the loss of time the day before. It was much the same in other events. Free Flight, using the "time a flight, fly a flight" scheme for the first time at a Nats, operated very smoothly. Many flyers said that it was better than previous years even with the lack of 60 or more timers that the Navy had usually supplied.

Control Line had another sort of crisis. First the Nats CL Manager of many years, Pete Peters, was not able to attend the Nats. So the load fell on CL Director Gosta Johnson's shoulders. Then Gosta got called home on an emergency, and Control Line events were suddenly without an overall leader.

The Nats Executive Committee went into a huddle and picked Combat Director Murry Frank for the bigger job. He came through in fine fashion and so another Nats crisis was overcome. Once again it was a case of people managing to 'make do' in situations that happened despite the best laid plans.

Continued on page 22

Rolling out the barrels for fence anchorage are AMA volunteers. Never before have AMA'ers been responsible for this kind of detail, but they did the job and ran the meet, too.

More than 2,000 Delta Darts given away, built and flown during the '72 Nats. Nancy Penrod and Bernie Drummond are shown attaching wings and stabs with electric glue guns—to speed the flow of anxious youngsters. Jigs a big aid in doing the job.
When, for example, the Navy had earlier indicated that military personnel would not be available to help AMA officials run the Nats, it had not been expected that the lack would be so complete. It was soon learned, however, that use of naval station personnel would be charged for, and therefore the cost of operating the Nats could go sky-high.

AMA officials, therefore, decided to go it alone, doing double and triple duty. They realized the necessity of showing that the Nats could be run with absolute minimum support in order to fan the faint sparks of hope that a minimum cost Nats might induce the Navy to keep the Nats going, although they previously had announced that this 25th year of Navy hosting would be the last.

Between the regular Nats officials working overtime and the help of many Chicago area AMA volunteers, the Nats went on successfully by substituting about 50 new AMA workers in place of over 150 Navy personnel in former years. These, plus the usual number of AMA officials, resulted in the Nats operating with about half the number of workers of past years—an 'above and beyond the line of duty' effort on the part of many.

This is not to say that the Navy was missing. Far from it. They provided equipment, housing, meals, basic garbage pickup, first aid, transportation, public affairs and other support. Two officers, Lt. Commanders Al Geimer and Bob Needham, together served in multiple capacities that had involved a dozen officers of past Nats. They solved many problems requiring AMA-Navy liaison, including the location, transportation, borrowing and procurement (paid for by AMA) of many items of meet needs, such as fencing, rope, electric power generators, signs, furniture, and lots more.

They also provided public relations support in place of the usual station effort to promote the Nats. They helped distribute Nats posters, promoted the Nats on TV and radio, even came up with a Miss Model Aviation after that usual Nats project had been dropped due to lack of time. They helped greatly to hold the Nats cost down by scrounging rather than buying or renting. When walkie-talkies were desperately needed for field communications, for example, they were able to borrow them from the Chicago Police Department. Likewise, they were able to borrow 12,000 feet of snow fencing. Commander Geimer even loaned two of his personal fans for the Nats headquarters operations, as well as his own bikes to Nats officials.

With these and other contributions the Navy did a lot despite severe restrictions. This, together with AMA absorbing a lot of cost items which had previously been provided by the Navy (such as rental of field sanitation facilities, airfield cleanup after the Nats, gas for vehicles, and pay for Navy truck drivers) made it possible for the 1972 Nats to be held.

It was reported earlier in the year that the Navy had cancelled participation in the '72 Nats due to budget reductions. This happened in March, but AMA got a reversal for one more year on the basis that the Navy would not have to foot the bill in the past. At the time it looked like the cost to AMA might be
Continued from page 20

ran up against a unique problem that the spectators helped mightily in solving.

**PRESIDENT'S MEMO**

demonstrations. An imaginary safety line was established with a few barrels as markers. Starting early with the public address system, the imaginary line marked by the barrels, I pointed out that INTELLIGENT AMERICAN LADIES AND GENTLEMEN would know how to conduct themselves under these circumstances and would not only stay at the proper distance, but would also aid us in pointing out to the less polite and less wise that they should stay back. The fact that this huge gathering did just as asked, with no fences or ropes, is a TREMENDOUS TRIBUTE to how AMERICANS can and will act when they stop and think—and are given a logical reason for acting. They even helped pick up litter in the area. As I told this fine assemblage of folks on the PA system, it sure made me proud to be an American!

While watching the crowd enjoy the air show, I also had a chance to watch the expressions of satisfaction and pride on the faces of our TWO MOST HONORED NAVY GUESTS. They also realized that we were witnessing a fine AMERICAN SPORTING ACTIVITY being enjoyed by a FINE AMERICAN CROWD being hosted aboard our U.S. NAVAL AIR STATION. These two gentlemen who added prestige to the giving of our TOP NATIONAL AWARDS were our hosts, the commanding officer of Glenview Naval Air Station, Captain Paul Merchant, and the Deputy Chief of Staff of Naval Air Reserve Training, Captain Richard Altmann.

Taking an interesting look at the other end of the week of Nats activity, I walked down to the main gate of N.A.S. Glenview just before it was opened to our AMA contestants. Cars, trailers, and campers filled the parking lot outside the gate as well as the access road as far as the eye could see. At about 8 am the gate was opened, and, so help me, it looked like the chariot race scenes from Ben Hur! Everyone placed some sort of premium on being first at the registration desks. This is amusing because, honestly, there is no advantage in first, second or even twenty-fifth. Since I am just not good enough to find something amusing in nearly everything, I shot the film with a special camera that takes only one frame every half second. When shown on the screen at normal 18 frames per second, everything is "hurried-up." The result looks like the NATS was being held at the Indianapolis 500 instead of the Griffith Glenview Naval Air Station. I wish all of you could see this film. But please slow down next year!

It made me proud that all the contestants coming through the gate smiled and waved when they realized that the president of AMA was there to greet them. AMA's are an awfully nice bunch of people!

*John E. Clemens*  
AMC President
Unusual microfilm biplane model by Clarence Mather.

Susan Weisenbach's rubber job heading aloft.

Team Cailliau makes a pit stop. Lawrence took second with his simply constructed Pennyplane.

Pat Wood, 15, begins a flight with his scaled version of a Pilatus Porter from AAM plans. He also flew this model in outdoor Scale.

An outstanding example of traditional stick-and-tissue construction, this rubber-powered Vought OS2U Kingfisher, built by Michael Kuenne, flew in the Indoor Navy Scale event.

Charles Wiese's Rocket-Power event entry powered by Jetex 150.

Diesel-powered, scale SE-5A by Francis Kastory.

Three seconds after this photo was snapped, the screaming Supertigre 23 pulled the rain soaked wings off of George Versaw's Starduster 600.

Winning Outdoor Flying Scale, Waco YKS-6 by Harold (Bill) Warner features opening doors, complete interior—even maps in the map pockets.

Indoor: It is no surprise to see Richmond, Mather, Sotich, Servaites and Rohrbaugh on the winners list, but two new names have appeared: Larry Cassillau and Dennis Jaacks. Dennis, a convert from R/C, won the increasingly popular Pennyplane event in 1971 and won again this year with an even better time of 12 min. 25 sec., phenomenal for this severely restricted event. He later placed fourth in the Microfilm Stick event. Larry, returning to modeling after an eight year time-out for college, marriage, and the early years of a career as a TWA pilot, placed second in Pennyplane and Hand-Launch Glider, and first in Paper Stick, breaking Jim Richmond's long-standing record by more than a minute.

There is a man at the Nats indoor events every year whose absence would spell disaster, yet his name never appears on the list of winners or the officials roster. He is "Major" Brown, custodian of the armory. He lowers the lamp when a rubber-powered model becomes snared by one, and jostles the hand-launch gliders loose when they alight on the rafters.

In one corner of the armory a free-balloon duration contest between Bill Bigge and John Thornhill was taking place. Helium-filled balloons were weighted with clay until they would rise slowly. Then after a few minutes enough helium seeped out to cause the balloon to descend. Hitting the ceiling disqualified the flight.

Fulton Hungerford, whose tiny Ford Trimotor stole the show at the 71 Nats, did a repeat performance this time with his Boeing 80-A1 trimotor. All three motors are rubber-powered, the props of the wing-mounted motors being driven through flexible shafts by rubber motors contained within the wing.

Al Rohrbaugh entered the only microfilm stick model built to the 300 sq. in. wing area limit. The 51 in. Nordic-like wing was pulled by a huge 27-in. prop which cruised at only 32 rpm. A disastrous collision with a lamp support prevented the model from exhibiting its true potential.

The Nats Hangar had its usual miscellany—rows of workbenches used for storing and working on models, and sleeping on or under; models under construction, few of which were completed by the end of the week; a committee of six assembling a stick-and-tissue scale model from a kit; people selling and swapping everything from old model maps to new engines; the scale cage and the model shop; hordes scanning the results posted on the bulletin boards. This year a new feature was added in the person of Bezir flying his rubber-powered helicopters all over the place, talking a blue streak, surrounded by an ever-changing mob of kids, and selling complete stick-and-tissue copters for two or three bucks, scarcely two alike. Why? To clear out his basement to make room for building more copters!

On Wednesday, the first day of the outdoor competition, the weather started off bad and got worse as the day wore on. The wind was strong, and it
### Free Flight Outdoor

#### A Gas

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### American Aircraft Modeler

25
Peanut Scale models are limited to a 13-in. wingspan and fly about a minute. Richard Whitten, editor of "Star Skippers" newsletter for Juniors, built this Pietenpol Air-Camper from a Peg-Polymers kit.

Launching his hand-built glider is James H. Harris.

A familiar sight at the Model Airplane Championships for seven years is the sister team of Cheryl (left) and Susan Weisenbach. Susan, 20, was the 1965 Nats Grand Champion which earned her a trip to the Naval Flight Academy at Pensacola, Florida, and a college scholarship provided by the Academy of Model Aeronautics. Cheryl, 18, specializes in FF scale models of WW I biplanes.

Neil Miller and husband Carl patch their Puss Moth rubber-powered free flight. The Millers are veterans of Nationals competition since 1954.

Terry (left) and Mike Kuehne have flown in model events for over ten years, specializing in FF gas events. Shown settling a timer for a two-min. flight.

The Linstrums, Mindy and Jennie, display their Pennyplanes. Popular with both tenderfeet and oldtimers, event drew 48 entries.

National Free Flight Society Executive Director Hardy Brodersen adjusts his Rossi I5 to around 24,000 rpm, pegging the light-beam tachometer built into his goody-box which also contains an electric starter. A fast climber.

was between a drizzle and a real rain all afternoon. Max flights didn't come easy. By 2 p.m., when the rain started in earnest, only four max flights had been posted on the Open A/2 glider scoreboard, many of the contestants hoping for better weather which never came.

Peter Alnutt, flying his rather saggy and tired-looking Adagio No. 6, won the Towline Glider event for the third time in four years.

Weather that bad couldn't get any way but better. And it got a little better each day—Saturday and Sunday had some of the best weather ever seen at a Glenview Nats.

Bruce Mathews, flying a replica of the Loening M4 with which Tom Stark won the Open Outdoor Flying Scale Gas event three times, came as close to tears as a young man would like to admit when, on the third of his allowed four attempts, his flight was 1/2 sec. short of the required 20 sec. He made it on his last attempt, however, and won in the Junior-Senior age group.

Harold (Bill) Warner included fishing, test flying, model building, and the Nats in a month-long Volks-van tour. While he was test flying in Iowa, the longest and best flight of his Peanut Scale ended with a dunk in the settling pond of a sewage disposal plant, and it hasn't flown the same since. Harold got even with the world by winning the Outdoor Scale Gas-Powered event with a Waco YKS-6 cabin biplane having doors and a complete interior.

Unlimited Rubber Powered: With the historic Mulvihill trophy as bait, the Unlimited Rubber marathon brought out the usual assemblage of top-notch rubber modelers. By noon it was clear that it would be a battle between Phil Klintworth and George Perryman, who has come within shooting distance of the Mulvihill a dozen times. Klintworth was following behind Perryman by about two flights when on its eleventh flight the stabilizer on Perryman's model was knocked out of alignment and the model destroyed itself. Klintworth flew his eleventh successfully to qualify for having his name engraved beside those of the other aeromodeling greats; and it is good that it ended then for his winding arm was being, George consoled himself by winning the Coupe D'Hiver event on the following day.

Toronto's Andy deMello established an early lead in Class A Gas flying his Cox 15-powered Half Nog to four maxes. Red Johnson, from Southern California, only got a 3-1/2 sec. engine run on his fifth flight—his pan bladdter fuel tank burst in flight. Hercules Farand, however, posted five maxes +96 sec. to win. Greg Forth, posted a creditable four maxes +70 sec. to win in Senior.

The unofficial Old-Timer events drew a nostalgic array of Zippers, Bombshells, Brooklyn Dodgers, Playboys, Korda Wakefields, Gollywocks, and even a pair of twin pushers. The gentle drone of spark-ignition engines and the smell of gasoline and castor oil brought back memories of the Genesis of Free-Flight Gas in the mid-thirties when models flew more like 'real' air-
planes instead of the rocket-boosted gliders they have evolved into.

FAI Power: Harold Eggleston of Toronto put up his five three-min. maxes, blew his fourth flight by dethermalizing early, and disgustedly left for home, not realizing that despite the seemingly ideal weather, no others would better his mark. With 55-min. of the day's flying remaining, Danny Lock roared up to begin the nearly impossible job of putting up his five flights. But he did just that, including one “attempt” when his engine flamed out upon launching and dived into the concrete, requiring a quick prop change and refueling. With only a minute remaining, he put up his fifth flight to complete the string of maxes and near maxes which earned him the second-place trophy.

Saturday was perfect hand-launch glider weather, with moderate drift straight along the runway. By early afternoon, Dick Mathis had posted four consecutive two-min. maxes, plus a flight of 1:39. Bucky Sarvaites, in a position to beat Mathis, went up into a cloud of other HLGs and Coupes in what seemed like good air, but was down in 40 sec. Later Paul Kosmala, flying an all-rudder design by Bill Patton, and Dana Mckinzie made their fifth maxes, hit holes on their sixth flights, and emerged first and second only six sec. apart. Mathis's third place was denied him because of a protest about his taking more than the allotted three-min. to launch his glider, although dozens of others did also—perhaps the price of being a well-known figure by virtue of previous successes.

Mark Kummerow was sure that his third flight in Senior C-Gas, a three-min. max, had put him into first place, but with less than an hour of the contest remaining and his model packed away, he discovered that his last flight had not been recorded. But after a long search, his timer was found and his max properly recorded. Mark's second flight dethermalized into the grass only 200 ft. from where he had launched it.

Rocket Power: With a surprisingly large turnout for an event which is so difficult to fly, the Rocket-Power event proved that the contest isn't over until everyone has finished flying, for first place changed hands often. Dave Chancey put up a mediocre 61-sec. flight followed by two three-min. maxes. Charlie Sotich maxed, crashed on his second flight, then made a 70-sec. flight followed by a max using his 1967 Nats winning model. Later Martin Richardson maxed on his third flight, which put him on top, only to be bitten by William Jenkins who also maxed on his third. Jenkins's win ended a week of bad luck which included crashing his 1/2 A Gas Model into a parked car, and having his hang-glummed glider mashed by another HLG while it was in the trunk of his car.

Meanwhile, Charlie Wise won in the Senior age class with a score that would have been good enough for second place in the Open age class, while Robert Lyons won in Junior, flying an all-balsa model he and his father had designed.
RC at the '72 Nats was many things for many people. For some it was joy—making the finals in Class C or Formula I or FAI Pylon and for many more others failing to do the same. Winners are always happy; losers, some bitter, some expect it, some shrug it off, wait till next year! But the name of the game, in no matter what kind of competition, is winning! All strive for victory—some more than others—and tremendous preparation is in evidence everywhere!

Preparation achieves, but what about Lady Luck? It struck down almost randomly: Jim Whitley and Jim Kirkland due to an unfortunate frequency mixup; Whit Stockwell and John Agee plus two others due to mid-air collisions; Bob Smith with the fastest qualifying time in Formula I racing dropped out of the finals due to equipment problems; Telford and Violett with the fastest FAI racing qualifying times were also struck down in the finals by engine and other problems.

Misfortune is very unforgiving as there is not much room these days for error; one missed pylon heat or pattern flight can change the whole picture. Some were able to rise above misfortune: Whitley finished second in C Pattern with a ship he had never before flown, borrowed from Ed Keck; Jim Kirkland with an airplane borrowed from Rhett Miller also never flown before by Jim; John Agee rose from the ashes of a mid-air and made the Class C finals with a borrowed airplane test flown in the rain!

RC at the '72 Nats was flown in conditions ranging from absolutely miserable hot and humid weather, to cool and very wet, to perfectly beautiful, sunny and calm. Something for everybody. I had never flown competition in the rain before, but I sure did this year. Two flights in the driving rain. It sure is hard to see that airplane with the rain beating in your face! Equipment operation was fantastic, until a drop of water got in the wrong place—just ask George Hill! "Fair weather" George was surviving okay, until his ship did an uncommanded 90° turn, whereupon George shook the water out of his transmitter and continued with "come back here you...!"

Have you ever flown in a strong crosswind? Well, always expect it in Chicago at Glenview. Crosswind is S.O.P. and he who has not practiced under these conditions won't do so well. Evidence of experience under these conditions was present in the high finishers in Class C Pattern. The old rudder really gets a workout under crosswind conditions!

Classes A and B were flown for a half day only to the chagrin of the A and B fliers) under ideal conditions. Time was available for only three flights each—very unfortunate since Class C fliers had six qualifying flights plus six more to each of the top 20 qualifiers. Classes A and B were won by two youngsters whom I had the opportunity to judge. Young Steve Brookes, son of twice International Champion Ralph Jackson beside his Weindecker Eagle.

Retracts to be added for next meet. All plastic real plane very suitable for modeling in scale. No rivets on joint lines.

Don Botteron's "paint brush" special, Akrobat, painted with a brush believe it or not.

Bob Smith's T-2A designed by Tom Atkins. Bob will kit this ship. Notice the drooped aileron. Ship has coupled ailerons/flaps. Works very well.

Josh Titus' magnificent and fine flying Ansaldo. It drops pilot by parachute and a bomb.

