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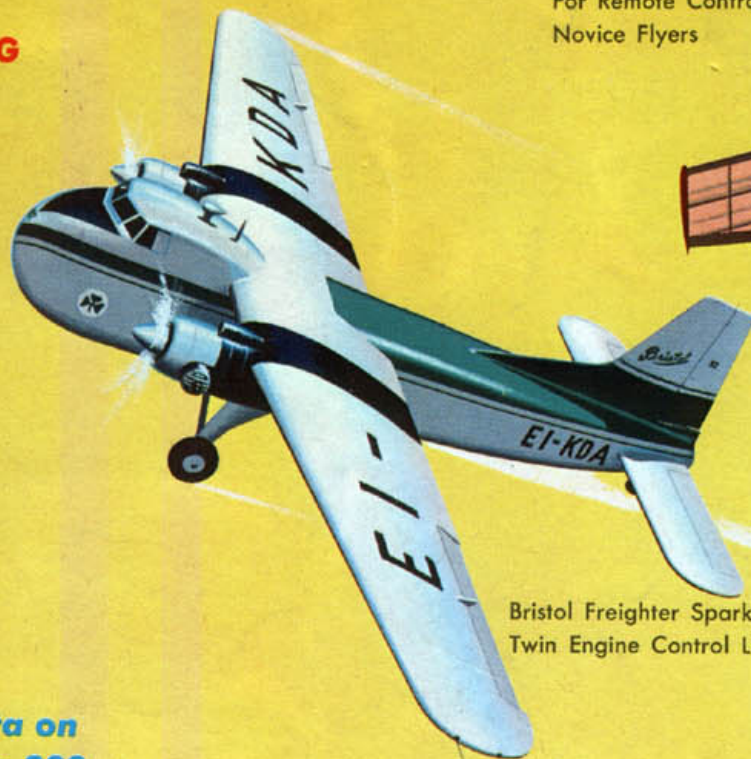
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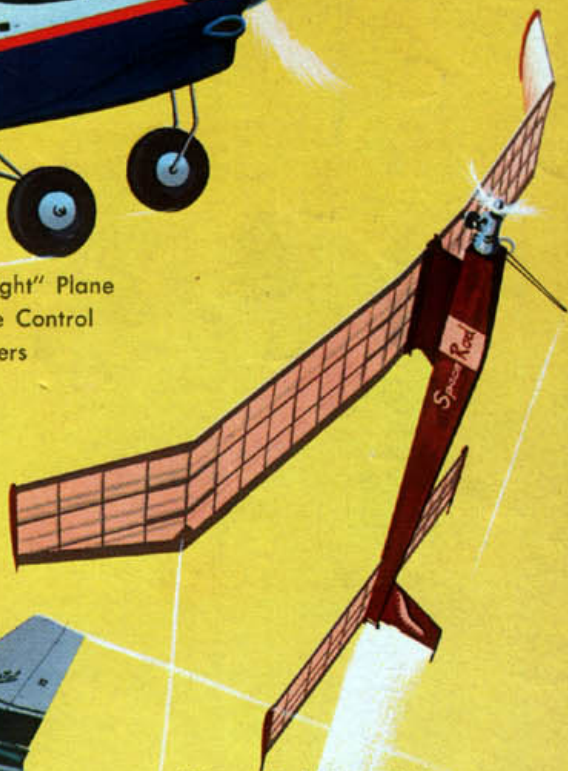


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ROCKET CHAMPIONSHIPS



■ The AMA has its annual "Nats" that draws over a thousand contestants and which has been going on for years. Another small but growing group of hobbyists has also been holding a national meet for two years running, and they are just as proud of it, work just as hard for it, and have just as much fun at it as the model aviators.

At this other national meet, model airplanes aren't flown. Instead, the sky is filled with model rockets, because the contest is the Annual Model Rocket Championships, sponsored by the National Association of Rocketry.

In 1959, the NAR held its first national meet, which they call the "NARAM"—standing for NAR Annual Meet—near Denver, Colorado. Some 21 contestants turned out (more, it is claimed, than were at the first AMA Nats). There were gripes at the judges, lost models, models that failed to fly, terrific performances, and a general good time.

