



MAX-Q HARA

Newsletter of the Huntsville Area Rocketry Association

Volume 8 , Number 2, Mar/Apr 1994

Thousands See Launches!

SOAR Shoots, Scores
On Mission #4-P6

SEP Christens New
High Powerfield-P4

Spaceweek Rockets
Fly at All
Schools -
P3

New Tab
loid For-
mat-P1

"Maybe it goes on the Pad over there."



From the President's Pad

Spaceweek Success

It's been a great spring in Huntsville for rocketry. There have been literally countless flights at various launches that have been a challenge to list.

Cathy Kulas, an educator on the Spaceweek committee, told me she knew of *eight hundred* rocket kits with motors that had been bought through the school system. These were for classes, and at some schools, whole grades to build, or serve for demo flights by the teachers for younger kids. Shop instructors who have a large supplies budget often made use of it to buy rockets. There were other teachers and classes that did rocket projects on their own that aren't

yet documented, so the actual rocket toll is higher than 800. With the exception of one high school and a few private schools, it can be truthfully said that during Spaceweek every school child in the county saw a model rocket launched. That makes the headline on the front page a fact.

Then you get into the other counties around the state that SEP went to. Greg's statistics suggest that in the three years of SEP, he's done rockets in front of thousands of kids! (Greg's comment following that is, "if I only had a dime...")

One student summed up Spaceweek in this statement: "we're having a lot of fun learning stuff, but we don't have to do the school work." Good thought, kid. Don't ever confuse designing spaceships, naming planets, writing space stories, describing new lifeforms, doing computer simulations, or building a lunar base with school work. It wouldn't be fun, then.

Feeling good about rockets.

There are some events you come back from and you don't want to think about rockets for a long time. There are other rocket events you come back from and you want to sit down at the workbench right then and build more. The recent launch in Athens was the satisfying kind of event showing rocketry at its best. Okay, the weather was fantastic and the field was great, which is circumstantial, but it wouldn't have been worth anything if we didn't have the kids, the range, the organization, the cooperation, and the expertise to make it happen. It was a great example of how to do things right, and I want to do it again, soon.

Why it Works

HARA and the related model rocket programs in Huntsville are successful because they seek to promote model rocketry. HARA

does not seek to promote specifically HARA, because if rocketry in Huntsville is advancing, by any body in any way, HARA's purpose is achieved. What undercuts an organization is when it starts to seek to promote itself more than the market it supports.

Maybe that's what's happened to NAR. Has NAR fallen back to just cover itself, rather than expedite the advance of the hobby? Things seem to be wearing out and running down on the national level. The upcoming election of the NAR trustees might be a good time for members to help them out.

We like to see people flying rockets. If rockets are flying, the rocket organization is being served, and it is serving the rocketeer. If rockets aren't flying, the rocket organization has no point.

I want my rocket back

On April 23 my dad and I went to the Old Airport to launch my latest rocket project. It was a \$50 kit called the "Jayhawk." It had a red 18-inch chute and its body was painted dark red. It was easy to see.

It launched perfectly into the breeze and the chute deployed. As it floated over the airport fence into the Joe Davis Stadium parking lot, I ran from the launch area as far as I could go. Standing at the fence, I saw a man about 50 or 60 years old in a gold Mazda pickup. He got out, picked up my rocket and put it in his cab. I thought he saw me waving because he looked in my direction. I didn't scream or yell too much because I thought he was going to hand it to me over the fence. My heart sank when he drove off.

Please, if someone has seen it, please contact the editorial page of this newspaper. I thought about this a lot over the past few days and decided he probably just didn't see me. Please, sir, my rocket was not lost or abandoned.

JESSE PARKER
Madison

The above letter in the local paper helped Jesse, HARA's newest member, get his rocket back. Happy ending.

MAX-Q

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MSFC Director Fires Rocket

For the third year, HARA members have represented NASA at the kickoff Monday of Spaceweek in Huntsville at Highlands Elementary. Dignitaries from the school system, the city, and MSFC are invited to the ceremony to encourage the kids to enjoy their activities. Each special guest says a few words, a band plays, and the program concludes with launching four model rockets where the honorees themselves push the button.

This year, the Center Director himself decided to show up, rather than send a representative. Porter Bridwell, in his first year at the helm, was glad to be there. His message to the kids was simple and good: "Your vehicle to other worlds is the library. Read!"

