

THE LEADING EDGE

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

Volume 24, Number 3
May/June 2001

Club News

MRFF 2001 – The Midwest Regional Fun Fly is less than a month away! Information and a registration form are located on pages 4 & 5 of this issue.

Volunteers are still needed to work a shift on the range. More information about how to sign up is included in the MRFF information. Working a range shift not only helps the launch but it's a great way to meet a lot of new and interesting people.

At the last club meeting, there were some safety issues brought up. As a reminder, there will be no smoking in the prep area and no grills either (this **should** be common sense, but it needs to be brought up).

Field Search – Although a new High Power capable field wasn't found before MRFF this year it doesn't mean that we should give up looking.

Adrian Butler contacted the manager of a sod farm where R/C airplanes are known to fly. Unfortunately the manager evidently had some problems with them because he told Adrian that "the airplane people are bad enough." So much for a promising field.

If you know of a possible field (or think you have a good way to find one), please tell Steve Piette (who is heading up the search) so we can follow up on it.

Equipment Storage & Transport – One of the more pressing needs for the club is to find a place to store the club's equipment and a means to transport it to launches.

One of the better suggestions is to buy an enclosed trailer and store the equipment in it. The only problem with this idea is *where do we store the trailer?*

If you have a place that a trailer could be stored between launches (and is easily accessible prior to launches), please let the club know. Also if you have a better suggestion for storage or transportation please let the club know about that too!

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, or by signing up at a monthly club meeting. 🐸🐸

April Model of the Month contest –

Victoria House – FireFlash (Youth) (Winner)

Adam Goodwin – Bandit

Loni Howard – PML IO (Adult Winner)

Ken Goodwin – Phoenix

Adam Elliot – NARAM Cluster Altitude model

Rick Gaff – Estes V2

Bob Kaplow – AOL.CON

Cal Jestice – Big Daddy

May Model of the Month contest –

Victoria House – X-Ray (Youth) (Winner)

Dave Ketchledge – PML Bullpup (Adult winner)

Adam Elliot – 'Battle of the Worlds' A23

Dave Dornblaser – Phantom 🐸🐸

NAR Standards & Testing News

R69: NAR S&T NEW MOTOR CERTIFICATIONS

The following motors have been certified by NAR Standards & Testing for general use as high power rocket motors effective May 7, 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 238mm (RMS-29/240 casing):

H210R-10 (220.0 Newton-seconds total impulse, 110.8 grams propellant mass)

38mm x 203mm (RMS-38/360 casing):

I218R-6,14 (330.0 Newton-seconds total impulse, 172.7 grams propellant mass)

Jim Cook, Secretary for
NAR Standards & Testing
<JimCook@AOL.COM>

Jack Kane, Chairman

R70: NAR S&T NEW MOTOR CERTIFICATIONS

The following motors have been certified by NAR Standards & Testing for general use as model rocket motors effective May 7, 2001. All are certified for NAR contest use effective July 6, 2001.

Estes:

13mm x 45mm:

A10-PT (2.50 Newton-seconds total impulse, 3.8 grams propellant mass)

24mm x 70mm:

D11-P (18.0 Newton-seconds total impulse, 24.5 grams propellant mass)

Jim Cook, Secretary for
NAR Standards & Testing
<JimCook@AOL.COM>

Jack Kane, Chairman 🐸🐸



Volume 24, Number 3
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THE LEADING EDGE is published bimonthly by and for members of the Northern Illinois Rocketry Association (NIRA), NAR Section #117, and is dedicated to the idea that Sport Rocketry is FUN!

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

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Photos will be returned, other material returned upon requested.

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Send membership applications (dues: \$6 per youth, \$8 per adult, \$12 per family, including a six issue subscription to the Leading Edge), non-member subscriptions (\$10 per six issues), and change of address notifications to:

Ken Hutchinson
82 Talcott Avenue
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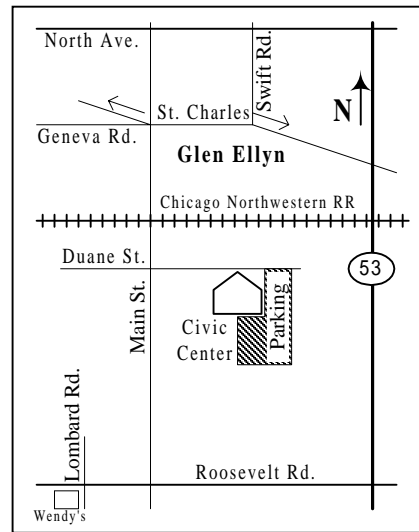
NIRA's web site is at: <http://nira.chicago.il.us/>



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).

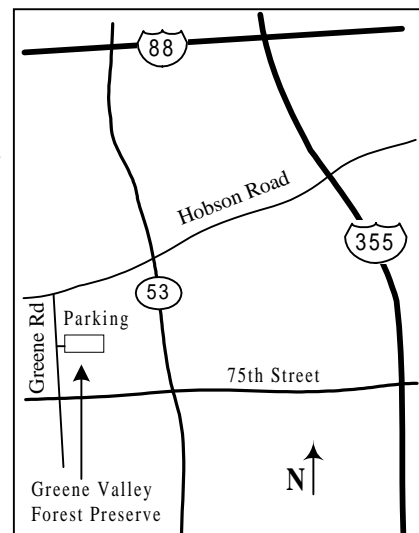
June 1
July 6
August 3
September - To Be Announced



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: 630-483-2468.

