

Altitude!



South Jersey Area Rocketry Society Official Newsletter
VOLUME 4, NUMBER 2

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NAR Section #593
MAY / JUNE 2002

White Sands Missile Range – “America’s Range”

By John Coles

In my candidacy statement for the office of Treasurer, I mentioned that I would be missing some meetings this year due to work-related travel. The vast majority of this travel has been/will be to the White Sands Missile Range in New Mexico (WSMR for short). Located about 45 miles north of El Paso, TX in southern New Mexico, the range is approximately 40 miles wide and 100 miles long, encompassing some 3200 square miles of the Tularosa Basin. To put it in perspective, this is larger than the entire state of Delaware! An additional 2500 square miles of ranch land to the north and west is available for use with advance notice.

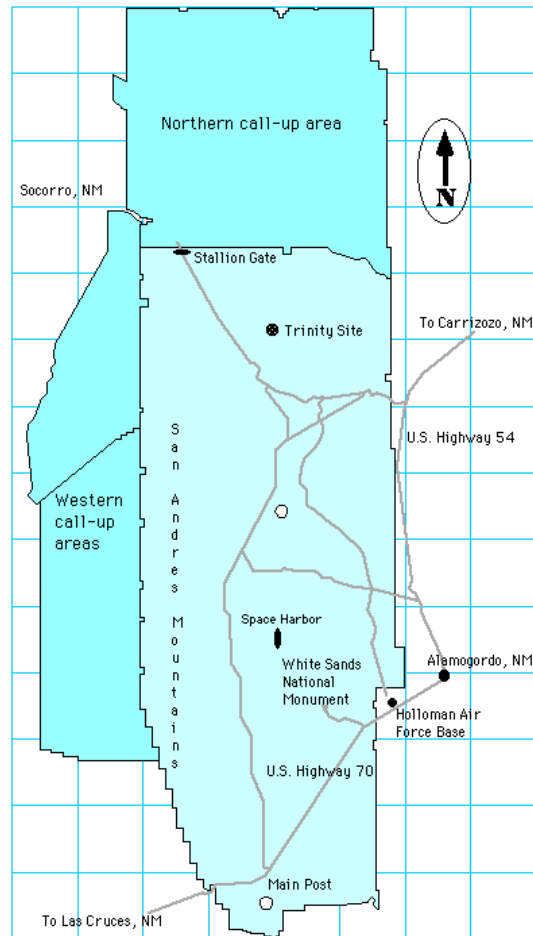
In addition to firing rockets and missiles on White Sands, the range has developed launch facilities in other areas of New Mexico, Utah and Idaho for long-range testing. In some of these tests, missiles are fired from the remote location to impact on WSMR. For others, a long-range target is launched from the remote site while the interceptor is launched from WSMR, with the intercept occurring over the northern end of the range.

While WSMR is officially an Army base, it shares its facilities with a number of other branches of the military and government. One of these is the Naval Air Warfare Center Weapons Division - White Sands Detachment (NAWCWD-WSD), established at WSMR in 1946. Presently, NAWC tests missile development and upgrade programs for the Navy’s surface weapon systems at Launch Complex 35. (LC-35 is also known as USS Desert Ship, one of two land-based commissioned “ships” in the US Navy. The other is the USS Rancocas, aka the “cruiser in a cornfield” here in Moorestown.) The Army-Navy rivalry is alive and well year-round on base, with the annual hijinx as expected during football season.

Two other “tenants” at WSMR are the US Air Force, and NASA. The Deputy of the Air Force acts as the executive agent for WSMR on all FAA matters and provides real-time control and management of the range's restricted airspace.

