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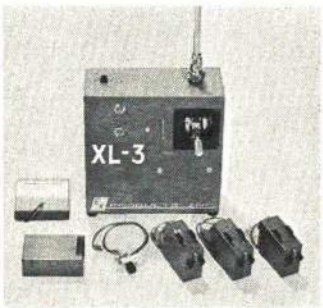
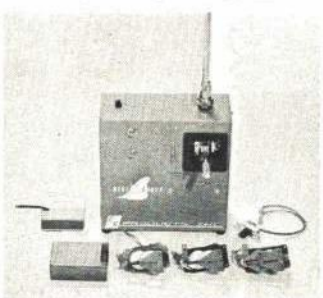
HI-REL XL-3 SYSTEM



This new HI-REL System from EK is ideal for beginners and for mini-size airplanes. It's extra little and extra light on the budget. The XL-3 offers three controls — two are proportional and motor control is positionable. It has the same HI-REL features as the dynamic LOGICTROL III Mini-System. The complete system includes a single stick transmitter, 3 Mini-Mite servos, a 4.8 v.—500 MA/HR nickel-cadmium battery, receiver, and switching harness. Operation instructions are included. Complete system price is $250 less charger and transmitter battery pack.

HI-REL DIGI-GHOST



The DIGI-GHOST uses the same HI-REL features found in the LOGICTROL III MINI-SYSTEM. A complete system includes transmitter, receiver, Rand actuator(s) 3.6 volt Nickel Cadmium battery, and switch harness. Charger and transmitter battery pack are not included. Two DIGI-GHOST models are available: The DG-1 (low rate) price is $135—The DG-2 (high rate) price is $180. The transmitter is equipped with a switch for low or high rate.

HI-REL LOGICTROL III

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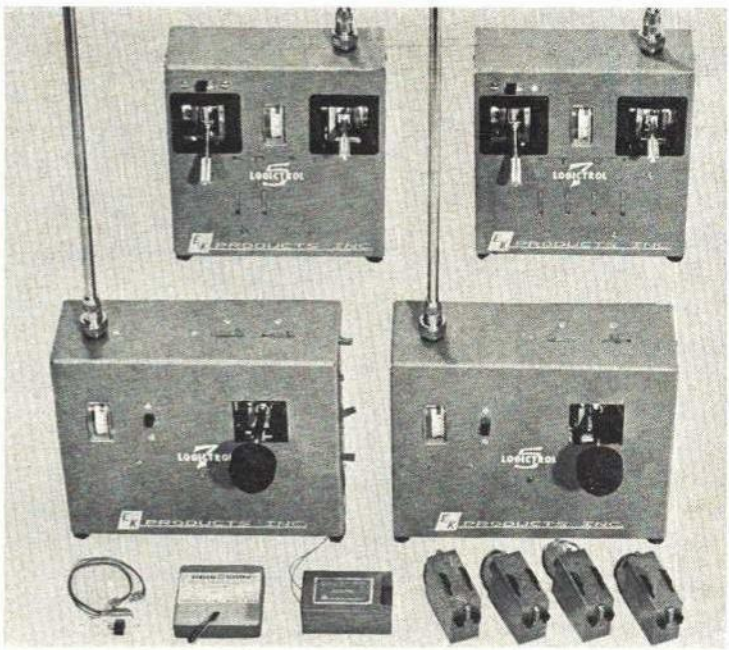

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VOLUME 67, NUMBER 1 **JULY 1968**

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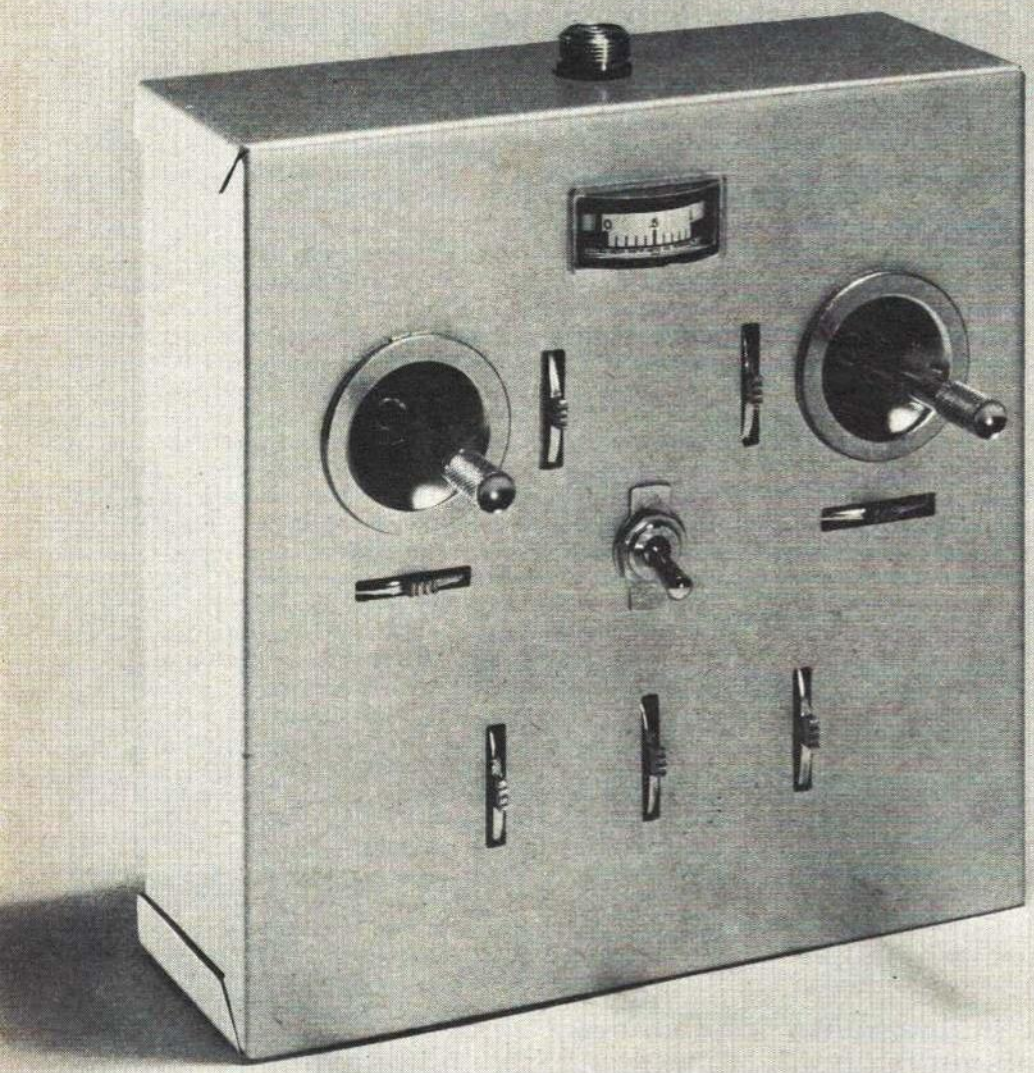

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STRAIGHT AND LEVEL

In Canada model airplane building leads all the way, and rock collecting is, shall we say, on the rocks.

IN the bold type above this line in February, the question was asked: Would you believe that for every two boys between 12 and 15 years of age who build model airplanes, one prefers rock collecting? The editorial reported on a survey conducted by the Young Catholic Messenger, a school magazine with a circulation of 650,000. If rock collecting is competitive, we had concluded, the challenge is obvious.

Before us is a copy of Canada Boy (the Boy Scout Magazine for all Boys), a copy of a survey that publication made in Canada, and a letter from George Bourne, Assistant Editor.

"You may be pleased, and reassured somewhat, by the fact that far higher percentage of boys in Canada — among our third of a million readers particularly — build and fly model airplanes," states Mr. Bourne. He lifts these figures: Of boys 10 and younger, 19.6% build flying models; for 11 to 13, it is 24.9%; and among those 14 and older, 16.5%.

"In all," continues Bourne, "80% of our replying readers build models of some kind. And nearly 60% of the builders show a preference for modern airplanes, while historical aircraft were also notably popular.

"This same, earlier report placed Canadian rock collecting far below the interest level of model airplanes. The birdmen showed up at 43% compared to 20% for the rockhounds! Stamp collecting came a close second to model aircraft, at 41% . . . figures also seem to indicate that the model aircraft enthusiasts are leaving the devotees of rocks, records (music), and railroads way behind." The Canada Boy dropped their Rockhound column. Interest fell off abruptly in 1966 and 1967.

Are Canadian boys different from American boys? We doubt it. Would Boy Scouts build more model airplanes per capita than the whole broad spectrum of school kids — remember, Catholic Messenger is a school magazine? If Boys' Life (U. S. scouting) ran such a survey, one might anticipate a roughly comparable situation. A few months from now, it might be expected, we probably shall have the opportunity of reporting Boys' Life statistics on rock collecting, and model airplanes! And, before we forget it, the typical boy responding to Canada Boy's survey has a weekly income of $2.73, about $142.00 annually — not much more than half of that for his American counterpart.

It should be stated that things are booming in the model airplane business. And, not only R/C. Three of the largest manufacturers told us within the last few days that volume is up from 20% to 50%. And, these are people who were crying the blues when the slot mania cooled off. It is nice to see these people back on earth. The bread and butter of this business was, is, and always will be, the model airplane, and if this last brutal lesson hasn't driven home the facts of life, we don't deserve this good fortune.

How kids will jump at model airplanes, if given the chance, is dramatically demonstrated by the skyrocket success of the AMA Delta Dart. Headquarters has knowledge of 10,000 kits moved. By summertime this figure will stand at 50,000. Some 20,000 are required for AMA-Navy Nats promotion. The Aero Club of Washington, with AMA advice, requires 4,000 for their program in that city alone. These will go out through the Washington's Recreation Department. Additional thousands are being marketed by Sig — for example, the Tulsa Glue Dobbers sold 1500 at the Oklahoma State Fair. Delta Darts were distributed at the National Science Teachers Association Annual Convention in Washington. Eight-thousand teachers attended.

But what of the follow-up? What happens after a kid has assembled and flown a Delta Dart in one of these programs? Probably zilch! He needs progressive follow-on projects and help. Always help and advice. It must always be fun — sorry you experts — and he must be insured of success. Eventually, he can run on his own steam. Why can't industry, somebody, anybody, at least provide a cheap pamphlet, perhaps called, "How to Build and Fly Model Airplanes," or "This is Model Airplane Building." The booklet would be a birdseye view of what the field is all about, what kind of models and products exist, and where to get them. For the most part, these kids — many of them underprivileged — are not yet exposed to the magazines, if they can afford them. And if they do buy them, what does a 10-year-old do with articles on Galloping Ghost and Digital Full House?

THE hobby industry, and especially his many friends within the magazine circle, were saddened by the passing of Walter McBride on March 22. Walt was advertising manager of this magazine until it was moved to Washington. He was a long-time friend and associate of your publisher. Starting with Street & Smith, publishers of Air Trails (now American Aircraft Modeler) in 1938, he continued with Conde Nast, in New York, who purchased S & S, and was active on Air Progress and other magazines. He was the boy next door, a fellow modeler, a school companion. He was our best man — many good years ago. We shall leave his praise to others. They don't come any better.

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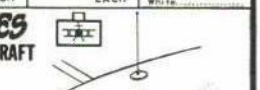

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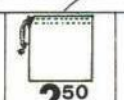

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35¢ a Foot Surgical Tubing by R C Craft

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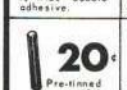

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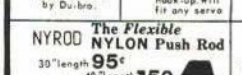

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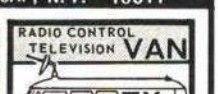

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A.M. REVIEWS

STANLEY M. ULANOFF

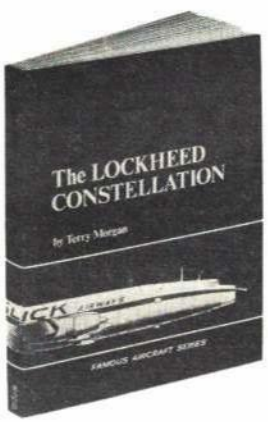
The Mad Major, by Major Christopher Draper, D.S.C., 231 pgs. $4.50. Published by Aeronautica, John W. Caler, 7506 Clybourn, Sun Valley, Calif.

THIS is an autobiography of a "gay cavalier of the air." Christopher Draper was known as the Mad Major for his daring flight under the Tower Bridge in 1931 and for the still more spectacular exploit in May 1953 when, at the age of 61, he flew under 15 bridges. The latter was a gesture to draw public attention to the Over 45's Assoc., a group formed to find employment for men in the higher-age brackets.

Draper obtained his pilot's license in October 1913, and held it for nearly 50 years. In World War I he won the D.S.C. In the Second World War he enlisted at 47, and continued with the same dare-devilry.

Between the wars he undertook a wide variety of jobs — as lecturer, salesman and actor. His stage career lasted 12 years and included a 54-week run at the Hippodrome. He was also a secret agent. He often was at odds with civil and military authority.

Christopher Draper tells his fascinating story with rare good humor.



The Lockheed Constellation, by Terry Morgan, 64 pgs.; **The B-58 Hustler,** by Douglas H. Robinson, 64 pgs.; **The Boeing 707,** by Barry J. Schiff, 80 pgs. Each booklet $2.95. By Arco Publishing Co. Inc. 219 Park Ave. South, N. Y.

THESE 8½" x 11" semi-stiff-covered books are part of Len Morgan's Famous Aircraft Series. They feature large clear photographs of aircraft with scale drawings and easy reading narratives that make the technical data more understandable.

In **The Lockheed Constellation,** Terry Morgan, using non-technical language, writes about the famous Connie. Taking the comments of the pilots who flew the Constellation he explains the popularity of this aircraft. The photographs show the Constellation as flown by airlines, and as a military aircraft.

In writing **The B-58 Hustler,** Robinson obtained the assistance of the Department of Defense and the Strategic Air Command. General Thomas S. Power of this Command considered the B-58 Hustler Bomber as "one of the best strategic weapon systems in existence." In discussing the strategic bomber, Robinson explains the concept of supersonic flight and explores the future use of manned machines as weapons of defense in the age of missiles and electronic gadgetry.

In **The Boeing 707,** Barry J. Schiff, drawing from his own experience as a Boeing 707 pilot for Trans World Airlines, tells the story of this aircraft's development, testing and airline career. The reader feels he is riding along in the cockpit as he describes a typical run across the United States, explaining in detail the complexities of modern high-speed transport. The book is profusely illustrated with photographs of the 707 and with excellent scale drawings.

With Prejudice, by Lord Tedder, 718 pgs., $10. By Little, Brown and Company, 60 East 42nd St. New York, N. Y.

"I mean to record the course of events as I saw them. I shall be as objective as I feel it possible to be, but I have no intention of departing, for any reason, from my own honest opinion as to events and personalities. So often, people make great play about being completely unprejudiced. Frankly, I am completely prejudiced. . . ."

Thus, Lord Tedder G.C.B., Marshal of the Royal Air Force and Deputy Supreme Commander of the Allied Expeditionary Force, prefaces his memoirs of the European War from 1939 to the end. Rather than writing history using the impersonal method — the method rightly adopted by official historians and based on official documents and records — Lord Tedder chooses the personal approach. His concept of air power as a vital force in warfare went beyond those of generals and admirals and other air marshals whose horizons were limited.

Lord Tedder's **With Prejudice** is an illuminating history of the Second World War. His writing makes it enjoyable reading.

Kookaburra Historic Aircraft Books. Each $1.95. By Kookaburra Technical Publications, Australia. Distributed by World War I Aero Bookshop, Box 142, West Roxbury, Mass.

THIS is a series of semi-hard covered booklets, varying from 26 to 30 pages, covering famous aircraft throughout the world. Each book, written by an authority on the subject, contains a concise but thorough history of the aircraft, its camouflage and marking schemes, the technical details and all the pertinent statistical data. Printed on fine paper and profusely illustrated with action photographs and clearly detailed scale drawings, these books should be extremely useful for the modeler and aviation fan.

Some of the titles in this series: Westland F 37/35 Whirlwind, by Bruce Robertson; Wirraway and Boomerang Markings, by

Geoffrey Pentland; Lockheed P-38 Lightning, by Roy Cross; Messerschmitt Me 262 (2 parts), by Kenneth A. Merrick; Commonwealth Boomerang, by Goeffrey Pentland; Sopwith Snipe, by A. Shennan; Albatros Scouts, by Charles Schoedel; Focke-Wulf FW190 (2 parts), by G. G. Pentland and A. Shennan; Warplanes of the RAAF, by the Kookaburra Staff; Markings of the Aces Part 1 — 8th U. S. Air Force, by Theodore R. Bennett.

The British Rigid Airship 1908-1931, by Robin Higham, 427 pgs., $9. By Aeronautica, John W. Caler, 7506 Clybourn Avenue, Sun Valley, Calif.

IN this detailed study of the British rigid airship, Dr. Higham reviews the factors affecting British aeronautical policy-making in the years 1908 to 1931. He tells the story of the rigid airship from its origin and traces its development through World War I and the years following.

Interesting photographs and diagrams, and an extensive bibliography.

Racing Planes and Air Races, by Reed Kinert, Volumes I, II and III, each 96 pgs. Each volume $3. By Aero Publishers, Inc., 329 Aviation Road, Fallbrook, Calif.

THIS series presents a history with a collection of photographs and drawings of the famous air races. Beginning with the first International Air Meet at Reims, France in 1909, the author, a former racing pilot, recounts in these paperbacks, the events of each important race up to the present time. He describes the planetypes, names, engines, horsepower, wing span, length, weight, speed, time and personalities who participated in the races.

Vol. I (1909-1923) contains the First International Air Meet of 1909; the James Gordon Bennet Cup Races of 1910, 1911, 1912, 1913 and 1920; the Schneider Trophy Races of 1913, 1914, 1920, 1921, 1922 and 1923; and the Pulitzer Trophy Races of 1920, 1921, 1922 and 1923.

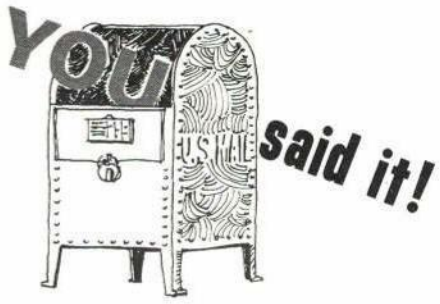
Vol. II (1924-1931) includes the Pulitzer Trophy Races of 1924 and 1925; the Schneider Trophy Races of 1925, 1926, 1927, 1929 and 1931; and the National Air Races of 1926, 1927, 1928, 1929, 1930 and 1931. Also capsule biographies of James Harold Doolittle and Alford Joseph Williams.

Vol. III (1932-1939) contains the National Air Races of 1932, 1933, 1934, 1935, 1936, 1937, 1938 and 1939; and short biographies of Ben Odell Howard, Stephen Wittman and Roscoe Turner.

A fourth volume, with races from 1939 to 1967, is scheduled for publication soon.

These interesting accounts together with the photographs and scale drawings make an important reference aid.

Continued on page 68



If Navy drops the Nats

Just a few comments regarding your editorial on possible dropping of Nats by Navy.

Contest modeling is a highly specialized activity engaged in by a relatively small number of people, many of whom are pros or semi-pros. It tends to be a semi-closed group with little effort to recruit new members. The constantly recurring idea of providing "new" events for "simple" models to attract newcomers, is totally ineffective.

Since only a small percentage of modelers belong to the AMA, it does little for the average modeler. This might best be restated to read: Because AMA does little for the average modeler, only a small percentage of them belong to it.

In many respects, the Nationals represent the peak of AMA's activities — a symbol of AMA. To the small group of AMA members who participate in them, they are great. Many non-AMA types think they are a waste of time and money, and an exercise in futility. To me they are a symbol of AMA's failure to understand what model building is all about, what its potential could be.

If the Navy drops the Nationals it could be the best thing that ever happened to model building and flying in the U.S. — if it shakes up AMA to revise their activities drastically.

Many of the problems facing modeling in general (and contest modeling as well) are social. They will not be solved by the time-honored AMA approach of juggling minor technological aspects of model aircraft in the vain hope of hitting some magical formula that will suddenly popularize model building and flying.

Bill Roosa, Waterloo, Ontario, Canada

Opinions expressed by readers are not necessarily those of the editor, or of this magazine. To our certain knowledge AMA has many programs going with important civic groups. No doubt rebuttal letters will appear here by the September issue. Ed.

He likes

I enjoy your magazine very much. Glad AMA and your magazine worked out this present coverage, with the American Aircraft Modeler as the AMA magazine.

Bennie Bodiford, Jr. Columbus, Ga.

We appreciate

After carefully reading your editorial in the January, 1968 issue, I am inclined to comment that your magazine is **now** quite "stuffy."

Prior to the merger of the official AMA publication and your magazine, there was much ballyhoo about expanded coverage of all model events. About the only expanded coverage that I have been aware of is the R/C coverage. Control-line, free flight, rat race, speed, etc. are woefully neglected for the same old R/C articles that appear in the "other" R/C publication.

Remember all those sad laments about the "vanishing junior?" Juniors are vanishing because magazines offer no inspiration to a junior.

Are all other aspects of modeling to be sacrificed to R/C? Must control-line and free flight be pushed to the rear for "commercial modeling?" Are the ready-to-fly jobs the thing of the future? If so, modeling will surely die.

Please consider this letter as constructive criticism and not a "crank" letter. I realize that yours is a thankless task, but this is the first time that I have ever written your magazine after reading it since the early 1950's.

Robert R. Burns, Chattanooga, Tenn.

Thank you for taking such an interest in our magazine. We are striving to expand coverage as rapidly as possible. Ed.

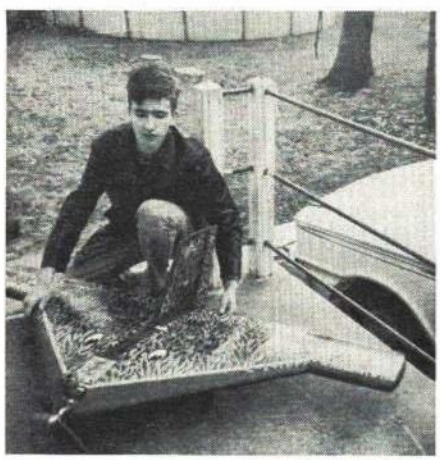
Harry Stine and the NAR

I would like to say: thanks to G. Harry Stine and the NAR. They provide many good, fact-filled articles helpful in the field of model rocketry. Keep up the good work.

Ken Montanye, Butler, N. J.

The exciting Neutrino

I am 15 years old and have only been flying R/C planes for a year and a half. I built and flew the Skylark, Falcon and Schoolmaster, plus a few others. But I was never so excited as I am about the Neutrino, which you published. I'm the only one at our field with one and everyone likes it. It was quite a challenge to build and fly.



My parents tried to talk me out of getting the plans because the plane was so different from the others, but they were thrilled when I took it up the first time. It flies beautifully! I've had 13 flights and I like it better each time I fly it.

Enclosed is a picture of me and my Neutrino.

Ron Palmer, Colonia, N. J.

Dad and R/C club helped

Was interested in your January, 1968 Straight and Level article because I have faced the same problems of trying to get into modeling.

I have been in the modeling hobby for about four years and I am going into my second year of R/C.

One thing I believe retarding youth modeling is price and work needed. I have averaged about $4 per rubber model. Many kids buy a wood model and glue. When they get home, they find this isn't all that's needed. Often they won't have the money for dope and hardware and become dis-

Continued on page 74

No matter how you look at it — this almost ready-to-fly R/C plane is truly a bird!

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**Does not include engine or wheels.*

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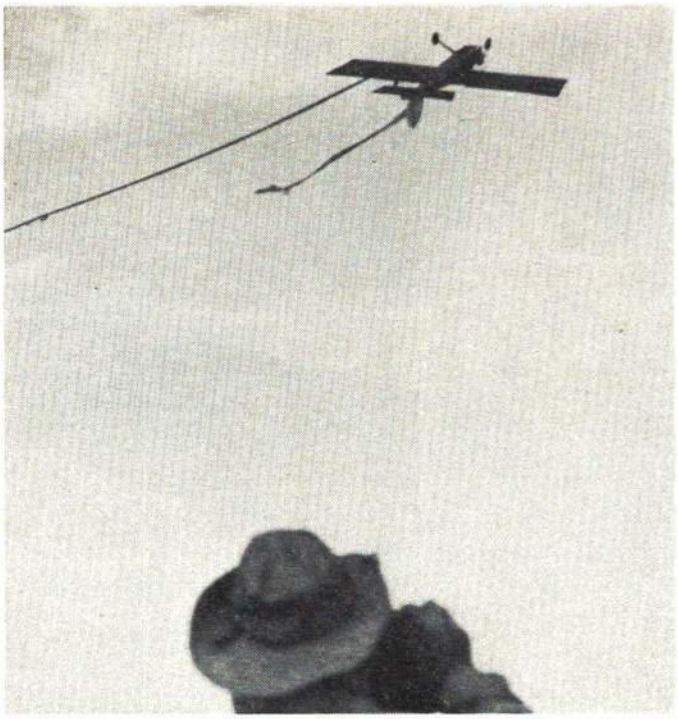
model world
...on the international scene

German lad created this monster in the kitchen—glue, hammer, saw

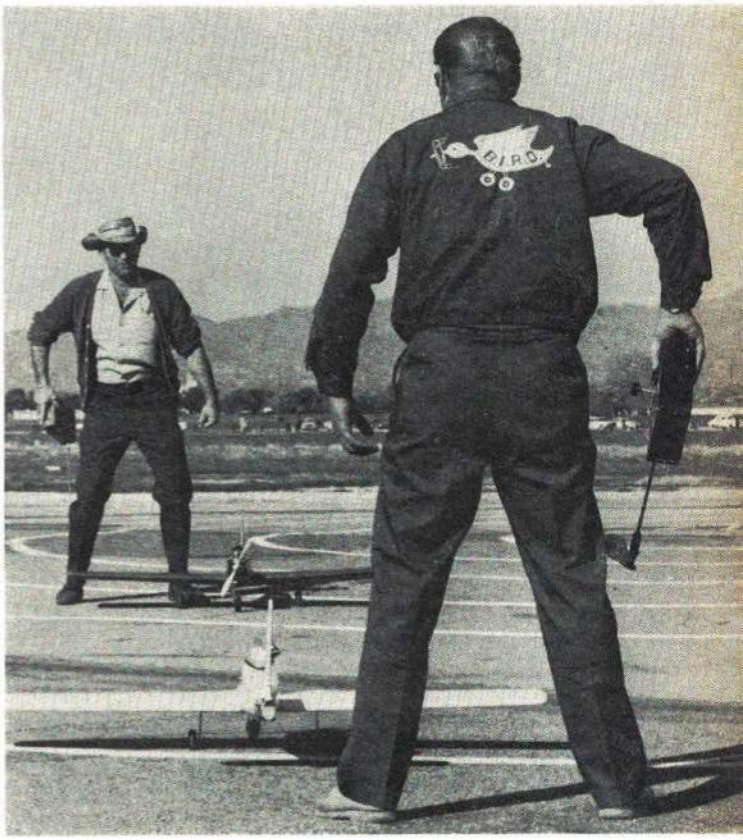
Heinrich Metzdorf, a 20-year-old R/Cer from Trier, Germany, spent 90 hours in his mother's kitchen with "saw, hammer, and glue pot" to turn out this 15 ft. 10 in. twin-engined monster. Powered by engines of unknown size, it is hand-launched without its undercarriage, and lands upon a skid. It flies only in calm weather. Small letters under the wing, probably not readable in the small reproduction here, indicate Heinrich is a member of the R/C Club, Welschbilling. Described as probably the largest model airplane ever built it is, believe it or not, many feet smaller than some of the projects which keep showing up. Ben Tarnofsky's 45-lb., 22½ footer, for example, was pictured in May R/C World.

At the Nuremberg Toy Fair—special area for model airplane exhibits

The world-famous Nuremberg Toy Fair (West Germany) included this year a separate section where manufacturers of model airplane equipment had their displays. There, as at Toledo, Chicago, or the MATS in California, the trade met and exchanged information. In this photo of the Wik Models booth — that is Wilfred Klinger — Ed Kirrman holds Klinger's "Dirigent 6," and the young lady displays the firm's new multi-channel design called "Johnny." The radio equipment is original Kraft — though the case, antenna, etc. are quite different. With its side-mounted engine, Johnny might be described loosely as a cross between a deBolt Jenny and Das Ugly Stik. Tail surfaces and strip ailerons have scalloped vintage edges.

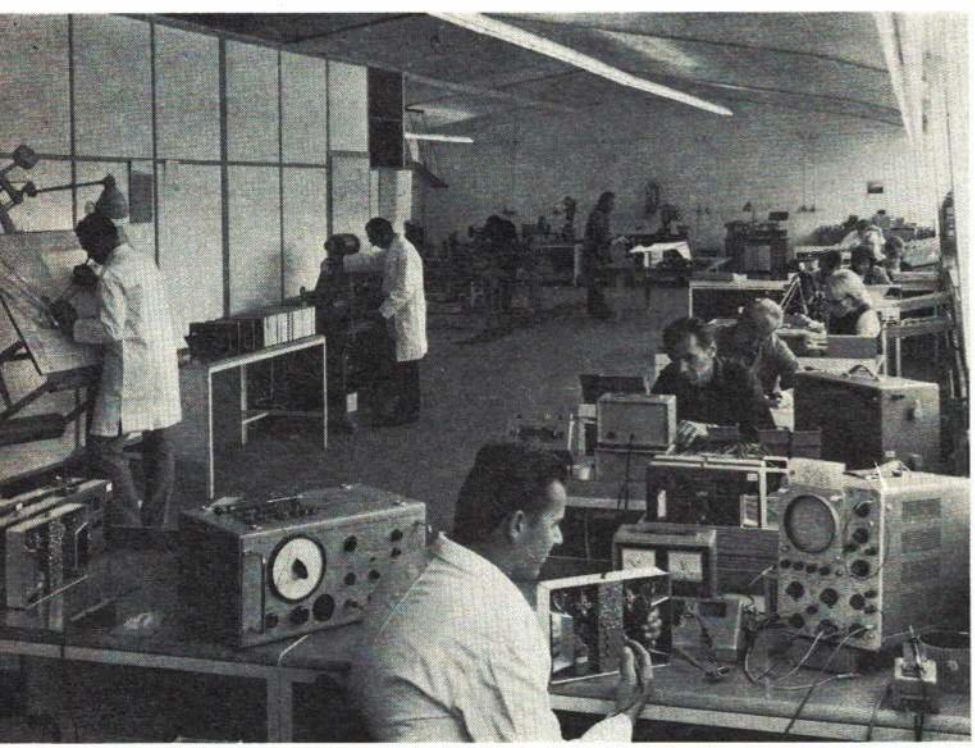


model world
...on the international scene



Shoot-out—out of town by sundown said the Birds to the Valley Fliers

Top: Come back with my ribbon, cries Limbo judge as Larry Leonard climbs out with it firmly hooked on his wing after unsuccesful inverted pass. Limbo and Spin were the two events of this unique contest held at Los Angeles' Sepulveda Basin, which resulted when the Long Beach Birds challenged the Valley Fliers for the "Top Ranch" trophy — a plastic cowboy on an engraved base. In Spin, the flyer had three minutes in which to put on prop handed him by judge, start, gain altitude, execute spins, land, and return prop to judge. For each second over limit, he was penalized one turn of spin. Limbo was flown under paper tape 12 feet up, one point upright, two inverted, five passes. On fly-off tape lowered to seven feet. Birds won, 45 to 42. Right: Frank Capan and Boror Faber did gag quick draw. Totals: Capan's Fliers 160 to Birds 77.

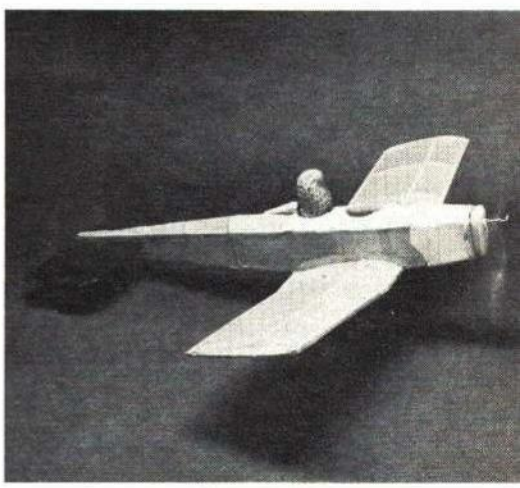


Simprop glimpse. Control of quality is a fetish of modern R/C producers

Left: The Simprop factory in Germany is quite busy producing their fine Digital radio control systems which range from two- to seven-channel units. They make their own servos, control sticks, and cases for transmitters, receivers, and batteries by injection mouldings. As a system Simprop is electronically similar to the U. S. designs but is physically larger than our newest and smallest. As many as seven IF stages are used in the German receivers since there are so many very adjacent frequencies used for model purposes. This means ultra sharp receiver-transmitter tuning. This equipmen was flown by Fritz Bosch at the Corsica Radio Control World Championships last year and by many other contestants as well. Of particular interest is the "human engineering" applied to the design and physical layout of the transmitter. Transmitter is held by sliding one's whole hand through the padded handles on each side of the case and placing one's thumb on top of the control sticks. From this position the transmitter stays comfortably and solidly in one's hands and the thumb has command of trim and extra channel functions.

Italian slope soaring championship to a magnet steerer

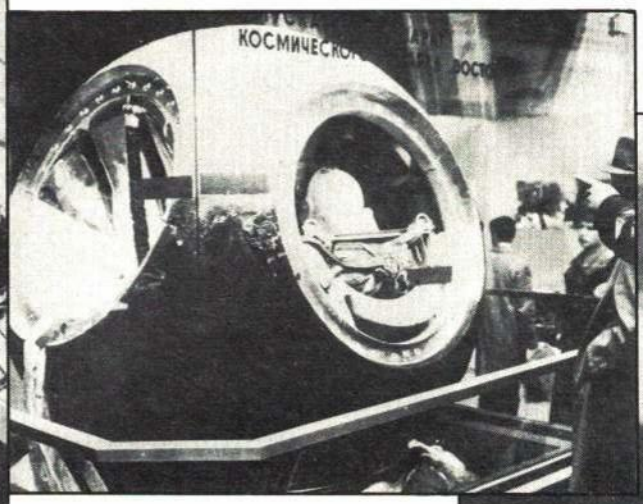
Above: Egidio Lince, holding his No. 2 model, used both ships to win the recent Italian Slope Soaring Championship. This was, perhaps, the first important title won by an electro-magnetic steering model. To win, Lince solved a tough problem. When FAI dropped the A/2 formula in favor of an unlimited-size model, many slope flyers favored bigger models. From the aerodynamic point of view they are superior, and they stay longer in the timekeeper's sight. Unfortunately, the limited power of magnets then presented many steering problems. So many slope fans investigated use of the magnet only to close a circuit to an electric motor to drive the rudder. Mr. Lince was not alone in this development, but his win proved it.



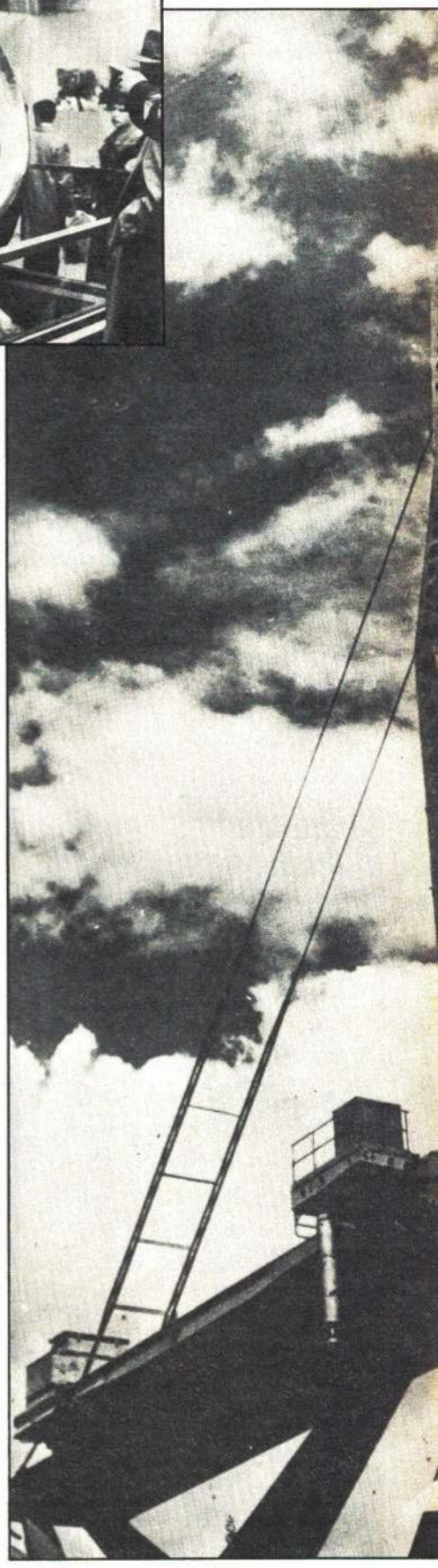
Peanut scale fun contests please old and young alike

Originated by the Bridgeport, Conn. Flying Aces club, this fun event also is the rage on the west coast. It is for tiny models like the "good-old-days" 10c kits. Accent is on simplicity and good flying, rather than fidelity to scale. Max permitted span is 13 in., minimum, 10 in. Motive power is rubber bands, judging three-flight average. High times are in 30-second range. Left, above: Bill Hannan's 1929 General Aristocrat, contrasted with peanut for size. Center: Same ship posed on 5¼ in. film package. Right: Eight-year-old Ken Hannan made Walt Mooney-designed Miles M .18 with a peanut for the pilot. One Southern California Peanut Scale meet produced a Fokker Triplane, Bristol biplane, Fokker D-7, a Curtiss Swift. At far left is the home-made trophy — seen at Southern Cal meet — featuring the Golden Peanut. The novelty of the event may account for its growing support, for fun of course, but it is felt that the youngest junior, as well as busiest adult, can easily participate with a minimum investment in time and materials.

