THE OFFICIAL NEWSLETTER OF NARHAMS SECTION # 139

ZOG-43

MAY 2001

PHOTO: Participants at the Opossum-5 Rangehead.

Photo By : Jim Filler

IN THIS EDITION

THE ONLY NAR NEWLETTER PUBLISHED MONTHLY ! !

From the Editor:

Every person reaches a point in his or her life where change is imminent. I can say with no uncertainty that I have reached one of these points in my life. I recently was notified that I was selected for a promotion at work. This will with out a doubt cause a lifestyle change for my family and me. With a promotion comes added responsibility, better salary, and less time for recreation. Since I've not been in this position since becoming King ZOG and the editor of ZOG-43, I am not certain how these things will play out. While I can say, I've thought a lot about this subject, I've not come close to a decision about my future and my club responsibilities. I am going to wait until after NARAM before I decide what is best for me. My wife voiced her opinion by saying I should resign my position as editor of ZOG-43and retain the position of club president. This is a possibility. I might decide to resign both positions. To put in all in a nutshell, I will let the club know of my intentions after the conclusion of NARAM-43. With the possibilities available, I am asking now for volunteers to fill these positions if they become vacant. If you are interested in taking on one of these responsibilities let me know. I will certainly answer any questions regarding either. The idea scenario would have two candidates for president, if I decide to stay, I can run against the other two. A new editor for ZOG-43 might be a tough slot to fill. I will certainly be willing to help someone starting out putting it all together. This way, the club is prepared. I hope you will see my decision as I do a tough one, so I hope you understand why I have chosen to proceed in this direction. For those that read this column, you will be the second to know (the wife is first naturally).

In other issues, we need your help. We are having a successful contest year thus far. We are only ½way done. With six contest factors gone, we have six left. ECRM is three, and RAMTEC is three also. If you can come to these meets to support our effort, you certainly have my appreciation. We will need a strong turnout at both meets to finish well. Looking back at our efforts for OSTRICH and OPOSSUM, we did quite well. These types of results can only happen with plenty of participants. If you have any questions, or need any help, contact any of the club officers. Hope to see you on the contest range !

Keep 'um flying at contests !

Jim

LAUNCH WINDOWS

SPORT lAUNCH

Middletown Park
May 12 - 10am-4PM
Contact: Khim Bittle

ECRM-28 Hosted by NARHAMS
Regional Meet
Middletown Park
May 19-20 Events are C Egg Alt, A PAY alt,
¼ A FW, A SD, SpSc.
Contact: Jim Filler
Picnic BBQ to follow on Sunday afternoon.

SPORT lAUNCH

Middletown Park
June 9 - 10am-4PM
Contact: Khim Bittle

RAMTEC-9 Hosted by SPAAR
Center Valley, Pa. June 16 & 17
Events: C Egg Dur., D HD, 1/2A BG, A SD, B SR Dur.
Contact: Glenn Feveryear

Goddard Commemorative Contest
Hosted by GSFC & NARHAMS
Greenbelt, Md. July 15
Non NAR contest , events to be announced

NARAM-43 National Meet Hosted by MARS
Geneseo NY Aug. 4-10
Events: ½A BG, ½AFW, A ALT, B SRA,
C SD, C ELA, D HD, SpSc, R&D.
Contact: John Viggiano

SPORT lAUNCH

Middletown Park
Aug 11 - 10am-4PM
Contact: Khim Bittle

TECH TIPS

WORKING WITH SELF-ADHESIVE DECALS

By: John McCoy NAR #15731

Our industry has been using adhesive backed vinyls for many years now, "self Stick" decal are really these vinyls.

1.) You really don't need to "Dip" the decal in your water/detergent mix. Get a spray bottle, spritzer, I've even used empty chloroseptic spray bottles, fill with water and 2 drops of dishwashing detergent, this is called a "wetting agent" by the vinyl manufacturers. simply peel the backing a spray the adhesive side and the surface your going to apply it to. Apply the decal or wrap and squeegee out as much water as possible starting from the center of the decal or wrap. Allow an hour or two for drying, than resqueegee the entire application, again starting from the center, its done. We use this method to apply vinly to sign faces as large as 4 ft. x 12 ft in one piece.

2.) Yes, the same procedure works for clear decal material.

