

# THE LEADING EDGE

Newsletter of the Northern Illinois Rocketry Association,  
NAR Section #117

Volume 24, Number 4  
July/August 2001

## Club News

**New NIRA InfoLine** – Rick Gaff needed his phone line back to the NIRA InfoLine has another new home. It's now at (630) 830-1587.

The line should be updated with last minute club news or the dates of the next meeting/launch

**Motor Certifications** - Not really 'club' news, but there are plenty of motor certifications from NAR's S&T (listed on page 11). This includes reintroduced motors from Estes as well as the new Redline motors from Aerotech.

**June Model of the Month contest** –  
Randy Ochs - Estes Fat Boy (Youth Winner)  
Victoria House – Space Camp Research Vehicle

Stella Howard – “Tryptophan” (Adult Winner)  
Martin Schrader - “Diplomatic Pouch”  
Ken Goodwin – Estes V-2  
Charles Hammerslough – “Noodle Roc”  
Loni Howard - Rocket R&D Phoenix  
Rick Gaff – 1/6 scale ASP

**July Model of the Month contest** –  
Mark Soppet - Estes Python (Youth Winner)

Adam Elliot – Delta II (Adult Winner)  
Martin Manny - Maple Leaf 

## For a Limited Time, Foundation to Match Donations

The Liberty Haven Foundation, a philanthropic institution established to promote the exercise and appreciation of individual human rights and liberties, has offered a grant worth up to \$3,000 to the National Association of Rocketry, to be applied towards our litigation with the Bureau of Alcohol, Tobacco, and Firearms.

The terms of the grant are: The grant will be awarded on the basis of “matching funds” for donations received from other individuals towards the NAR's BATF Legal Defense Fund.

To be eligible for matching funds, donations must be made between June 15 and August 15, 2001, and must each be for a minimum of \$100. These donations will be matched dollar for dol-

## Hobby Show News


By Bob Wiersbe

I'm co-chairing the event this year with Mike Jungclas, and need to start lining up volunteers for this year.

The dates are September 8th & 9th, at the Rosemont Convention Center, 10 am-5 pm on both days. Please note: This is almost two months earlier than in previous years so check and mark your calendars!

We are looking for people to work on both days, whatever they can fit into their schedules.


The deal is that if you work a shift (3.5 hours or more) you get a pass to get into the show. The 'standard' shifts are 10 am to 1:30 pm and 1:30 pm to 5 pm Saturday and Sunday. We usually have about 18 tables, so we need at least 13 - 15 people per shift, plus runners, plus someone up front to run the show. That's 18 people minimum per shift.

Please mark your calendars today, and let me know you're planning to help out! I can be reached at (630) 979-1336 (work), by email at [wiersbe@lucent.com](mailto:wiersbe@lucent.com), or by signing up at a monthly club meeting. 

lar up to an aggregate limit of \$3,000. This offer is not applicable to previous donations.

Although donors are encouraged to take advantage of donation-matching programs offered by employers or other organizations, only the original donation will be matched by Liberty Haven. For example, a donation of \$200, which is matched by an employer with another \$200, will also be matched with \$200 by Liberty Haven Foundation, resulting in a \$600 total donation to the NAR's legal fund.

The offer is open to donations made on the web, via US mail, or by phone to the NAR at (800) 262-4872. The donor must indicate in some manner that he or she wishes to take advantage of the Liberty Haven Foundation matching offer.

Please take advantage of this generous limited-time offer by contributing now to our Legal Defense Fund. 


## September Meeting Moved to Wheaton North High School!

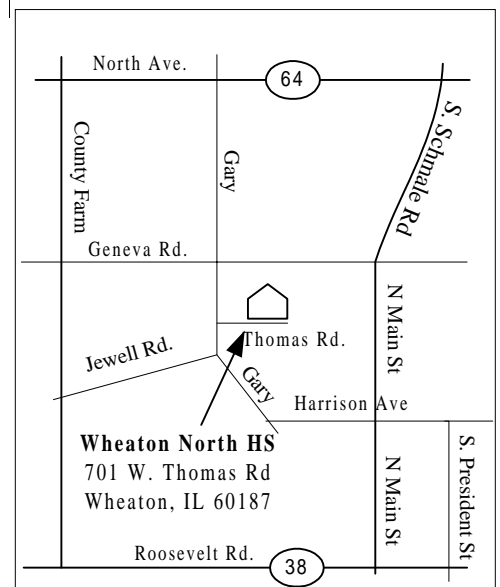
The September 2001 meeting is being moved to Wheaton North High School at the regular date/time (September 7th at 7:30 pm). This is because of an annual scheduling conflict with the Glen Ellyn Civic Center (usually either maintenance or their employee recognition dinner).

Because the Hobby Show is that weekend, it was decided that moving the location was better than trying to change the meeting date (so we can see the kit we'll be helping to build).

Thanks goes to Martin Maney who took the initiative to schedule the meeting with Wheaton North High School.

Martin asked for what they call “the little theatre,” which is near both the main doors and the gymnasium-side front doors, but it's possible we'll end up elsewhere. Martin will have signs up and will send a message to the NIRA email list as soon as he knows (the NIRA InfoLine should also have the information).

Below is a map to the High School. 





Volume 24, Number 4  
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Vice President – Pierre Miller  
Secretary/Treasurer – Ken Hutchinson  
RSO – David Wallis

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Editor – Jeff Pleimling  
Production – Julie, Beth & Brian Pleimling

**This Issues Contributors**

Jonathan Charbonneau, Norm Dziedzic,  
Tim Johnson, Bob Kaplow,  
Mark Kotolski, Martin Maney,  
Steve Piette, Leo Ringwald,  
Mark Soppet, Bob Wiersbe

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Articles, plans, photos, other newsletters, and news items of interest should be sent to:

Jeff Pleimling, Editor  
The Leading Edge  
245 Superior Circle  
Bartlett, IL 60103-2029

or emailed to [leadingedge@pleimling.org](mailto:leadingedge@pleimling.org)

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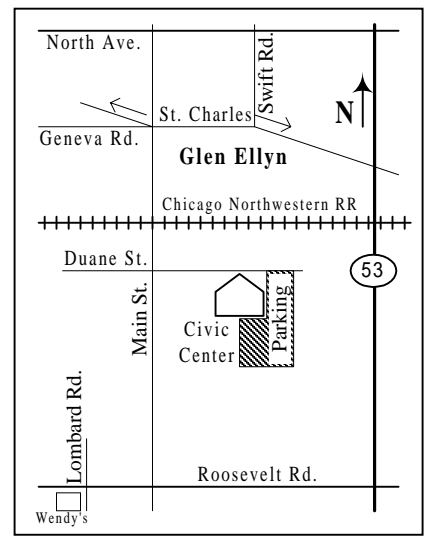
NIRA InfoLine: (630) 830-1587



**CLUB MEETING DATES**

All meetings start at 7:30 pm. Bring a model for 'Model of the Month.' We always need volunteers for pre-meeting lectures, contact Rick Gaff if you want to schedule a date. The location is the Glen Ellyn Civic Center, 535 Duane Street (usually the 3rd floor, but check the board in the lobby).

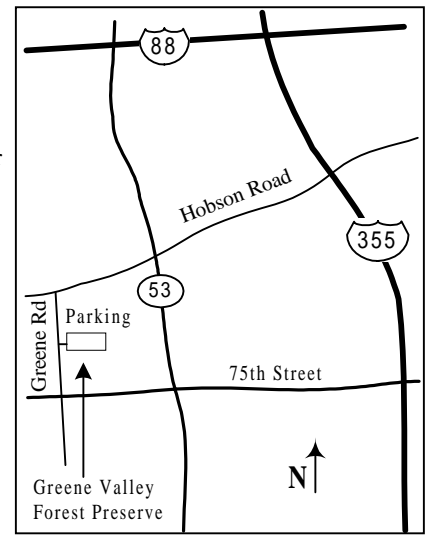
- August 3
- September 7 - at Wheaton North HS - see Page 1**
- October 5
- November 2
- December 7
- January 4, 2002
- February 1
- March 1



**CLUB LAUNCH DATES**

Launches are BYOL (bring your own launcher). The location for our launches is the Greene Valley Forest Preserve (see map at right). Call the NIRA infoline for pre-launch information: 630-830-1587.