June 16-17 – Midwest Regional Fun Fly
July 15 – Greene Valley Forest Preserve
August 19 – Greene Valley Forest Preserve
September 9 – Youth Group Launch at Greene Valley
September 16 – Greene Valley Forest Preserve
October 21 – Greene Valley Forest Preserve
November 18 – Greene Valley Forest Preserve



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

April – Loni Howard won the Adult category with his PML IO (named 'My First "Missile" ') and Victoria House won the Youth category with her Estes FireFlash.

May – Adult winner was Dave Ketchledge with his PML Bullpup and Victoria House was the Youth winner with her Estes X-Ray (and a different hair style then in April).

April 2001 Launch Report

By David Wallis

NIRA held its first official club launch of the new year on Sunday, April 15. After having rained all night, and with dark skies and drizzle all morning, I wasn't too hopeful that this launch would take place.

By the time we arrived to set up the range, however, the skies had begun to clear, and the sun took some of the chill out of the air. Somehow, the field had dried out enough that it wasn't muddy. By mid-afternoon, everyone had taken off their jackets, and enjoyed a wonderfully warm Sunday under a clear blue sky.

The turnout was small, due mostly to the weather, I think, with about 35 or 40 people total. We saw the usual variety of model rockets, with lots of Estes kits. There were relatively few E and F flights, and no G flights, due to a gusty and highly variable wind.

I took the opportunity to try out my own new odd-rock, the "Space Shuttle Cock-lumbia." I built this one from a standard badminton birdie, or shuttlecock, a mini motor mount, and a bit of hot-melt glue (hmmmm.... doesn't that sound a bit familiar?). It flew well on low-thrust motors like the 1/2A3, but was only marginally stable on higher thrust motors. All in all, I was happy with its performance, especially considering how much time went into building it!

C. Hammerslough (darn, I can't remember his first name!) flew a really unique rocket, and the only Micro Max flight of the day. Called, "Noodle Roc," this tiny thing was built entirely from pasta! The body tube was a length of mostaccioli, the fins were made from linguini, and the launch lug was a small piece of coffee stir-stick (I'd guess it was from espresso, but could

have been cappuccino I guess!). After several failed attempts at getting the tiny thing to light, it finally took to the sky. It flew reasonably well, but an over-ambitious ejection charge caused some damage - 2 of the fins were broken off. I think Noodle Roc will live to fly again!

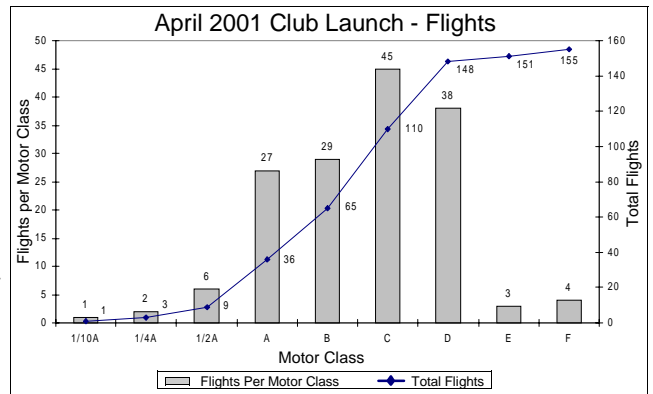
Bob Kaplow flew his usual assortment of weird stuff, and also worked on burning off some of his stock of motors that are losing certification soon. Among those were some FSI motors, including an E5 and a couple E60s! He flew his, "Sputnik 24" on a D12-3 in honor of the 40th anniversary of Yuri Gagarin's first trip into space.

The sobbing towel for the month goes to John Hojek, who flew his Air Tomahawk for its very first flight on an Aerotech F39-T motor. After a beautiful boost and normal recovery, it headed west on the breeze, only to end up draped across the power lines along Green Valley Road.

Thanks to all the folks, kids and grownups alike, who came out and made this a fun spring launch, and thanks to the NIRA members who volunteered their time to set up and run it!

Here are some statistics from this launch:

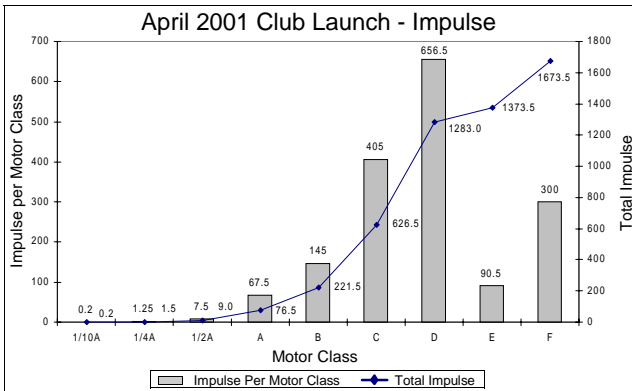
Total Flights:	155
Cluster Flights:	0
Multi-stage Flights:	1
Micro Max Flights:	1
1/4A Flights:	2
1/2A Flights:	6
A Flights:	27
B Flights:	29
C Flights:	45
D Flights:	38
E Flights:	3



F Flights: 4
G Flights: 0

Total impulse flown this day: 1673 Newton seconds, or the equivalent of a 64% K motor! 🚀🚀