The complete Vostok spacecraft as it was displayed in Moscow in May 1965. Note vernier-thruster nozzles and top-stage engine nozzle. Shown here in orbital configuration, it may be compared to drawing.



Vostok command module sphere on display in Moscow shows dummy cosmonaut in ejection seat, and hatch used for entrance and ejection. Open hatch, left, to parachute storage — with the risers attached.



THE TRUTH ABOUT THE RUSSIAN SPACE PROGRAM

G. HARRY STINE
Photography / CTK, Space Business Daily, G. Harry Stine

EXCEPT for the obvious, well-documented results of the Soviet Union's space program in the past decade, there has been a shroud of secrecy around the actual vehicles, techniques, and equipment used by the Soviets to accomplish the numerous "firsts" in astronautics. Tass, the Soviet news agency, has never been reticent about announcing every Soviet space achievement as it has occurred, and Sovfoto has released numerous pictures of the Sputniks, Kosmos, Luniks, and other satellites and space probes. As a result of this secrecy, a tremendous amount of speculation about the Soviet space program has been carried out in Europe and the United States. Some Soviet space watchers, myself included, have continued to keep a quiet archive, awaiting the day when enough information became available to piece together a logical, unemotional, solidly based historical story of the Soviet space program.

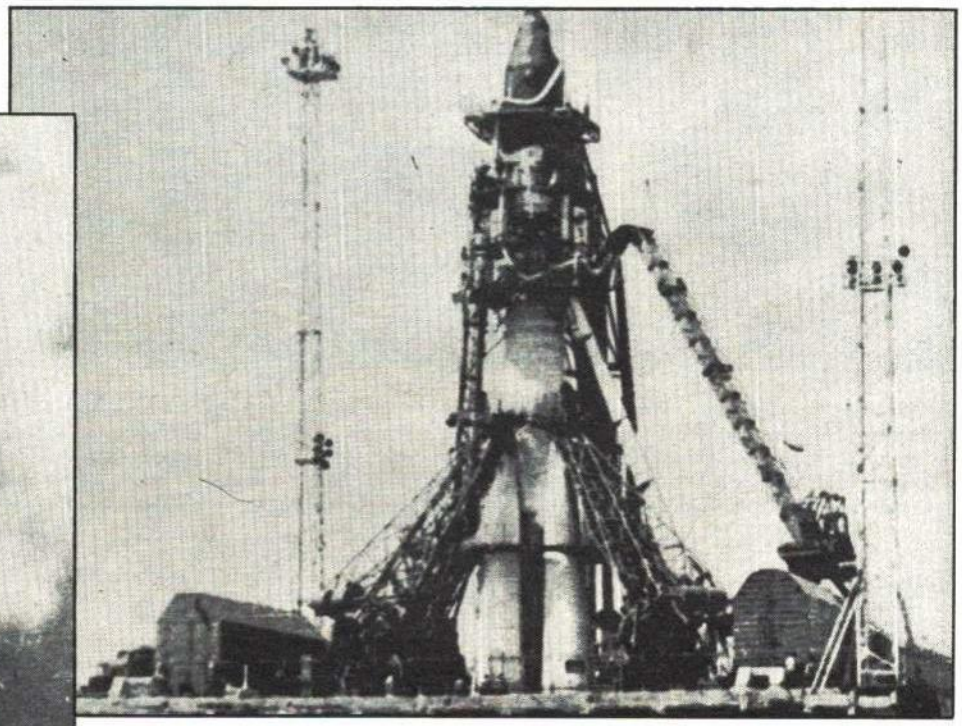
In 1967, the year of the 50th Anniversary of the October Revolution and the 10th Anniversary of the launching of Sputnik I, this shroud of secrecy was lifted by the Soviets. As of this writing, the shroud is almost completely gone, allowing us to determine exactly how the Soviets did it. So much data is now being released so rapidly that it is quite difficult to keep up with it all.

What stands revealed is a space program characterized by decades of supporting research and development, long-term planning, constantly increasing support, and excellent engineering.

This is confirmed by the unveiling of the standard Soviet space launch vehicle — "carrier rocket," in their terminology — at the Paris Air Show held at le Bourget on May 26, 1967. At the same time, the Soviets revealed details of the rocket engines used to power their vehicles. This has been followed in 1968 by additional photographic and motion picture film releases from Tass and Sovfoto, as well as from the Czech news agency (CTK). This evidence, in turn, confirms the fact that the Soviets developed and used a large launch vehicle during the first decade of the Space Age.

The standard Soviet space launch vehicle is undoubtedly the original T-3 ICBM. This conjecture is supported by the early 1957 flight history of the T-3 ICBM as announced by the Soviets and revealed by our long-range Turkish-based tracking radars.

Briefly, the history of the Soviet space



Vostok and its carrier rocket before launch. Hold-down arms grasp forward booster attach points. Two umbilical towers swing back on lift-off. The vans are rail cars. Base of carrier rests below launch pad.

Standard Soviet space carrier rocket with Vostok spacecraft. Strap-on boosters and hammerhead configuration of sustainer core are visible. The unfaired hatch in nose shroud is for cosmonaut entry-egress.

Shrouded in secrecy until now, actual vehicles, techniques, and equipment are authoratively described by our rocketry editor who just returned from a fact-finding European tour.

program goes back to 1903, the year of publication of the initial works of Konstantin E. Tsiolkovski dealing with the use of multi-staged rocket-propelled space vehicles. In 1919, the first Soviet rocket research laboratory, the Leningrad Gas Dynamics Laboratory (LENGIRD) was established. The Soviets were flying their first liquid-propellant sounding rockets in the 1930's. They received a windfall (as we did) in 1945 with the capture of the German rocket research center at Peenemunde, the German A4 (V-2) assembly factory, Mittelwerk, near Nordhausen, and several hundred German A4 rocket production and test engineers. The USA got von Braun's design and development team. By 1949, most of these German rocket engineers had been returned to Germany by the Soviets, who had, in the meantime, cranked-up the A4 production line again. Several improved versions of the A4 were developed by the Soviets. But, by and large, their rocket development work remained their own; they learned from the Germans and then modified their own developments from this teaching.

We can lay to rest forever the fallacy that the Soviet space program was German in origin and execution. Facts no longer will support this notion.

Both the Soviet Union and the United

SOVIET RD-107 ROCKET ENGINE

(Data from Soviet display, Paris Air Show, Le Bourget, May 26, 1967, and Spaceflight magazine, Vol. 9, No. 10, October 1967.)

Type: Liquid-propellant, multi-chamber, turbo-pump fed.

Thrust in vacuum: 102 t (228,480 lbs.)

Vacuum specific impulse: 314 lb.-sec/lb.

Chamber pressure: 60 atmospheres (885 lbs. per sq. in.)

Propellants: Liquid oxygen and hydrocarbon (kerosene?)

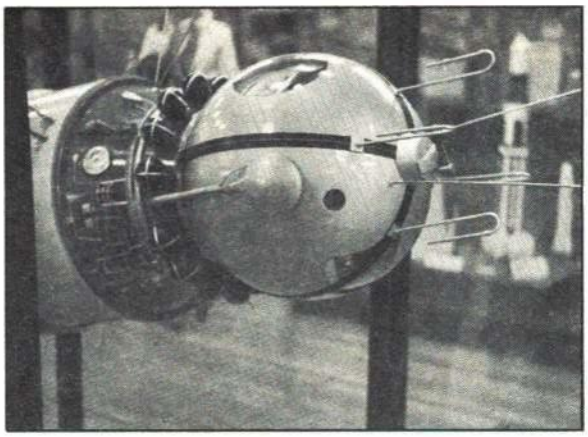
Configuration: Four main thrust chambers and two vernier chambers, regeneratively-cooled, supplied by single turbo-pump.

Turbo-pump details: Single shaft. Double-sided LOX pump. Single-sided fuel pump. Centrifugal type. Driven by gas generator, in turn fed by smaller centrifugal pump. Gas generator apparently driven by decomposition of hydrogen peroxide.

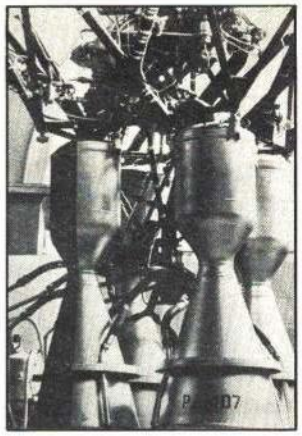
Injector design: Welded construction single-plate injector in each chamber.

Thrust chamber materials: External walls apparently steel. Internal chamber walls high copper alloy.

Interior of Voskhod 1 cabin shows viewport between the feet of the command pilot and simple instrument panel. Cabin heavily padded. Quite a contrast to the instrument and control panels of the U. S. Gemini.



Umbilical connector and shroud connecting the Vostok command module to service module positioned so as not to penetrate ablative heat shield. The 1:16 model on display London Kensington Science Museum.



RD-107 rocket engine has four main thrust chambers and two vernier chambers, supplied with Lox and kerosene by a single turbo-pump. The main chamber at left was cut away to show internal features.

CHART B

SOVIET SPACE CARRIER ROCKET DATA

(From Soviet display, Paris Air Show, Le Bourget, May 28, 1967, and from various published sources.)

Length overall: 38 meters (124.678 ft.)
Diameter over fins: 10.3 meters (33.794 ft.)
Sustainer length: 28 meters (91.868 ft.)
Maximum diameter of sustainer: 2.95 meters (9.679 ft.)
Length of boosters: 19 meters (62.339 ft.)
Maximum diameter of boosters: 3 meters (9.843 ft.)
Top stage length over nose fairing: 10 meters (32.81 ft.)
Maximum diameter, top stage: 2.58 meters (8.465 ft.)
Nominal Vostok weight, including pilot: 4725 kilograms (10,400 lbs.)
Total thrust, liftoff: 950,000 lbs.
Total thrust, vacuum: 1,150,000 lbs.
Estimated weights:

Propellants in 4 boosters:	375,000 lbs.
Propellants in sustainer:	240,000 lbs.
Propellants in top stage:	32,000 lbs.
Total propellants:	647,000 lbs.
Vostok spacecraft:	10,400 lbs.
Empty vehicle:	61,400 lbs.
Total empty weight:	71,800 lbs.
Liftoff weight:	718,800 lbs.

States started serious design studies of a nuclear-tipped ICBM at about the same time. The USA demurred from building the very large rocket vehicle that would have been required to carry the bulky and heavy nuclear and thermonuclear warheads of 1950-1952. The Soviets went ahead and built the kind of big rocket it would take to deliver such a heavy warhead over intercontinental ranges. We waited until the "thermonuclear breakthrough" of 1953 permitted smaller TN warheads and therefore smaller ICBM's of the size of the Atlas SM-65. By 1957, the Soviets found themselves with a very large rocket capable of carrying very heavy payloads over both ICBM range and into orbit.

Based on the data filed with the FAI in Paris for the Soviet manned flight records, we believed that the Soviets had developed some very large liquid propellant rocket engines. The Soviet data submitted to FAI clearly states that the launch vehicle was powered by six rocket engines. To achieve the payload orbiting capability announced by the Soviets, this meant that the rocket engines would have to be large.

In US terminology, a rocket engine is a single combustion chamber with a single turbo-pump supplying its propellants. There have been some exceptions to this, namely the RMI XLR-11 four-chambered "Black Betsy" that powered the Bell X-1, the Convair MX-774, the Douglas D-558-2, and the early version of the X-15.

But, to the Soviet engineers, a rocket engine was one or more combustion chambers linked together to be supplied by a single turbo-pump. This follows the same logic that terms a V8 automobile engine as **an engine**, although it may have eight separately acting combustion cylinders; a V8 automobile is not powered by eight separate engines, by definition.

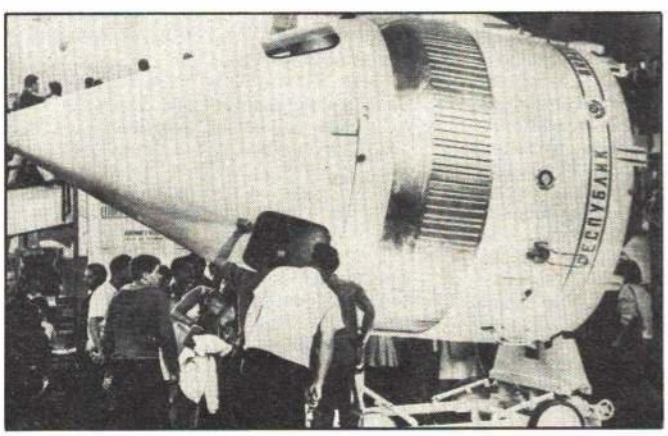
This glaring difference in rocket terminology which caused some observers to conclude that the Soviets were either lying, or had big combustion chambers available, was resolved when the standard Soviet space vehicle was displayed at Paris. According to Soviet terminology, this launch rocket does indeed have six rocket engines as follows:

Four main thrust chambers and two vernier chambers with a single turbo-pump in each of four strap-on boosters. This is known as the RD-107 rocket engine. Four main thrust chambers and four vernier chambers with a single turbo-pump in the central sustainer core, known as the RD-108 rocket engine. A single thrust chamber and four vernier chambers with a single turbo-pump in the top stage. This engine designation is unknown, but may be the RD-119.

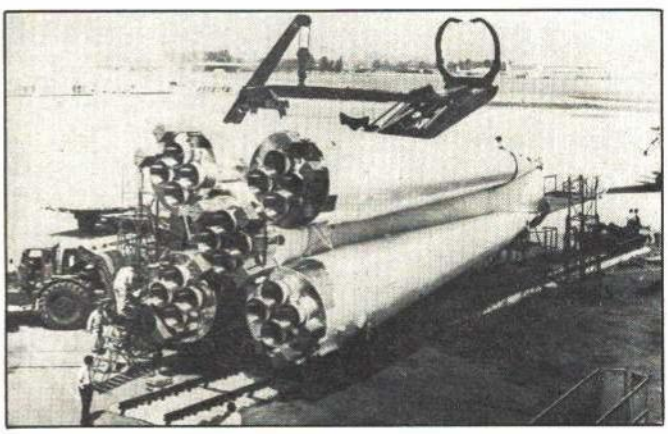
Totals: four boosters, one sustainer, one top stage. Six rocket engines in all, Soviet style, and six turbo-pumps.

In operation, the Soviet carrier rocket is

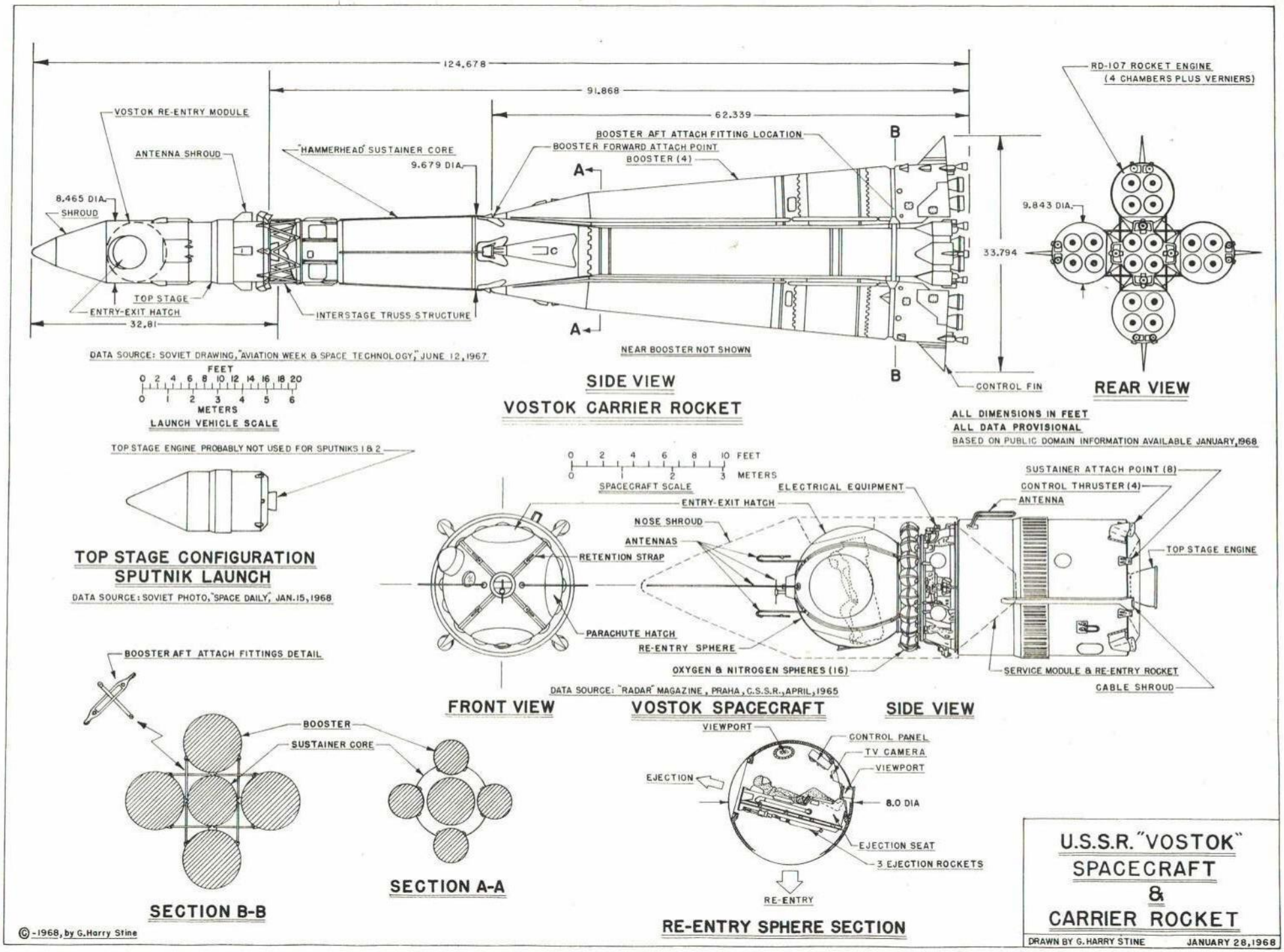
Continued on page 48



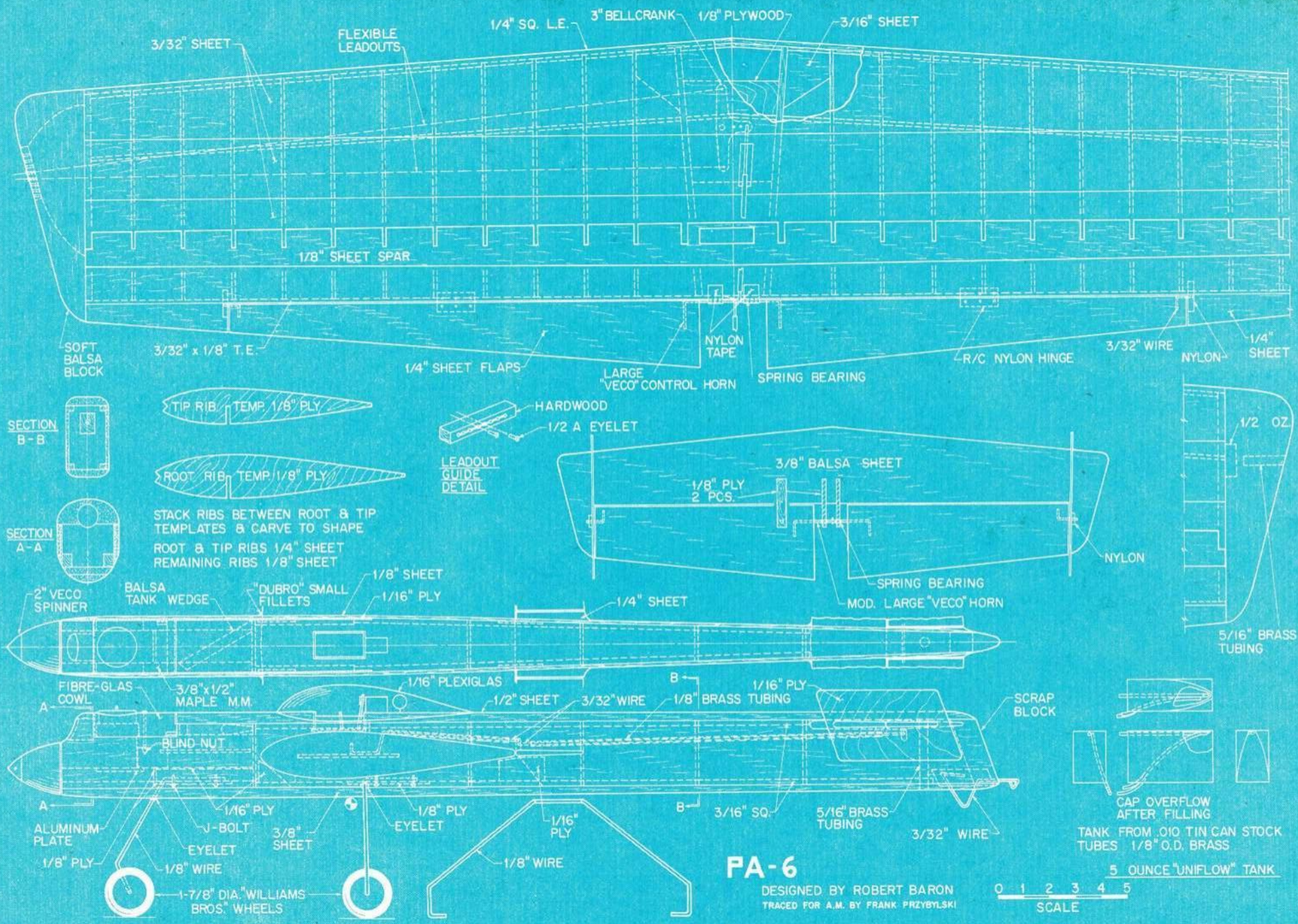
Top stage of standard carrier rocket as displayed at Paris Air Show in 1961. Basic top stage was added to sustainer-booster vehicle in 1959-1960 to raise the orbital capability to more than 10,000 lbs. Capability at that date was impressive.



Arrangement of the 20 main thrust chambers of the standard Soviet space carrier rocket are clearly shown here, as it was prepared for display at Paris Air Show. Rocket is robustly constructed for handling and erection.



This drawing of the Soviet carrier rocket and the Vostok spacecraft is accurate according to data released on or before January 28, 1968.



PA-6

DESIGNED BY ROBERT BARON

TRACED FOR A.M. BY FRANK PRZYBYLSKI

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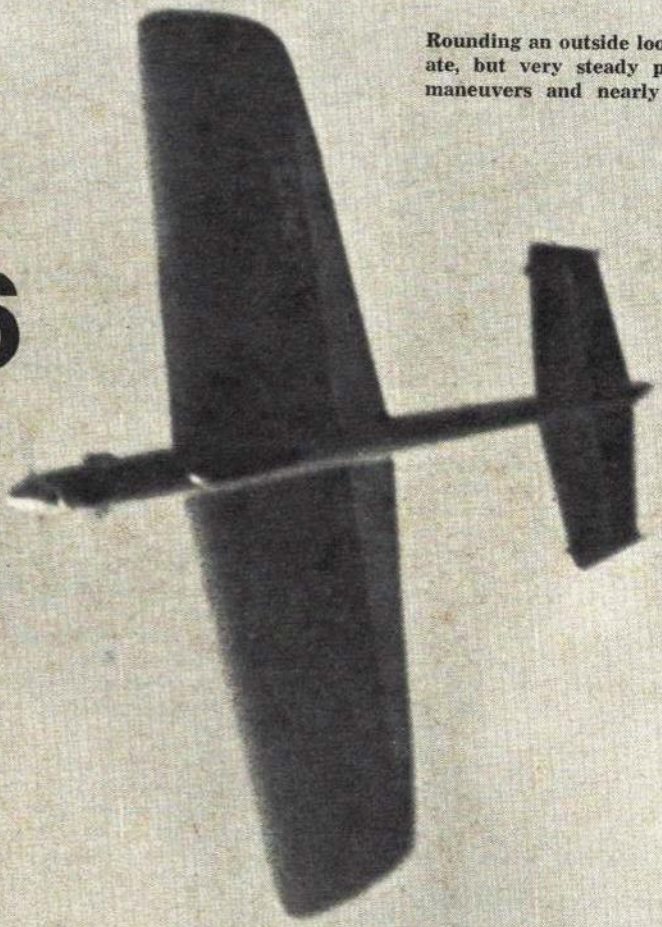
SCALE

FULL SIZE PLANS AVAILABLE — SEE PAGE 60

A PRECISION AEROBATIC AIRPLANE

The PA-6



Rounding an outside loop. Ship has moderate, but very steady pull through all its maneuvers and nearly constant airspeed.

Cleverly blended design factors — notably engine/prop combination — make this a truly great stunt design.

BOB BARON

MY first thought in designing this plane was to use the maximum allowable line length of 70 ft. and to take advantage of the lower drag of .015 lines for engines of 40 and below displacement. Together with a flying speed below 60 mph, the apparent (angular) speed would be quite slow. The important trim parameters — leadout sweep, center of gravity, tip weight, and handle width — were to be made easily adjustable on the field to facilitate trimming.

Several features were incorporated to reduce the physical effort of flying to the minimum. The wing was to be very rigid and to hold its airfoil, which led to an all sheet wing. Ease of maintenance and everyday handling were considered desirable assets. Most important, the prop (10-4) would be of relatively low pitch so as not to stall under loads, and the corresponding high rpm would use most of the available horsepower of our present engines.

The resulting 50-oz. ship flies at 54 mph on 70-ft. lines and can be flown through every corner with no tendency to yaw or roll. The pull is moderate but very steady throughout the maneuvers. The flying speed is very nearly constant due to the low-pitch prop not stalling, as does the traditional 10-6. In the wind the low pitch tends to brake the plane. This minimizes the vicious whipping tendency that gives

Sleek is the word! Displayed by its designer, PA-6 shows compactly cowled nose, flowed-in canopy, and smooth surface of sheeted wing.

stunt flyers the jitters. A balanced elevator, together with a proper CG, handle, and control setup, reduces the physical effort at the handle, over a conventional arrangement.

The sheet wing (13.5 oz.) weighs less than the equivalent capstripped D-tube. A table of weights is provided so the builder can guide himself toward a finished weight of no more than 50 oz. Extruded nylon bearings were used in the hinges to eliminate a frequent trouble spot. A fiber-glass cowling and strong front end minimize the usual deterioration of the nose. This plane has a useful life of around 2,000 flights, after which most flyers would be quite tired of it anyway.

The tank is readily removable, since when permanently installed, it will no doubt leak due to "Murphy's Law." Aluminum plates in the bearers keep them from crushing with age. The finish was dope, filled and colored, followed by epoxy paint. The epoxy paint has amazing resistance to fuel, and frequently the author takes ten straight flights without bothering to clean the ship. A stooge takes care of the dirty work, as no one would launch a plane that filthy.

The choice of wood is vital if the weight is to be kept below 50 oz. Wood of five- to seven-pound density will give the weights listed on the table. Wood ordered directly from Sig with a request for medium-soft will be adequate. The solid flap and empennage are actually lighter than a built up surface, since the finish weighs more over an open surface than a closed one. Glue is the real culprit in the weight department. For curiosity, weigh all the ribs in a stunt wing, then hollow them and check again. It's hardly worth the effort.

Building can be greatly speeded by assembling all components (wing, tail, fuselage) as completely as possible separately. The fuselage in particular is built quickly by tack-gluing the blocks and sanding everything to shape without the wing, tail, and tank vents being in the way. After this is done, the blocks and underwing cut-outs are removed and the wing, tail, and gear can be installed leaving relatively little construction to be done.

The wing planking is spliced chordwise as shown for a specific reason. The three pieces as shown make it possible to glue the planking with little danger of it popping up after the job is completed. First glue the trailing edge sheet and leading edge stringer with the spar in place, but not glued. Before the glue sets thoroughly, steam the wing as straight as possible. When you are satisfied with the alignment, glue the main spar. Install controls and continue with the center piece. After each sheet is in place smear each rib with glue where it meets the planking to prevent the sheet from separating from the ribs. Do not substitute $\frac{1}{16}$ sheet for the $\frac{3}{32}$ planking, as it makes the job too critical. Do all sanding with a block to prevent sagging between the ribs. Sand only enough to smooth the seams. The inboard tip sanded and hollowed should weigh .75 ounce and outboard one should weight 1.00 ounce. The fixed tip weight is .50 ounce giving .75 ounce of tip weight to start. The additional .25 to .50 ounce needed is put in the tube as determined by test flights.

TABLE OF WEIGHTS

13.5	Wing unfinished ready to install complete with all controls and tip weight
3.0*	Tail assembly including controls and rudders
2.0	Tank
.75	Three 1⅞ diameter Williams Bros. Scale wheels
2.0	Veco 2" spinner
8.5	Super-Tigre .35 BB
.5	Prop
8.0	Fuselage completely sanded with blocks left solid with all formers and mounts installed
2.0	Assembly of components and installation of controls, fillets
.5	Fiber-glass cowling
8.0	Finish from bare wood
48.75 oz.	

Finish:

.5	two thinned clear on bare wood
2.5	paper covering + three thinned clear
3.0	one coat of given mixture
2.0	two coats of hobbypoxy color
8.0	

*½ oz. too heavy here means 1½ ounces of nose weight!

It is imperative that epoxy glue be used for the engine bearer-doubler, nose gear mount-bearer, wing-fuselage, and main gear-fuselage joints, as well as all horn and hinge mount installations, if the airplane is to last for a reasonable time. The entire engine-tank compartment must be given two coats of fiber-glass resin directly over the bare wood.

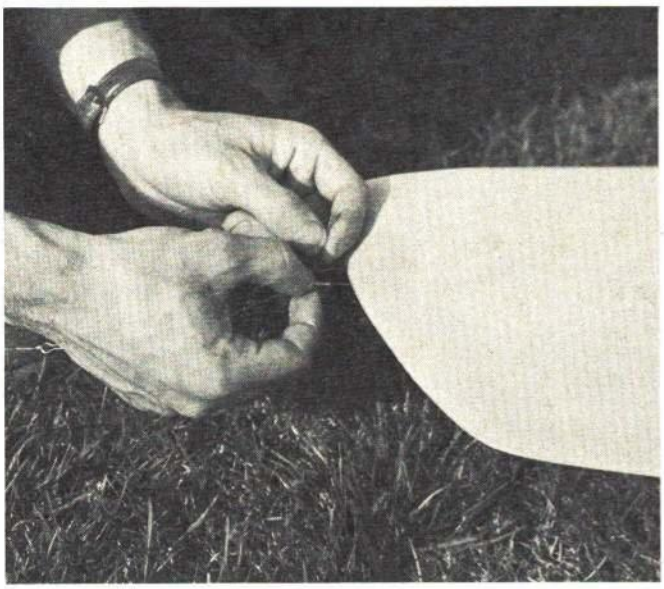
The finish was two thinned coats of clear on the bare wood, covered with Silkspan, three thinned coats of clear. Then spray on one coat of a mixture of equal volumes of clear, thinner, talcum powder, and color. This last step should add no more than three ounces when sanded properly, yet will fill all the grain. Finish the ritual with two coats of Hobbypoxy color applied with an airbrush, not a gun.

A few words are in order on the engine. The usual plain-bearing stunt engine has neither the power nor strength to run repeatedly at the 15,000 rpms required by the 10-4 prop. The Super Tigre 35 BB combat mill, model G21/35, with restricter installed, shows no tendency to overheat at the high rpms and low airspeed of this design. In addition, it is operating comfortably below its maximum output on a very mild fuel of 75% methanol and 25% castor oil. No shaft extension is used, as this is only a source of additional vibration.

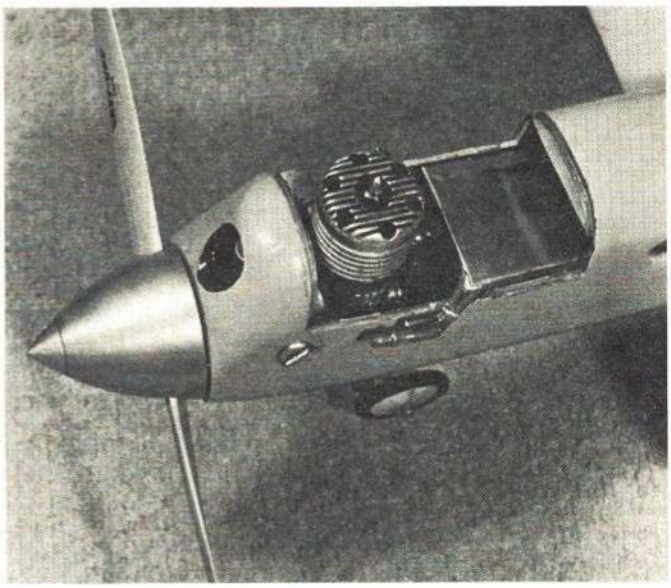
Props must be carefully balanced to prevent excessive wear on both engine and plane. The Tigre starts very quickly when hot, whereas many stunt engines simply will not start until they have cooled. This characteristic makes it possible to fly seven patterns an hour when practicing hard for a meet. This engine is particularly nasty when new, but after a gallon of fuel is run through in five-minute periods on a 10-4 it becomes relatively docile.

Proper trimming is essential to the success of any stunter. Our CG is very near the aerodynamic center of the wing which means that inertial and not aerodynamic forces are those principally overcome to initiate a maneuver. My handle is 2.5 inches in line width with the control system shown and the lines are .015 x 70 ft. as measured from center-of-plane to center-of-handle. It is very strongly suggested that the CG and control system be used exactly as shown and that individual preferences in feel be adjusted with handle line width only.

Continued on page 68



Provision of extra leadout bushings permits fine adjustments. Play line rake and tip weight until ship does not yaw on sharp corners.



Engine-tank compartment given two coats fiberglass resin. Tank removable. Super Tigre 35 combat engine permits 15,000 on 10-4.

Unique landing flap — shown extended — did little to slow speed but it did assist setting up glide angle, sink rate for short fields.

The Wonderful Ryan S-C

A trend setter that looks as modern today as it did 30 years ago.

PAUL R. MATT

Photos / Ryan and Historical Aviation Album

SHE was a beautiful ship, just as beautiful and easy to fly, too — you knew it was a trend setter, and those few that are still flying look just as modern and at home today as they did 30 years ago." So stated a pilot recently who had considerable time on the Ryan S-C shortly before WW II and for a couple of years after. To this we can add that the S-C was more than a trend setter in its class; it was the first truly successful private plane to pioneer the all-metal, low-wing, enclosed-cabin concept. A plane that had everything going for it if a nasty war had not intervened and halted production.

T. Claude Ryan envisioned the S-C (Sport Cabin) in 1936. Later, in a resume about its development, he expressed his hopes, intentions and requirements.

"The plane was planned from the first preliminary drawing as a production job," he stated. "We wanted to develop a type of construction so simple and so practical that it would lend itself to efficient manufacture in much larger quantities than had been customary in the past.