3.) If possible trim the area contaminated at the corner, suggest using the side of your finger to start the edge separation from the backing than use a rounded dowel of blunt object to "hold" the corner down on the table while you remove the remaining backing sheet, do not handle until the adhesive has been completely "wetted".

4.) If a corner absolutely has to be reattached, a drop of thin CA will work. Work the CA out to the corner with a rolled piece of paper towel.

Keep un flyin
John

EJECTION PLUGS

By: John McCoy NAR #15731

Editors note: I thought I might preface this with some background first. Competition models can use these foam plugs for deployment of contest parachutes, streamers, flex-wings and more. The advantage is a clean deployment. When using an external mounted shock cord, this is a very easy and reliable method. When using an internal shock cord, the shock cord mount must be below the plug in order for the plug to move through the body cleanly.

I thought I might share my method for making ejection plugs.If you have black Shaft body tubing it works the best, regular craft paper can be used with a little modification. cut a 4" pieces of tubing for each tube size you intend to make plugs for. I have used plugs for BT-60 to 7mm micro-maxx. Find, buy, or make, a solid wood or metal dowel that easily but snuggly slides inside each body tube size, cut these 6" long. Using thin CA Soak the outside edge at least 1" or more on one end. Allow to dry, don't us accelerator. When completely dry, sand an approximate 60 degree bevel on the CA'ed end of each tube, sand to a shape edge, this becomes your cutter, I place the dowel in the tube, tapering the top edge to the dowel while shaping the edge. After sharpening, again CA the cutting end up about an inch. If you have a buildup of CA on the inside of the tube remove it by sanding. Wipe the sanded inside edge with a CA soaked Q-Tip or piece of paper towel. I use 1" thick Closed cell blue Styrofoam material but regular old open cell white Styrofoam will work fine, its just a little harder to get a "clean" edge.

Place the foam board on the table or other flat solid surface. select the size(s) you are going to cut. Place the right size dowel in the cutter tube. Place the pair on the foam. Using a little down pressure on the tube only, rotate the cutter tube in one direction c.w. or c.c.w. until you have advance the cutter through the foam. This operation is very quick. Lift the cutter/dowel combination from the foam, push out the plug. Repeat. The new plugs may be a little ragged on the edges, these can be sanded off with 120 grit sandpaper. I slightly bevel the ends for easier insertion, I usually keep the plugs, cutter tube and dowel for each size in a separate zip-lock so I won't loose the cutter & dowel or mistakenly use it for something else. I usually resharpen the cutters after each use to be ready for next time. Caution! If you are using the Black Shaft to much pressure on the cutter tube will crack it while turning. I also mounted a 13mm 18m and 24mm black shaft cutter tube on dowels with a 1/4" rod centered for use in my drill press, they work OK but I really prefer the hand method, not quite as quick but fewer rejections. You will have plugs that just don't look right, chuck them and cut others. Blue Styrofoam is best by far, cutting is clean, straight and fewer gouges or torn sides.

Hope this helps
Keep um flyin
John

CONTEST RESULTS

OPOSSUM-5

By: Dr. Chris Kidwell NAR # 45225

OPOSSUM-5 got off to a rather ominous start on April 21 with overcast skies and sprinkles of rain as the range was being setup. At the contestants meeting, the dice were rolled for random duration, and as luck would have it, the time was again set at 35 seconds. Everyone then disbursed and began madly prepping away to get as many flights in as possible before the weather worsened. About 1:30, the floodgates were released, and it poured rain for about an hour. This actually worked out quite well for the sport scale judges, allowing us to do our work without missing too many flights.

Flying resumed at a frantic pace around 2:30 pm. With 32 registered competitors, and 5 events, there was a constant line at check-in until after 6 pm.

Random duration proved to be a bit less competitive than at OSTRICH-1. Kris Bittle took first in A division with 8.6% error. B division was the war between proxy flyers Mike Filler and Josh Russell. ..... (Continued on the next page) .....

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Mike edged out 1st place with 37.1% error over Josh's 34.3%. First time competitor Alex Kovacic got exactly 35 seconds, but unfortunately was disqualified for an ejected motor. Ed Giugliano proved the value of his R&D research, also getting exactly 35 seconds to claim 1st in C division. Murphy's Lawyers took 1st in Team division with 14.3% error over TMJ's 22.9%.