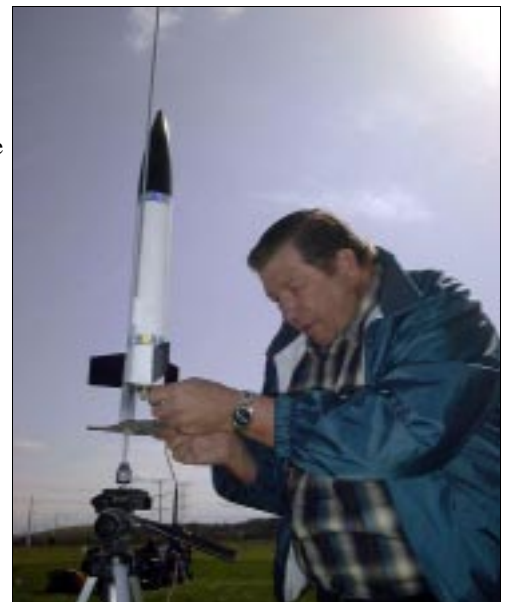
[More April launch photos are on the back cover!]



My 11-year-old son, Alex, had a great time with his first scratch-built odd-rock, called, "700 Free Minutes." He built it from an AOL CD, a motor mount, and a bit of hot-melt glue. It flew very well, and I think he tried out just about every size motor in my inventory, for a total of 10 flights!



Who says you can't get lift-off photos with a digital camera? (Rick Gaff photo)



Rick Kramer prepping a rocket (one of his few that doesn't use tube fins) (Rick Gaff photo)



RSO David Wallis checks a two-stage rocket (Rick Gaff photo)

Midwest Regional Fun Fly 2001

NIRA's Midwest Regional Fun Fly is the nations oldest running regional sport launch. As is tradition, MRFF will be held Father's Day Weekend, June 16-17, 2001.

We are back again this year on the runway at Bong for a weekend of high energy flying. We have a confirmed waiver from the FAA for the weekend of 10,000ft MSL.

Schedule:

Saturday: 0830 Registration
0900 to 1700 - Range Open
Sunday: 0900 to 1600 - Range Open
1600 Range tear down

Directions:

From I-94 north, go west on Highway 142 (Exit 140, where the Mars Cheese Castle is) about 14 miles towards Burlington.

The entrance is on the south side of 142 just west of the intersection with Highway 75.

At the front gate ask for directions to the launch area.

Park Fee:

Be aware that Bong is a Wisconsin state park and that entrance fees/passes apply. Current Non-resident fees are \$25/yr., good for all Wisconsin state parks, or \$7/day.

Food and Water:

Please remember to bring food and water with you. Although there are wells, it a long hike. Bring garbage bags too, everything you bring you need to take home. All garbage has to be packed out of the park.

HPR Vendor:

Please preorder any HPR motors and reloads to be delivered at the field. Al's Hobby Shop has confirmed that they will be there, you can contact them by phone at (630) 832-4908 or email alshobbyshop@attglobal.net.

MRFF Range Help Needed

by David Wallis

Planning is underway for NIRA's Midwest Regional Fun Fly (MRFF) launch. We'll be back at the Bong State Recreation Area, in Kansasville, Wisconsin again this year, on June 16 and 17.

Like last year, the range will be designed to support both model and high power fliers. Unlike last year, there will be only one range. If you attended last year's event, you'll remember that we shared the Bong runway with the WOOSH club's contest range (actually, they shared the runway with us – thanks WOOSH!). This year, we have the runway all to ourselves, although we're looking forward to lots of WOOSH members joining us.

NIRA will not be offering NAR Level 2 testing this year at MRFF. With all the excitement and last minute preparations, and with the huge amount of work it takes to set up and operate the MRFF range, there just isn't enough time for proctoring the tests. If you plan to make a Level 2 certification attempt, make sure to take (and pass!) the written test before you come. Remember to bring proof that you passed the test within the last 12 months - you will not be able to make the certification flight without it! Please contact NIRA if you plan to make any certification flight, so we know what to plan for.

The waiver for the launch is not finalized as of the time this article was written. We expect to be approved for flights up to 10,000 feet MSL (about 9,000 feet AGL) on both Saturday and Sunday. If you plan to fly any motors above 'K', please contact the MRFF staff before the event for approval.

Although we won't be giving the L2 test, we will be offering support for anyone who's participating in the NAR Trained Safety Officer (TSO) program. If you plan to work on the TSO requirements, please contact NIRA's RSO (David Wallis – contact info is at the bottom of this article) or Steve Piette, the MRFF chairman. Also, remember to bring your TSO paperwork! If you're not familiar with the TSO program, you can read all about it on the NAR website: <http://www.nar.org>.

The range layout this year will be similar to last year's layout (basically, a circle of model rocket launch pads, and HPR launchers progressively extending out from that). We're working hard on streamlining our launch management plan, with the intent of reducing the wait time experienced by some high power fliers last year.

If you plan to fly high power rockets, please remember to bring proof of the appropriate certification level. Both NAR and Tripoli HPR certified fliers are welcome to fly at MRFF.

We are looking for volunteers to staff the MRFF range. The range is scheduled to be open from 9:00 am until 5:00 pm both Saturday and Sunday. The range staffing schedule will be divided into 2-hour time slots for each of the range operation positions. Those positions are:

- Range Safety Officer (RSO) – ensures the overall safety of the launch and compliance with safety codes and range rules. The RSO has the final voice in questions of which rockets may fly and which may not.
- Launch Control Officer (LCO) – announces and launches rockets as they are ready
- Safety Check-in Officer (SCO) – checks rockets onto the range, ensuring compliance with all safety codes and range rules.
- Pad Manager (PM) – assigns rockets to pads, and works with the LCO to keep the launch moving
- Gofers – assist other range staff by running errands or relaying messages.