Robert Burdine and Vince Huegele had a rack of B engine birds set up. The VIP's came over to the firing panel and Vince explained the launch procedure. "When the kids countdown to zero, push the red button."

All models fired instantly and flew nominally, with one making it over the schoolyard fence. It was a satisfying relief to have everything work properly in front of the whole city. A few kids provided recovery support, but one little girl had to be reminded she was supposed to return the model to the owners and not keep it.



New Contest Initiated

While dressing like an alien is an exciting exercise for elementary schoolers, middle school students need something more sophisticated to do for Spaceweek. City school committee members decided a model rocket contest would be appropriate. The contest rules were given in the last MAX-Q. HARA, through Project LASER, assisted in planning the contest and conducting the final fly-off for the City title on Wednesday of Spaceweek.

Robert Burdine and Vince Huegele went to Challenger Middle School to set up the firing system. Only six kids from three schools showed up, but it was enough to fly, even for the first year of the contest. Robert assisted the kids in operating the launch box while Vince ran the stopwatch and tallied the numbers. The results are shown below.

HUNTSVILLE CITY SCHOOLS CHAMPIONSHIP ROCKET CONTEST March 23, 1994

Class A Motor, Parachute Duration, Rank by Flight Time, in seconds

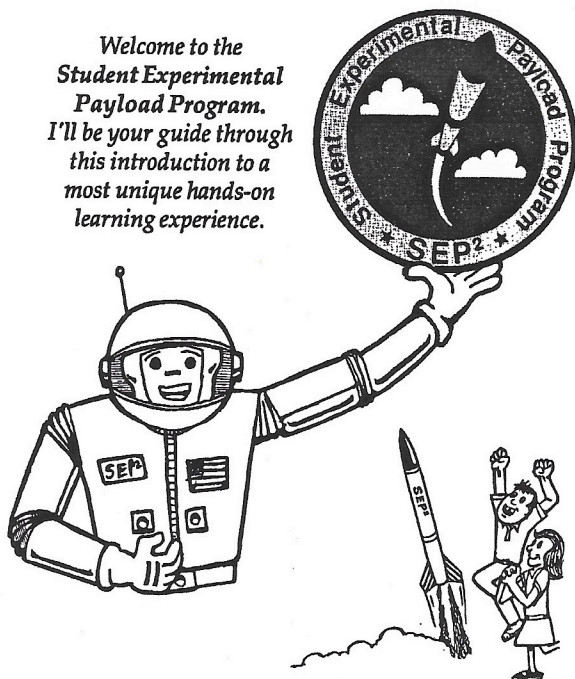
Name	Grade	School	Time1	Time2	Total
Greg Rass	7	Huntsville Middle	18.7	17.9	36.6
Jimmy Yack	6	Mountain Gap	13.8	18.9	32.7
Jerimy Stockdill	10	Butler	11.0	9.1	20.1
Tonya Walls	9	Butler	9.6	9.9	19.5
Jakeel Shager	7	Huntsville Middle	DQ*	12.7	12.7
John Pape	9	Butler	DQ**	--	

*Disqualified Flight, rocket separated from parachute.

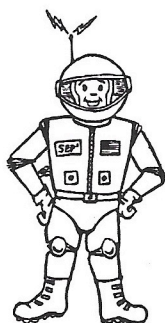
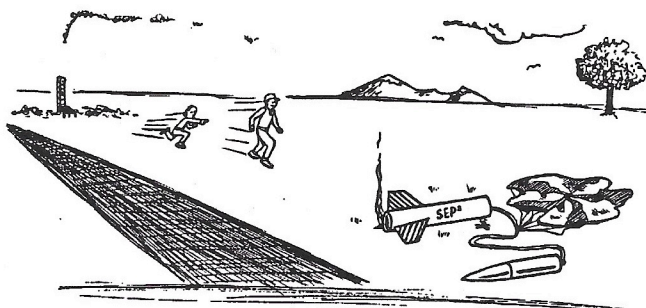
**Disqualified Flight, Parachute did not deploy.

SEP '94

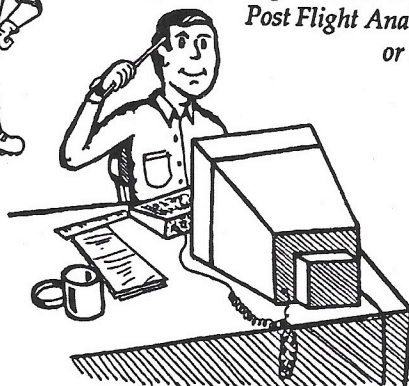
Welcome to the
Student Experimental
Payload Program.
I'll be your guide through
this introduction to a
most unique hands-on
learning experience.