B Streamer saw quite a variety of designs, but everyone stuck with the unofficial agreement to use 18 mm motors. Matthew and Mike Filler took 1st in their respective divisions. I took 1st in C division (more R&D research paying off), and Grumpy Old Men took Team division. B Parachute had another club agreement to use clunky, preferably Big Bertha size, models on Estes motors. The Petrovich's took A (Mark Jr.) and C (Mark Sr.) divisions, while Josh Russell won B division. The guys from SPAAR were not aware of the agreement beforehand, so they didn't have a Big Bertha, but we let them fly anyway, and Over 40 Victims of Fate took 1st in Team division.

A Super-Roc provided the usual share of loop-de-loops and skywriting. A and B divisions were again the battle between proxy flyers, with Richard Tsang winning A division, and Josh Russell winning B division. Jim Filler took C division and Grumpy Old Men won Team division.

Sport Scale saw many old models come out of retirement to serve duty again. Kris Bittle took first in A division with his Kappa-9M-1. Mike Filler won B division with a V-2, beating out Josh Russell's V-2. Jim Filler was back with another Black Brant III to win C division. Grumpy Old Men flew their GIRD-09 again for another 1st place finish in Team division.

I want to give a big thank you to everyone who participated, performed their range duty, and put up with a very hectic contest day. We did extremely well as a club, racking up 9,880 points. This puts us well on the way toward the winning national championship. We just need to keep up this level of participation through ECRM and RAMTEC, then do the big road trip to Geneseo in August!

NIGHT LAUNCH - 2001

Each year for the past several years, NARHAMS has applied and received a FAA waiver for night operations. With some special conditions and permission from the park, we decided to schedule 2 night launches this year. The first occurred after the conclusion of OPOSSUM-5. About 7:30 PM the weather was the nicest it had been all day and we opened up for night operations after a briefing from John McCoy a.k.a. Mr. Night Launch. A few special rules were reviewed and launching started. All types of lighting apparatus was used including cylume sticks, to LED circuits and strobes. Many successful flights happened to the thrill of the crowd. If you've never attended a night launch, put the next one on your calendar for this upcoming Sept. This is one you won't want to miss !

NIGHT LAUNCH EQUIMENT

By: Kevin Johnson NAR # 77083

This is really an extension from last year's night launch where Jen suggested I talk about how I came up with my LED strings for the infamous Las Vegas Wicked Winnie Payload. Since we just finished up a night launch the thoughts are fresh in my mind.

If you haven't heard about it yet, American Science and Surplus (www.sciplus.com) is a great source for interesting doo-dads that can be used in our hobby. Specifically for night launching, AS&S has a large selection of LED's in various sizes, colors and mountings. One of the items I got last year was a rainbow headband with a string of blinking lights connected to a 9 volt battery clip. At 3 for $5, I found a cheap source for a pre-wired light strip. All it took was a couple quick snips with the scissors to free the LED's from the head band, a couple of holes poked in the payload bay and pretso chango! a NITE equipped rocket was born!

I also picked up a surplus personal alram with strobe and siren, that with some minor surgery to remove the case, fit perfectly inside my stretched Big Daddy, the remains of which are still imbedded in the Middletown turf. This ran me about $6 if I remember.

With the requirement of anything larger than B power to use electronics, and still not being the world's best electron pusher, I love to see what each new catalog has to offer. Here is a small sampling of the items in the May volume that you might consider for the next launch..

Product No./ Description / Price
30837 / COMPLETE 12 LED STRING / $5.75 (with control to make them chase)

30574 / HEART LIGHT PIN / $2.50 for 2 (red blinkers w/batt)

91762 / RED/GREEN LED / $2.00 for 2 (kinda like LED buttons, w/batt)

There are also LED grab packs for those of you who want to go at making your own system, for less than what you'll pay at Radio Shack.

PREVIEW TO ECRM-28

By: Jim Filler NAR # 27862

The 28th annual East Coast Regional Meet will take place on May19&20 at Middletown Park. I decided to go ahead and post the schedule early this year for those who plan on attending.