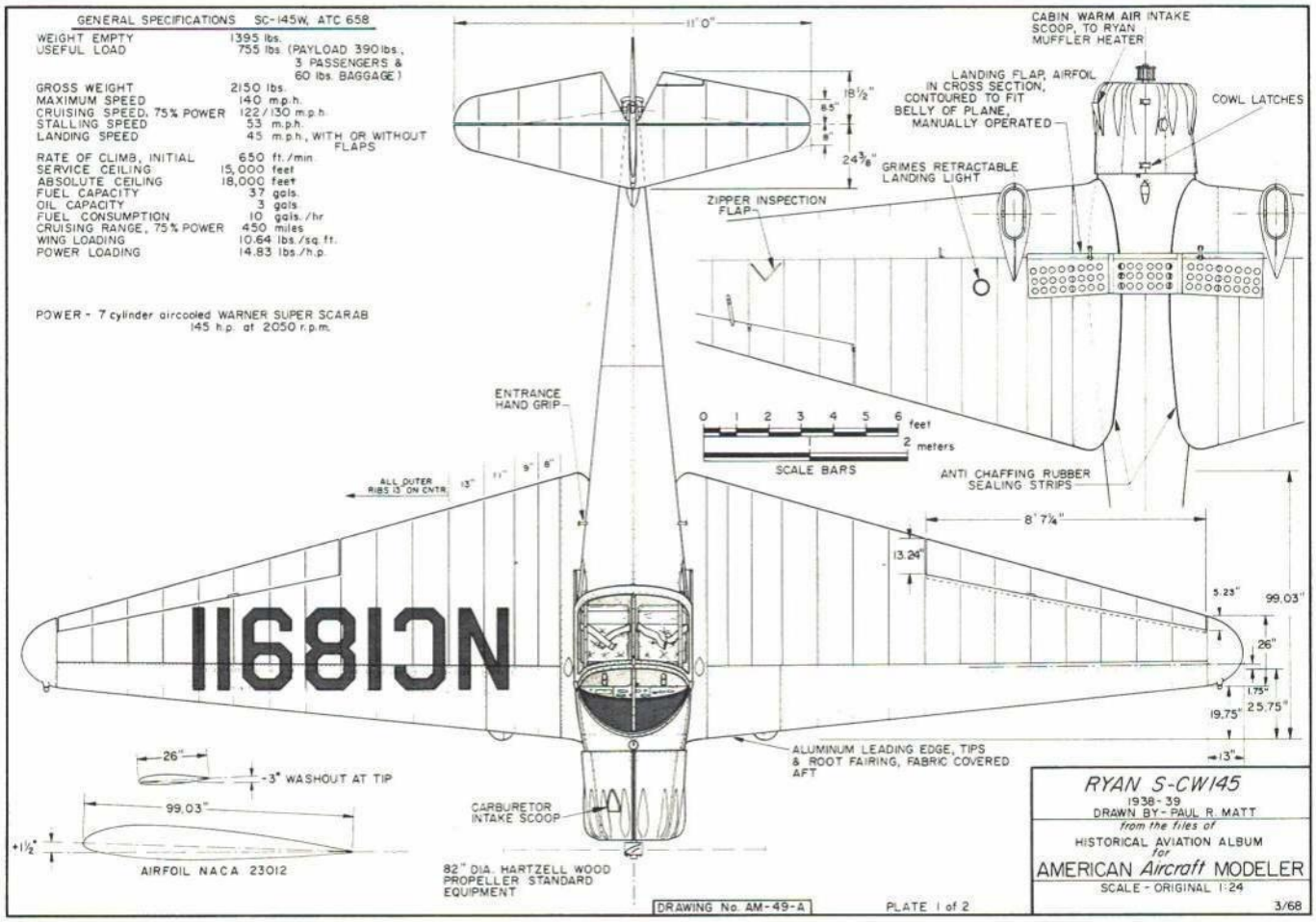
"Aircraft designers have for years toyed with the idea of airplanes stamped all at once in one huge press, or poured out of some synthetic material in a single molding operation, or somehow fabricated so as to avoid the tedious hand fitting of limitless numbers of small parts. We believe that in the development of the S-C we approached this ideal of the one-piece airplane.

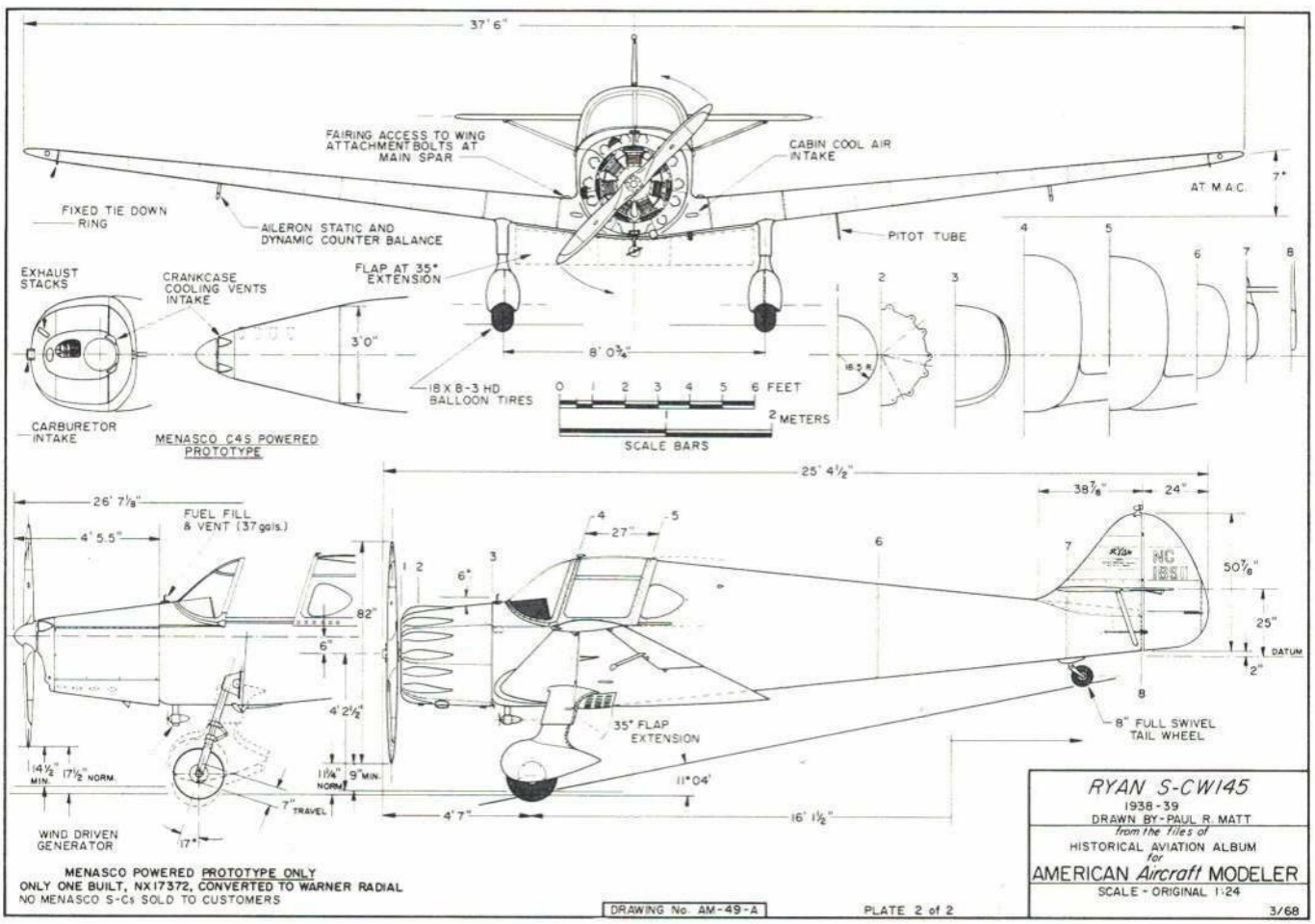
"It is a much more difficult assignment to simplify a structure than to 'complexify' it," he went on, "We feel it (the S-C) is the most simply manufactured metal airplane and the most adaptable of any yet developed to an efficient production machine."

Ryan achieved the classic S-C through two years of extensive study, experiment and ingenuity. Every part, with few exceptions, was either a flat sheet or a drop-hammer stamping. Flat sheets were marked and drilled from steel master templates, while stamped sheets were formed from dies which accurately reproduced a given part exactly over and over again. The only major compound curves were in the engine cowling, wheel pants and fairings. Nearly 90% of the structure and covering was of one gauge aluminum — 24ST.

In producing the S-C a full-scale plaster model was built first. Once the shape was finalized, lines were transferred from the plaster mock-up directly to metal by means of progressive steps. Shells were built around the fuselage model at bulkhead points and at compound curve areas. Plaster casts were then made and,

The 145-hp Warner-powered Ryan S-C prototype flies over San Diego Bay shortly after conversion from in-lined configuration.


GENERAL SPECIFICATIONS SC-145W, ATC 658
WEIGHT EMPTY 1395 lbs.
USEFUL LOAD 755 lbs. (PAYLOAD 390 lbs., 3 PASSENGERS & 60 lbs. BAGGAGE)
GROSS WEIGHT 2150 lbs.
MAXIMUM SPEED 140 m.p.h.
CRUISING SPEED, 75% POWER 122/130 m.p.h.
STALLING SPEED 53 m.p.h.
LANDING SPEED 45 m.p.h., WITH OR WITHOUT FLAPS
RATE OF CLIMB, INITIAL 650 ft./min
SERVICE CEILING 15,000 feet
ABSOLUTE CEILING 18,000 feet
FUEL CAPACITY 37 gals.
OIL CAPACITY 3 gals.
FUEL CONSUMPTION 10 gals./hr
CRUISING RANGE, 75% POWER 450 miles
WING LOADING 10.64 lbs./sq. ft.
POWER LOADING 14.83 lbs./h.p.
POWER - 7 cylinder aircooled WARNER SUPER SCARAB 145 h.p. at 2050 r.p.m.
11'0"
18½"
6.5"
8"
24 3/8"
CABIN WARM AIR INTAKE SCOOP, TO RYAN MUFFLER HEATER
LANDING FLAP, AIRFOIL IN CROSS SECTION, CONTOURED TO FIT BELLY OF PLANE, MANUALLY OPERATED
COWL LATCHES
GRIMES RETRACTABLE LANDING LIGHT
ZIPPER INSPECTION FLAP
ENTRANCE HAND GRIP
0 1 2 3 4 5 6 feet
2 meters
SCALE BARS
ANTI CHAFFING RUBBER SEALING STRIPS
ALL OUTER RIBS 13" ON CNTR
13" 11" 9" 6"
8' 7¼"
13.24"
5.23"
99.03"
26"
1.75"
25.75"
19.75"
13"
NC1681N
26"
-3" WASHOUT AT TIP
99.03"
+1½"
AIRFOIL NACA 23012
CARBURETOR INTAKE SCOOP
82" DIA. HARTZELL WOOD PROPELLER STANDARD EQUIPMENT
ALUMINUM LEADING EDGE, TIPS & ROOT FAIRING, FABRIC COVERED AFT
RYAN S-CW145
1938-39
DRAWN BY - PAUL R. MATT
from the files of
HISTORICAL AVIATION ALBUM
for
AMERICAN Aircraft MODELER
SCALE - ORIGINAL 1:24
3/68
DRAWING No. AM-49-A
PLATE 1 of 2


37' 6"
FAIRING ACCESS TO WING ATTACHMENT BOLTS AT MAIN SPAR
CABIN COOL AIR INTAKE
7° AT M.A.C.
FIXED TIE DOWN RING
AILERON STATIC AND DYNAMIC COUNTER BALANCE
PITOT TUBE
EXHAUST STACKS
CRANKCASE COOLING VENTS INTAKE
FLAP AT 35° EXTENSION
3'0"
8' 0¾"
18 X 8-3 HD BALLOON TIRES
0 1 2 3 4 5 6 FEET
2 METERS
SCALE BARS
CARBURETOR INTAKE
MENASCO C4S POWERED PROTOTYPE
25' 4½"
26' 7⅛"
4' 5.5"
FUEL FILL & VENT (37 gals.)
38⅞"
24"
27"
82"
6"
6°
50⅞"
25"
2" DATUM
4' 2½"
35° FLAP EXTENSION
8" FULL SWIVEL TAIL WHEEL
14½" MIN.
17½" NORM.
11¼" NORM.
9" MIN.
7" TRAVEL
11°04'
4' 7"
16' 1½"
17°
WIND DRIVEN GENERATOR
MENASCO POWERED PROTOTYPE ONLY
ONLY ONE BUILT, NX17372, CONVERTED TO WARNER RADIAL
NO MENASCO S-Cs SOLD TO CUSTOMERS
RYAN S-CW145
1938-39
DRAWN BY-PAUL R. MATT
from the files of
HISTORICAL AVIATION ALBUM
for
AMERICAN Aircraft MODELER
SCALE - ORIGINAL 1:24
3/68
DRAWING No. AM-49-A
PLATE 2 of 2

from these female castings, master male plaster casts were made.

The plaster patterns were used to make sand molds into which was poured molten zinc metal, thus forming one half of the die. The "punch" or female half of the die was made by pouring lead directly over the zinc die. The complete S-C was built up of a little more than 200 individual sets of dies from which all the essential parts of the plane's structure was formed.

The wing structure was greatly simplified and its construction of great interest. Again, the precision of the drop-hammer die-stamping process was utilized. The wing featured the monospar principle and each panel was attached to the fuselage by three taper bolts. The spar did not run as one unit throughout the span. This metal "monocoque spar," as it was termed, was a Ryan patented development.

In reality, the spar embodied approximately the full forward-third portion of the wing. This nose portion was assembled as a single unit with major stresses carried by the outer skin. It was further stiffened by the nose ribs and single vertical webs located about one-third of the chord. Thus, the entire forward portion of the wing formed a light but strong tapered box spar.

The master spar swept back from root to tip about 1½ degrees due partially to the 3-degree washout in the wing, to gain added structural strength as the wing thinned near the tip, and to retain the correct airfoil shape. This method of construction is known today as the "D" tube spar and is used on the popular Mooney.

The wings were formed and assembled in one continuous operation in a master jig. The trailing portion was cantilever ribbed. From root to aileron, ribs were built up from drop-hammer formed cap strips and simple diagonal members. The outer ribs were stamped in one piece. Final assembly was completed on the master wing panel jig to assure alignment. The entire S-C was completely assembled and aligned on but three main jigs.

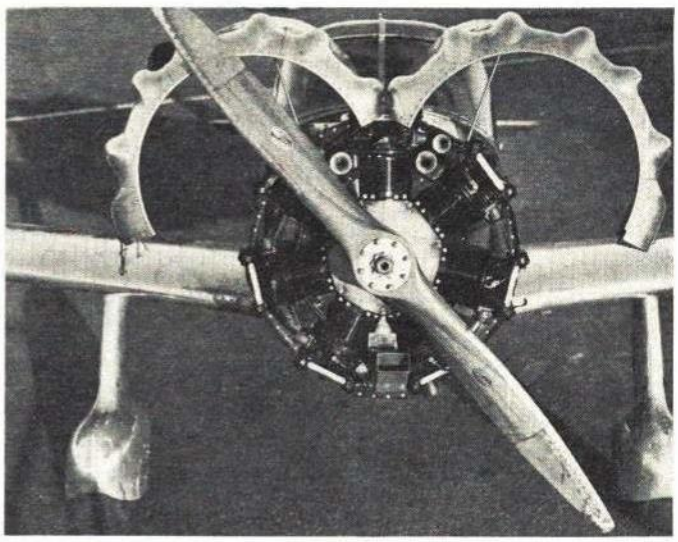
These processes may seem commonplace today and in many cases old fashioned. However, in 1936/37 such utilization of metal in a low-cost, private light plane was a great advance in aircraft design and construction. For its simple construction the S-C was beautifully streamlined and efficient. It quickly gained a reputation as just about the classiest private plane of its day.

The Ryan was a remarkable plane, highly maneuverable, responsive to the controls under all conditions, yet stable enough to be flown hands off. Careful choice and use of the right airfoil provided a stable center of pressure which made the natural center of gravity coincide with the center of pressure throughout the wing. Tests showed the wing as near perfectly balanced and free from flutter under all conditions as possible. Stalls were mild, the nose dropping only slightly below the horizon and aileron control was positive throughout. Forced loops and spins were possible with the S-C's but they were placarded against any violent maneuver. They were not intended as aerobatic machines.

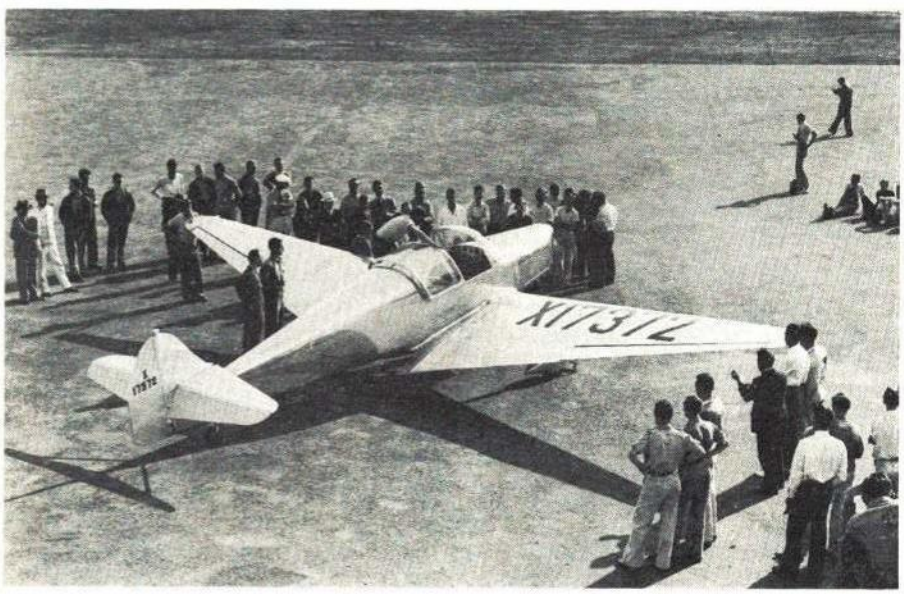
Development of the S-C was based on the popular acceptance of the model ST low-wing open-cockpit training plane and interests expressed by dealers and owners for a companion cabin model. Engineering was placed under the direction of Millard Boyd and Will von der Meer who previously designed the ST. The mock-up was built during the spring of 1937 and the flying prototype completed by mid-summer.

Continued on page 60

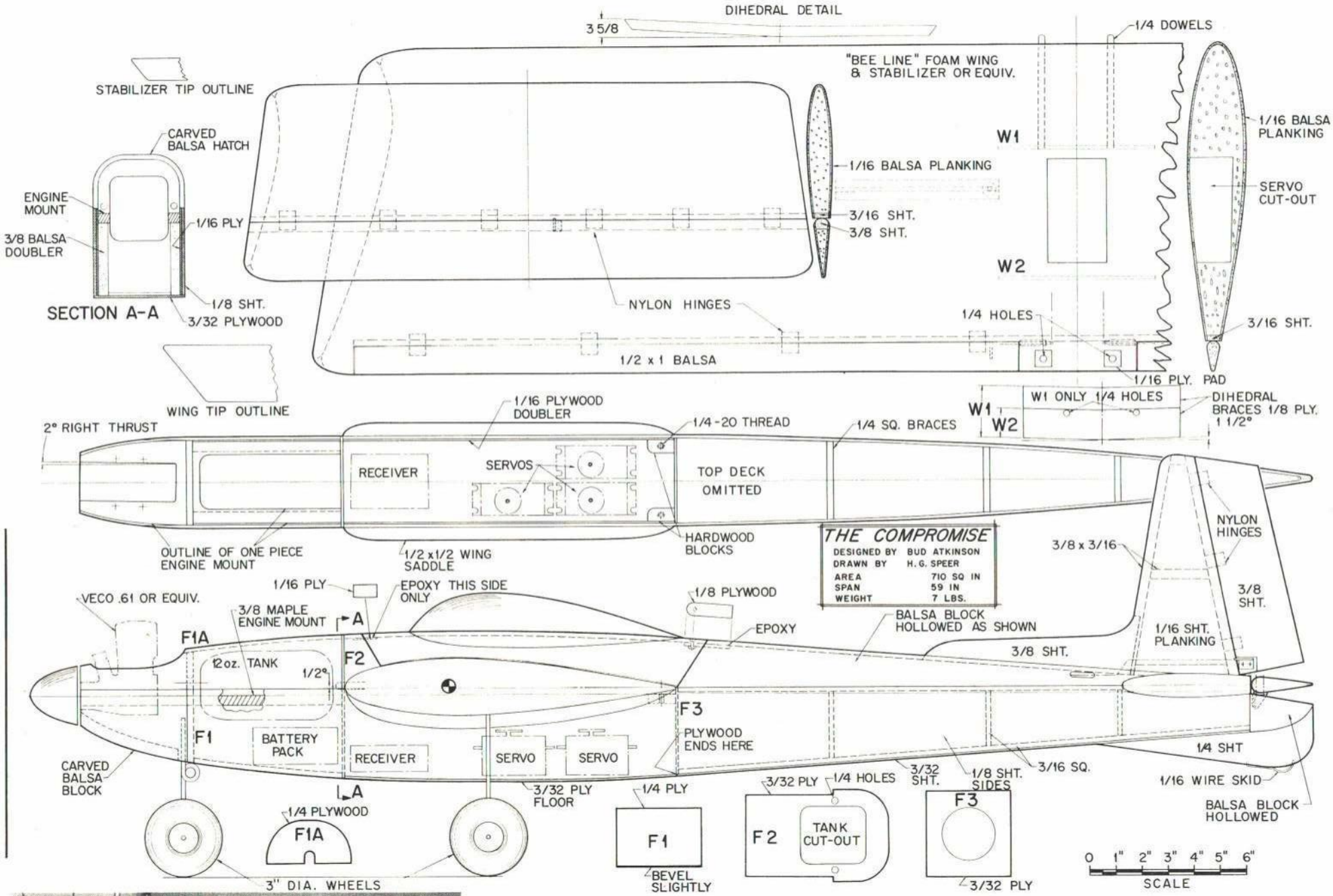
Warner 145-hp radial proved more reliable, rugged, easier to maintain. Only 12 S-CW's built before military contracts interfered.



Access to the Warner engine was simplified by an automobile hood type cowling, shown in opened position here on the prototype S-CW.



Test pilot John Fornasero runs up the engine for first flight in early 1937. The design called for 95- to 150-hp Menasco engines.



FULL SIZE PLANS AVAILABLE — SEE PAGE 60

Are mid-wings better?

The Compromise

A unique concept in an ordinary looking R/C airplane polishes performance. For 45's to 61's.

BUD ATKINSON

Showing clearly in this picture, the wide-tread tricycle landing gear is capable of takeoffs from extremely rough fields. Wing is foam.

IT seems we R/Cers must be conformists because our competition birds are in a rut. Over the past three or four years they have all looked, and performed, about the same. The competition multi airplane has become a low-wing Taurus, Candy, Beachcomber, or Kwik-Fli, or a variation of the same. All are good competition machines, of course. But there cannot be an ultimate end in design. There should, and will, be new and different methods for obtaining high-performance in an R/C airplane. With this in mind, we present the Compromise, a high-performance, easy-to-construct, pattern-competition airplane, much different from the run-of-the-mill low winger.

In my association with the old Class II for the past several years many things have been learned about lateral stability, which such an airplane must possess. This is the main, controlling factor of this class of planes. A large percentage of the ships in this class lack lateral stability, simply because many designers say you don't have to worry about it. We have ailerons to overcome the lack of stability, they argue, so it's no problem. That's why many low-wing airplanes don't spin easily on command, or, when they do, recover poorly from a spin. Rolls are rather sloppy on many a low-wing ship.

The Compromise was designed to handle these problems. With the addition of more power in our airplanes, performance didn't necessarily improve very much, simply because wing loading also went up. The answer, as I see it, was to go to a cleaner aerodynamic airplane. A mid-wing, or one with the engine, wing and stabilizer on the same line, produces less drag. Many of the Goodyears prove this; both in full-size and models. Generally speaking, the mid-wing is faster.

I would define a mid-wing this way: It is not a mid-wing because the wing is in the center of the fuselage; it's a mid-wing because the engine, wing, and stabilizer are on the same line. So why the name Compromise? It's just that, a compromise between a low-wing and a shoulder-wing airplane.

With the help of Bob Almes (Bee Line), who produces one of the finest foam precovered wings and stabilizers I have seen, was able to come up with an excellent surface cut from foam, covered with Bee Line's special material.

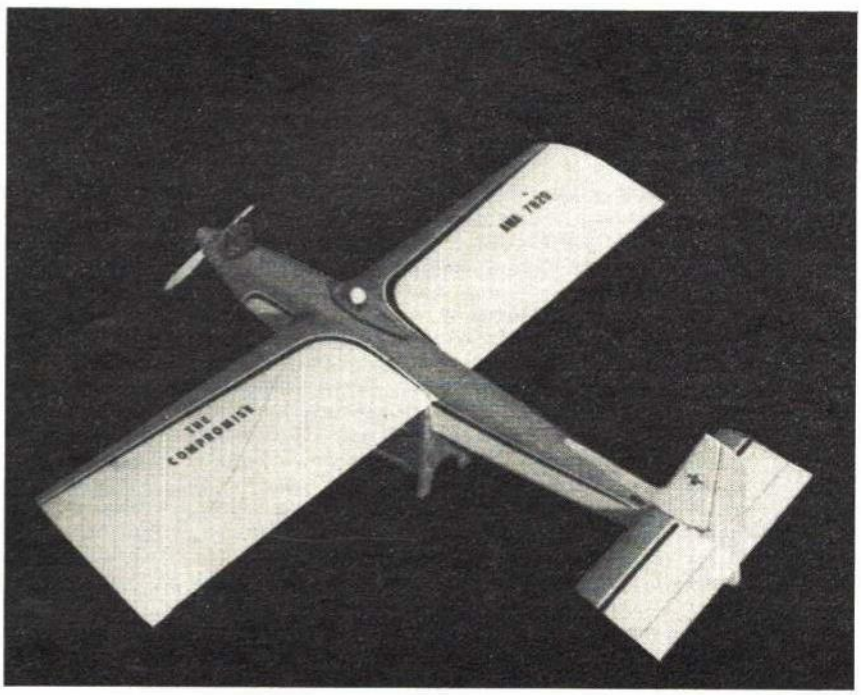
I don't claim the Compromise to be a revolutionary design. It is different, and a new approach to a high-performance airplane. I think we will see more mid-wing airplanes in the future because they have outstanding flying characteristics.

Construction: I try to keep my pattern birds simple and comparatively light with a minimum of parts. The fuselage sides are $\frac{1}{8}$" sheet with $\frac{1}{16}$" ply doublers. Normally, I use $\frac{3}{16}$" sides without doublers; but being a mid-wing, the fuselage is rather shallow at the wing center. So I believe the $\frac{1}{16}$" ply is necessary. The entire top section is made of a balsa and hollowed out. This is the strongest, fastest, and simplest way, and takes only an hour or

Continued on page 66

Bud prepares for a takeoff at the Nationals. Important points of the design are wing, engine, stab on one line, and wing-mounted gear.

The odd rake line of wing and stabilizer tips is functional feature which tends to reduce tip losses through control of air flow.



RADIO CONTROL WORLD

A ROUNDUP OF LATEST NEWS

CONDUCTED BY HOWARD MC ENTEE

Clubs and Modelers

THERE are several statewide or area groups in the country, but here is one that is purposely kept to a limited size. The idea might well be tried in other localities. The Southern Tier R/C Assoc. was formally organized in April 1967, with charter clubs in Sayre, Pa. (Valley RCMC), Elmira, N. Y. (Flying Sparks RCC), Ithaca, N. Y. (Ithaca RCS) and Endicott, N. Y. (Aeroguidance Society).

All these clubs are within an hour's drive of each other, so attendance of STRCA meetings will be simplified, and Assoc. dinners and meets will always enjoy good attendance. Most of the membership is interested in fun-fly type meets that do not require expert judging (or flying), but some AMA competition will doubtless be scheduled. At least one Assoc. meet will be held each flying season at the field of each club. Points go to each club for winners of events, also for each member who enters an event and each one who flies. A perpetual trophy will go to high-point club at season's end. Handicap multiplier assures the largest club won't always win the trophy. Sec. Austin Cleis Jr. (13 Larchmont Rd., Owego, N. Y.) can supply info.

Updated Jester: The Jester bipe (plans in March '67 A. M. cut a real swath in Eastern Class 2 competition during the 1966 season, for designer Ken Bonnema. Ken "retired" the plane at the end of 1966, and started 1967 with a Class 3 Comp. plane. But latter was demolished early in the year, and the old Jester was once more put to use, with a few modifications that improved stunt performance. A new bottom wing spanning 46" was installed. The landing gear was moved 4" further outboard on each side of this wing, than shown in original plans. And a S. T. 56 with 11-7 Rev-Up prop was installed. The plane then outdid its previous winning ways, collecting five firsts and three second places in Class 2 competition, plus a second in Class 3 Novice. The wing change eliminated all tendency to drop a wing in loops, and inverted flight was improved. While Class 2 is now defunct, the Jester should hold its own in the new Classes A and B; with ailerons and less dihedral, it

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An editorial — *More little Toledos: To be sure, your efforts will look pretty feeble — but remember Toledo*

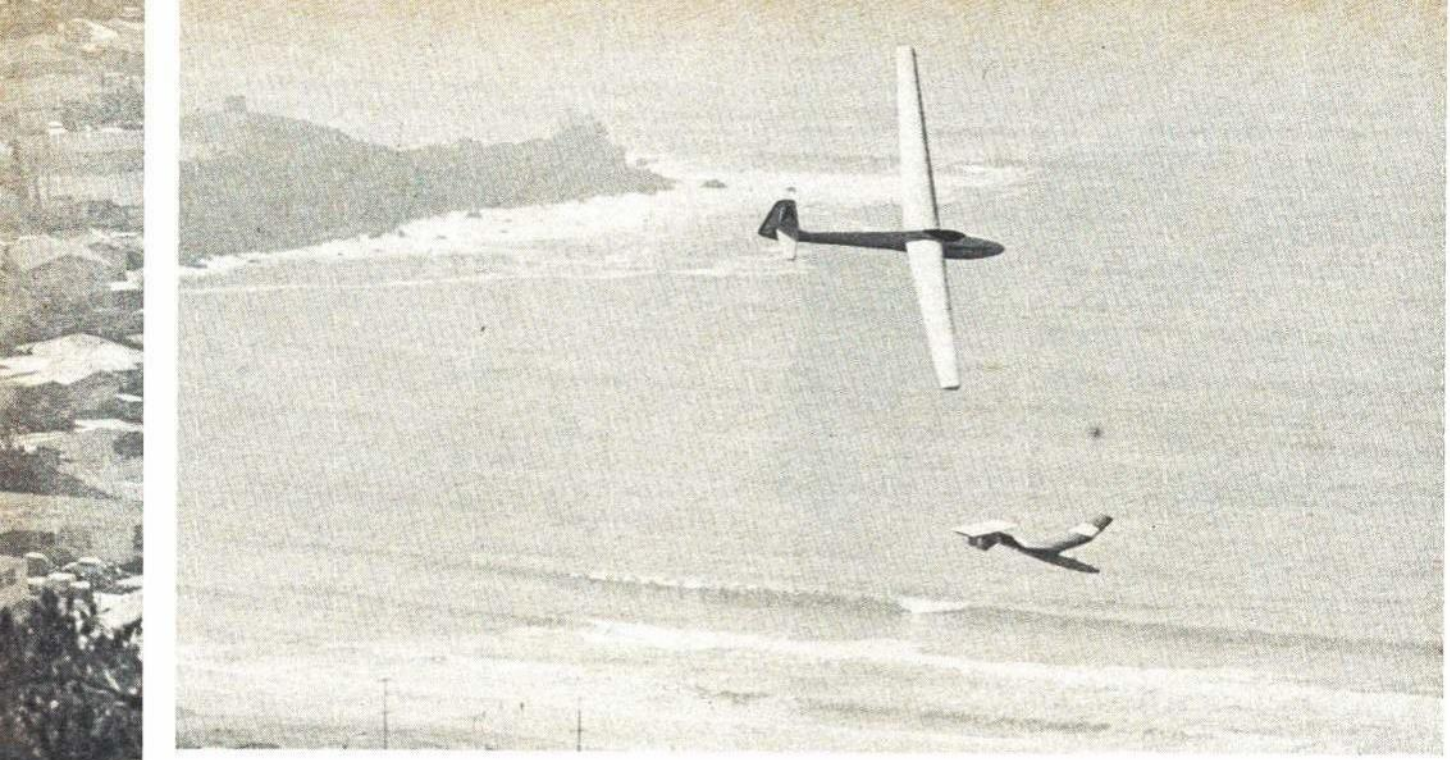
WITH the 1968 Toledo R/C Conference once more behind us, it might be worthwhile to try to stir a little interest among R/C clubs to hold *little* Toledos in their own areas. There is nothing new in this, and it has been done in a few parts of the country in recent years. We don't expect to generate full-sized R/C conventions all over the country, on the order of Toledo or the California M.A.T.S. — in fact, we doubt the industry could *stand* many more such huge shows. For don't forget, the very considerable time and money that members of the R/C industry spend in traveling to such shows simply subtracts that much from the time and money they have available for research, development and production. No, we refer to the much smaller and rather "local" shows that might attract modelers from a radius of 50-100 miles. They cost only modest sums to stage (though a lot of work by a lot of club members might be required) and do much good, especially for those unable to attend the larger shows.

Most such affairs are held during the winter, when poor flying weather keeps the majority of modelers grounded. And though they might have spent the winter building, late winter is a time when the spirits of most modelers could stand a boost — and what better way than to have a "convention" where they can show their winter's work to fellow flyers (or boatmen — or model car racers) and eagerly discuss the coming active outdoor season. Probably in most parts of the U. S., late January to early March would be the best bet, possibly modified a bit to suit local conditions.

This period of the year is generally off-season for motels, in case you expect to have some visitors stay overnight. Also, many modern motels have very suitable meeting rooms, and they can stage a banquet right on the premises, if you wish to have one.

Once you have picked your date, the most important matter of all is to *get the word around*. If you expect help from the national magazines, try to get the word to them at least three and preferably four months ahead. Send full particulars to all R/C club papers in your area; preliminary news could go out at the same time you contact the national mags, then stage a late campaign in the club papers a few weeks before your date. If you wish to invite the general public — which is a fine idea, if you have room to accommodate them — this latter period is the time to approach the local newspapers and radio stations too. Try to have posters in every hobby shop for a hundred miles around. And don't neglect that most reliable medium of communication — the good ole grapevine!

Now, what about your program? If you can persuade any local R/C manufacturers to attend your affair and put on a display, fine. These smaller conferences are a fine place for the smaller R/C maker to exhibit, who probably couldn't afford to show at Toledo or M.A.T.S. Try to get hobby shops



Oh, No! That is not a bird about to flap its wings! McKenna's almost total failure of the wings on scale Skylark glider resulted in a very rapid descent, under apparent control.

Soaring on slope lift over the Pacific coast are Bob Seigelkoff's Libelle and friend. Scale gliders are fun, too; because of the tremendous lift available, anything will fly!

might be a good Class C plane?!

Second club needed: Though there has been an active R/C club in Montreal, Canada for some ten years (M.A.R.S. of Montreal), some of the active flyers felt the need of a second club in the area, and the Montreal R/C Club Inc. has recently been formed. Why a second club? M.A.R.S. had gotten up to a membership of 55 at the end of 1967, and those active flyers found they could only get in 3-4 flights during a long weekend afternoon. Further increase seemed inevitable — with less and less chance to fly equipment in which there was a bigger and bigger investment. Hence the formation of M.R.R.C., which initially will be limited to a maximum of 25 members. This may eventually be raised, but will never go higher than 40 members. A permanent board of directors will eliminate the confusion of yearly changeover of officers, and they pledge that there will be a minimum of "business haggling" at meetings. The new group has a fine flying field, and their club paper is being edited by Jean Rivard (4403 Champagne St., Pierrefonds, Que., Canada).

UFO reported: Pennsylvania R.R. employees called the police to report a UFO spotted one night about ¼ mile from their tracks. They claimed it moved back and forth rapidly, looked like a long lighted "bar," and made a buzzing sound. Police arrived, saw no such object and were about to haul the informants to headquarters for imbibing too much "railroad juice," when the UFO appeared again. Obviously, this required reinforcements, and soon the fuzz was arriving from every direction. A couple of officers crept closer to the area near where the "saucer" was gyrating, saw a dim figure on the ground in the darkness swaying from side to side in unison with movements of the UFO. The monster must have sensed he was being stalked and turned quickly; fingers tightened on triggers just as he called out to the nearest officer, "Hi Charlie, what are **you** doing out here?" The "spaceman" turned out to be the proprietor of Hen's Hobby House in Harrisburgh, testing a lighting system installed in his R/C plane! Lights were strung inside the wing, which had clear dope over the silk. This exciting

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started many years ago as a local affair. And look at it now!

in the areas to put up a display; while many manufacturers may have only one or two products to show, the well-stocked hobby shop can put on a highly varied show that will interest everyone.

Have plenty of room, and plenty of tables for display of models brought by visiting hobbyists themselves. You'll get a much better turnout of models if you let it be known that there will be prizes in several categories well publicized beforehand. Make the categories broad so they will attract a wide array of models. "Best Finish," for example, would attract many more models than "Best Low wing Class II multi Competition Stunt Model." If there is much R/C boating in the area, be sure to award at least one prize for boats.

If there is a reasonable possibility (considering local weather at that time of year) and there is a place nearby, consider the advisability of having flying demonstrations. If there is nearby suitable water, boats might be shown in action. And you could run R/C cars on a reasonably large and smooth parking lot.

If there are any local attractions that might interest wives and kids, be sure to set up trips to visit them. Museums, fashion shows, amusement parks are possibilities. Remember — probably the majority of wives and many youngsters couldn't care less about hanging around a model plane show; if you have something that *will* interest them, it is much more likely that the old man will be "allowed" to attend your show!

Good R/C movies and slides are always of interest. Some affairs such as that staged by the Seattle RAMS run a virtually continuous movie show all day long. There are numerous comic films with an aviation flavor you can rent to piece out your show, and make it more generally interesting.

Should you schedule a banquet? Opinions differ on this. It takes up a lot of valuable time, especially if your conference is only for one day. But if you can be sure of a top grade meal at moderate cost, it's worth considering.