Claude McCullough's very nice Shinn. Notice the detailing.

28 November 1972
Charley Kenney oil from *The Pathfinder*.

An uncomplicated Ryan M-1 mailplane ready to start.

The "Doc" Brookes family. Young 12-year-old Steve won Class A with some very impressive flying of his Kaos. Powered by HP 60 and controlled by Pro-Line. Steve has been flying RC two years and won his first contest a year ago.

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### RADIO CONTROL

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**Best C/N-E Junior**

Rhett Miller

**Best C/N-E Senior**

Steve Ellison

---

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**Best Junior**

Steve Brooke

**Best Senior**

Robert Platter

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### PYLON FORMULA 1

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**Best Junior**

Bruce Richmond

**Best Senior**

Richard Brickert

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### PYLON FAI

#### C PATTERN—EXPERT

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**Best Junior**

Bruce Richmond

**Best Senior**

Richard Brickert

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### SCALE

#### RADIO CONTROL

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**Best Flight Achievement**

Tom Cook

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<td>5. Joseph Hildreth</td>
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**Best Senior**

Ellis Newkirk

---

American Aircraft Modeler 29
Jimmy Grier gets his “kicks” out of a Norm Page Mach 1 ti days. Jimmy is always a tough competitor.

Young Rhett Miller, only 14-years-old, came within a whisker of qualifying for Class C top 20! A Kirkland-designed Intruder.

30 November 1972

A very rainy day during pattern prelims. Flying in the rain ain’t much fun, but fly we did. Ed and Louise Izzo their thing.

Jim Bonanno’s replica of the WW II German Stuka JU-87 dive bomber.

Bill Bertrand surprised everyone with a new ship—a Handley Page bomber. It was a handful to fly!

Brooke, took Class A Pattern in impressive fashion. This youngster has been flying RC for only two years and flew in his first meet just one year ago. The boy’s technique, presentation and execution of maneuvers was far beyond his tender years. Also Ellis Newkirk from Nashville, winner of Class B, had all the style and skill of many oldsters. You can certainly expect a lot from these boys as they move into the advanced classes! Let’s also mention 14-year-old Rhett Miller from Tallahassee, Florida. This boy placed second in Class C Novice and almost made the finals in Class C. He has been flying competition for only two years with two wins and a second in Class A, two wins in Class B, and two wins in Class C/D. Except for engine problems in two qualifying flights, Rhett would have been flying in the top 20 Class C finals at the Nats!

What is a Nats without “Goldie” Goldclank doing his thing in Pattern and Pylon? This guy won’t admit it and rarely shows it, but he’s really a very good flier. Goldie’s thing is not winning but having a good time in his own fashion and entertaining the crowd with his original (and unrecognizable?) maneuvers. Fun and laughter is Goldie’s reward—too bad more of us can’t be satisfied with that!

Horror of horrors, a Nats without Bill Bertrand’s perennial monster scale Fokker D-7? Bill showed up this year with a four-engine (count ’em) scale Handley Page biplane bomber, and it flew—precariously. Why must it be that Scale is fraught with near-disaster in flying most of these fabulous creations? I strongly contend that we are placing too much emphasis on scale and not enough on flying. It takes one to two years to build a competitive scale ship and five seconds to wipe it out! This happened to several at this Nats. I don’t have a final count, but many were damaged or lost including two beautiful Ray STs by young Bill and Jim Hiller—months of work down the drain!

Stand-off Scale, here we come! Rarely have I witnessed a good scale-like flight in RC Scale and didn’t see one this year. An interesting sidelong in Scale: Fred Stark placed only 19th in RC Scale with a cute McDonald Doodlebug, but he was Scale category champion with firsts in Indoor Rubber Scale, Outdoor Rubber Scale, Navy Rubber Scale, second in Outdoor Gas Scale and 19th in RC Scale—now there is what I would call a Scale enthusiast!

What about design and trends? Most Pattern ships seen at the Nats were fast and sleek, complete with super engines and retract, Phil Kraft tried to turn back the clock with his famous Kwik-Fli Iii and placed sixth. The fast aircraft definitely had an advantage in the windy weather conditions that prevailed during the prelims. However, slower ships such as Steve Brooke’s KaoS looked very good in the calm air Sunday morning.

All Class C finalists had retractors as well as “honking” engines. Probably the fastest was Jim Martin’s Banshee pro-
pelled by an H.P. (Hot Pants) 60. Would you believe a mile-high top hat? (Well, almost.)

A very interesting flap/aileron arrangement was used by both Bob Smith and Ed Hotelling on their Pattern ships. Bob says the flaps cut landing speeds in half! Bob flew a beautiful T-2A which he plans to add to his kit line. Du-Bro showed a very interesting muffler which was used by several contestants. It is a compact device made of perforated flat plates stacked together with spacers; it will soon hit the market.

Fred Hartshorn flew a unique ship—very long fuselage, highly tapered wings and coupled flying stab and flaps! Now that was different! It was complete with retracts, 550 sq. in, and a Weabra Blackhead—fast!

Pylon was dominated by the new K&B Schneurle engine. “Over the Hill” Cliff Weirick showed them in Formula I with all firsts. Many of the California troops dropped out in the finals for one reason or another—mostly equipment or damaged aircraft. A downwind takeoff was the nemesis of several. A near-disaster occurred when Bob Reuther’s Minnow pranged into the crowd with equipment failure and New England’s “Tiny” Rich escaped with a bad cut, bruises and shock. Tiny’s buddy, Jerry Wagner, a potential winner due to a tremendous qualifying time, thereupon withdrew from the contest. Bob Stockwell did a great job calling the races. His expert patter added much to the activity.

Helicopters are here! Informal competition and demos in the evenings brought out many originals and kit designs. The most impressive (to me) was still the Schuler chopper flown by Horace Hagen. AAM’s Ed Sweeney showed up with a very interesting variation on the Du-Bro Whirlybird soon to be an AAM feature. Windy conditions are still a strong deterrent to helicopter operation and proved to be the downfall of several, but progress has been remarkable!

How does one sum up the ’72 RC Nats? Memorable—the last (supposedly) Navy-sponsored Nats. Frustrating—same management errors here and there. I’m sure aided and abetted by lack of Navy help. Scary—the speeds of Formula I and FAI Pylon are almost out of hand. Satisfying—a demonstration of aircraft, design and performance, dreamed of when I first entered the hobby/sport. So into history we file the 1972 RC Nats.

The big winners in Class C: Jim Whitley (2nd), Ron Chidgey (1st for the second time) and Don Coleman (3rd). Note that Jim was flying Ed Keck’s ship as a backup when his own splattered due to radio interference.

Leon Shulman flew Top Flite kit P-51 Mustang in pattern until a glitch destroyed this fine ship, retracts and all.

The most unique pattern ship there—Fred Hartshorn’s Thunderball. Coupled flying stab and flaps, 12 to 9% wing, wing taper 13 to 11 in, tip, 550 sq. in., 7½ lb., Rom-Air retracts. Really moved with a Weabra Blackhead.

Mike Mueller and his Mach 1 from Chicago. Also very close to qualifying for top 20 in Class C.

Scale winner in flight. Bud Nosen’s highly detailed and colorful A-1 Skyraider which later crashed by control system failure.
Beautifully finished in red and white trim is Lew McFarland's Akromaster. Lew finished fourth in the Open Stunt category with this fine scale-like plane.

Racer by James Hojnaski has all the improvements used on many of this year's racers—foam wings, metal engine mounting plates, titanium gear, and Kosmic engine.

It's a Flap Jack; Navy's experimental Sea Skimmer was the basis for this novel Profile Carrier plane flown by Bob Hayword.

Small League of Nations is seen in this lineup of Class I and II Carrier planes. Planes are Mauler, Martin MO-1, Guardians, Fairey Spearfish (English) and The Latecoere (French). Also seen, but not pictured, were several Japanese planes.

Scale Racer by James Hojnaski has all the latest improvements used on many of this year's racers—foam wings, metal engine mounting plates, titanium gear, and Kosmic engine.

This beautiful F4 Phantom by John Valasek was the only jet-powered entry in the CL Scale events. It weighed 62 lbs. and was equipped with a Dyna-Jet. It is from AAM plans.

There's no doubt about this one, it's a clean cut—one of the many seen in the final round of the Open Combat matches.

The 41st Nationals Competition of the Academy of Model Aeronautics was hosted for the 25th time by the U.S. Navy at Glenview N.A.S., Illinois, during the week of July 24 to July 30, 1972. For those of you who could not attend we'll try and present the highlights of this year's competition.

Before getting into the competition highlights, I'd like to cover briefly what makes a Nationals competition. We might ask the question: Is the NATS a true Nationals competition? I think not. Our Nationals competition is more like an annual convention of model fliers. It is that once a year opportunity for the inexperienced to come in contact with the champs. It's a time when clubs or areas of the country come together to fight it out in friendly competitive rivalry, and of course it's a time when last year's champions try to retain their crowns for another year. It's also a time for talking about the good old days and renewing modeling acquaintances.

Modelers come from just about every state in the United States, Canada and Mexico—with cars, station wagons, campers and trailers all loaded with modeling equipment. Housing arrangements are somewhat unique: those with campers of course live in them, many stay in Navy barracks, while others bring tents to form what the modelers refer to as "Tent City."

To put on this yearly extravaganza there are several hundred people working behind the scenes to make each event a success. Many are members of the competitors' families and many are just modelers who gave up flying in the competition to work. That help was required more this year than in the past because of the Navy's reduced manpower roll.

Our many "thanks" to all who gave up some of their flying time to work.

Rat and Scale Racing participants saw two spectacular performances, one by the Boss Rat Team and the other by a club known as the Cow Town Circle Burners.

The Boss Rat Team has been trying for seven years to capture the Open Rat Race crown, and finally succeeded this year. Not only did they take the Open Class, but also succeeded in winning in the Senior category.

Bill Keller piloted his HP-powered ship to a 5:10.4 win in Open which was 14 sec. faster than last year's time, while Bernie Varnau captured the Senior Class for the Boss team. (With a name like that I couldn't help but root for them.) It should be noted that Bill Keller's win in Open was made under extremely bad weather conditions. Not only was it rather cold, but it rained heavily almost all day long. Perhaps this helped keep his engine cool for the great time turned in.

The Cow Town Circle Burners of the Irving-Dallas, Texas area put in a most impressive performance in Scale Racing by flying to victory in all three classes. Mark McEndree, Junior Class; Dennis Williams, Senior Class; while Kerry Turner took the Open Class. The best time posted was 6:54.3 by Turner.
CONTROL LINE

4A SPEED

Junior
1. Billy Hoyt 184.35
2. Bill Hoyt 182.11
3. Donald Bramsch 180.47

4A PROTO SPEED

Junior-Profile
1. Jimmy Clem 82.23
2. Bruce Pallet 80.50
3. H. Dickinson 79.26
4. Matt Kelly 76.80
5. C. Westbrook 76.21

JET SPEED

1. Myrl Hoyt 181.65
2. Bill Hoyt 181.20
3. Thomas/Wade 179.75
4. Seymour Olson 170.05
5. Yoho/Baughman 176.05

JET SPEED

Junior
1. George Huesen 112.18
2. Mark Coates 109.29
3. Kenneth Bauer 88.91

3. COMBAT

Junior
1. Rick Winslewski 128.49
2. Brian Webster 121.50
3. Brian Pardue 117.42
4. Jay Rosenberg 102.42

AEROBATICS

Junior
1. Mark Bauer 101.26
2. Terry Herron 99.06
3. Charles Schubert 89.34

4. Scale Racing

Junior
1. Darrin Matthews 65.43
2. Darrin Mathews 49.09

5. NAVY CARRIER PROF.

Junior
1. Robert Sawicki 597.78
2. Dale Johnson 407.44
3. Terry Fryer 296.71

5. RAT RACE

Junior
1. Rodney Lyons 6:57.4
2. Van Sant/ Van Sant 7:06.0
3. Oestler/Fischer 7:11.9

5. NAVY CARRIER II

Junior
1. Robert Sawicki 597.78
2. Dale Johnson 407.44
3. Terry Fryer 296.71

5. C. SPEED

Junior
1. Glenn Van Sant 149.07
2. Dennis McGraw 148.33
3. Mark Coates 141.75
4. Allen Swanson 135.79
5. Patrick Hampel 129.99

4. NAVY CARRIER I

Junior
1. Robert Sawicki 597.78
2. Dale Johnson 407.44
3. Terry Fryer 296.71

5. Open

1. James Finley 588.19
2. Harold Wallick 583.80
3. Ray Willmann 566.43
4. Michael Bedard 550.14
5. Roland Beltis 545.79

5. A SPEED

Junior
1. Jimmy Clem 124.78
2. Glen Van Sant 121.41
3. Patrick Hampel 117.52
4. Carl Parsons 92.41

4. SCALE

Junior
1. Darrin Matthews 223
2. Mark Bauer S.E. 5A 193
3. Gary Cain 187
4. Paul Blaker Smith Miniplane 172

5. Open

1. Ernie Violett 460
2. Moon Kaydet 420
3. Robert Telchick 400
4. Lynn Sidebars 420
5. Michael Gertz 417

5. Senior

1. John Glab 324
2. Dale Johnson 193
3. Gary Caulf 187
4. Paul Bauer Smith Miniplane 172

5. Open

1. Ernie Violett 460
2. Moon Kaydet 420
3. Robert Telchick 400
4. Lynn Sidebars 420
5. Michael Gertz 417

5. Open

1. Ernie Violett 460
2. Moon Kaydet 420
3. Robert Telchick 400
4. Lynn Sidebars 420
5. Michael Gertz 417
Tuning the engine of his carrier plane is Jim McEndree. The plane was piloted by his son, Mark.

Tanks away—Hawker Hurricane MK-2-G by Lynn Sidabras was the only CL Scale plane to demonstrate airborne operational features other than flaps and throttle control. His efforts garnered a third place win in the Open Class.

November 1972

Contestants in the Goodyear Race event line up for technical examination before entering the competition.

Waiting in line seems to be part of the game. Navy Carrier ships are lined up for processing the night before flying the event.

The Dixie Whiz Kids, left to right, Dennis McGraw, Brian Webster, Mary Lou Brown, Charlie Schubert, and Brian Pardue, all champions in their own right, combined their talents again this year to walk off with the National Team Championship.

This V-tailed French Fouga Magister sporting a Belgian paint scheme was another of the scale-like Stunters that brought Dennis Adamisin a first place win in the Senior Stunt category. Similar version of the model is in this issue of AAM.

Dave Ankenman (Toronto, Canada) had the most novel engine-plane combination in Scale Racing. Dave had his Ole-Tiger Scale Racer outfitted with an ST 15 rear rotor engine and a tuned pipe. Dave had high hopes of turning some fabulous times but pit stop problems and weather prevented him from giving a winning performance.

Gusty winds and rain couldn't dampen the spirits of the A Proto racers (left to right) Peter Bauer (9) and Tommy Wozny (6). Just when most thought they had that magical needle valve setting, the conditions changed and so few good times were posted than were expected.

Dave McGraw, a Junior from Memphis, Tenn., put in a record performance in Jet Speed setting a 166.87 mph mark, and then backed it up with a 167.37 mph flight.

Glenn Lee (Batavia, Ill.) not only captured the Open C Speed Class with a 186.84 mph to beat out the Bartley/Garner/Huff Team by .58 mph in this event, but also captured the overall CL Championship award by accumulating 714.43 points. Glenn flew a finely made plane equipped with an OPS 60 and tuned pipe for his C Class win.

The Dixie Whiz Kids Do It Again—Dennis McGraw, Brian Webster, Manchester, Tenn.; Mary Lou Brown, Staten Island, N.Y.; Charlie Schubert, Greensboro, N.C.; and Brian Pardue, High Point, N.C. make up the Whiz Kids Team, and put in a spectacular performance by winning the National Team Championship for the second year in a row.
row. Flying in some 40 or more events the kids racked up an impressive 2919.98 points.

Over 200 contestants participated in this year’s Combat Bash with 135 in Open, 65 in Senior and about 20 in the Junior class. When I say “Combat Bash” I mean just that, because there were more planes driven into the ground or involved in mid-air collisions than I have seen in the past three years. In two matches the Combat boys gave the Free Flighters competition—combat ships in each match broke loose and put in maxes. Both planes went up and out of sight. Howard Rush was one of those making a max; his plane was recovered from the N.A’S’s golf course. I never did learn who flew the second Combat free flighter or whether it was found.

Combat flying this year was most spectacular. There seemed to be as much controversy on the ground as there was combat in the air. Contestants were at odds with the judges on many calls on how many cuts were made or who had the kill. One such protest ended in the awarding of duplicate trophies for fourth place in Open Combat to Bob Baldus (Dayton, Ohio) and Ron Esman (Houston, Texas).

There was also a display of sportsmanship between two buddies, J. Sima and W. Keidel in the semi-final fly-offs for fifth place in the Senior category. Sima and Keidel were matched against each other. This would have been alright except for the fact that they only had one plane between them. Sima forfeited the match to allow Keidel to fly in the next round. As it turned out Keidel lost to B. Miller (Des Moines, Iowa) for the fifth place honors.

Texas Does It In Combat—All three category winners in Combat hailed from Houston or Dallas. Mike Wheeler from Dallas took the Open event by posting ten sec. better air time than John Hollfelder (Castro Valley, Cal.). Mike flew a “Spoiler” equipped with an ST 35BB engine, a pacifier, 9-6 Power prop and used 40% nitro fuel. Russ Green, from Dallas, Texas took the Senior category with his “Sneeker” equipped with an ST 35BB, pacifier and an 8-8 Tornado prop. Engines used by both these winners had been reworked by Phil Bascel. J. Plake of Houston was the winner in the Junior Class.

In the Navy Carrier event we were pleasantly surprised by the small League of Nations displayed in the various planes. The ever-dominant Guardian of the past few years seems to be giving way to a new variety of planes, all of which proved to be good flying ships. In addition to the ever-present Guardian the following planes were seen: Martin MD-1 by Don Gerber, Mauler by Robert Sawicki, N5B Kate (Japanese) by Tony Naccarato Jr., Naka Jima Myrt (Japanese) by Roland Baltas, Judy (Japanese) by Terry Herron, Lattecoere (France) and Fairey Spearfish (England) both by Dick Sawicki. All these planes flew very well with several of them reaching the winners’ circle. If you are looking for a Carrier ship that’s a little (Continued on page 82)
Three high points in Pylon Racing at the 1972 Nationals stand out: (1) Johnny Brodbeck and the K&B Schneurle were the fastest with the mostest; (2) Cliff Telford and Bob Violett dramatically improved the speed potential of FAI Pylon; (3) A serious accident, that could have been much worse, put a damper on the whole affair.