ECRM-28 EVENTS

1/4A Flexwing
A Streamer
A Payload
C Eggloft Alt.
Sport Scale

FYI : The contest is a regional and will have to following fee schedule A/B Division $8 C/T $12

The schedule will go as follows:

Sat May 19
7:30-8:00 am arrive for setup
9:00 Contestants briefing
9:30 Range open for Altitude events and Sport Flights (Sport flights are open all day both days, but contest flights have the priority)
11:00 Shift change still Altitude
12:30 Range shut down for Lunch! Yeah !
1:00 Shift Change Range open for Altitude
2:30 Shift Change still open for Altitude
4:00 Range open for Duration
5:30 Range closed for the day Returns closed at 6:15
****The last shift from 4-5:30 will be for duration only. however, if we have all altitude flights done sooner, I will close tracking earlier and open to duration earlier.

Sun May 20
9:00 Range opens for Duration and Sport Scale
Sport flights all day
10:15 Shift Change still for Duration and Sport Scale
11:30 Shift Change still Duration and Sport Scale
12:45 Shift Change Sport Scale closes Only Duration and Sport flights
2:00 Range closes for all flights
2:00-3:30 range tear down and results tabulated
3:30 Deadline for returns
4:00-5:30 Awards (Trophies for all 1st place finishes, ribbons for 2nd-4th place.)
Picnic/BBQ for any and all, cost $5 dollars includes the usual, fried chicken, Hamburgers, Hot-dogs, trimmings and sides. If you wish to bring something to share please do. Please let me know on Sat and pay on Sat if attending the BBQ so I can purchase the correct amount of food.

FLYING "A" PAYLOAD

By: Jim Filler NAR # 27862

Flying any competition event starts with one thing. Get a qualified flight! Let's look at a couple of basic items specific to this event. Your model must be tracked for altitude, therefore the trackers have to be able to see it. Tracking powder added on top of the recovery device gives the trackers something to zero in on in the sky. The trackers must be within 10% of each other in order for it count as a track closed flight. All payload events require a parachute recovery. I suggest using a plastic type chute in the 8"-10" range. I also recommend using the over the top method of attaching the shroud lines. Use plenty of kevlar cord for your shock cord. Typically a payload model needs 4'-5' to prevent a separation. The payload section of the model must return with a parachute as mentioned before, however if you do have a shockcord failure, make sure the chute is attached to the payload section. It is possible for the booster section to tumble if it recovers safely in the RSO's opinion. Some contests will provide you with a payload, some require you to provide your own. The Pink Book sets the parameters for its min. size. The standard NAR model rocket payload is a non-metallic cylinder containing fine sand, with a mass of no less than 28.0 grams. This cylinder shall be 19.1 millimeters (+/-0.5 millimeter) in diameter, and 70 millimeters (+/- 10.0 millimeters) in length. The payload may be permanently sealed to prevent the loss of the sand. No holes may be drilled into it, no changes made in its shape, and no other material may be affixed to it

When building a model for "A" payload, you will need to plan around these size requirements. A good place to start is with a Pratt Hobbies Super-6 kit. The body is the old CMR RB-77, which is close in size to current Apogee and Totally Tubular 19-mm airframe. Another nice feature of the Super-6 is the plastic vacu-form nosecone that requires zero finishing and lightweight. Wen kitbashing the Super-6 allow for enough room on each end of the payload compartment for the nosecone shoulder and the shoulder connecting the payload section to the main body. Fins can be somewhat smaller with all the weight of the payload up front. A model that is 19mm the entire length will yield a qualified flight using an A8-3. If you want to improve your performance, try using a 13mm A10-3 or A3-4. By using a 19mm payload section with a transition to a 13mm booster, you will improve performance even more. I have never attempted using an Apogee 10mm A2. This could be successful if conditions are very calm.

Some tips for flying the event. I mentioned tracking powder. Go to your local hardware store and pick up some orange powdered chalk, usually available near the tools. Pour in about a body diameter in height on top of your recovery device and replace the payload section. Tape your nosecone securely on to the payload section after installing the actual payload. Tower launching will result tin the best flight. Remember to fly when the sky is optimum, meaning fewer clouds and or haze. Be aware of the location of the baseline, the line running between the 2 tracking stations and avoid crossing the line. If you have a slight breeze, resist the temptation of flying into the wind, angle your model straight up or slightly with the wind. Good Luck !