A trading post or swap shop is always of interest, but takes quite a bit of space. If you know an R/Cer with a real gift of gab, you could even stage a genuine auction. A modeler is better at this than a professional auctioneer, as he knows exactly what he's trying to sell.

These are just a few of the angles of running your own local R/C conference. If you need more hints, you can contact groups who have done it themselves, such as the RAMS, the Buffalo Bisons, the New England R/C Modelers (whose members have staged several late spring conferences at Northampton, Mass.) and perhaps other groups of which we have no record. To be sure, your efforts will look pretty feeble alongside Toledo — but please remember, Toledo started many years ago as a *local* affair sponsored by the Radio Control Club of Detroit, in that city. And look at it now!

Second place in scale at Southwestern Regionals was captured by this magnificent, smooth-flying Hawker Hunter by Bill Hollenbach. All controls are operable and the flaps are used during takeoff and landing. Weighs 10 lbs., spans 57 in., and uses Kraft KP6.

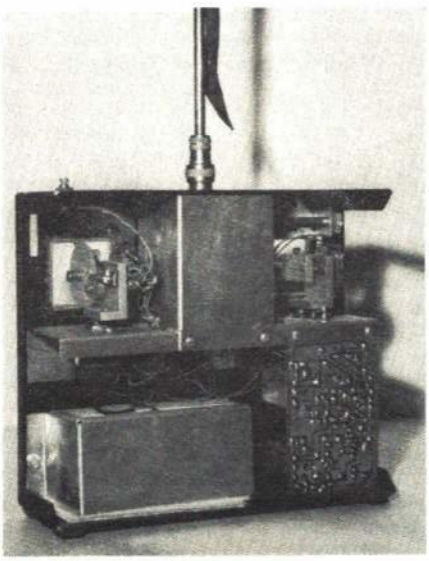
episode gleaned from **Hear Ye**, club paper of the Valley Forge Signal Seekers (Bob Lamey, 2133 Kenmore Ave., Glenside, Pa. 19038).

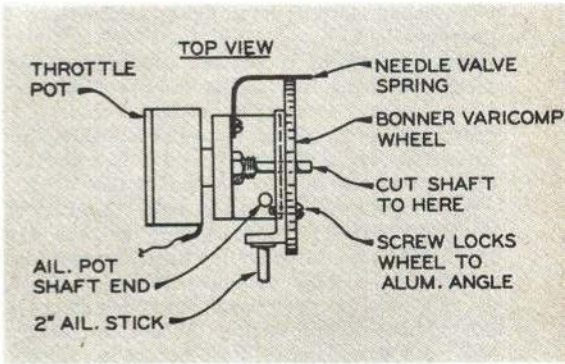
Chicken finger: This writer was one of several pleased recipients, while at Toledo, of a prop-finger protector dreamed up by the distaff member of the Flying Wischer Family (Mrs. Wm. Wischer, Box 236A, RR 1, Delafield, Wis.). Just how Dolly knew we needed a **left**-handed protector is a mystery — but it's a fact. Anyhow, the gadget is so simple and appears to be practical that we show the details herewith. Note that it **is** "handed"; the drawing of the material pattern will make either a left or right unit, but when you sew up the edge, it definitely becomes one or the other. The material is fairly heavy leather — about $\frac{3}{32}$" thick on our sample.

You could probably get scraps large enough from the local shoemaker, or harness maker if there is still one of the latter locally. Needless to say, the smooth side of the leather should be on the outside. Neat part of the design is that the double thickness edge where the stitching is placed is where the prop hits if the engine tries to "bite" you — thus you have plenty of protection. To use, just insert your index finger in the folded section, hold the "handle" with the rest of your fingers; if you make the protector the right size, you can shake it off after the engine is running, without using your other hand. The pattern looks a bit complex (our artist got carried away!) and cutting needn't be as precise as shown — just cut for a comfortable fit on **your** prop-twisting finger.

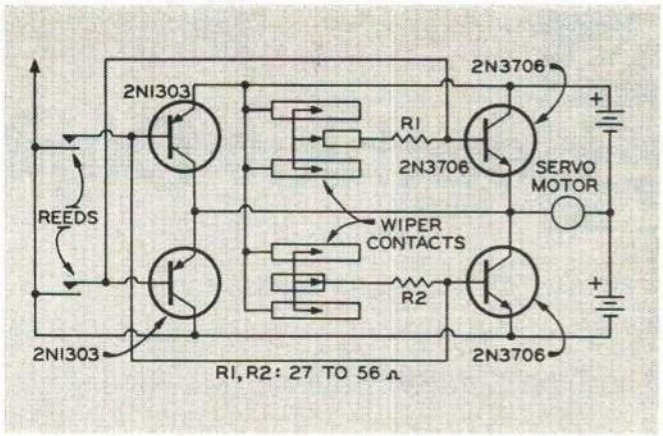
Technical Matters

Sunspots increasing: With an increase in sunspots, there is more and more chance of long distance signals being very strong at your flying area on the 27 mHz spots (less chance on 50 mHz, still less on 72). The sunspot cycle runs about ten years between maximum and minimum; the peak of spots is expected to occur during the winter of 1968-69. Signals from several thousand miles away — and from intermediate distances too — can come in with fantastic strength during high sunspot periods. While it's highly unlikely that an R/Cer on your frequency a couple thousand miles away could bother you (due to the low power and relatively very inefficient antennas used on R/C transmitters) a CB phone transmitter very possibly could. So if you have a 27 mHz monitor, listen occasionally on your frequency, especially if you seem to be having more than the usual number of glitches

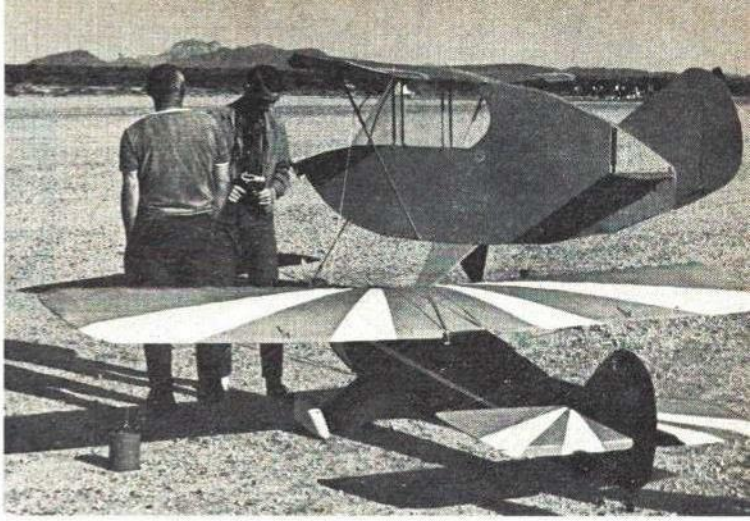




It is quite practical to convert the Orbit analog four-channel proportional two-stick set to have a more modern stick arrangement. Get the stick assembly from Orbit (or EK Products) and duplicate the other assembly in the transmitter. Ken McClure also highly recommends newer Orbit analog servos. Miniature version available, too.



Bobby Hill, a dedicated reed flyer, developed this remarkably simple reed servo drive amplifier that requires no bias battery. We needed this idea ten years ago! Other applications possible.



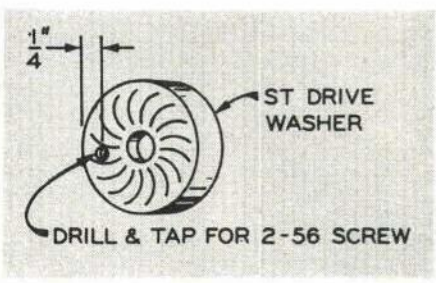
Some like them big! Most every year Wincell Poge brings his large models to the Phoenix Regionals. Enya .60 powered, all controls, 14-6 prop. Real slow flying, good climb, but 15 lb.

during flight. Always a problem it seems.

Modified orbit transmitter: When Keith McClure (3465 Powers, Memphis, Tenn. 38128) bought his Orbit propo outfit, he found it a bit awkward to use, after having been a reed flyer for many years. His transmitter had rudder and elevator on the left control stick, while the right stick handled only aileron via sideways movement (Mode 2). Throttle was on upper right edge of the case, and it was this throttle operation that bothered Keith. He envied those flyers whose propo transmitters had a two-way stick on the right for aileron and throttle. But the Orbit was very reliable — and he had quite an investment in it — why not convert it?

The throttle pot and its bracket were removed, and the slot in which the aileron lever had moved was enlarged to match the one on the left side of the case — 1½" square. The transmitter wasn't even disassembled for the cutting process. The throttle pot was taped out of the way, and other parts nearby covered a bit. A vacuum cleaner was rigged to suck up the aluminum dust generated when the hole was opened with an abrasive cut-off wheel.

Keith obtained the added parts needed for the new stick assembly from Orbit, but they may no longer be available since this concern switched to enclosed sticks some time ago. Possibly Kraft or Logictrol parts could be used. If you obtained a complete gimbal assembly, the throttle ratchet assembly would be included. In any case, the whole assembly (throttle pot and angle bracket, another angle to hold the control stick and the ratchet wheel) all pivot on the aileron pot, which remains in its original position in the transmitter. The usual scissor spring centers the assembly for aileron operation.



Pete Reed suggests use of a bolt inserted in the drive washer on Super Tigre engines to prevent prop-washer slippage while tightening the prop nut. Easy to do.

Our drawing shows the way the assembly looks as viewed from the top of the transmitter. The ratchet wheel came from a Bonner Vari-Comp escapement, and the spring on it is from a K&B or Johnson engine. Throttle pot must be marked before removal from its original spot, so you can get the proper range of movement with new setup. Keith lined the edges of both panel stick openings with split nylon tubing held in place with RTV cement (a good idea for other propo transmitters with open stick assemblies).

He highly recommends the newer Orbit PS2A servos over the original style (even for rudder), has found them absolutely reliable. And incidentally, for those who wish to replace the pots in the old type, he notes that Centralab F1-1000 (1000 ohms, taper C1) costs only $1.49 each.

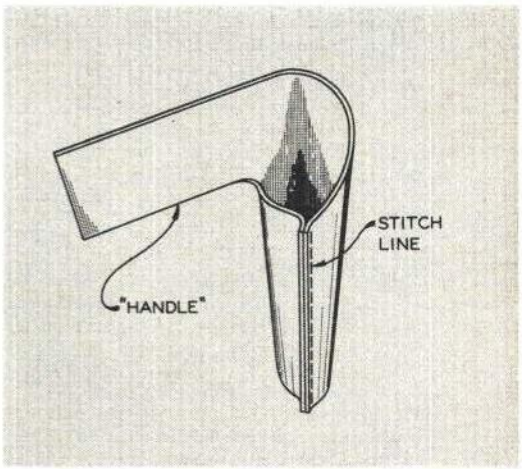
Slipping prop washers: Those who have trouble with the prop backup washer slipping, when they are trying to tighten the prop on Super Tigre engines will find the suggestion from Pete Reed (19 Eastwood Dr., Plainville, Conn. 06062) helpful. Pete simply drills and taps a 2-56 hole ¼" in from one edge; a 2-56 bolt is inserted from the rear, and the end cut off to leave a projection of about 1/16" on front. The end will sink into wood props as they are tightened, will also drop into the indentations found on the rear hub area of Top Flite nylon props (Tornado nylon props are solid and won't fit on, however).

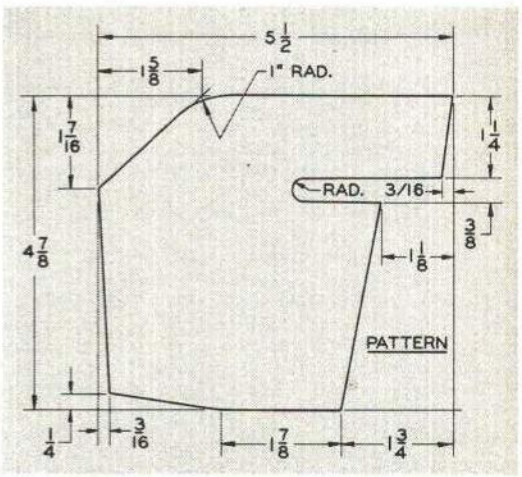
Simple reed servo driver: As was the case with his trim servo amplifier for converting reed servos, which we diagrammed in a past issue, the self-neutralizing amplifier shown here will fit inside a Crescent 15-pin plug, so doesn't even have to go inside the servo. Arrangement has been used by Bobby Hill (2125 18th St. S. E., Washington, D. C. 20020) with Duramite servos. Circuitry should be such that negative voltage is applied to the bases of the 2N1303 transistors, when a reed vibrates. The four positioning contact strips are all connected together as a safety factor, and to lower resistance.

Competition Flying

Goodyear continental event: As promised by the NMPRA, a considerable number of events for the larger Goodyear models (originally called the 600 cu. in. Class, now Continental Class) has been scheduled for the 1968 season. Latest listing of Goodyear meets shows at least eight Continental events definite, and there may be more, but many listings just give a place and date, do not list specific events.

The word is out that in all probability there will **not** be a Continental event (even on a demonstration basis) at the Olathe Nats; due to restricted Nats schedule, there just isn't time for it. But the many events scheduled for the 600-size racers will certainly show how much interest there is in the event, will point up bugs in the present rules, and will show whether Continental should be made an official AMA event for the 1969 flying season. Present plans call for Goodyear Qualifying flights to be flown





Chicken finger! Very effective finger guard made of 3/32" leather by Dolly Wischer features grip handle and low cost. Adjust the pattern to suit your finger size and hand, but must be a loose fit.

at Olathe N.A.S. on Saturday and Sunday (Aug. 3-4) with Finals on the following Wednesday and Thursday, starting at 4 p.m. In addition, Qualifying times made at the TORKS 8th Annual Meet (Aug. 3-4 at Tahlequah, Okla.) will be accepted for Nats competition.

Manufacturers invitational: The Fourth Annual Invitational Fly-In for those in the R/C industry will be sponsored on Sept. 7-8 by the Queen City RCC and World Engines Inc. Saturday will have just a display of models and fun-flying, with Saturday evening meal courtesy of the sponsors. More formal flying program Sunday includes AMA "Splattern" event (modified strictly for the safety of all); Open Pile-On; Limbo and other fun events. As you might guess, this is not too serious an affair, and reports on past meets show a fine time had by all, despite less-than-expert flying in certain cases. While the events are not open to the average R/Cer, we believe they will be welcome to spectate. And who knows — you may very likely see in action the kit planes that will be on sale for the 1969 season! Further info may be had from Paul Benkner (World Engines, Inc. 8960 Rossash Ave., Cincinnati, Ohio 45236).

Hobos invited: All wandering R/Cers are welcome at the Hobo Meets run each August by the Syracuse ARCS, and the event this summer will be on Aug. 31, Sept. 1. These are strictly fun-fly meets, with a few informal events (winners get prizes) to liven things up. Picnic supper is provided by the ARCS on Saturday, and there will doubtless be R/C movies and slides on view. To keep things from getting too hectic, the ARCS allow a maximum of four planes in the air at any one time. To assure maximum airtime, super-regens have been outlawed at the fine ARCS field south of Syracuse. Due to popular demand, ARCS C. D. Ed Izzo will conduct Goodyear races on Sept. 1. Bill Kenyon (7384 Cherry St., Pompey, N. Y. 13138) invites all R/C "bums" to join the fun and bring the family.

Sixth Annual Wright Brothers Meet: One of the top competitions in recent years has been the Wright Brothers Memorial R/C Championship, sponsored by Western Ohio Radio Kontrol Soc. They will conduct this meet again on June 22-23, at Wright-Patterson AFB as in the past. The huge area allows safe operation of four flight circles simultaneously, so entrants are promised a busy weekend.

Events are: Class A Jr.-Sr.; Class A Open; Class B (all classes combined); Class C Novice; Class C Expert; R/C Scale; Goodyear Pylon; Open Pylon; Combat. Last two informal events have been popular in past years. Very special trophies are awarded at these meets, plus many merchandise prizes. A Grand Champion each year receives custody of a beautiful trophy which includes a replica of the Wright Bros. biplane. Further info from C. D. Don Lowe (5936 Clair-Von Dr., Dayton, Ohio 45430).

AMA R/C records? Most of us know about the FAI R/C (also FF and UC) records, in which there has been considerable activity in the past few years, but there's been little activity in AMA records. While marks have been posted in control-line, we understand there are none in free flight or R/C. Red Gunning, Editor of the AMA-FAI Record Attempt Newsletter (c/o AMA Headquarters) feels it's high time some attempts were made to set up AMA records in **all** model plane categories. He suggests these be termed U. S. Records, to distinguish them from FAI International Records.

Continued on page 72

Heathkit Digital

A frank review of the kit as built by your R/C editor. Any careful patient modeler can build the set and gain much valuable knowledge.

WHEN digital systems were just getting into widespread use, the word went out from the makers that such equipment could never be serviced by the average modeler — even one who was fairly hep electronically. We were told you needed top calibre test equipment — starting with an oscilloscope costing around a thousand bucks.

Things have changed. Now you can build a digital outfit with **no** test equipment (all checking of the Heath outfit is done with the RF output meter from the transmitter, which is clipped into various parts of the transmitter and receiver). To be sure, one should be handy with tools, and especially with a soldering iron, but an electronic genius you need **not** be.

It's well known that the Heathkit outfit is electrically akin to Kraft propo of 1967 vintage (prior to the Gold Medal series). There are a few electronic changes, and Heath has used their own transmitter RF strip (which has been well-proven in thousands of CB transmitters). Heath utilizes the same battery packs as Kraft, and the capacitor-feedback servos are similar (except for connectors). Mechanically, there are vast differences, many made to facilitate kit building.

The transmitter has an entirely different case shape — comfortable to hold, since there are no sharp edges digging into your hands. Completely assembled Bonner control sticks are furnished. The RF strip comes finished and aligned (which gets past the FCC requirement that no RF tuning may be done unless one has a Commercial license). The receiver has been made considerably larger than the Kraft, for easier construction.

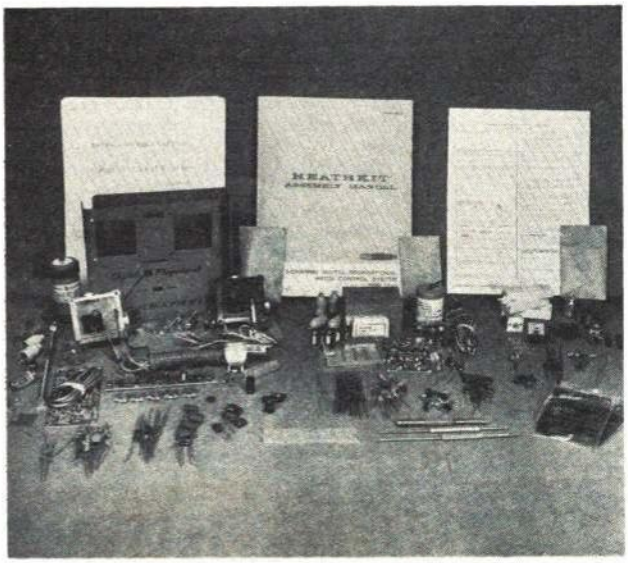
Heath went into R/C kit manufacture through the prodding of a couple executives. Primary was Bill Hannah (Consumer Product Manager), ably seconded by Carl Heald (Chief Engineer of the General Dept.). Bill has been an avid R/Cer for seven years, and Carl is an active flyer.

The prototype equipment was flown through most of 1967 by Bill and several others, including entry in quite a few midwest contests. Many details of the system may be gleaned from Heath ads — you can obtain a more comprehensive free brochure on the outfit (which includes all circuit diagrams). The first production run was sold out early in March.

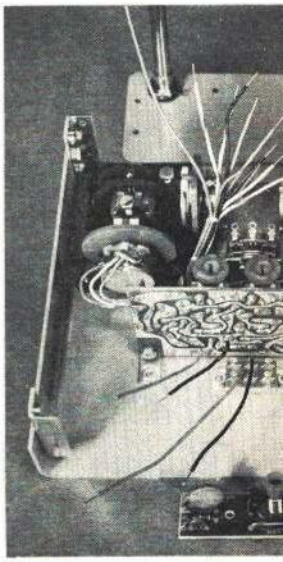
For now, the Heath propo system is available only in the 5-control version, only with two control sticks (only in the so-called Mode I — for Mode II, you could transpose stick assembly parts) and only in kit form — some Heathkit units may be had either as kits or fully assembled. The systems are presently sold only on 27 mc frequencies. The line will be expanded for 1969 — many variations may be expected.

What will the average purchaser get into? We assembled a complete outfit for testing. It must be admitted that the writer has done much R/C work in the past (and has built several dozen Heathkits, dating back to their very first — an oscilloscope

Although there are many parts, the very thorough instructions, which demonstrate Heath's vast experience with electronic kits, makes the job relatively easy.



The transmitter ready for final assembly with the encoder board in place. The 400-mw, 27-mhz RF strip in foreground comes already built and pre-tuned as shown.



5 Propo Outfit

around 1946). Our total building time was some 32 hours, and this includes rectifying a boo-boo or two, tracing down a faulty component in the transmitter, considerable time reading the Assembly Manual prior to commencing assembly, and with no effort to rush any part of the job.

We certainly wouldn't recommend this as the very **first** electronic project for any hobbyist — though with some prior soldering practice, plus extremely careful check and recheck of all work (preferably by someone **other** than the builder) it could be done. If you are handy with tools, have done a modest amount of electrical or electronic assembly — and if you will carefully read all the literature — it should really be a rather easy project.

Let's take each element of the system separately. The Manual takes up the transmitter first, a fine choice, as the only electronic assembly here is the decoder board, which is reasonably large and uncrowded. Heath has come up with an entirely different case shape — and a new color too. The case is finished in light blue crackle paint, is most attractive with black Bonner assemblies, and all controls in bright red. On the bottom of the case are connectors for a cable to charge the receiver battery, and for plugging in the detachable 115V cable for the AC line. The charger is built into the transmitter. Transmitter and receiver batteries are charged in series; you can't charge one without the other. A pilot lamp shows that the circuit is complete and charging is proceeding. One most handy feature of the Heath transmitter is the collapsible antenna, which projects only 1⅜" above the case top when not in use.

Our assembly time for the decoder board was 2½ hours, and the entire transmitter was assembled in 5¼ hours — less the testing and adjustment time. No problems were encountered on transmitter assembly, but a few time-saving shortcuts were utilized. For example, we found it much faster to set the pots in the Bonner stick assemblies with an ohmmeter — though the manual gives full details of this job if you don't have a meter. It seemed much faster to thread the mounting holes in the Bonner stick units with a 4-40 tap — but you can do it without, as Heath furnishes thread-cutting machine screws. Everything fitted nicely during assembly, but when we put the back upon the case, a gap of some 1/32" was left on each side. This may be cleared up on later production. The case is rugged, made entirely of 1/16" aluminum.

The manual strongly recommends cleaning the PC board undersides with acetone or dope thinner. We heartily agree. This is even more true of the receiver and servo boards, where there is close spacing.

Nor were problems encountered in receiver assembly, which took 8¾ hours, including wiring the many connectors. We suggest tinning the ends of **every** piece of stranded wire used in the system — this will prevent possible shorts and make assembly much easier.

Servos brought a few problems. Firstly, we found the capacitor shaft would bind up on the case, unless the hole for same was somewhat enlarged. When installing the two driver transistors on the PC board, bend their leads so they are as far away from their end of the board as possible (without shorting other components); this assures they will clear the capacitor attached to the motor. There just isn't much room for this capacitor and its leads, which must all be tight against the motor case.

Installing a little nylon pin in a hole on the end of the capacitor shaft proved troublesome on a couple of servos; trick here seems to be to slightly taper the small end of this pin, to remove a tiny "ridge" that catches on the screw threads in the hole. A fine file (a nail file would do nicely) does the trick.

Our first servo took about 3¾ hours, but later ones went faster.

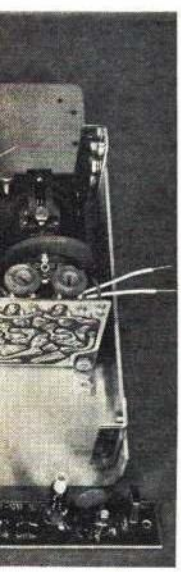
Some difficulties were had in tuning up, mostly caused by a shorted auxiliary pot in the transmitter; if you have time and the necessary equipment, it might be wise to check every electronic part, though this is the first bad one we can recall in many years of Heathkit construction. One other problem was caused by our own carelessness — a solder "bridge" in the receiver wiring. Such errors are often spotted more quickly by an inspector who hasn't built the equipment. Other than these troubles, tuneup went according to the book and the final result was very fine indeed.

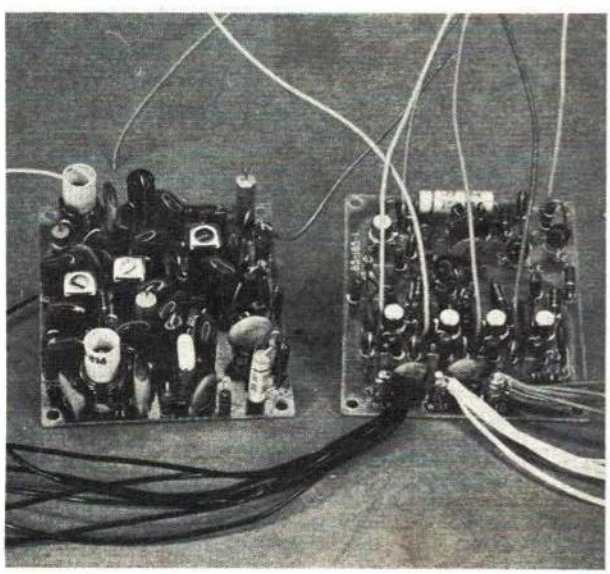
What do you do, if you have trouble that you can't locate? In the first place, trouble-shooting info is most complete throughout the book, on a step-by-step basis, and overall. As longtime purveyors of electronic kits, Heath has a large repair department at the Benton Harbor plant, geared to clear up troubles and get the apparatus back to the buyer just as rapidly as possible. But of even more interest to R/Cers — there are some 17 Heathkit repair and service shops located in principle cities of the U. S., and two in Canada. They are fully equipped and stocked to set your Digital 5 aright — whether your trouble comes from building problems, or from later crash damage.

Finally, we found that the complete plane installation with four servos totaled 21 oz. Transmitter and receiver will handle a fifth servo, of course, which costs you $21.50 additional (and with connector mods, these servos will work fine with Kraft or PCS systems). All Heathkit parts are available individually, right down to nuts and bolts. Some of these parts look to us like "best buys"; for example, you can get a completed 400 MW output RF strip with crystal, already tuned (and thus "legal" for use in homebuilt apparatus) for only $9.60. As a matter of fact, Heath does not sell transmitter crystals separately; to shift frequency you buy an entire RF strip on the desired spot, and a matching receiver crystal.

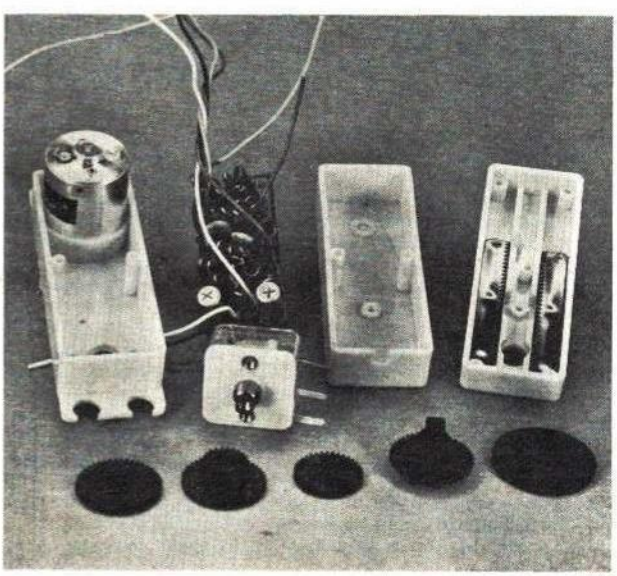
Builders of this equipment will end up with top grade apparatus at a considerable price saving; even more important to our mind — they will gain considerable knowledge of the workings, so much so that they will be able to cure many troubles themselves, thus saving time and money.

by Howard McEntee.





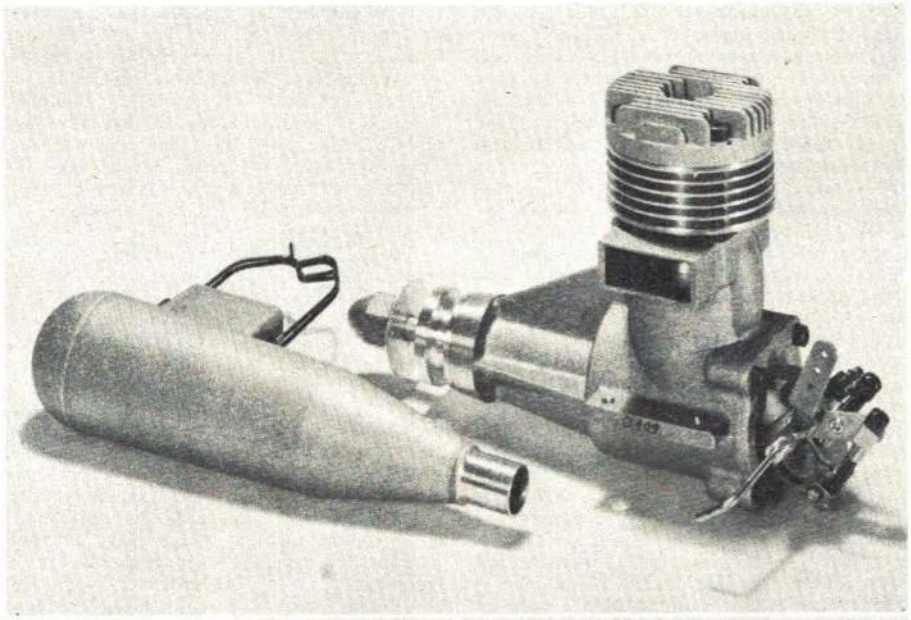
Receiver layout provides adequate space for easy assembly. The system uses the well-proven and up-to-date Kraft electronic design almost throughout.

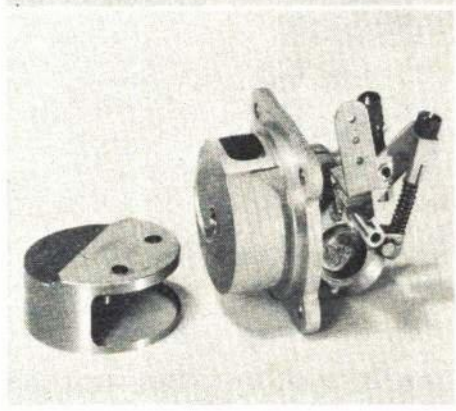


The variable capacitance feedback Kraft-Hayes digital servo, as kitted by Heath, is also useable with the newest Kraft and PCS control systems. Requires patience.

NEW PRODUCTS CHECK LIST

Write the manufacturers for more data; tell them, "I saw it in American Aircraft Modeler."





Performance Aero Products/HP .61 G-R/C. First production units of this Austrian made engine have reached the U. S. distributors. Craftsmanship is evident in the powerful R/C version. Designed for the serious modeler, who must have the best, it developes 1.0 bhp at 9,000 rpm and a peak of 1.49 bhp at 15,000 rpm on 5% nitro, R/C fuel. It also has the lowest specific fuel consumption per bhp of any R/C .60 engine now available. Top photo — the 16 oz. engine has a unique, specular appearance (die-cast crankcase is air blasted with metallic particles). Lightweight muffler with a similar finish plugs onto the rectangular exhaust and is retained by spring, wire clips. The combination spinner/hub nut/prop shaft threads into the ball bearing supported crankshaft. Lower left photo — the carburetor and the steel, dynamically balanced, bell valve are patented. The bell valve shaft rides in a bronze bush in the backplate's center; very smooth and friction free. The special carb has no spray bar, just a single needle rotating with the venturi barrel and two adjustment screws to regulate the idle stop and the venturi's size. Lower right photo — single fuel line fitting is above the venturi. Five transfer ports (three seen here) are slanted to take advantage of the Schnuerle type bypass ports (plus the boost port) and direct the fuel/air mix into the combustion chamber with little drag and great efficiency. The light alloy piston has two rings, each relieved to permit faster seating. Conrod bearings are bronze. End pads on the hollow wrist pin are a soft alloy. Overall the finish is excellent and the fit such that no gaskets are required. Price of the HP .61 G-R/C is $70.00; other versions to be announced later. PERFORMANCE AERO PRODUCTS, INC., P. O. Box 6064, Shirlington Sta., Arlington, Va. 22206.

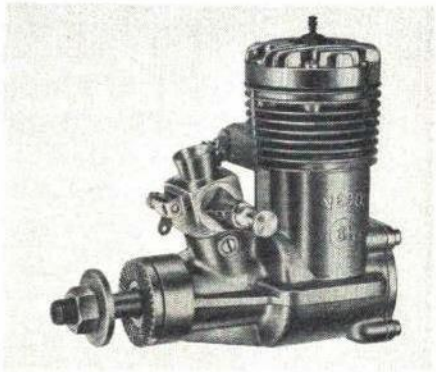
Anderson Engineering/Geodetic Galaxie. Free Flight kits seldom cross the *Check List* desk. On arrival the Geodetic Galaxie received a double look. "Geodetic" as the name indicates is the structural arrangement in the constant chord wing and stab. Ribs in this pattern create a stiffness and warp-resistance that is superior to a standard rib and spar layout without adding much weight. The rest is conventional — pylon wing mount, an upright, stab-mounted fin and a box fuselage. Vic Cunnyngham Jr. designed the potent looking model for .049 or .051 engines. Design has contest-seasoning; Bill Davis used it to win first in Open ½A at the '67 Nats. Area of the 49" wing is 312 sq. in. Kit wood looked good. Fuselage formers, wing and stab ribs are saw-cut (great time-saver). Fuselage, pylon and fin parts are printed, offering no cut-out problems. Jap tissue covering is included. Plans are well detailed. Seems like a well-thought-out, no-nonsense, winning design. Kit price is $4.95. Contact: ANDERSON ENGINEERING, 1336 Winn Dr., Upland, Calif. 91786.

Finishing Touch Decals/Nickel Numbers. Finishing Touch is now offering the AMA sheets in cut up form. The numbers are individually boxed so you only need buy those to fit your needs. The large size, 2¾" high, are a nickel each; the smaller, 2" high, are sold in a strip of 10 (one to zero) for 25c. The center section of the AMA sheet — misc. items, insignia and the instrument dials — is packaged separately and sells for 98c. Bill Polvogt of Finishing Touch has this suggestion: sometimes problems arise when you try to stick decals to plastic aircraft such as the Lanier and Dee Bee types. To insure good adhesion, spray the area, where the decal will go, first with Krylon Crystal Clear Spray. It seals the plastic and prevents microscopic amounts of oil that fresh plastic emits. This accounts for the problem. Apply the decals and they'll stick like crazy. You can also spray over the decals with dope. Query: FINISHING TOUCH DECALS, 9941 Debbie Drive, El Paso, Texas 79925.

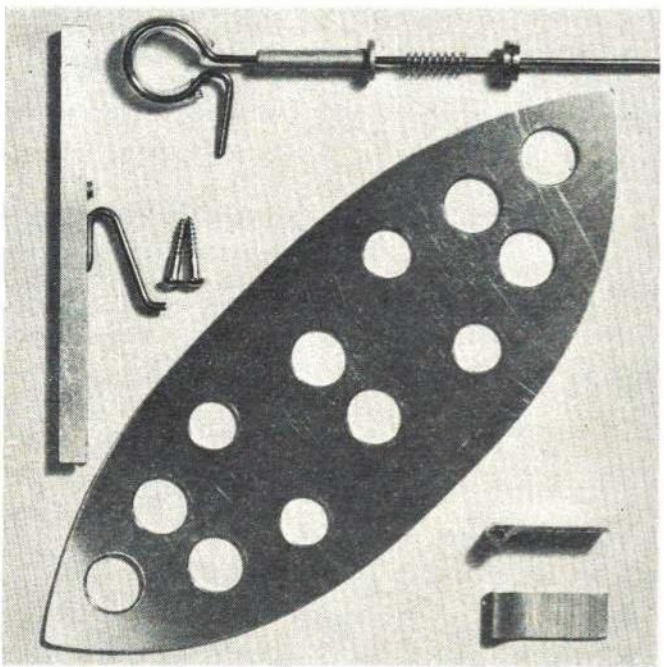
Bob Holman/Plans and Parts. As many know, Bob Holman produces scale drawings — three-views with all cross-sections and complete wing and tail planforms. Size is big enough so the drawings may be used in the construction. Latest drawing is the Curtiss F7C-1, "Sea Hawk" bipe in 2" scale, 65" span. Over 30 sq. ft. of plans on this at a cost of $4.50. Holman is also able to furnish Foamcraft wing cores, complete with formed balsa L.E. and instructions for these aircraft: Fokker D-8, 2" scale; Focke-Wulf 190 A-3, 2" scale and the Curtiss P-40D, 1½" scale. Cores are $16.95 each. On the FW 190 A-3 — a highly detailed, scale canopy is available at $3.25. BOB HOLMAN PLANS, P. O. Box 741, San Bernardino, Calif. 92402.