This year, the NAR did it again. The Second Annual Model Rocket Championships, NARAM-2, was flown off in the four-day period of 18-21 August 1960 on the Peak City Rocket Range near Colorado Springs, Colo. Here, in the shadow of 14,000-foot Pikes Peak and next door to the USAF Academy, 27 contestants battled it out with model rockets.

By actual count, 304 model rocket flights were made in that four-day gaggle. The mayor of Colorado Springs, William C. Henderson, presided at the opening ceremonies of the contest and fired the first model. After that, the boys went at one another, guided by the strict NAR rules and supervised by adult NAR officials.

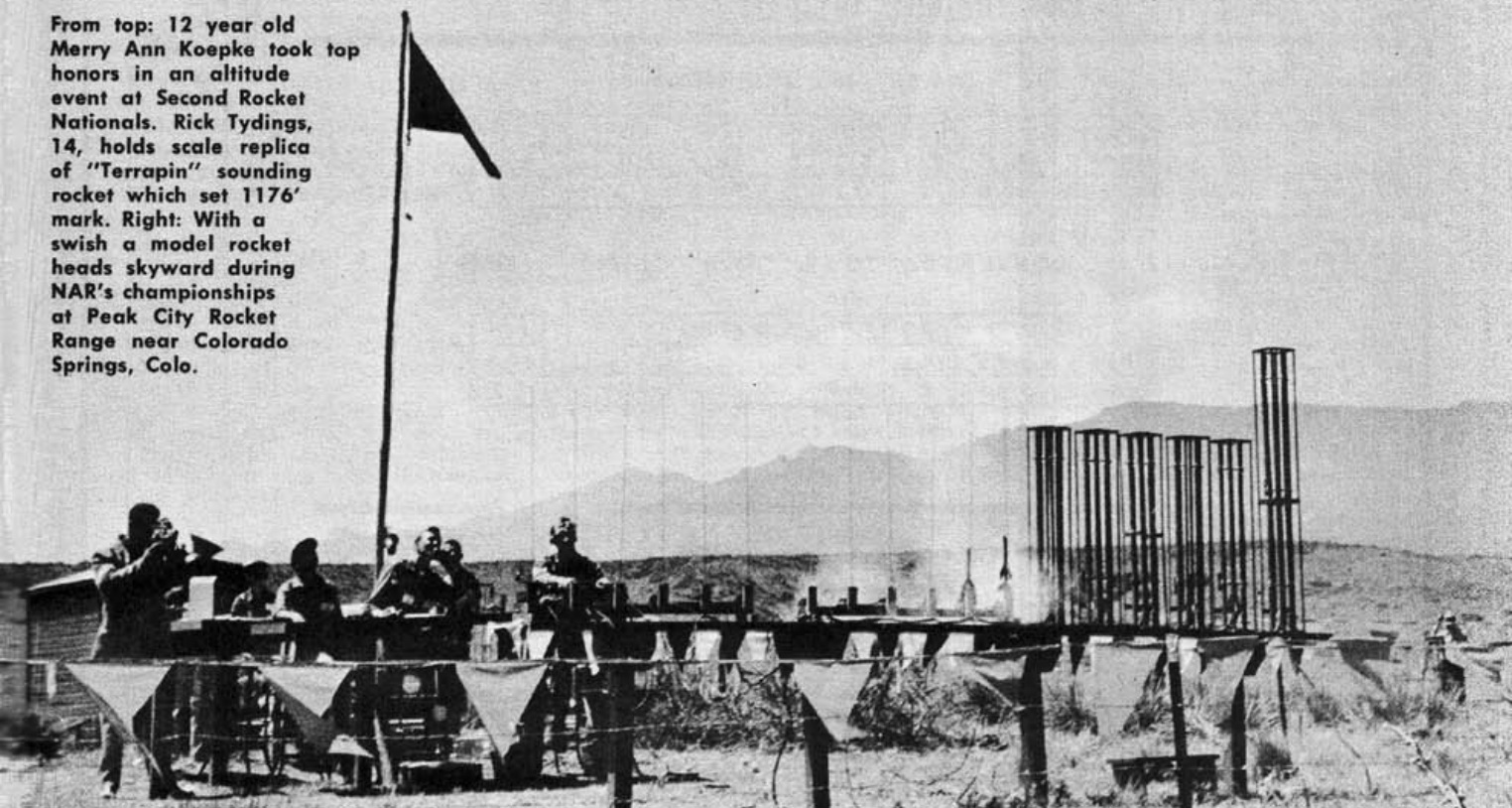
A visitor to the Peak City Rocket Range would have been mightily impressed by the goings-on. People were running around with various model rockets in hand. Somebody was continually counting backwards over the loudspeakers. Little models were streaking up into the blue Colorado sky with incredible speed. Judges were being tough as usual about the safety rules, but contestants were grinning at one another and nodding happily.