In order to fill an RSO slot, you must be HPR certified Level 2, have completed the TSO training program and have the approval of the RSO. If you have questions about the duties of any of these positions, please contact David Wallis or any of the NIRA board members for more information.

If you want to volunteer for one or more time slots, please email David Wallis (wallis@aps.anl.gov) with your name, email, phone number, and desired time slot and position. Preferences will be taken on a first-come, first-served basis. Don't wait to volunteer! Rockets will not fly without a full shift of range personnel on the field.

MRFF contact information:

Steve Piette – MRFF Chairman
Email: steve@simon.chi.il.us

David Wallis – RSO
Email: wallis@aps.anl.gov

Bob Wiersbe
Email: wiersbe@lucent.com

Northern Illinois Rocketry Association

Midwest Regional Fun Fly 2001

June 16th & 17th, 2001

Bong State Recreational Area, Kansasville, WI

Name(s) _____

Address _____

City _____ State _____ Zip _____

Club / Organization _____

NAR # _____ NAR Certification Level _____

TRA # _____ TRA Certification Level _____

Phone _____ E-Mail _____

Number	Price	Total
	\$10.00	
	\$5.00	

Adult (16 and over) MRFF 2001 Registration Fee

Youth (15 and under) MRFF 2001 Registration Fee

Free with paid Adult

Total Registration Fees Due

Launch Information is available at www.NIRA.chicago.il.us/MRFF.htm

Are you interested in helping? RSO LCO SCO Pad Manager Registration

Make all checks payable to Northern Illinois Rocketry Association and return to:

Northern Illinois Rocketry Association

C/O Steve Piette

7N852 Phar Lap Drive

St. Charles, Illinois 60175-6868

I am familiar with the standards and regulations of the National Association of Rocketry and with the Safety Codes of the NAR and I agree to abide by them.

Date: _____ Signed: _____
Attendee

PARENT'S CONSENT: (Must be signed by parent or legal guardian before any attendee under 18 years of age can be registered)

As parent or legal guardian of _____, a minor, I hereby give my full and unqualified consent to his/her participation in this NAR insured event, and to his/her accepting any and all awards whatsoever that he/she may win.

Date: _____ Signed: _____
Parent or Guardian

TALON

A sport model featuring anti-zipper recovery technique construction
Designed by Mark Kotolski (NAR 35707, TRA 3609), Plan #042698

Parts List:

- A. Nose Cone, PMC 2.14
- B. Body tube, BT 2.14 x 10"
- C. Body tube, BT 2.14 x 20"
- D. Fins, 1/8" Plywood (4 needed)
- E. Bulkhead Assembly, BA 2.14
- F. Motor Tube MMT, 1.14 x 6"
- G. Centering Rings, CR 2.14-1.14 (2 needed)
- H. Launch Lug, 1/4" x 4"
- I. Shock Cord, 1/2" x 12'
- J. Parachute, 18" Nylon

Recommended Motors:

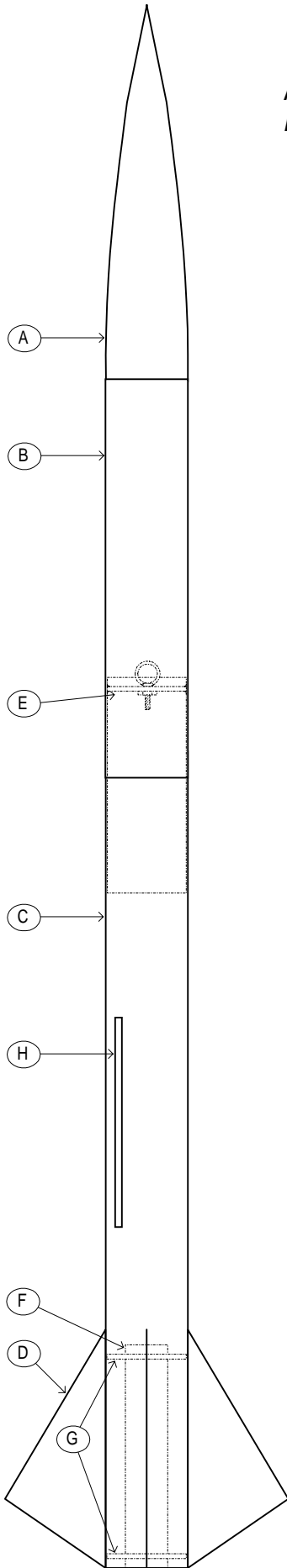
F20-7w F37-sw F40-7w F52-8t F62-st G25-10w
G33-7j G35-7w G40-10w G64-10w G75-mj G80-10t
G125-10t H97-mj H128-mw H180-mw H220-mt H238-mt

