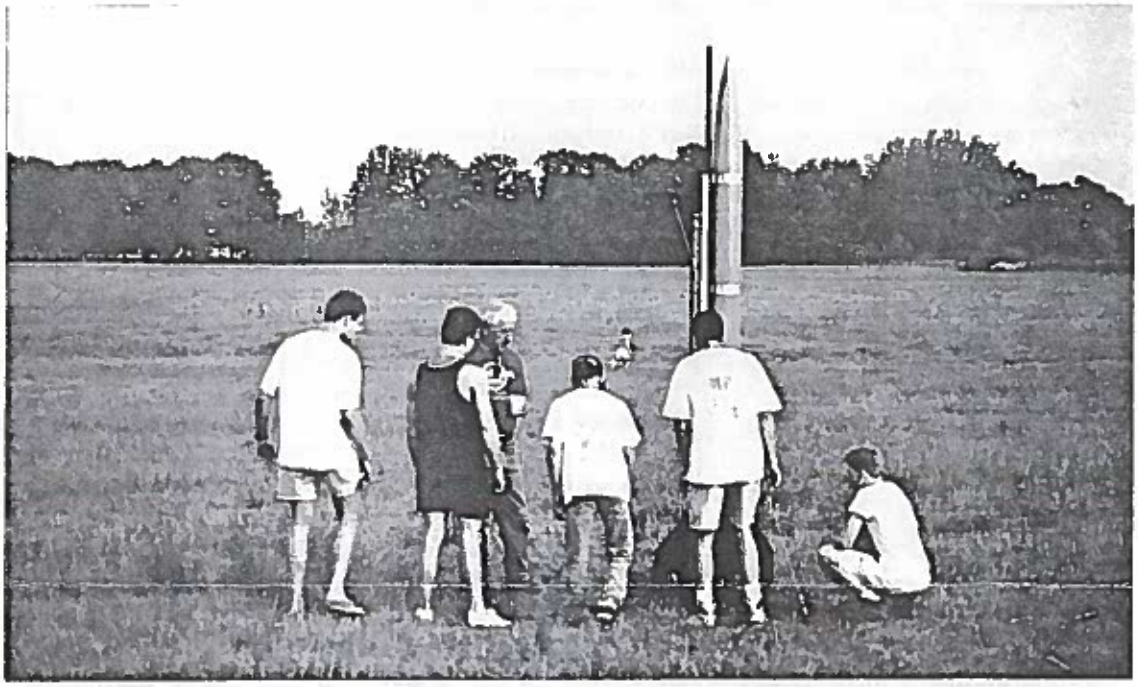
Volume II, Number VI - July/August 1994

Flamethrower®

Official Newsletter of the Student Experimental Payload Program



The Big Rockets of Summer

During the summer months, the SEP Program often gets involved in some big projects, but this year has seen some of the "biggest" and most challenging. Of particular interest are the water rockets of Tim Pickens and Dan Coon. If you have been keeping up with the articles in the *Flamethrower*, you know that Tim is working with steam power while Dan is concentrating on cold water. Both have had overwhelming success and continue to refine their projects. In the photo above, Tim and his team of assistants ready the 11 foot tall, 8 inch diameter steam rocket for a flight. Despite his success, Tim suffered a slight setback during his last launch attempt when a radio controlled ejection charge activated while the rocket was being prepped for launch. Damage to the airframe was minimal and repairs are already being made.

Dan has added gyroscopes and servos to his multi 3-litre bottle water rocket in an effort to launch the vehicle without the use of a launch tower or rod. At a preliminary test launch, Dan was able to determine that the gyroscopes and servos did what they were supposed to do, but as of yet no flight with the new gear has taken place. As the 1994-95 school year gets under way, there promises to be plenty of new surprises and additions to the program. Besides a small version of the water rocket for use in school demonstrations, new props and a hand held model rocket flight simulator will add excitement to the already upgraded show. The SEP Program has also started negotiations with a local cable television company to air 15 minute installments of aerospace technology classes involving SEP Program activities. For more information on these negotiations, an update on summer activities, a glimpse of things to come, and even an article on things you should and should not do to have safer flights, read through the following pages of this issue of the *Flamethrower*.

A Note from the Program Director

As the summer months draw to a close, the SEP Program begins to gear up for another year of school demonstrations and payload endeavors. The program has continued to increase in size since its beginning, and as we enter our fourth year as a public non-profit organization the SEP Team should be proud of its accomplishments.

Our program has grown to become the largest non-profit, hands-on aerospace education organization in the country. With 426 schools in 38 states keeping in constant contact with SEP Program activities, this is no little achievement. What started out as a "Fun" project has taken on a life of its own and become a success story that many people only dream of. Yet despite the increased workload and time requirement, the "Fun" has continued to increase as well.

Although it often goes unspoken, I want to take a moment to thank all those companies and individuals that have helped make the SEP Program a success. Without the dedication of the SEP Team Members, this project would have never gotten started in the first place. And, without the financial support of the AmSouth Fund for Educational Excellence, the program could not have grown. I also want to thank the numerous manufacturers and vendors that provide the SEP Program with discounts, contest give-aways, advice and plenty of patience. It is a wonderful thing to see so many people work together for the good of educating young minds, while introducing them to an exciting hobby. The numbers are impressive. At the writing of this newsletter, the SEP Program has performed demonstrations for nearly 30,000 students directly, and who knows how many tens of thousands indirectly through workshops, teachers, and publications.

But for all of this; for all the individuals, companies, organizations and clubs that have supported the SEP Program, I have to thank my wife the most. In the beginning, it was her encouragement that helped me take the chance on an idea that is now the SEP Program. Thanks Karen!