- August 19 – Greene Valley Forest Preserve
- September 15 – Hobby Show Launch
- September 16 – Greene Valley Forest Preserve
- October 21 – Greene Valley Forest Preserve
- November 18 – Greene Valley Forest Preserve
- December ? - Holiday Party - location/date/time TBD
- January 20, 2002 - Building session - location TBD
- February 17, 2002 - Building session - location TBD



**Model of the Month Winners!** (photos by Jeff Pleimling)

**June** – Randy Ochs displays his winning youth entry - an excellently finished Estes Fat Boy. The adult winner was Stella Howard with "Tryptophan," a very modified Maxi Alpha 3

**July** – Mark Soppet's Estes Python was the winning youth entry while Adam Elliot's scratch built Delta II was the winning adult entry.

## 2001 - A MRFF Odyssey

By Bob Wiersbe

The Midwest Regional Fun Fly 2001 (or MRFF, as we know and love it in NIRA) has come and gone. As MRFF's go, this was a great one. We couldn't have asked for better weather, well, we could have, but we wouldn't have gotten it. We had two days of sunshine, high (or no) clouds, temperatures in the 80's, fairly low winds, and no rain. A crescent moon was even visible. It was perfect rocket launching weather.



Not much of a waiting line for check in. (Leo Ringwald photo)

MRFF was held at Bong Recreation Area in Wisconsin again this year. Bong is famous for its fin denting gravel runways, rocket hiding tall grass, rocket eating swamps, leg-swallowing holes, turtles, ticks, mosquitos, and a new discovery - electrified fences. In spite of these challenges, it's a great place to launch rockets.

This two day event drew 98 fliers from Illinois, Wisconsin, and even Minnesota. 579 flights were made over the two days, on everything from 1/4A to M motors. Tim Lehr of Al's Hobby's was on site with almost the entire store. We want to thank Tim and his family for coming out to provide us with motors, kits, some really cool flights, and great raffle donations.

There were very few motor failures, the most spectacular was Ted Brady's Graduator on an F50-9T. About 15 feet off the rod there was an earth shattering kaboom! and the bottom of the rocket disintegrated. Fins and body tube pieces fluttered down, as Ted experienced his first cato.

David Wallis, Range Director, sent this note: Here are the people on my list of range volunteers - I'm sure there are a couple that didn't get written down, please accept my apology if I've missed you. If you know of anyone who worked a range shift and isn't listed, please let me know so I can recognize them.

### MRFF 2001 Range Staff:

Cole Arntzen, Mark Bundick, Adrian Butler, Dan Cordes, David Dornblaser, Adam Elliott, Joe Franck, Rick Gaff, Ken Goodwin, John Hojek, Loni Howard, Ken Hutchinson, Cal Jestice, ??? Jonawack, Bob Kaplow, Martin Maney, Kent Ochs, Leo Ringwald, Cally Soukup, Bob Wiersbe.

He plans on repairing it and flying it again as "The Post Graduate."

On Saturday we were treated to not one but two M flights! Both were quite loud, long, high, and remarkable. Those M's have a roar that seems to echo forever. One other HPR flight that sticks in my memory was one that had a cluster of two J570s. It leapt off the pad like no other rocket I'd ever seen, and kept going, and going, and going. They should have named it "The Energizer". There were 73 HPR (H-M) flights over the weekend. CPR (Close Proximity Recovery) - not because people were having heart attacks) was a popular choice among the HPR fliers, and a wise one.

Several people attempted Certification Flights, most of them successfully. The only one that I know of that was unsuccessful was David Wallis, whose Endeavour on a J350 was eaten by a swamp. This was an unfortunate end to an otherwise perfect flight, and he has our condolences. I do know that Joe Nowak is now certified Level 1, because I signed his paperwork. His beautifully done Nike-Smoke made a picture-perfect flight (I'm sure that some of the pictures came out) on an H123-S. Well done, Joe! Congratulations also go to Cole Arntzen, who successfully completed his certification flight at MRFF on Saturday afternoon, to become the newest L2 member of NIRA!

Two motors made their debut at MRFF this year, the new Aerotech Redline reloads and the new Estes E9-4. Several folks were able to get their hands on the Redline motors from Al's Hobbys, and they really do put out a bright red flame! Bob Kaplow received a box of E9-4 motors, courtesy of Mary Roberts at Estes, to beta test. Bob tried a few himself, and loaned the others out. All worked well, but Ken Goodwin did find out that it's not a good choice for a Phoenix. His flight ended in a prang. This will not be a good motor for heavy rockets like Saturn V's, it just doesn't have the lift. But, put one in a Black Brant II and you've got a winner (just wait for the 8 second delay version to come out!).

Bob Kaplow was busy both days trying to use up his supply of FSI motors before they became decertified at the end of the month. Amazingly, none of them blew up! He may have tempted fate too much by clustering about five F's around a central H reload. The rocket headed south toward SwampLand, and was last seen dropping behind a stand of trees. Bob took a compass reading, and took off in pursuit. As he was attempting to cross a barbed wire fence in SwampLand he received a shock. Quite literally. The fence was electrified, but no one knows why. Bob never

(2001 - A MRFF continued on page 9)

## A MRFF Wrap-up

By Steve Piette, MRFF Chairman

It's now history.

We had a total of 98 registered flyers, 76 on Saturday and 22 new on Sunday with many people attending and assisting both days.

We flew 576 flights with around 350 being on Saturday. We could have flown a lot more, I don't remember a line forming that lasted more than few minutes on either day and many times during both days when the range staff had nothing to fly.


Sunday actually was the better day for flying. The sky was a deep blue with a moon still visible until almost noon without a cloud in the sky. But both days were wonderful, and it hard to do better weather wise.

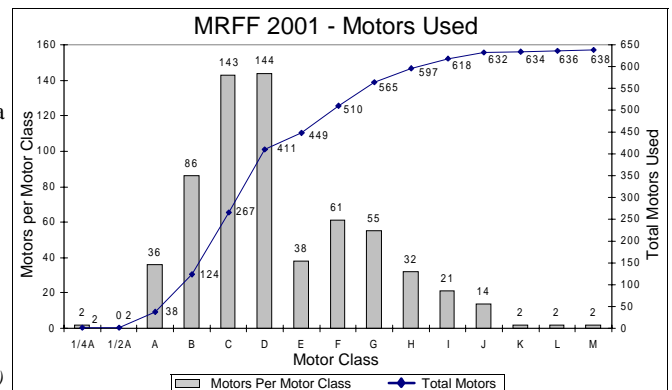
I spent most of both days distracted from the actual flying, but there are a few memorable flights that I write up after I get the flight cards and refresh my memory. IIRC, Alex Wallis opened MRFF and Dave Zupan closed this years MRFF with the L850 to 3 H161 Airstart.

I want to thank the team that helped me put this launch together this year:

Dave Wallis - Chief RSO & Range Operations  
 Bob Wiersbe - Contests and Range Operations  
 Adrian Butler - Equipment and Sanitation  
 Dave Dornblaser - Prizes and Promotion  
 Rick Gaff - Chief Equipment Transport.  
 Bob Kaplow - Equipment Manager  
 Dean Roth - For the use of his Rails, Bong Connections, and helping Dave get our waiver.  
 Mike Dybul - For his HPR pad, rail, and tracking expertise that made all of the big HPR flights possible  
 Tim Lehr and Al's Hobbys - For their donations and onsite support of MRFF

And everyone who took time out of their weekend to do a shift or three to make this launch successful. I hope we saved the signup sheet so we can thank everyone publicly. We had lots of complements from guests on the quality of the launch we put on and that is due the efforts of those working the range and registration. You all put on a fine show. If I forgot somebody, it's only because I'm tired. Thank you all.

I hope everyone who attended had a good time, that's what it was for. 



## What is the Space Launch Initiative? By Mark Soppet

In March 2001, NASA decided to stop funding the X-33, the unmanned spacecraft that was supposed to lead to a fully reusable spaceship. Instead, they want the industry to go back to the drawing boards and create a new spacecraft, which is slated to replace the Space Shuttle by 2015.

This effort is now called the Space Launch Initiative, or SLI. Right now, SLI is just a study, with no actual hardware being developed. Twenty-two companies and universities have been awarded study contracts, including Boeing, Lockheed Martin, Northrop Grumman, Kistler Aerospace, Pratt & Whitney, and Rocketdyne.