FLYING "A" STREAMER DURATION

By: Jennifer Ash-Poole NAR # 61415

At ECRM, we are flying A streamer duration. Since we are going all out competition wise at this meet, plan on using the 13-mm A3-4T, or an Apogee A2-3.
(Editors note: I would use the A2-5 in a 13mm model and the A2-7 in a 10mm model.) Even if I am using an Apogee motor, I tend to use a 13-mm body tube. This helps the streamer come out (important) I just use an engine tube around the engine, and tape, lots of tape.

Streamers must have a length to width ratio of 5 to 1 or greater and a minimum area of 100 square centimeters (or approx. 15.5 square inches). It has been proven that a 10 to 1 ratio works best for streamer duration. If we use the 10 to 1 rule, we can have a streamer that is 2x20, 3x30, 4x40 (see the pattern?). If we are trying to put a streamer into a minimum diameter tube (10.5) then we will probably go for the 2x20 or 3x30 inches. The type of material used for the streamer has been an R&D project. You can use mica film (plastic), crepe paper, mylar film or even cloth. I have red mica film I got from Eclipse. Sometimes, when I have shredded my streamer, I will use crepe paper in a long stream just to get a qualified flight. (Or, us one of those Alphas you built for Ostrich!)

When I build my streamer duration model, the body tube is 8 inches long. I put the shock cord on the outside of the tube so that it doesn't snag the streamer. I attach the shock cord next to a fin, and use a piece of mylar tape at the balance point on the tube. This balance point is found by putting a spent engine into the model, and holding onto the nosecone.
The balance point is where the model lies flat, so it has more resistance and more time on the stopwatchHow long do you make the shock cord?? Well, I tend to do twice the length of the model. Some people do 3 times the length, but you can get things tangled.

How to fold a streamer? Usually, you fold the streamer 75 percent of the way, like this
/\ /\ /\ /\ /\ /\ /\ /_____ _ this end is attached to
/ \/ \/ \/ \/ \/ \/ \/ the shock cord.

The greatest challenge in streamer is getting the streamer to deploy. With the Apogee motors, the ejection charge can be a little weak (plus we won't even discuss the fun of trying to get them to light!) I plan on getting some Estes engines to try them out. Sometimes the greatest challenge in contest flying is just getting a qualified flight.

FLYING ¼ A FLEXWING

By: John McCoy NAR # 15731

From the Pink Book: Flex-wing is open to any model rocket, one portion of which returns to the ground in stabile, gliding flight supported by flexible aerodynamic lifting surfaces which sustain that portion Against gravity.
If the entry is staged, the gliding portion must be part of the uppermost stage and must not be deployed until that stage has burned out. The entry may separate into multiple pieces; only the gliding portion is timed. The purpose is to achieve the longest flight duration time. Any entry descending with a parachute or streamer attached to the gliding portion will be DQ'ED."

Two flights are allowed, times are combined. One flight must be returned."That's all the official stuff:

Most competitors fly 12" flex-wings or is it flexwings? Usually an .020 steel spring with 3/64th or 1/16th inch spruce square dowels. Thread tied and CA'ed to the spring. I fly the same size glider in 1/4A - C motor flex-wing. Spruce/spring frames are covered with some type of "Thin" flexible plastic or mylar material, 1/4mil mylar works will, also most plastic shopping bags, look for the very thinnest weight bags. Coverings are attached to the spruce with a good "Contact Cement",Weldwood or other bands. Make sure to powder the flexie with baby powder "Before" folding for the first time after construction. It is also a good idea to rub off any excess contact cement before that first folding,with you finger after it has dried.

Booster(s) can be any material you are comfortable with. 13mm is the usual dia. and approximately 12" long. Fit the booster with Three .015 waferglass, 1/16" basswood or 3/32" balsa fins. 1" root, 5/8"tip and 1-1/4" span clipped delta planform set 1/4" from the aft end of the tube seem to work best for me. Launch lug or tower launch. Keep in mind a well trimmed 1/4A flexie will fly away in the slightest breeze, one MUST be returned so either detrim or limit altitude on one flight.