Five events were flown each day. On the first day, two national records were smashed. Glen Davis put his Class A Payload bird, *NORCAN-A*, 341 feet up, beating the old record by more than 100 feet. Under NAR rules, a payload consists of a cylinder of lead $\frac{3}{8}$ " in diameter, $\frac{3}{8}$ " long, and weighing exactly one ounce. The object is to use a commercial model rocket engine of limited power, enclose the payload totally within a model so it can't come out in flight yet can be removed at will, and fly the

(Continued on page 64)



From top: 12 year old Merry Ann Koepke took top honors in an altitude event at Second Rocket Nationals. Rick Tydings, 14, holds scale replica of "Terrapin" sounding rocket which set 1176' mark. Right: With a swish a model rocket heads skyward during NAR's championships at Peak City Rocket Range near Colorado Springs, Colo.





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MODEL ROCKETS from pg. 25

model as high as possible. Needless to say, it will boils down to a matter of fine design.

On the first day, Lynn Ericson became a member of the 1000-foot Club by getting his two-staged bird 1495 feet up.

From then on, the sky was the limit. Records started to fall right and left. All models, by the way, were tracked in flight by telescope theodolites. Situated on 1000-foot and 2000-foot baselines, trackers manned these instruments—which were built of surplus store parts—to follow the little birds in flight until

they reached peak altitude. And, brother, this is no mean trick with little model rockets. Yet, the NAR boys have proved that this method of tracking using simple trigonometry is accurate to within plus-or-minus 2% at altitudes up to 2000 feet.

Several new scale altitude marks were set at NARAM-2. A scale altitude contest is restricted to models which are exact copies of an existing sounding rocket or guided missile. Not only must the model be authentic scale, but it must also go as high as possible using a limited engine power. NAR has classified model rocket engines according to total impulse or power, Class A being smallest, Class B being the next size up the ladder, and so forth. The loveliest scale altitude flight of the whole meet was turned in by an exquisite replica of the University of Maryland's *Terrapin* sounding vehicle, built by Rick Tydings. Rick's bird blasted off in a beautiful vertical flight, hit stage separation perfectly, and soared to 1176 feet. The scale points for the bird, 85 out of a possible 100, were added to the altitude to give him a total of 1261 points. By adding scale points to altitude achieved, certain recognition is given for the scale qualities of the model.

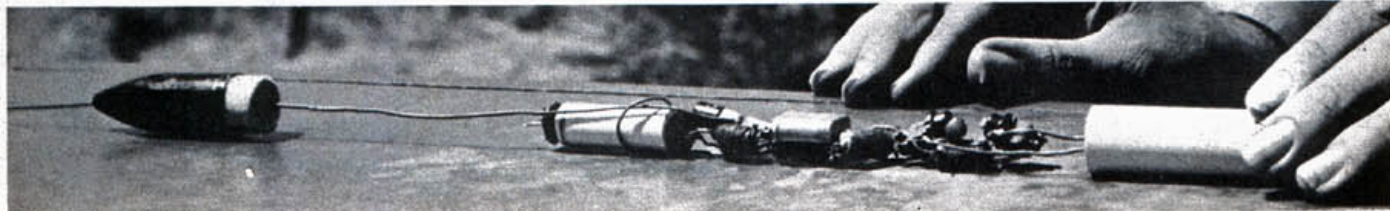
Rick also turned up with a fine scale model of the GAR-3 *Falcon* in the Scale event, where models must be exact scale and must fly, although altitude achieved is not a factor. But he lost out to Dave Jenkins, son of a Martin engineer, who showed up with a scale Viking #10 sounding rocket, complete with roll tabs, antennas, and turbine exhaust covers.