NASA has changed its approach to SLI, compared with previous manned spacecraft. In the past, NASA always came up with the baseline design, and the aerospace companies would bid on who got to build it. Now NASA is leaving the design up to the different companies. But that doesn't mean that NASA doesn't have ideas in mind for what the next generation shuttle should do. NASA favors a fully reusable two-stage to orbit approach, with a new engine and a new thermal protection system (TPS.) After the orbiter and booster(s) return to base, health management software spots the areas which need repair, and the ship is ready to fly again in less than two weeks. These goals aren't too far from those of the X-33 follow-on, VentureStar, but SLI will utilize less unproven technologies than the X-33 in its design. SLI also has a payload capacity of 60-75 thousand pounds to low earth orbit, and NASA wants it to be ten times cheaper and a hundred times safer than the existing space shuttle.

The different companies involved in the SLI study are taking different approaches to the design of the new shuttle. Boeing prefers using twin orbiters, one of which would boost the other into orbit. The concept is similar to the MUSTARD design from British Aircraft Corporation in the 1960s. Lockheed Martin's design is closer to the Shuttle II study that NASA Langley conducted in 1988-1989. It uses a large orbiter with liquid-fueled flyback boosters. But both designs hope to move away from using the maintenance-intensive Space Shuttle Main Engines (SSMEs). That's why Pratt & Whitney and

Boeing-Rocketdyne are designing new engines. Unlike the X-33 engine, they will use the traditional bell nozzle instead of the aerospike variety. But the new engines, referred to as COBRA and RS-2400, will still represent an impressive technological leap over the 1970s-era SSME.

The Thermal Protection System is another area of concern in the design of the new spacecraft. NASA has awarded a contract to Kistler so they can obtain data from the K1 reusable rocket's heat shield. But Kistler, like every other civilian space startup, has run into problems getting funding, and it's not certain whether the K1 will actually fly. NASA will also obtain valuable data from the TPS on the X-37 Space Maneuvering Vehicle, which is slated to fly in 2004. But NASA has scrapped its most valuable source of TPS information, the Orbital Sciences X-34. If funding appears in the future, NASA should restart the X-34 program. If the three X-34s can be refurbished to flyable condition, they would be a vital source of data on new TPS materials and reusable engines.

NASA hopes that Space Launch Initiative will proceed into the development phase in 2006, and the new spacecraft will be operational by 2015. Until then, the aging space shuttle will have to keep on trucking. Although the shuttle has operated for thirteen consecutive years without an accident, the possibility that one will occur in the next fifteen years is still significant. Many people in NASA support upgrading the shuttle, and the congressman from Palmdale supports building new orbiters to replace the current ones as they age. Several modest upgrades, such as improved cockpits and more reliable auxiliary power units, could be applied to the shuttles today. Other improvements, such as liquid flyback boosters and new main engines, could result from the Space Launch Initiative. The solid rocket boosters on the shuttle have always been a problem. They are inherently unsafe (as the Challenger seven learned), they are expensive to retrieve and remanufacture, and they do not meet their original thrust specifications. As a result, the shuttle main engines have to be pushed beyond their design limits to get the shuttle into orbit. Replacing both will not only make the shuttle safer and cheaper, but it will help validate the SLI main engines and boosters long before the second-generation shuttle makes its first flight.

Building replacement orbiters will be much more difficult to pull off. The assembly line at Boeing's Palmdale plant has been closed since Endeavour (OV-105) was built. Even then, it wasn't fully reopened, because parts of Endeavour, such as the forward fuselage,



Artist concept of Kistler's K-1 at liftoff  
(Kistler Aerospace illustration)


were built as spares when Discovery (OV-103) and Atlantis (OV-104) were built. Starting the production of new orbiters would be prohibitively expensive. But that doesn't rule out the addition of one more orbiter to the fleet. NASA could still, theoretically, convert the prototype orbiter Enterprise (OV-101). This was NASA's plan in 1977, but they opted instead to convert the structural test article Challenger (OV-99) because it would be easier to disassemble. Enterprise is still in storage at Dulles Airport, and it can still be converted, with consider-

able effort. If NASA can keep Enterprise's weight down, it could replace Columbia (OV-101), because Columbia is too heavy to reach the International Space Station.

Some experts have painted a dire picture for NASA if the Space Launch Initiative doesn't produce a replacement for the Shuttle. But NASA still has a backup plan. The agency recently produced drawings of Space Express, an air-breathing spacecraft that can be seen as the descendant of the National Aerospace Plane of the 1980s. In order to build Space Express, NASA will test its new technologies with the X-43 series of unmanned aircraft.

The X-43A would have tested a hydrogen-fueled scramjet engine. Its follow-on, the Air Force X-43C, will be two feet longer, and it will carry denser methane fuel instead of hydrogen. The first X-43 test on June 2<sup>nd</sup> was a failure because the Pegasus booster rocket spiraled out of control, but NASA and the Air Force still have five more attempts to get the X-43 to work.

If all goes well, NASA will build the X-43B, a larger vehicle that uses rocket-based combined cycle engines (RBCCs). Unlike scramjets, which can't start without air rushing through them, a rocket-based combined cycle uses compressed oxygen from the atmosphere to react with the fuel in a rocket chamber to get the spacecraft moving. The engine then bypasses the rocket and moves into scramjet mode. At around Mach 18, the RBCC switches back to rocket mode for the final push into orbit. If the X-43B flies successfully, the next step will be the full-sized Space Express.

Obviously, a lot more work has to be done before NASA settles on a design and an engine in 2006. A lot of questions will have to be decided by then. Will the new orbiter use hydrogen or kerosene as fuel? Will it have jet engines for its return to base? Will NASA have to build a new carrier aircraft to ferry the orbiter across the country? The project will, no doubt, need more money and the best engineers in the industry. But the Space Launch Initiative deserves it. The Space Shuttle won't last forever. 



Artist Concept - X-37 Space Maneuvering Vehicle  
(Boeing illustration)

## 4H Judging & Launch

By Bob Kaplow

The 4H launch went pretty well last night (July 9th). I judged the advanced models while Adrian did the beginners and Loni ran the launching. I got to see some of the new kits, including a couple NightWings, Nemesis, and others. One young man had a PML AMRAAM that flew nicely on an F25-4 off a Quad Pad. He ended up the champion.

Another young girl had researched her space history. Her EchoStar had Sally Ride, Dr. Mae Jemison, and Leika in its payload section.

For the first time I had to "DQ" one entry. They are required to build and fly a rocket. Amazingly enough, there was one advanced entry that was an RTF Quest rocket – it wouldn't have even qualified in the beginner class. I saw a few other Quest kits, and at least one Custom Aztec in the beginner group.


As in years past, most of the entries suffered from the same flaws: grainy fins, spiral tubes, and bumpy paint jobs. One Nightwing was well finished and had clear coated over the decals, but had grain showing and was the second place

finisher. Another had the grain well filled but had some paint and decal problems.

New from 3 years ago was asking the kids a few basic questions about their rockets. Due to time, I had to limit myself to 3 questions; one form each category: (1) What is this thing and what is it for (launch lug) (2) How do you test a rocket for stability before you fly it and (3) why do we use electrical ignition instead of a fuse. I was surprised at how many kids answered the last question with "it will blow up" which is obviously incorrect. Most knew it was for safety, but less knew WHY. Only a few could come up with more than one reason it's unsafe. Overall, I think this is a good addition to the program.


It was hot, humid, and buggy, and their director wanted the kids to launch from the gravel parking lot. We hiked out into a grass field to the north to give them the best chance of a soft landing. Most survived.

I handed out several dozen NIRA fliers to the kids and leaders.

I'm going to see if I can track down the folks who produce the 4H aerospace literature. It's got the now obsolete NAR safety code, and doesn't list the NAR under its list of resources. 

## New PML Motor Recommendations (press release)

PML has just added 29mm motor flight performance information for their Hydra, Intruder, and Matrix kits to the Motor Recommendations Chart on the Specs Page of their website [www.publicmissiles.com](http://www.publicmissiles.com). It has become evident that many customers want to fly those kits on 29mm motors (even though they come with 38mm MMTs). So, PML has shown how those kits perform using 29mm motors and their prebuilt adapter ADPTR-38/29. Other popular 38mm kits that are often flown on 29mm motors are already shown in their Motor Recommendations Chart.

PML has also added those 3 kits with the ADPTR-38/29 added and 29mm flights to the RockSim files database on the RockSim Page of their website. The files are blended into the PMLRKTS.ZIP file. If you need to add only those three from the ZIP file, when running Winzip just select the 3 new ones to unzip and add to your database. 