Flamethrower

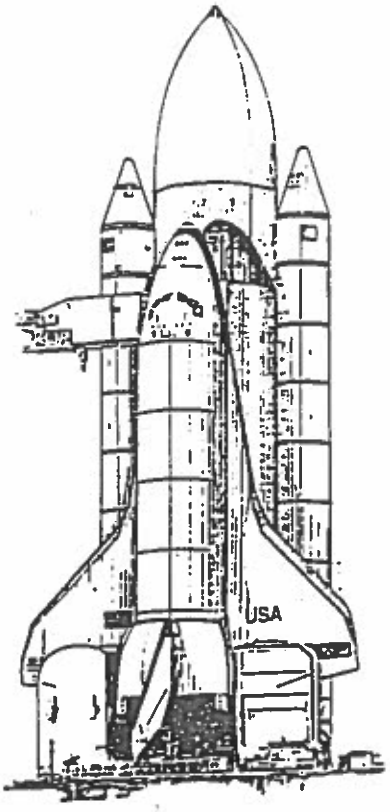
Volume II, Number VI - July/August 1994
Editor: Greg Warren

The Flamethrower is the official newlsetter of the Student Experimental Paylaod Program. Issues are published every two months with an update published between issues. Subscription rate is $10.00 per year. The editor welcomes any material submitted for publication. Contributing editors are noted per article. When submitting photos, please include return postage and address or materials will be kept on file at our office. Send articles or subscription payments to:

Student Experimental Payload Program
Post Office Box 1934
Huntsville, Alabama 35807

The Student Experimental Payload Program is a non-profit organization dedicated to hands-on aerospace education. Team members include:
Greg Warren: Program Director
Joe Robertson: Technical Consultant
Dan Coon: Technical Consultant
Ken Pearce: Payload Integration
Guy McClure: Educational Consultant, High School Level
Pam Fowler: Educational Consultant, Middle School Level
Karen Warren: Educational Consultant, Elementary School Level
Todd Gangl: NASA Space Program Consultant
and numerous others who offer their support

NASA Shuttle Manifest



September 1994

- Vehicle: Discovery
- Mission: Lidar In-Space Technology Exp.
- Orbit: 57° inclination/161 st. miles
- Duration: Ten days
- Liftoff: Pad 39-A / Landing: Kennedy
- Crew: Richard Richards, Carl Meade, Susan Helms, Blaine Hammond, Mark Lee

October 1994

- Vehicle: Atlantis
- Mission: Atlas-03/CRISTA-SPAS
- Orbit: 57.0° inclination/185 st. miles
- Duration: Ten days
- Liftoff: Pad 39-A / Landing: Kennedy
- Crew: Donald McMonagle, Curtis Brown, Ellen Ochoa, Scott Parazynski, Joseph Tanner, Jean-Francois Clervoy

December 1994

- Vehicle: Columbia
- Mission: ASTRO-02
- Orbit: 28.5° inclination/218 st. miles
- Duration: Thirteen days
- Liftoff: Pad 39-B / Landing: Kennedy
- Crew: Stephen Oswald, Ronald Parise, Tamara Jernigan, John Grunsfeld, Wendy Lawrence, Samuel Durrance, William Gregory

NAR Announces New Officers

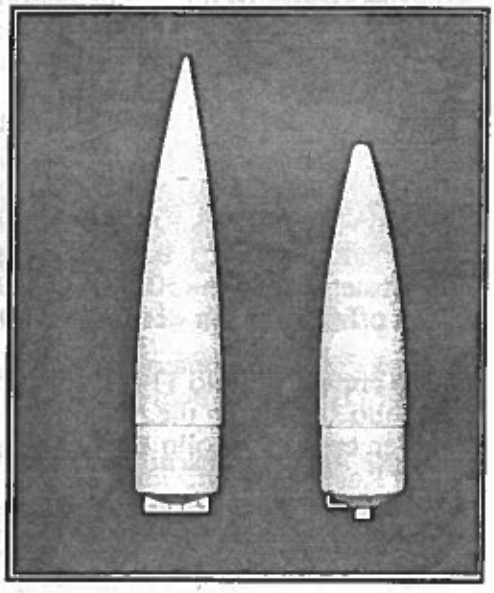
As a result of its latest polls from qualified members, the National Association of Rocketry has anounced the results of its elections for new officers. The new administration, already in place and beginning their tasks, are:

President	Mark Bundick
Vice President	Trip Barber
Trustee (3 year term)	Vern Estes Pat Miller Trip Barber
Trustee (2 year term)	Jack Kane Mark Bundick Ed LeCroix
Trustee (1 year term)	Bob Sanford George Gassaway Bob Alway

Congratulations to all of these fine individuals. You have your work cut out for you. The SEP Program stands ready to assist you and the NAR in whatever capacity you feel adequate.

PML Introduces New Nosecones

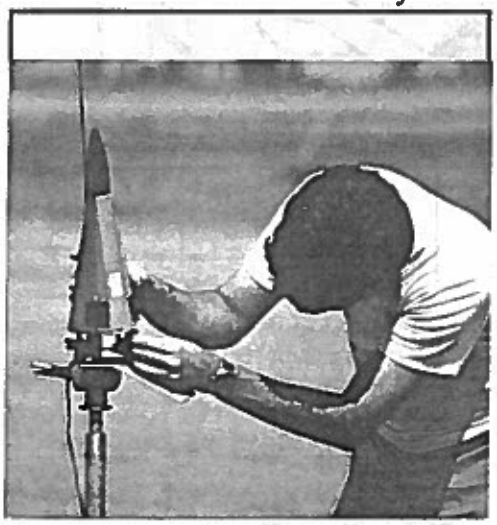
Public Missiles, Ltd. has introduced a new line of their own plastic nose cones. The new cones are longer than the standard LOC Precision cones, and also feature twin anchor points for shock cords. The PML nose cones are very accurate if you are building scale missiles. Contact Frank Uroda at Public Missiles, Ltd.; 38300 Long; Mt. Clemens, MI 48045.