After the rocket is recovered, the payload canister is
returned to you, unopened, so that you may be the first
to analyze your experiment.



Once you have completed your analysis,
you must write a one page report
on your findings. This is called a
Post Flight Analysis,
or PFA.



The day had finally come for what every rocketeer wants: A cloudless sky with seventy degree temps and mild wind, acres of open field, an appreciative audience, and a waiver, all on the specific day scheduled. It was on this April 23 Saturday, modelers all over north Alabama and students from several states had waited for and come to attend. The SEP launch was for big rockets and payloads, but also to initiate a new found field in Athens.

Greg Warren had worked long and hard to secure the use of the property and to stroke the feathers of many local officials to assure them this kind of rocketry is good for the kids and the community, (or at least harmless.) The work paid off with no hassles, an orderly run range, many good launches, and a lot of happy campers. Recovery was a delight, with plenty of medium grass cow pasture to chase through, and no plowing or planting to dodge. This ground was much friendlier to landing rockets than the concrete of the old airport.

The field had a line of viewers set up along the fence with lawn chairs, blankets, and coolers. The tent over the control table was very useful to shield the sun on the clear day. It was a picnic by all measures, and modelers emptied their range boxes of motors to keep the rockets going.

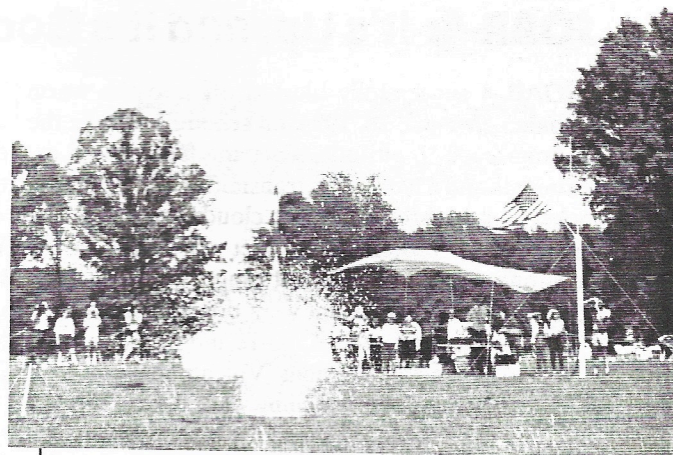
Several classes of kids were out to have their experiments flown on the SEP rocket, but also to fly their own models. Various HARA members were there to do the same with big rockets. (A more complete description of the serious motors will be given next issue.) The kids flew most of the morning and were mostly gone by early afternoon. The big kids hung on until late, savoring every moment.

Much of the good school response came from the new SEP handbook. Excerpts are shown here on this page of the cartoon instructions that explain the program and what the students are suppose to do. Many teachers had no experience with model rocketry and not the first idea of what a payload was, so an explicit primer was required. It's also a good promotional device. The artwork is great and the book is another fine piece of work from SEP.

PHOTOS on pages 5 and 11.

SEP Action

clockwise from right: A Silver Streak F50-5 motor lights up the range. Plenty of kids are anxious to fly. A well decorated Starhawk is connected. SEP rocket being integrated. Has she been here before?



SOAR-4: It's Up, and It's Good!

SOAR-4 successfully blasted off into the warm Alabama air April 26, 1994, on schedule to take the program back to altitude. Carrying four school experiments and a ham radio transmitter, the eight foot rocket chased through broken clouds before sprouting its chute thousands of feet above the Army Redstone Arsenal missile test range. There were no delays or slips as the count went down by the book.

The custom Aerotech K500-18 motor was slower taking off than the previous Vulcan versions, and SOAR crew members watching were fearing it was a dud. The large throat on the moon burner motor also sounded different, but it put out the thrust to adequately accelerate eighteen pounds of rocket.

Tracking was tricky since the overcast sky was raising and braking up that morning. There was plenty of blue around the white, but no single observer could follow the complete trajectory of the rocket to touchdown. As eyes strained scanning among the wispy clouds, hearing the boom of the ejection charge was reassuring. Hearing, "it's heading toward the pond," was not.

Recovery on the large test range is not easy because it's not as open as it looks. The brush height inhibits walking and the tree line distances are deceptive. Like a golf course, there are water hazards, inconspicuous, but present nevertheless.