## Bye Bye, FSI :-( By Bob Kaplow (r.m.r post)

This weekend, just before their certification expires forever, I managed to burn up the last of my non collection FSI motors. At the past few NIRA launches, plus SWOOFF and MRFF this past weekend, I burned up as many of them as I could; 11 last fall, 11 more this spring, 8 at SWOOFF last month, and 20 at MRFF this past weekend. Sunday afternoon Rick Gaff got into the act, burning up a bunch of D20s as well.

Most of them had been in my motor box for 15-20 years. I just never flew them that often. Now, I wonder why. I had forgot how much fun these motors were.

The loadlifters: D20, E60, and F100 were real butt-kicker motors but with a bit of lower thrust at the end. Ideal upgrades for the old Estes Maxi Brute kits that needed more than a D12. They would easily re-kit any poorly built rocket. The D18 had an even longer tail thrust, much like the A10, which made it an "interesting" motor.

And of course the steam machine E5 and F7 just kept going and going and going. But they could barely lift their own weight! I've lost count of how many unstable F7 launches I've seen over the years. Rick Gaff captured several on 8mm film; including the F100:F7 Spirit of NOVAAR, and my F7 altitude model that did at least 7 loops, and a touch and go before finally falling to rest.

Or how many crazy Condor BG or RG flights pranged, shredded, or otherwise met their end on FSI motors. Like Bruce Blackstone's Disaster Valkarye gliders at NARAM-18; The F100

shredded instantly, a D20:F7 model took off on the D20, staged, and hovered on the F7 until it was ready to finally prang back into the ground. Or Dave Cook's delta wing F7 RG that played shovel in the launch area, also captured on Ric's film. I'm sure George Gassaway has more FSI flights immortalized on acetate, including some of his huge Great Dane swingwings and some of the "Land Rockets".

Of course half the mystique around FSI motors was their reputation for CATOing. They stretched the limits of BP motors beyond what Estes or Centuri offered, and we all now know what affects BP motors. Still when they were good they were great motors. But when they were bad... It wasn't until I met the Dybens in 1988 and showed them some FSI motors that they told me part of the problem. FSI always told you to ignite the cored motors at the top, as we do with composite motors. The RocketFlite guys told me to ignite them at the nozzle end, allowing them to build up a bit slower. It works! I flew many of my FSI motors from then on with a Solar ignitor just inside the grain above the nozzle, with very high reliability. Searching through my flight logs, which are pretty complete back to about 1984, I find that I've flown exactly 100 FSI motors. Between 1987 and 1992 I had 4 CATOs, plus one last month at SWOOFF. A classic FSI cato, that torched a hole through the side of the D20 casing. And this from motors that were mostly made in the late 70s or early 80s.


But there were plenty of great flights with these motors. In the late 60s, one of the first issues of "Model Rocketry magazine" had an article about a student from NM who successfully launched 2 gerbils on an F100 powered rocket: one James P

Miller! And in the mid 70s the first model rocket video camera was flown by Jeff Lee on a cluster of 2 F100s. It became a very controversial R&D project because the rocket exceeded the 1 pound limit of the safety code!

In 1978 Guppy won the first USA Gold Medal in world competition in E BG flying masterfully crafted and flown RC models with downrated 40NS F7 motors. And again in 1980 the US team flew these motors in the event, with Guppy finishing second.

It's unfortunate that it wasn't until last fall that I finally got my E5 Tasmanian Devil to the point that it worked, and worked very well. I never did get the F7 version to do anything but power prang. But it didn't prang any faster heading down than it had gone going up!

In my years flying FSI motors, I got to meet the late Lonnie Reese several times, and even competed against him head to head in Dual Eggloft, breaking his record with my first US record back in 1976. I met his brother Larry once, and Doug Pratt was associated with FSI for several years. I remember when FSI was upset with the rapid certification of some new AVI motors, and to match their marketing started using "gold" paper caps in their motors. They never did change to the clay caps that Estes used for years now.

I've missed Lonnie for many years now; he was killed in an auto racing accident years ago. And after this weekend of FSI nostalgia, I'm really going to miss those motors. They were always a lot of fun. 

# HI-5

A 33" tall sport model that uses 5-18mm motors  
Designed by Mark Kotolski (NAR 35707, TRA 3609), Plan #060198

## Parts List:

- A. Nose Cone, PNC80K
- B. Body tube, BT80 x 6.5"
- C. Body tube, BT80 x 14.2"
- D. Tube Coupler, BT80
- E. Fins, 1/8" (3 needed)
- F. Launch Lug, 3/16" x 2" (2 needed)
- G. Motor Tube, BT20 x 2.75" (5 needed)
- H. Core Tube, BT50 x 2.75" (1 needed)
- I. Centering Rings, 2050 (2 needed)
- J. Centering Rings, 5080 (1 needed)
- K. Thrust Ring, EB20 (5 needed)
- L. Elastic Shock Cord, 1/4" x 24'
- M. Elastic Shock Cord, 1/4" x 48'
- N. Parachute, 24"
- O. Stick Balsa, 1/16" x 1/8" (Optional)

## Specifications:

Length: 33"

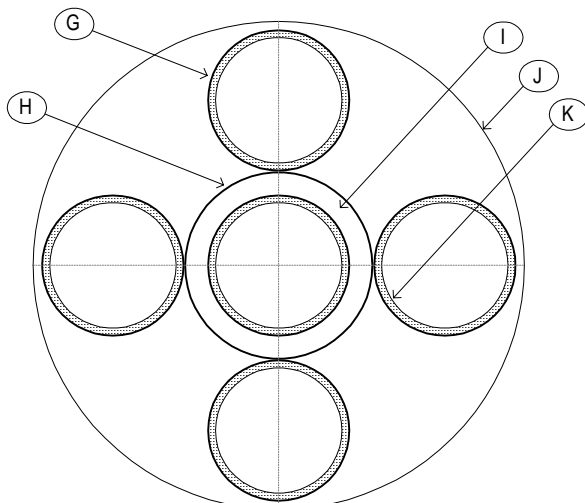
Diameter: 2.6"

Recommended Motors (5 needed): A8-3\*, B4-4, B6-4, C6-5

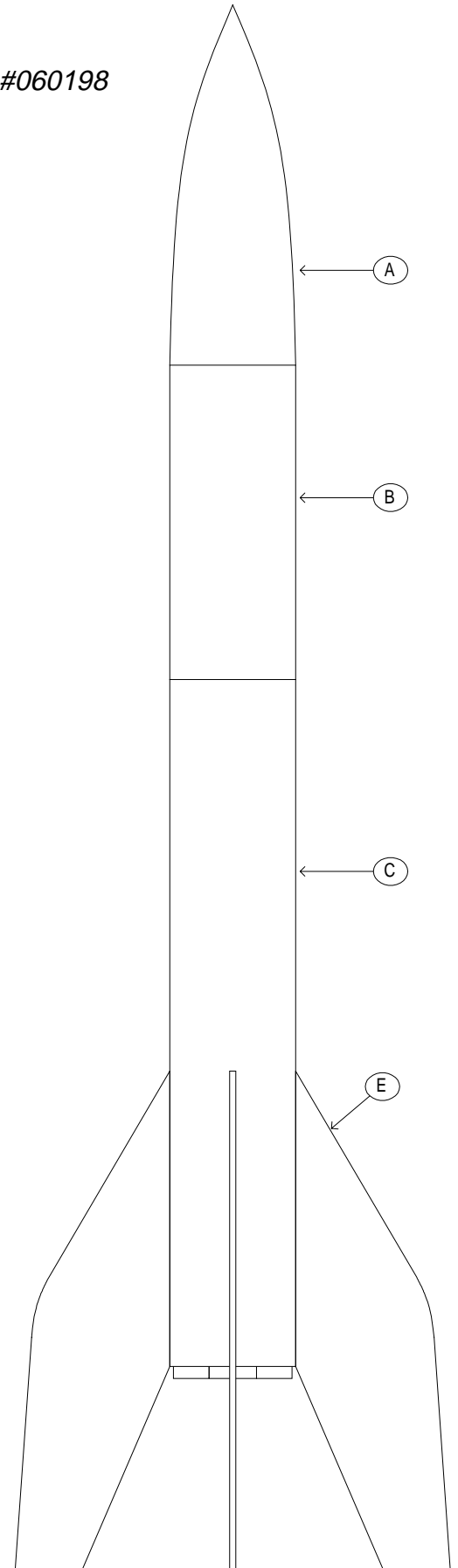
\*Though it has flown on these motors, it is an ELA flight (Extreme Low Altitude). It's great for giving heart attacks at about 100'. They should only be used in a NO WIND situation, and you better be good at cluster ignition!