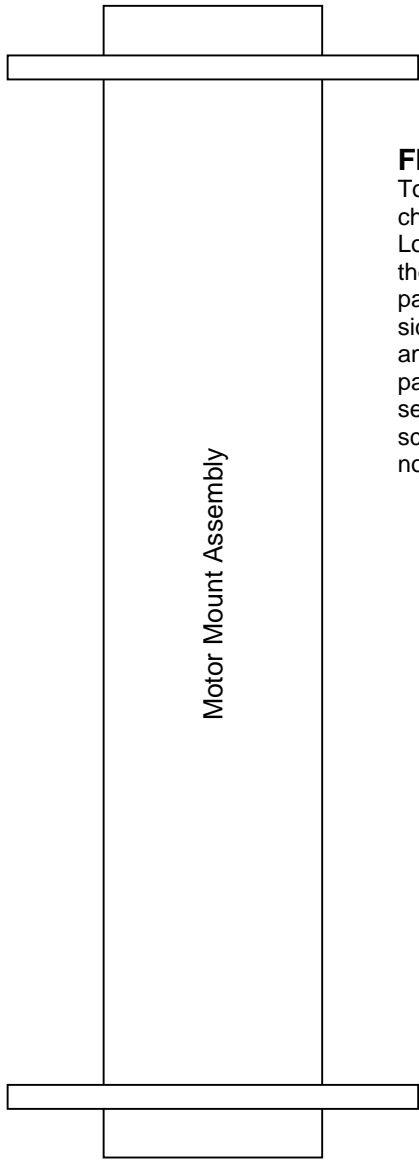
Prototype Specifications:

Weight: 17.76 oz.
Predicted CD: .503
Predicted CP: 31.43" from tip of nose cone

Construction Steps:

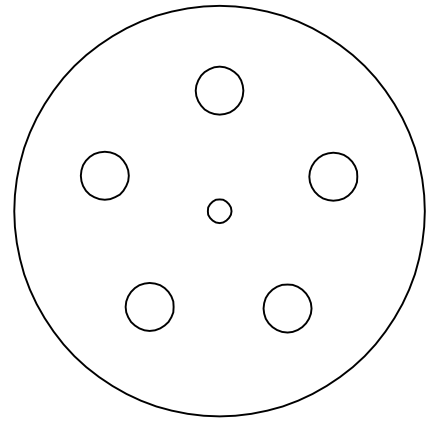
- Epoxy a centering ring 1/4" in from each end of the 6" long motor tube. Apply a good fillet of epoxy to all motor tube/centering ring joints.
- Apply a bead of epoxy around the inside of the main 20" long airframe about 5" up from one end. Push the assembled motor mount straight up into the epoxy until the motor tube is flush with the end of the airframe. Keep in an upright position until dry. Turn assembly upside down and apply epoxy to the rear ring and airframe joint.
- Cut four (4) fins from 1/8" plywood. Sand all fins smooth and round the leading and trailing edges (not the root edge).
- Use your favorite method to mark the motor end of the main airframe for the placement of the four fins and the launch lug. Extend the fin lines about 7" and the launch lug about 14".
- Epoxy the fins to the main airframe with the rear of the fins even with the end of the airframe.
- Epoxy the launch lug on the line. Position the lug so that the bottom end of the lug is 7.5" from the rear of the airframe.
- Give all fin and launch lug joints epoxy fillets for maximum strength.
[For more information on the following construction technique, refer to the March/April 1993 issue of HIGH POWER ROCKETRY or the March/April 1998 issue of SPORT ROCKETRY magazine.]
- Assemble the bulkhead assembly in the normal fashion. After the epoxy has dried, drill five (5), 1/4" holes around the perimeter of the bulkhead plate (see diagram on the next page). These are the ejection gas ports.
- Epoxy the bulkhead assembly into the top of the main airframe so one half of the coupler portion sticks out the top of the airframe. **Note:** This assembly is in reverse as compared to the normal 'payload tube' orientation.
- Seal the wood grain of the fins using your favorite sealing method.
- When satisfied with the appearance of all the surfaces, it is ready to prime and then paint in the color(s) of your choice.
- After the paint has dried, tie one end of the shock cord to the eyebolt. Pass the shock cord through the upper airframe tube and tie it to the nose cone. Friction fit the nose cone to the upper airframe. It may be a good idea, especially if you intend to use high impulse motors, to drill a 1/8" hole in the upper airframe just below the nose cone shoulder to act as a pressure relief.
- Attach the parachute to the shock cord about 48" from the lower section. Construction is now complete!