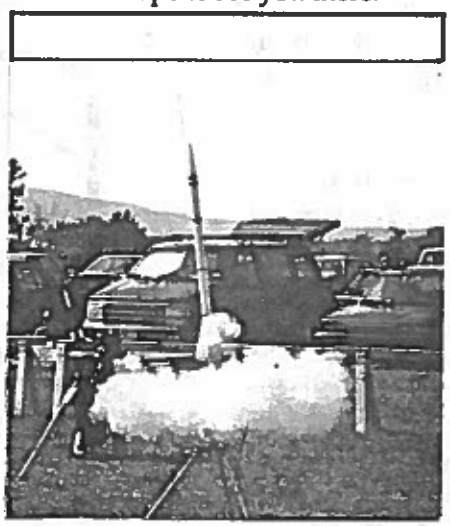


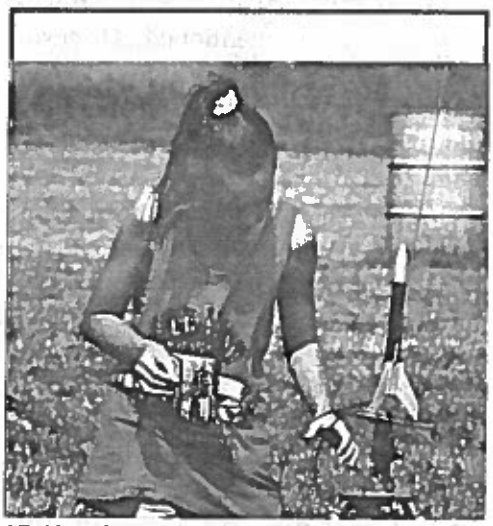
Public Missiles nosecone on the right, and the LOC Precision nosecone on the left. Now you have a choice.

Get Ready for the Classic

The Huntsville Area Rocketry Association (HARA), N.A.R. Section 403 will be holding its annual "Big Launch" at the Huntsville Old Airport (North end, near the stadium). The event is scheduled for 1 October beginning at 9:00 a.m. and wrapping up at 12:00. Bathroom facilities are available at the nearby Jaycees building. Refreshments will be available and the usual variety of fast food restaurants are close by. The event is open to the public and features several contest for both novice and experienced rocketeers. There are a few items to note if you plan on attending, such as: The N.A.R. Safety Code will be followed for all model rockets; no motors above "G" classification will be allowed; and only certified motors will be allowed - with the exception of Dan's water rocket. Door prizes are also awarded, and this is a great time to meet up with those rocketeers who only come out once a year. For more information, contact HARA President Vince Huegele at (205) 881-2904. Below are some scenes from last year's Classic XII. Hope to see you there.







Note: Most members of the SEP Program are also members of NAR Section 403 (HARA) and support various activities in whatever way best benefits the organization, HARA and the National Association of Rocketry.

Time Traveler - Log Entry Data [25 years ago]
Subject: Apollo Program **Source:** All We Did Was Fly To The Moon (Eagle Press ©1983) **Date:** 1969

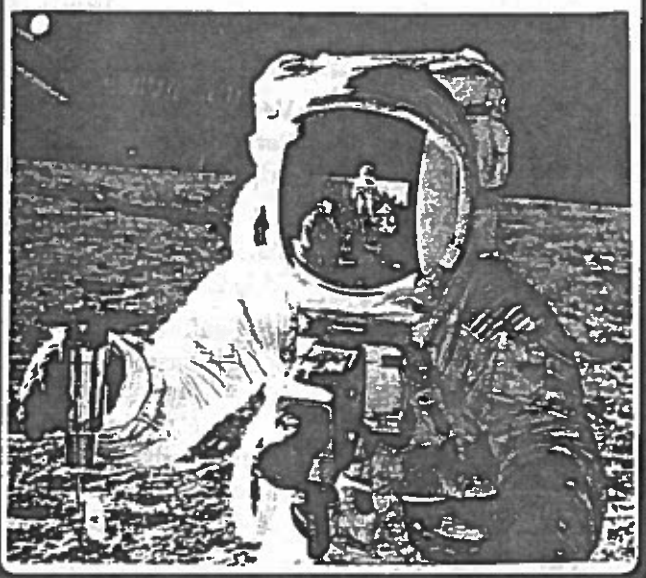
On July 20, 1969, Man first landed on the Moon. Part of their mission included leaving a small plaque on one of the legs of the Lunar Module "Eagle" However, there was a slight change in the plaque before Apollo 11 left on its mission - a change made by President Nixon. The original read, "We come in peace for all mankind." Mr. Nixon changed "come" to "came", a decision we all supported.

- Edwin E. "Buzz" Aldrin, Jr.
Apollo 11 Lunar Module Pilot

Apollo 11 Landing Area - Sea of Tranquility
Touchdown - 4:10 p.m. EDT Sunday, July 20, 1969
First step on Moon - 10:56 p.m. EDT July 20, 1969
Lift off from Moon - 1:54 p.m. EDT July 21, 1969

The crew of Apollo 11 also left a medallion of the Apollo 1 patch on the moon to commemorate the fallen crew of Apollo 1 - Gus Grissom, Ed White and Roger Chaffee.

Visual Reference Data
Apollo 11 on the Moon



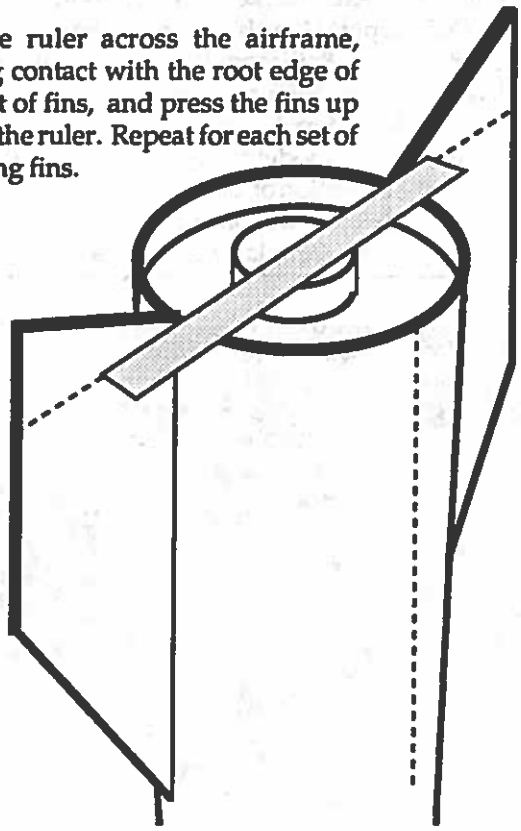
Tech Brief
Accurate Fin Alignment

One of the most critical aspects of a correct flight is proper fin alignment. The critical part is to make sure the fins are in perfect alignment with the length of the airframe, otherwise spinning will occur as a result of lift. If the fins do not keep the rocket flying straight, then they serve as wings.