Eico/Electronic Products. For more than 23 years, Eico has been designing and manufacturing electronic products. They are not only available by mail-order but also from more than 2500 dealers and distributors. We've found their multimeter assortment interesting and useful, particularly the Model 20A3. It's practical for general service and small enough (palm size) to fit in a flight box; reasonably priced too, at $12.95. The unit will measure to 1,000 volts AC or DC; up to 250 mA DC current and to seven megohms of resistance. The meter has a D'Arsonval movement. Its sensitivity is 20,000 ohms/volt DC and 10,000 ohms/volt AC. For the latest prices and specifications on this multimeter assortment and other items in Eico's extensive kit line, request the free, 1968 catalog: EICO ELECTRONIC INSTRUMENT CO., INC., 283 Malta St., Brooklyn, N. Y. 11207.

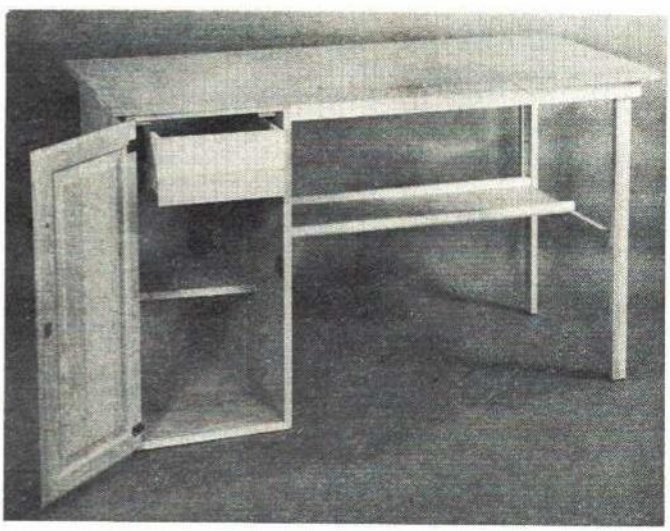
K & B/Veco .61 R/C. After being acquired by K & B Manufacturing, along with other Veco engines, the Veco .61 R/C is in full production. It is the largest in the K & B line. Features include: K & B's exclusive no-tension, single ring and low expansion aluminum piston; chromed cylinder; linear carburetion from idle to top rpm and two Fafnir precision ball bearings. Price is $55.95. Query: K & B MANUFACTURING, 12152 Woodruff Ave., Downey, Calif. 90241.



Lanier Industries, Inc./P-51. Lanier's latest, a semi-scale P-51, flies the complete AMA pattern. Snap rolls and spin maneuvers are easily accomplished; the knife-edge flight characteristics are said to be excellent. In order to fly — simply glue the wing halves together, mount tail surfaces, attach control surfaces and install your favorite engine (.45 to .60) and radio control gear. The P-51's span is 65" and the airfoil is symmetrical. Wing area is 630 sq. in. As is the regular Lanier practice, the wing and stab are Air-O-Sheet covered, molded foam cores. The control surfaces are balsa covered with Air-O-Sheet too. A vacuum formed fuselage includes motor mounts and dorsal fin. The molded-in wing fillets and the engine cowl add much to the model's speed. No painting or doping is required. Kit price is $46.95. LANIER INDUSTRIES, INC., Briarwood Rd., Oakwood, Georgia 30566.



F.A.I. Model Supply/1968 Catalog. An unused 6c stamp gets you the new catalog of model supplies; this should interest the FF modeler. Some items are shown. At center — a tough, aluminum wing tongue is ready for installation. Thickness is .063" or .073"; $2.50 each. Lower right — alum. prop hinges are 35c a pair. Drilled for .045", 1/16" or 2mm wire; 2mm is ideal for a wire hub. Left — adjustable towline glider hook allows 3" hook travel at the turn of a screw. Top — complete front end assembly has a formed prop shaft/motor hook (plastic covered); alum. shaft bushing; tension spring and a thrust, ball bearing. Costs only $1.95. Components available separately. They have a fine assortment of quality products from Pirelli to towline. F.A.I. MODEL SUPPLY, 1112 W. Mission Ln., Phoenix, Ariz. 85021.



Angel Mini-Flite Co./Epoxybond Hobby Putty. Each time we passed Angel's booth at the Toledo show, this group was slicing and wrapping a bushel of carmel-size bits of Epoxybond to offer as samples. Modelers found them as attractive as candy too. It is a popular epoxy putty, useable for so many purposes that Angel now offers a free, six page leaflet that gives illustrated tips on the putty's use. Write and ask for your copy. Naturally, other items on display were the Mini-Blinker and the handy Touch'-n'Hold finger-tip wrenches. Shown above is their latest item — a Hobby Bench for the workshop. Designed especially for the modeler; its ¾" top is 25" wide and 54" long. The top is a solid, wood-composition material and virtually warp-proof. The storage cabinet is 24" deep, 15" wide, and 30½" high. Of clear, Ponderosa pine, it has milled locking corners for strength and ease of assembly. A large shelf will hold finishing materials or a good supply of balsa sheet and strip. The entire bench is pre-fabbed; put it together in only 20 minutes with just a screwdriver and a hammer. All of the necessary hardware is included. The Hobby Bench, Model BH-1, costs $54.95. Write: ANGEL MINI-FLITE CO., P. O. Box 437, Fitchburg, Mass. 01420.

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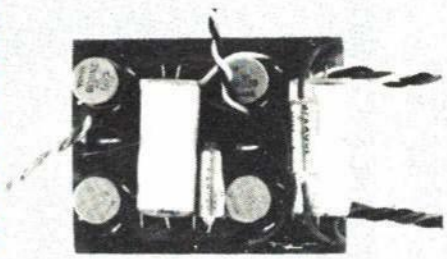

SIMPRO III KIT

The Simpro III kit above is a refinement of the earlier Simpro units which have appeared in American Modeler. The October 1967 issue contains full info on a relayless version for use with commercial actuators . . . Does away completely with any adjustments—and provides non-interacting rudder and elevator controls when used with the Ace Jansson or Sim-Plus transmitters, or most other GG transmitters. Motor control is achieved by full on and full off . . . The Simpro III makes into a compact unit. Measures 1½ x 1⅞ x ¾". Designed to work with most of the commercial proportional actuators available. Go-Around types are required for motor control. Compatible with Rand HR1 and HR2. Mini Max, Mini Max RM, Ghost, Airtrol, Bellamatics, and home made units built around Micro Mo motors. (NOTE: 1.8 ohm resistors required only for Micro Mo units are not furnished in kit.) . . . Kit contains reed units, all transistors and diodes, capacitors, resistors and an etched and drilled PC board to duplicate this fine decoder. Connectors not supplied.

No. 15K43—Simpro III Kit $27.75

Note—Simpro III systems require pulse rate of 15 to 25 pulses per second. Transmitter modification may be required.

SIMPRO III DECODER PACKAGE OFFERS

You've got a good GG system, and it's a lot of fun—but you have wished for something that performed as well, in a plane just a bit larger? Well, there's no reason to start from scratch—simply add the Simpro III decoder unit, along with the required actuators and mounting board, and you are there! The Simpro III decoder can be adapted to almost ANY existing simple GG system and provide you power enough for engines up to .45! . . . Extra cost is minimized since you can use your transmitter and receiver (relay or relayless), and with Simpro III, Rand HR1 and HR2, you have proportional Rudder, Elevator and positionable Motor Control. Packages include a special 3/64" mounting plate for the Rand units to simplify mounting—template for use with any servo is silk screened on. . . . Or, you have a GG system using the LR3. Use the LR3 as the rudder-motor servo, and add a Rand HR1 for elevator and you cut cost still more with our package #2. . . . The Simpro III decoder pulses fast enough so there is only a slight dither in rudder; elevator works only on command.

No. 15K1—Simpro III package #1: Contains Simpro III decoder kit as detailed above, Rand HR1 and HR2, and special 3/64" mounting plate for use with YOUR GG receiver and transmitter combination. A $65.00 value. . . . . Only $59.50

No. 15K2—Simpro II package #2: Contains Simpro III decoder kit as above, Rand HR1, special 3/64" mounting plate for use with your GG combo and your LR3. A $46.00 value. Only $41.50

Note—Simpro III systems require pulse rate of 15 to 25 pulses per second. Transmitter modification may be required.

ACE

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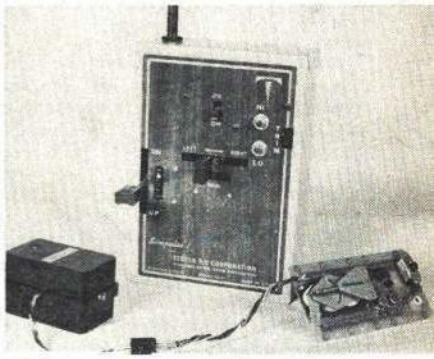
NEW!

DICKERSON—TESTOR CONVERSION KIT



Although intended primarily to convert t Testor Skyhawk to GG operation for rudder a elevator (motor if desired), the kits below a among the most versatile ever offered.

The plane conversion kit will give GG for t Skyhawk, but also may be adapted for airplan up to .19 power! May also be used with almo any other type of receiver—relay or relayles

RECEIVER CONVERSION KIT

The Dickerson conversion kit for the Skyhaw receiver utilizes some of the components ready in the unit, but adds a switching decod to convert signals for a Rand LR3. Kit consis of PC board for housing switcher, LR3, swit and charging jack on a 2⅝ x 4¼" deck. Co tains all transistors and resistors. LR3, co nector, switch and charging jack are not su plied.

No. 15K53—Dickerson Skyhawk Rx Conversi Kit, $11.50

TRANSMITTER CONVERSION KIT

While foregoing may be used with any GG tra mitter, this kit makes the conversion of t Testor Simpulse Tx into a two stick GG tra mitter easy and simple. Only hand tools quired. Basic kit contains all pots, bracke extra stick assembly (SPST push switches motor available as extras.)

No. 11K5—Dickerson-Testor GG Tx Conversi Kit, $11.50

No. 30K3—SPST push switch for motor cont (2 required) each, $.45

TESTOR RX CONVERSION PC BASE

Printed Circuit base for plane and receiver co version is available separately for the scrat builder.

No. 28K75—Dickerson-Testor Rx Board, $3.25

NEW!

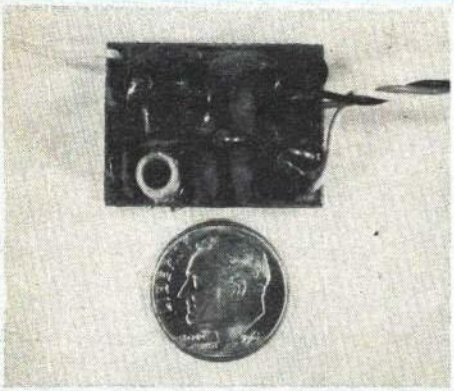
TRANSMITTER SIGNAL STRENGTH METER KIT

Would you like to add a signal strength me to your Jansson or Commander or almost a R/C transmitter that does not have one bu in? This simple Ace kit, while designed marily for the Jansson transmitter, can eas be adapted to any transmitter that allows j a bit of room in case.

The S/S Meter Kit monitors the RF going i your antenna and is reliable indication of signal you have from your transmitter.

Simple to install: All components mount meter except for connections to antenna a case. Kit contains all components, includ instructions.

No. 22K17—Transmitter S/S Meter Kit.....$4



NEW! ALBIN MICRO RECEIVER KIT

Would you believe a superregen receiver weighing just .2 oz? This Bill Albin kit design measures 13/16 x 1 1/16". uses silicon transistors, 1/8 watt resistors, micro mini caps, drilled 1/2" PC base. Single ended output for actuators of Bentert type.

While it is superregen, this kit will be used in applications where this is not too important. Makes indoor R/C a distinct possibility!

Recommended for those with some building experience, since small size makes care necessary. Not complicated, however.

No. 12K60—Albin Micro Receiver Kit, $12.95

NEW! AOSK II KIT

A switcher for the Albin .2 oz. receiver and the Adams Baby so you can use one set of batteries and don't have to use a spring for return!

Designed to fit on the actuator itself, this Add On Switcher Kit II is micro miniature. Designed for the Albin receiver only.

Complete kit contains 1/2 etched and drilled PC base, 1/8 watt resistors, tantalum cap, two Motorola transistors and full instructions. A gem of micro miniaturization using discreet components.

No. 15K55—AOSK II Kit.....$3.25

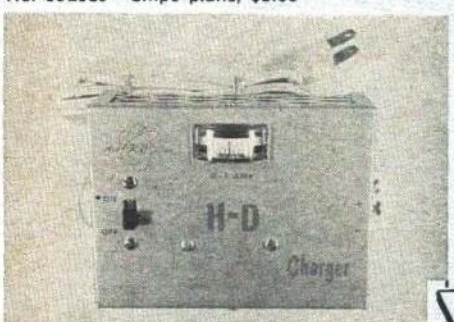
ACE-CLASSIC FULL SIZE PLANS

The UGLY STIK . . . designed by Phil Kraft, and originally called the Square Stik. By adding scalloped ailerons and scalloped elevators and a semi-scale type rudder, this .45 to .65 proportional test bed resembles the Fokker-Eindecker World War I plane. Features extremely fast construction, and is designed as a proportional trainer.

No. 13L108—Kraft's Ugly Stik, $3.00.

The SNIPE is a sailboat of a very popular design in full size. This is a 36" scale model, patterned after real racing types. Plans contain full size sail plans, as well as some construction details on building this model. May be built from balsa or from plywood. Is just it for the R/C fan who is looking for something that is different, and yet easy to build.

No. 13L189—Snipe plans, $3.00



NEW! H-D CHARGER

The H D refers to Heavy Duty—and that's exactly what this brute is—capable of charging your larger nickel cads and wet cells. For rates of 100 ma up to 1 amp. Has meter for monitoring and for setting of charge rate. Not dual purpose, but made for those husky charging jobs where you need the power. For nickel cadmiums from 1.2 to 10 ampere size. Will also series charge transmitter battery packages. Adjustable internal resistor sets rate.

Uses all new components double the ratings necessary to assure long life. Housed in aluminite case, with ventilated back, and rubber feet. A deluxe design. Assembled, tested, guaranteed.

No. 34K1—H-D Charger, assembled.....$13.95

NEW! ACE GG PACKAGE!

Galloping Ghost Transmitter by Dick Janson. 9 volt battery- Citizenship SSH Receiver and the new Rand GG pack, with batteries.

If You are going GG–Go First Class–With ACE GG!

Now you can go First Class all the way with simple proportional on Galloping Ghost. Ace has pioneered in proportional for 14 years. This is a combination package that we believe takes the best of all of the components that are available and puts them into one first class package.

Start with the Galloping Ghost Transmitter by Dick Janson, which has been acknowledged as being one of the most versatile, couple this with a the new improved Citizenship SSH Receiver and the new Rand GG pack, with LR3 and new 600 ma GE sintered and vented batteries, and you have a winner! The package even includes a 9 volt battery for the transmitter—the dependable Mallory M1603. The Ace GG package is completely prewired and requires only installation in the plane. . . . Weight of the receiver with GG Pak, LR3, nickel cadmiums, and harness, hooked up ready to install is approximately 7 ounces, yet it has power enough to handle planes with engines up to .35. **Go First Class—Go Ace GG.**

No. 10G1—Ace GG Package, ready to go with all batteries $129.50

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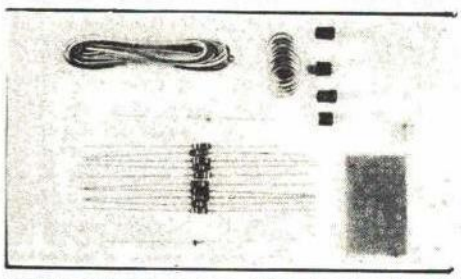
No. 34K21—Ace Vari-Charger assembled $8.95
No. 34K22—Ace Vari-Charger Kit 7.50



NEW! MARKS BASIC VERSAPULSER KIT

The Versapulser is a revolutionary design as up to date as tomorrow. Features a rate adjustment that allows it to be used with ANY pulse system that is on the market today. It is linear over the entire range And no interaction pulse rate is completely variable from 2 to approximately 50 pulses per second. This means it can be used with magnetic actuators, Rand and other types of actuators, Rand Dual Paks, Simpro, and other decoders that require the faster pulsing, including the ones that use feedback servos. No other pulser is available today that is as capable of this broad rate change, and yet still feature complete linearity and less interaction, than any pulser in use . . . Secret is a linear stabilizer, which was developed by Fred Marks, and which is an Ace exclusive priority design . . . Basic kit is offered two ways so it may be easily adapted to any existing tone transmitter. With tone key in negative side (Mule, etc.), you need Model NPN. With keying in positive leg (Commander, Kraft, etc.), you need Model PNP . . . Basic kit contains all components such as resistors, capacitor, printed circuit board, all transistors and diodes. Base measures 1 3/4 x 11/16 inches, so it may be fitted into a very small space inside your case. Uses same 9 volt battery.

Versapulse Kit does not contain: Pots, switches or stick assembly. Pots required for the stick are 2.5K for width, 10K for rate, and 5K is required for rate adjustment.

No. 15K49—Marks Basic Versapulser Kit, NPN, $12.25.

No. 15K50—Marks Basic Versapulser Kit, PNP, $10.75.

MORE THAN JUST A CATALOG FOR 1968!

Our 1968 version of the Ace R/C Catalog is also a handbook—has an R/C Glossary; How To Solder; Pulse Proportional Control for Rudder and GG, including Decoders; Schematic Symbols; Batteries and Charging, Resistor Color Code, Transistor Chart; Electric Motor Spec Chart and many more Data Sheets you will refer to again and again. Three holes punched, 8 1/2 x 11 in size, it is designed to be added to! Will fit special* Ace Binder, for permanently keeping any of your R/C instruction as well . . . In addition it lists all the latest Ace R/C Products and thousands of other R/C items and R/C accessories made by other manufacturers all over the world . . . Cost is only $1.00. BUT this is refundable on your first order! So actually the catalog costs you nothing. Your order also places your name on the Ace mailing list to receive regular additional R/C Data info, and newsletters . . . The Ace Handbook-Catalog is a must for the tinkerer, the Sunday and the sport flyer. We have served the R/C field since 1953 Send your catalog buck on a round trip today. You can't lose!

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COUNTDOWN

G. HARRY STINE

Author prepares Parachute Duration entry for a launch at first Internats, Dubnica, Czechoslovakia, in May 1966. The model was recovered by a forest ranger 17 miles away.

NEW CONTEST EVENT?

Since the 1967 Edition of the U. S. Model Rocket Sporting Code was published by the NAR Contest Board late last year, we've got many new competition events to try. As of this writing, Contest Board Chairman Al Kirchner reports that most clubs and individuals aren't trying the new events, seeming to prefer to stick to the old tried-and-true categories. This is a disappointment. Does it mean that our hobby is stuck in a rut? Or are the new event categories so tough that modelers just don't want to try them? If all we want to do is buy a prefabbed kit, model astronautics is in for trouble.

If you're looking for a simple event that's a lot of fun, why not try "Streamer Duration?" This is not yet an official NAR competition category, but it may well become one if everyone likes it. Here's the way it goes:

Single-staged birds only, powered by a Type B engine maximum. Every bird must have a standard crepe paper streamer for recovery; this is 1" wide and 18" long (12 mm. x 225 mm.). Each model is timed from instant of first motion on the launcher to the instant it touches the ground again. Model with longest time of flight wins.

This is a sneaky event, because it really isn't a flight duration event, but an **altitude** event! Obviously, the model that achieves the highest peak altitude is going to stay up the longest and therefore win. What's sneaky about it is the fact that it is an altitude event that can be conducted using stop watches rather than complex altitude tracking theodolites!

Streamer Duration competition was worked out by the Czechoslovakians, who report that it is a great favorite among their junior rocketeers. It's a perfect Junior Division event. Nothing complicated. No expensive equipment, just a couple of stop watches borrowed from the physical education department of the local school. No complicated rules. Just plain fun. Why not try it out in your club?

IF AT FIRST YOU DON'T SUCCEED. . .

All of us who report model rocketry try to write very carefully. We try to include every bit of information necessary, and we try to word things quite carefully so that there will be little question in the mind of the reader. But I still get questions wanting to know what total impulse is and how it is figured. Or from people who want to know how to pack a parachute (yes!).

The classic type of letter I receive always opens with a paragraph telling me how much the writer enjoyed reading "The Handbook of Model Rocketry" and how much he learned from it. Then the second paragraph begins with a series of questions about model rocketry, all of which have not only been answered but thoroughly discussed in the "Handbook."

Model astronautics — or model rocketry, if you prefer the old terminology — happens to be one hobby that has a tremendous amount of written material available. We have the "Handbook of Model Rocketry" which was just judged to be one of the ten best scientific and technical books of 1967 by the Carnegie Libraries (I'm proud of it, natch). The NAR has a whole series of stuff in their Technical Services catalog. And the model rocket manufacturers publish highly descriptive catalogs, comprehensive technical reports, and thoroughly detailed plans and instructions.

In my local NAR club, we have a motto that applies to those who goof: "If at first you don't succeed, try reading instructions!"

And that's good advice to all modelers.

AGAIN, NO CZECH ENGINES!

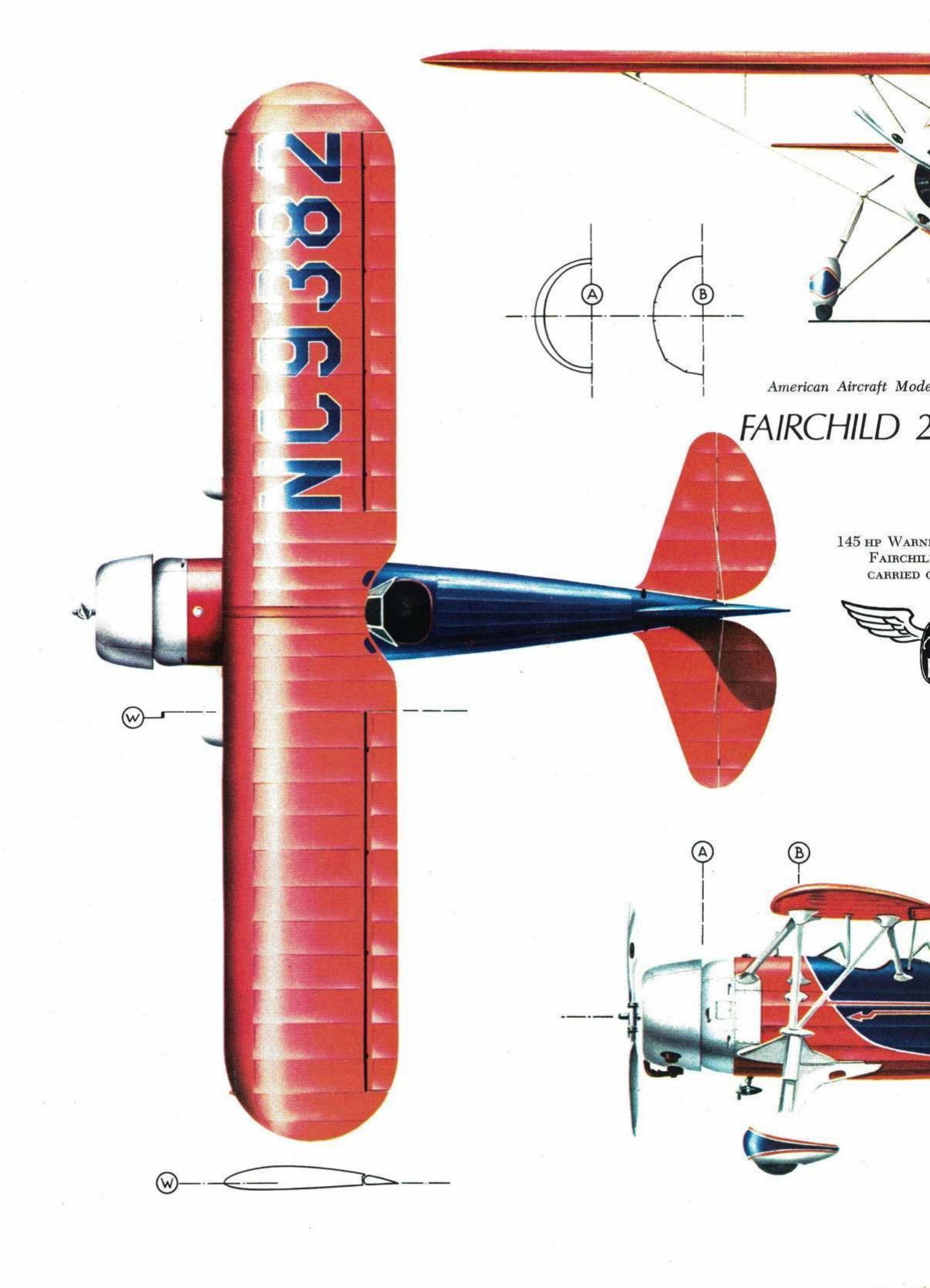
No, it is not possible under any circumstances to obtain, purchase, beg, borrow or steal in the USA any of the Czechoslovakian ADAST model rocket engines. You can't get them. Period. (So, I'm sorry I can't help you.)

Czechoslovakia is a socialist nation with-

Continued on page 68

In Czech movie, "Secret Agent W4C," a satire on James Bond, villain in black, launched model rockets hidden in piano. They rode on invisible wires, shattered against walls.

Girls are proficient rocketeers, just as they shine in the model airplane competitions. Vera Busova of the Dubnica Rocket Club, Czechoslovakia prepares B/G launch.



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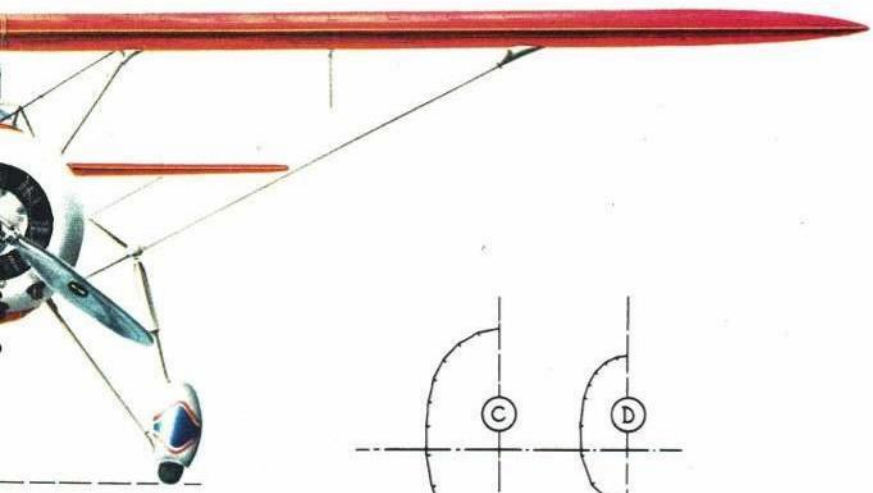

album of all-time favorites

C-7-F (1934)

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HE RUDDER

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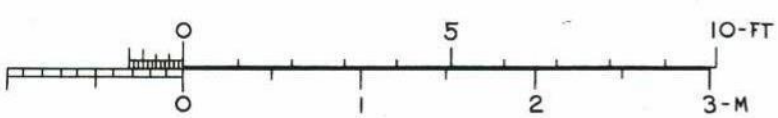

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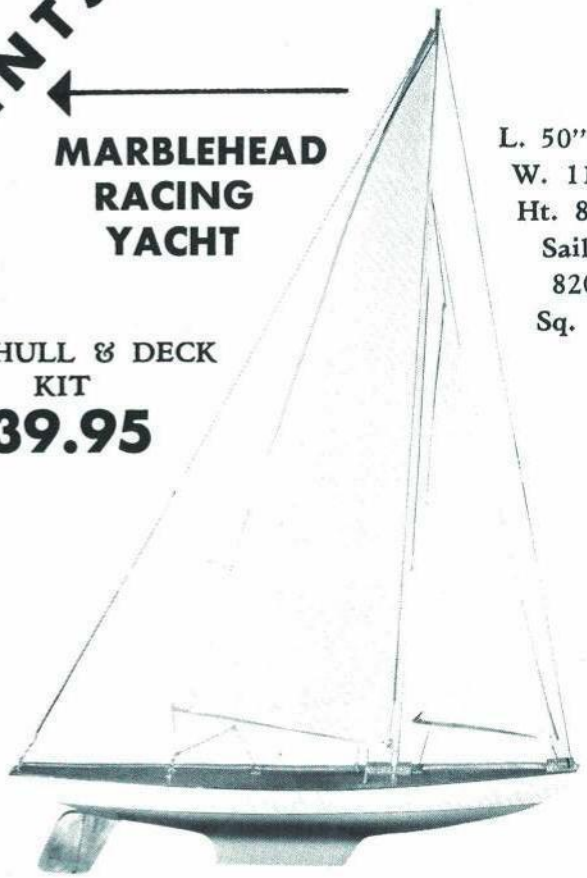

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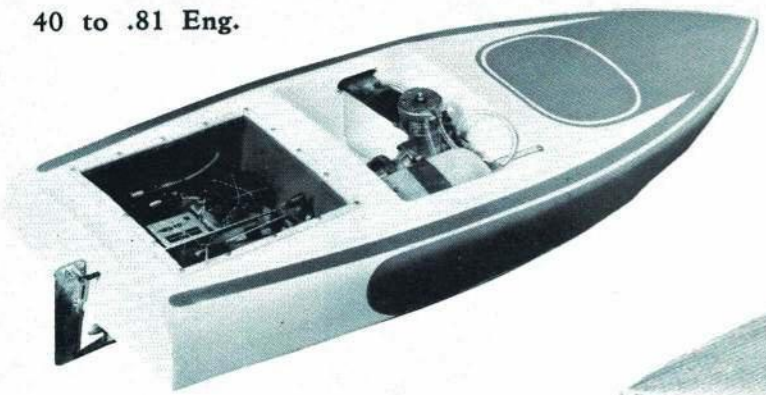

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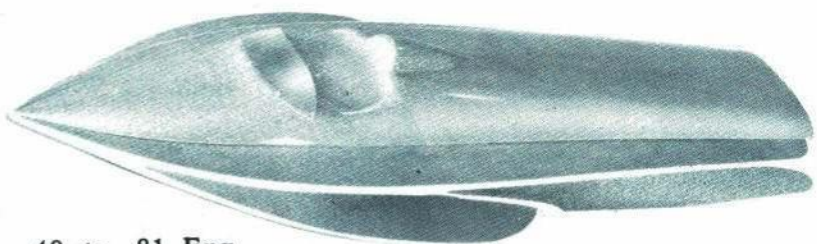

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Four machine guns and four cannon were carried when the Mosquito was equipped for fighter missions. Top speed 375 mph.

DeHavilland F.V. VI Mosquito

The all-wood fighter-bomber of WW 2 is one of the most famous of all warplanes.

JOHN N. TOWNSLEY

THIS month's model is the Airfix 1/72 scale Mosquito, manufactured by Craftsman, kit No. 1205, retailing at 50c.

The Mosquito was the descendent of a long line of famous aircraft which broke many world's speed records and appreciably helped to further the progress of civil and allied military aviation. Built almost entirely of wood, it was a direct development of the de Havilland Comet. The smooth-surfaced wood was found (by our own wartime performance tests) to be superior to the finest flush-riveted metal.

The wood wing was free of seams, rivet heads, nailheads or screws, all of which could create drag. In fact, one row of ordinary rivets could add as much as 20% additional drag to an aircraft having the speed of the Mosquito. The wood was treated to be impervious to dampness, heat, or fungus, and with a later-developed construction and material, burned less readily than the metal. The wood construction gave rise to many affectionate nicknames, such as Termite, Mossie, etc. Derisive names notwithstanding, the "Mossie" was one of the most outstanding World War II aircraft. In 1944, the Mosquito was ranked as the world's fastest aircraft of its type.

The bomb-carrying capacity of the plywood aircraft had been increased from 1,000 lbs. to a mighty two-ton blockbuster with four 20-mm cannon and four .303 machine guns, centered in the nose of the aircraft. In addition, four 500-lb. bombs were in the bomb compartment and two 500-lb. bombs were carried beneath the wings to augment the armament.

Employed in large-scale operation, the various types included fighters, fighter-bombers, bombers, reconnaissance and the deadly night intruders. In the fighter class, the day fighter (the type used in article) had four 20-mm belly cannon and four .303 nose-mounted machine guns. Bombs were not carried, as high speed was the fundamental purpose of this particular Mosquito. It could be converted into a long-range fighter by adding two slipper-type wing fuel tanks. The tanks did not decrease the speed, and allowed a considerably longer range. To attain maximum range, non-jettisonable fuel cells were installed in the bomb bays. By adding two to four 500-lb. bombs in the bomb bays and two 500-lb. bombs beneath the wings, the fighter was converted into a fighter-bomber.

Occasionally, when the target was a particularly difficult one to destroy, two 1,000-lb. bombs were carried in the bomb bays. When the 500-lb. bombs were replaced with slipper flush tanks, the plane was converted into a long-range fighter-bomber. The full armament complement was carried on these aircraft.

The short-range Mark II interceptor night fighters were solid black to blend with the nighttime darkness, and carried no bombs

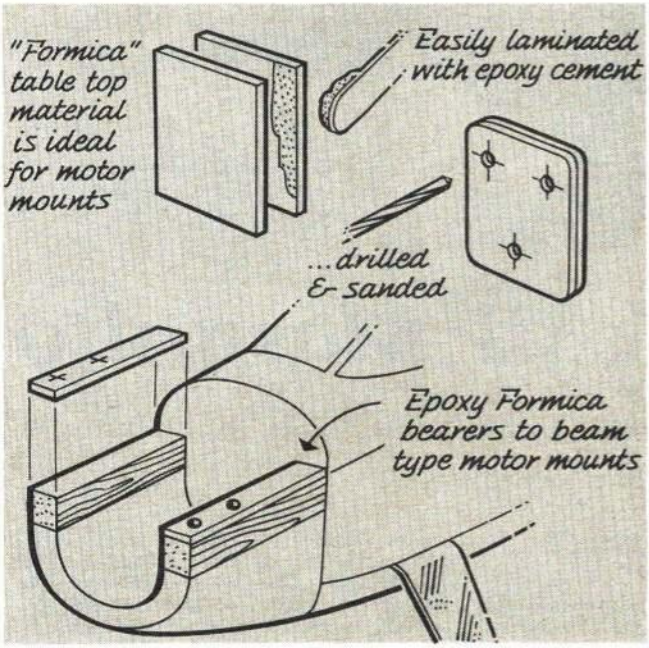
Continued on page 55

Camouflage color schemes can be rewarding to the more serious hobbyist. The colors here are dark sea gray, and dark green.

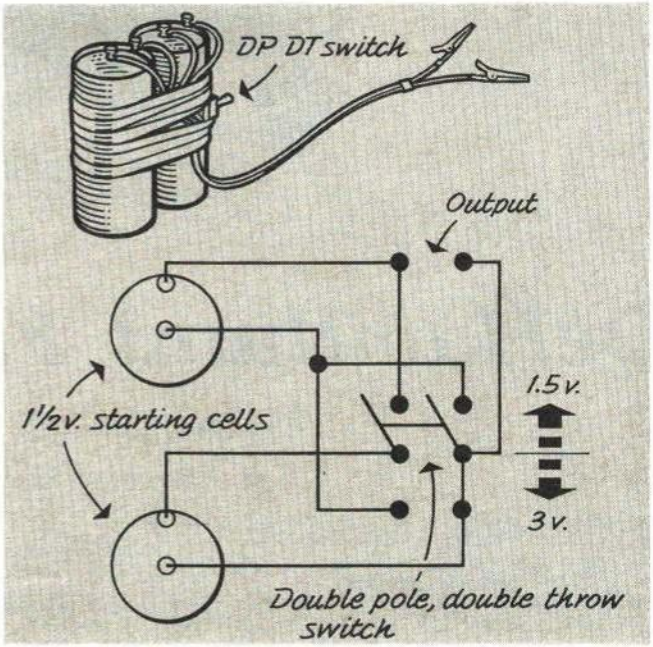
H. A. THOMAS

SKETCHBOOK

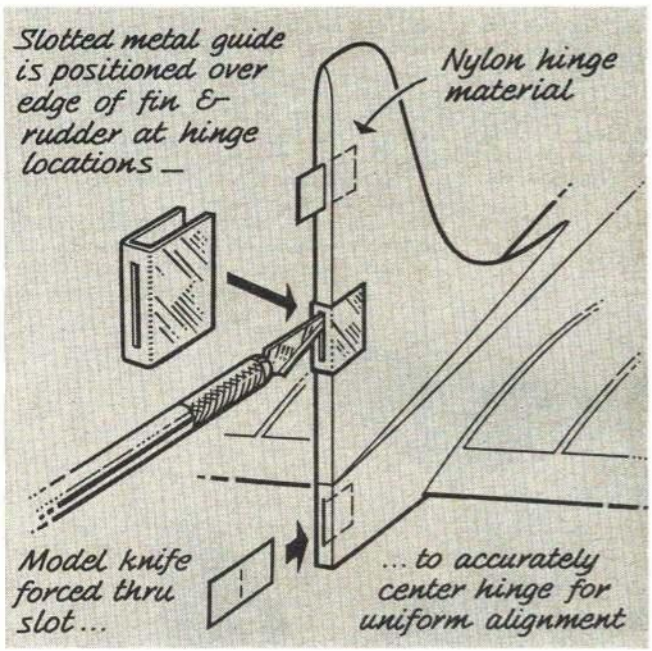
Have a new idea for construction, adjustment or operation of model aircraft or RC? AM pays $10 for each 'hint & kink' used. Send rough sketch and description to Sketchbook, c/o American Aircraft Modeler, Potomac Aviation Publications, Inc., 1012 14th St., NW, Washington, D. C. 20005.