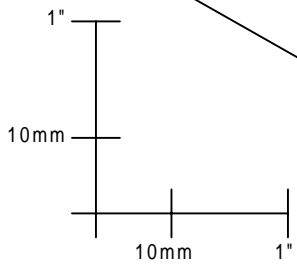
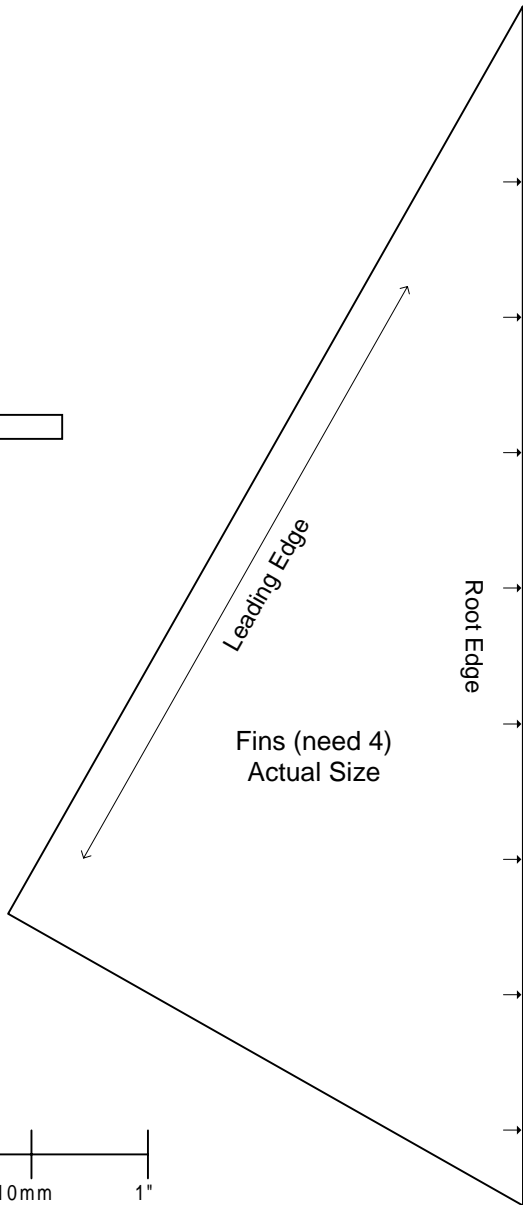
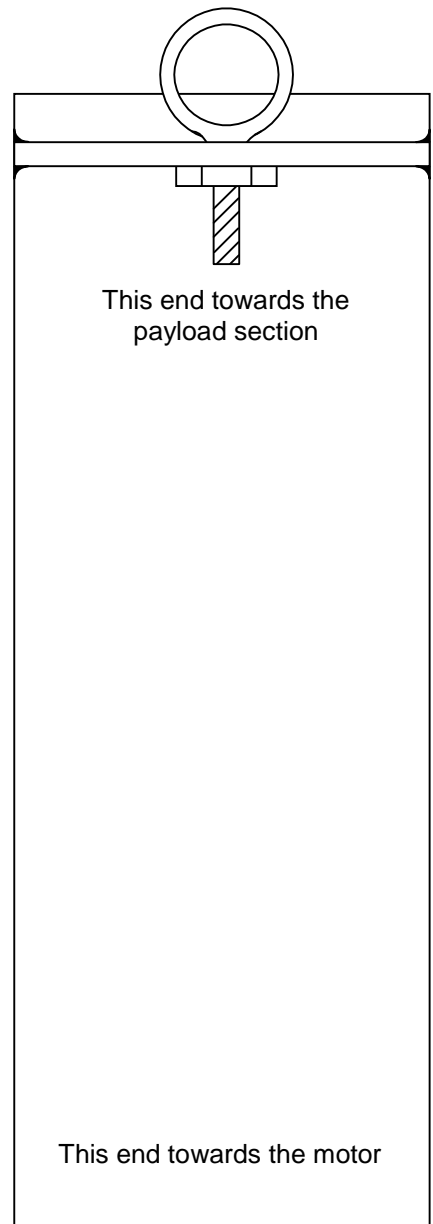


Flight Prepping:

To prep the "TALON" for flight, select the motor of choice and retain it using your favorite method. Loosely pack the longer section of shock cord into the upper airframe. Fold the parachute. Insert the parachute and lower shock cord at the same time, side by side into the upper airframe. Add a small amount of wadding loosely on top of the parachute and shock cord before joining the two sections together. This will deter any minor scorching to the parachute or shock cord. You are now prepped and ready to fly.



Bulkhead Plate with holes drilled



**Space Launch Report for
March-April 2001**
by Tim Johnson

Eight launch vehicles blasted their way into space during March- April, 2001. Two space shuttles and one Soyuz spacecraft visited the International Space Station (ISS). Twenty humans flew to or resided at ISS during the period, but the average earthbound citizen probably only knew of Dennis Tito, who rode Soyuz TM-32 aloft to become the world's first space tourist.

Meanwhile, India's GSLV and Russia's reengineered Proton M performed inaugural flights, NASA sent another spacecraft toward Mars on a Delta II, and Ariespace and Sea Launch each performed one commercial launch. The period also saw Mir's spectacular demise, the end of NASA's single-stage RLV efforts, and steady Delta IV and Atlas V development progress.

ISS Missions

Two space shuttles and one Soyuz spacecraft visited ISS during March-April, 2001. Shuttle Discovery was first, beginning the STS-102/ISS-5A.1 mission with a March 8 launch from Kennedy Space Center (KSC) Launch Complex (LC)39B. The 17-year-old orbiter docked to Destiny's forward port on March 10. Aboard were Commander Jim Wetherbee, Pilot Jim Kelly, Mission Specialists Andy Thomas and Paul Richards, and the Expedition 2 Crew - Jim Voss, Susan Helms, and Russia's Yuri Usachev. Discovery brought 4,500 kg of experiments in Italy's "Leonardo" logistics module, which was docked to Unity's nadir port for unloading. The shuttle returned to KSC on March 21 with the Expedition 1 crew - Bill Shepard, Yuri Gidzenko, and Sergey Krikalyov - who completed nearly five months in orbit.

Shuttle Endeavour docked to ISS on April 21, two days after lifting off from KSC LC39A. In preparation, the Expedition 2 crew discarded Progress M44 on April 16 and moved Soyuz TM-31 from Zarya's nadir port to Zvezda's aft port on April 18. Endeavour brought Canada's Space Station Remote Manipulator System (SSRMS) and 3,400 kg of supplies in "Raffaello", Italy's second logistics module. Crew members included Commander Kent Rominger, Pilot Jeff Ashby, and Mission Specialists John Phillips, Scott Parazynski, Chris Hadfield (Canada), Umberto Guidoni (Italy), and Yuri Lonchakov (Russia). Endeavour stayed until April 29 while NASA rebooted three failed ISS Command and Control computers, landing at Edwards AFB on May 1.