Another critical alignment of fins, although not as improtant as that just mentioned, is to ensure that the fins are in line with each other across the airframe. Everyone that has ever built a rocket is familiar with the drawing of the end view of the body tube with the appropriate number of fins junting out in perfect alignment with each other. To assist in accomplishing this task, try this simple remedy. But first note, this method of fin alignment will only work with rockets whose fins have a trailing edge that extends below the ariframe (i.e., the rocket stands on its fins).

After gluing opposing fins on a rocket, invert the rocket and lay a ruler across the airframe with the ruler touching the root edge of each fin. Now hold, clamp or tape the fins to the ruler until the glue sets. The fins will be perfectly aligned with each other, *but only if you glued the root edge on in the proper place*. This is easy to accomplish using the fin marking template included in each rocket kit.

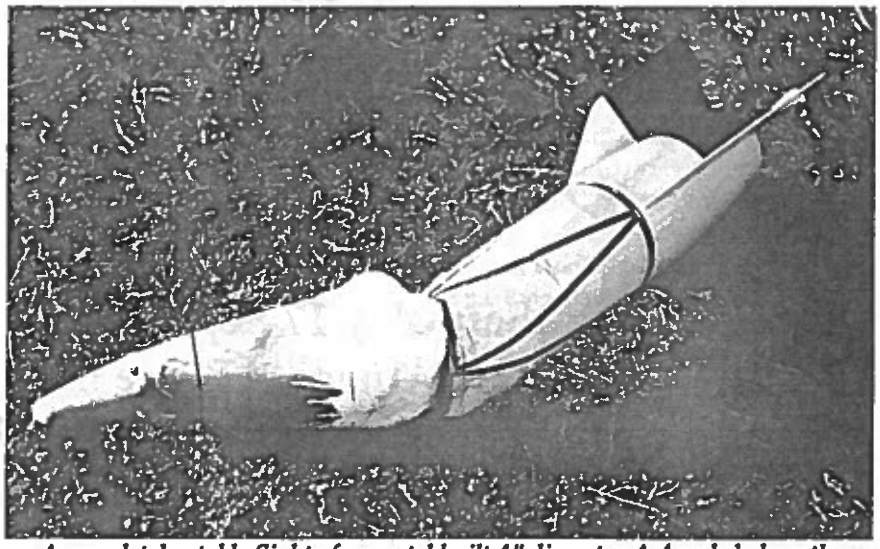
Lay the ruler across the airframe, making contact with the root edge of each set of fins, and press the fins up next to the ruler. Repeat for each set of opposing fins.



Safety on the Range

There is a saying that an ounce of prevention is worth a pound of cure. If that is true, then in rocketry there shoud also be an additional understanding: for every pound that your rocket weighs, there shoud be an ounce of prevention.

Flight failures in rocketry are caused by one of two things - either the motor malfunctions, or some component of the rocket itself is to blame. Often a failure of one system can lead to failures of other systems. For instance, a motor whose ejection charge is inadequate or missing will cause the recovery system to fail. Or a radio controlled recovery system activated too soon can cause an otherwise perfect motor to destroy a rocket in flight. So what can you do?



A completely stable flight of a scratchbuilt 4" diameter A-4 ended abruptly when the G80-4 came packaged with no ejection charge.

It all comes down to avoiding the problem before it occurs. Plan ahead to the best of your ability and never underestimate the importance of a preflight checkout. Any rocket intended to be launched should be inspected by the Range Safety Officer. The purpose of this inspection is to ensure that there is a recovery system in place, that wadding or a baffle is installed, that fins are attached firmly and that the motor to be used will neither under or overpower the rocket.

But proper planning actually starts before the RSO inspection. In fact, it starts during the construction process. Such things as ensuring the fins are glued or epoxied in a strong fashion, and that they are aligned properly is a basic necessity. Shock cords, if in question, should be too long as opposed to too short, and anchor points to nose cone and airframe should well exceed the anticipated "shock". Airframes and nosecones should be dent-free and show no signs of wrinkles, creases or punctures. Also, although it seems like a minor detail, launch lugs should be secured, glued on, attached and glued again.

In respect to motor application, single use motors are a "take 'em as they are" situation. Single use motors are generally reliable, although there is a higher occurance of motor failure in high power motors than in the lower class "black powder" motors. In the case of such high power motors as Aerotech, the paper disc can be carefully removed and one can check to see if the ejection charge is in place or is adequate (experienced and certified high power rocketeers only please). Keep motors stored in a cool, dry place away from moisture or humidity, and reduce the thermal cycling to extend the shelf life of motors. Of course, who keeps motors long enough to *store* them anyway! Other than that, careful storage procedures and stock rotation are about the only insurance one has against motor damage. Reloadable motor systems are a whole different ballgame, and should only be attempted by experienced rocketeers. The only word of advice here - take your time and follow the instructions carefully. If you finish loading an RMS and there are parts left over, chances are you did something wrong. Every "O" ring, paper disc, spacer, part and item should be used. Otherwise the results could be disasterous, and possibly even dangerous. *Continued on page 8.*

Above: A 1/4 scale Patriot descends horizontally as a result of inadequate ejection charge in an RMS. The model sustained little damage due to advanced construction techniques. Note the safe distance between rocket and buildings.

Right: Fire on the Pad! as a J-800 RMS blows a forward gasket and incinerates the rocket. Although correct assembly procedures were followed, sometimes it just happens. SEP Team members responded with fire extinguishers.