The SOAR-4 vehicle was finally spotted an hour after launch in an obscure stream on the range boundary. The payload section, descending nose down on a pointy new 5:1 ogive, had stabbed into the mud bottom so that it was standing up above the water line. Everything else was submerged and invisible. The 70" bright red and yellow parachute was useless as a ground marker under water.

The ham transmitter had been working long after landing to provide a directional beacon and a "life sign" for the rocket. The continuing signal proved the nose section had soft landed, but suggested that it had missed the water, since it would have presumably otherwise flooded and shorted out. The moisture integrity turned out to be very good, but no one had expected to hit water on the range if you had tried to in a hundred flights.

Even though the rocket was found, it was another matter to retrieve it. The Army had to employ its Lance ATV to get to it later that day. By then, the transmitter had failed and the student payloads were at risk. But, when the kids opened their canisters back at the classroom, the brief baptism had not affected the experiments. Except for the getting wet, the investigators rated the mission fully successful.

The experiments were: Flight Effects on Planaria by Whitesberg, Chaffee, and Weatherly; Material Shifting by Ridgecrest; and the Amateur Radio

Tracking Experiment (ARTE.) Highlands came up empty handed. They had planned to fly tadpoles in the "Frogs Aloft" project, but the tadpoles all croaked the day before the launch.

Local ham radio operators, including Dick Curtis of WHNT-TV, set up an amateur television channel to broadcast remote scenes of the launch to the children in the classroom. Army policy forbids spectators on the test range for security reasons. Dick had a nice feature about the flight on the six o'clock news.

The die hard SOARriors convened the night before to prepare for launch. Pat Buddington, Lee Huffman, Vince Huegele, Wayne McCain, Ed Stluka all had jobs to do to integrate the payload and inspect the rocket assembly. Wayne made the ignitor and customized the ejection charge. Vince untangled and adjusted the recovery rigging. Lee finagled the hardware mounting for installing the experiment. Ed fussed with getting the transmitter to work and still fit in the nose. Pat lent extra hands to all efforts, but did the best by bringing the pizza.

Although all aerospace professionals, proud of their methodical analysis, the crew was up past midnight, just like so many amateurs, resolving last minute glitches to finish prepping the bird for flight the next day. And they were having fun doing it, just like so many amateurs.

The flight of SOAR-4 shows progress in the program after a year of inactivity. SOAR-3 was launched October 16, 1992. The program began in 1989.

Lee Huffman applies epoxy to prep SOAR-4.



Local Hobby Shop News

Ben Franklin

There's a new store in town that is the ultimate art and craft source. **Ben Franklin** is open in the Haysland Square shopping center on South Parkway. This place is the Home Depot of hobby supplies, with aisles and aisles of great stuff. Many items there have rocketry applications, with more that needs to be tried. The store has a more diverse offering of general art materials than any other place around. It's not junk and it's not cheap, but it is available.

Here's a sampling of things a rocketeer may use:
Xacto tools / Modeling plywood, Balsa wood blocks / wrapping paper, party streamers, mylar balloons / specialized craft glues / various craft paints, airbrush supplies / paintbrushes / Tempera paint powder / rub-on lettering, transfers / art paper, drafting supplies / styrofoam shapes / electronic music buttons / and finally, model rocket kits, plastic and flying.

New Store

Hobbytown USA has been open in Huntsville since the first of the year. Located in the Home Depot plaza on 72 West just past Madison Mall, this store is a franchise of a national chain. The selection is good but typical, with some rocket kits and associated supplies. It should mainly be a convenience for Madison residents.

Wilson's Remodeled

Wilson's hobbies is still at the same address, but has swapped places with the laundry and is now on the left side of the building. The place is bigger with more navigable aisles. They have tons of Estes and Quest products, and many tempting plastic kits.

Rocket Magazines

Sport Rocketry and *High Power Rocketry* are available at some hobby shops, and also **Bookstar** on University Drive. These magazines are good and tell a lot about what's happening in the hobby. Get a copy and decide if you want to subscribe. News about HARA has been appearing regularly in the club section of *High Power*. Alan Berman has nicely summarized *MAX-Q* articles into very favorable reports.

and these fine stores coming to the mall real soon:

/House of Rockets / 1001 Rockets / Land of Rockets / Rockets 'R' Us / Everything's Rockets / Lots to Launch / Model Fun / Rocket Town / Launch Land / Extreme Rocketry / Missile Madness / Mach City / Sky Stuff / Wan Hu's Thrust Emporium /

Hubble Telescope Becomes a Star

by Vince Huegele

The next new movie you will see in the IMAX theater at the Space and Rocket Center will be called *Destiny in Space*. Premiering this June, the film will feature scenes of the Hubble Space Telescope repair mission STS-61 taken in the shuttle payload bay by the special high resolution wide field IMAX camera.