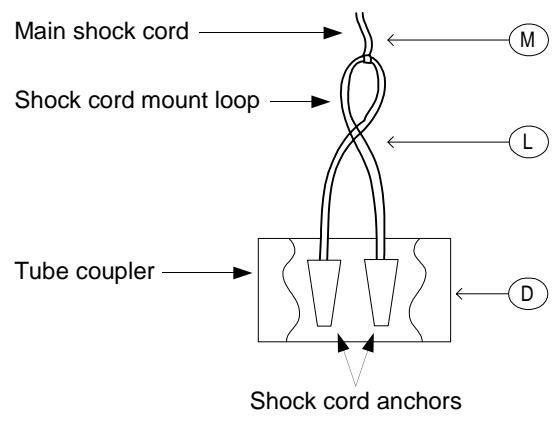
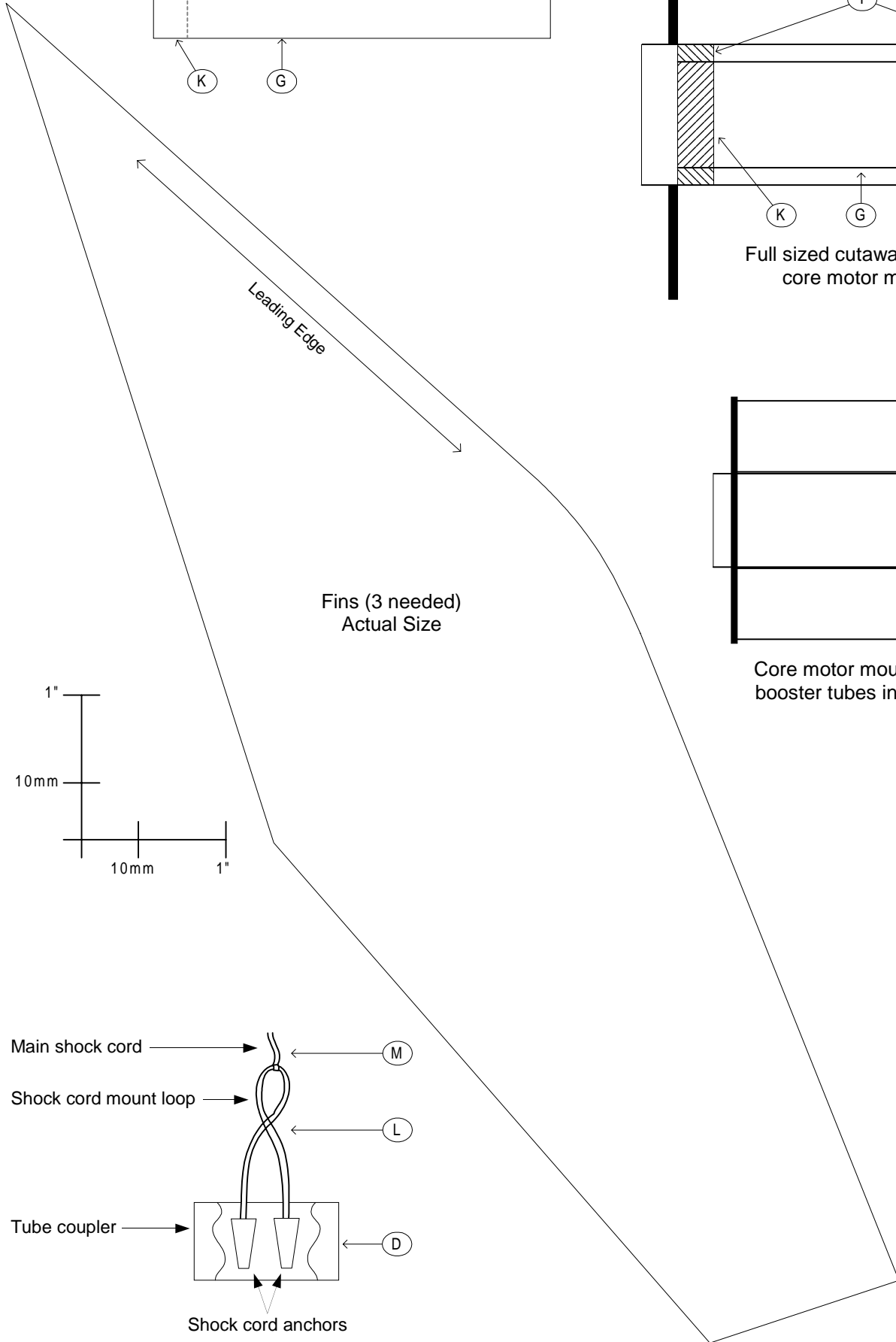
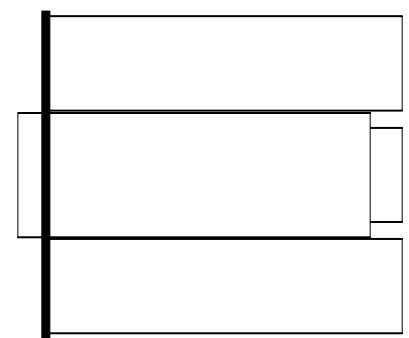
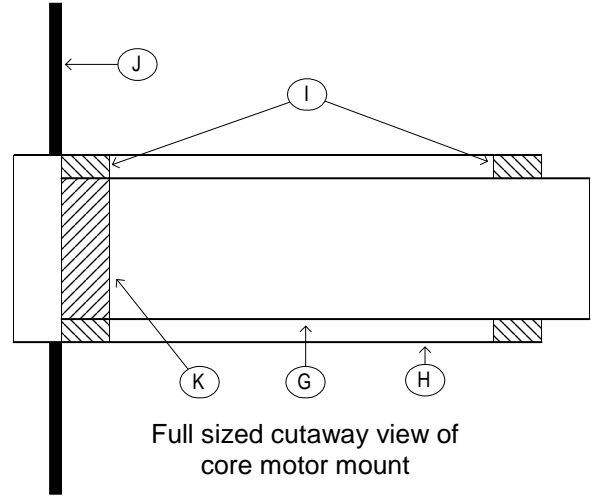
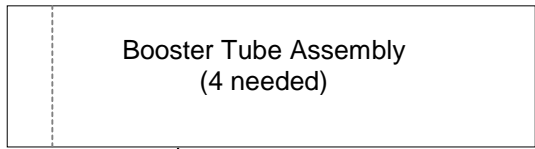
## Construction Hints:

- Assemble motor mount as shown in the diagram.
- Test fit the motor mount into the long body tube. If needed, glue balsa strips to booster tubes to fill any gap between booster tubes and body tube.
- Cut holes in 5080 ring over booster tubes to allow ejection gas passage.
- Glue motor mount in place with 1/4" of motor tube exposed.
- Glue a paper shock cord mount to each end of the 24" shock cord. Glue both shock cord mounts inside the tube coupler. When dry, knot a loop in this shock cord. Tie the 48" shock cord to this loop. (See shock cord mount detail)
- Attach 3 fins in the normal manner. Fillet joints well.
- Glue one launch lug flush with the end of the body tube and between fins. Glue the 2nd launch lug 5" up from the first.
- Be sure you fillet the launch lug joints and fin joints well.



Full size motor mount end view





## Space Launch Report for May-June 2001 by Tim Johnson

Ten unmanned space launches took place during May-June, 2001, bringing the mid-year launch total to 27, eight less than last year. Two Protons and an upgraded Soyuz flew from Baikonur. One Kosmos 3M and one Soyuz launched from Plesetsk. Two Deltas and an Atlas lifted off from Cape Canaveral. One Ariane 4 flew from Kourou and a Sea Launch Zenit lifted off from Launch Platform Odyssey in the Pacific. Half of the flights were for commercial customers. Three were military in nature. One launched a NASA Explorer-series probe and another carried cargo to the International Space Station (ISS).

During June, Paris Air Show announcements heralded a possible commercial launch market rebound, the first Delta IV and Atlas V hardware arrived at Cape Canaveral, and NASA's first X-43A hypersonic scramjet test launch failed.