(Images taken from video)

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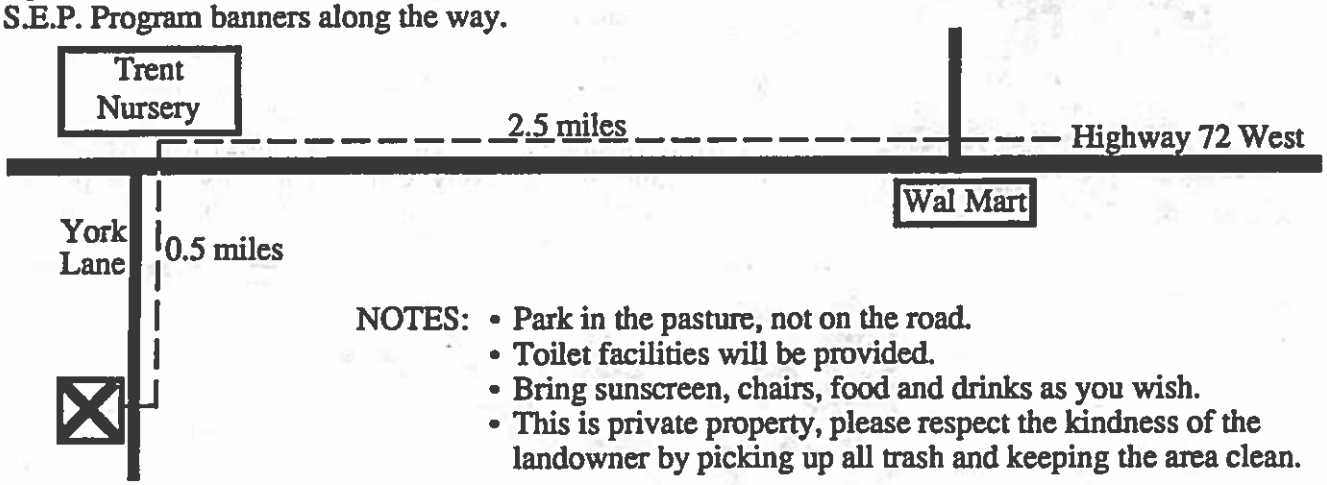
S.E.P. Program
High Power Launch

When: Saturday 17 Sept. 1994
Where: Athens, AL (see map below)
Time: Range opens at 10:00 a.m.
Waiver: FAA approved to 10,000 ft. AGL

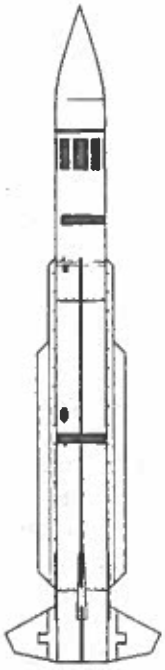
The public is invited to attend the September launch of the Student Experimental Payload Program at the Athens Field. This is an open range event with pads for model and high power rockets, as well as experimental craft. The N.A.R. Safety Code will be obeyed for all model rockets, and the Tripoli Code for all rockets rated "G" and above. There is no registration fee. This event is conducted on private property, spectators and participants attend at your own risk. Flight waivers must be signed by all participants.

Directions: Travel **WEST** on **Highway 72** to Athens. Once entering Athens, continue on Highway 72 West until you reach **Wal Mart** on the left. Continue on Highway 72 for **2.5 miles** past the traffic light at Wal Mart. Turn **LEFT** onto **York Lane** (Trent Nursery on Hwy 72 will be on your right), and travel **0.5 miles**. The launch will take place in the large pasture to your right. Look for S.E.P. Program banners along the way.



NOTES:
- Park in the pasture, not on the road.
- Toilet facilities will be provided.
- Bring sunscreen, chairs, food and drinks as you wish.
- This is private property, please respect the kindness of the landowner by picking up all trash and keeping the area clean.

The Student Experimental Payload Program is a non-profit organization dedicated to hands-on aerospace education. For more information call (205) 230-0353.



Construction of the "Standard AGM"

Manufacturer:	The Launch Pad
Length:	34.6 inches
Diameter:	2.6 inches
Motors:	(1) D12-3 or (1) D12-5
Price:	$24.99

I have always had a preference for military style models as opposed to science fiction versions, so it stands to reason that I was very pleased to hear about The Launch Pad. This newcomer to the rocketry arena specializes in military missiles from around the world and my introduction to this company came with the Standard AGM-78 Anti-Radar Missile.

The kit is bagged in clear plastic with all the necessary parts and construction is straight forward as per well established techniques. Upon examining the parts, I was impressed with the well illustrated and throughly explained instructions. If a picture is worth a thousand words, these guys have an extensive vocabulary. Each step is clean and concise, and supplemented with a line drawing. This added detail pays off for the novice rocketeer in a couple of areas.

One item that lends to the authenticity of the finished kit is the nose cone. In order to give the cone the proper shape, a paper shroud must be cut from the supplied stock and bent to shape. The instructions call for this nose cone "point" to be coated externally with super glue, but I went a little further and lightly coated the interior with 5 minute epoxy before installation. Attaching the shroud to the rounded nose cone gives the model the correct appearance.

The motor mount is straight forward with the standard metal engine hook, paper spacers and "D" size motor tube. One feature not common to kits of this size is the ejection baffle. This simple mechanism is a paper disc which requires 1/4" holes to be punched into it with a hole punch. Once glued into place, it is designed to reduce the need for recovery wadding (I don't trust baffles, so I always use recovery wadding anyway. But for the purpose of the review, the kit was built as per instructions). The airframe comes in two sections, connected by a short tube coupler. Separation is designated at the nose cone with a mylar parachute included for recovery.