NASA’s White Sands Test Facility performed most of the testing of the shuttle's rocket engines,

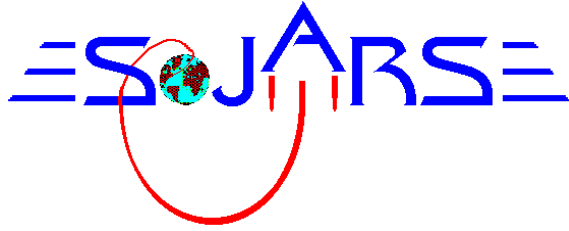
components and materials used in the orbiter. There is a backup landing strip for the Shuttle at Space Harbor’s Northrup Strip (used once by Columbia in March of 1982), and shuttle astronauts practice landings there in a jet aircraft, which simulates shuttle orbiter flight characteristics. The ground terminal of NASA’s Tracking and Data Relay Satellite System (TDRSS) is also located at the NASA White Sands Test Facility.



Range History

WSMR was established as a missile range in July of 1945, as the United States military sat up and took notice of the rocketry work being done by the

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Altitude! is the Award Winning* Official Newsletter of **SoJARS**, the **South Jersey Area Rocketry Society**, NAR Section #593. **Altitude!** is published bimonthly for the benefit of **SoJARS** members. Information contained in **Altitude!** may be used by anyone as long as proper credit is given. Please visit the frequently updated **SoJARS** website at <http://www.sojars.org> or call the **SoJARS Hotline: 856-424-5905**

Email address: SoJARS@rocketryonline.com

* NAR's Best New Newsletter '99-'00;
Honorable Mention '00-'01.

Calendar of Events

SoJARS Meetings

Unless otherwise specified, all meetings take place at the Cherry Hill Public Library, 1100 North Kings Highway, Cherry Hill, NJ. (856) 667-0300. Directions are available on our web site. For 2002, all meetings will be held on the 4th Tuesday of the month, 7:00pm - 9:00pm, in Room A.

Tuesday, May 28, 2002.

Tuesday, June 25, 2002.

Tuesday, July 23, 2002.

Tuesday, August 27, 2002.

SoJARS Launch Dates

Unless otherwise specified, our launch area is at the Gloucester County College. Directions are available on our web site.

Sunday, May 19, 12:00pm to 4pm.

Raindate: May 26.

Theme, Funtest, Vendor: TBA

Sunday, June 9, 12:00pm to 4pm.

Raindate: June 23.

Theme, Funtest, Vendor: TBA

GSSS, NAR #439

Launches are usually held on Saturdays each month, 10am - 3pm: May 18, Jun 22 (Summer Challenge 2), Jul 27, Aug 31, Sep 28, Nov 23, Dec 21.

Location: North Branch Park, near Somerville, NJ

GSSS Hotline: (908)-658-9417

Website: <http://www.robnee.com/gsss/>

MARS, TRA #105

Next Launch: TBA.

Location: Sod Farm, Allentown, NJ.

Website: <http://www.njtripoli.org/>

METRA, TRA #94

Next Launches: Jun 1-2, Jul 6-7, Aug 3-4, Aug 31-Sep 1, Oct 5-6, Nov 2-3.

Location: Barron Farm, Wawayanda, NY.

Web: <http://www.metrarocketclub.org/>

Garden State Tripoli, TRA #74

Next Launch: TBA.

Location: Cederville, NJ.

Website: <http://www.njtripoli.com/>

Calendar of Events

Continued

PARA, NAR #520

Next Launch: Sunday, May 5, 11:00a - 4:00p.
Location: a farm 9 miles north of Doylestown, PA
Phone: You may call Chuck Arkens (215) 855-5599
or David Stoetzer (215) 412-4348 the night before or
the morning of the launch for verification.
Website: <http://users.erols.com/dstoetz/para/>

SPAAR, NAR # 503

May 26: SPAAR Section Meet, 9am – 5pm.
June 15 – 16: RAMTEC 10.
Jul 7 & Aug 4: 1pm – 5pm.
Location: Cocalico High School in Denver, PA
Website: <http://www.spaar.org>

Deleware Tripoli, TRA #106

Next Launch: TBA.
Location: Harper Farm, Rhodesdale, DE
Website: <http://www.detripoli.org/>

Maryland Tripoli, TRA #68

Next Launch: TBA.
Location: Higgs Dairy Farm, Price, MD
Website: <http://www.mdtripoli.org/>

Team America Challenge

Around April 2003.
Specific dates and locations will vary by state, but we
are hopeful that SoJARS will be called upon to host
South Jersey's Fly-Offs.