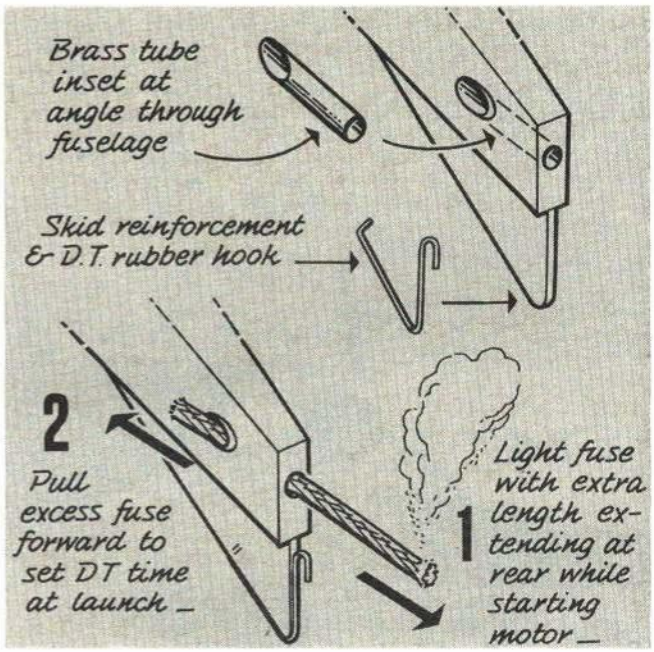
Scraps of Formica table-top material make ideal firewalls and motor mounts suggests Robert Stemper, S.J., Auburn, Wash. Formica is easily sawed, drilled, sanded; may be laminated with epoxy cement to desired thickness.



Double pole, double throw switch properly wired to starting batteries permits instant voltage change from parallel (1.5 v.) to series (3 v.). Center "off" position prevents shorting. Submitted by Steve Kowal, Campbell, Calif.



Lt. Jerry Small, Redstone Arsenal, Ala., makes simple metal jig as guide for accurately cutting hinge slots in edges of tail group parts. Advantage is perfect alignment of fin-rudder and stabilizer-elevator.



Tested over years of flying is dethermalizer fuse mount used by Bill Northrop, Burbank, Calif. Brass or aluminum tube is mounted diagonally through rear of fuselage. Fuse length easily adjusted after motor is started and fuse lighted.

On the Coast

While cold weather slowed down activity over much of the nation, things were popping out west.

JERRY NELSON

Phoenix Contest

THE first major R/C meet on the west coast was held in Arizona at the Buckeye airport near Phoenix, Feb. 17, 18. Sixty-two contestants enjoyed near perfect weather. This was the first meet in this area, if not in the country, to use the new AMA pattern rules.

They worked without problems. There were more entries in Class A and B than in previous Class I and II at this meet. The caliber of competition in all events was of a very high level. The Class A and B events seemed to fill the competition gap that has existed in previous years.

The new maneuvers in Class C proved not to be a major obstacle, as was predicted by some of the opponents of the new schedule. The majority of the pilots could perform all the maneuvers with their standard designs they flew last year. The quality of the maneuvers, even those performed by the top experts, left a lot to be desired. This is what we want. Everybody can't get 10's! The selection of the optional maneuvers proved to be a very exciting portion of the contest.

First in Class C expert was Ted White from Albuquerque, New Mexico. He flew his familiar Veco 61/El Gringo. The low-level performance which typifies Ted's flying is always interesting to watch.

A fly-off between the top three flyers (White, Kraft, and Weirick) for the grand champion trophy resulted in Phil Kraft coming out on top. For this special trophy the entire Class C schedule was utilized. All ten optional maneuvers were flown in one flight. Total time for the flight was around 14 minutes. The contestants agreed to this pattern prior to the fly-off even though they knew fuel capacity could be a problem. Ted White had such a problem. So, the final fly-off winners were Kraft, Weirick, and White in that order. Phil flew his Kwik-Fli III.

First in Class C novice was Don Downing all the way from Arlington, Tex. Don flew an original ship, Twigy. Span was 70 in. Power was a Super Tigre 61. An unusual feature was the geodetic construction of his wing.

Class B winner was George Reis, a local flyer from Phoenix. He flew a clipped-wing Webra 61/Sportsmaster.

Class A winner was Junior flyer Randy Kempf from Encino, Calif., flying an Enya 61/Kwik-Fli. He is going to give the Class C flyers some serious competition!

Another Junior flyer, Whit Stockwell, also from Encino, showed how you are supposed to fly a good pattern by placing second in Class C novice. Whit is only 13. I wouldn't be a bit surprised to see Whit a serious contender at next year's Nats.

Scale winner was Joe Bridi from Torrance, Calif. Joe is a master craftsman at everything he does. His winning P-47 was no exception. It is hard to describe the ship. It looks and flies like a P-47 should!

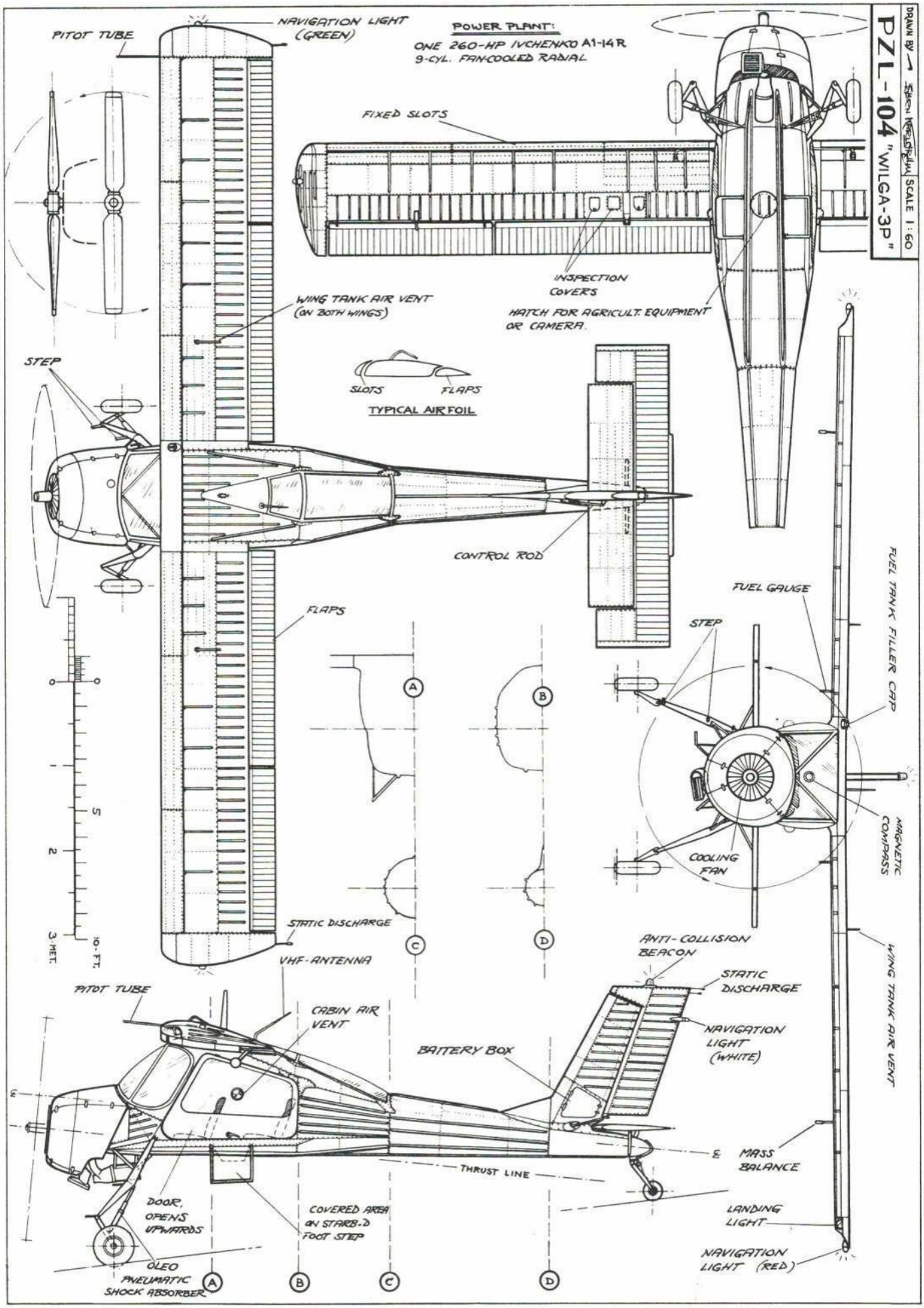
Continued on page 64

Top left: Ridge site at Linda Mar, overlooking Pacific, where Vultures Club hosted first annual slope soaring contest.

Second from top: Morse McKenna and his T-Ninety, a subminiature stunt job, 19 power. Fiberglass fuselage, 45″ span.

Third from top: Winch used at Phoenix glider event, has 12-volt starter motor and automobile storage battery for power.

Left: Cliff Weirick and modified Kwik-Fli II, Enya 60. Remarkable how a few changes seem to alter a design.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NAVIGATION LIGHT (RED)
OLEO PNEUMATIC SHOCK ABSORBER
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5
2
3 MET.
10 FT.

JULY 1968

model aviation

Official magazine of the Academy of Model Aeronautics • 1239 Vermont Avenue N.W., Washington, DC 20005

AMA-HIAA-Navy Regional Youth Contest Program Launched

With unusual speed a program to interest young people in model airplanes, particularly competitions, has been formulated by the Academy of Model Aeronautics and is in action even as you read this. The objective is to increase the number of youngsters (ages 6 through 20) in model airplane competitions and to promote the National Model Airplane Championships. The basic idea is for twelve meets to be held at Naval Air Stations throughout the country, featuring special events designed to the capabilities of previously uninvolved youth.

The new program has resulted from the U. S. Navy need to have more young people associated with the Nats. Your AMA officers concurred and encouraged the HQ staff to develop the program, work with the Hobby Industry Association of America to secure the awards, and to enlist the cooperation of chartered clubs in administering the local level contests. The Navy, meanwhile, promised to make available many of its Air Stations for conducting the special events.

The response of all parties has been most heartening. Members of the Model Aeronautics Division of the HIAA quickly pledged $6,000 in merchandise certificate awards, or $500 for each of the twelve meets. Meanwhile, a good many clubs had indicated a desire to participate and coordinating meetings with Navy officers at various Naval Air Stations were going on at press time. And, additional incentives for young modelers to enter the special events of the participating meets were developed.

Sponsored trips to the National Contest for the high point winner at each location (provided by meet organizers) were promised, as were opportunities for these high point winners who attend the Nats to go on an Aircraft Carrier Cruise (provided by the U. S. Navy via HIAA sponsorship). The regional meets are scheduled for May, June, or July, depending upon local meet sponsor and Navy concurrence. Nationals dates are Aug. 3 thru 8 at the Olathe (Kansas) naval air station, near Kansas City. Navy transportation is expected to depart from Olathe on the evening of Aug. 8 to Pensacola, Florida, with return to Olathe on Aug. 10.

Eight special model events were designed for this program — half free flight, half control line:

1. Free Flight

a. AMA Cub (or Delta Dart, or AMA Racer.) The winner will be the flyer of the model which stays in the air the longest during any single flight.

b. Hand-Launched Glider. Models may be constructed by the entrant or may be of ready-to-fly commercial manufacture. Wing span limit is 12 inches. Scoring same as for AMA Cub.

c. Rubber. Wing span limit is 24 inches, and models must use a commercially manufactured non-folding propeller. Scoring same as for AMA Cub.

d. Time-Target Gas. A free flight gas event with engine limited to .10 cu. in. and no maximum engine run. The winner will be the flyer who obtains three flights closest to two minutes each.

2. Control Line

a. ½A Profile Proto. AMA rules in gen-

U. S. Navy photo

Model aviation's great friend, Vice Admiral A. S. "Sandy" Heyward, Chief of Naval Air Training, is shown with the symbol of a revitalized National Meet program: the AMA Cub, to be distributed by the thousands in the Kansas City area this July in a special Junior competition.

eral, with modifications: maximum engine displacement is .051 cu. in., and engine, fuel tank and control system shall not be cowled or enclosed. Models will be timed from release until they have flown a half mile; the winner will be the one whose model attains the highest speed.

b. ½A Solo Race. Any design control line model is permitted, including plastic ready-builts, which has an engine with stock factory-equipped fuel tank and displacement not over .051 cu. in. The event has elements of team racing, but only one plane at a time is flown, and the entrant, who must be the pilot, must also do all engine starting and refueling.

Number of laps to be timed is 40, during which the model must land, be refueled and restarted at least once. Points will be awarded for each mph of speed and for smoothness of the initial take-off and first landing.

c. Balloon Bust. Any design model having a fixed two-wheel landing gear is permitted if it has an engine of from .14 cu. in. to .36 cu. in. Five balloons spaced 5' apart are used for scoring. The maximum score will be obtained when all five balloons are broken on a single flight within the first ten laps, with no more than one balloon being broken during a single lap.

d. Sport Race. No restrictions on model design except that they must have a permanently attached two-wheel landing gear. Maximum engine size is .36, and only plain sleeve bearing engines may be used. Various minimum line lengths and wire diameters are required according to engine displacement. Models are timed for speed over a half-mile course.

The winner will be the one who has the highest single flight point score when each mph of speed is considered as one point and this is adjusted by deducting 1 point for each hundredth cu. in. of displacement. (A .19-powered model which achieved a speed of 90 mph would be awarded points as follows: 90 — 19 = 71 points.)

Participating contests need not hold all eight of the special events, but they must include at least five. This will allow the program to be carried out successfully in most all areas whether or not flight facilities are most suited to control line or free flight. It also takes into account that local interest may be primarily CL or FF. Detailed rules are available from local hobby shops, participating Naval Air Stations (Public Affairs Office) or the Academy of Model Aeronautics.

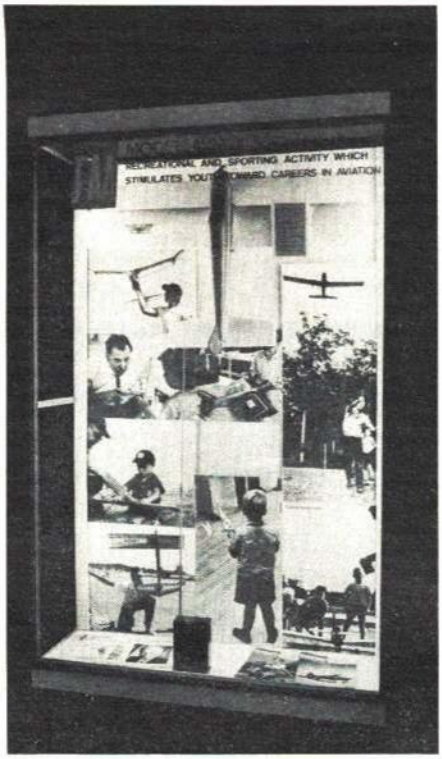
Competition Age Classes. The special events flown at each contest will be separated into Junior (up to 16 years) and Senior (16 through 20 years) age classes. Juniors will not compete against Seniors.

Contestant Eligibility. All entrants in the special events must be AMA members in one of three ways: 1. regular AMA Junior or Senior members; 2. AMA Sub-Junior members; 3. Special Junior members — those not already Junior or Sub-Junior members: Upon payment of 25c fee to Contest Director such contestants will be classed as Special Junior members, with normal AMA insurance coverage, for the duration of the meet only. (Sub-Junior and Special Junior contestants may fly in all events provided they do not use an engine larger than .051 cu. in. in any gas-powered event.)

Merchandise Awards to Winners: Certificates to at least the top three modelers per event, per age category. First place certificate value $20 — others in proportion.

For more information: Contact your local hobby shop, the nearest Naval Air Station, or AMA HQ (1239 Vermont Ave. N.W., Washington, D. C. 20005. Phone (202) 347-2751).

Tourists to Washington may see an attractive aeromodeling display if they visit the Federal Aviation Agency. Prepared jointly by FAA and AMA HQ, supervised by AMA PR man G. Wells, the display is expected to be in the lobby through this summer. Comprised chiefly of photos, the exhibit also contains an RC model with gear, AMA and NAA magazines and literature, and a photo montage depicting AMA Junior activities. Keynote is that "Model Aviation is an educational, recreational and sporting activity which stimulates youth toward careers in aviation." AMA HQ has been working closely with the FAA educational programs office for about a year, as part of an overall public relations effort.



AMA Status Report: New Look for '69?

Nineteen sixty seven was a great year for the Academy of Model Aeronautics, with more members and more chartered clubs than ever before. And we ended the year in the black. In 1964 a dues increase and office economies also produced a break-even year. But the organization was barely able to service its many operations: membership publication, contest administration, the Nationals, contest board operation, meet sanctioning, team selection, and others.

So breaking even in itself is not necessarily a solution to AMA's problems. Membership, down considerably in 1964, dropped further in 1965. AMA's Executive Council, despite severe financial pressures and urging from some that only further economies were in order, approved investments in better services. And a Dump-the-Deficit campaign was initiated, which raised several thousand dollars in contributions — not enough to put a dent in previous deficits but of sufficient help to maintain improved operations. In 1966 membership was up slightly over 1965. And in 1967 membership topped all previous years — achieving a breakeven year, without having to use contributions to support operations.

Donations in 1967 went toward reducing the old deficit — the latter is now two thousand dollars less than it was in 1966. It would seem, therefore, that major financial problems are behind us. We're certainly far stronger as an organization than we were five years ago, but there are new financial pressures to deal with.

Expenses are up in all areas: services, supplies, salaries. The HQ staff has been expanded to give better service to clubs and Junior programs. The magazine cost has increased. New office equipment has been purchased. Hopefully, continued membership growth will produce enough new income from dues this year to pay for the extra costs.

But we really need a bigger margin between income and expenses. With expenses always creeping up we're constantly dependent upon an expanding membership. So we have not been able to get ahead, as we might if new income could go into new services, greater efficiency, and added membership benefits. Instead of merely holding our own we need a breakthrough.

The obvious solution to such problems is a dues increase. But it's certainly not a popular one, even though many people recognize that it's normal in any organization — due to ordinary rises in the cost of living — for dues increases to be applied about every five years. Discussions of a possible dues increase for 1969 will be on the agenda when the AMA Executive Council meets in August this year. But such discussions will also explore alternatives. And it appears that some reasonable alternatives are available.

An important area to be explored is whether some things are being done for all members even though most may not care about them. This is most obvious concerning the needs of competition fliers as compared with those who fly only for sport. Sport fliers are generally not interested in the AMA rule book, the competition license, license number, or contest board operations. Savings are possible if these items are provided only to competition people — especially since sport fliers appear to make up over three-quarters of the membership. For example, instead of producing 23,000 rule books we might only need two or three thousand.

We may also be able to offer improved services to competition people on the same basis — more things can be done if fewer people are involved. For example, many competition people (about 1,000) now pay $3.00 extra to receive AMA's special monthly mailing, which includes a detailed contest calendar and contest board news. They are thus paying a total of $9.00. It's possible that this special mailing service could be provided automatically to all competition people for no more total money than now.

We may also be able to upgrade the status of competition people. Recognizing that they are the backbone of the organization we can offer them more prestige — they would be the only members with competition licenses, license numbers, eligibility for records and team selection, the only people with a voice in competition rules-making.

This is the nature of current thinking by some people studying AMA's structure and needs. Whether the organization goes this way will depend largely upon the economics involved. Cost comparisons of current versus proposed changes will be presented at Council meetings in August, as well as the pros and cons of such proposals as basic matters of Academy policy. It all adds up to a detailed review of what AMA has been, what it could be, what can be none to improve the organization physically and financially.

Nats Notes

What: The annual National Model Airplane Championships.

Where: Naval Air Station; Olathe, Kansas; near Kansas City.

When: Aug. 3-8, 1968.

Entry Forms: Available by sending stamped, self-addressed envelope to Academy of Model Aeronautics, 1239 Vermont Ave. N.W., Washington, D. C. 20005.

Advance Entry Deadline: July 7, 1968 (postmark date of entry form mailing to AMA HQ).

Basic Information: Was published in June 1968 issue, Model Aviation section of American Aircraft Modeler.

Other Information: Indoor will be flown at K.C. Municipal Auditorium on Sunday, Aug. 4. Contestants may register at the Indoor site — not necessary to go to Olathe NAS first (indoor contestants only).

Advance Entry Fees are reduced this year for Junior and Seniors: $2 for either category, includes two events. Additional events at $1 each, except RC: $5. Adult fee is $10, plus $1 for each event entered, except RC: $5. Adult entries and event additions — at the Nats site — will pay late penalty fees. No penalties for Junior and Senior late entries but additional events will cost $2 each, except RC: $5.

Registration vs Entry: Entry is required first, either in advance by mail or at the Nats, by submitting entry form and entry fees. Registration is the checking in at the Nats, after entry, to receive Nats identification, instructions, latest information. Registration is the final step of entry which acknowledges contestant's presence on site and authorizes flying in the competition.

Lodging: Free housing on station to male contestants. Camping on station for males and females (self-contained trailer units only — no electricity or plumbing hookups). Motel listing available: Chamber of Commerce, Overland Park, Kan. 66204.

Meals: Breakfast, Lunch, Supper available at station mess hall, pay-as-you-go, less than $1.50 total per day.

Membership Meeting Called

As provided by the bylaws, the Executive Council is calling for the regular meeting of the AMA membership to be held this year during the National Contest, 7 pm on Sunday, August 4. Consult the bulletin board at Nats HQ for the exact location of the meeting aboard Olathe NAS. No agenda had been prepared at press time.

Committees Dissolved

AMA President Cliff Weirick has officially disbanded the Radio Control, Control Line and Free Flight Rules Advisory Committees. The committees had been formed in 1967 to advise the president and the Contest Boards of proposed solutions to then existing problems regarding flying rules.

As it turned out, the Contest Boards have effectively cured most of the big problems by creating and passing on the new rules that became effective this year.

Bill Northrop, chairman of the disbanded RC Committee, has been reassigned to chairmanship of the Scale Advisory Committee, replacing Claude McCullough who has retired.

Flip Schulke photo courtesy of *Boy's Life*

Two plane loads of AMA Nats Jr. and Sr. contestants are to be guests of the Navy and the Hobby Industry Assn. of America on a Carrier Cruise this August. Scene is from 1967 Pensacola event.

New World Distance Record

Bob Kunce (AMA 29528) flew his RC model around a course of 500 meters (1640') length on February 19 for a total distance of 332 kilometers (206 miles), a performance believed to have set a new FAI World Class record. FAI HQ in Paris, France, has been notified of the tentative record.

Kunce is from Redlands, Calif. His model, an original shoulder wing design using the NASA 23012 airfoil, was powered by a Super Tigre 56. The engine was equipped with a Cox 15 carb and an O & R fuel regulator.

Total flight time for the record was 4 hours and 4 minutes. The model was landed 70 feet from the launch point, well within the 1640-ft. radius allowed by the rules.

The previous record of 280 km. (173 miles) was held by Maynard Hill, set June 4, 1965.

Later on, Kunce plans to try to beat the World Record for Absolute Distance. Present record, held by Russia, is 378.756 km. (235 miles).

Call for Nominations

The important posts of AMA president and vice president for Districts II, IV, VI VIII and X come up for election later this year. Modelers from all over the country should concern themselves with candidates for the office of president, while only members in even-numbered AMA districts should consider selections for VP candidacy. (In 1969 the election will be for the offices of secretary-treasurer and VP's of the odd-numbered districts.) Look for the map at the end of this section to locate your AMA district.

AMA's Nominating Committee, composed of the eleven VP's or their delegated representatives, will meet during the National Contest (August 3-8, Olathe, Kan.) to finalize the slate. This does not leave much time for discussion. Nominations are acceptable from any AMA member, should be transmitted to his or her own district VP, together with as much supporting information as possible (at least 100 words by, for or about the candidate), with a copy to AMA HQ.

Officers are elected for two-year terms. At the time of their nomination as well as during their entire terms, they must be AMA Leader Members.

The president's responsibility is rather awesome, demanding drive, enthusiasm, administrative ability, and time to do the job. He may preside at all meetings; be a member of all committees; may establish and dissolve committees; he also makes final decisions regarding disputes and protests; appoints Contest Board chairmen; coordinates overall CB activities; coordinates international modeling activity.

No less is the need for well-qualified VP's. In addition to being directly responsible for appointing district Contest Board members and Contest Coordinators, they, as a group, comprise the majority of the Executive Council, AMA's equivalent of a corporation's board of directors. The council is answerable for management of AMA, supervision of its affairs and establishing its policies.

The cover tells the story.

Free Flight History

will be made at Olathe this year.

Over a dozen papers will be presented at the Symposium by the top people in Free Flight. 100 pages plus, with photos, graphs and drawings will bring into focus the newest technical, theoretical and practical Free Flight thinking under Bill Hartill's editorship, given by the NFFS in affiliation with the AMA.

Symposium date is Monday, Aug. 5 at the '68 Nats. Those attending will receive the book of technical papers. After the Nats copies may be ordered from the NFFS or AMA HQ.

DIRECTORY OF AMA OFFICERS

Which officers live in your district? Select correct address when writing officers.

EXECUTIVE COUNCIL

President:
C. G. Weirick, 2802 New Deal Ave., Apt. C, El Monte, Calif. 91733
Secretary-Treasurer:
Earl Witt, Longview Trailer Court, R.D. #3, Chambersburg, Pa.
Executive Director
John Worth, c/o AMA Hq., 1239 Vermont Ave. N.W., Washington, D. C. 20005
Vice Presidents:
I: Cliff Piper, Highland Road, Atkinson, N. H.
II: A Schroeder, 18 Spencer Rd., Glen Ridge, N. J.
III: Eva Biddle, 2156 Street Rd., Warrington, Pa.
IV: C. Telford, 8612 Rayburn Rd., Bethesda, Md.
V: Jim Kirkland, 344 Edge Ave., Valparaiso, Fla.
VI: W. Weaver, 7248 Winchester Dr., St. Louis, Mo.
VII: Jack Josaitis, 10382 Elmira, Detroit, Mich.
VIII: L. Peters, 3025 Hillglen Rd., Dallas, Tex. 75228
IX: Stan Chilton, 446 Ida, Wichita, Kans.
X: J. Pond, 2162 43rd Ave., San Francisco, Calif.
XI: R. D. Stalick, 2807 S. Oak St., Albany, Ore.

CONTEST COORDINATORS:

I: W. Leonhardt, 100 Abbott St., Lawrence, Mass.
II: E. F. Hoffman, 158 Carpenter St., Belleville, N.J.
III: E. Biddle, 2156 Street Rd., Warrington, Penna. 18976 (East)
M. Weisenbach, 4568 West 146th St., Cleveland, Ohio 44135 (West)
IV: D. L. Johnson, 3367 Sudlersville So., Laurel, Md.
V: T. McLaughlan, 741 W. Hernandez St., Pensacola, Fla 32501
VI: Gosta Johnson, 6810 S. Crandon, Chicago, Ill. 60649
VII: Odell Marchant, 2004 N. Hillsboro, Minneapolis, Minn. 55427 (North)
W. Hartung, 14759 Kilbourne, Detroit, Mich. 48213 (South)
VIII: M. Frank, 2933 Blankenship, Wichita Falls, Tex. 76308
IX: R. R. Combs, RR #1 Box 712, Morrison, Colo.
X: D. C. Farnsworth, 301 Carl Dr., Visalia, Calif. 93277 (North)
Pete Brandt, 5817 W. Ironwood, Palos Verdes Peninsula, Calif. 90274 (South)
XI: A. L. Grell, Rt. 1 Box 165, Tangent, Ore. 97389

CONTEST BOARD COORDINATOR: Pete Soule, 26622 Fond Du Lac, Palos Verdes Peninsula, Calif. 90274

Bold type below indicates Chairman of Contest Board.

FREE FLIGHT CONTEST BOARD:

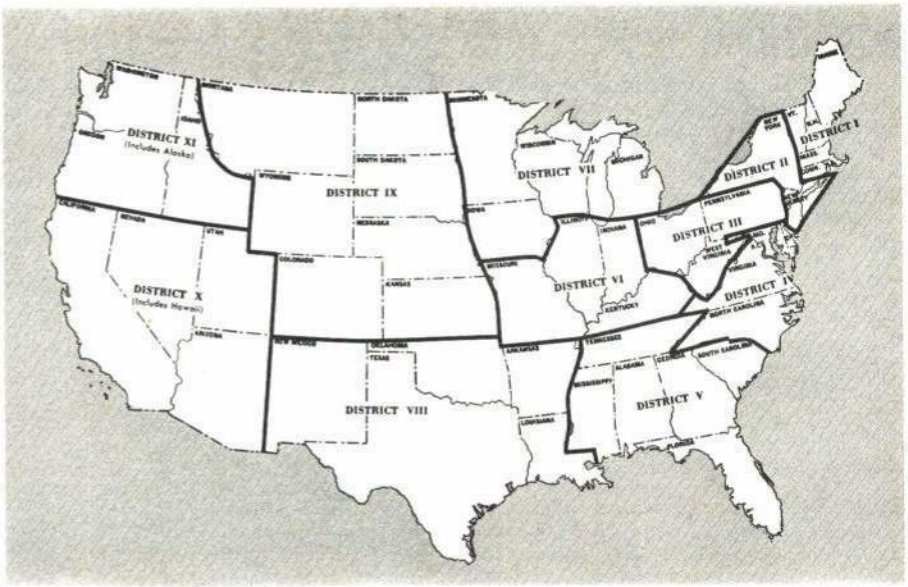
I: Henry Struck, R.F.D. #2, Hamburg, Old Lyme, Conn.
II: E. Fronczek, 34-14 Broadway, Long Island City, N. Y. 11106
III: Robert Leishman, 167 Goldenridge Dr., Levittown, Pa.
IV: J. V. Boyle Jr., 219 Shenandoah Rd., Hampton, Va. 23361
V: Jerry Wagner, 274 E. 9th St., Hialeah, Fla.
VI: E. D. Capogreco, 1423 Andrews, Cahokia, Ill. 62206
VII: P. W. Klintworth Jr., 894 Brooklawn Rd., Troy, Mich. 48084
VIII: **R. Tenny, 432 Lynn St., Richardson, Tex. 75080**
IX: Frank Monts, 6519 Marjorie Lane, Wichita, Kans.
X: V. Cunnyngham, 4337 Hornbrook St., Baldwin Park, Calif. 91706
XI: D. Sobala, 12003 S.E. Taylor St., Portland, Ore.

CONTROL LINE CONTEST BOARD:

I: D. K. Cook, 148 Belair St., Brockton, Mass. 02401
II: J. G. Pailet, 30 Emerson Rd., Brookville, Glen Head, N. Y. 11545
III: Laird Jackson, 5415 Houghton Pl., Philadelphia, Pa.
IV: H. Larsen, Rt. 1, Box 307, Manassas, Va. 22110
V: W. D. McGraw, 1325 Carol Dr., Memphis, Tenn.
VI: R. G. Marek, 1003 Tacoma St., Carpentersville, Ill.
VII: **Howard Mottin, 2124 Common Rd., Warren, Mich.**
VIII: G. M. Aldrich, 3219 Shady Springs, San Antonio, Tex. 78230
IX: J. R. Mason, 2214 S. Pine Crest, Wichita, Kans.
X: J. E. Barr, 7418 Collett Ave., Van Nuys, Calif.
XI: Keith Loutocky, 1419 S. 48th, Tacoma, Wash.

RADIO CONTROL CONTEST BOARD:

I: H. A. Thomasian, 369 Brigham St., Northboro, Mass. 01532
II: R. Noll, 96 Pine Knoll Rd., Endicott, N. Y. 13760
III: George Kane, 209 Barbara Lane, Warminster, Pa.
IV: W. C. Northrop Jr., 56 Holly Lane, Newark, Del.
V: Don Coleman, P.O. Box 436, Citronelle, Ala. 36522
VI: Bud Atkinson, 734 North 6th St. Terr., Blue Springs, Mo. 64015
VII: Loren Tregellas, 3003 S. Everett, Wichita, Kans.
VIII: C. Summers, 7132 Shook Ave., Dallas, Tex.
IX: James E. Northmore, 28207 Grand Duke, Farmington, Mich.
X: **G. E. Nelson, 8638 Patterson Pass Rd., Livermore, Calif. 94550**
XI: R. Brooke, 17845 3rd Ave. S.W., Seattle, Wash.



CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

June 22 — Salt Lake City, Utah (AA) Summer FF Solace. Site: Saltair Modelport. J. Jackson CD, 3205 Canyon Rim Lane, Salt Lake City, Utah 84109. Sponsor: Utah State Aeromodelers.

June 22-23 — Albany, Ore. (AA) Willamette Modelers Club 7th Annual FF & CL Meet. Spec. Events. Site: Brewster Field. c/o Willamette Modelers Club, 316 Main St., Lebanon, Ore. 97335. Sponsor: Willamette Modelers Club.

June 22-23 — Wallops, Va. (AA) MARKS 3rd Annual RC Meet. Site: Wallops Station. H. Jones CD, 59 Aigburth Ave., Towson, Md. 21204. Sponsor: Mid Atlantic Radio Kontrol Society.

June 22-23 — Wichita, Kans. (AAA) Annual Midwestern Championships for FF, CL & RC. Spec. Events. Site: 13th & Webb Rd. J. Finley CD, 5217 E. Murdock, Wichita, Kans. 67208. Sponsor: WICHIHAWKS.

June 22-23 — Dayton, Ohio (AAA) Wright Brothers Memorial Annual RC Meet. Spec. Events. D. Lowe CD, 5936 Clar-Von Dr., Dayton, Ohio 45430. Sponsor: Western Ohio Radio Kontrol Society.

June 23 — Hempstead, L. I., N. Y. (AA) Long Island Drone Society 10th Annual RC Contest. Spec. Events. Site: Mitchell Field. J. D'Amico CD, 9224 Rost Pl., Brooklyn, N. Y. 11236. Sponsor: Long Island Drone Society.

June 23 — Bergenfield, N. J. (AA) Twin Boro Stunt Meet for CL. Spec. Events. Site: Memorial Field. H. Stiles CD, 185 Franklin Turnpike, Mahwah, N. J. 07430. Sponsor: Twin Boro Flying Club.

June 23 — Council Bluffs, Iowa (AA) 4th Annual CL Contest. Site: New Airport. D. Bailey CD, 2215 6th Ave., Council Bluffs, Iowa 51501. Sponsor: Balsa Busters.

June 23 — Ft. Worth, Tex. (AA) Cowtown Circle Burners Annual Meet for CL. Site: Forest Park. B. Davis CD, 1613 Carl, Ft. Worth, Tex. 76103. Sponsor: Cowtown Circle Burners.

June 23 — Valley Park, Mo. (AAA) Greater St. Louis Modeling Association CL & RC Meet. Site: Buder Park. B. Johnson CD, 6328 Jackson, Berkeley, Mo. 63134.

June 23 — Detroit, Mich. (AA) Cloudbusters 6th Annual CL Meet. Site: Rouge Park. C. Wentzel CD, 30357 Roan, Warren, Mich. 48093.

June 23 — Johnsville, Pa. (AA) 4th Annual FF Fling. Site: Naval Air Facility. R. Leishman CD, 167 Goldenridge Dr., Levittown, Pa. 19057.

June 23 — Burgettstown, Pa. (AAA) 2nd Annual Gr. Pgh. CL Meet. Site: Hillman's Model Field. J. Nickerson CD, 29 Maplewood Ave., Pittsburgh, Pa. 15205. Sponsor: West Hills Aeromodeling Kontroline Society.

June 23 — Fresno, Calif. (A) Fresno Monthly FF Meet. Site: Near Kerman. F. Gallo CD, 1725 Kenmore Dr. W., Fresno, Calif. 93702. Sponsor: Fresno Gas Model Club.

June 29-30 — Northampton, Mass. (AA) H.C.R.C. 5th RC Rally Conference. Site: Westover (Tentative). J. Papageorge CD, 104 Rocky Hill Rd., Hadley, Mass. 01035. Sponsor: Hampshire Co. Radio Controllers.

June 29-30 — Denver, Colo. (AA) 10th Annual Metro Denver RC Meet. Site: Lowry AFB. H. Geller CD, 6920 E. Exposition Ave., Denver, Colo. 80222.

June 29-30 — Creve Couer, Mo. (AA) 2nd Annual Spirits of St. Louis RC Contest. Site: Spirits Field. R. Williams CD, 4060 Bondurante Dr., Bridgeton, Mo. 62042. Sponsor: Spirits of St. Louis RC Club.

June 30 — Oklahoma City, Okla. (AA) Central Okla. CL Championships. Spec. Event. Site: Topping Park, 5300 N. Broadway Ext. M. McGee CD, 126 S. E. 35, Oklahoma City, Okla. Sponsor: Controliners Model Club.