### Commercial Missions

Three of the five commercial missions orbited Boeing 601-series satellites for International Launch Services (ILS) customers. A Proton-K/DM3 put PAS-10 into geosynchronous transfer orbit (GTO) for PanAmSat on May 15. Another Proton boosted 3,643 kg Astra-2C into GTO on June 16. Both launches were from Baikonur Area 81 Pad 23.

The ILS third launch, by an Atlas IIAS (AC-156), put 2,700 kg ICO-F2 into an unusual 10,100 km x 45 deg. circular orbit from Cape Canaveral Space Launch Complex (SLC) 36B on June 19. The rocket flew northeast from the Cape, using a long Centaur burn to reach a 167 x 10,100 km transfer orbit. At apogee, 109 minutes after liftoff over the Indian Ocean, the Centaur stage restarted to circularize the orbit. AC-156 was the 55th consecutive successful Atlas Centaur. ICO-F2 inaugurated the long delayed ICO mobile telecommunications constellation. ICO-F1 was lost in a 2000 Sea Launch Zenit failure.

The seventh Sea Launch Zenit 3SL successfully put XM Satellite Radio's XM-1 "Roll", a 4,672 kg Boeing 702 satellite, into GTO from Launch Platform Odyssey on May 8. "Roll" joined XM-2 "Rock", launched by a Zenit in March. As before, the launch took place from 154 W/O N in the Pacific Ocean.



Zenit putting "Roll" into orbit  
(Sea Launch photo)

The 104th Ariane 4, a 44L model with four liquid strap-on boosters, boosted 4,723 kg Intelsat 901, built by SS/Loral, into GTO from Kourou ELA-2 on June 9. It was the 62nd straight Ariane 4 success. Arianespace only has 12 more of these market-dominating rockets in its inventory.

### Delta Flights

Boeing's Delta II performed its third and fourth missions of the year during May-June. Delta 285, a 7925-9.5 with a Star 48B third stage, boosted the 1,800 kg TRW GeoLITE into GTO for the National Reconnaissance Office on May 18. Delta 286, a 7425-10 with four strap-on motors and a Star 48B, launched NASA's 800 kg Microwave Anisotropy Probe into a 177 x 290,000 km elliptical orbit on June 30. The "MAP" spacecraft's will maneuver toward an August lunar flyby that will fling it toward Lagrange Point 2, located about 1.5 million km outside Earth's orbit in line with the sun. Both Deltas lifted off from SLC 17B.

### ISS Mission

The first 2.5-stage Soyuz-FG orbited Progress M1-6 from Baikonur Pad 1 on May 20. The 7,250 kg cargo ship docked with ISS two days later, ferrying supplies and spare parts for the three-person Expedition 2 crew. The Soyuz-FG launcher features a 5% performance improvement compared to Soyuz-U. A new fuel injection system in the RD-107/108 engines that power the strap on boosters and core stage is responsible.

### Plesetsk Launches

Two Russian military satellites were launched on separate missions from the Northern Cosmodrome near Plesetsk during May-June. A Soyuz-U put Kosmos 2377, probably an imaging satellite, into a 165 x 358 km x 67.1 deg orbit from LC 43/4 on May 29. A two-stage Kosmos-3M orbited Kosmos 2378 from LC 132 on June 8. The second stage restarted at transfer orbit apogee to put what was probably an 825 kg Parus navigation satellite into a 1,000 km x 83 deg orbit. It was the first Kosmos-3M launched since a November 2000 failure.

### Launch Vehicle News

Boeing's 43 m long Delta IV pathfinder CBC stage completed static hot fire testing at NASA's Mississippi Stennis Space Center B-2 stand in early May, then was shipped to Cape Canaveral aboard the brand new, 95 m long Delta Mariner. The stage will be used during the summer to check out the new Horizontal Integration Facility (HIF) and the new launch pad at SLC 37B. The first flight stage is expected to arrive in September to prepare for a planned March 2002 launch.

Lockheed Martin's AV-001 CCB, the first Atlas V booster, was flown to the Cape Skid Strip from Denver by a Russian AN-124 aircraft on June 5. The Russian-powered rocket will be used to check out the new Atlas Spaceflight Operations Center (ASOC) and the new SLC 41 facility.



NASA's MAP being launched on a Delta II  
(Boeing photo)

ties, including the new Vertical Integration Facility (VIF) and Mobile Launch Platform. AV-001 will also power the first Atlas V mission planned for May 2002.

Announcements during the Paris Air Show may herald a commercial launch market rebound. Arianespace led the way, signing eight new customers to build a record 54-satellite backlog. Boeing, ILS, Sea Launch, and Orbital Sciences also each landed at least one new launch. Boeing is believed to have a 50-ish satellite backlog for Delta II, III, and IV. ILS has 40+ spacecraft on its Atlas II, III, V, and Proton manifests. Sea Launch has 16 satellite launches scheduled.


NASA's first X-43A scramjet-powered hypersonic test vehicle was destroyed during a failed

(Space Launch Report continued on page 9)



Delta IV 1st stage arriving at Cape Canaveral - and passing a Navaho G-26 on display at the south gate. (NASA photo)



(Space Launch Report continued from page 8)  
 launch attempt off the California coast on June 2. The 3.7 m long, 1,500 kg, sled-like X-43A was to have been boosted to Mach 7 at 95,000 ft by a winged Pegasus first stage, where it would have separated and briefly run its scramjet engine. Instead, both of the steering elevons on the aft end of the Pegasus stage failed after 8 seconds of powered flight, about 13 seconds after being drop launched from beneath the starboard wing of NASA's famed B-52 "Mothership". The rocket spiraled out of control, forcing its range safety destruction. 



NASA's X-43A just after being released from the B-52 (NASA photo)

## May 2001 Club Launch

By Jeff Pleimling


The May club launch was held on May 20, and was an excellent day for flying. There was a breeze that kept everyone on their toes, but it also kept the temperature to reasonable levels.

By the end of the day there had been 192 flights from 1/4A through G. There were many long time NIRA people on-hand as well as a nice smattering of new people.

Some of the memorable flights include Al Hirsbrunner's Saturn V flying on a cluster with an E15-4 center and 4 C6-5 motors clusters around it (approximately an F39). The C6-5s were ignited after the center E15 lifts the rocket about 3/8's of an inch. It was a picture perfect flight (but I don't think anyone got a picture) down to the three good chutes at apogee. It was recovered without damage other than some scorch marks on the bottoms of the engine shrouds.

Also of interest was the sheer number of flights that Bob Kaplow made on FSI engines. Bob was trying to burn up his stock before they become uncertified. He probably used more FSI motors at this launch than the rest of the club did all last year. Only one of the flights was a failure and that was his (or is it Rachel's) pink and purple upscaled Generic E2X rocket. He had a bonus delay long enough that the ejection charge didn't go off until a couple of seconds after the rocket had lawn dartsed. He worked at trying to get the jammed nosecone off - but I think he finally gave up until after he got home.

Even Mark 'Bunny' Bundick showed up (proving that the NAR president **can** fly rockets). He showed up with his scratch built Gemini Titan that used a cluster of 2 A10s. Unfortunately, one of A10s CATOed on each of the two flights he attempted with the last one trashing the motor mount enough to prevent a third.

All in all - a great launch day! 

(2001 - A MRFF Odyssey continued from page 3)  
 found the rocket. The rest of the weekend he could be overheard saying things like "Kelly and Tunick are really nice guys", and "I saw the neatest thing on Yahoo the other day", so we decided the shock hadn't hurt him.


Ted Brady gave this description of Dave Zupan's clustered L850 and 3 H161 flight to end MRFF:

For people who like to see the numbers, here are the stats from MRFF:

Engine	Count	Engine	Count
1/4A	2	H	32
A	36	I	21
B	86	J	14
C	143	K	2
D	144	L	2
E	38	M	2
F	61		
G	55		

Clustered Flights: 20  
 2 Stage Flights: 29  
 3 Stage Flights: 2

"The final flight on Sunday was absolutely beautiful, the fire plume on the L motor was really impressive and the anticipation of the 3-H cluster airstart was well rewarded. Amazing how much fun it can be just watching the initial drogue chute recovery followed by seeing and hearing the "pop" of the main chute deployment. Way cool."