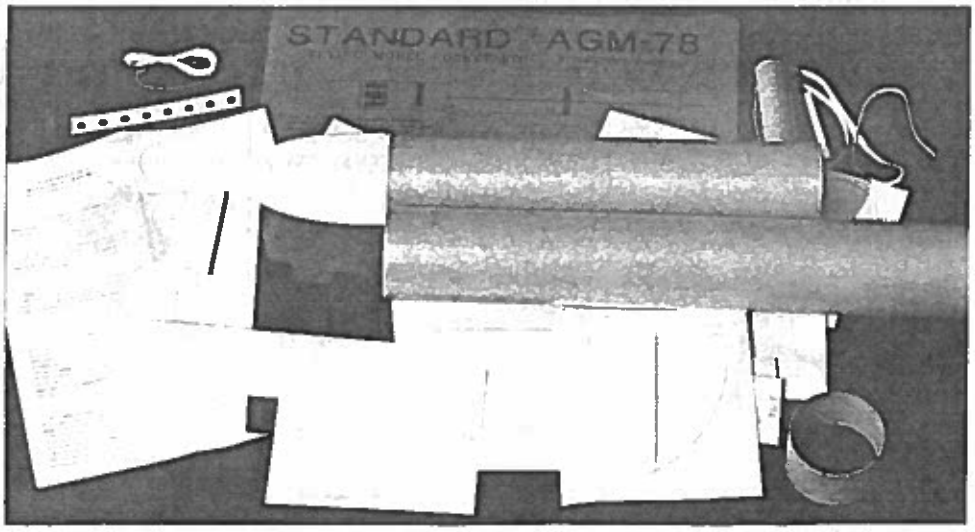
One thing you will notice during the construction of the kit is the thinness of the body tubes and paper discs. I almost felt as though the spiral tubes were too thin, but then I fly a lot of high power kits whose body tubes could be used to hammer nails. Only repeated flights would prove the durability of these particular tubes. The most time consuming part of this model was the strakes, or long thin fins which run almost the entire length of the airframe. The paper template must be assembled, then traced onto the balsa stock. Small reinforcement plates at the base of the strakes add more realistic detail. The fins are also balsa with built-up reinforcements to simulate the steering mechanism and anchor plates of the actual missile. Again, the paper template must be cut and traced onto the balsa stock. Care should be taken to seal and sand the numerous fin surfaces if you want a model worthy of the kit detail. It's a slow process, but worth the extra time.

The final detail prior to painting the model is the attachment of several dozen scale bolts. I thought this was an excellent finishing point until I found that the "bolts" were not included. The instructions call for the builder to cut the heads off of pins and attach them with super glue. I cheated on this point and, after painting the model in the appropriate color scheme, I used a technical pen to "dot" the bolt heads onto the painted model. The finished appearance was good enough to resemble bolts and required much less time.

The finished model stands nearly three feet tall and is impressive to view. The dictated paint instructions allow the builder to construct an accurate scale model of a real missile, and a nice addition to any rocket collection ... now for the real test. The first flight was conducted with the recommended D12-3 on a perfectly clear and still day. Following standard launch porcedures, I was very pleased with the arrow straight flight right up to apogee. Two more flights brought the model back to earth safely, although the paper baffle was damaged by the third flight. No major problem, just continue to put wadding in the airframe.

Being the kind of person that likes to push the envelope, I decided to try an Aerotech "E" motor in the rocket. Let me save you the trouble of ripping your model to shreds. This rocket is not designed to handle anything above a "D" motor. But, better for me to find out in a test scenario than for your to destroy your model. That's what kit reviews are for. What was left of my rocket still hangs in a tree somewhere on the outskirts of some unknown city miles away from the launch site (although parts of it did flutter back down a few moments after that final liftoff.

Final verdict: This is a great kit for scale enthusiasts. Be prepared to spend some time on the detail, as is usual with scale kits. I do not recommended it for the "first time" rocket builder, but with a little experience, it will be a great addition to your fleet.



SEP T-Shirts

Many of the students have asked for them, and now they are available. The SEP Program has had several dozen T-shirts printed with the slogan "Go for main engine burn" accenting the launch of a SEP rocket. The T-shirts are available in children sizes S-M-L-XL and adult sizes M-L. They can be ordered by sending check or money order along with quantity and sizes to the SEP Program at P.O. box 1934; Huntsville, AL 35807. Price: $10.00 each

Range Safety

Continued from page 5.

The third and final point of range safety is the flying field itself. This would not be a consideration if rockets went straight up and came straight down, with or without recovery systems. But they do not. At times they veer off course, dance around the sky, pick out the most obvious risk and head straight for it. Nothing more than common sense should be applied here. If there are trees nearby, a rocket will end up in one. Same for powerlines. When flying model rockets, a suitable field is not hard to find. Even if the flight is less than successful, the model is usually light weight enough that damage to surrounding objects is minimal. Don't ignore the minimum safe distance, just be careful. On the other hand, high power rockets can range in weight from several pounds to several hundred pounds and that again is a whole different situation. Basic rule: the bigger and heavier the rocket, the more room you need. The SEP Program is fortunate to have access to 150 acres of pasture for their launches, and that area is surrounded by additional pasture scattered with houses. Also, the residents nearby are both aware and supportive of the SEP Program and neighborhood children have occasionally returned a stray rocket several days after a launch. One aspect we stress at the SEP Program launches is for individuals to park their cars away from the flying fields. Participants may drive out to the launch field to unload their equipment, but they must move their vehicle once they have finished unloading. If you have ever seen a 10 of 15 pound rocket nose over at several thousand feet and come in ballistic, you can appreciate this bit of advice. Another very important aspect of the SEP Launches is a competent launch crew with an effective PA system. There have been several instances where the ever familiar "Heads Up!" has been heard across the pasture. To complement this practice, the SEP Program also has a siren that is sounded in the event of a CATO or Heads Up alert. So even if you are a seasoned rocketeer and tend to ignore the LCO or RSO on the PA giving you a warning, you can't ignore a siren blasting in your direction. Better safe than sorry!

Of course none of this can guarantee that every flight you make will be successful, but it will cut down the probability of something going wrong. Rocketry is an inherently risky hobby as far as the rocket itself is concerned. But, if every flight was perfect and every recovery flawless, we would all become bored and take up some other passtime with an element of risk.