Certain MSFC employees were privileged to attend an unedited viewing of the IMAX footage narrated by the astronauts at the SARC. When I say unedited, I mean the leaders and trailers from each roll of film showed up between scenes with white bursts of numbers scrolling by. It had the real feel of home movies - but from space. The views were out of sequence, and some were too long or too short. There was no soundtrack either. The astronauts narration was typical of post mission briefings, very casual and somewhat bland.

The images were fantastic. In the midnight void above the Earth's limb, a shining cylinder approaches the camera. The maneuvering arm is seen to capture Hubble and settle it into its berth in the cargo bay. As the world goes by, the blue sea and red-brown continents are reflected on the telescope's exterior. HST stands upraised in the bay like a high tech idol. You can see over the astronauts' shoulders as they extract the servicable components and replace them. If you look closely in the upper frame, one view shows our moon in quarter phase.

The most compelling scene, I think, is when spacewalking Kathy Thornton lets go of the inoperative solar panel. It gently glides off, iridescent in the sun, until the OMS pulses to move the orbiter away from the panel. When the invisible exhaust hits the panel, the solar sheets flutter like a bird startled, then flap in resonance as it begins to roll and casually fly away.

Finally, the Space Telescope is shown releasing from its mount to rise above the shuttle and go back to work in space. The backlighting on Hubble's erect arrays and antennae as it recedes, is magnificent.

Whatever the script turns out to be, Hubble will be the star of this movie. Check it out when it plays. These effects are very special.

Recent Launch Coverage

SOAR Qual Flights

On a cold, windy Saturday in February, the children wondered if the rocket would fly. Dozens of students, their parents, and the teachers sat in their cars at the old airport watching the SOAR personnel pace in the arctic air. The day had been planned for the test flights of the student payloads on the SOAR qualification vehicle, but the real weather that morning on that field was intimidating. When it came down to giving it a try, or telling everyone to come back another day, the decision was made in the spirit of the winter Olympics everyone had seen that week: go for it.

Rocket people Ed Stluka, Pat Buddington, Neal Redmon, and Vince Huegele were being watched by anxious eyes to see what would happen. The choice to launch was made methodically. A test model would be flown to check the actual wind effects since the human skin was prejudiced against the chill. Neal put up a bird which had a nominal ascent and acceptable down range drift. With that, Vince proceeded to prep the first qual rocket.

The five schools had combined their experiments into just two screw cap cylindrical canisters which conveniently and precisely fit into the payload body tube. Both were 4" diameter with one 3 7/8" in length, and the other one inch shorter.

Ed Stluka spoke over the bull horn to announce the flight and prompt spectators from their cars. When a lull came in the wind, a brief count was given and cold batteries were opened to the ignitor. The Vulcan G80-5 motor, left over from the first qual flights in 1990, erupted to life with ample thrust. The rocket wasn't bothered by the wind and confidently followed a textbook profile. It tipped over at apogee deploying two good chutes that brought down the booster and nose. A fin came off on landing, but the payload removed from the nose was unmolested and was returned to the happy, shivering students.

Fortunately, there are two qual rockets for such occasions, and while the tail pieces of one booster, *Discovery*, were deposited in its transport box, the other unit, *Endeavor*, was withdrawn and prepped by Neal with a motor. Vince installed the other student canister in the nose and the elements were integrated.

Back on the pad the rocket went into the air, with the second flight a mirror image of the first, down to breaking the same fin. The payload was certified okay and given to the class and teachers that quickly got back in their cars to go somewhere warm. It didn't take long for the launch team to throw a single launcher back in the trunk and follow them.

In one hour on the day and time scheduled, HARA got the rockets off to launch the students into the

SOAR program: the process of flying experimental payloads. The kids were now confident their package would survive launch loads and serve its purpose for the SOAR-4 mission on April 26.