RAMTEC 10

June 15 – 16, 2002.
Annual event sponsored by SPAAR, NAR #503.
Location: Cocalico High School in Denver, PA
Registration form available online:
<http://www.spaar.org/contests/ramtec.htm>

NARAM-44

NARAM-44 will be held on August 4 - 9, 2002,
in McGregor, Texas. Contest events will include: B
Alt, E Eggloft Alt, 1/2A Parachute Duration, C
Helicopter Duration, B Eggloft Duration, B Boost
Glide Duration, C Rocket Glide Duration, Sport
Scale & Pro Sport Scale, and R&D.

Check www.naram2002.org for details.

Altitude! Deadlines

Submissions for publication are accepted
continuously by the editor. The Deadline for the July
- August issue will be July 6.

“White Sands...”

Continued from Front Page

Germans during WWII. The White Sands Proving
Ground (as it was originally named) was to become
the focal point in America's development of rocket
technology and missile weapons.

Only days after its establishment, the range made
history when the world's first atomic bomb was
exploded at Trinity Site (near the northern boundary)
on July 16, 1945.

Establishment of a launch facility began, and the
first “hot” firing of a rocket motor took place soon
after when a Tiny Tim booster was fired on
September 26, 1945. October 11, 1945 saw the first
actual launch of a rocket from WSMR, when a WAC
Corporal was boosted by a Tiny Tim to a final
altitude of 43 miles. The first American firing of a
V-2 rocket took place at WSMR in March of 1946.

This launch complex (now known as Launch
Complex 33) quickly became the focal point for V-2
firings and developmental testing of such missile
programs as Nike, Viking, Corporal, Lance and
others. As other missile programs came into
development, more launch complexes were built,
until the range had the capacity to perform over 2400
missions in 1958.

In more recent years, WSMR has been the home
to some more exotic research, such as the Mid-
Infrared Advanced Chemical Laser (MIRACL), a
multi-megawatt chemical laser, the Large Vacuum
Chamber, a 50 foot diameter vacuum facility
designed to accept materials up to half the size of the
space shuttle bay, and the White Sands Solar
Furnace, the third largest in the country.

Missile Park & Museum

Just inside the north gate of the main post is the
missile park and White Sands museum. These are
open to the public, and the missile park is the only
area of the base where photography is allowed.

The missile park is the home to some 50 missiles
from the old WAC Corporal and V-2 to the present-
day Patriot. While a neat place to visit, almost all of
the missiles are painted in plain white and black, and
most of the larger ones are mounted vertically, so
obtaining a full set of scale measurements is
impossible.

The museum next door has a few more exhibits
on some of the smaller missiles, as well as some of
the theodolites and other equipment used throughout
the history of the range. There are some displays on
the history of the region, as well as a small room
dedicated to the Trinity Site.

Other Points of Interest

About 30 miles northeast of the main post is the White Sands National Monument. This is an area of the Tularosa basin covered by large dunes of white gypsum sand. There is a visitors center at the entrance to the park with exhibits on the flora, fauna and geography of the area. There is, of course, the obligatory gift shop – but the most interesting thing they sell are snow saucers. It turns out that there is one area of the park where “sledding” on the dunes is quite the pastime! The park is open daily from dawn to dark, except for being closed (and evacuated) when missiles are scheduled to be fired overhead.



My Involvement

My own involvement in WSMR operations isn't nearly as compelling as all of this. About half of the trips I take will be for meetings and presentations, while the other half will be to witness missile firings to test various engineering upgrades to the Standard Missile type 2 (SM-2) family of missiles.

Lockheed Martin in Moorestown is the design agent for the operational program that controls the missiles during their flight against a target.