Tips:
I always have a backup finned body in case of landing damage, and one additional body in 18mm, and 24mm to limit altitude if the conditions are bad. Always use ejection plugs with flex-wings. Powder the flex-wing before folding.
Fold the wing material back on itself limiting the wraps around the spares to two. Don't leave flex-wings folded in the bodies for long periods or in direct sun.This 1/4A event will most likely be flown on 1/4A3-3T Estes motors, A few may try 10.5mm 1/4A2-2 Apogee's or some darn fool may even try staging to micro-maxx 1/8A's, no matter which it will be fun and frustrating.

FLYING "C" EGGLOFT ALTITUDE

By: Dr. Chris Kidwell NAR# 45225

C Eggloft Altitude is only slightly different from C Eggloft Duration that we flew at OSTRICH. You can use the same B-Liner kits that we built before with Pratt egg capsules. All of our altitude events are tracked to ejection, so you will want to add a bit of tracking powder on top of your recovery device to aid the trackers. Since this is altitude, there is no need to try cramming a 30" chute -- just use an 18" plastic, mylar, or even nylon chute and hope you don't land on the road. The model is allowed to separate, so make sure the chute is attached to the egg capsule.

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There are several choices for engine selection:
- For a qualified (and relatively cheap) flight, use an Estes C6-5
- In calm conditions, you can get a bit more altitude with an Apogee C4-5
- Apogee C10-4 is also a possibility but may risk breaking the egg on boost
- If you have a model that tapers down to 13 mm, then Apogee C6-4 or C6-7 is definitely the way to go. The reduced drag will give a substantial increase in altitude.

OUTREACH ACTIVITIES
ROCKVILLE CONSORTIUM OF SCIENCES

By: Jennifer Ash-Poole NAR # 61415

On April 29, several members of the NARHAMS club descended upon Montgomery College for the Rockville Science Consortium. This is the 11th or 12th year of Ed Pearson helping with this event.

Alan Holmes, Richard Hickok, John and Mary McCoy, Chris Kidwell, Ed Pearson and Jennifer Ash-Poole helped 19 kids build Alpha 3 kits. Then at 4 pm, the kids met the group out on the athletic field to launch them. The kids seemed younger this year, but were just as enthusiastic as ever.

Between the building and launching, I went and looked around at the exhibits. Imagine my surprise to find Ed Pearson and Kevin Johnson in photos at the Botball exhibit! The Explorers Post that we helped last year had a poster with the launch, and there was Ed Pearson showing how to fold a parachute.

If you haven't come to help at the Rockville Science Day, plan now for next year. Bring the kids, have fun, and help build rockets.

May - Mai - Mayo ...

Paul Miller, NAR 51615

Enough of the showers bring on the flowers. And bring on Mars! Mars has arrived. Next month our view of Mars will be even better. The Full Flower Moon fills the May sky on the seventh.

Try to find Mars around midnight on May 9th and 10th. He will be low in the southeast in Sagittarius. Before the end of the month Mars will move toward Scorpius and appear brighter than Jupiter.

Early in May, Mercury, Saturn and Jupiter team up in Taurus about 40 minutes after sunset. Set your sights to the WNW just to the left of the Pleiades on the horizon. Mercury will be at its best for the whole year. If you have yet spot the swift "messenger", this might prove to be your best opportunity. Mercury will be below Saturn at the beginning of May and will quickly pass both Saturn and Jupiter by the 22nd! By the 24th, Mercury will dim considerably and climb the right of a slender crescent Moon.

Venus rises in the east about 90 minutes before the Sun. Venus will be at its greatest magnitude early in Mat - a real treat for early morning skywatchers.

On May 29, 1919 my hero Al Einstein had his General Theory of Relativity tested during a total solar eclipse. Whoa! What a guy!

Well, I've got to get back to my garden... According to Bob Ryan's 2001 Almanac we had a record late frost on the Delmarva on May 21, 1992. What? Frost in Frederick for ECRM-28? Of course, frost rarely forms when it's windy and it's been WINDY when we've flown rockets so far this year. The heck with the garden, I've got to get my range box ready for the East Coast Regional Meet. Maybe I'll pack my parka too.

NASA / SPACE NEWS

Compiled By: Jennifer Ash-Poole NAR # 61415

NASA/ New main engine promises even safer shuttle ride
April 30, 2001

The next Space Shuttle crew can expect an even safer ride into orbit, thanks to the completion of a new SpaceShuttle Main Engine. Workers installed one of the new engines, called the Block II configuration, on Space Shuttle Atlantis, April 24, at NASA's Kennedy Space Center, Fla.