Perhaps the biggest paradox of the NARAM-2 was the fact that a Class 4-BB altitude bird, using single Class B engines in both stages, grossly outperformed all of the Open Altitude entries which could use clustered engines and three stages. Steve Kushnir's *Nebulla* 4-BB bird hit 1,770 feet, while the best in Open Altitude, Dan Oberhausen's *Rusty VI*, only did 1597 feet.

Most of the trouble in Open Altitude came with staging. This was the first year the NAR rules had allowed three-stage rockets. A three-stager has some nasty tricks to it. Stage coupling must be exceptionally solid, or the bird will jack-knife under the push of the lower stage thrust. Several boys got three staggers to stay together as long as they were supposed to, but had trouble with the lower stage separation igniting the third-stage engines. The result was WOOSH-whop-whop-WOOSH instead of WHOOSH-whop-WHOOSH-whop-WHOOSH.

Also, NAR rules allowed a plastic scale event this year. The object is to modify a non-flying plastic model for flight. Two Revell X-17's showed up... and they did very well indeed.

Lynn Ericson's entry in the Best Design event really stole the show... and caused a rhubarb. He demonstrated a scale model of the TITAN ICBM which was spin-stabilized and launched from an underground silo by an automatic count-down circuit. In essence, Lynn duplicated in miniature the action of the TITAN weapon system. The rhubarb





Inaugurating 2nd annual model rocket championships Mayor William Henderson of Colorado Springs (center) presses switch to send up first rocket. Clay Banta and John Roe (rt.) look on.

came when someone pointed out that the model wasn't legal under the rules; it should have had aerodynamic stabilizing surfaces (fins). But, because the purpose of the Best Design event is to stimulate new ideas, new research, and new concepts, the rules were stretched. To keep rule-stretching out of this event in the future, Bill Roe and the NAR Contest Board are now busy closing the loop-holes in the rules for this event.

The highlight of the NARAM-2 was the flight of two model rockets equipped with radio transmitters. Gary Johnson and Jim Meek of Colorado Springs flew a bird equipped with a crystal-controlled peanut-powered transmitter weighing about 1.3 ounces; they picked up the signal on the ground with mobile receiving gear and were attempting to measure velocity by Doppler shift of the transmitter signal. John Roe's *Loudmouth* model also contained a crystal-controlled miniwatt ounce-weight transmitter plus a device for measuring rocket acceleration. Both radio birds flew well, and signals were transmitted during their entire flight paths.

As if the contestants didn't have enough to do in the evenings fixing busted fins and otherwise repairing birds and getting others ready to fly, there were three symposia scheduled, one each night. The object of these get-togethers was to pass around information, get a bull session going, and generally help model rocketeers share their knowledge.

The first night's symposium was chaired by your reporter and covered the subject of model rocket design. There have been two important breakthroughs in model rocket design this year. The first was the development of a workable thrust augmentor or "wind sucker" by the NAR boys in Denver, Colorado. Using furnace asbestos paper, they have been able to build jet-pump type thrust augmentors weighing only a fraction of an ounce and contributing very little additional drag. Vern Estes ran many tests on his recording static thrust stand to determine the best diameter, length, and distance from the nozzle. The result was a configuration that adds about 50% to the thrust during the critical takeoff period. Several augmentor birds were flown by the Denver boys in the NARAM-2; and, when they took off, (Continued on page 94)

This complete radio transmitter (left) weighing less than 1 ounce for operation in a model rocket was built by Gary Johnson and Jim Meek, worked successfully during flights of 500' altitude.

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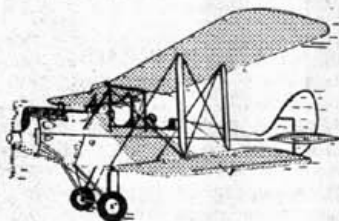
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Model Rockets

(Continued from page 65)

you could certainly tell why they were nicknamed "wind suckers." You could hear them suck air, a resonating hiss over the blast of the engine.

The second big breakthrough was the realization that everyone was building model rockets to look like their big, supersonic counterparts in real rocketry. But model rockets rarely exceed 25% of the speed of sound. Your reporter had a great deal to do with this discovery, but some of the advanced NAR members found out that air flow around shapes in subsonic flight was different than in supersonic flight. Jim and John Bonine were two of the first to apply the principle of subsonic aerodynamic design to model rockets. As a result, most of the winning high-performance model rockets at NARAM-2 had blunt, parabolic nose cones, airfoil-shaped fins, and very smooth surfaces. They don't look streamlined, but for subsonic flight they are more streamlined and have less drag than the supersonic-shape models.