From "The Indespensable Calvin & Hobbes" by Bill Watterson ©1992 p. 32

Science Lab

Provided to the Student Experimental Payload Program
courtesy of NASA/Aerospace Education Services

Making a Topographic Globe

Activity Description:

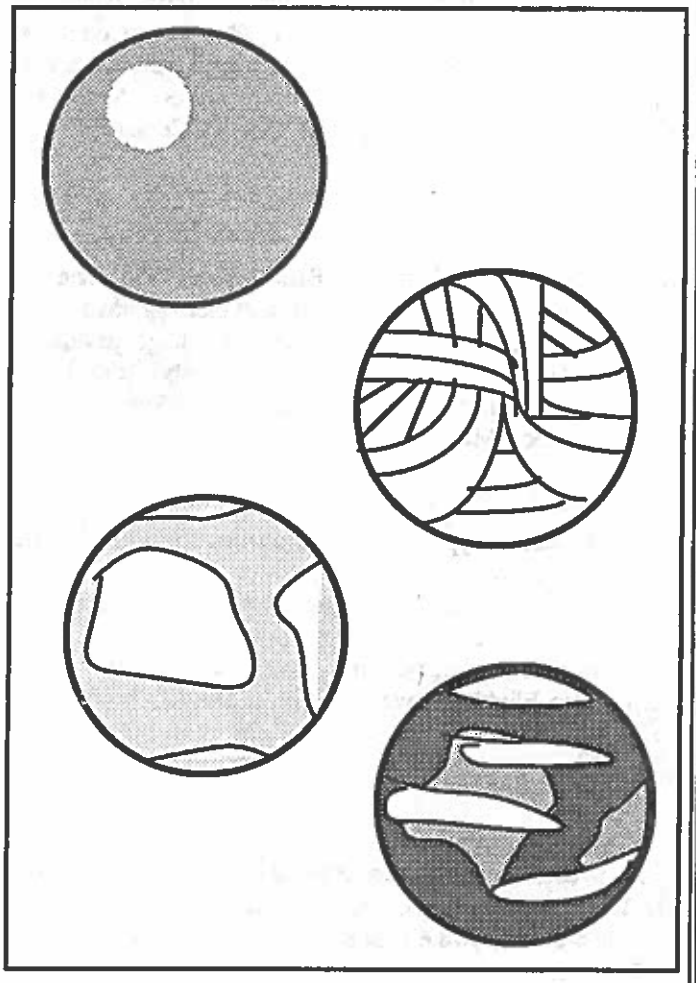
This activity is designed for class or small group participation to create a view of the earth as it might appear from space.

Materials:

Inflated P.E. Ball or other soft inflated ball
approximately 12" in diameter
Several Sections of Newspaper
Flour
Water
Acrylic paints in a variety of colors
Globe or world map for reference

Procedure:

1. Tear the newspaper into strips approximately 2" wide and 12" long.
2. Mix the flour and water together to make a paper mache mixture.
3. Using typical paper mache techniques, cover the ballwith the soaked newspaper strips.
4. Sand the dried ball to a SMOOTH finish.
5. Using a globe or world map as reference, add additional layers of paper mache mixture to the ball to form continents and mountain ranges.
6. Paint the fininshed globe in accurate colors with water blue and land masses in different colors to represent grasslands, deserts, etc.
7. Once completed, use white paint to apply clouds to the model planet.



Discussion:

Once in space, astronauts have a unique view of our planet. To them, the mountain ranges are smooth and the clouds appear to be a part of the surface of the planet. However, as you approach your model of the earth, you can see the features and tell that the planet's surface is not smooth. Use this technique to create a planet of your own with features, clouds, oceans and colors that are different from those of earth.

Let us hear from you:
Write a report about what you think it would be like to travel in space. Reports or stories should be no more than two pages double spaced. Be sure to include your name, school and grade for possible publication.

News from Manufacturers

As listed in Sport Rocketry magazine,
official publication of the National Association of Rocketry.

CSpace Inc.

publishers of the popular Quest, history of spaceflight magazine, has recently purchased Countdown magazine. Offering continuous coverage of every shuttle mission since 1983, the new Countdown continues in this tradition under a larger bimonthly format expanded to include additional contemporary space topics. A one year subscription rate (6 issues) is $32.95. Contact: Countdown; P.O. Box 9331; Grand Rapids, MI 49509.

Altron Systems

now offers the BlastMaster Mk6 and BlastMaster Mk8, six and eight channel launch controllers. They also have clear payload section material in 2", 2.6" and 3" sizes, perfect for large payloaders. ALTRON SYSTEMS is also offering a line of strobes, sonic locator beacons, and night flight systems. Contact: Altron Systems; 45814 Kensington; Utica, MI 48317.

Top Flight Recovery

offers parachutes, X-type parachutes and streamers in 26 different sizes. All products are constructed of high quality ripstop nylon fabric in high visibility colors. Braided nylon is used for the shroud lines in either 70lb or 250lb test. They will work with you for custom sizes or designs. For catalog and samples send $1.00 or SASE, contact: Top Flight Recovery; S-12621 Donald Road; Spring Green, WI 53588.

Great Planes

has introduced a new line of CA adhesives, "PRO CA." They're proven to "wick" better into balsa wood for the strongest possible bond. Each viscosity (CA, CA+, CA- and CA Gel) has been tested and refined to deliver the maximum penetration required for its specific purpose. The bottles feature a "best if used by" date for guaranteed freshness and maximum bonding power. A sample pack (1/2 ounce of each CA, CA+, and CA-) is only $3.99, check your nearest hobby dealer for details.

Retrieval Systems

These world class systems have proven themselves for years in locating model airplanes. Now you can rest easier knowing that you can find your rocket. The on-board transmitter weighs only 4 grams yet has a 20 mile air range and two+ mile ground range. The receiver has three channels if you opt to place additional transmitters in each section. Complete systems are ready to use, extra transmitters are available. Contact: Retrieval Systems; 725 Cooper Lake Road; Smyrna, GA 30082.

Apogee Components

made several product announcements at the NAR National Sport Launch in February. New kits include Over-EZ Egglofter for use with 24mm "D" and "E" motors, Maxima 1/2A, A and B Boost Gliders. The glider kits feature pre-cut contest grade balsa and spruce fuselage with bright yellow pod tubing. Apogee Components; 19828 N. 43rd Drive; Glendale, AZ 85398.