Atlantis' first flight using the new engine is targeted for no earlier than June 14 on mission STS-104 to the International Space Station. Atlantis will use one Block II Main Engine and two Block IIA Main Engines to complete its full complement of three engines.

Improvements to the main engines, managed by NASA's Marshall Space Flight Center in Huntsville, Ala., continue to evolve to produce the safest, most reliable and reusable space transportation system in the world.

The Block II Main Engine configuration includes a new Pratt & Whitney high- pressure fuel turbopump. The primary modification to the engine is elimination of welds by using a casting process for the housing, and an integral shaft/disk with thin-wall blades and ceramic bearings. This makes the pump stronger and should increase the number of flights between major overhauls. Although the new pump adds 300 pounds (135 kilograms) of weight to the Shuttle, the results are a more reliable and safer engine because of increased pump robustness.

"With this design change, we believe we have more than doubled the reliability of the engine," said George Hopson, manager of the Space Shuttle Main Engine Project at Marshall. The engines perform at greater temperature extremes than any mechanical system in common use today. At minus 423 degrees Fahrenheit (minus 217 degrees Celsius), the liquid hydrogen fuel is the second coldest liquid on Earth. When it and the liquid oxygen are combusted, the temperature in the main combustion chamber of the engine is 6,000 degrees Fahrenheit (3,316 degrees Celsius), hotter than the boiling point of iron.

EARTH DAY PORTRAIT IS FIRST ONE SNAPPED BY NASA'S 2001 MARS ODYSSEY

NASA's Mars Odyssey spacecraft turned its multipurpose camera homeward last week and took its first picture -- a shot of a faint crescent Earth -- as the spacecraft heads off toward its destination, the planet Mars.

The image was taken as part of the calibration process for the Thermal Emission Imaging System (THEMIS), the camera system that is one of three science instrument packages on the spacecraft. The imaging system will study the Martian surface in both the visible and the infrared and will help determine what minerals are present. It also will map landscapes on Mars at resolutions comparable to that of NASA's Landsat Earth observing satellite.

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The visible image shows the night side of the crescent Earth looking toward the South Pole. Taken at the same time, the infrared image measures temperature, showing its "night-vision" capability to observe Earth even in the dark. "The instrument measured a low surface temperature of minus 50 degrees Celsius (minus 58 degrees Fahrenheit) for Antarctica in winter, and a high of 9 degrees Celsius (48.2 degrees Fahrenheit) at night in Australia. These temperatures agree remarkably well with observed temperatures of minus 63 degrees Celsius at Vostok Station in Antarctica, and 10 degrees Celsius in Australia. Thus we demonstrated that the instrument can accurately measure temperatures, even from a distance of more than 3 million kilometers (2 million miles)," Christensen said.

The images were taken on April 19 and are available on the Internet at:
http://www.jpl.nasa.gov/pictures/odyssey
http://mars.jpl.nasa.gov/odyssey
http://themis.asu.edu

Pioneer 10 Probe Lives On
STEPHEN CLARK SPACEFLIGHT NOW
Posted: April 30, 2001

In a possibly last-ditch attempt to try to contact Pioneer 10, ground controllers successfully received the deep-space probe's faint radio signal Saturday (April 26), washing away fears that the craft had been forever lost.

Pioneer 10 was last heard from in real time last July, while the last radio signal of any kind came in August. Officials were able to obtain five one-way communications sessions and three more opportunities of the two-way variety in early March.

Pioneer's chief flight controller Ric Campo summed up the problem: "In order [for Pioneer 10] to talk to us, we need to talk to it." This means that for controllers to communicate with Pioneer 10 in the future, they must reserve extra capabilities with the Deep Space Network (DSN). The DSN also supports more important missions such as Galileo, Cassini and Ulysses, making future communications more difficult to obtain and limiting the tracking capabilities for Pioneer 10.

Currently, Pioneer 10 is 7.29 billion miles from Earth and its round-trip light time is 21 hours, 45 minutes. Its speed relative to the Sun is 27,380 miles per hour.

Pioneer 10 was officially retired March 31, 1997. The craft now serves as a training tool for ground controllers and its faint signal provides a radio beacon used by DSN and other facilities to confirm station tracking and receiver performance.