Consider the K&B story first. They posted the four top FAI I qualifying times: Bob Smith set a new record time of 1:27.5, followed by Larry Leonard with 1:30.1, Kent Nogy with 1:31.5, and Chuck Smith tied with Telford/Violett at 1:32.7. The slowest qualifying time was 1:40.0, a little slower than we had predicted (I didn't think anyone slower than 1:36 would make the finals). In the finals, eight out of the top ten finishers did it with the Schneurles, including the first four out of the top five: Terry Prather was fifth with a Tigre, and Telford/Violett were tenth.

There were no R.A.F. engines available for the Nats, and now it appears they will not be competing prior to next season. Jack Frye brought one of his test engines which Whit Stockwell flew for him after the Formula I finals were over; while the engine appears to have great promise, it is also clear that more refinement is needed. None of the H.P.s made the finals, and only four Super-tigres did.

On the other hand, there was ample evidence in FAI Pylon that the Tigre is equal or superior to the '71 K&Bs (almost no one tried to run a Schneurle in FAI, for good reason). The Korpi/Roy team, with a '71 K&B modified with Luke Roy's special head, took four firsts out of five heats, and were second to Whit Stockwell's Aldrich Supertigre in the only heat where he got off the ground all day. Since that 1:59.4 for second place was the best time Korpi posted in the finals, though he had a 1:51.8 in the qualifying runs, it would appear that the engines are competitive.

More striking evidence of the competitive status of the Tigre in FAI was the spectacular showing of the Telford/Violett team in the qualifying runs, where after failing to get off on their first attempt, they posted a 1:45 for eleven laps, and a 1:44.4 in the finals for ten laps. Some of their speed can certainly be attributed to their highly original design which places the two wheels side by side in the belly of the fuselage, leaving a completely clean wing and absolute minimum wheel drag, with anhedral in the stab to give ground-handling stability (about a half inch clearance on each tip). It was the ground-handling stability that cost them the contest, since they were faster than anyone else by a wide margin. All they really had to do was get in the air five times and cruise around the course. But, as in qualifying, they failed to get in the air once, and twice were beaten when their extremely sensitive needle valve setting was off the mark. In the end, K&B not only had the first four places in Formula I, but one, three and five in FAI.
The accident that marred the Formula I races happily turned out to be less serious than it at first appeared to be. The control tent and ready area were only 150 ft. from the No. 3 pylon —absolute minimal legal distance. Never again should it be less than 300 ft. Bob Reuther had completed the first heat of the day and was coming around No. 3 rather wide at the end of his precautionary eleventh lap when his radio went ape and he got two bumps and then full down elevator. The plane smashed directly into the ready area, hitting Tony Rich, who is Jerry Wagner’s caller, on the left wrist and side. Tiny was in shock for a few minutes, an ambulance quickly got him over to X-ray, and within an hour he was back watching the races, with a bone fracture in the wrist. Bob had completed the first heat of the day and was coming around No. 3 rather wide at the end of his precautionary eleventh lap when his radio went ape and he got two bumps and then full down elevator. The plane smashed directly into the ready area, hitting Tony Rich, who is Jerry Wagner’s caller, on the left wrist and side. Tiny was in shock for a few minutes, an ambulance quickly got him over to X-ray, and within an hour he was back watching the races, with a bone fracture in the wrist. But it was so close that we can only shudder at what might have happened. There is no point in saying that it could have been prevented by slowing them down: it was not pilot error, and a plane going 10 m.p.h. slower would have done exactly the same thing. I am reporting it in detail as I want the facts known without distortion or hand-wringing over the dangers of Pylon Racing.

Because of the accident, Jerry Wagner withdrew from the remainder of the competition. I was tremendously impressed with his airplane, his general competence, and his sportsmanship. His blue mid-wing Cosmic Wind was one of the very finest Formula I ships to qualify. All balsa, including the cock cowls and a built-up stab and fin, it weighed 4¼ lb. all completed, and Jerry had to add some lead to make it legal. Jerry’s 1:33.0 was sixth best qualifying time, and I think there’s no doubt he would have placed high in the finals. I think he’s about the best bet I’ve seen to win the Nats next year, given any decent breaks at all.

My own association with Pylon Racing only goes back to 1967, when I saw Joe Foster beat Cliff Weirick in a fly-off for first that ended with Cliff’s dramatic dive from several hundred feet up (his victory roll) that splattered his Midget Mustang totally in an area that could be covered by a dinner napkin. But before that, he was the winner of the first Nats Pylon Races ever. And now, six or seven years later, after several near misses, this former AMA president, this leader of the Over-the-Hill Gang, has done it again: and he earned it with five perfect races, in one race beating Terry Prather and Larry Leonard (who ended up fifth and second, respectively), beating Harold Coleson in another (he came out a sparkling third), and D.C. May and Danny McCann in still another (D.C. was fourth, in the end, and Danny had carburetor trouble that knocked him down to eleventh). Cliff’s time was only the fourth best of the finals (1:34.9, with Leonard’s 1:33.5, Prather’s 1:34.0, and Nogy’s 1:34.7 ahead of him), but he was as fast as he had to be whenever it was necessary: and just as he did at Las Vegas, he came through on the big ones. I have never seen a more exciting race (Continued on page 94)
GRAND NATIONAL CHAMPION

If it wasn't for the friends he has made in modeling, Brian Webster wouldn't have been the 1972 Grand National Champion. In fact, he likely wouldn't have entered the Nats at all or kept with model aircraft for all the period of time since his father, Lee Webster, introduced him to this hobby—something he had not been for the most pleasant associations he has developed. In an interview with an AMA staffer, Brian said, "You come to the Nats more to see your friends than do you fly."

JUNIOR NATIONAL CHAMPION

Kenneth Bauer, the 1972 Junior National Champion, was influenced in begin modeling at age eight by his dad. He is now 13 and will be in the eighth grade this fall. Optional school activities that suit his interests are science and the band; he plays trombone.

Ken's primary field is Free Flight modeling in which he has had expert tutelage and advice from not only his father but also such "name" modellers as Bob White, Jim Quinn, Bob Gibb's and Sal Taibi. That's good company in which Ken recognizes and for which he is most appreciative. And during the Nats, Ken remarked that Rick Wasiak had been very helpful at the Control Line circles.

Help is a two-way street as far as the Junior Champ is concerned. A prime example of this, brought out in our interview, occurred on the night before he left his California home for the Nats. There he was, at 8 pm, helping a neighbor boy at his first try to learn how to fly Control Line!

OPEN NATIONAL CHAMPION

The three-year reign of Bucky Servaites as Grand National Champion was ended in 1972, but it is believed that he has set a new mark for the consecutive number of years being Open National Champion—four. Bucky has been Open Nats Champ continuously since 1969!

Bucky builds and flies models primarily for the relaxation it gives him, he says. Even with his work as a bridge engineer for the State of Ohio Highway Department, he makes the opportunity for having this kind of relaxation a priority. Come lunch time he closes his office door, takes off the phone, gets out the sticks, glue, board, etc., and "has at it for 45 minutes or so...to forget the trials and tribulations of the day."

One of Bucky's strategies in Nats flying is to make good use of his exuberent energy at the beginning of the contest by flying many events very carefully. A prime consideration of course, was to fly the models he could expect to do well with based upon pre-Nats performance. But another factor, which he said is equally important, has to do with how points are computed according to official AMA rules.

Two years ago it was standard practice to lean heavily on outdoor FF events because everyone who "maxed out" would receive 100 points irrespective of how much flyoff time was added into the score of the winner. Then came the new and current procedure which includes flyoffs and which awards 100 points only to the winner; and as Brian indicates, championship contenders stayed away from such events as Unlimited Rubber, A Speed, and A Proto Speed.

A look at Brian's events shows that he adhered fully to this concept: FF non-Gas power—Indoor Scale and Nordic Glider; FF Gas power—B FF Gas and FFI Power; Control Line—A Speed, B Speed; C Speed; FFI Speed, B Proto Speed. As the results indicate, he was a high placers in many of these events, and even where his name is not shown as being within the first five places, he still received a good number of points for having a high (though not winning) score relative to the winner's.

Buckies' experience was mostly with Free Flight models, it is strange that his championship entires leaned heavily in that direction: Indoor HL Glider, Unlimited Rubber, Coupe d'Oliver Rubber, B4A FF Gas, and A FF Gas. His Control Line entries, built especially for the Nats, were 1/6A Speed, 1/6A Profile Proto, FFI Speed, and Stunt. This was Ken's third National Contest.

Many original design models were among Ken's entries. A notable exception was the Starbuster 350 which he flew in 1/6A Speed, and B A FF Gas merely by swapping engines. He pulled another swap, using the same prop assembly for Unlimited Rubber and Coupe d'Oliver.

Why does Ken like modeling? "It's fun to do," he said, "and it also keeps you busy."
The lamp support cables collected indoor models like a flypaper strip collects flies. "Major" Brown lowered the lamps to the floor, and most were recovered.

Continued from page 22

in the neighborhood of $15,000 more than previous years.

This was regarded by AMA officers as a tough cost situation but one that could be met by a combination of fee increases and service reductions. It was generally felt that a limited loss situation could be tolerated in order to prevent cancellation of the Nats program in 1972. So, with some gulps and finger-crossing, the Nats planning went ahead. It was already late in the year, but a special effort would be made to catch up.

Then came another crisis in May. A request for clarification of AMA's financial obligation indicated that the cost could go up another $10,000 above the basic $15,000 that planning was based on. The threat of Nats cancellation, this time by AMA, was again in the air.

But some quick AMA HQ action on the phone came up with the answer. Discussion with the Navy revealed the problem to be an apparent need to fly aircraft away from the station during the Nats, the cost of which would have to be borne by AMA. By brainstorming the problem the solution came to light: relocation of Control Line events and the Sunday air show so as to permit station aircraft to remain in their normal squadron locations.

Agreement by the commanding officer, followed by a meeting at the Pentagon, confirmed the solution. The crisis was averted; the Nats were back on. But valuable time had been lost. There was barely time to get word to all Nats officials concerning details of travel and lodging. There was some confusion and some juggling of Nats workers due to the late word, but these problems were largely solved by a week before Nats time when AMA

(Continued on page 102)
The Warlock was one of the classic mistakes of all time. The usual procedure of thought and design was somehow reversed in the creation of this machine. Far more thought and theory was expended after the first version was flown to discover why this aircraft could perform so flawlessly.

In late fall 1970, I was out flying my past National's Pattern ship and was feeling rather unsatisfied with it. Some-thing was lacking. After a relatively dismal flight, I was stricken to the core when Lloyd Nicholson (our local big-time contest flier) offered to let me try his latest design for the weekend. (Why, I'll never know!)

Sometime later, we descended into the murky depths of his basement, a light was flipped on, and there amidst the balsa shavings and dope fumes squatted the strangest, most bizarre creation I had ever seen. If you can mentally combine the outlines of a Bomark missile, the character of a broomstick, and the grotesque charm of an Ugly Stick, I think you will get the idea.

Upon closer examination, even stranger particulars came to my attention: flying stab, delta-outline wing, formerless fuselage, and a 'King' airfoil. From this angular airframe would evolve the precise machines of a new era!

The next weekend was exclusively spent in trimming, practice and evaluation, and I slowly came to the conclusion that somewhere deep inside the essence of this craft was the answer I had been seeking. Suggestions were then typed up, and a set of modified drawings plotted out, all of which were returned with the cybernetic bird in the hopes of improving the breed. However, Lloyd had already started work along a different line, so I took it upon myself to create and modify from memory, as I had given away the only copy of my drawings. Luckily, measurements were still clinging to the deep recesses of my mind; work progressed swiftly. Within two days the final draft was ready.

As the din of frenzied creation subsided, I dumbly stared at the result resting on the tangerine felt surface of the pool table. Something which had bothered me fixed itself into words: "Egad! The resemblance has been lost!"

The essence of its predecessor had been warped by the addition of tandem gear, swept wing, top decking, stall strips, canopy, altered movements, new airfoils, increased areas, redrawn contours and a swept fin. Through the process of imagination and a bad memory, a totally different aircraft had been arrived at.

At last the fateful day of its maiden flight arrived. The Enya 60II was cranked to life, and this behemoth taxied out to the center of the runway. Power was brought back to full idle, and a control check was made. A powerful realization slammed through the barriers.
of my subconscious. This monstrosity can't possibly be capable of controlled flight. It's too radical... too many new ideas at once... maybe I should forget about it. Every eye on the field is on me. I can't chicken out now. Somehow the throttle was shoved to the extreme, the Warlock screamed down the runway. Instinctively I pulled back on the stick, and the red, white and blue blur started to rotate... that's enough, now ease up... it's still going up! Put it into a bank... it's still going up! Loosen up now, just horse it around, I thought to myself as more trim was stuffed into the box... here she comes!

During that immediate low full-power fly-by I came to experience a feeling of total exhilaration, of freedom and absolute precise control. I also realized that this craft was slightly under-powered and I would have to come down soon. This was one decision I wished to delay until I discovered how the flying stab worked (I kept remembering the sight of countless past wreckages caused by improperly balanced flying stabs), and what the stalling speed was.

At the moment, altitude was no problem. Power was reduced to full idle, and back stick was fed in slowly until it became apparent that stalls were nearly impossible. With this knowledge, a final approach was set up, and a truly fantastic landing was accomplished due to the unique outrigger arrangement.

Further flights were cancelled until one of the newly introduced Supertigre Bluehead G60s was purchased, installed, and broken in. I had decided to run the Tigre rich for the first flight and was aghast when it died on me at 200 ft. altitude. I had only one landing under my belt, and panic set in immediately. I was not used to the feel of my handiwork. Instinctively, I pulled the craft into a split-S to keep my speed up, and set up an approach for a hot landing. At about ten ft. altitude, I realized the Warlock was traveling at about 105 mph, downwind, and with a dead engine. As it screamed past me at eye level, I was uneasy but reassured by the two miles of runway. Sometime later, it dawned on me that my pride and joy was disappearing into the sunset with the same altitude and speed it had when it had passed by me. I let go of the back stick, and saw the plane come in contact with the strip, back down again, up again, and then settle down out of sight below the horizon. After a dismal four-mile walk to and from the site—only one outrigger was seriously damaged—I was told never to run a G-Tigre rich after it is broken in.

With an application of five-minute epoxy, I was back in business. The engine was leaned out, and the rest is history.
Throughout the contest season, the Warlock never failed to place high in the standings. This can be attributed to three factors. First, the Warlock has the capability to awe the judges and intimidate competitors. Due to its unusual appearance and unique design aspects, an immense psychological advantage was created in my favor. In this day of immaculate maneuvers, something is needed to make a flier stand above the others. In some cases, just the name of the contestant alone is good for extra one or two points for each maneuver. Another way to influence the judges is to literally astound them by hauling out a truly unique aircraft which flies with utter perfection.

Second, when these intangible aspects have been peeled away, the most vital factor remains: consistency. In this design, all the components melded together into a flawless, dependable piece of machinery. Fate guided my decision toward selecting the Super Tiger Bluehead as my main contest engine. Throughout the '71 contest season, I never experienced an engine malfunction—no aborted flights, dead-sticks, overheating, load-ups on taxi, or even a broken prop! Also, I was fortunate because I never had to quit in the middle of a contest due to radio failure (Royal Classic 70 system). And the Warlock has its own dependable features; it has the uncanny ability to maintain precise contest trim, access to most vital areas is direct and simple, every component is incorporated simply and logically.

I was terribly perplexed about why the Warlock was so successful. After the fact, I did some research to find out where I went right! After some 83 pages of theory, I noted that through mistakes, curiosity, and pure luck, the Warlock design matches up almost item for item with the hypothetical aerobatic ideal. Through the conglomeration of rule-of-thumb and a fatalistic attitude, I've proven the age-old maxim of "what looks right flies right."

**Construction**

To all expert builders: If you expect to create a flyable precise machine, you must carefully read these construction notes. Several unique practices employed. The Warlock is not a Sport aircraft, nor even a C-Novice ship. It was designed to be exclusively built and flown by experts.

The wing should be built first. Notice that this particular wing cannot be built on an Ajusto-Jig due to its severe taper and sweep. Due to the need for precision, however, some jig has to be used. Notice that there are 1/4" holes in the rib templates through which 36" long 1/4" steel rods are inserted. One wing panel is completely assembled up to the stall strips on these rods at a time; later, both are joined together (with no dihedral) by inserting 1/4" hardwood dowels through the first three ribs on each side. Sheeting is applied around the center section and the optional stall strips, the formed leading edges are glued on, and the whole center section is then fiberglassed.

(Continued on page 69)
DENNIS ADAMISIN

The Sweet Pea is my newest hat in the stunt design ring. It is a notch different than most stunt ships. The V-tail not only opens a whole new series of designs but seems to improve the plane's flying ability. This airplane is the first "full stunter" I have built with a V-tail, though it is actually the third development model in my V-tail series. Number four is on the board right now, and by the time you read this it will probably have been flown and evaluated. I do not believe in building the same airplane every year.

In 1965 my brother flew his first original design at the Nationals. That year marked the last time anyone in our family flew a kit design. Since then we have designed our own airplanes.

The Sweet Pea represents the present cog in our design machine. Since 1965, an impressive array of shapes has come off our drawing board with approximately half the designs actually built. The shapes have included jets, pure original, semi-scale and novelties. Variation in the design has been more than superficial; we have experimented with wing configurations, airfoils, stab and flap configurations, moment arms, wing and stab positions in relationship to the thrustline, size of the overall airplane, wing loadings, power loadings, tail-draggers, trike gears, tandem gears with

[Text continued on page 86]

(Plans on page 48)
MODEL AIRCRAFT OPERATING STANDARDS

1. PURPOSE
This advisory circular outlines safety standards for operators of model aircraft, and encourages voluntary compliance with these standards.