Soyuz TM-32 lifted off from Baikonur's historic Gagarin Pad on April 28, making its own bit of history in the process. The ISS-2S crew vehicle ferry mission carried U.S. businessman Dennis Tito, the first self-paying "space tourist", along with Commander Talgat Musabayev and Flight Engineer Yuri Baturin. The spacecraft docked with Zarya's nadir port on April 30. Mr. Tito paid \$20 million to Russia for the flight, which took place despite the objections of all other ISS partners.



India's GSLV on the Sriharikota launch pad. (ISRO photo)

GSLV-D1

India's Space Research Organization (ISRO) recovered quickly from a March 28 "hang fire" to launch its first Geosynchronous Satellite Launch Vehicle (GSLV) from Sriharikota on April 18. An early third stage cutoff denied the 49-meter tall rocket's total success in the inaugural D-1 mission, however. G-Sat 1, a 1,540 kg test payload, fell about 4,000 km short of its planned 36,000 km geosynchronous transfer orbit (GTO) apogee. A weight imbalance later prevented G-Sat from making up the difference with its apogee motor, stranding it in a 23-hour drift orbit.

The 401,000 kg, three-stage GSLV is a conglomerate of Indian, European, and Russian components. The first stage uses a 20.3 x 2.8 meter (m), 4700 kiloNewton (kN) thrust solid motor, augmented by four 19.7 x 2.1 m L40 liquid strap-on motors. The non-separating L40s are powered by 700 kN Viking 2 engines that burn UDMH/N2O4 for 150 seconds, 50 seconds longer than the core.

GSLV's 11.6 x 2.8 m GS-2 second stage starts its Viking 4 700 kN UDMH/N2O4 engine just before first stage cutoff, to ensure propellant settling, and burns for 160 seconds. The Glavkosmos 12KRB Cryogenic Stage (CS) then ignites its 73.5 kN KVD-1 LH2/LOX engine for a planned 710 second burn that ended 12 seconds early on this flight. CS is the first Russian-built liquid-hydrogen upper



Soyuz ISS-2S mission (with Dennis Tito) (Energia photo)



Proton M/Briz M begins its first mission (International Launch Services photo)

stage to fly, but ISRO plans to replace it with its own LH2 third stage in a few years.

Proton M Inaugural

Krunichev's Proton M/Briz M succeeded on its April 7 inaugural flight, boosting the 2,100 kg Ekran M-18 communication satellite to geosynchronous orbit from Baikonur Area 81 Pad 24. The four stage rocket's RD-253 first stage engines produce 160,000 kgf thrust each, a 6% increase over Proton K. Proton M also uses a new digital flight control system. With its new Krunichev drop-tank Briz M upper stage, the all-hypergolic rocket can boost 5,500 kg to GTO from Baikonur, a commercial capability currently exceeded only by Ariane 5G and Zenit 3SL.

Mir Deorbit

Russia's Mir space station reentered on March 23, ending its 15- year mission. Progress M1-5 performed a series of deorbit burns to drop the 140,000 kg T-shaped station from orbit. Several tons of debris fell to the South Pacific near 150W/44S.

(Space Launch Report continued on page 9)



The first Titan IV prior to rollout

(Boeing photo)

March 2001 Building Session By Norm Dziedzic

A small but dedicated group assembled for the March building session at my house in Park Ridge. Bill Thiel and Tom Pastrick continued their projects from the February session. Bill worked on a square bodied Stellar Dimensions kit (maybe a Spinnaker?) and Tom labored on a boost glider from a set of vintage Estes plans. I don't think Bill finished (he took time out to watch the LDRS video) but Tom was done by the end of the day. President Rick Gaff was also there with the NIRA library and his trusty digital camera.

Brand new NIRA members Charles and Lexi Hammerslough (father & son team) showed up to build a Big Bertha and Quark respectively. They learned the benefits and how-to's of CA glue from Bill and Tom and in general sucked in advice and information from the over 100 years of combined rocketry experience present.



Norm Dziedzic preps a Micro V2
(Rick Gaff photo)

(Space Launch Report continued from page 8)

Other Launches

Delta 284, a 7925 model with a Star 48B solid fuel third stage, boosted NASA's 725 kg 2001 Mars Odyssey into solar orbit from Cape Canaveral SLC 17A on April 7. Ariane 509, a 5G model flying mission V140, put 3,050 kg Eurobird and 1,318 kg Bsat-2A into GTO from Kourou ELA3 on March 8. The sixth Sea Launch Zenit 3SL/DM-SL mission put XM Satellite Radio's 4,682 kg "Rock" into GTO from LP Odyssey at 154W/0N on March 18.

Launch Vehicle News

Lockheed Martin rolled out its first Atlas V Common Core Booster (CCB), denoted AV-001, at its Denver plant on April 30 before shipping the rocket to Cape Canaveral for a planned May 2002 launch. CCB is a structurally stable aluminum assembly, unlike prior Atlas stages. The new rocket does borrow the classic Atlas external equipment fairing design, however.

Boeing's pathfinder Delta IV Common Booster Core (CBC) performed its first 15-second hot fire test at Stennis Space Center on March 17. By early April, the vehicle had fired its 297,500 kgf thrust LOX/LH2 RS-68 engine for up to 145 seconds at a time.

NASA cancelled its X-33 and X-34 projects in early March, abandoning single stage RLV research in favor of its new Space Launch Initiative. Cost overruns also forced NASA to slash future ISS expansion plans, a move that will cut the shuttle flight rate from eight to six per year. 🚀🚀

Bob Kaplow and myself were out to investigate the cutting of G10 fiberglass with diamond wheel wet saws. We had heard about this technique on rec.models.rockets and gave it a try with some .031" thick G10 I had bought from McMaster Carr a while back. I had borrowed my brother's Plasplugs brand diamond wheel wet saw (available at Home Depot for around \$90) and Bob brought along his Makita cordless saw (Model #4190D: \$105 with diamond blade but without battery or charger).