Springing To Flight

Out like a Lion

After a serious series of school demos for Spaceweek, the HARA launch on Saturday, March 26 was a bit tame. Many modelers had burned out, but others maintained the momentum by showing up. The weather wasn't great either, with a March wind chasing clouds across the sun, but it was worth setting up a pad or two for a few hours.

New HARA member Kevin Cornelious had a number of birds to fly. Kevin has put fins on a deodorant can that goes up stable. Murphy's law caught up with his Aerotech *Arreoux*. The *Arreoux* had no ejection and came in hard. The charge had fired, but the motor seemed to have not had enough in it to work right.

Tim Bennett flew various models from his collection, but held off the larger stuff because of the wind. Joe Robertson flew his *Delta Clipper*, assorted sport models, and a two stage rocket.

Vince sent up a few small potatoes on B motors, but then lit an Estes E15-8 in a medium size streamer model. The composite streamer of orange nylon and silver wrapping paper made for easy recovery coming down and on the ground. For a flourish finish, Vince fired a F50-7 Silver Streak in an old *Eliminator* that did everything right.



COUNT DOWN '94

HARA meetings are second Thursdays (except December) at the Huntsville Association of Technical Societies (HATS) office, Suite 29, Building 4900, University Square, (off the Boardwalk.)

Launches are 9:00 am Saturday mornings at the Old Airport, unless announced otherwise. Call Greg Warren for SEP launch site information.

MAY: 12 Thur; HARA Meeting, 7:30pm, HATS
14 Sat; Sport Launch

JUN: 9 Thur; HARA Meeting, 7:30pm, HATS
11 Sat; Sport Launch

JUL: 14 Thur; HARA Meeting, 7:30pm, HATS
9 Sat; Sport Launch
20 Apollo 11 Anniversary

AUG: 11 Thur; HARA Meeting, 7:30pm, HATS
13 Sat; Sport Launch

SEP: 8 Thur; HARA Meeting, 7:30pm, HATS
17 Sat; Sport Launch, Classic Prep

OCT: 1 Sat; Rocket City Classic XIII, 9-12
13 Thur; HARA Meeting, 7:30pm, HATS

NOV: 5 Sat; Sport Launch
10 Thur; HARA Meeting, 7:30pm, HATS

DEC: No HARA activities.

Some scheduled events subject to change.

For more details call Vince at 881-2904 or Joe at 721-1338.

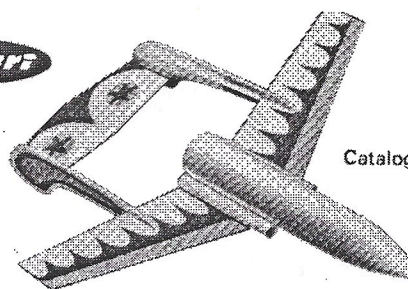
.....Recent Launches, continued from facing page

No Eggs Expected

The April launch a week after Easter was well attended, but the wind once again kept the real fun rockets in the back seat. No Eggloft was scheduled this year due to the low student participation expected. There might have been a SEDS launch the same day at UAH, according to some sources, but that would be for the college people.

HARA set up on the south end of the airport to accommodate the wind direction, but mainly because the north end was occupied by people demanding an

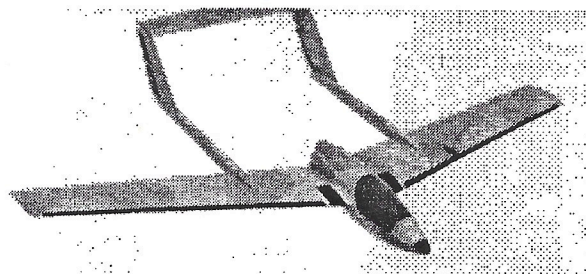
Centuri



Catalog No. KF-2

Double Take

Look Familiar? Sometimes designs aren't new, but merely recycled, which is fine if it's a good idea. Above is an old glider kit called the *Hummingbird* that flew on an A motor, (but not very well.) Below is the Estes RC *StratoBlaster* glider that takes an "E." The tail rudder is a little different, but you can tell the similarities for yourself.



admission fee to get through the gate for their activity that was just in the Jaycees building. All over the park there were hundreds of kids practicing soccer, a bike race in progress, a cross country run, and the usual golf course traffic. The place is a zoo on weekends, and will likely remain that way, even without rocketeers.

The launch manifest was modest but adequate. Kevin probably did the most flying with many Estes kits. Tim Bennett was back with some medium powered stuff. Jeff Frohwein used up several packs of motors on a *Bullpup* and a *Mercury Redstone*. Vince found out a *Phoenix* flies very well on an Estes E15-4. Neal made a gratuitous flight with his rear ejection *Trident* design.