2. BACKGROUND
Attention has been drawn to the increase in model aircraft operations, and the need for added caution in the case of free-flight and radio-controlled types to avoid creating a noise nuisance or a potential hazard to full-scale aircraft and persons and property on the surface.

3. OPERATING STANDARDS
Modelers, generally, are concerned about safety and do exercise good judgment when flying model aircraft. However, in the interest of avoiding undue criticism from affected communities and airspace users, compliance with the following standards is encouraged by operators of radio-controlled and free-flight models.

c. Exercise vigilance for full-scale aircraft (get other people to help if possible) so as not to create a collision hazard.

b. Select an operating site at a sufficient distance from populated areas to avoid creating a noise problem or a potential hazard.

c. Do not fly higher than 400 feet above the surface.

d. Do not operate closer than three miles from the boundary of an airport unless permitted to do so by the appropriate air traffic control facility in the case of an airport for which a control zone has been designated, or by the airport manager in the case of other airports.

e. Do not hesitate to ask for assistance in complying with these guidelines at the airport traffic control tower, or air route traffic control center nearest the site of the proposed operations.

William M. Flener
Director, Air Traffic Service
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DRAGON International Racing Class. 31” long. Complete with fittings. $31.00

BLUENOSE. 35” long, 27” high. Beam 51/2” with all fittings — $52.00 $49.00

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Approx. 24 1/2" long, 33” overall height. Mast 27” high. Excellent quality wood construction kit including keel plate, ribs, and planking. Detailed instructions and plans. Complete with sails, metal keel, and fittings. $13.00

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DANMARK complete with fittings
This training ship of Danish Merchant Navy is a real beauty. Kit has wooden planked construction, and is complete with turned brass fittings. Scale 1:75. Length 36 1/2”, 23 1/2” high, beam 5 1/2”.

JYLLAND Frigate. 39 1/2” long, 24” high. Complete with fittings. $67.00

ZWARTE ZEE tugboat. 30 1/2” long, 11 1/2” high, 5” beam. With fittings. $55.00

VIKING SHIP Exciting, authentic reproduction, scaled down to 26” by 6 1/2” Complete Kit. . . . . $17.00

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STEP 1. The ribbed hull of a typical Billing Boat® kit. No short cuts; you become the skilled modeller!

STEP 2. Planking is being laid in place. A simple challenge for any careful model builder.

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“SCHOUW” or Seow, Netherlands Canal freight barge. Easy to build this satisfying kit. Makes a 26" model with planked hull construction, cloth sails, all fittings. Complete kit. $16.00

“SAMSON” Sea-going Tug. Unusually fine quality wood kit, with keel plate, ribs and planking. Excellent detailing includes rubber bumper on bow. Approximately 22 1/2" long. Complete with metal fittings. $22.00

“STATENJACHT” was the Dutch called original Royal Yacht. Planked hull construction with hardwoods. Builds to 39" long by 8 1/4" wide and 33" high. Complete with fittings. $61.00

SANTA MARIA. 21 1/4" long, 17 1/4" high, 5" beam. With fittings. $26.00

SPERWER — Model of Dutch Canal Boat, in scale of 1:15. Length 23 1/2", Width 9", height 32". Kit comes complete with sails and decorative side paddle. Complete with fittings of brass — $34.00.

Excellent quality construction kit. 22 1/2" long by 13 1/2" high. Includes ribs, planking, Brass fittings, cloth for sails. Complete kit — $14.00

See Your Hobby Dealer... Dozens of beautiful models; some advertised in recent issues of this magazine. If dealer does not stock, send check or money order for direct, prompt shipment. California orders must add 5% sales tax. Satisfaction guaranteed.
The night is All Hallows' Eve, and ghostly figures scamper through the darkness to the lighted doorways where they demand their yearly tribute of sweets. There are, however, others who may call this night Lammas, and from overhead we hear the rustling of wind-blown garments as we glimpse a witch in flight on her way to the Witches' Sabbath.

Spooky indeed, but alas impossible. Magic is a flimsy substitute for aerodynamics, and so we have had to overcome the ancient broom's shortcomings with more modern power and balsa.

If you would like to duplicate our enchanting miss, pull yourself up to your workbench for a spell and clear off a spot big enough to glue together the soft 1/8" sheet balsa cape. Better first place a piece of plastic wrapping on the workbench unless you intend to fly the whole table.

Any wood model cement or white glue will suffice for the cape. Due to the unusual nature of this model, however, we strongly recommend using an epoxy-type glue for all other gluing to insure adequate strength.

The nose block can be either a solid block or laminated from any sheet wood to make a block 1 1/4" thick. When the glue has dried on the block, carefully square the front end with saw or sandpaper and drill lengthwise for the 3/8" dia. tail boom. Epoxy the 1/8" plywood firewall in place; when cured finish shaping the nose block and sand smooth.

The broom handle is a 14" length of 3/8" dia. dowel slotted to receive the horizontal stabilizer and drilled to accept (in order, nose to tail) the line guide, bellcrank screw, and both the

*(Continued on page 57)*
**Jig for Aligning Tail Surfaces**

1. **1/16" Ply Tail Segments, Make 3**
   - Control horn
   - Cut away for adequate travel

2. **1/16" Ply Tail, Off Set 3/8" to Right**

3. **Cape (Wing), Build Flat with No Airfoil or Dihedral from 1/8" Sheet Balsa, Grain as Shown.**

4. **1/16" Dia. Music Wire, Landing Gear**

5. **1/32" Ply Leading Edge Reinforcement**

6. **Optional 1/8" Sq. Stiffener**

7. **Control Horn**

8. **Cloth Tape Hinges on Underside**

9. **Stabilizer 1/16" Ply**

10. **Note Gap**

11. **CUT OUT, GLUE ON NOSE BLOCK**

12. **Arm 3/32" Sheet Make 2**

13. **Edge Reinforcement Option 1/8"sq. Stiffener**

14. **1/8" Ply Firewall**

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*American Aircraft Modeler 53*
Maxey Hester's Ryan STA is one of the best known models in the world, having placed 2nd in England at the 1970 World meet, won 1st at the 1971 Nationals and recently captured 3rd in Toulouse at the 1972 World Championships, leading the U.S. RC Scale team to victory. It was the prototype for the popular Sig Ryan kit and an outstanding performer in the air. A Locotrol Pro Series radio is used for control.

Mike Stott designed his Meyers 145 from measurements and photos taken of the big ship on display at the Antique Airplane Association Fly-In. It is completely riveted, the only addition being a 7500-lb. head aluminum rudder. It is powered, Rom-Air units retract the gear and the flaps also operate. Mike placed 4th at the World Championships in France during August, highest placing member of the U.S. CL Scale team.
The assignment of reproducing the authentically scaled full-size aircraft in miniature realises all three of these realistic beauties in balsa and glues, covered with Sig Sanding Sealer, finish coat Dope topped off with an appliance-Coat Clear Dope and flown in Sig Fuel. See your Sig dealer for the modeling world.

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ORDERING INSTRUCTIONS

SIG MANUFACTURING CO., INC
401 S. FRONT STREET
MONTezUMA, IOWA 50171
Use .045 wire for push rod.

Hat brim

Wing brace

Balance here

1/8" ply wing brace

1/8" dia. aluminum tube handle bars

1/2 A bell crank

3/8" dia. dowel broom

Hole for line guide

Balsa for witches

Use very hard 1/4" balsa.

Add wart to suit.

Use jig to obtain angle.

End view of tail assembly (no scale).

Witch craft

Conjured by Frank Scott

1" dia. wheels

56 November 1972
WITCH CRAFT
(Continued from page 52)
cat’s feet. With the stabilizer slot cut
and holes drilled, this boom may be
 glued into the nose block.

Our bewitching aviatrix is cut from
the hardest piece of 1/4” balsa available.
After she has been shaped and sanded,
saw her in two to allow for the broom-
stick. Wrap rough sandpaper around the
broomstick, rough side out, and slide
the witch halves back and forth in order
to relieve them for a good fit with the
boom. When you’re satisfied with this
fit, the witch may be epoxied to the
broom handle.

The cape, which sustains our craft as
a wing, needs only to be cut to shape
and the edges sanded round. The wing is
attached to the body with the 1/8”
plywood “T”, which passes through the
witch’s body, and reinforced by the
1/32” plywood plate at the under side
of the leading edge. At the trailing edge,
the wing is secured in place with the
1/8” plywood “Familiar” cat. The
attachment of the cat is facilitated by
the pegs left on the bottom of his feet
which are glued into holes in the broom-
stick.

The 1/16” plywood fins are a bit
stiff for broom bristles, but being
paulwood, they are strong and help
balance the machine. Of course balsa
may be substituted, but then ball ist
may be required. Note that the hori-
izontal stabilizer is made in one piece, is
substantially larger than the other fins,
and passes through the fuselage slot.
The other fins are simply glued onto the
broomstick. The lower vertical fin also
serves as a rudder with its trailing edge
bent 3/8” to the outside of the circle.

Incidentally, the rudder offset is the
only line-tensioning device needed. The
position of the line guide makes any
wing tip weight mm engine offset un-
necessary.

In keeping with our modernization
of the ancient vehicle, handlebars are
provided for improved rider comfort.
These are bent from 1/8” aluminum
tube, and the witch’s 3/32” sheet balsa
arms mm epoxied in place.

So much for the airframe. To give
this project real color, it’s time to de-
corate. A felt tip pen can be used to
handily sketch in broom bristles and
bindings and, after achieving some con-
fidence with the broom, the witch’s
face. Give the entire model two coats of
clear fuelproof dope, lightly sanding be-
tween coats. No fashion discerning
witch would be caught in a drab cape,
so a bright red lining is appropriate. The
top of her cape, dress, hat and shoes are
black. Stockings are the traditional red
and white stripe. The engine pod can be
any color that turns you on. The re-
mainder—face, hands and broom—are
clear finished.

Bend landing gear wire to shape and
attach wheels. The landing gear is sand-
wiched between the firewall and engine
when the engine is mounted with No. 2
sheet metal screws.

Mount the bellcrank and hook up
pushrod. Finish the control system with
the line guide, bent from .045 wire,
epoxied in place.

Now for the final inspection. Check
the model’s balance and add ballast as
necessary. If built according to plans,
balance ought to be right with a Cox
Pee Wee .020. Check for control free-
dom, warps, and anything which may
put a hex on your witch.

At the flying field, try your flying
sorceress on short lines (15 ft., for ex-
ample). Fill the tank with the appro-
priate elixer, mutter the usual incanta-
tions, and with a bit of up broom it
should fly like magic!
Free Flight

BOB MEUSER
SPORT

Boeing Scholarship Contest: Marty Thompson of the Oakland Cloud Dusters did it again. He won the Boeing Bash, and a $1500 check that goes with it. He took six first places (Half-A Gas, A/2 Towline Glider, Unlimited Rubber, Cargo, Outdoor Handlaunch Glider, and Easy-Bee) plus two second places (Control-Line Speed, and Helicopter). Quite a cross-section.

We presented a three-view of his winning Forty-Plus Cargo model (December 1971 AAM, p. 35). It carried 20 oz. of three flights,

Meanwhile Back at Charlie: Last month we started on a complete uncut, unexpurgated expose of Charlie Sotich's Draw-Dip Nordic. Now comes the good part: the wing construction.

First of all, you will have to make a special 9 block, shaped to give a 10% thick logarithmic spiral on the convex side, and a circular arc on the concave side. (The coordinates are shown in the table.) The surfaces are covered with sandpaper or, better still, with "craftsmen sandpaper," consisting of grits of tungsten carbide bonded to a thin sheet of steel called Craftsman Karbo-Grit Sanding Sheet which is sold at Sears Roebuck stores.

Charlie's method of constructing the wing appears to be similar to the one presented by Italy's Paolo Soave in Frank Zuck's 1969-1971 Model Aerodynamic Yearbook. But it is different in important ways. You had best follow the recipe by the numbers, or you will void your guarantee.

1) Laminate the leading edge by forming and gluing the strips directly over the plans. Taper the trailing edge stock from 1/4 x 1/8 to a width of 3/4 at the tip.
2) Pin the LE and TE in place on the plans, and prop up the front edge of the TE to the proper angle.
3) Lay strips of sheet balsa to a width of 13/32 in. This is the rib stock.
4) Cut the full-ribs to length, and glue in place.
5) Cut the half-ribs to length, and glue in place. Then the quarter-ribs. Add the straight-across ribs to the wing roots. (When all the ribs are in place, the tops form a flat surface.)
6) (Here comes the sneaky part.) Remove the wing from the plan and set it on a flat surface with the convex side up. Sand down the undercamber using the convex surface of the sanding block.
7) Turn the wing top side up, and align the trailing edge with the edge of the flat working surface. Sand in the upper surface camber using the concave side of the sanding block. Keep the leading edge guide on the sanding block in contact with the leading edge. Continue sanding until the sanding block bottoms out at the TE, and until the ribs are flush with the TE stock.
8) Sand the leading edge to shape.
9) Plane the top surface spars to a taper. Pin the spars on the rib joints, and mark the ribs for notching. Remove the spars, notch the ribs and glue the spars in place.
10) Brush water-thinned white glue over all the joints.
11) Coat the entire framework with clear Hobbypoxy.
12) Mount the aluminum tubes which receive the wing-joiner wire with Sig Epoxy.
13) Cover the wings with MonoKote.

Stabilizer and rudder construction is similar, but since they are so small they can be sanded freehand. Stab section is flat-bottomed, 7% thick.

Charlie Sotich gives his Draw-Dip Nordic those masterful touches that make winners.

Thoughtfully designed pay load model by Marty Thompson has one-bladed prop, four-point tail, and dropped wing tips.

Indoor Plumbing is In: There are two kinds of people in the world: those who prefer screw adjustments, and those who prefer glued-in-place shims. Charlie Sotich is one who prefers screw adjustments for Nordic rudder. The usual arrangement is a U-shaped bracket with a pair of tapped holes spaced to the top of the tailboom. The rudder fits between the ends of a pair of screws inserted in the tapped holes. Charlie gets the whole thing inside the fuselage pod quite neatly, as the sketch shows. When the model is being towed, the formed wire is held against the front screw, and the rudder is approximately straight-ahead. When the towing line is released, the formed wire is pulled to the rear against the other screw, permitting the rudder to flip to the glide position.

BUD TENNY
INDOOR

More Fuselage Bracing: The October 1972 issue explained the advantages of bracing motor sticks, and showed the two most popular bracing methods currently in use. This month, Fig. 1 shows another method of stick bracing, which has been used by experienced flyers for years. Because it is somewhat more demanding in craftsmanship and precise wire tension and alignment, it is not recommended for beginners.
An unusual Pennyplane model by Dick Hardcastle is patterned after ideas from John Kukon and Doug McLean. Funny looking circle rudder sits atop fuselage while large stabilizer is pyloned below fuselage.

The posts are installed in pairs, with the posts passing through the motor stick, and ending flush with the bottom of the stick in the center next to the motor. It is necessary to install the motor stick at the same tension in each wire. Field adjustment of the wire is not recommended unless building time allows. It is assumed that the motor stick is straight and the wire tension correct.

One-gem FAI models need a fairly large piece of equipment that must be used to permit enough turns for long flights. As a result, the motor sticks get extra stress from both torsional forces and rubber tension. The slightest misalignment of a sharply wound motor can deflect the stick to the side and cause stick collapse. For that reason, the corresponding designed the bracing shown in Fig. 2. The basic stick bending loads are taken by the removable top wire which delivers extra leverage by being hooked on the wing posts. Side loads are taken by a tightly-strung wire which is installed in the tail. The combination of thrust adjustments and bending motor stick gives unusual latitude in adjusting the power pattern—quite important for highly powered FAI models.

BOB HATSCHEK

GADETS AND EQUIPMENT

From a Loser's Viewpoint: This is being written the day after arriving in Long Island after the 1600 mi. drive from Caddo Mills, Texas, and the U.S. 1973 Team Selection Finals. Placing well down the list of Nordic fliers, this gadgeter fell far short of making the team. Since almost a hundred of the nation's top free fliers also were trying to make the team, there's no cause for feeling shame, just a bit of disappointment—until next time.

It was a tough meet. The competition was tough. And the weather was tough. Winds ranged up to about 30 mph for the three days of official flying, and it wasn't even approaching calm at the 6:30 a.m. start of flying. It was hot, too, with temperatures in the 90's on most days, which made it particularly tough on the Wakefield fliers, who left a lot of broken rubber on the field. None of this is meant as an excuse. Rather it's a statement of the obstacles successfully overcome by the eventual winners. Win, lose or draw at next year's World Championships, they'll be a great U.S. team.

The strong winds made model retrieval considerably more difficult than usual despite the fairly open Texas countryside. One of the most widely used retrieval aids was the trail bike, which is fairly effective and certainly fun. But it can also be dangerous. At least two motorbike retrievers ran into trouble—one in a hole on what appeared to be a smooth field, and the other into a couple of feet of water in what appeared to be nothing but lush grass. Neither was seriously injured, though one was taken to a hospital for a check-up when he appeared to be suffering from at least a mild concussion. So don't rely alone on a motorbike! It's a job for two—one to watch the model and one to watch where the bike is going. The course for retrieving with a car—you need a full-time driver and a full-time spotter.

One of the best-equipped and best-organized retrieving systems was the one used by the Brooklyn Sky Scrapers. With eight members flying (two in Power, two in Nordic Glider, and four in Wakefield), the Sky Scraper retriever with bags, and after 15 rounds in the high winds they hadn't lost a single model permanently (some did take a few hours to find and return). The principal piece of equipment they used was Frank Pualin's "optical tracking station." (See April 1972 AAM.) This consists of a pair of binoculars mounted on a camera tripod along with a telescopic riflescope and a good compass. It was used in conjunction with an enlarged U.S. Coast and Geodetic Survey map of the area. At each Sky Scraper model either landed or went out of sight in the distance, or with binoculars, its magnetic compass bearing was noted and plotted on a plastic overlay on the map. This sight line was then cross-hatched to indicate the estimated distance. Two members manned this fixed station and, with the aid of an additional pair of binoculars, they managed to keep track of as many as three airplanes in the air simultaneously.