Our thanks go to Steve Piette who organized MRFF this year, you did a great job! Thanks also to all those who helped set up and take down the range, or provided equipment for MRFF. It wouldn't have happened without you. See you next year! 

For those that like to see their name in lights, here are the Top 10 Fliers:

Name	Launches
1. Ken Goodwin	31
2. Jonathan Charbonneau	24
3. Conrad Helland	23
4. Cal Jestice	22
5. Bob Kaplow	21
6. Randy Dust	20
7. Alex Wallis	18
8. Chris Wiersbe	16
9. Rick Gaff	14
10. Scott Oliver	13
10. Bob Wiersbe	13



(left to right) Adrian Butler and Ken Hutchinson prepping at a high-power pad; Returning with the remains of a not-quite successful Phoenix flight; Jonathan Charbonneau attaching the clips to a rocket before one of his many flights. (Leo Ringwald photos)

## DESCON *The online rocketry design contest*

by Norman Dziedzic




Norm's "Home Improvement"  
(Norm Dziedzic photo)

You probably know that the NAR sponsors model rocketry competitions but these are all related to rocket performance, scale modeling or research and development. For most of these, the emphasis is on construction and finishing. The designs are mostly determined by the event with tried and true forms usually winning. There is a junior rocket design competition but this only applies to a subset of people in NAR. What if there was a place to showcase and put your original designs up against others in a competition open to any and all comers. Well, that's just what DESCON is.

DESCON was started in 1998 by Dave Lee so that modelers, rocketeers, and most specifically readers of the Usenet newsgroup rec.models.rockets could showcase their talents, display their design on the internet, and win the acclaim of their peers. Prizes were donated by those entering the contest or readers of the newsgroup who had extra goodies underfoot and wanted to put them to good use. Over the years it's blossomed into contests with over of 30 entrants and prize donations from the biggest names in the hobby rocket business. Recently, the DESCON competitions have been proctored by Bob Fortune who also runs the rocketry store Aerocon Systems.

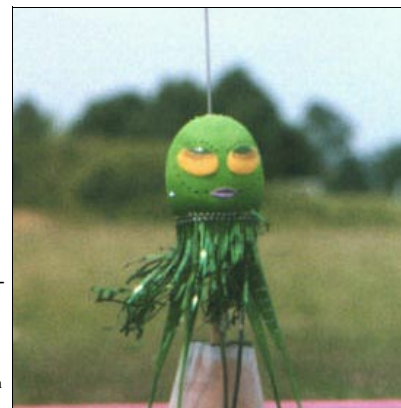
This ongoing competition has just completed its 8<sup>th</sup> round with an odd-roc contest which included 43 entries of just about everything imaginable (and some things you never would have imagined). Our three

NIRA entries were put in by Bob Kaplow with "AOL.CON", John Kallend with "Miss Universe" and myself, Norm Dziedzic with "Home Improvement". We finished 17<sup>th</sup>, 28<sup>th</sup> and 27<sup>th</sup> respectively. You can see the full entries for these models and all the others in DESCON 8 at: [http://www.aeroconsystems.com/descon/descon8/descon8\\_index.html](http://www.aeroconsystems.com/descon/descon8/descon8_index.html) 



Bob Kaplow's "AOL.CON"

(Jeff Pleimling photo)




John Kallend's "Miss Universe"

(John Kallend photo)

## LDRS 21 Location Announced

Tripoli Amarillo # 92, POTROCS INC, (Panhandle Of Texas ROCKETry Society) proposal to host the 2002 Tripoli National launch has been accepted by the Board of Directors. Bruce Kelly informed Pat Gordzelik, Prefect/President of Potrocs, of the Boards decision on Monday, July 23.

Gordzelik stated that the launch will be held July 11,12,13, and 14 commercial motor, with a following "Mini Balls" experimental motor launch to be conducted on July 15 and 16. He also commented that "no way, no how, would Potrocs have bid for LDRS 21 without significant assistance from other surrounding clubs, but with several Texas Prefectures and NAR Sections, Tripoli Oklahoma, and the Kloudbusters weighing in with promised help for the event, "Temporary Insanity" gripped me," and the results shall we say is history. For the first time ever LDRS will be held in Texas.

Potrocs' flying field boasts 5.5 square miles of open pasture and range land, and a whopping 21,500' AGL waiver. Site altitude is 3,452' MSL. For further information please go to Tripoli Amarillo's web site, [www.potrocs.org](http://www.potrocs.org). An official LDRS21 website will be forthcoming soon. 

## Confused Stages – Stage 20 by Jonathan Charbonneau

In the previous two stages, I've described the different shapes of noses, fins and airfoils. These are very important in scale competition events - the subject of this stage.

A scale model is a replica of a real rocket or missile that is/was of important significance in professional rocketry.

There are several different scale events in NAR competition: Scale, Super Scale, Sport Scale, Giant scale, and Peanut scale.


**Scale:** In scale competition, the model is actually measured and compared for accuracy against the actual prototype. Documentation of the dimensions of the real rocket or missile is required.

**Super Scale:** This is just like Scale, but also requires a matching scale launcher.

**Sport Scale:** The most common of the scale events. It is also very popular because the only required substantiation data is a color photo of the real one. A black & white photo or half tone is also acceptable if accompanied by a data sheet showing color patterns. The model is judged from a distance of one meter and is not measured. It is then examined more closely for things like surface prep, finish and fine detail. Depending upon the complexity of the structure and the detail, and other factors, up to 800 points can be scored. General flight points consist of 50 points for flight and 50 for lack of damage. This is ex-


remely important because if the flight is disqualified, you've lost the competition no matter how well you did statically. The rocket must make a safe flight. A sport scale model that scores two points consisting of one static point and one flight point and is not disqualified can win against a rival with a perfect static score but DQ'ed on it's flight.

Mission points can also be earned if the mission is declared to the judge before the flight. Mission points are awarded as follows: 2-stage 50, 3-stage 100, glide 50, spin 10, release 10 deployment 10 2 engine cluster 25 additional engines in cluster 20 per engine, working payload 25-50, payload producing reduced data for judges 50-100. Up to 200 mission points can be earned. It takes a minimum of two mission features to get more than 100 mission points. If you aren't so hot at static points but good at mission features, you can benefit by using mission features. And, get this! If you equip the rocket with many mission features, so many that even if some of them fail, the ones that do work are enough to amass 200 mission points, you may very well get the perfect mission score of 200. Just be sure not to get DQ'ed.

Peanut Scale and Giant Scale are just like Sports Scale except that the dimensions are no more than 30 cm long or no more than 2 cm in diameter for peanut scale; no less than 100 cm long or less than 10 cm in diameter, or at least 31.4 cm in girth around outer assemblies or at least 100 cm wing span for giant scale. 

## Welcome to the Club!

Ted, Megan and David Brady, Mike, Cindy and William Moriarity, Kent Ochs, Elliott Sarich, Nick and Caroline Wlodarski have all joined NIRA in the past few months. Welcome to the club!

(If I somehow missed your name, please let me know!) 

## MWRC-2001

This is an official announcement from the Mid-West Regional Contest 2001 Committee. MWRC 2001 will be held on September 29-30, 2001 at Bong State Recreation Area, WI. Please watch the WOOSH website for last minute changes:

(<http://www.gamerz.net/woosh>)

We are pleased to announce the event card for MWRC 2001 has been approved by the WOOSH contest board. We shall be flying:

- Streamer Spot Landing
- 1/2A Scale Altitude
- 1/4A Streamer Duration
- 1/4A Rocket Glider (multiround)
- B Eggloft Duration

**Fun Event:** *Fibber McGee Kitbash*. If you are not familiar with the rules for this event, please consult the WOOSH website or contact the contest director.

There will be NO sport flying at this contest.

**Entry Fee:** \$5 C & Team, \$3 A & B division.

**Contest Director:** Kevin Wickart  
kwickart@cyberianet.com, phone: 309-862-2263

## NAR Standards & Testing News

### R71 Interim Motor Certifications 9 Jun 2001

Some people have received packages of E9-4 motors from Estes. A note asks the recipients to use the motors and report on your satisfaction. The E9-4 motors are certified by the NAR. There is still more work to do on the certification by the S&T committee before we issue the final certification report. The motors are 24 by 95 mm and are in the 27 N-Sec impulse range. The burn time is about 3 sec and the delay is about 3.25 sec.