Greg Warren, Tim Pickens, Joe Robertson, Ed Stluka, and Lee Huffman all made the scene but flew nothing, waiting for the bigger SEP and SOAR rockets later in the month.

For the last half of the flying, a van load of Boy Scouts that had pulled up became the irrepressible recovery team. The wind suddenly became no problem, with rockets getting found and brought back by energetic kids doing their good deeds.

PROCEDURE FOR SETTING UP AND OPERATING TWO STATION TRACKING FOR MODEL ROCKETS

In working with student groups, this set of procedures was developed for setting up a tracking network. It is based on using two azimuth - elevation theodolites in the configuration shown. Just having the equipment and knowing the general concept isn't explicit enough for students, so here are instructions.

REQUIREMENTS

The baseline B between the trackers should be 1.4 times the average expected altitude. Generally 1000' is good.

Trackers should be 30-45 degrees azimuth off the launcher point, and in no case less than 10 degrees to it. Stations should be arranged so that operators do not have to look into the sun.

Trackers should be set up on level land at equal heights to each other, (not on hills.) They must have a clear view of each other.

Tracking station should be manned by at least two people. The operator tracks the rocket, the assistant works the radio and reads and records the angles.

SET UP PROCEDURE

1. Step off the baseline between tracking stations with a tape measure (or equivalent) and record the distance. Set up the stations in accordance with the above requirements.

2. Install the theodolite head on tripod. Level the azimuth scale to the horizon and check for smooth operation.

3. Calibrate / align tracker to the other tracker point (*not to the launcher*): aim tracker at the other station and set azimuth and elevation angles to zero.

4. Sweep tracker azimuth to view launcher. Elevation angle should still read zero. Adjust alignment until it is so. Check radio and establish contact with control.

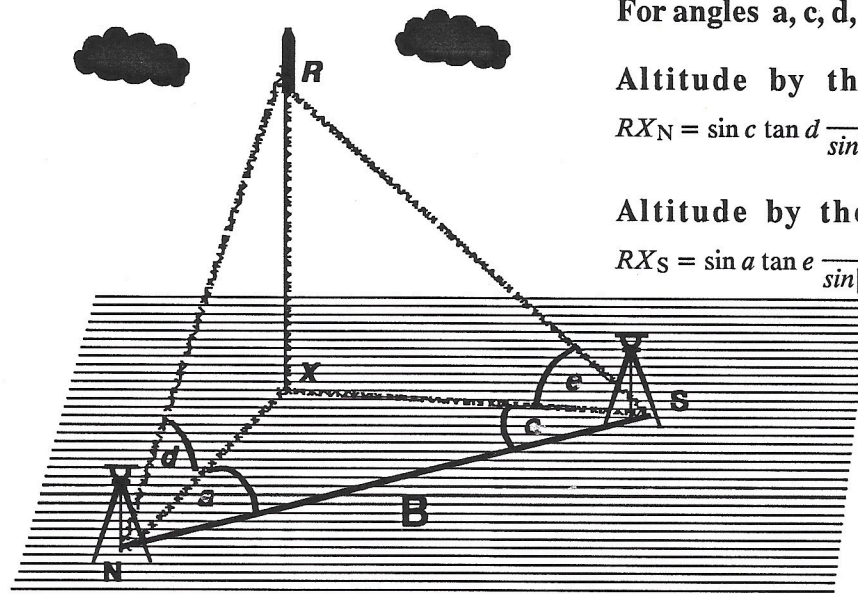
FLIGHT OPERATIONS

A. During launch, follow standard radio net protocol. Firing officer should announce the rocket motor type of each flight to alert stations of the expected altitude. If station becomes disabled during countdown, operator will call for a "hold," and the count will hold until the problem is fixed.

B. Operator will track ascending rocket to apogee and stop or lock the theodolite at that point. Read off the angles from the scale and record, or relay them on the radio to the data recorder giving elevation angle first, then azimuth.

C. Operator need not "lead" the rocket to track it every moment of flight, but mainly point the tracker at the rocket at its peak arc. This may *or may not* be the point of ejection. If trackers are having great difficulty in seeing the rockets deploy, they should appeal to the launch crew for extra tracking chalk or talcum powder to be added to the parachutes.