This station, identified as "Sky Scraper Upwind," was constantly in touch by Citizen's Band radio with "Sky Scraper Downwind," the retrieve command post about a mile from the launching site. The one member at this station, also equipped with binoculars, directed the retrieving crew, each of whom also had a lightweight Citizen's Band radio. The individual retrievers brought the models back to the headquarters station, where they were picked up by car (several at a time) by the fliers.

For the really long flights, and some went several miles, the Sky Scrapers had the ultimate in retrieving equipment—the Cessna 170. This was generally the aircraft the day's competition was over, but it was a simple matter to fly over the model launching point and fly the compass heading plotted on the map. Not only did the airborne Sky Scrapers take care of their own, they also spotted a number of models belonging to other contestants, later sending ground parties to the locations marked on the map. One afternoon, they picked up eight strays this way and returned them.

There was one retrieve that was only partly successful, however. Sky Scraper Carrol Allen's Wakefields are covered with black tissue on the bottom surfaces so they showed strong deflection against the back of the model. The model apparently flipped over its back so it wasn't visible from the air. So Carrol took a compass and marched across the countryside on the recorded reading until he found the model. But by this time it had been chewed to pieces by one horse pastured in the field where it landed. You just can't win 'em all!

BOB STALICK

GLIDER, RUBBER AND POWER

FAI Team Selected: Caddo Mills, Texas was the place and the U.S.A. FAI Team Selection Finals was the event. Starting at 6:30 a.m. July 1 and ending at 2 p.m. July 3, this was the big step on the road to represent the country in Austria next year as the FAI Internationals. The weather was hot and windy and models were drifting downwind into the cottonfields, trees and town, but it was a great spectacle and a gathering of some of the top fliers in the country. Support equipment and personnel were in use throughout the contest, but those with the experience and the good models placed high, whether the support equipment they used was extensive or not. As a result, a strong representative team was selected, with experienced internats contestants and newcomers playing in each event.

In Power the trendy thing to have was a high aspect ratio elliptical tipped wing covered with sheet balsa and Monokote or Solarfilm and using a thin, flat-bottomed airframe. Finch is fit, rubber's wound, and Willard Smith is ready to launch at Caddo Mills FAI FF Finals.
foil. The fuselage was long, with a low to medium height pylon and rear fin. Rossi engines were definitely the standard ... wings were seen only fon the models flown by Ann Gieskieng and by Tom Koster, who came over from Den- mark to compete.

High thrustline models were flown by only two contestants: Don Wensel with a Lightning Rod and John Rak with a Soarhead. Tom Koster flew both. The Lightning was designed by Bill and his brother, Bill, and the Soarhead was designed by Tom Koster. The Lightning had a very high thrustline, and the Soarhead had a very low thrustline. The Lightning was much more difficult to fly than the Soarhead, and the Soarhead was much more difficult to design than the Lightning.

Even with the sometimes finicky habits, the auto-stab is here to stay and the flapper appears to be lurking just around the corner. This is a good thing, as it means that the auto-stab is becoming more reliable and easier to use. The auto-stab is a device that automatically stabilizes the model, making it easier to fly. The flapper is a device that changes the shape of the model's wing, allowing it to fly in a more stable manner.

There will be many articles and reports to read and hear on these finals. Modelers serious about the FAI program should definitely not miss this opportunity. The FAI program is the world's premier free flight program, and it is a great way to test your skills and compete against the best modelers in the world. The FAI program is also a great way to meet new friends and to learn from other modelers.

GUEST AUTHOR: CLARENCE MATHER

SCALE

Flying Scale at Taft: The recent United States Free Flight Championships held at Taft, California, included Flying Scale events. It was a good number of entries although several Southern California Scale enthusiasts did not compete. The weather was hot and breezy but not bad if you flew early. Jack McConnell, NAR Flightmasters president, proved that he has organizational ability equal to his superior scale building talent. Carl Hatrick, Scale event director, had serious car trouble en route to Taft, Jack got word of this and sprang into action. Very soon tables, score sheets, and flight cards were set and Jack had a watch in each hand timing flights.

During the contest I discovered a neat way to rack scale models. Two of my models, a PT-19 and a Stormovik, were in a cardboard box with the top closed but not tied. The box was setting on a pot in a dead that had three sides open. A tremenous dust devil came along engulfing the tent and blowing everything near with dust and debris. After it passed I suddenly noticed, with great alarm, that the model box was no longer on the pot—in fact, it was nowhere in sight! Frantically I looked for the box and models. Soon the models were found upon the ground about 100 ft. from the tent. They were battered and torn but not nearly as much as anticipated. Later Pido Takiok found the box a good quarter mile from the tent.

The contest was not difficult to obtain a consistent circling flight pattern with rubber-powered scale models. Outdoors a wandering flight usually can be tolerated but indoors the model crashes into hard walls or bangs around chairs and bleachers. The cause of some of these crashes is not hard to understand. A lightweight rubber motor generates several times the torque of a partially charged AA battery. The transfer of the propeller to the model, the propeller's weight, the model's speed, the propeller's mass, and the model's aerodynamic shape all contribute to the model's behavior. During a fully wound flight, if the model depends only upon offset rudder or only upon angle of attack, then the model's direction will probably change during the flight. Each design and often each particular model has uniqueness but I'll describe the trim adjustments that work well for me.

Most of my scale models are flown indoors in a small recreation center about 40 ft. wide, so there is not much room for a wandering flight. Most models are flown to the left. The rudder is offset about 1/32" to 1/16" from true straight. This is for models that are Peanut Scale weigh about 1/3 oz. and proportionally more in larger sizes. The ultralights will need more rudder offset and heavier modelers less.

To allow for change, the tail assembly is rather loosely spot-glued when first assembled. Thus it can be easily cut free to trim changes. The propeller is angled several degrees down when model is fully wound. This usually is not necessary for the whole TE to be down that much, but the outer portion should be. This can be accomplished by building the wing that way or it sometimes can be warped in by steam. Also a small down elevator can be spot-glued to the underside of the trailing edge of the wing. Of course twisting up the right wing has about the same effect.

If the circle begins the proper size but enlarges as the motor unwinds, try more rudder and less thrust offset. If spiral dives persist, even with wash-inting edge of the stabilizer. Some models require consider- able tinkering with the various adjustments because each model will respond somewhat different. The thrill of seeing a neat scale model roll across the floor then chandelle up into a smooth circling climb makes it all worthwhile.
Good coloring and markings with several working features on Bill O'Connor's Whidcat.

Fox 59 for power. Anyone want to retract those gears?

Low in the fidelity to scale portion of his score. Several reasons could account for low score, the most common of which is with color and markings and perhaps some of the detail work.

Remember that your model has to be a specific aircraft. That means that it must be painted, and marked in the same manner as the full-size prototype. To substantiate this, you should be able to present photos (color if possible) and a good set of three-view drawings, as well as any other information that will help the judges in giving you every point you deserve. Don't forget to have responsibility to prove that what you have done to your model is correct.

Detailing of the plane is important. Make sure that hatches, rivet patterns, antennas, guns, etc. are all in the proper location and size. In your first attempts at scale it might be better to concentrate on a few details and be very accurate about their placement and size, then go from there rather than put on a lot of detail and an overall poor job.

One last thought: Scale builders are not made over night, it takes time, patience and work. Even the best had to start small.

HOWARD RUSH

Combat

Honkin' Engines: Lots of people hop-up engines for hire these days. I propose a contest to see who's best. Hopper-uppers are invited to send me their engines for evaluation, after which they will be returned. Engines will be judged for starting (hot and cold), consistency of running in maneuvers, and level-flight speed on a Combat plane. Results will appear in this column. Write to Rush, c/o AAM for details.

What?: There's an alternative to going deaf from engine noise. Sonic Ear Valves are ear plugs that attenuate loud noises, but don't cut out quieter sounds. Designed for folks who shoot guns, they can be found in sporting goods stores for about five dollars per pair. Of course, you could use a muffler.

How Fast?: To get speed in mph, divide 1800 by time in seconds for seven laps on 60 ft. lines or for eight laps on 52 ft. lines.

Universal Slow Combat Rules: Slow Combat is here to stay, so there's no point arguing about a standard rules system. folks can use the same plane for contests in more than one place. Ron McNally, an engineering professor at Purdue and a competitor in both Slow and AMA Combat, proposes a streamlined set of Slow rules. By his system, AMA rules would be followed plus: (1) sleeve bearing engines are required, and (2) airplanes must have at least 350 sq. in. wing area and must be at least 24 in. long, measured from propeller to tail hinge line.

Ron favors plain-bearing engines with pressure fuel systems optional because it's the least expensive way to fly. "Suction fuel draw limitations are unarbitrary to the point of causing crashes," he claims. Also, experience gained by novices using a pan bladder or baby pacifier. Slow Combat is good training for AMA Combat, where competition dictates the use of a pressurized system.

Ron rejects mandatory landing gear as adding to a plane's cost and complexity at the expense of performance. His area and length rules would rule out all existing competitive AMA Combat planes and would favor Ringmasters, Flite Streaks, and the like.

Rusty Motors: After running an engine with synthetic oil, squirt some light motor oil in the exhaust port to prevent rust. Synthetic lubricants make fine lubricants, but they need help when the engine is not running, particularly in damp weather.

John Blum

Carrier and Stunt

Throttle Handles: Much has been said about throttle handles and many types have made the scene. Bob Lee, writing in the San Jose (Calif.) Aero Modeler's Newsletter, presents a workable throttle control handle that parallels the standard EZ-Just two-line handle.

Some models may have 3/32" holes 5/16" centers. The trigger at the widest part is 2-1/4", countours and disassemble. Bolt trigger to center plate, reassemble handle with leads extending 1 1/2", and dope finish.

Refer to the May 1972 AAM for method of constructing an inexpensive, but effective, three-line throttle bellcrank. Above handle will work with this crank or a Robert's crank.

Stunt Wings: Requests have been made for suppliers of various wing cores suitable for UC Stunt. Here's two: Controline Specialties, 3 Roger Court, Wantagh, N.Y.; Foam Flite, 628 West Sixth St., Mankato, Minn.

Line Tension Problems: More questions on this and a model's inability to pull out of a loop. Would require a book to define them all. Most problems pertain to 1/2A and Sport.

The following is a list of suspicions. Line tension: (1) no outboard tip weight; (2) no
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.19 TO .35 ENGINES
SCALE: 1¼" EQUALS 1 FT.

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no — not little Indians... but 10 nifty little Control Line models that deliver real fun flying... and are they easy to build! Only 6 to 9 die-cut parts (depending on the particular kit) to glue together; a motor mount (that's ready to bolt in place); also the complete control system (less handle and lines); decals, landing gear, wheels, etc.; which makes building a lark and assembly literally in minutes! Use any .049 engine (you might even have around from an abandoned ready-to-fly plastic job, it may require slight modification). A perfect ship to learn to fly on (first time flight instructions on the plan). They're great little flyers and so light you can't hardly hurt them. We've got 10 of them in the line now, 9 at $2.95 and the Bipe at $3.50. Tools you need are generally found around the house. So take a look at them at your dealer. You'll love them... and so will your pocketbook.

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Eleven-year-old Matthew Bauer uses Enya 15 'on his Jr, Flite Streak. He's a most happy fella, nice building job.

engine offset; (3) UC lines too long; (4) insufficient power; (5) lines too large in diameter and too heavy; (6) model extremely tight for wind; (7) model too slow, inability to loop (8) model not designed for stunts; (2) model too heavy; (3) nose moment too long; (4) flat bottom wing; (5) tail moment extremely short in comparison to nose length; (6) flexing pushrod; (7) model too fast; (8) lines long resulting in loss of control; (9) insufficient elevator-elevator area; (10) insufficient wing area. Well, that's a few!

JOHN SMITH

SPEED AND RACING

Formula V and Mouse Racers Equals Fun: In recent columns I have been mentioning the newest fad to hit the Control Line scene. In different parts of the country they are called different things. But every one agrees that the small .049-powered scale-like racers have added new blood to racing circles. It seems as if every club newsletter has mention of these little bombs. All state that Junior who never before were interested in racing building them. Most of the models are built for the reed valve Cox .049.

In Cleveland where the event was started, the rules state that only this type engine be allowed. Wingspans run from 12 to 14 in., models 3/4" scale profile, and are flown on 42 ft. lines. 48 to 54 laps per tank (Golden Bee) are common and some pilots have been seen flying on 52 ft. lines! Any engine modification is allowed as long as the outer-counter parts used. Fifty lap heat races, three models per heat, and 100 lap finals run. One pit stop must be made in each race. Designs call for over-sized stab, about 20 to 25% of wing area, balance on or near .049. Kann LH props are being seen some. The reverse torque helps control takeoff. At least one major kit manufacturer is planning to get on the bandwagon with at least three models. If your club is running this event, let's hear from you. With everybody's ideas, maybe a set of national type rules can be written up. Should make a nice after-hours event at the Nats next year.

Like 'em Bigger, Try Slow Rat: Bob Compton (El Paso, Texas) says they're flying Slow Rat in our second largest state—300 sq. in. on the wing, 36" span. Profile, no pressure, hot glove, or fast fins. Add a two-oz. tank, two-wheel gear and 40 up front. Fly for 140 laps with at least two pit stops. Mix well and you have the fastest growing event at the Texas area. Bob adds that the Juniors are running faster than the Open guys with oil stops averaging around 15 9sec. This event ought to keep everybody happy. Something is getting people interested in Speed flying. This year's Nats had 409 entries in Speed with 71 in Junior 1/2A Profile Proto. Hope the trend continues.

Radio Control

BOB STOCKWELL

PYLON

NATS Predictions: As of July 13, Bob Smith is ninth in the National Standings in the basis of three races, whereas everyone ahead of him has had five or more races. The simple truth about Bob is that he is flying closer to the pylons than he is, you have cut. So you have to go faster than .049. In 1971 there were some Supertigers that did in fact go faster than Bob—Terry Prather, Telford, Violent. But this year Bob has as good an engine as anyone, and when his own isn't running, he has Roger Thistle's to put in his stead (as at Bakersfield when he turned 1:27.9), or his partner Jeff Bertken's, or one of Larry Leonard's. There is no way he will be in the with less than the best K&B engine around. Unless he has terrible luck, like a mid-air collision, I have to predict that he can't be beaten this year except under one condition: that someone comes up with an engine that is better than the K&B, and, I believe as well as Bob. Early in the season there was some hope that .033 might be able to do it. As of the date of this writing (July 13), there is no doubt whether .033 will even have engines competing at the Nats. They will be good, we believe, when finally released, quite possibly better than the K&B, but it now looks as if their year will be 1973. There are some top Supertigers around, some fine Aeron engines, some Telford engines, some Prather engines. They are capable of besting almost anyone else flying a K&B, except Larry Leonard or Harold Colson or Cliff Weinick or Gary Korin on a given heat. But they do not have the torque of the Schneurles, though they have considerably more rpm, it shows in the turns.

I will also predict that the top two or three winners at the Nats will all be on the same frequency, that they won't have had to fly against each other. Last year it was 72.40 that picked up the first three positions. This year it will be 72.24. I hope I'm wrong. I can't believe we will be as lucky this year about mid-air collisions as we were in 1971. I predict that the outcome will be in part determined by the luck of avoiding mid-air. At these speeds it's just a matter of skill when you manage to stay clear.

I think we'll see several wings fold in the qualifying trials. The present speeds are increasing the wing stress exponentially.

Bob Smith, one of the men to beat, with a retractable P-31 going as fast as the retractables.

Glen Spickler, Nats Pylon Director, assigns handicap points at local race.

A Cassutt III Formula V (.049) built by Bob Sargent. Handles like a team racer.
Active again in a big way in Pylon is Joe Foster with a retractable tricycle-gearred P-35 from Francis kit. Attractive model does not have distorted appearance in all the P-51s.

Chamber Maid by Bob Root is skillfully caught in flight passing a pylon by Ron Reed.

Let's hope my crystal ball is foggy on all but Smith winning. No one could deserve it more. He flies superbly, builds to perfection, and is a modest and sporting competitor.

Editor's Note: To see how close Correspondent Stockwell came to predicting the outcome of Pylon Racing at the Nats, turn to page 36.

Making of fiberglass glider wheel well:

1. Cutting the form: Using a sharp knife, carefully cut the form to the desired shape. Be sure to leave a small margin for "finishing off" later.

2. Cutting the cloth: The cloth should be cut to the desired shape, leaving a small margin for "finishing off" later.

3. Mixing the epoxy: The epoxy should be mixed according to the manufacturer's instructions.

4. Shaping the well: The well should be shaped to the desired size and shape.

5. Finishing off: The finished well should be sanded and sealed with silicone.

CARL MARONEY
GLIDERS AND FAI

Molding Wheel Wells with Silicone: Editor Bud Faulkner published his idea for providing added realism to scale sailplanes in the EBS Journal. "Sailplanes," testing the basic method could be adaptable to new ideas he requested to share with other modelers.

John Burkam
HELICOPTERS

Fuselage Design: All kit helicopters to date have fiberglass fuselages, and the helicopters made from these kits are rather heavy. Fiberglass scale metal fuselages will be built 20 to 30% lighter than scale fiberglass jobs of the same power and size. Few scratch building of helicopters as interest turns more toward performance.

Next-to-latest version has more realistic fuselage and tail rotor drive by Gene Rock.
sinker is used. The shroud also prevents the fan from exerting a varying lift force on the fuselage and upsetting the balance of the model when you least want it. With just a little more effort, even the pulleys and belts could be enclosed on this model.

On the prototype pictured, .020 thick 2024-T3 aluminum was used, but the box is too strong for .016 could easily have been used. Soft aluminum from hardware stores may require thicker gage or more reinforcing. Metal Good Div. of Alcan Aluminum Corp., Norcom and Charter Roads, Philadelphia, Pa. 19134, will accept orders of .525 or more and will deliver in the Philadelphia area. Consult your Yellow Pages for local source. The pop or blind rivets available in many hardware stores are neat and quick to use. Steel, 3/32 dia. rivets are recommended and seem to work even in rivet guns which are only supposed to take 1/8 or larger rivets.