Jim Cook, Secretary for  
NAR Standards & Testing  
Jack Kane, Chairman

### R72 New Motor Certifications 27 Jun 2001

The following motors have been certified by NAR Standards & Testing for general use as high power rocket motors effective June 4, 2001. They will not be certified for NAR contest use as they are not model rocket motors.

The following are Aerotech reloadable motors, certified only with the indicated size casing and manufacturer supplied nozzle, end closures, delays, and propellant slugs. All use the new "Redline" propellant.

#### Aerotech:

29mm x 333mm (RMS-29/360 casing):  
H268R-10,14,P (320.0 Newton-seconds total impulse, 166.0 grams propellant mass)

38mm x 250mm (RMS-38/480 casing):  
I285R-10,14,P (420.0 Newton-seconds total impulse, 230.2 grams propellant mass)

The following is an Aerotech single-use (disposable) high power rocket motor.

#### Aerotech:

54mm x 235mm  
I65W-P (640.0 Newton-seconds total impulse, 369.7 grams propellant mass)

Jim Cook, Secretary for  
NAR Standards & Testing  
Jack Kane, Chairman

### R73 New Motor Certifications 7 Jul 2001

The following motors have been certified by NAR Standards & Testing for general use as model rocket motors effective May 6, 2001. They are certified for NAR contest use effective August 17, 2001. This contest use date is more than the usual 60 days from the general use certification date because it is adjusted for distribution chain delays, thus allowing all contestants to avail themselves of this motor. They are not certified for contest use at NARAM-43 because NARAM-43 occurs before this date.

#### Estes:

24mm x 95mm:  
E9-0,4,6,8,P (29.5 Newton-seconds total impulse, 35.8 grams propellant mass)

The following motors have been certified by NAR Standards & Testing for general use as model rocket motors effective June 18, 2001. They are certified for NAR contest use effective August 17, 2001. They are not certified for contest use at NARAM-43 because NARAM-43 occurs before this date.

#### Estes:

18mm x 70mm:  
1/2A6-2 (1.25 Newton-seconds total impulse, 2.6 grams propellant mass)

24mm x 70mm:  
C11-0,3,5,7 (9.0 Newton-seconds total impulse, 12.0 grams propellant mass)

The following motors have been certified by NAR Standards & Testing for general use as model rocket motors effective June 18, 2001. They are currently certified for NAR contest use. The previous announcement that they would be decertified for NAR contest use effective July 1, 2001 is rescinded. They are now certified for NAR contest use indefinitely. They may be used for contests at NARAM-43.

#### Estes:

18mm x 70mm:  
B6-0 (4.9 Newton-seconds total impulse, 5.6 grams propellant mass)

24mm x 70mm:  
D12-7 (17.0 Newton-seconds total impulse, 21.1 grams propellant mass)

Jim Cook, Secretary for  
NAR Standards & Testing  
Jack Kane, Chairman

### R74 New Motor Certifications 9 Jul 2001

The following motors have been certified by NAR Standards & Testing for general use as model rocket motors effective March 4, 2001. They are certified for NAR contest use effective August 17, 2001. The delay in this announcement and the contest-use date was to allow labeling modifications to percolate through the distribution chain. They are not certified for contest use at NARAM-43 because NARAM-43 occurs before this date.

The following are Aerotech reloadable motors, certified only with the indicated size casing and manufacturer supplied nozzle, end closures, delays, and propellant slugs.

#### Aerotech:

18mm x 70mm (RMS-18/20 casing):  
D24-4,7 (18.5 Newton-seconds total impulse, 8.8 grams propellant mass)

Jim Cook, Secretary for  
NAR Standards & Testing  
Jack Kane, Chairman

### R75 Interim Motor Certifications 16 Jul 2001

This is an interim announcement for the Quest Micro-Maxx II.

#### Quest:

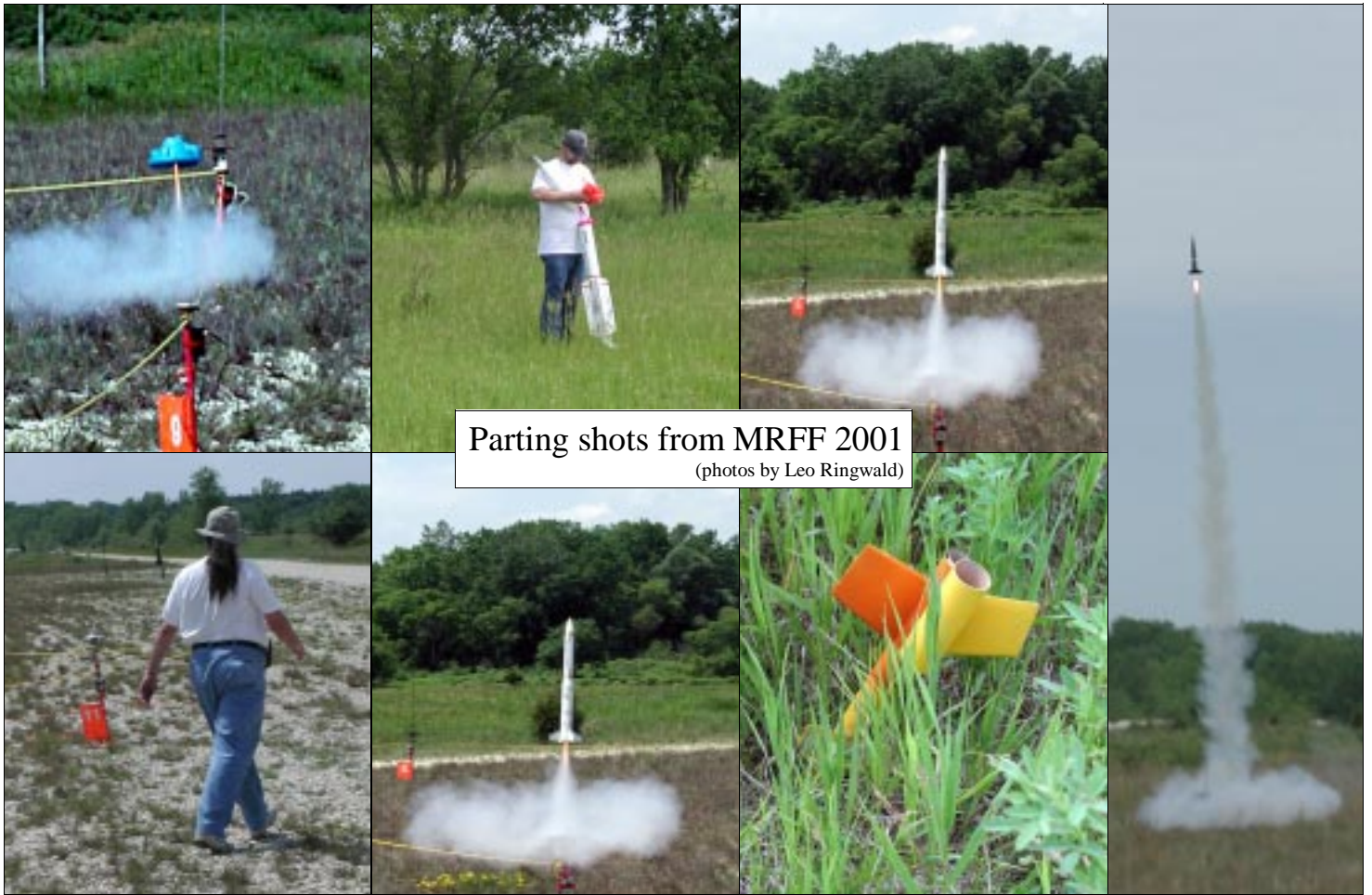
Micro-Maxx II (6mm x 16mm)

This motor is certified by the NAR, effective July 7, 2001. There is still more work to do on the certification by the S&T committee before we issue the final certification report. The motors measure 6mm by 16mm and are in the 0.35 Newton-second impulse range. The propellant mass is 0.504 grams and the delay is about 0.5 seconds.

Jim Cook, Secretary for  
NAR Standards & Testing

Jack Kane, Chairman 

**For Sale:** Aerotech Mantis Pad and Interlok Launch Controller. New. \$60.00 or best offer for the set. This is a great deal – it normally costs \$80.00 for more just for the pad alone. See Jonathan "Superman" Charbonneau at a launch or meeting for more information.



Parting shots from MRFF 2001  
(photos by Leo Ringwald)



Jeff Pleimling, Editor  
245 Superior Circle  
Bartlett, IL 60103-2029

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