For more information on the mission and history of the White Sands Missile Range, check out the links from the WSMR Public Affairs Office at: <http://www.wsmr.army.mil/paopage/pao.htm>

President's Report

By Art Treiman

It is with cautious optimism that I write this report. Our club is now three years old (hard to believe!) and we are well on our way to offering a “complete” program. By this I mean that we have active programs (or are close to having active

programs) in all areas of model rocketry. When we began, the idea was just to get off the ground. Now, if our permission to fly from the farm in Swedesboro pans out, we will have everything from competition to high power!

To give a little more detail to those I haven't spoken to... several months ago I was talking to a business acquaintance about rocketry. She had flown rockets as a kid and remembered they were pretty cool (my words, I think). I mentioned, as I always do, “you don't know any farmers, do you?” To my surprise, she said yes, she did know one!!! Things move slowly and a couple months later she asked them what they thought. Last month she called and told me that, yes, they would be willing to let us fly! I have not yet seen the field, but she describes it as massive, @1000 acres. It is farmed from spring to fall, but after harvest we can give it a go! I have not yet met with them because now is their busy planting season, so I don't know specifics or what price they might ask. But, as I said above, I'm cautiously optimistic!

On another front, our competition program continues with healthy enthusiasm. As you've seen in my emails, we have several active competitors in our group so, while we won't be winning the national title any time soon, we are certainly doing a respectable job. The newsletter continues to win awards. Our youth outreach programs also continue. These are key because fewer parents are likely to bring home a rocket to their child nowadays.

So, I remain “cautiously optimistic” about our future and the future of rocketry. Why cautious? Well, not because we are in trouble, but because we can't take our success for granted.

See you all at the field!

Art

Editorial

By Joe Libby

Ah, spring is in the air. Longer days, warmer weather, flowers in bloom, a nice dusting of green pollen on my car every morning...

Not to mention the possibility of a nice big farm to fly on this fall! Well, let's not count our chicks just yet, but it sure is exciting. Thanks Art!

Thanks also, as usual, to our contributors for some fine articles this issue. Earning Front Page honors this time is John Coles. Bob Ross gives us another fine building pointer (pun intended), a book review, and an FYI on motor thrust curve data. Adrian points out another space related coin & Ed

shares his Make-N-Take experience. And this issue finishes with a bang (sorry, couldn't help myself).

Launch Reports

Not available 'till next issue.

Members' Forum

Hobby Show Make & Take

By Ed Romani

I spent about 10 hrs this weekend at Make & Take. Yeah, there were times I had to break up the Excato knife fight (nobody got hurt), or ask a kid why he poured glue all over his hand (he was being "artistic"), or reassure when parents ask if the Elmer's glue was dangerous ("only if he glues the rocket to his hand and launches it ;) and I enjoyed every minute of it.

It's too bad that some of you didn't get to take part in the Quest Make & Take late in the afternoon. PARA helped a group of 12 kids led by the Salvation Army who came up from West Philly partake in rocket building. They were the most respectful, courteous, grateful kids I dealt with all week. I don't think half of them knew what a model rocket was. I'm planning to have them all up to launch their rockets this year at PARAs field. They even mentioned a name for themselves - West Philly Rocket Club. A good way to end the show with a warm, fuzzy feeling of "giving back."

"The greatest good you can do for another is not just share your riches, but reveal to them their own."
Disraeli

Bob's Modeling Tips – 2002

By Bob Ross
NAR 75320
Tripoli 7904

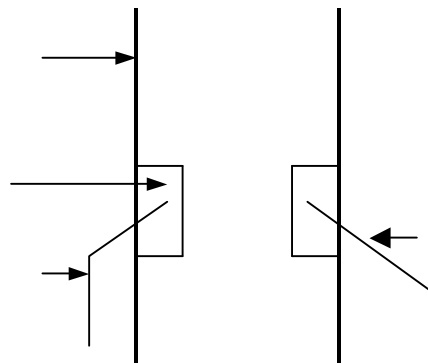
Antennas

A number of rockets have antennas protruding from the rocket body. Although prevalent on sounding rockets, some of the larger ones have them also. Adding these to the models gives an extra amount of detail that really stands out when viewing the rocket. Unfortunately these can break off very easily.