Wind Tunnel Free Flying: Gene Rock established what may be a world’s first when he flew his 55P-4 helicopter in Boeing Vertol’s 20 x 20 ft. wind tunnel with wind on and without benefit of tethering lines. Speeds to 25 knots were flown, and a sling load consisting of a miniature telephone pole was carried during parts of the tests. Ceiling effect was noted one time when the model came too close to the ceiling and sucked itself up. The friction on the blade tips along with the pilot’s chopping throttle caused a sharp drop in rotor rpm, but the big Enya 45 engine managed to rev up the rotor in time to prevent damage on landing. At 25 knots, the model wanted to pitch up or down if disturbed from equilibrium conditions—In other words, a slight static pitching divergence, reduction in collective pitch of the Hiller servo paddles from about 10° to zero collective improved handling qualities at high speeds. With more practice, it should be possible to hold the model within two ft. of a given point. This new technique of testing in a wind tunnel opens up new possibilities of studying stability and control and helicopter operating load compatibility.

TRIM IN A LITTLE UP JOHN!
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2. Producing all Blue Max systems as 6 channel outfits (4 servos) and adding only $10.00 to the 4 channel price—$330.00 + $10.00 = $340.00 and remember our Blue Max 12 volt set comes with Buddy Box—a deluxe set.

To be quite familiar with the procedures. We plan to discuss this in a future “Where The Action Is” column.

The receiver has a double-tuned front end, the usual 455 kHz IF strip and a stage of output squaring. The detected output is fed back to all IF stages for ACC. The output pulse train is fed to the decoder where the clock and reset pulses are formed by discrete components. Decoding is performed by an SCS for each channel.

The servos feature the use of an IC amplifier by Texas Instruments with discrete, passive components for trimming and damping. These are mounted in D & R Bantam DS2P mechanisms.

Interconnections are via a miniature plug block with separate plugs for fifth channel and power supply. Charging connection is made via the same power harness.

The test system had a separate inline failsafe device with it which could be used with most any digital system. It simply plugs into any desired receiver output to a servo and the servo, in turn, plugs into the failsafe.

The failsafe functions as follows: It detects the presence of the incoming servo control pulses arriving at 60 times per second; so long as the pulses are present, pulse omission detector (POD) remains deactivated and the control pulse is passed on to the servo. When a pulse is not present, for example during a loss of signal to the receiver, for a period of one second, the POD activates to start a reference pulse generator the output of which now controls the servo. The width of this reference pulse may be set by means of a tiny trim pot on the failsafe board to position the servo at any point in its normal range of travel. If used for “fail-safe” i.e., low throttle, the throttle servo could be run to full cut-off. At any time signal is regained, the servo will return to its original commanded position.

Near the end of our evaluation, a new IC decoder was sent to us by Silver-
tone and installed in place of the SCS decoder. The decoder utilizes three SN74L73 dual J-K flip-flops for decoding. Performance of the system is essentially the same with the IC decoder; however, reliability should be significantly improved.

Performance of the system was quite satisfactory. Temperature tests at 0°F and 150°F were satisfactory although one servo slowed perceptibly at 0°F. The average torque for the four servos tested was 0.43 in.-lb. This compares with a nominal 0.70 to 0.90 in.-lb for most systems we have tested. The output thrust of 2.5 lb. at a 11/64 in. radius was quite adequate for the helicopter.

In addition, we were informed by John Foy, president of Strato Model Products, that they would be using Orbit PS-6 servomechanisms. Measurements were made of torque for a set of these servos and an average value of 0.83 in.-lb was obtained, a considerable improvement over previously measured servos.

WARLOCK
(Continued from page 44)

To cut out the 1/4" dowel holes in each rib, round up a 1/4" dia. brass tube and grind away the inside edge of one end using a conical grinder (Dremel tool). Hone down and polish this edge to a razor-like character, and punch out the required holes.

The formed leading edge is made from a piece of 6 x 36 x 3/32" sheet which has been soaked in steaming hot water for an hour. If possible, find an old tapered wing, and wrap the wet wood around the leading edge and tape it in place until dry. This process may have to be repeated to make the wood hold a tight curve. Then take it off the old wing, trim it, and glue it to the new wing (formed leading edges are needed for both sides).

Our home-brew wing-jig consists of two 1/4" steel rods supported evenly at each end by clamps. Note that the rods go through the wing at an angle. Slide the ribs into position—carefully! First, slide all the ribs into position on the back rod and tape them to the rod so they do not slide around. Then slide the front rod through the remaining holes with a twisting motion (you'll probably need help to keep things in position).

Splice together enough soft 1/2" balsa to form the rough shape of the flying stab (it should be full-span). After all the edges are squared up, imbed the 1/2" brass tube in the stab (see plans). Then flow five-minute epoxy into the gaps on both sides of the tube until the glue is flush with the surface. At this point, rasp and sand the stab to an airfoil shape using the brass tube as the peak of the camber. When satisfied with the shape, run it through a bandsaw along the lines shown on the plans to cut out the center section. Cut out the top and bottom of the center section brass tube to obtain a 1/2" square hole. Slide in the torque tube, and solder the tiller bar in position. Install the center section on the fuselage, and slip on the 1/32" spacers and stabilizer halves. Fasten with sheet metal screws, two on
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Good until December 31, 1972.

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Complete weight of each unit and suggested application:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Weight (oz)</th>
<th>Recommended (oz)</th>
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<tbody>
<tr>
<td>Baby</td>
<td>2.5</td>
<td>Pee Wee .020</td>
</tr>
<tr>
<td>Baby</td>
<td>2.7</td>
<td>Up to .80</td>
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<tr>
<td>Twin</td>
<td>4.4</td>
<td>Up to .72</td>
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<tr>
<td>Standard</td>
<td>4.8</td>
<td>.049</td>
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<tr>
<td>Stomper</td>
<td>4.8</td>
<td>.049-23</td>
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ACE MINI FOAM WINGS

These jobs are being used by more and more modelers to come up with their own designs. See recent issue of AAM for P38 and RCM for Mr. Mulligan's ideal for 1/2A Racing and other planes of semi-scale or fun types.

Constant chord measures 35" span, 5% wide, area 192.5. Weighs 31 ounces.

Taper section is 25" span, center 5%, which tapers to 4", area 166.25. Just over 2 ounces.

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No. 13L100--Dick's Dream Kit $6.95

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1. 70" Foam Wing - Moulded sections
2. Precision Machine cut and sanded wood
3. For .049- Power Pod parts supplied
4. Recommended for Rudder-Only
5. Standard or Stomper Commander
6. Owen Kampen design

No. 13L104--Ace High Glider Kit $14.95

ACE MINI FOAM WINGS

These jobs are being used by more and more modelers to come up with their own designs. See recent issue of AAM for P38 and RCM for Mr. Mulligan's ideal for 1/2A Racing and other planes of semi-scale or fun types.

Constant chord measures 35" span, 5% wide, area 192.5. Weighs 31 ounces.

Taper section is 25" span, center 5%, which tapers to 4", area 166.25. Just over 2 ounces.

13L166- Ace Mini Foam Taper Wing $2.95
13L102- Ace Mini Constant Wing $2.95

STOMPY KIT

If you have mastered Rudder-Only pulse proportional flying, and are looking for new ventures, the Stompy is for you. Reassembles a stand-off Goodyear scale racer, Owen Kampen touches in both the design and kit assures the experienced modeler of a satisfactory RO pulse experience. It is NOT recommended for beginners.

Has 30" span wing cut from Ace mini foam tapers. Construction of the fuselage is a bit harder than a box type, but still simple for modelers with experience. Fuselage is 23% recommended power is Tea Dee.020. Recommended radio installation is Commander Baby Twin. This makes total weight of 12 to 13 oz.

Kit contains foam wing set, precision band sawed and sanded top grade balsa and hardwood parts. Bent landing gear, wire for torque rod and plastic bearing, and hinge material is also supplied. Wheels and engine mounting hardware are not included.

Full step by step instructions make this a simple job for the experienced RO flyer.

No. 13L103--Stompy Foam Wing Airplane Kit $6.95

2T KIT

By Ron Jacobsen

Uses two sections of the Ace Mini Foam Taper Wings, and Constant Chord section for a total span of 60 inches, 362 sq. in. Coupled with an .049, the 2T was designed primarily for the two channel Brick type digital that are on the market, or two servo's of any digital system.

Also, when constructed correctly, it performs exceptionally well on Rudder Only using the Commander Standard or Stomper. Motor control can be added to at a later date by using the KRD motor control. Motor Kit contains three wing panels, all balsa wood completely band sawed and precision sanded, bent landing gear, and miscellaneous parts. Is of the same general high caliber as previous Ace kits. Hardware for hinges and linkage and wheels is left to the buyer.

No. 13L106- 2T Foam Wing Airplane Kit 14.75
No. 13L206- Three Foam Wing Sections 5.00

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4. For .049 to .051 Tee Dee Engines
5. Two channel operation
6. Owen Kampen design

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- Receiver-Decoder will work with ANY modern 4-8-Bit digital transmitter on same frequency! Reads aileron and elevator signals; ignores the rest.
- Receiver-Decoder works any modern digital servo.
- Receiver-Decoder offer inexpensive way to upgrade your present system for glider, plane, boat or car. Requires extra components you already have. Or use our combo flite pak: receiver-decoder, two servos, etc.

Available on the following frequencies:
- 27.995, 27.045, 27.095, 27.145, 27.195
- 53.100, 53.200, 53.300, 53.400, 53.500

Complete Kit Combo

Consists of Transmitter Kit, and all parts of Flight Pak Combo, Saves. Available on 27 and 50 mHz spots. Without battery pack.

No. 10G2-Digital Commander Combo Kit $177.95

Please Specify Frequency

Battery & Charger Options

While alkaline energizers may be used for Flite Pak, Nicads are recommended-4.8 volts.

<table>
<thead>
<tr>
<th>Option</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>38K32—Nicad 225 ma Cylindrical cells</td>
<td>2.50</td>
</tr>
<tr>
<td>38K30—KRQ Flat Pack for above (4)</td>
<td>1.00</td>
</tr>
<tr>
<td>38K35—Nicad 450 mm Cylindrical cells</td>
<td>2.50</td>
</tr>
<tr>
<td>38K6—D &amp; R Square Pack for above</td>
<td>9.95</td>
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<tr>
<td>38K7—XL-48 by 500 ma button pak</td>
<td>6.95</td>
</tr>
<tr>
<td>38K7A—XL-48 by 250 ma charger kit</td>
<td>3.95</td>
</tr>
<tr>
<td>38K22—Varicharger</td>
<td>7.95</td>
</tr>
<tr>
<td>38K21—Varicharger, assembled</td>
<td>9.95</td>
</tr>
</tbody>
</table>

* Receiver-Decoder works any modern digital servo.

COMPLETE KIT COMBO

Complete Kit Combo

No. 11G20—Digital Commander 2 Channel Kit $49.95

Please Specify Frequency

digital commander

receiver-decoder kit

IC’s simplify wiring and set up of 8 channel decoder. Receiver is conventional double tuned front and uses a simple decoder. Complete with detailed step by step instructions.

No. 12G20—Digital Commander Receiver-Decoder Kit $27.95

Please Specify Frequency

digital commander

servo kit

Housed in the D & R Bantam DS3P mechanics, uses WE 3141 IC for easy assembly. Kit contains motor, pot, wiper and all components required, with step by step manual.

No. 14G20—Digital Commander Servo Kit $29.95

No. 14G20L—As above, but with D & R DS2P Linear Mechanics (Less connector)

flite pak kit combo

If you intend to use Commander Digital with your multi digital transmitter, all you need are the receiver decoder and 2 servo kits. Combo offers savings over kits purchased individually. Includes 3 connectors, switch, hookup wire for wiring. Everything you need to make complete 2 channel 2 servo pak for your sailplane, boat or car, except batteries.

No. 12G30—Flight Pak Combo $69.95

No. 12G30L—As above, but with D & R DS2P Linear Mechanics

Please Specify Frequency

For complete listing of Transmitter and Combo Pak, Batteries, Packs, Connectors, or components and PC boards—see our Handbook Catalog. Price as $1.00 BULK Third Class. $1.50 via First Class.

Dear Friend:

The photo above is of the Ace Foam Wing. The reason we're bringing this up again is that we're not sure if a design of a set of wings has done so much for so many.

Designed by Owen Kampen with small aircraft in mind, they are being used with modification in biplanes such as the All Star, and triplanes such as the J-8 with Fred Reese, and 1/2 A mitigate races of all types. You can purchase one has built it. A sort of scale model kit of Ace Mini Foam Wings. AAM will have plans by John Chapal for a low wing Ryan. RCM will have the plans for the new commander R-O set, and our hobby house flyer who wants the "Instant" fun that a small ship will provide. Some clubs are even having Pulse R-O contests. If you haven't investigated the pulse proportional set, by all means, send for our latest Ace catalog, it's packed with useful information.

Another interesting application is the Questor by Airtronics. A Stomper gives amazing and very satisfying results. It goes off the winch like a shot, and even in calm and dead air will achieve consistent glides. Airtronics plans for the Questor contain suggestions for the Commander R-O installation. We've been asked whether we will have a kit this Christmas. Very definitely. If you are in doubt as to what to give that R/C model builder, this is the kit. We will have gift certificates in any denomination from $10.00 up. This will allow the recipients to make their own choice from our big and expanding catalog.

Next time we'll have more on the expansion of the Foam Wings. The changeover for the existing receiver-decoder is quite simple and is especially for the people who are using this with transmitters other than the ACE Digital 2 channel.

Digital Commanders are presently available on all 27 and 53 mHz spots. May you have happy flights and soft landings.

Signed in cordiality,

Paul F. Runge
each side, to the torque tube and finish with resin to prevent warping of the stabilizer.

Round up a piece of 1/2" brass tube and another piece with lesser diameter which will rotate smoothly inside the 1/2" piece yet not flop around. Whenever a cut is made, polish the edges so the torque tube will rotate smoothly.

Note that the slot for the tube in the stabilizer blank is cut completely through the 1/2" balsa. Pin the tube to wax paper and, using a spatula, push epoxy into the gaps to hold the tube in position and make a flush surface.

The one-piece center torque tube is slipped through all three pieces of the completed stabilizer. Do not cut it into three pieces (as you did with the larger 1/2" piece). Slip this tube into the center section, and drill a 1/16" hole through both sides for the torque rod. (See diagrams on plans.) Then, insert the torque rod in the torque tube and solder at both ends. Be careful to do a neat job; the flux has a tendency to flow all over and gum up the tubes. The solder joints must be strong and closely contained in the vicinity of the joint. If solder or flux gets into the tube surfaces, the whole assembly must be taken apart and polished to make it work smoothly again.

The 1/32" spacers are made from scrap 1/2" brass tube. Be sure not to get any resin into the tubes or sheet metal screw holes when you resin the stab.

Glue the Nos. 2 and 4 bulkheads to the fuselage sides, then pull in the nose and tail ends. Add the trianglars, spacers, and bottom and top sheeting. Piece in the canopy area, and block in the engine compartment with one of triangular pieces. (I usually install an old engine with spinner to properly shape the front end and to be certain access room is left for the engine. Next, with rough sandpaper, rough out the shape of your plane. When that job is done, cut out the canopy hatch, wing hatch, wing cavity and stabilizer slot. Glue in the former for the wing hatch and set aside. Position the wing on the fuselage, fiberglass the front hold-down dowel in place, and rig up the trailing edge bolt(s). Then glue the top wing hatch to the top of the wing, and sand it down to blend in with the rest of the fuselage.

Install the center section of the flying stab with its access hatch cut out, and epoxy on the fin and fuselage spine.

For the fixed-gear version, use an old Debolt belly mount bolted to a piece of 3/16" plywood and lock it so it will not slip. The retract-gear version requires more thought, and the Positraction nose gear units are recommended for both the front and belly gear. The nose unit is shown in phantom line on the plans—it retracts to the rear. The belly gear goes in the same position as the fixed gear with the same amount of sweep in the strut (it is necessary to adjust the micro-switching of the retract mechanism to obtain this sweep). The retractable belly gear is not shown on the plans. I am certain there is a better
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Fiberglass both sides of the firewall (front and back) to provide a sturdy, vibration-resistant base for the engine. Also fiberglass any landing gear mounts and attach the outrigger method to retract it than the one I used (retracting towards the tail necessitated locating the throttle servo under the gas tank!). It would probably make more sense to retract the gear forward and take the sweep out of the strut. This, however, would decrease the cushioning effect and detract from the overall appearance of the gear. Use your own judgement.

The severe sweep in the hinge line complicates the making of the rudder horn. Round up a 4-40 bolt, 1/2" long, and bolt it through the rudder near the hinge line. Thread an aileron tiller onto the bolt, and connect it to the pushrod Kwik Link.

The canopy is placed together or made out of a solid block, cut from the fuselage, and painted. Cut an old clear canopy for the windscreen, and epoxy it in place.

It is probably unnecessary to tell experts how to set up a Pattern ship, but here are some notes on the landing gear system, CG, and control surface throws.

First, the landing gear. Much thought was put into this system. If you change it, do not expect things to work perfectly. Less-than-perfect landings are nearly impossible if the outriggers and undercarriage are located according to the plan. For example, as the craft is set up on final, the power is reduced to full and brought in very fast with a slight amount of back slide. This rocks the plane back on its heels causing the outriggers to touch ground first. These appendages are set up with a small amount of "spring" to put pressure on the nose gear on the ground. When the weight is off the outriggers, they spring back. Slow down the speed of the plane and the impact on the outriggers is negligible.

Second, the flying stab has a few tricks to it. You will need about twice the throw you would expect: about 1/2" in both directions (sometimes as much as 5/8"). In the air, the craft is not super-sensitive, but gives a smooth, gentle and precise feel which is just what today's pattern calls for. Also, a flying stab eliminates worrying about wing incidence. The stabilizer will always align itself with the wing to achieve level flight.

Last, but not least, is the CG. Due to the long nose moment, this craft cannot be tail-heavy. Even with all the flying stab equipment back there, I still had to add weight to the tail. Generally, the CG should be about 8% in. from the front of the fuselage.

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trailing edge of the wing, just outside the fuselage. From this point, gradually add tail weight until the plane enters easily into a spin. Once this is achieved, go no farther.

Don't try to fool yourself into thinking you can fly the Warlock if your skills are less than perfect. This is one heck of practice, but | shudder to think of the result which will inevitably occur if inexperienced hands get on the box!