June 30 — Endicott, N. Y. (AA) 3rd Annual Northeast RC Goodyear Championships. Site: Tri-Cities Airport. R. Noll CD, 96 Pine Knoll Rd., Endicott, N. Y. 13760. Sponsor: Aeroguidance Society Inc.

June 30 — Ridley Township, Pa. (AA) 2nd Annual Boeing Balsa Choppers UC Meet. Site: Boeing Vertol Parking Lot at Rte 291 & Sellers Ave. R. Heminway CD, 519 Oaklawn Ave., Oaklyn, N. J. 08107.

July 4 — Washington, D. C. (AA) NCMAC 7th Annual Meet for CL. Site: Bolling AFB. D. Johnson CD, 3367 Sudlersville So., Laurel, Md. 20810. Sponsor: National Capitol MAC.

July 6-7 — Sebring, Fla. (AAA) Confederate Nationals FF & CL Contest. Site: Air Terminal. R. Myers CD, 3935 S. W. 125 Ave., Miami, Fla. 33165.

July 6-7 — Kansas City, Mo. (AA) KCRC Annual RC Contest. Site: Lake Jacomo. B. Drummond CD, 9115 Charlotte, Kansas City, Mo. 64131. Sponsor: Kansas City RC Club.

July 6-7 — Chicago, Ill. (AA) Chicagoland RC Open Meet. Site: CRCM Club Field. D. Burt CD, 3048 Central St., Evanston, Ill. 60201. Sponsor: Chicagoland RC Club.

July 7 — Forest Preserve, Ill. (AA) 3rd Annual Aero Angels CL Model Meet. Site: Cumberland & Irving Park Rd. D. Hardt CD, 7371 N. Lincoln Ave., Lincolnwood, Ill. 60646. Sponsor: Aero Angels.

July 7 — Columbus, Ohio (AA) Northland CL Championships. Site: Northland Shopping Center. C. Marco CD, 1466 Burnley Sq. N., Columbus, Ohio 43224. Sponsor: Capital City Controlliners.

July 8-13 — Arnold AFS, Tenn. (AAA) 1968 USAF Worldwide FF, CL & RC Model Airplane Championships. Restricted. Site: AECD Model Flying Field. M. Collier CD, 518 Sharondale Dr., Tullahoma, Tenn. 37388. Sponsor: Coffee Airfoilers.

July 13 — Taft, Calif. (AA) Thunder Bugs 1st Annual Night FF Contest. Site: Gardner Field. J. Bonang CD, 1320 Welton Way, Inglewood, Calif. 90302. Sponsor: Thunder Bugs MAC.

July 13-14 — Selma, Ala. (AAA) Ala. State Championships for FF & CL. Site: Silfield. K. Scott CD, 904 Kings Bend Rd., Selma, Ala. 36701.

July 13-14 — Salt Lake City, Utah (AA) July Fiesta RC Contest. Site: Saltair Model Port. C. Pannier CD, 1781 Mountain View Dr., Salt Lake City, Utah 84106.

July 13-14 — Turlock, Calif. (AA) Pioneers Annual RC Contest. Site: Municipal Airport. R. Morse CD, 3351 Pruneridge Ave., Santa Clara, Calif. 95011. Sponsor: Pioneer RC Club.

July 13-14 — Mandan, N. D. Missouri Slope Annual RC Model Fly In. Site: Mandan Airport. A. May CD, Rt. 2 Box 58, Bismarck, N. D. 58554.

July 13-14 — Roanoke, Ill. (AA) 3rd Annual RC Contest. Site: Robert Sherer Farm. E. Dalton CD, 1429 E. Hendryx Lane, Peoria, Ill. 61614. Sponsor: Peoria RC Modelers.

July 13-14 — San Antonio, Tex. (AAA) Sidewinders 4th Annual CL Contest. Site: Churchill H. S. G. Aldrich CD, 3219 Shady Springs, San Antonio, Tex. 78230.

July 14 — Aurora, Colo. July FF Fun Fly. Site: MMM Flying Site. A. White CD, 1373 Bellaire, Denver, Colo. 80220. Sponsor: Magnificent Mountain Men.

July 14 — Dayton, Ohio (AA) Midwestern CL Championships. Site: Municipal Model Flying Field. C. China CD, 5028 Broughton Pl., Dayton, Ohio 45431. Sponsor: Dayton Buzzin Buzzards.

July 14 — Suffield, Conn. NCRCC RC Fun Fly. Site: Club Field. R. Bernier CD, 761 Mather St., Suffield, Conn. 06078. Sponsor: Northern Conn. RC Club.

July 14 — Geneva Area, N. Y. Hobo or Fun Meet Site: Oaks Corners. H. Ford CD, 11 Stephens St.,

Continued on page 67

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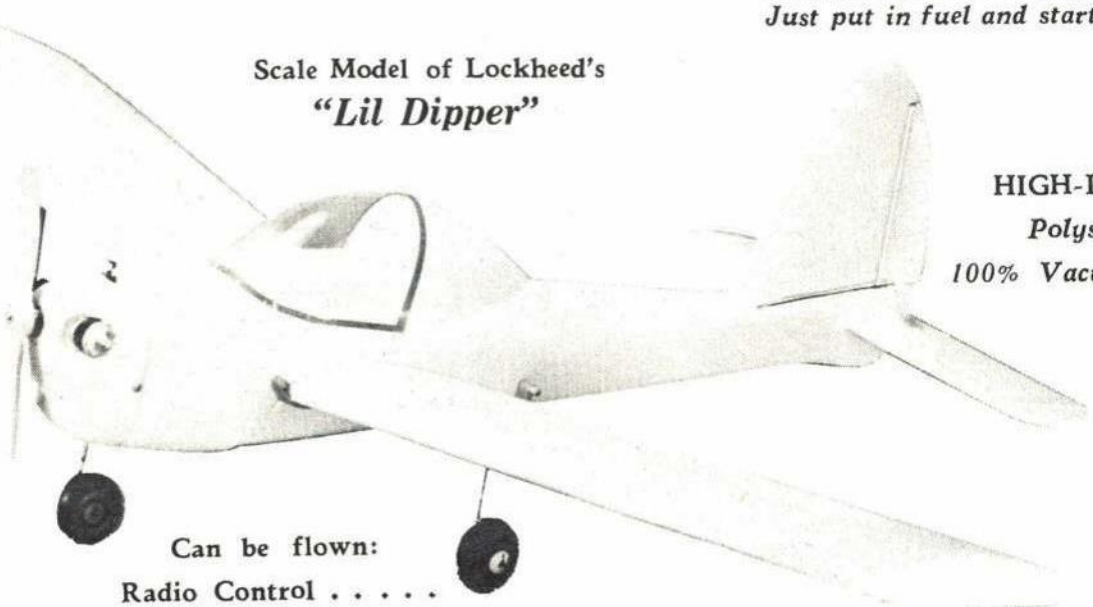

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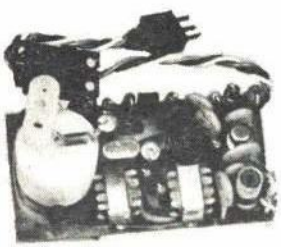

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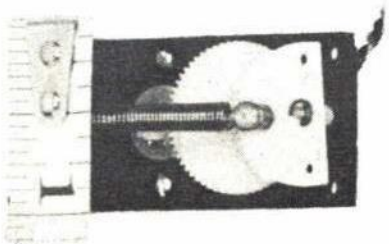

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NAR

CONTEST GUIDE

Several NAR sections have asked for assistance in getting their group on the right track in the area of sanctioned competition. Here is a step-by-step guide on how to put your section in the competition business.

1) Before you decide to hold a contest, your members must have a complete knowledge of the NAR Rules and Regulations "Pink Book." If you are a new club, you should spend several meetings discussing the basic requirements for a meet and the many contests that can be sanctioned.

2) Know the limitations of your members. If your members are new to model rocketry, plan contests which are relatively easy for your entire membership. Seek your own club's level. If your membership is of a relatively young age and generally inexperienced you should hold such events as Parachute Duration, Altitude competition (if you have theodolites, experienced trackers and data reduction crews), Drag Race, Spot Landing and the like. Only if you are advanced in techniques and ability should you schedule scale events and boost-glide.

3) Appoint a Contest Director. He must have a thorough knowledge of rules and regulations.

He must be able to correspond with the National Contest Director and follow the directions that are given to conduct a meet. The Contest Director (CD) must organize his meet and be able to delegate authority. The CD should be the adult advisor. And there must be a dependable and hardworking member of the section working directly under the CD.

4) In order to obtain sanction for a meet, the CD must obtain the proper sanction application papers from the National Contest Director. Remember, in order to obtain sanction, you must plan ahead. Thirty (30) days notice is required.

5) Upon receipt of the sanction request, fill out the questionaire completely and return the copy immediately to the National CD. When you receive the meet flight cards and scoring sheets, study them carefully so that you understand every detail. If you have questions, ask the National CD for clarification.

6) Before the meet is held, develop a system to handle the flight cards on the field. A dry run before the meet with contest officials is very important. This can be done at a section meeting. It is a good idea to have a Leader or Senior member monitor the activity.

7) After the meet, be sure that all the information required is completed. Check and double check that everything that is to be returned to the National CD is in proper order. Don't put it aside. Remember, it must be sent to the National CD as soon as possible after the meet (generally 7 days).

There are many tips that you can use in the above points to help you get started. One thing you must remember is don't bite off more than you can chew in your first few section meets. If you live in an area where there are other sections, seek assistance and advice from them.

Step-by-step organization is always required. Range discipline is absolutely necessary and the Range Safety Officer must be firm, level-headed and possess leadership capabilities.

If you are unsure of the requirements for a good launch range, you may refer to the layout in the Handbook of Model Rocketry.

Requests for sanction applications should be directed to: Albert Kirchner Sr., 49 Cheshire Rd., Bethpage, N. Y. 11714. Requests for sanction sent to NAR Headquarters will be immediately forwarded to Mr. Kirchner.

PITTSBURGH CONVENTION

The Steel City Section of the NAR held their 3rd Spring Convention at Shadyside Academy, March 15-17. Over 200 modelers attended. The huge turnout was especially rewarding in that many non-NAR members were introduced to the Assoc. Discussion groups and lectures covered a wide range of topics from beginning model rocketry to advanced projects.

There were industry representatives from Centuri Engineering, Estes Industries and Model Rocket Industries.

The convention is an excellent example of what the section level can do to instill an interest in model rocketry and insure its steady growth. Kudos go out to Arnold Pittler, convention chairman, for his outstanding work.

TRUSTEES MEET

The Board of Trustees of the NAR held an open and executive session at the Pittsburgh convention. Committee reports show that the NAR membership in 1968 will exceed all other years. The continued growth of the NAR is an indication of the interest in modeling. As of March 1, 1968 membership was 172 percent of that a year ago at that time.

A motion was approved that reduces the NAR Section Charter fee to $5.00 per year. All sections chartering this year and sending in $15.00 will receive a $10.00 refund.

Mr. Tim Skinner, of Model Rocket Industries, pledged his support of the NAR and promised nationwide publicity of the NAR program through hobby dealers.

The Leader Administrative Council has completed the new NAR By-laws. They are now available at a very low cost from NAR Technical Services.

Technical Services says that NAR pins are now available as well as other supplies. The Handbook of Model Rocketry (second edition) is selling at a good rate. Cost is still $4.00 for the paper cover edition to NAR members. Items to come from NARTS include complete scale plans for Falcon, Scout, Black Brant IV and the Nike-Tomahawk. Availability will be announced in The Model Rocketeer.

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Russian Space Program

Continued from page 18

a 1½ stage vehicle with a series top stage. As we will see, the top series stage was added to the basic booster as the program progressed. According to Space Business Daily, the Soviets refer to this carrier rocket as the RD-107, the same designation as the booster engines.

At lift-off, it operates as a parallel-staged vehicle. The four RD-107 engines of the boosters and the RD-108 of the sustainer core are ignited at the same time. This is a total of 20 main thrust chambers and 12 vernier chambers, providing an estimated total takeoff thrust of 950,000 lbs., increasing to 1,150,000 in vacuum. At an undisclosed time and altitude, the four strap-on boosters separate from the sustainer core, probably by having explosive bolts sever the fore and aft attachments. The hammerheaded sustainer core continues thrusting with its RD-108 engine producing 228,480 lbs. of thrust. In due course — thrust duration unknown — the sustainer core propellant tanks are emptied, and the RD-108 shuts down. If the vehicle is carrying its top stage, the single-chambered top stage engine then lights-off with "fire-in-the-hole" technique, and explosive bolts separate the top stage from the interstage truss structure.

Soviet rocket technology must certainly be applauded if their engineers can manage to ignite simultaneously 32 thrust chambers at launch. The ignition technique is very similar to that of the German A4, as shown by released motion pictures of the start sequence. At the ignition signal, propellant valves open permitting the propellants — liquid oxygen and kerosene — to flow to all combustion chambers by a combination of gravity feed and tank pressurization. We don't know whether ignition is accomplished by pyrotechnic igniters in each chamber or by use of "hypergolic leads" — slugs of propellants introduced into the engine plumbing between tanks and chamber injectors so that when they initially come into contact after the start signal, they start a fire simply by contact with each other. Thus, in this "preliminary stage," a very low-thrust combustion process gets ignition going in all 32 thrust chambers.

Using either instruments to detect combustion in all chambers or eyeball inspection through periscopes from the blockhouse, the launch crew has a few seconds to determine if all chambers are lit off satisfactorily. If everything is well, the "main stage" signal is sent, starting the turbo-pumps. Thrust in all chambers then rises rapidly to some 950,000 lbs. total because the propellants are being driven into the combustion chambers by the turbopumps. Once thrust has risen to the correct level, four launcher arms swing back from their hold-down attachment points at the forward booster attachments, leaving the vehicle free to lift off at an acceleration of about 1.3 gees, which is nearly optimum.

Unlike our paper-thin Atlas vehicle which also uses a modified 1½-stage principle—jetissoning only two outboard booster engines, however, instead of engines and tanks — the Soviet carrier rocket is built very solidly. While the vehicle was being assembled at Paris, technicians walked up and down all over it. It was lifted and placed on its railway car erector by two cranes which picked it up and the forward and aft booster attachment points. By using the strap-on booster concept with parallel staging, the Soviets were able to make a much shorter vehicle than would have been possible with series staging, and the carrier rocket is therefore a

much stiffer vehicle than our smaller Atlas. There is also evidence that Soviet engineers paid a great deal of attention to aerodynamics in their design.

This sustainer-booster combination is undoubtedly the first-generation Soviet ICBM, often termed the T-3 and also called the M-108, although the latter designation may have referred only to an earlier version of the RD-107 rocket engine. As such, the sustainer-booster combination alone launched the first three Sputniks without a top stage. Soviet photos have been released showing the launching of Sputnik III with no top stage and no interstage support trusses. Another photo has been released showing a top stage and interstage truss structure with the caption, "Launching of the Soviet pioneer manmade earth satellite." Therefore, the exact configuration of the launch vehicle for the first three Sputniks is, at this time, unconfirmed, but the standard Soviet space carrier rocket was indeed used to launch the Sputniks.

Although the spherical Sputnik I was only 24" in diameter and weighed 184 lbs., it is not generally known that the Soviets orbited a total of some 8,000 lbs. on the first shot. Sputnik II weighed-in at 1,120 lbs. with the dog Laika aboard, and again some 8,000 lbs. were orbited. Sputnik II was a bright object in the heavens, and I watched it go overhead many times. Sputnik II was photographed from Cape Canaveral, and RCA Service, Inc. estimated its length between 74 and 84 ft. The Royal Aircraft Establishment in England estimated from tracking data that the entire Sputnik II vehicle was 7.6 ft. in diameter and 65.6 ft. long. The total length of the carrier rocket sustainer core plus Sputnik II payload shroud is actually between 95 and 110 ft. long (depending upon whether or not the top stage structure and interstage trusses were really used), which is very close to the photo-based estimates of 1958.

The first three Sputniks were therefore orbited using only the booster-sustainer configuration without any top stage. With Sputnik I, the rocket was operating far below its maximum payload-carrying capability. Even with the 2926-lb. Sputnik III, the vehicle was operating far below the 3087-lb. orbital capability of the booster, a figure recently revealed by Soviet professor G. V. Petrovich.

In 1959-1960, the Soviets added the top stage to the RD-107, and this was first tested on the launching of Luna I on January 2, 1959. This, then, was the complete 2½-stage booster that was eventually to launch the manned Vostoks. Petrovich announced recently that the orbital capability of this booster was 10,142 lbs., and this was very close to the weight of Spacecraft I, launched May 15, 1960, which put an unmanned Vostok into orbit for the first time.

The Soviets did not go at their manned orbital program lightly. There is absolutely no substantiation at this time to the persistent rumor that the Soviets lost one or more cosmonauts in the Vostok program. When they finally did lose a man, Komarov, in the first Soyuz flight, they did not try to hide the fact. They even went to great lengths in the unmanned Vostok test program to keep the West from believing that they had a cosmonaut in orbit; for the test of the communications in one of the unmanned flights, they deliberately used a recording of a choral group singing folk songs rather than the recorded voice of a single man. The Soviets do have a sense of humor, because they have admitted with chuckles that they also thought that this chorus from space

would cause a bit of confusion among Western listeners!

They also used their most reliable orbital weight-lifter as the launch vehicle, the standard carrier rocket. By the time they orbited the first unmanned Vostok in May 1960, they had had at least six tests of the vehicle as an ICBM (probably more), three orbital Sputnik shots, and three lunar shots. Their Vostok program was not without problems, however. Technology is technology, and there are no infallible super-engineers. They lost Spacecraft I, which is still going around in orbit as an unmanned Vostok. Spacecraft III, another unmanned Vostok precursor flight, burned up on re-entry. However, by the time their carrier rocket was "man rated," at the time of the first manned flight, the Soviets had had at least 18 space launches (that we know of) with the carrier rocket, two of which failed (that we know of). Undoubtedly, there were more flights of the vehicle than that, some of them being the Pacific test shots that were run during that time period. Therefore, the Soviets had a man-rated launch vehicle of very high reliability by the time Yuri Gagarin climbed aboard and rode into history once around the world on April 12, 1961.

Having available the large standard carrier rocket, the Soviets were not as limited in the weight of their manned spacecraft as was NASA with the Mercury spacecraft lofted by the Atlas-D. The nominal orbital weight of the Vostok spacecraft, including pilot, is given by the Soviets as 4725 kilograms (10,422.5 lbs.). Therefore, they did not need to cut things as finely as the USA did with Mercury. The Soviets could afford the weight of a dual-gas — oxygen and nitrogen — capsule atmosphere, plus enough consumables to permit Vostok to remain in orbit for long periods of time — 64 orbits in the case of Nikolayev in Vostok 3. They even had television transmission from the Vostok.

The Vostok capsule is a very strong and rugged vehicle, as evidence by the released photographs. It also came as a great surprise to Western engineers to see from released motion pictures that the Soviets do not use "white room" techniques in the assembly and check-out of the Vostoks. Photos plainly show the Vostok capsules being assembled in huge hangars. The equipment aboard is also very rugged and heavy; a photo shows a coveralled Soviet technician installing some electrical gear with a large 250-watt soldering iron.

The Vostok capsule that is placed in orbit consists of 1) the entire top stage of the carrier rocket, 2) a service module carrying electronics, consumables, and re-entry rockets, and 3) a spherical re-entry command module. An aerodynamic shroud protects the spacecraft during launch and perhaps is jetissoned after separation of the top stage from the booster sustainer core.

The only thrusters visible on the Vostok spacecraft that have been displayed in Paris, Moscow, and Montreal are the four nozzles located on the aft end of the top stage. These may also be vernier rockets for final orbit adjustment. They appear to be canted slightly to provide roll control as well as pitch and yaw control when operated singly or in pairs.

When ready for re-entry, the top stage is jetissoned, revealing the conical-shaped aft end of the service module. This has never been displayed, but is shown in both Czech and Polish drawings. Although its exact shape is therefore open to question, it must also mount some manner of attitude control thrusters to align the command and service modules for proper re-entry rocket firing angle. The re-entry

rocket engine is apparently at the small end of the conical frustrum of the service module. After firing of the re-entry retro rocket, the service module is separated from the spherical command module, probably by releasing the straps that go around the command module. The service module thrusters, wherever they are located, may also impart a roll to the command module after it is positioned in the proper re-entry attitude.

The command module is a sphere 96" in diameter. The displayed Vostok had a coating of aluminum foil over the sphere to provide thermal control. Released Soviet photos indicate that the sphere is coated with an ablative heat shield material on the hemisphere at the pilot's back, while the remainder of the sphere is protected with honeycomb material.

Early USA manned capsule designs used the spherical shape, but this was later modified to the blunted cone shape now so familiar to us, primarily because the blunted cone shape weighs less. The Soviets stuck to the spherical re-entry shape because: a) they did not have a weight-lifting problem to contend with, and b) the aerodynamic characteristics of a sphere are very well known. In the engineering trade-off between weight and aerodynamic knowledge, the Soviets opted for more weight and a shape they knew more about, thereby shortening their development time period.

The Vostok re-entry sphere has an off-set center of gravity to provide some stabilization during re-entry. It may also have an imparted roll around its fore-and-aft axis (with respect to its position on the launch vehicle). It apparently has no drogue parachute like our Mercury and Gemini capsules. It comes in like a spinning ball. The spherical shape, with its off-set CG and imparted roll, leads me to believe personally that the Vostok probably undergoes more oscillation during re-entry than the US space capsules. Re-entry in a Vostok must be a wild ride!

At about 23,000 ft., the cosmonaut ejects from the spherical capsule. The entry-exit hatch blows off, and the three ejection seat rockets fire to push the cosmonaut and his seat clear of the falling capsule. The cosmonaut then separates from his seat and lands under a regular personnel parachute, just like a jet pilot that has ejected from a plane. Soviet films show the Cosmonauts practicing ejection from Yak-25 Flashlight jets. At about 16,000 ft., another hatch blows off the side of the Vostok sphere, the capsule recovery parachute deploys, and the capsule lands at a velocity of about 33 ft. per second.

Although all Vostok cosmonauts used this type of landing system, the Soviets claim that a landing can be made with the cosmonaut remaining inside the capsule. This may be true; in an emergency, the cosmonaut may not have to eject from the capsule. But it is my belief that such a landing would be very rough on a cosmonaut.

Why did the Soviets use this recovery technique for their Vostok cosmonauts?

In the first place, they recover their capsules over land rather than over water as the U. S. does. Impact forces for a ground landing are much more severe than for a water landing. The geometry of the Vostok sphere shows that the only available free volume in the sphere for stowage of the capsule parachute is on the *side* of the sphere. If the cosmonaut stayed inside the capsule, he would have to take the parachute opening shock and a landing shock of 33 ft. per second *on his side*. So the obvious safe technique was to get the cosmonaut out of the capsule before parachute

opening and landing. This also permitted a smaller capsule recovery chute and the high capsule landing velocity.

Again, however, we see Soviet engineering philosophy at work here. The cosmonaut is already strapped into an ejection seat which is required for emergency egress during a launch abort. The Soviets did not develop an escape rocket system such as we used on Mercury. They used the ejection seat technique that we later used with Gemini. Apparently, the Soviet engineers decided to use the ejection seat that was incorporated for launch abort purposes in a dual role: launch abort safety as well as simplifying the landing problem.

The ejection seat is also obviously intended for launch abort purposes because the capsule's aerodynamic shroud has a large, un-faired opening in it for entry and egress.

Although the Vostok spacecraft system may appear to some people to be crude, it is well to remember that it worked quite well. The Soviets got 12 flights with it, including six completely successful manned missions. They even flew a woman in it. Soviet engineering, as evidenced by their aircraft alone, is eminently pragmatic.

Their launch pad technique also shows this. Recently released motion pictures of the check-out, erection, and launch sequences at the Tyuratam Cosmodrome reveals an entirely different system than that in use in the United States for large launch vehicles.

The carrier rocket is completely assembled horizontally on a railway car erector inside the Cosmodrome hangar. The Vostok space capsule also undergoes final assembly in the hangar and is put through a series of systems tests with and without a cosmonaut aboard before mating the spacecraft to the booster. Finally, the entire carrier rocket and spacecraft is mated horizontally in the hangar. The check-out vehicle is taken by rail on its erector car to the launch pad. It is then erected on the pad by the hydraulically-operated erector, and four counter-weighted steadying and hold-down arms swing in to secure the booster vehicle on the pad in a vertical direction. These hold-down arms also have work platforms attached to them. Two swing-back umbilical towers are also positioned against the vehicle so that propellant loading lines, electrical cables, and capsule air conditioning ducts can be attached. After the erector is removed, a rail-mounted service tower with an elevator is moved into position on the erection side of the vehicle. The vehicle itself does not have its base flush with the main surface of the pad, but is positioned with its base below the pad level in a well over the flame pit. There are no assembly operations carried out on the launch pad, but some final systems checks are probably made. Everything appears to be moved in and out of the launch pad area by rail.

Either the Soviets have two such pads at Tyuratam Cosmodrome, or this system of horizontal hangar assembly and rail-borne erection has been designed for an extremely rapid pad turn-around time. The first Soviet paired flight with Vostok 3 and Vostok 4 required two launches within 24 hours — one on August 11, 1962, and the second on August 12th. It took the U. S. a week of three-shift operation to re-cycle the launch pad between Gemini 7 and Gemini 6; this long re-cycle time was due to the fact that the Gemini-Titan vehicle must be assembled in a vertical position on the launch pad before final systems checks can be done.

If the Soviets used the same launch pad for their paired Vostok flights, it seems unlikely that the USA can match their pad

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turn-around time even with the Saturn V Complex 39 or the Titan III complex at Cape Kennedy. Obviously, the Soviets can assemble and check-out two Vostok launch vehicles at the same time with their horizontal assembly system.

Now that the Soviet Sputnik, Lunik, early interplanetary, and Vostok programs have been reasonably well described by Soviet sources and Western analysts, what about the Soviet multi-man Voskhod follow-on program? Again, we now know from Soviet sources that the standard space carrier rocket was used. This has been called the RD-107B vehicle by some U. S. sources. It utilizes the same 1½-stage booster-sustainer vehicle, but has an up-rated, lengthened upper stage that is some 18 ft. longer than the Vostok top stage. Most of this additional volume is devoted to additional propellants, and the new top stage may have a multiple-chamber rocket engine in place of the single-chamber engine of the Vostok vehicle. The released photographs at the time of this writing give no information on this point. However, like the Vostok RD-107 vehicle, the Voskhod RD-107B rocket was used by the Soviets from 1961 on. According to Professor G. V. Petrovich, it has an orbital capability of 14,333 lbs. The Voskhod shroud seems to be the same diameter as the Vostok's, but it is longer.

External details of the Voskhod spacecraft itself have not yet been revealed at the time of this writing, but several things can be inferred about Voskhod. It has no ejection seats in evidence. In Voskhod 1, the three cosmonauts Komarov, Yegorov, and Feoktistov flew without pressure suits and landed inside the capsule. On Voskhod 2, Belyayev and Leonov flew in pressure suits as a safeguard against airlock malfunction, the weight of the third crew member being replaced by the collapsible

airlock for Leonov's EVA. Again, Voskhod 2 landed with the two cosmonauts aboard. The Soviets have announced that retro-rockets were used in the landing sequence.

The simple blackboard drawings of Leonov during the press conference in which he described his EVA indicate that the Voskhod may still be the 96-inch diameter re-entry sphere of the Vostok program but with a cannister added on the forward end for a larger landing parachute. Since the cosmonauts landed in the capsule, it seems reasonable to assume that the Soviets eliminated the side-mounting of the Vostok recovery chute. How and where landing retro-rockets could have been mounted so that they were protected during re-entry remains unknown at this time.

Whatever the Soviets have come up with beyond Voskhod is not known yet. Undoubtedly, they have already made several unmanned flights with a much larger carrier rocket, if the past history of their space program is any indication. Proton 1 was flown on July 16, 1965; its announced weight was 26,840 lbs. in orbit. As displayed in Paris, Proton 1 was 14.76 ft. in diameter. A vehicle of this size and this weight would require a launching vehicle of a size between Saturn-Ib and Saturn-V. The Soviets may have used this new vehicle for the successful Venus shot, and may also have used it for the ill-fated flight of Soyuz 1 on April 24, 1967 during which Komarov lost his life after re-entry. Norman Baker, the editor and publisher of Space Business Daily, remarked to me that the Soyuz booster might be an SS-9 core surrounded by four strap-on SS-9 boosters.

The SS-9 is the new Soviet ICBM paraded in Moscow in 1967 and powered by a cluster of six thrust chambers. This would certainly be consistent with the Soviet space vehicle design philosophy evidenced to date. However, all of this must remain speculation until more details are released by the Soviets and until they make their next series of space flights.

One thing is certain: The Soviets are going to continue to expand their space program with multi-man flights, orbital rendezvous, and very large launch vehicles. The Moon may not be their immediate goal; a permanent manned orbiting space station may well be in the Soviet space planning instead, and this may be used as a departure point for the Moon and the planets which they are currently engaged in scouting successfully with unmanned spacecraft.

The Soviet Union has been aiming toward space flight longer and more consistently than the United States. It would be folly to believe that they would not continue the pace of their program regardless of what the United States does.

Scale Techniques for the Plastic Modeler

Continued from page 39

or long-range fuel tanks. Night fighters carried the conventional Mark II solid-nose armament of four cannon and four guns.

With the addition of slipper wing tanks, this type aircraft could be used as a long-range interceptor night fighter, with bomb loads on the night fighter the same as those used on the daytime counterparts. Mosquito Mark II's were used for bad-weather operations on bombing and reconnaissance missions as they operated most effectively in scattered cloud cover.

Specifications — Wingspan: 54′ 2″; Length: 40′ 4″; Maximum speed: 370 mph; Ceiling: 36,000 ft.; Maximum range: 1,705 mi.; En-

gine: Two 1,460 hp Rolls-Royce Merlin 21 or 23, 12-cylinder "V" liquid-cooled engines.

Armament: Four .303 machine guns—two to each wing, each firing 500 rounds and four 20-mm cannon which fired recessed in base of nose, 150 rounds each.

Color scheme: The Mark VI was camouflaged in dark green, with dark sea gray on the upper surfaces and medium sea gray on the lower surfaces.

Preliminary procedures: Check kit for broken or missing parts. Dunk parts in lukewarm water, then set aside to dry. After parts are dry, assemble fuselage parts, coating outer edges on both halves with Testor's liquid cement. (In case mention is omitted in any article, Testor's is used on all models.)

Assembly and painting: Accurately align fuselage halves and use rubber bands or short pieces of masking tape to keep fuselage under tension. While fuselage dries, cement wing halves together. Apply tape over leading and trailing edges of wing and add a few pieces on each wing tip.

While cement is setting up, small parts can be painted. Paint wheel centers light gray and tires flat black (add small amount of white to give rubber-tire-look). Paint both spinners light sea gray and propeller blades flat black. Landing gear is painted medium sea gray to which small amount of silver has been added. Strip canopy medium sea gray, interior apple green, rockets and machine guns semi-flat blue-black.

Now remove tape or rubber bands from wings and fuselage, and putty centerlines on top and bottom of fuselage and leading and trailing edges of wings. While putty is drying, assemble rest of plane: stabilizer, landing gear unit, etc. When putty on fuselage and wings is thoroughly dry, sand

smooth with #400 wet or dry, and cement fuselage and wing together. If wing doesn't fit snugly where it joins fuselage, add putty to fair in. After dry, use wet or dry to sand again to contour.

Spray entire plane medium sea gray, sanding lightly with wet or dry between coats. Apply a minimum of three coats of paint, allow to dry thoroughly and sand smooth between coats. The Badger Air-brush #200 was used throughout on model.

Camouflage layout: Profile Publication #52 is an excellent source for the Mosquito color scheme. The three-view color scheme can be used as your camouflage guide. After masking off the lower half, dark sea gray can be sprayed on upper surfaces (see color scheme). Two coats of dark sea gray should be sufficient.

Using soft lead pencil with sharp point, sketch in outline of camouflage pattern. Mask all sea gray areas and proceed to spray exposed parts dark green. An excellent material to use for the masking chore is the adhesive label stock manufactured by Avery, called Kum-Kleen, product No. S-6432.

A minimum of two coats of green are required; more may be applied if it looks as though the coverage is not complete. Remove tape after green paint is dried thoroughly and use wet or dry to smooth out gray and green junctures.

Cement wheels to landing gear and add canopy, propellers, and decals. The model is ready to be added to your "Museum."

AUTHOR'S NOTE: There is a correction in the text of the March article on the P-38, as follows: Correct the sentence "The following Groups of the Ninth U.S.A.A.F. flew the P-38's in the Pacific area . . . " to read: "The 8th, 49th, 347th and 475th Fighter Groups flew the P-38's in the Pacific area."

Getting Started in R/C

How Circuit Symbols Grow into Circuits: Eleventh in a Series

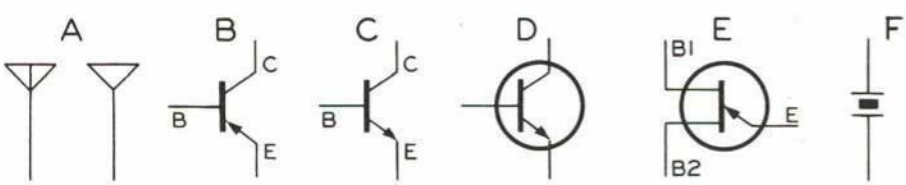
HOWARD MC ENTEE

WHEN we had completed Part 9 of this series, we had no intention of going any further with description of circuit symbols, what they mean, how they are used. But it seemed a shame to completely drop the subject when it came time to write Part 10, so that part went a bit more into the subject, even showing a simple diagram of a Simpro control system — and again we had intended to go on to other subjects. Well, more of the same follows below — but this will be the last of the matter.

This time we cover a few remaining common circuit symbols you will see quite frequently in this and other model magazines, then go on to a couple of circuits, to show how all the parts we have described tie together. At A herewith you see two symbols that indicate the antenna, either transmitter or receiver. There is no difference between the two we depict, but that at left is probably more common, and is the one we use in A.A.M. The symbol does not indicate how long the antenna should be; if length is important, it is simply given via a figure for inches or feet.

Transistors are in many circuits nowadays — we might even say, in most. The more common types are shown here. At B is the so-called PNP transistor, while the NPN is seen at C. We won't go into the internal differences, which have to do with the actual material of which the transistor is made, and the battery polarity. Suffice to say that many circuits require both types, and the only symbol difference is in the direction of the arrow on the emitter (or E) lead.

This is extremely important. The B on the lefthand lead stands for Base, the C on the upper right one for Collector. Often you'll see the "bare" transistor symbol with a circle around it, as in D. This circle has no meaning at all — it just dresses up the circuit and serves to set the transistor apart from all other circuit elements and the actual wiring. Note that the B, C and E are often omitted from the transistor symbols in circuits, but one who is hep to the symbols utilized will know which is which — and also if the transistor is PNP or NPN — at a glance.



At E we have a slightly different style of transistor, which is actually different internally from those in B and C, and which is often seen in pulser or tone modulator circuits. It is called the "unijunction" transistor. This one does not have a collector (C symbol), but there is an emitter, and two base leads, E, B1 and B2 respectively. Such transistors are especially useful as low frequency oscillators, hence their popularity in pulse and tone circuits.

All R/C transmitters and all super-heterodyne receivers (but not super-regenerative types) that we use today have a crystal — a little sealed tin can with two leads or prongs. The symbol is at F. Generally crystals aren't polarized — that is, you can connect the leads either of the two possible ways with no change in operation.

While there are lots more circuit symbols (there are dozens of special types of diodes and transistors, for example), we've presented the most common. Now let's look at a couple of typical circuits, to see how they are used. In illustration G we see a unijunction transistor, per E above. An odd fact with such transistors is that in many cases B1 and B2 can be switched, with little or no change in operation. But better connect them as indicated, where B1 and B2 *are* specified, as is the case here. Following along the circuit to the right (circuits are *usually* drawn in a logical sequence,

with the parts that initiate action at left, and parts that act later strung out to the right—though this is not always observed), the 2N2160 pulse oscillator feeds into the transistor to its right, via a diode.

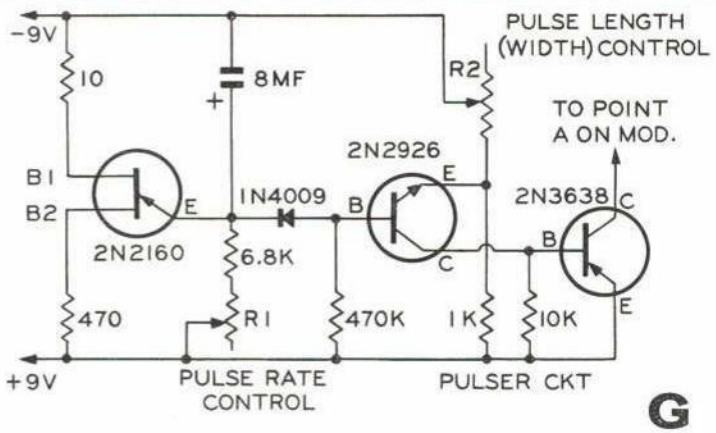
Connected to the two are the resistors that feed current to the various elements, and the variable resistors that change operation to give the required shift in pulse rate and length. The 2N3638 at the right-hand end of the circuit is an amplifier, which also isolates the pulser components from further circuitry in the transmitter which might cause unwanted pulse variations. Often a circuit designer will place actual values on most of the components, as is the case here, but a few are designated by a specific R or C number — R1 and R2 in this case.