A couple of kits I have put together had toothpicks for the antennas. These were supposed to be glued to the body tube prior to painting. My estimate for the survival of these was ~50% making it out of the construction phase, ~25% traveling to the launch, and ~1% making it through the flight. Something better had to be done !!

To eliminate the toothpick or any other type of wood, I use spring (piano) wire, styrene covered wire, or nylon paint brush bristles. Monofilament fishing line would be OK as a material; however, it always has a curve to it. The one advantage that the nylon paintbrush bristles have over the wire is that they will bend if the parachute lines get near them during deployment. The drawback to the nylon is that they cannot be bent into a specific shape. My Terrier-Sandhawk model has antennas that protrude from the body at a 45° angle and then bend straight down. I had to use spring wire to model these. The Black Brant II has straight antennas and the nylon bristles work fine.

Attachment to the body tube can be a challenge. You simply cannot glue the antennas to the outside of the body and expect them to last. There must be a strong mechanical fit. To do this, add some material inside the body tube, drill a hole through the body tube and into the material, and then glue the antenna into the hole. I normally use pieces of 1/4 inch or 3/8 inch balsa wood about 1/2 inches long as the internal material.



The location of the antenna internal balsa wood material has a lot to do with its shape. In the nosecone or in the motor tube area the material can simply be a rectangle. Note you may have to plan ahead and glue in the material when you have access to that area of the rocket during construction. An antenna in the parachute cavity area poses additional problems. If the rocket had a small diameter body tube, substitute the balsa wood with a 1/8 inch piece of basswood. For a larger diameter rocket, a 1/4 inch basswood piece would suffice. In either case, the material would have to be rounded on all edges protruding into the cavity so the parachute does not

get caught in the tube. A “blob” of epoxy floated over the piece would also help to smooth the transition from the internal wall and the material.

That’s it for this issue. As always, if you have any comments, questions, or suggestions, don’t hesitate to contact me via e-mail, at the meetings, or at the launches.

Estes Motor Thrust Curves

By Bob Ross

As most of you know, Estes has released three new engines this past year, the C11, D11, and E9. They have also released their latest 2002 Estes Catalog. On page 33 there is a neatly laid out Thrust-Time Curve graph for each engine produced. Unfortunately someone goofed and copied the graph for the C6 engine into the C11, the B6 engine into the D11, and the D12 engine into the E9. Because of this error, it is impossible to tell what type of thrust-time curve the new engines have. Note that the Estes Engine Chart on page 34 of the catalog does appear to have accurate information.

Fortunately there is a website (<http://www.thrustcurve.org/>) that lists complete information for virtually every engine from every manufacturer. The information presented on each engine lists the NAR and Tripoli Certified Values, Static Test Data, and Thrust-Time Curves. Apparently up to date, the website includes the three new Estes engines.

Copyright warnings prevented me from inserting the correct Thrust-Time Curves from the website. Below is some tabular data on the engines taken from both the Estes chart and derived from the website. The sustained thrust is the part of the curve that follows the peak (maximum) thrust. D12 data is included since many of us are familiar with this long standing engine and can use it as a reference for the other three. For complete information and the actual Thrust-Time Curves, access the website noted above.

Motor	Total Impulse (Estes)	Maximum Thrust (Estes Chart)		Average Thrust (Website Data)		Thrust Duration
		N	Lbs	N	Lbs	
C11	10.00	22.1	4.9	10.9	2.4	0.8
D11	20.00	27.6	6.2	9.4	2.1	1.8
D12	20.00	32.9	7.4	10.2	2.3	1.6
E9	30.00	25.0	5.6	9.0	2.0	2.8

The delay times for the engines are listed below. Note that the Estes Engine Chart states, “Delays have

a tolerance of plus or minus 10% or 1 second, whichever is greater.” Since all Estes engines have delays of <10 seconds, you should simply use a + / - 1 second tolerance. This covers all engines, not just the new ones.