Two Tracking Station Altitude Determination



For angles a, c, d, and e, and distance B,

Altitude by the North station is:

$$RX_N = \sin c \tan d \frac{B}{\sin[180-(a+c)]}$$

Altitude by the South station is:

$$RX_S = \sin a \tan e \frac{B}{\sin[180-(a+c)]}$$



PARTING SHOTS

More scenes from the SEP launch.



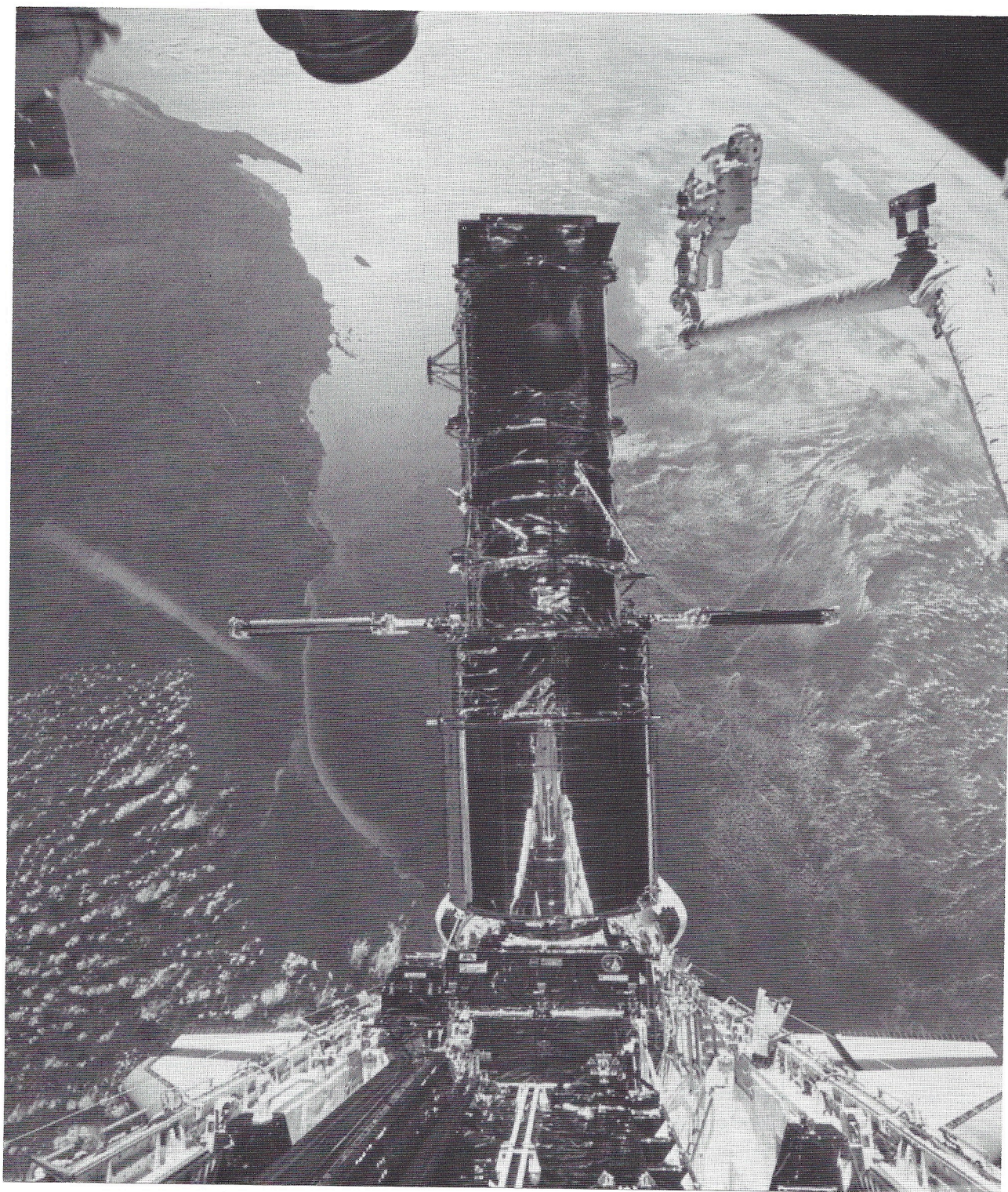
M

A

X

-

Q



**Huntsville Area Rocketry Association
11108 Argent Drive
Huntsville, Alabama 35803**

First Class Delivery to

Return Requested