So, good luck. | hope | never have to compete against another Warlock!

BLUE RIBBON REVIEW—
PART II
(Continued from page 17)

mounting plate is then attached to the rotor head assembly with counter-sunk 4-40 machine screws. Three 8-32 machine screws hold the Wankel mounting ring to the plate. The engine is located on the plate with the throttle in line with the rotor blades. Final balancing of the rotor assembly is accomplished by placing small pieces of solder in the end of the rotor blade.

Several tanks of fuel were run through the engine before attempting tethered flight. With the chopper firmly anchored (bricks on the landing skid), this engine break in time also afforded an opportunity to check and observe the action of the controls. Final trimming of the flybar linkage was made by observing the disc of the flybar in motion and adjusting for a level condition with all controls in neutral.

Initial flight attempts were made with the two-line tether system described in the instructions. The model weighed just under four lb, dry, and ten oz, of additional weight was attached to the landing gear. The first "flights" were made in Bob Beckman's backyard heliport, using a sheet of plywood as a landing pad. Two things became immediately obvious: There was enough lift from the Wankel; there wasn't enough tail rotor control. A quick trip to the shop to adjust the tail rotor linkage, and we were back to the now greasy plywood.

Several days and many penguin-type flights later we were beginning to wonder. The model obviously got light as power was applied, but it also started jittering and swinging around as soon as it started to lift. Even the most charitable of spectators couldn't say that the model was flying. At times it did seem that we had some control over the bird's gyrations, but for the most part it was just bouncing up and down with just enough lift to lift one tether. We were beginning to question whether the engine had the power to turn the rotor fast enough to provide the necessary control.

At this point we got a break. Dave Gray was in town to help with the AMA demonstrations at TRANSPO '72, and he gave our bird a test flight. After removing the weights and checking over...
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Du-Bro Whirlybird and the Ross have been a pleasure. The engine is easy to start, smooth and quiet running, with more than enough power to do the job. The first takeoff resulted in the bird climbing to a six ft. altitude before we realized what was happening. That we got it back down undamaged proved that we were making some progress in learning to handle this new type of RC flight. Since then we have progressed to short duration hovering flights and, more important, learned that we can fly the Whirlybird in moderate wind.

The Du-Bro Whirlybird has proven itself to be a fascinating and successful introduction to RC helicopters. Its greatest value may be as a trainer in preparation for full size flying of choppers. But we have to repeat the oft-stated fact that it takes a lot of time to learn to fly a model helicopter. After about four gallons of fuel we're still a long way from being accomplished RC helicopter pilots. But we'll get there!

Additional comments by the Editor: Many modelers have given up on their Du-Bro 505's and claimed that they are not flyable. This is just not so. They fly well and are a true helicopter even with the torque reaction drive. Think of this as a coaxial helicopter. The Du-Bro is the easiest helicopter to fly, too. I have become a pretty good fixed-wing RC pilot, but I felt like a rank beginner in RC with my first three gallons of fuel through the Whirlybird. It takes about four gallons to achieve smooth hovering.
With a helicopter, four gallons are used surprisingly fast.

Comments by other would-be Du-Bro 505 pilots indicate much misunderstanding of helicopter characteristics. For example, the Du-Bro is not top-heavy just because the engine is on top. Consider where the lift is coming from and realize that all the weight is below the lift. The chopper may seem top-heavy because of marginal control and stability when the rotors slow down or are unpowered when chopping the throttle. Because this model has a low rotor speed, that speed is critical.

Helicopters when within one rotor diameter distance from the ground are flying a very slippery bubble of air. All control inputs are concentrated on keeping that bubble of air. When the model is up to five ft., it is riding on a more stable column of air, not just a

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bubble. Also, the Du-Bro is a rigid rotor design and must be in full free flight off the ground (by at least 1 inch) before any control inputs are meaningful. Inputs on the ground have no relation to the direction of flight or movement of the model. So, bring the rotors up to speed, then lift off quickly but slightly before expecting controls to take effect.

As mentioned by Bob Beckman in the above text, we switched from the Wankel engine to the Ross to try the model with added power. I made this conversion after achieving significant power increases. Unfortunately, Bob did not get to fly it with the improved Wankel operation.

The engine loves lots of nitro and K&B 500 seems to be its best fuel. A Fox short idle-bar plug improves rpm by nearly 800 rpm over the original O.S. Wankel plug. The engine overheats and then sags fairly soon after running up to full speed on the helicopter, as there is almost no cooling in this application. Simple aluminum cooling fan of eight blades, 4½ in. dia., mounted just under the flying prop, provides the necessary engine cooling air. Use an 11-4 prop to fly the helicopter.

You just can't beat having extra power and the Ross is the way to overpower the Du-Bro 505. However, by using a high pitch prop (11-7½), more energy is put into the main rotor via torque at liftoff speed. More torque means more rotor rpm and thus both more control and more stability.

The tripod landing gear is quite easy to make with fiberglass rods into a base block or with bent wires into the original landing gear mounts. We'll sketch the elaborate tripod gear, you can simplify it to suit yourself. Please, build one for your model, it makes learning to fly more successful and possible.
If you haven't yet made a scale model, there's no excuse—Now!

Our new Radio Controlled P-51 Mustang is a Standoff Scale model. You can build it in about the same time a Kwik-Fli takes, but when you're through, you've got a model that only a ruler can tell from a true scale plane.

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CONTROL LINE
(Continued from page 35)

different and want to get some color back into your local Carrier contest, you might investigate the use of these planes.

Jim Finley (Wichita, Kansas), as a result of his win in the Open Class, was the most happy individual I have seen in a long time. Jim has been trying for years to capture the Open crown, but for one reason or another it has eluded him until now. Jim was the third or fourth contestant to get airborne in this competition and put his Guardian through its paces to post an impressive 588.19 score. As it turned out, the score held throughout the day giving Jim the win. Jim's Guardian was equipped with a Rossi 60, Bill Johnson fuel metering system and used a Herron blend fuel.

Robert Sawicki (Wyandotte, Mich.), eleven years old, also put on a great show at the Carrier circles by taking first place in the Junior classes for I and II events. Robert posted a 507.78 in Class I, but exceeded this score in Class II to establish a new Class I record at 515.15 points. Robert's win this year makes it the fourth consecutive year that he has dominated the Junior Carrier Class I and II events.

Terry Herron (Wichita, Kansas) flew his Japanese Judy to a first place win in Class II with a 518.05. I might point out that by winning this year, Terry has successfully defended his Senior crown won in 1971.

In the Open classes the names of Ray Willman (Normandy, Mo.) and Dick Sawicki (Westland, Mich.) are like household names. Both men can be counted upon to be in the winners' circle at the Nats—it's only a matter of which place. Last year Willman took the first place slot flying his Guardian for a 556.10 score while Willman placed second. Approximately seven points separated them in 1971. This year, however, Willman took the first place slot flying his Guardian for a 556.10 score to beat Sawicki who finished in the second place slot with his French Latecoere, less than three points behind Willman. What will it be next year, gentlemen?

To round out the report on Carrier event winners it should be noted that Senior John Gerber (Wyomissing, Pa.), flying a Martin MO-1, took the Senior Class I event with a 499.24 score.

Control Line Scale was not as impressive this year as it has been in the past couple of years. I believe this was because our top-notch scale modelers were in France representing the U.S.A. at the World Championships, and many new faces were seen at the Scale circles. This probably accounted for a lower level of workmanship and fewer operational features than is normally seen in this event, all of which was evident in the scoring. The highest score was 460 points in the Open Class where there are usually several scores over the 500 mark.

Seniors Cathy Burnstine and Rick Duwoleze had the only multi-engine planes entered. Cathy ran into trouble
with her previous Nats winning B-26 when an engine failed during flight causing the plane to come in on the lines destroying her chances for another win this year. Ouweleen managed to nurse his underpowered and tail-heavy P-51 around the circles for five laps to qualify for a second place in the Senior category.

The only plane having operating features other than the normal throttle control and flaps configuration was the 1/3" scale Hawker Hurricane MK-2-A by Lynn Sidabras which dropped fuel tanks after making his qualifying flight.

Dr. Charles Kirkland (Chicago, Ill.) entered one of the most talked about planes in this year's meet. Everyone waited for the moment when Kirkland brought out his 1904 Philips Multiplane for a qualifying flight. The question everyone wanted answered was "Would it fly?"

Before answering that question let me give you a few details about the plane. It was built to a 2"-1" scale giving the plane a 36" wingspan, and was powered with a Fox 59 (almost 50 years old on the plane). For those of you that don't know what a Multiplane looks like, just imagine an open Venetian blind with a small fuselage attached to the bottom of the blind.

Now back to the flight line, Kirkland got set on the circle, started his engine, set the needle valve, and went out to the center of the circle. He called for the release of the plane. It moved out and around the circle picking up speed.
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| No. 0111, Tucson—Scaled-down model of Tucson Air Race, $3.25 |

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| No. 0011, Stinger—Fine flying ship on balsa fuselage, $1.50 |
| No. 0010, Canusa—Riveted aluminum fuselage, $3.50 |

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| No. 0004, Bimbo—Winged HC plane for big engines, 4 channels, and clond. pleasing flights, |
When the plane had run about one third the way around the circle a little up elevator was applied and the plane was airborne, but not for long. It did what many of us thought it would—a small loop and back down to the ground to collapse in a heap much like an open Venetian blind would when dropped to the floor. It did what should have been done for more than once and would top this performance. It should be noted that during my discussion with Dr. Kirkland about his plane he had indicated that this particular plane has never been done for CL before. Now I know why. Ernie's plane was powered with a KB&G 45 and was equipped with throttle control.

John Garibaldi (Chickasha, Okla.) defended his Senior crown for the third year in a row with a well-executed flight. He activated the throttle to prevent the plane from collapsing when it hit the floor. His plane was powered with an ST 60 providing the necessary power for a smooth clean pattern.

Al also used a movable rudder on the ship to control yaw during maneuvers, and a shock absorbing landing gear for good takeoff and landing characteristics.

Dennis Adamson (Taylor, Mich.) was the winner in the Senior Class flying a semi-scale Fougé Magister. Dennis's plane weighed in at the more conventional weight of 54 oz., but was powered by a KB&G 45 and was equipped with throttle control.

The Seaforth stunter captured first place honors in the Open Class. Al's Seaforth weighed in at 73 oz., some 20 oz. more than most Stunt fliers feel is a good flying weight for this event. The effect of the extra weight was well balanced by the 15 oz. of ST 60 providing the necessary power for a smooth clean pattern. Al also used a movable rudder on the ship to control yaw during maneuvers, and a shock absorbing landing gear for good takeoff and landing characteristics.

Dennis Adamson (Taylor, Mich.) was the winner in the Senior Class flying a semi-scale Fougé Magister. Dennis's plane weighed in at the more conventional weight of 54 oz., but was powered by a KB&G 45 and was equipped with throttle control.

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**SWEET PEA**
(Continued from page 47)

... tip skids, twin rudders, single rudders and, in the case of this craft, no rudder.

After all these different designs we have reached a conclusion: Keeping the basic designs similar, the number of good flying aircraft but different-looking designs is endless. Building the exact same airplane every year because you are afraid to change is silly. All it does is put you in a rut which gets deeper each year. Even if you are successful in competition, there is eventually and inevitably a time when you will be beaten. Anyone who builds the same plane year after year without innovation or experimenting is not going to have experience with different designs, and therefore will not know in which direction he is going. Also, no

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a Max 35 and featured a semi-matte paint finish.

Mark Bauer (Norridge, Ill.) flew an original take-off on the Eindecker to take the first place slot in the Junior category on his third try at Nats Stunt competition. Mark's plane was powered by an ST 40, weighed in at 50 oz, and featured adjustable wing tip weight and a movable rudder for better flying characteristics in the turns.

The competition in all three categories was very tight as shown by the final results. In the Open Class Rabe won over Gieske by two points. Adamisin in the Senior Class bested Jackson by only .75 points, while Bauer beat Peterson by four points in the Junior event.

A great bit of flying by all. It might be noted that in addition to the three first place winners flying semi-scale planes, Bill Rutherford (Dallas, Texas) flew a well executed P-51 for a third place in the Open Class, while Lew McFarland (Lexington, Ky.) flew his Akromaster to the fourth place position. Yes, this was the year for the semi-scale stunters.

At the time of this writing the Jim Walker fly-off to determine the overall Nat's Stunt Champion had taken place, but the trophy had not been awarded. Senior Dennis Adamisin put in a good flight topping Al Rabe's performance by about two points. However, the question of whether or not appearance points should be counted in the overall scoring was raised. If appearance points were to be counted, the score would have been in favor of Rabe as he had about six more points in appearance than Adamisin. It might also be pointed out that with the K factor system of judging used in this year's competition, only a half point difference in a judge's mark on one maneuver could have made the difference between a win and a loss.

I don't know how headquarters is going to resolve the problem, but I do know that from talking to some previous Jim Walker winners that appearance points were not counted. The win was made on flying only. If this precedent were applied to this year's flyoffs, Dennis Adamisin would be the Jim Walker Trophy Winner.

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**PHIL-LEYS**

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With regard to the appearance points controversy, there seems to be growing sentiment for dropping appearance points from the AMA Pattern. Proponents of this idea claim dropping appearance points will increase interest in Stunt because competitors wouldn't have to spend as much time building. These people also claim Stunt is primarily a flying event and appearance points shouldn't play any part in the final outcome.

I consider both these views irrational and unfounded. Many modelers in different parts of the country, including my own, have dropped appearance points at local contests in an effort to improve participation. They have found that in the long run only Stunt fliers participate anyway. All stunt planes are time consuming to construct. If you want to be competitive in this event, you have to build one; if you don't have the desire or ambition to do this, you can forget about competing.

I partially agree with those who contend that Stunt is a flying event. The existence or nonexistence of appearance points is not going to make it easier to spend long, grinding hours practicing. A major difficulty is the way some judges score. In four days of flying at the 1971 Nationals, only one flier, the Senior winner, scored over 500 points (503). It is unrealistic to say that the best fliers in the country cannot fly high 500-point patterns. A flier should be awarded the full value of his maneuver. Too many judges give a great maneuver 29 points and a bad maneuver 22 points. The AMA scoring allows for a 30 point spread from top to bottom-use it! Give credit for a maneuver which deserves it. Doing this would lessen the effect of appearance points and put the emphasis on a consistent quality pattern.

If we drop appearance points, the whole quality of the event is going to drop with them. Except for Scale events, Control Line Stunt is the only AMA event where the quality of the airplane is judged. There are some small U-Control stunters available in ARF. If
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we drop appearance points then we can drop the builder of the model rules too. close as they do even in RC. When this happens the man with the heavy pocketbook will have the inside track in the race for a good airplane. Even if all this did happen, the man with the prettiest airplane has got a psychological advantage in the judges’ eyes before anybody even flies. Funny thing about humans — they are notoriously impressionable animals.

Construction
Sweet Pea’s construction is different but not difficult. Necessary materials are a large flat board and some scrap wood suitable for jig blocks. All major assemblies will be built in a jig.

All balsa, except as noted, should be the lightest available. The strength of this model comes from the structure, not hard wood. In most cases the strength to weight ratio is higher for a light airplane.

Use sensible gluing techniques. Don’t overglue, but don’t go the other way either. Make the joints fit; don’t depend on glue to fill the cracks. When you use epoxy, remember everything you apply stays.

The wing is a sparless structure and is designed to be covered. If you do not want a sheeted wing, take out every other rib and build a D-tube wing. (If in doubt, consult September 1972 AAM “The Hawker Typhoon.

Begin by cutting out the rib templates — one root and two tip ribs out of 1/16” plywood. Sandwich 49 rib blanks, 25 outside and 24 inside between the templates. There are three 1/8” ribs each side of center and one on each tip; all the other ribs are 1/16”.

Carve the ribs and hollow them to approximately 3/8” wide. Just before assembly, hollow the first two center ribs and the tip ribs only as much as is needed. Notch ribs in 1/4 x 1/2” leading and trailing edges as shown; the leading and trailing edge are notched full length. This is done with a 1/8” diameter cutter on a drill press. The 1/8” diameter notch is cut only in the center section where the 1/8” plywood center brace is located. Scrap 1/16” x 1/4” balsa is inserted into the slots to hold the ribs on center while gluing.

The center section crutch out of 1/8” x 4” x 12” plywood and hollow out as shown. Epoxy the bellcrank screw brace into place and drill the screw holes. Epoxy the leading edge and trailing edge onto the crutch, and allow to harden. When this is hard, you can begin the assembly of the jig. The leading and trailing edges are each blocked up with one-in. blocks. Nail all the blocks in their respective spots, and pin the framework to them. Starting at either end, install the ribs one at a time; cut off as much of the bevel on the leading edge as is necessary. When these are dry, sand the structure, preferably finishing the sanding with a long straight edge. If the wing is upright on the board, install your favorite control system.

Join and sand sheeting off the wing, making sure the joints are on the flat part of the airfoil. If you use four and six in. sheeting, you will have only one major joint on the wing.

The most difficult job is next. Coat the entire sheeting with Hobbypoxy Formula II glue. The trick is to leave only as much glue on the sheet as is necessary and then spread it. Try to get the coating to look just a little shinier than dry. Also apply glue to the leading edge, trailing edge and the center and tip ribs. Pin down the sheeting at the trailing edge, smooth the sheet forward and pin the sheet to the leading edge. Depress weights evenly across the sheet and let harden.

When hardened, pull the wing off
Plans and helpful hints for the beginning modeler are featured. Instruction and information are stressed, but the biggest thing is FUN! The magazine is designed for the boy or girl from seven on up. Take advantage of the only model hobby magazine written for beginners.

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OFFER EXPIRES DECEMBER 31, 1972
Hot racing models for fun and the toughest competition

There's lots new in the Dumas fun and competition line of boat kits this year...Atlas Van Lines, a 18" scale model of the unlimited hydro, driven by World Champion Bill Muncey. She's great for display, free or tether running with .049 or .09 engines. For the real RC competitor the new SK Daddle 60 features a bottom design, by Steve Muck, which provides higher straightaway speeds and faster turns. The SK 60 has hardware options for outboard rudder, water pickup and parallel drive.