C11 – 0, 3, 5, 7

D11 – P

E9 – 4, 6, 8, P

New U.S. Space-Related Coin

By Adrian Liggins

March 11th 2002 saw the release of the Ohio State Quarter, as part of the ongoing program to produce one such coin for each of the 50 states in the order in which they joined the Union or ratified the Constitution. This particular coin is number 17 in the series. Its reverse features images of an Apollo



astronaut and the Wright flyer with the motto “Birthplace of Aviation Pioneers”, over the outline of Ohio. Apparently, along with the Wright brothers, several NASA astronauts hail from Ohio, including John Glenn and Neil Armstrong

(presumably the subject of the coin’s image). Four of these coins recently flew on board Columbia, during its mission to upgrade the Hubble Space Telescope.

This is technically the third U.S. space-related circulating coin: the Eisenhower (1971-1975 and 1977-1978) and Susan B. Anthony (1979-1999) Dollar coins both featured an adaptation of the Apollo 11 insignia.

The Ohio State Quarter should be appearing in your pocket-change shortly. Remember, however, that two versions will be in circulation: one from the Philadelphia mint and one from the Denver mint. These can be recognized by the small “P” or “D” on the obverse (front), to the right of Washington.

SoJARS Accumulating Contest Points

Dear Sojarians,

The fruits of our long and winding path to develop a competition program in our section are starting to show...

We now have several members who've amassed some competition points and as a result, we have several members with nice point totals and our

section is actually in the "middle of the pack" nationally! Check out:

<http://www.acmenet.net/~jvincent/nercb/20012002/uspt0501.txt>

Art

PS: Ed, you're now the 54th most competitive rocketeer in the nation... if I counted right!

Art,

Actually I earned 288 points at PSC in just 1 event. Total was 453. That's 1185 points for the year. SoJARS should then have (if no one else in SOJARS competed other than in Dec) 2794 points.

See standings from PSC Steel City Smoke Trail I in October: <http://www.psc473.org/>
Ed

Book Review

"Lost Moon..."

Book Review By Bob Ross

This past Christmas my wife gave me a book called *Lost Moon, The Perilous Voyage of Apollo 13*. It was written by Jim Lovell and Jeffrey Kluger. Jim Lovell was the mission commander of Apollo 13 and Jeffrey Kluger is a contributing editor / columnist at *Discover* magazine.

As you would expect from the title, the book describes the story of the flight of Apollo 13 on its near catastrophic journey to the moon. What it does in addition is give you an insight into the extraordinary efforts at Mission Control and the lives of the astronaut's families at the time.

The book is definitely not a dry, technical treatise on the mission. Instead, it is written more on human terms and provides numerous flashbacks to the beginning of Jim Lovell's career as a test pilot for the Navy, his transfer to NASA, his mission to the moon on Apollo 8, and the title mission. Through all of this, you learn a great deal about NASA and the camaraderie of the astronauts of that time.

If you enjoyed the movie, *Apollo 13*, or have an interest in the Apollo moon missions, I would highly recommend you pick up the book. It is a hardback published by the Houghton Mifflin Company. Copyrighted in 1994, it has a Library of Congress number 94-28052 and an ISBN of 0-395-67029-2.

Meeting Minutes

March 26, 2002

Submitted by A. Treiman

*Attendance list missing

1. Open - A. Treiman
2. Review and approve previous minutes
3. Treasury Report - J. Coles- \$435 in bank, Art holding \$99 in dues and other collected fees. Cash box total pending.
 - a. Reminder was made that some still have not paid 2002 dues.
4. Launch Debrief - there was no launch. Next launch Saturday 4/13 if baseball does not take it for a rain date.
5. Newsletter - J. Libby. Joe presented latest issue. Fine job!
6. Website - Discussion was entertained about putting a downloadable launch card on the website. We'll try to get a copy to Paul to post it.
7. Hobby show - a good deal of discussion on this. We had an excellent showing. Club members helped out with the booth as well as the make-n-take run by PARA. This years show was definitely smaller that last years, but Estes had a nice presence, with many new kits.
8. Outreach - B. Berman - there is a scout program in mid-April, being coordinated by Art. Contact him. It will be a build on Wed pm 4/10 or 17.
9. Competition - T. Mitchell - Will be planned for NAR sanctioned meets in July and October. July will be 1/2A PD, A BG, and Set Dur.
10. New shirts - Joe's got em! Fine job... these are nice golf shirts. Contact Joe. All should have received email from him.