The second symposium, space flight, was sparked by Captain Dave Wilmoth of the USAF Academy Department of Astronautics. This session was devoted to a discussion of rate gyros, guidance systems, autopilots for missiles, and orbital trajectories. It got quite involved as the chalk dust flew. Wilmoth, a Ph.D. from M.I.T., kept the discussion lively.

The third evening symposium, run by Bill Roe, covered the subject of rocket range operations . . . and a lively discussion got going. One of the big problems on a model rocket range is manpower and how to get people to do the dirty little jobs like recovering models. Most NAR ranges are run by groups of 10 to 18 NAR members, and it takes nearly this many people to operate a good range. Add to this the fact that the boys running the tracking telescopes, doing the data reduction, and chasing out on recovery also have models they wish to prepare and fly, and you will get some idea of the problems.

As the contest drew to a close, the competition got more frantic. Bruce Unruh walked away with the Spot Landing event by a real *tour de force*; the object of this event is to land your nose cone (no free-falling objects, please) closest to the target downrange. Unruh's *Zeno* bird came all apart in the air with parachutes and fluttering boosters. Using his main parachute as an air anchor, he deployed his nose cone slowly toward the ground by letting rubber band from a golf ball slowly unreel out of the nose. The target was some 100 feet down range, and Bruce had to hit 100 feet altitude to be within the rules. He landed his nose cone 20 feet from the stake. The next closest man was 88 feet away.

And a *girl* rocketeer beat all the men in the contest for Class 1-B Altitude. Little Merry Ann Koepeke of Colorado Springs, rocketrix, dancer, skater, musician, mathematician, and assistant manager of the meet's refreshment stand, got her *P'Dinky* bird to an altitude of 985 feet to nearly break a record and walk away with a blue ribbon.



Lynn Ericson demonstrates his electronic firing panel which goes through automatic checkout and count-down procedure for launching model rockets.

Yes, it was quite a meet. At the final festivities, there was enough brass to start a band. Brig. Gen. Robert W. Burns of the USAF's Air Defense Command presented the trophies, while Lt. Col. Robert E. Collier, head of the Air Academy's Astronautics Department, handed out the ribbons. United Airline's trophy for Payload went to Lynn Ericson, who also captured the Huyck Corporation Trophy for Best Design. Dick Keller of Model Missiles, Inc. presented a launching tower kit to Doug Hylton, winner of the Duration contest. The Martin Company Scale Trophy, a beautiful scale model of the TITAN ICBM, was won by Dave Jenkins. And John Bonine of Denver took the Kaman Nuclear Trophy for Scale Altitude.

During each contest year, contest points won by all NAR members in NAR-sanctioned contests are forwarded to NAR headquarters and added up. At the end of each year's Annual Meet, the high point man becomes the National Champion Rocketeer. This year, it was close. *One point* stood between Lynn Ericson, Reserve Champion, and John Bonine, National Champion and recipient of the Holly Sugar Trophy. The Championship Team award went to the Hitch-Stine team, who boasted themselves as being the *first* model rocket team in history; but they broke up the team of three years' standing after the NARAM-2 "to give some other guys a chance." The high-point NAR Section, the Championship Section, was a closely-fought battle that was won by the Mile-High Section of Denver, the oldest NAR group in the nation.

Last but not least, the NAR's hard-working Executive Secretary, Bill Roe, was completely surprised by a Special Award consisting of a plaque and a commendation from the NAR Trustees for his exceptional efforts on behalf of model rocketry. Bill set up the 1960 Boy Scout Jamboree demonstration and was contest director for the NARAM-2.

On Sunday evening, August 21, 1960, Peak City Rocket Range was strangely quiet. The crowds had gone. The contestants had started to wend their way back across the nation to home, to more model rockets, to schemes to win the NARAM-3 in 1961. The Colorado evening sky was bright with stars as Echo I

flashed across the heavens instead of model rockets.

I wouldn't want to bet against the possibility that in some future year one of the NARAM-2 contestants would look down from orbit like Echo I and recall that to be a member of the 1000-foot Club of the NAR was just the first step toward the stars.