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Kit SK-60...$34.95

NEW SK Daddle 60
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SK Daddle 20

SK Daddle Jr...$9.50

Dumas Products, Inc., 790 S. Park Avenue, Tucson, Arizona 85716
the board, rebuild the jig, and sand and apply sheeting as before. Completed wing shouldn't weigh over 14 oz. Install flaps and tips.

Cut fuselage sides out of 1/8" medium-soft balsa. Make a template of the airfoil off the wing, and cut out wing hole. Cut out stab hole also. Taper and drill out the motor mounts as shown on plans. Cut out all bulkheads. Glue motor mounts directly to fuselage sides—there are no doublers. This is a tried and true method for avoiding stress cracks at the wing leading edge-fuselage joint. If you insist on doublers, do not use plywood thicker than 1/32". Make them as long as the motor mounts and do not extend them past the leading edge. Make sure to have a left and right side! Epoxy two bulkheads and fuel tank to left fuselage side. Slide the sides onto the wing from each side, and epoxy the bulkheads to the right fuselage side. Glue the next two bulkheads in. Build a jig for the fuselage with the fuselage resting on its top. This will hold the fuselage steady while you align the wing. When the wing is properly aligned, epoxy it in and let it harden.

Cut the stab and elevator out of 1/2" soft sheet. Carve them to an airfoil shape. Be extremely careful to leave 3/4" each side of center of stab uncarved; it greatly facilitates construction. Bevel the center of the stab to create a 50° angle. It is possible to increase the angle to 60° or decrease it to 45° without any real difference in performance. Carve a block one in. wide to fit the inside angle of the stab. Join the stab halves, and block together with epoxy. When hard, sand the bottom of the stab until you have a flat approximately one in wide.

Elevator horns are made of Du Bro strip aileron linkage. Position the horn wires in the elevator, and open up the bend of the wire until it is vertical to the fuselage and parallel to the wire on the opposite side. The two wires should be no more than 5/8" apart. Epoxy the horn wires and hinge the two elevators onto the stab using at least three hinge points on each side.

The pushrod is a little tricky but, when done, is about the best way to motivate the multiple control horns. Using 1/16" wire, bend the rod as follows: bend a "Z" in the wire approximately 1/4" wide; bend the wire at a right angle opposite the direction of the "Z" so the wire crosses back across its center; bend another right angle bringing the wire back towards the point you started; bend another "Z" to bring the wire back right next to the original leg. You should end up with a 3/4" rectangular loop with the two open sides angling towards the center. Slide the Du-Bro nylon horns onto the loop with a cut-down ink pen spring between them to help keep them separated. Solder the open ends of the loop to a piece of 3/32" wire for the pushrod proper. Slide the horns onto the wire uprights on the elevators, and lock them into position with the set screw which comes with the horns.

Notice the former under the stab at the bottom of the fuselage and running to the back. Make one of these out of...
3/8" balsa, and pull the back of the fuselage together around it and the tail post. Install the remaining bulkheads. Slide the pushrods-stab assembly into place. After the controls work freely and smoothly, epoxy the stab into place.

The top, front and entire bottom of the fuselage should be covered and hollowed out of blocks. Build up the turtle deck with sheet balsa and then cap it. Glue the block above the stab to both the fuselage and to the block in the center of the stab. This improves the solidity of the rear fuselage.

Any of the new breed stunt engines run with good power and dependability. I used an OS MAX 35, but several other engines—notably the Testors and Fox 40s—are excellent choices.

Wheel pants are a nice luxury. The tailwheel fairing is borrowed from the full-size Sweet Pea. It looks nice but requires sacrificing the advantage of a long tailwheel. Then, you have to work for good landings. It is made of a 3/8" balsa core, cut out for the wheel. A 1/16" plywood cap on either side of the cutout faired in with 1/16" balsa finishes the assembly except for sanding to shape.

Cheek cowls are made from one in scrap balsa covered, hollowed and capped. These add charm and also make it easy to grab hold of the airplane.

Apply your favorite fillets. I carve mine out of balsa or use Epoxylite putty. Finish methods vary. If in doubt about finishing, consult articles written by Don Bambrick and Dave Gierke.

Flying
My model is a little heavy at 51 oz.; shoot for 48 oz. Mine took little trimming and flies extremely well. It doesn't turn as tightly as some of its contemporaries, but it turns cleaner. I flew mine on 65-ft lines with excellent results. The plane will carry the extra weight, and it also gives you more time to think between corners.

I would enjoy hearing your comments and ideas. Send me a note in care of the editor.

Pylon
(Continued from page 37)

than the one in which he just nosed Terry Prather out at the finish line: They were coming down the back straight ten feet apart, and Cliff got Terry on the finish by little more than the length of the airplane. Cliff's caller Dave Lane did a superb job. Cliff had to win several races starting from second or third position, which is rough, with everyone capable of flying in the 1:30's.

What happened to some of the names you'd expect to find high in the finals? Well, what makes racing fun is just exactly the incredible number of unpredictable things that can go wrong. I remember one year when Cliff Weirick went to the line and flamed out four out of five times because he had insufficient rotor clearance. This year the Hound Dog was out to get the San Fernando Valley contingent, except for Larry Leonard and Kent Nogy, to say nothing of what the Hound Dog did to
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The Florida, Texas and San Gabriel Valley entries.

Tommy Tusing, the brilliant young competitor from the S.G.V. R/C League, had a mid-air in his qualifying attempt, flying one of the prettiest Miss Dallas races you’ve ever seen, with a Super-tiger that was going with the best of Telford, Prather or Aldrich. Since only the wing was damaged, he put the wing of his back-up onto his No. 1 fuselage. The result: a disastrous trim problem that caused him to dump it full bore around the No. 3 pylon. Ed Rankin from Ft. Worth had a plug cool off in his Miss DARA and he filtered it through a fence on a downwind landing.

Bob Bleasby went off rich as Croesus, the plug cooled off, and he tried to turn it downwind before he had adequate flying speed, and, of course, knocked it in. Bob Smith, still in my opinion the best bet to win any given race entered, had something go crazy in his radio in his first heat, or there was interference in the air and his plane snapped on take-off. (One has to wonder. There were too many of these strange failing, and I think there is no doubt that Smith himself was innocent of fault.) Chuck Smith, who finished a brilliant third in FAI Pylon, was also in great shape to place high in Formula 1 when he landed his Miss DARA into the landing lights just beyond the No. 2 pylon. Jack Hahling, one of the last Florida group, had a wire come loose on his starting battery when he was on the line for his third attempt. And a lot of guys who are capable of beating 1:40.0 almost
any day in the week just somehow couldn't put it together: Pete Reed, Joe Martin, Whit Stockwell, Ted White, Charley Gray, Don Singer, Bob Bleadon, Garry Korpi. And maybe twenty others of the sixty-two who failed to qualify could almost as easily have made it as not. It's hard to figure sometimes.

One wonders about the whole qualifying system. Why couldn't we fly heat races all day Monday and Tuesday? At Bakersfield we flew eight complete rounds in two days with 95 entries. With 82 entries, I'll bet we could have done ten rounds and still had Friday afternoon for five complete rounds of the 35 or so FAI entries, and Saturday afternoon for five rounds of the twenty who were at the top of Formula I after the racing Monday and Tuesday. I don't think one freak time should determine your opportunity to fly in the finals, but rather your heat point accumulation after eight or ten rounds. I also don't trust those stop watches, despite the fact that we had the best group of counters, flagmen, starters and desk helpers ever at one contest. There was one instance when three planes finished within ten feet of each other: two of them were timed at 1:37 and 1:38, and both qualified, and the third was timed at 1:43 and failed to qualify. No way!

Please understand that I do not mean this as criticism of any of the workers, most of whom I number, hopefully, among my friends. I mean it as criticism of the system—a bad one that has been thrown out at every other major event except the Nats. And it cannot be claimed that it is retained at the
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Spectacular AMA - AAM Nats Coverage Begins Page 20

The regular “AMA News” section may look as if it has been short-changed this month, but it really isn’t so. Instead AMA and AAM have teamed up to improve the reporting and graphic presentation of the highlights and official results of the 1972 National Model Airplane Championships.

Beginning on page 20 you’ll find the usual AMA authors plus AAM’s “Where the Action Is” columnists. In this manner the reader will be able to learn about all aspects of the Nats with improved continuity. It is a team effort designed to pay dividends in increased reading pleasure.

New Dues Structure

The AMA Executive Council, at its July 26, 1972 meeting, approved the following dues structure for 1973 AMA members:

- Open class (19 or over as of July 1, 1973)—$15.00, including subscription to American Aircraft Modeler Magazine,
- Junior or Senior classes (not 19 by July 1, 1973)—$3.00 without American Aircraft Modeler Magazine, $7.50 with the magazine.

Membership renewal notices will be in the mail during October, must be returned with dues payment by December 15, to avoid missing any magazine issues for 1973.

New memberships may be applied for now—should be received by AMA by December 15 for full 1973 service including magazine subscription, liability insurance, and AMA competition eligibility.

U.S. Wins Indoor WC and RC Pylon Int’l

Pete Andrews, the first man to clock 30 minutes with an Indoor model, has won the 1972 Indoor World Championships with a two-flight total of 71:09. Czechoslovakians took 2nd, 3rd and 4th and also the team prize. U.S.A.’ers Cannizzo and Romak were 5th and 7th to earn 2nd team place.

Bob Violett, piloting the Telford/Violett entry, won the RC Pylon Race International Contest with 32 race points and best meet time of 1:40.5. Philip Greeno, Gt. Britain, was 2nd with 28 points, and Jeff Bertken, U.S., was 3rd with 23 points.

The two contests were in England, August 25-28; Indoor was flown at Cardington while the RC Pylon Race was at Cranfield.
Official Sanctioned Contests of the Academy of Model Aeronautics


particularly annoying since white is the easiest color to apply (especially with SuperPoxy), and the white primer. But then Tim's was the best; whether they were on target all the rest of the way down the line or not. Handicap judging is a thankless task; far be it from me to add to their burden. Certainly Bob Violett didn't agree with them when he found his beautiful bronze mid-wing Cosmic Wind with all the detail of rivets, control surface striping and the like, was in fact seventh rather than second (he was looking at the wrong end of the first row). And apparently it doesn't matter whether your engine is fully cowled or not. Terry Prether's was the only fully cowled engine to fly the first six; he does it by having an overwhelming advantage on the right side which nobody ever noticed.

In FAI Pylon, this time Garry Korpi did what he came so close to doing last year; that time he was third, this time he went all the way for an unchallenged first place. His most serious competition had bad cases of the cuts. Bob Smith couldn't find the No. 3 pylon on the FAI course, kept flying it like Formula 1, for two zeroes. Chuck Smith had a perfect score four out of five heats, but in his third heat he went to the line to find he had a dead receiver. During the qualifications Whit Stockwell's P-51 died just after release and there it sat in front of Doug Spreng, who turned sharp left to avoid it on takeoff and ended up crashing near the No. 3 pylon while trying to get up flying speed and avoid the officials in the course. Pete Reed's fine consistent performance earned him two firsts, two seconds and a third to place fourth in the finals. Bob Upton had the same points as Pete Reed but a slightly slower time to take fifth.

As almost always in Pylon Racing, the finals were full of surprises. No one who watched Telford/Violett qualify in FAI would have predicted anything but first for them. No one would have figured Bob Smith for 19th in Formula 1, or that Garry Korpi would fail to qualify. Terry Prether lived up to his reputation much better than expected, with a solid second in FAI, though he might easily have been higher than fifth in Formula 1—he crashed his No. 1 ship on landing during the qualifications, and his back-up has never been as fast even though they appear to be identical. Whit Stockwell did fail to qualify with the finest engine he's ever had was beyond our ability to fathom: we were just snake bit, that's all there is to it. And we weren't alone. It was a strange Nats—unpredictable, surprising, but always a good sportsmanship, good fellowship.

BEHIND THE SCENES
(Continued from page 39)

Executive Director John Worth and Nats Manager Ron Morgan arrived at Glenview.

One of the first problems encountered was a lack of any station public affairs office planning concerning advance publicity. It had been assumed that despite the Navy's minimum support situation, the normal publicity relations effort would be provided, simply to protect the Navy's interests and to obtain maximum publicity from the event. When this was found to be not so, AMA's PR man, Bob Lospohie, was called in several days sooner than was originally planned. He immediately got things rolling to provide an AMA effort to replace the usual Navy support.

With the help of Navy officers Geimer and Needham, the publicity effort quickly produced good newspaper, TV and radio promotion. In fact, the effort also produced good national promotion, due to Nats visits by commentator Paul Harvey and by a CBS network crew headed by newsmen Hughes Rudd.

Other problems were solved during the week, including a big one concerning how the
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Control Line circles were to be marked. Because of new paving and the runway the usual painted lines were not permitted. Nor was any form of whitewashing or washable marking. It was felt by Navy interests that any of these would leave a permanent stain, and this would not be acceptable on a runway used for regular full scale operations. It was finally agreed that masking tape would be acceptable since it could be peeled off and would deteriorate by exposure to weather.

Then came another shocker: 1400 yards of masking tape were required! At normal prices the cost would have been unthinkable, but it was finally arranged that AMA could buy the tape at government cost, and this kept the Nats budget within control. Meanwhile arrangements had been made to borrow two miles of snow fencing from the State Highway Department. Navy help got it transported from Chicago to Glenview, but it was AMA's job to get it put in place on the field. It was obvious that between the fencing and runway marking jobs a major effort would be required on the weekend immediately preceding the Nats.

Then came another last minute requirement that threatened to double the entire workload. The Navy insisted on fencing off all station aircraft for protection against curious spectators. This added at least another mile of effort. But with many surplus barrels and thousands of feet of rope (also bought by AMA) the additional fencing requirement was met.

At this point, on Sunday before the Nats was to start, everything depended upon a massive personnel effort by AMA to get everything ready on the field in time. The job was divided between two basic groups: airlift officials and local volunteers. About seventy AMA officials had arrived by Navy airlift on Saturday. Meanwhile many Chicago area volunteers, organized under the leadership of Bob Vojslavke (Woodbridge, Ill.), arrived to help. In addition, other officials from out of state drove to the Nats and joined the effort.

It all came together on Sunday, and the job continued through the next day. The fencing got up, the runways got marked. At the same time the special Nats phone system got installed as did 4200 feet of tables in the contestants' work hangar, and many portable exhibit stands. All these contracts were handled by AMA. In addition, the trailer and tents got laid out, and dozens of trash barrels got distributed.

The Nats hobby shop got built and stocked, a trophy case got built. Before the Nats week started, the usual huge Scale model display case had been built. This was a special effort by the Chicago Scalemasters Club: AMA paid for the materials; the club did the work.

AMA also set up a printing plant operation at the Nats to avoid costs which would be charged if Navy facilities were used. An offset press and photocopying machine were borrowed. Throughout the Nats, therefore, all printing was done by AMA including Nats results, contestant instructions, publicity handouts for spectators. This was a brand new and massive effort by AMA handled very well by AMA.

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It all came together on Sunday, and the job continued through the next day. The fencing got up, the runways got marked. At the same time the special Nats phone system got installed as did 4200 feet of tables in the contestants' work hangar, and many portable exhibit stands. All these contracts were handled by AMA. In addition, the trailer and tents got laid out, and dozens of trash barrels got distributed.

The Nats hobby shop got built and stocked, a trophy case got built. Before the Nats week started, the usual huge Scale model display case had been built. This was a special effort by the Chicago Scalemasters Club: AMA paid for the materials; the club did the work.

AMA also set up a printing plant operation at the Nats to avoid costs which would be charged if Navy facilities were used. An offset press and photocopying machine were borrowed. Throughout the Nats, therefore, all printing was done by AMA including Nats results, contestant instructions, publicity handouts for spectators. This was a brand new and massive effort by AMA handled very well by AMA.
local area officials. In an operation involving over 150 Nats workers, transportation was a key element to success.

All these and many other factors went into producing an outstandingly successful Nats. Whatever problems were involved behind the scenes, the main goal was to achieve a good contest. This was done, and to most contestants the ‘72 Nats was much like others before it—the problems and extraordinary efforts were not visible to most flyers.

For this Nats the behind the scenes efforts were more important than usual because they would determine what any future Nats might be like. Had AMA not been able, for example, to do on its own what had been done by the Navy in past years, the likelihood of continuing the Nats on a large scale basis would have been greatly diminished. The 1972 effort proved that AMA can produce the same type of effort since this is no longer an operational airfield for aircraft; another is to go to a private field such as Oshkosh, Wisconsin (where extra income is available from public admission charges); and a brand new possibility is Wichita, Kansas, based on an offer involving community support from that area. AMA's Executive Council has promised to review all possibilities and announce the date and location of the next Nats before the end of 1972.

While the question of the ’73 Nats is being resolved, a few closing memories of the ’72 event linger. One is that of Ed Sweeney, editor of American Aircraft Modeler, all alone on Sunday evening of the last day of the Nats unloading bushels and rolling up snow fence. He had volunteered to help and did it, at a time when most everyone else had quit in exhaustion. Similarly, on the day after the Nats, one lone volunteer single-handedly did the final cleanup at the contestant hangar. Ray Collins, of New Orleans, simply grabbed a broom and worked all day on his own. He made no favor or compensation—this was his contribution in appreciation for having enjoyed many Nats.

Many others pitched in during Nats week for similar reasons. They emptied garbage cans, swept the hangar floor, set up work tables or took them down, and generally offered their efforts without looking for recognition. Another good example was that of the Nats workers who picked up even when they learned their airlift flight would be late departing. They worked on Monday morning, after the Nats, taking up the runway markings.

Yet even with these extra efforts—and despite a tremendous final Nats day cleanup by contestants and officials—AMA had to do it again in ’73, it was a last reminder that a Nats effort on our own does not come easily or cheaply.

It was a tremendous Nats, in many ways perhaps the best in 25 years of Navy hosting—certainly the biggest. Hopefully we will go on to other great Nats, with or without the Navy. In the meantime the ’72 effort should make us all grateful for those great years of Navy support—we found out in ’72 just how much of a contribution the Navy had been making behind the scenes, and without question it was tremendous. In weariness, therefore, after the experience of 1972, we can say in full appreciation, "Thanks, Navy, for 25 great years of Nats history—regardless of where we go in ’73, we're grateful!"

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