This means that there might be something special about these parts which is further explained in the text, as is the case here. For ease in referring to transistors, they are often given "Q" numbers in a circuit; the 2N2160 would be Q1, the 2N2926 would be Q2 and so on. "Q" has no special meaning; it's just a designation generally meaning transistor — the same as V stands for any vacuum tube, in a circuit utilizing these components.

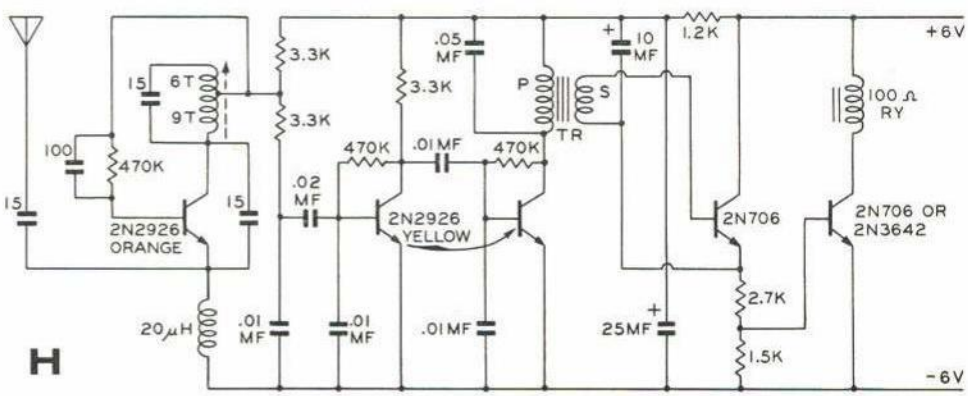
Tube sockets are seldom indicated in a circuit, the leads going right to the tube elements. The same is true of transistor sockets. Actually, the vast majority of transistors are used without sockets, which is not true of tubes (except for the subminiature types).

For a more complex circuit we see strung together (H) a collection of the circuit elements we have covered in the past three issues of this series. And again, the action starts at the far left, with an antenna to

Continued on page 65



G



H

Wonderful Ryan S-C

Continued from page 25

John Fornasero did the initial flight test work. He was also chief test pilot for Ryan on the ST series.

The S-C was originally designed to employ the complete line of Menasco inline aircooled engines, ranging from the 95-hp B-4, 125-hp C-4 and the 150-hp C-4S as optional customer choice. The prototype had the C-4S installed and proved most adaptable from the standpoint of operational costs versus performance compromise. Trials continued throughout the summer with the little aircraft turning in an ideal and enviable performance. The recorded facts and figures along with its sleek appearance made headlines in all the leading aviation journals. By late summer the S-C had received its ATC (No. 651) and the NX 17372 license was changed to NC.

As fall approached, the S-C was put into service at the Ryan School of Aeronautics in San Diego. Here it served as a primary trainer, being used for indoctrination into the "first feel of flight." Several months later a re-evaluation of the S-C was undertaken. A review of upkeep costs, flight hours, maintenance problems, and what bearing these would have on the owner of such a plane, was made. The original S-C was brought back to the factory, the Menasco engine removed and a seven-cylinder Warner 145-hp radial installed. This change was dictated purely by engine studies and considerations by engineers.

With the Warner engine, fuel consumption was only slightly less than with the Menasco but it proved more reliable, rugged, easier to maintain and cost less per unit to install. With the radial engine as power, the entire series of tests had to

be carried out again and the only change found necessary was an added wing-to-fuselage fairing. This was done in order to retain spin characteristics for the airplane to be CAA certified. John Fornasero once again did the early flight work, but most of the later wringing out was done by Paul Wilcox, who succeeded Fornasero.

The prototype now sported the S-CW designation and in October 1937 became NC 17372 all over again under ATC 658. Production tooling got underway immediately and material was procured for an initial lot of 25 aircraft with deliveries to start in the spring of 1938.

S-C production was just underway when Claude Ryan announced a new contract for aircraft parts, putting the company in the position of having over $300,000 backlog of work. Within a few months of this, Ryan received overwhelming orders for the STM, military version of the ST trainer. These orders came in from the U.S. as well as many foreign governments. Only 12 S-CWs were built before production had to be stopped in order to keep up with the more pressing military schedules. It was hoped the S-C could be brought back but, when war broke out, any possibilities of resuming commercial production was forgotten for the duration.

Initial retail price for the standard S-C was $6,885 but with extra equipment, which most customers chose to have installed, the cost was around $7,500. No Menasco or inline powered S-Cs were delivered to customers. Only the NX prototype employed this engine for only a few months.

The Ryan S-C had a top speed of about 140 mph at 5,000 ft. and a cruising speed of 125 mph. Landing speed was 45 mph. The metal perforated landing flap, situated between the landing gears, attached at the main spar line and manually controlled

by a lever in the cockpit, was effective in giving good glide control during approach but had little effect upon the plane's speed. It in no way changed the stability nor was there any correction necessary when it was extended. It also provided a slight assist in short takeoff runs. The sliding cockpit canopy could be adjusted in flight through intermediate positions between closed to fully open. No buffeting occurred and there was no change in trim necessary.

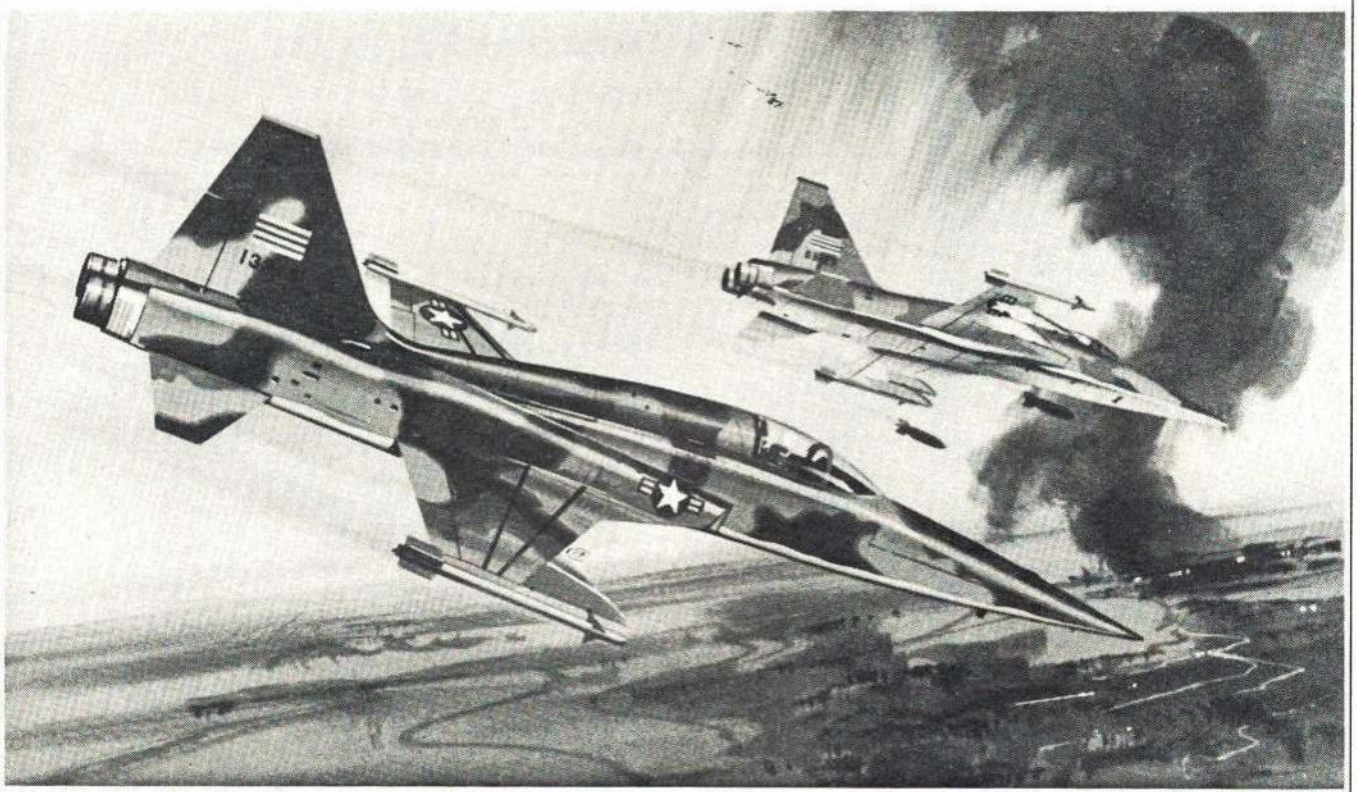
Because of their similarity in planview, with long tapered wings, fixed spatted undercarriage and general silhouette, several Ryan S-Cs were used in war movies to represent early Japanese Nakajima fighters. Many S-Cs played their own war-time role in the hands of the C.A.P. and one has been unofficially credited with spotting and sinking or disabling of a German U-Boat off the Atlantic coast in 1942. Of the 12 S-C's built, one was sold to Brazil and one was flown to a customer in Mexico City. The other ten were initially purchased by customers in the U. S.

Considerable analysis was made after the war as to the economics of resuming production of the S-C model. Two versions were to be offered, the standard S-C145W and an improved S-C165W model with the Warner 165-hp Super Scarab engine. However, when the opportunity arose to purchase the rights for the North American Navion, the S-C was abandoned. The S-C had a comparatively short production life but its appearance in the late 1930's will long be remembered as just about one of the classiest private planes to ever flex its wings in flight.

(The author wishes to express his sincere appreciation to Mr. William Wagner, Vice-President, Public Relations, Ryan Aeronautical Company for his valuable time and assistance with this article.)

THE NORTHROP F-5A

"FREEDOM FIGHTER!"



NOW AVAILABLE FROM AMT, IN 1/72nd SCALE!

An authentically detailed model of the famous fighter now in combat in Vietnam. AMT's exciting new kit includes such features as: choice of USAF or South Vietnamese Air Force markings; camoflage paint guide; highly detailed pilot's figure; complete selection of armament including machine guns, bombs, Bullpup and Sidewinder missiles. Nicknamed the "Skoshi Tiger" because of its small size, AMT's 1/72nd scale model of the F-5A is an exciting new kit you won't want to miss!

THE EXCITING KITS ARE FROM amt®

On The Coast

Continued from page 41

A very deserving second place went to Bill Hollenbach from San Antonio, Tex., flying a fantastic Hawker Hunter jet. The Enya 60 in the nose was almost completely cowled in. You just couldn't believe how realistic the ship looked in the air and on the ground.

A special R/C glider event was held during the lunch hour each day. Six contestants entered. Event #1 consisted of a procedure pattern, one optional maneuver and a spot landing. Event #2 was a duration with an eight-minute max. The models were launched via a winch tow or by auxiliary power. Timing started after the release, or after a maximum of three minutes engine run.

Event #1 seemed to work out quite well. The launching method did not matter. Maneuvers were done during the glide down. Spot landings with a high degree of accuracy seemed common. Bill Roseberry from Phoenix was the winner, flying a Cox 09/Jetco Imperial.

Event #2 also proved a workable event. Contest director, Bill Roseberry, made the comment that we can't equate engine assist with winching aloft from the results of this meet. Here, it didn't seem to make too much difference either as to what type of launch was used.

The winch worked very well. It was fabricated from a 12-volt starter motor, driving a large drum capable of holding about 1,000 ft. of heavy nylon cord. A small nylon guide in front of the drum was utilized. A remote pushbutton switch on a foot cable actuated the solenoid that turned on the power to the motor. A switch was provided to allow the motor to run on six volts for towing up smaller gliders or for use in strong winds. A reel-in speed of 30 mph was claimed.

The contest was the best Phoenix meet yet. The evening sporting events were typically R/C. Phil Kraft's performance with George Sing's Ugly Stick at 10:30 pm in the motel parking lot was, shall we say, very interesting. A lot of us really thought he could do it!

San Francisco Vultures Glider Meet

The Vultures Club hosted their first annual slope soaring contest March 3. The meet was sponsored by the Pacifica Moose Lodge #1944. The contest side was on the north side of Linda Mar on a hill overlooking the Pacific Ocean.

FLY SAFELY
Avoid power lines

Three events held were: spot landing, touch-and-go, and limbo. The spot landing was determined by the closest landing to a designated spot measured from the extreme nose of the model after it came to rest. The touch-and-go was determined when the model struck the ground or short grass. You had to hear the model touch something (people not counted). The limbo consisted of flying the glider under a streamer stretched between two 15-ft. poles. All flights were limited to ten minutes with no relaunches.

Weather was marginal due to low velocity winds. Ridge lift was not constant. At times the gliders were 50 ft. high and then, suddenly, were just able to maintain lift, or had to land.

In spite of the poor weather, winners were obtained in the three events. Bob Anderson from Concord, Calif. placed first in the limbo, first in spot landing, and second in touch-and-goes. He flew a lightweight original design, Ridge Hawk. This ship was a combination effort with Bob and Gene Downey. Gene flew it. Gene didn't fair too well because of a mid-air with another glider. Bob Forrette, Santa Clara, Calif. placed first in touch-in-goes.

If the weather was better there would have been a much higher level of competition. We have had three glider meets so far in the Northern California area in the last few months and each time the weather has been very poor.

The three events are excellent for a glider meet. No special designs are required. I would say that duration events at a slope soaring meet are not recommended. How long one stays up off a ridge is not a satisfactory method of selecting a winner. Flat-land flying, as at the Phoenix contest, almost requires a duration event.

600 sq. In. Continental plyon racers

NMPRA will try to encourage this activity. Two main reasons for this event are speed reduction and easier-to-fly designs.

The large wing will limit the speed. In the long run we should be turning in times of 2:30 or so. This speed range will keep the pilot skill down to a reasonable level so that more flyers can successfully fly the event. The large wing will also make landings easier, prolonging the life of the model. The 600 sq. in. ships will settle in like a conventional multi job. Visibility is better too. The added wing area really shows up during a turn at the far pylon.

If you are interested in building a Continental racer, I would suggest Maxey Hester's Midget Mustang, Aug. 1967 issue of this magazine. I have flown against it in competition. It is stable and easy to fly. Construction is simple.

Getting Started in R/C

Continued from page 59

pick up a signal, followed by the orange 2N2926 (due to wide variations in characteristics, some transistors are not only marked with a nominal type designation, but are color-coded by actual test after manufacture, to tie individual characteristics down more tightly, as is the case here). We see several different styles of coils — more elegantly referred to as "inductances." One appears above the orange transistor, and those who read Part 9 carefully will realize that the dotted line vertically alongside the coil means it has a powdered iron core, and the arrow on this line indicates it is adjustable. This is where you tune the receiver to the desired incoming signal.

Two amplifier transistors come next (the "yellow" units) with the signal then going through a transformer (TR) and on to two more transistors. The last one to the right

feeds power to the "load" — in this case a relay of 100 ohms winding resistance. And again, resistors lead to various transistor elements, as required for their particular performances. Since this is a radio frequency circuit, and also has audio frequencies at various points, several circuit parts have capacitors running to ground, in this case the battery minus lead.

As the reader will see from the last three parts, circuits aren't really so fearsome. You don't have to know how each part operates (though it's helpful) to get a general idea of how the parts are connected. And a little general info, as we have given in the last three parts of this series, can be most useful to the average R/Cer, who really couldn't care less what goes in inside his equipment.

We would like to suggest that readers of this material write us with suggestions for future parts, criticisms, comments, etc. This whole series was really launched on the basis of a few letters from beginning R/Cers. We hope to keep the contents at a level which will really aid such R/Cers.

The Compromise

Continued from page 27

so to complete the entire top section.

The engine mount is drawn for an Enya 60 but, of course, any engine will do from a 45 to 61. Make your mounts accordingly. The lower block is hollowed-out balsa.

The wing is foam but it could be built of wood, if desired. I have found that the negative rake of the tips grooves the airplane in flight. It also eliminates yaw tendencies at low speed, which many a low-wing airplane exhibits in the landing approach. The rake in the stabilizer matches that in the wing. I ran several tests on wings with, and without, the rake. There is a definite advantage to using the negative rake at the tips.

The main landing gear is somewhat unorthodox, since it is mounted in the wing rather than attached to the fuselage, as is the usual practice on other than low-wing airplanes. The ground stability of this gear is far superior to the fuselage-mounted gear. The ship practically will take off from a plowed field. Some contest sites I have seen are almost that bad. I have used this type of main gear on several airplanes. Once you have ever tried this gear, I'm sure you would never go back to the fuselage mounted type.

You will notice that the aileron servo is mounted to the top of the wing, as in a low wing. Since the lower half of the fuselage is shallow, there is not room to mount the servo on the bottom of the wing; also it's easy to make adjustments to the servo and ailerons, simply by removing the center hatch, held in place by one screw. You don't have to remove the wing from the fuselage to make adjustments.

The stabilizer also is foam but it, too, may be built of balsa. The elevator is one piece. The chances of warping are less than with a split-type elevator. Fin and rudder are of balsa. Use hard balsa on the rudder to discourage warping.

You will enjoy the first flights of your Compromise. Its smoothness and ease of handling are exceptional. It does both AMA and FAI patterns easily.

(Editor's Note: Under the rules the old class designations are gone. It is now Class A, B, and C. Any airplanes may be used in any class, but the flyer is required to execute maneuvers called for in the particular class. Bud's article was written before the rules changes and appropriate alterations were made in his copy to references to Class II or Class III.)

AMA Contest Calendar

Continued from page 46

Clifton Springs, N. Y. 14432. Sponsor: Sky Rovers RC Finger Lakes.

July 14 — Rostraver Township, Pa. (AA) 1st Annual Mon-Valley RC Meet. Site: Cedar Creek, County Park. J. Parrinello CD, 1928 Carson St., Pittsburgh, Pa. 15203.

July 14 — Westminster, Md. (AA) Westminster CL Meet. Site: Shopping Center. R. Pease CD, 65 E. Main St., Westminster, Md. 21157. Sponsor: Westminster Aero Modelers.

July 20-21 — Dickerson, Md. (AAA) D. C. Maxecuters FF Championships & Record Trials. Site: Whites Ferry. G. Buck CD, 4215 Howard Rd., Beltsville, Md. 20705. Sponsor: D. C. Maxecuters.

July 20-21 — Chicago, Ill. (AA) 2nd Annual SAC RC Meet. Site: Crawford Ave. & Vollmer Rd. S. Peterson CD, 6416 S. LaPorte, Chicago, Ill. 60638. Sponsor: Suburban Aeroclub of Chicago.

July 20-21 — Houston, Tex. Southwest RC Pylon Championships. Site: Bissonett at Roark Rds. C. Hirsch CD, 412 W. 30th, Houston, Tex. 77018.

July 20-21 — Oklahoma City, Okla. (AAA) Sooner State Model Championships for FF & CL. Site: Memorial Rd. & N. Western. F. Miller CD, 1900 Rolling Ridge, Bethany, Okla. 73008.

July 21 — Lima, Ohio (AA) Lima Prop Busters 1st Annual CL Meet. Site: Lima Airport on Baty Rd. R. Loescher CD, 535½ N. Elizabeth, Lima, Ohio 45801. Sponsor: Prop Busters.

July 21 — St. Louis, Mo. (AA) Hot Heads Model Aircraft CL Contest. Site: Buder Park. A. Biehl CD, 2195 Bienville, Florissant, Mo. 63031. Sponsor: Hot Heads MAC.

July 28 — Grand Ledge, Mich. (AAA) 5th Annual Flying Aces International FF & CL Contest. Site: Airport. C. Spencer CD, 236 Theo St., Lansing, Mich. 48917. Sponsor: Lansing Flying Aces.

July 28 — Fresno, Calif. (A) Fresno Monthly FF Meet. Site: Near Kerman. F. Gallo CD, 1725 Kenmore Dr. W., Fresno, Calif. 93702. Sponsor: Fresno Gas Model Club.

July 29-31 — Denver, Colo. (AAA) 2nd Annual Old Timers Championships for FF. Spec. Events. Site: East Colfax Air Park. H. Elmore CD, 1326 Geneva St., Aurora, Colo. 80010. Sponsor: Model Museum Flying Club.

Aug. 3-4 — West Point, Va. (AA) RARC 8th Annual RC Meet. Site: Airport. F. Gregg CD, 12709 Richmond St., Chester, Va. 23831. Sponsor: Richmond Area RC.

Aug. 3-4 — Tahlequah, Okla. (AA) TORKS 8th American RC Annual Meet. Site: Municipal Airport. C. Brownlee CD, 3033 Rolling Stone, Oklahoma City, Okla. 73120.

A.M. Reviews

Continued from page 9

The New Tigers, by Herbert Molly Mason Jr., 241 pgs., $6.95. By David McKay Company, Inc. 750 Third Ave., New York, N. Y.

THE author takes the reader through the most demanding pilot-training program to show how a new breed of pilot is prepared for the needs of today's supersonic combat. The need for pilots is apparent in Vietnam.

Their training is described. Young men just graduated from college are carefully selected and put through a rigorous curriculum lasting 53 weeks. Highly sophisticated techniques and gruelling activities are combined, and only the best are capable of graduating to further training as fighter-bomber pilots. The author, a veteran flyer and aeronautical writer, sat in on this training — in the cockpit, the classroom and the barracks — to describe the daily life of these undergraduate pilots.

The PA-6

Continued from page 22

First determine if the engine runs exactly the same speed in both directions. If the outsides are faster than the insides, or inverted flight is faster than right side up, the tank is high and the engine must be raised with washers. Next establish the engine setting that gives 55 mph on a Rev-Up 10-4 prop.

Steam the wing until line tension is exactly the same right side up as inverted. **Do not** adjust this tension by bending the flaps. If the ship loses tension on insides but not outsides, then there is more tension inverted and the wing should be steamed accordingly. If tension is lost equally in both directions on loops, try additional tip weight and if that doesn't help, put in additional line sweep. Play with tip weight and line rake until the ship does not yaw on a sharp corner. The actual rake angle agrees very closely with the theoretical calculations of William Netzeband as published in the Sept./Oct. 1966 issue of American Aircraft Modeler.

I think you will find this ship equal to the competition, and also a pleasure for everyday flying.

Countdown

Continued from page 38

out hard currency. There are also some USA restrictions regarding trade with the CSSR.

In any case, the ADAST engines are no different from the USA engines now. They are 18mm x 70mm, exactly the same size as ours. They have almost identical performance. The thrust-time curves match almost exactly. The USA engines are cheaper and are available in wider varieties. I'm just saying that you shouldn't cry about not being able to get the ADAST engines. The ADAST factory is having a ball just keeping up with the Czech demand. And American manufacturers seem to be having the same problem.

DISTANCE-IN-A-STRAIGHT-LINE RECORD?

I am informed by Otaker Saffek of Prague that my FAI Parachute Duration model, last seen heading northwest from Dubnica nad Vahom, Czechoslovakia during the First International Model Rocket Competition in May 1966, was returned to the ADAST factory nearby by a Czech forest ranger. The unharmed model with

Phantom

COMPLETE KIT CONTAINS

- Beautiful fiberglass fuselage completely prefinished, needs no painting. Includes vertical fin.
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Disassembled fuselage—2 halves plus mount, **$29.95**
Assembled fuselage—nose gear mount and canopy, **$44.95**
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Specifications:

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Wing Span 66"
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Engines from 45 to 60
Fuselage features side mounted engine

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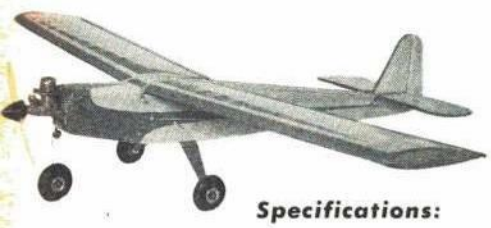


$24.95

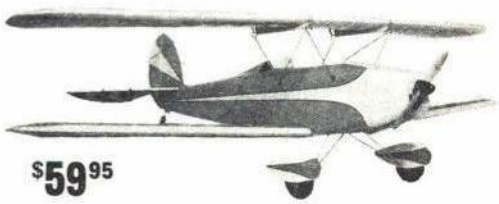
Specifications:

- 67" Wing Span—Semi Symmetrical
- 704 Sq. In. Wing Area
- 5-lbs. Flying Weight

78" Great Lakes

Specifications:

- 78" Wing Span
- 1775 Sq. In. Wing Area
- 16-oz. Wing Loading
- 60 Engine Recommended
- Radio: Multi-Reed or Proportional
- 12-lbs. Total Flying Weight W/Radic



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1946 Taylorcraft ¼ Size Kit

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Victour

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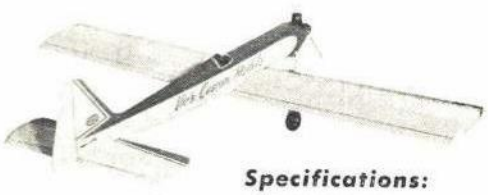

Specifications:

- 9-ft. Wing Span
- 1755 Sq. In. Wing Area
- 16-oz. Wing Loading
- 60 Engine Recommended
- Radio: Multi-Reed or Proportional
- 12-lbs. Total Flying Weight W/Radio

Specifications:

- 67" Wing Span
- 770 Sq. In. Wing Area
- 52" Fuselage
- 29-60 Engine
- 6-lbs. Total Flying Weight W/Radio

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its 18" plastic parachute is in the ADAST factory museum.

It was recovered 27 kilometers from the launch site.

SPEAKING OF RECORDS. . .

It's high time that we in the USA shook a leg and established the first international FAI records. Nobody has yet filed for an international model rocketry record with the FAI in Paris. Since model rocketry started in the USA, it's only fitting that the USA hold the first record in each category.

The FAI model rocket records that can be established are as follows: Class 1 Altitude, Class 2 Altitude, Class 3 Altitude, and Class 4 Altitude; Single Payload, Dual Payload, and Open Payload; Parachute Duration; Swift B/G Duration, Hawk B/G Duration, Eagle B/G Duration, and Condor B/G Duration.

All FAI rules for record purposes are identical to the 1967 Edition of the U.S. Model Rocket Sporting Code with the exception of Parachute Duration, which, under FAI rules, is flown in a single category with a maximum total impulse of 10.00 N-sec and a single-staged model.

Procedures for establishing an FAI record are identical to those required to establish a USA national record, and it's all set forth in the 1967 NAR "pink book."

To establish a record, you must fly your model in a sanctioned NAR meet with NAR-certified model rocket engines. The NAR has a special type of sanctioned meet called Record Trials, a classification solely for the purposes of establishing records.

You don't have to be a member of a club to get a sanctioned record trial. An NAR Senior Member must apply for the sanction of the record trials on the standard sanctions application form available from the NAR Contest Board. There is a small sanction fee payable to cover costs, etc. Having once obtained the sanction, gather together sufficient NAR Senior Members or Leaders Members to satisfy the requirements of the NAR "pink book," and you're in business.

To my knowledge, the **only** record trials sanctioned thus far were held by my club, the YMCA Space Pioneers, last year when we decided to go after some records before the pink book changed. I beg to report that we had a veritibobble ball that afternoon. You can try as many times as you wish to set a record, and we had scads of flights. It was also a lot of fun because there was not the pressure of competition.

Once we have established some FAI records for the USA, a lot of nations will be out to take them away from us because they will have a mark to shoot for. So don't turn in a Parachute Duration rec-

ord attempt of 45 seconds! And if you can't break two minutes in B/G, forget it, because Otakar Saffek of Czechoslovakia once turned in a 25 minute B/G flight—before the FAI rules were official, therefore he could not file for an FAI record.

Model Rocketeer

Continued from page 48

The U. S. has been invited to compete in a World Championship Meet in Yugoslavia in 1969. Details will be announced at a later date.

Members attending the meetings were, President Beetch, and trustees Atwood, Barrowman, Butterworth, Belkewitch, Kirchner, Kukowski, Worth, Stine, Thompson and Rich.

NEW EDITOR

Larry Loos, USAF, Ent Air Force Base, will assume editorship of The Model Rocketeer beginning with the next issue. Larry served as Assistant Public Affairs Chief at NARAM-9. He is well qualified to handle the chore since he is a Public Information Specialist at the Colorado Air Force installation. Larry was responsible for the establishment of a model rocket program among USAF personnel and their dependents in Europe.

He replaces "Casey" Kukowski, NAR Public Affairs Trustee. (I'm going to start building models for a change and be nice to my wife). **JK.**

National Model Rocket Championship Meet
NASA Wallops Station, Va.
August 19-23, 1968

Radio Control World

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Red notes that U. S. modelers should receive recognition for their efforts made under AMA rules. Furthermore, he opines that such activity might lead modelers on to trying to break some of the FAI record marks. In the R/C line, he suggests Duration with a limited amount of fuel; Closed Course Distance; Speed and Altitude events with small engines in large planes. There are many other possibilities. Proposals are starting to come in and we'll report later on those that sound the most interesting.

AMA R/C Glider Rules: Tentative rules for AMA R/C Glider competition have been offered by a Committee headed by Dale Willoughby. Two glider classes are proposed: Standard, up to 100" wing span; Open, over 100" span. Wing loading must be between 5 and 15 oz. per 100 sq. in. of wing area (this **includes** stabilizer area, and the area of wing over or through the fuselage). For powered gliders, maximum of .02 cu. in. engine displacement per 100 sq. in. area (calculated as above). Maximum of 180 sec. engine run, from moment of release on launch. Launching allowed by various methods depending upon terrain (ROG specified for powered gliders, unless terrain prohibits).

The rules also include basic suggestions for various glider events, maneuvers to be performed in stunt flights, a glider Pylon race course and so on. These rules give a good outline for those who wish to plan glider meets, and results will be studied to determine if there is enough interest to include official AMA R/C Glider rules in the 1969 AMA rules book.

L.I.D.S. Ninth Annual R/C Contest: Members of the Long Island Drone Society are making their annual, AMA sanctioned, meet a "fly for fun" affair. Date is June 23, 1968; location is Mitchell Field, East Meadow, L. I., N. Y. Events — scale, open and scale pylon balloon bust, bomb drop, etc. Prizes range from trophies to model aircraft gear and cash. Query: Dick Saggese, 10 Hunter St., Hicksville, L. I., N. Y. 11801.

NEW IN R/C

Distribution of **More-Craft "Goodies"** will henceforth take place from **Ace Radio Control (Box 301, Higginsville, Mo. 64037).** **More-Craft** line will be expanded, is available nationally from many hobby shops — or order by mail from Higginsville.

Longer life alkaline type dry cells, **Mallory Battery Co. (Tarrytown, N. Y.).** Alkaline style flashlight cells give considerably longer life under fairly high

drains than the standard cells. **Mallory Mn-2400** cell (size AAA — the "slim" pencell) will put 100 ma through a resistive load for about ½ hour, to an end-point of 1.1V; the new **HRA-2400** doesn't drop to 1.1V until almost 2 hours! Both cells supply power for much longer periods, but when you get to 1.1V under load, it's time to replace battery. New cells to be available in standard flashlight sizes. Prices not known yet.

Tiny, light, **two-position motor-driven servo** for throttle, **Polks Hobbies (New York, N. Y.)**; weighs only 1¼ oz., costs $7.50, triggered by rudder escapement or single-channel servo. Matching rudder servo will be available. Aristo-Kavan long **Super K-Links** (10" overall), 59c each. **Flexi-Trol** another Aristo-Kavan unit with Super-K-Link at one end; consists of 38" long plastic tubing about ⅛" OD, inside which slides a stiff smaller tube with link cemented to one end. Can be bent to reasonable curves without binding; $1.29 each.

Scarplane hi-start kits, Ray Smith (811 Brantford Ave., Silver Spring, Md. 20904). Standard kit includes a single 600' length of 125-lb.-test braided nylon cable, on spool reel allows winding full length in about 2 minutes. Also, two lengths of exerciser cord, one each of 40' and 80'. Connectors attached to all pieces, simply snap together. The 120' of rubber cord in kit capable of launching 4½ lb. glider to 700' altitude in 5 mph wind. The 40' cord alone is fine for launching same glider from slope. Added 40' and 80' lengths $4.25 and $8 respectively. For large and heavy gliders, heavier cord, at 100' for $21. Exerciser cord has woven outer jacket for protection from abrasion and sunlight, and to prevent over-extension.

Several digital propo systems by **Cannon Electronics Inc. (13400-26 Saticoy St., North Hollywood, Calif. 91605).** **Mini-3** system includes three fully propo channels, with plane equipment weight of 14 oz., $225 with charger, all wiring harness and nickel-cad batteries. **Mini-5** system utilizes same components but transmitter has two control sticks; all components, four servos, $295. **Mini-3** can be converted to **Mini-5** at factory for $70, including one added servo. Standard 5-control system (17 oz. airborne weight), $295. Transmitters have precision enclosed control sticks, built-in charger; 5-channel unit has panel meter; RF output is .8 W. Servos are capacitor feedback style, both push-pull and rotary output. Kit for standard 5-control system, $199.95.

Kit for scale-like **Morane Saulnier and Fokker Eindecker WWI monoplanes, by Major Model & Manufacturing (Box 74, Smithtown, N. Y. 11787).** Both have 53" span, 550 sq. in. area, .19-.45 engines. Precut balsa parts, formed wire parts, hardware, decals, paper for wings (fabric included for Saulnier fuselage). Either kit, $22.95 PP. For Galloping Ghost, reeds or 3-channel propo.

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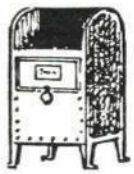

YOU said it!

Continued from page 11

interested because of price or work involved.

I found getting into R/C easier because of previous experience in modeling. I was helped along immensely by my father and the R/C club in our town. Their encouragement to continue the hobby also helped.

By the way, I wouldn't suggest R/C to any junior, unless he had an interested relative; in my case, my father. If he hadn't bought the radio gear, I wouldn't be in this hobby now. Money also helps. I spent $60 on my last model, a Senior Falcon.

By the way, I am 14.

Bill Black, Beaumont, Tex.

Take a bow, Dave Thornburg

Last year, you published "The Zephyr" by Dave Thornburg. Our club, "Blue Mountain Buzz Bombs," would like to contact Mr. Thornburg to obtain further information. Would it be possible to obtain his mailing address?

I was so impressed with this article, that I purchased the plans and built an R/C glider. I believe this to be the ideal way to get the younger members started in R/C. Yes, I have a multi outfit, but I still feel that there is nothing so graceful or beautiful as a glider hunting a thermal.

Larry Shank, Harrisburg, Pa.

Any reader may address a letter to an author in care of American Aircraft Modeler. We will be happy to forward.

Ed.

Un-United Nations

Purchased a huge model glider kit called the "Baron." Apparently, this kit is from Germany. Very fine wood, excellent plans, and quite simple to put together. But I had to spend quite a little time with a German friend to learn the metric system and to help decipher the German. There are English instructions, but in the translation, something is lost. It says: "Block up the bottom from point 'O' 3 MM. Then at point 7, block up 9 MM etc." The fun came when I started to ask "What the heck is a millimeter, and how much is that in inches?" I have the fuselage assembled and I still don't know exactly how much a millimeter is. I just put a ruler on the plan and tried to get as close as I could in 64ths of an inch. Hope we don't run into language problems on the first flight because with a German plane, Japanese controls, American transmitter, Italian engine, and a dumb Polack at the controls, there could be trouble. . . .

Tony Michael, Bryant, Wis.

From the land of the Incas

I have been trying to send a bank draft to you before now to renew my subscription, however with the economical crisis in Peru it has been impossible to exchange U. S. dollars until recently.

I know how busy you are and how many thousands of subscriptions you have to deal with. However, could I please beg of you to continue the present subscription where the old one expired, so that I won't miss any issues of your wonderful magazine that helps us "out of the way" people so much with our hobby.

Manuel Suarez O., Peru, S. A.

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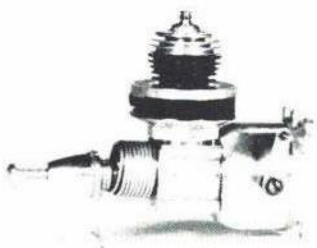

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With throttle and muffler $12.95

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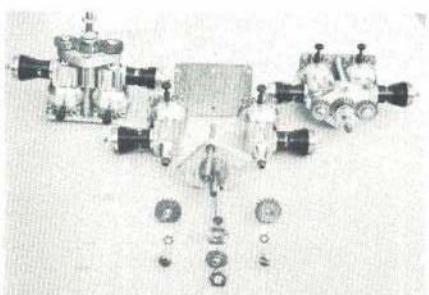

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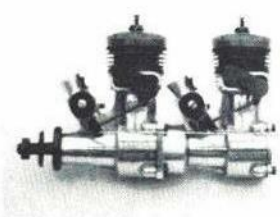

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- Your dealer can now show you this advanced design engine that will deliver all the performance designed into your airplane and R/C system. . . Be First with the WEBRA .61 TV —$59.50. Also, a marine version of this engine—$67.50. Muffler—$6.95. Throttle Valve—$14.95.

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