Calendar of Upcoming Launches

May 7 Sea Launch * XM-1 (Roll)
Launch window: 2210-2255 (1810-1855 EDT)
Launch site: Odyssey platform, Pacific Ocean (154° West, 0° North)

The seventh flight of the Sea Launch Zenit 3SL rocket will launch with the second of two Boeing-built spacecraft for XM Satellite Radio Inc. of Washington, D.C. The satellites (named "Rock" and "Roll") will provide digital audio radio programming directly to subscribers' cars, homes and portable radios throughout the U.S.

May 15 Proton * PAS-10
Launch window: TBA
Launch site: Baikonur Cosmodrome, Kazakhstan

An ILS Proton will launch the PAS-10 international communications satellite for PanAmSat. The craft was built by Boeing Satellite Systems.

May 17 Delta 2 * GeoLITE
Launch window: 1707-1830 GMT (1307-1430 EDT)
Launch site: SLC-17B, Cape Canaveral Air Force Station, Florida

Boeing Delta 2 will launch the U.S. National Reconnaissance Office's Geosynchronous Lightweight Technology Experiment (GeoLITE) advanced communications technology demonstration satellite. The craft will test a laser communications experiment and an operational UHF communications mission. Launch date reset from March 1, April 25 and May 2. [April 17]

May 20 Soyuz-U * Progress 4P
Launch time: TBA
Launch site: Baikonur Cosmodrome, Kazakhstan

A Russian government Soyuz rocket will launch the fourth Progress cargo delivery ship to the International Space Station. Launch delayed from April 12 at request of Russian partner.
[March 29]

June Proton * Astra 2C
Launch window: TBA
Launch site: Baikonur Cosmodrome, Kazakhstan

An ILS Proton will launch the Societe Europeenne des Satellites' Astra 2C digital broadcasting spacecraft. The satellite is a Boeing 601 HP model with 28 Ku-band transponders.

June 7 Pegasus XL * HESSI
Launch window: 1300-1500 GMT (0900-1100 EDT)
Launch site: Cape Canaveral Air Force Station, Fla.

An Orbital Sciences air-launched Pegasus XL rocket will carry NASA's High Energy Solar Spectroscopic Imager satellite into space. Launch delayed from July because the satellite was damaged in March during a testing accident.

June 14 Shuttle Atlantis * ISS 7A
Launch window: 2010-2020 GMT (1610-1620 EDT)
Launch site: LC-39B, Kennedy Space Center, Florida

STS-104 will be the tenth U.S. mission to the International Space Station. The flight will deliver the space station's airlock.

June 20 Atlas 2AS * ICO A1
Launch window: 0500-0600 GMT (0100-0200 EDT)
Launch site: SLC-36B, Cape Canaveral Air Station, Florida

Lockheed Martin's Atlas AC-156 will launch a spacecraft for the New ICO satellite mobile communications constellation. The satellite is built by Boeing.

June 30 Delta 2 * MAP
Launch time: 2000 GMT (1600 EDT)
Launch site: SLC-17B, Cape Canaveral Air Force Station, Florida

Boeing Delta 2 will launch NASA's Microwave Anisotropy Probe into space. The rocket will fly in the 7425-10 vehicle configuration.

July 4 Soyuz-U * Progress 5P
Launch time: TBA
Launch site: Baikonur Cosmodrome, Kazakhstan

A Russian government Soyuz rocket will launch the fifth Progress cargo delivery ship to the International Space Station.

July 12 Atlas 2A * GOES-M
Launch time: 0652 GMT (0252 EDT)
Launch site: SLC-36A, Cape Canaveral Air Force Station, Florida

Lockheed Martin's Atlas AC-142 will launch the Geostationary Operational Environmental Satellite-M weather spacecraft for NASA and NOAA.

July 12 Shuttle Discovery * ISS 7A.1
Launch window: 0840-0850 GMT (0440-0450 EDT)
Launch site: LC-39A, Kennedy Space Center, Florida

STS-105 will be the eleventh U.S. mission to the International Space Station. The flight will deliver supplies and equipment to station using a Multi-Purpose Logistics Module. The Expedition Three crew will launch aboard Discovery, replacing the Expedition Two crew that will return to Earth via the shuttle.