North Coast Rocketry

is now shipping the 1/72 scale Space Shuttle kit. The kit is sure to be popular with experienced scale rocketeers. This model features a detailed vac-molded orbitor that can glide back under free flight or utilize extremely light weight radio control. The NCR Space Shuttle also has a 4.6" diameter external tank, a 36" parachute and a pre-formed clear plastic fin unit. It is powered by a single Impulse G50-3 motor in the external tank. As a bonus, retail kits will also include a 16" x 20" color launch photo of the real Space Shuttle in flight. Contact: North Coast Rocketry; 4848 S. Highland Drive; Suite 424; Salt Lake City, UT 84117.

Sentell Enterprises

the original parachute company, now has a new line of braided shroudlines. To find out more about the full line of parachute products, contact: Sentell Enterprises; 104 Linden Drive; Hendersonville, TN 37075.

Mattel

Has introduced the "Air Aviva rocket" launching system, designed for ages 6 years and up. This product is an exciting alternative for the younger rocketeer. The rockets are kid powered by using the "Big Stompin'" launching pad. The Air Aviva Rocket includes a Stunt Shuttle for two stage separation and gliding. A super-spinning Spiral Screamer is also featured in the kit with a launch tower that stands over 36" tall. Visit your local toy store or contact Mattel for more information. Contact: Mattel, Inc.; El Segundo, CA 90245.

Custom Rocket Company

has combined forces with Rising Star Hobbies in order to offer its complete line of 23 high quality rocket kits via mail order. All kits are currently in stock and ready for immediate shipment. NAR Members receive a 10% discount off suggested retail prices. Every two months a new Super Saver special is also available. Contact: Rising Star Hobbies; P.O. Box 376; Greenfield, OH 45123.

Devcon

Offers a high quality professional quality white glue for use with constructing your model rocket kits. Gripwood White Glue is fast drying, non-toxic, dries clear, sets in five minutes and provides a high strength bond. For more information on this and other Devcon products, contact: Devcon Corporation; Wood Dale, IL 60191.

Qualified Competition Rockets

kits are designed to give the rocketeers a means to participate in NAR competition and sport events. The kits are ideal for section building sessions and are low cost, reliable and have winning potential. All parts and instructions are included. Catalog available, contact: Qualified Competition Rockets; 7021 Forest View Drive; Springfield, VA 22150.

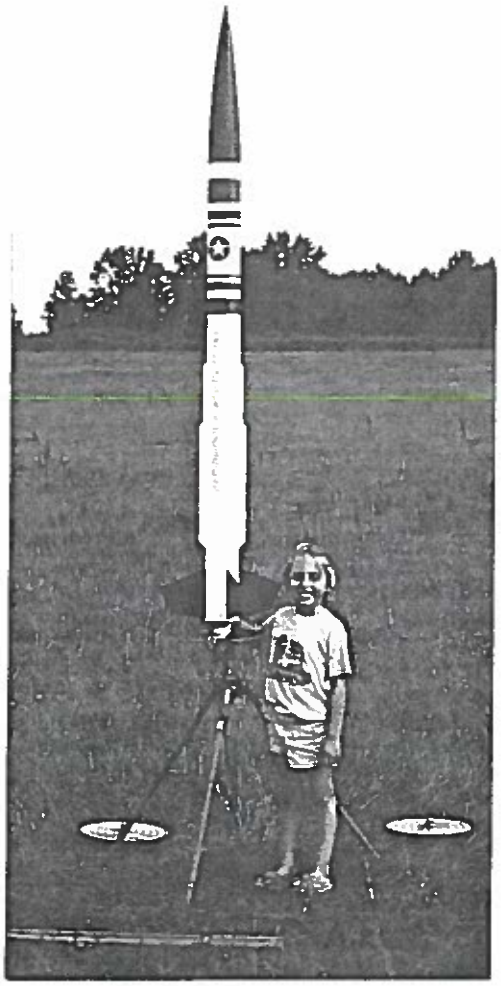
Photo Gallery

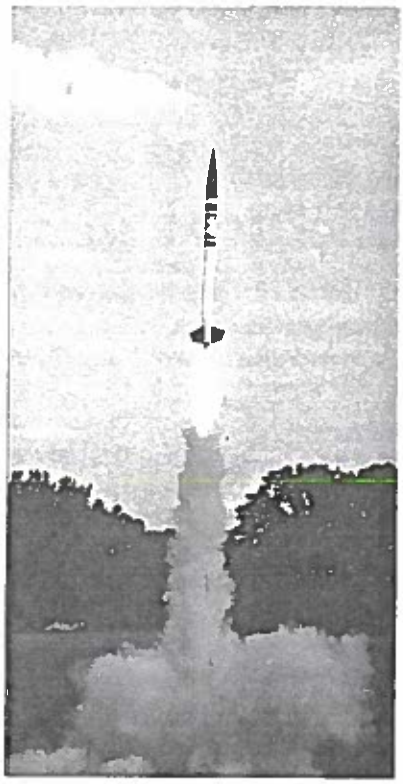
Rocketry is fun, exciting and educational. If you are not a member of a rocketry club, talk to your teacher about starting one in your school, or contact the SEP Program to get the name and address of the NAR section that is nearest you. Join thousands of other people just like yourself in the world's leading hands-on aerospace hobby.

Above: Bringing home what's left.

Right: Neal Redmond assists Jerry Thompson with his first high power launch.

Far Right: Successful launch and a newly certified high power rocketeer.





Left: Melissa Redmond poses beside her dad's modified "Standard ARM" from Cluster R.

Above: A beautiful liftoff and realistic flight under "I" power.

Right: Al Clark helps his son load one on the pad.

SPORT ROCKETRY

NAR®

The National Association of Rocketry (NAR) is the official non-profit national organization for model rocketry. The NAR establishes safety rules, certifies records, provides technical data and news, sponsors contests and promotes model rocketry.

Membership in the NAR entitles you to a one year subscription to ***SPORT ROCKETRY*** magazine, a membership decal, and a Technical Services (NARTS) catalog. Also available is personal and club liability insurance. And, you can have the fun of meeting other NAR members through local, regional, and national level events.

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