April 23, 2002

Submitted by A. Treiman

Present: A. Treiman, E. Romani, S. Wilson, S. Wilson, M. Rossbach, P. Menard, E. Blair, P. Blair, L. Paullin, J. Libby, R. Mozier, B. Ross.

1. Open - A. Treiman
2. Review and approve previous minutes - Done
3. Treasurers Report - J. Coles absent so tabled
4. Future Launch Dates - Just in from GCC: May 19th w/ tentative rain date May 26; June 9th w/ tentative rain date June 23.
5. Launch and Failure debriefing - Windy, windy. The day was nice so we gave it a try. Unfortunately the high winds carried the sound, and our rockets, in the direction of the tennis

courts. Although no rockets came close to the tennis match going on there, it bothered them so we packed it in early.

6. Newsletter - Joe Libby - Deadline is first week of May... get your articles. We always welcome contributions.
7. Web update - Paul DeCrane
8. Design of the Month Contest - Winners were 1st: Bob Ross with a beautiful V2, and 2nd went to Randy Depasquale with the prototype for his TARC model, a very cool parallel stager.
9. Update on field search - Woo hoo!!! We likely have a farm! We discussed the tentative "yes" we have from a farm with a 600 acre farm in Swedesboro. The farm is planted from spring thru fall, but we will be permitted to fly in the off-season. We will hear and talk more with them after the busy spring planting season is over. The general consensus was we will initially fly up to the 3.3lb/G motor limit and then see how it goes.
10. Outreach - Cub Scouts debriefing - Art discussed the nice build session we did with a scout troop in Woodbury. He, Steve Bastow, and Bruce Canino helped about a dozen scouts build Estes generics. They'll be flying at our may launch. The troop is run by Sharon Mustaro, who's son Nick is a Sojars "frequent flyer!" At the troop meeting was a nice display on rocketry done by Nick. Good job to all!
11. Contest Committee report -
 - a. Events for July: 1/2 A PD, A B/G Dur, Set Dur
 - b. Theolodites - Thanks Russ Mozier! We have one done and three more in various stages. Goal is to try them out at RAMTEC (maybe), then at our launches, and be able to do altitude events in our fall Open Skies 2002 meet.
 - c. Also, there is a GSSS Event June 22 and RAMTEC in Allentown, PA, Fathers Day weekend (Russ Mozier and Ed Romani are planning to attend).
12. AIM - Art's working on it
13. T-shirts - J. Libby - we have broken even and the shirts are selling well. Thanks Joe!
14. Airshow note: Thunderbirds at Millville 5/4 weekend and at Willow Grove Sept.
15. PALS group: Mike Rossbach discussed the PALs group. This is a terrific program he's been running for a couple years now in Egg Harbor Township. Mike, Jack Komorowski, and Jim Szygula have been holding monthly launches for a PALS group. Any of us are welcome to attend their launches, which are usually on the second

Sunday of each month (this is why we aim for the third Sunday with our launches!) The field is about the same size as the GCC field and it sounds like a good time with a good group of folks. Website is:

<http://www.ehtpal.com/rocket.html>

16. Russ Mozier then gave his talk - "Chillin' with the Astronaut's Folks" (ed. Note: the title was mine, with apologies to Russ!) At the most recent space shuttle launch, Russ and his wife happened to be at a kite festival. As if seeing the launch wasn't enough, the next day while flying kites on the beach, a nice couple approached Russ to ask for kite advice. It turns out that the people were the parents of the commander of the shuttle mission! Russ spent some time with them (fine folks) and learned all sorts of interesting stuff about the "behind the scenes" of the lives of the astronauts and their families... like real time email to the shuttle crew for the families! (ed. again: Can I retire yet?)
17. Adjourn at 9pm.