Both saws use water to totally eliminate airborne dust during cutting (which is hazardous to your health). The Plasplugs saw looks like a mini table saw with a toothless diamond impregnated cutting wheel that sits over a shallow water bath while the Makita cordless has a coarsely toothed diamond wheel. Both cut through the G10 without any problems. The Plasplugs saw has a fence and T-Square-ish implement for cutting angles

but these are made for thick tiles so we had to space up the G10 so it didn't slip under the fence.

The Plasplugs saw makes it a little easier to cut straight or 45 deg. lines while the Makita cordless has go-anywhere convenience and eliminates the possible electrical hazard of the Plasplugs model which is plugged into a standard wall socket.

Toward the end of the afternoon we had a small launch in the park across the street. I started things off with my Quest MicroMaxx Saturn V which flew straight for a change. Bob Kaplow flew his Sputnik-13 on a 1/4A3-3T and the model he assembled at the building session, PLATINUM (made from an A.O.L. "PLATINUM" disk & assembled with hot



Lexi Hammerslough preps his Quark for flight
(Rick Gaff photo)



Lexi Hammerslough celebrates a successful Quark flight (and recovery!)
(Rick Gaff photo)



Bob Kaplow and Norm survey the launch site for flammable material...
(Rick Gaff photo)

melt glue and scrap parts from a 1980 superroc model) on a 1/2A3-2T. The highlight of the whole day for me was watching Lexi Hammerslough launch his just finished Quark on a 1/4A3-3T. This was Lexi's first non-RTF model and his excitement at the successful flight was fantastic to watch. We even found the Quark so it can fly again. I also launched my MicroMaxx Space Shuttle which had the usual erratic flight and my Apogee Micro V2 on an Apogee 1/4A2-2. After the launch, the boxes were packed up and good-byes said as the Point 39 Productions LDRS 19 video rolled on. 🚀🚀

Pathfinder Class/Launch by Kurt Gunther

On Sunday, March 11, I taught a Model Rocketry class at a Pathfinder Craft Fair near La Fox, Illinois. (A Pathfinder club is a church-sponsored youth program for both boys and girls.) Eight boys joined the class, with ages ranging from 8 to 14 years old.

This was the third year that I've taught this class and again I selected the Estes "Wizard" kit. I like this kit because it is inexpensive in bulk purchases, lends itself to quick assembly, and requires balsa fin cutting and gluing. (Call me old-fashioned but I wanted the kids to have to work at building the kit.)

Unlike previous years when the craft fair was in Chicago, the location this year featured a large athletic field: ideal for a rocket launch. For the first time I was able to offer a rocket launch too. (Because the Pathfinders come from all over Illinois, previously their local club had to provide the launch opportunity at a later date.) This time we would be able to complete every requirement for the rocketry instruction with the exception of painting the rocket. The students would have to complete that at home.

I began our class by introducing the names of various rocket parts (to aid in building the kit). Then we dug into kit construction because we had to have as much time as possible to let the glue dry (we were using wood glue). I was fortun-

nate to have two experienced helpers for the kit build so each student could get plenty of personalized attention when necessary.

By lunch time, everyone had finished building their kit. After a break, we resumed the class for technical instruction. We discussed the Model Rocketry Safety Code, the function of various rocket components, the steps in the flight of a model rocket, and identified the parts of a model rocket engine. We studied a schematic of a simple launch system and defined the terms: "wadding, boost glider, stall, payload, apogee, impulse, velocity and ejection".

We spent a good portion of time discussing stability and understanding "center of gravity" and "center of pressure". During this point in our class I made a mental note that I still need to find a more effective, intuitive way of communicat-



A Pathfinder preps his Wizard for launch
(Kurt Gunther photo)

ing and demonstrating these principles. (Any suggestions, NIRA members?)

Finally, I asked the class to suggest various types of recovery systems. Parachutes and streamers were quickly offered as answers (they had already seen the Wizard's streamer during construction). It took some prodding to get them to remember the gliding part of boost gliders that we had already talked about. I was impressed when one of the older students suggested something like tumble recovery. He didn't use the word "tumble" but he remembered our discussion about instability during the discussion of center of pressure and thought that it might be a way of slowing the descent of a rocket.

Despite weather predictions that called for rain, the weather was nearly ideal, except for a healthy wind. Just after we got the launcher set up, one student showed me that his launch lug had just fallen off! I told him that we would glue it on and have him be the last to launch, (hoping that the glue would have enough time to set up).

Word spread quickly that we were going to launch rockets and a crowd began to form. Each rocket launched on the first attempt. I'd forgotten how far a small rocket can go on just an A8-3 engine! Every recovery system deployed properly.

Fortunately for our final rocketeer, the wood glue set up quickly enough and the freshly repaired launch lug held just fine. One of his

(Science Fair Launch continued on page 11)

Confused Stages – Stage 19 by Jonathan Charbonneau

"What's a Delta?" asks a curious rookie rocketeer. What is meant by swept back? Swept forward? Ever wonder what is meant by the term "raked?" You need look no further. This stage will explain these terms, and more, about fins.

Fins are described according to their planform, airfoil and configuration.

Planform: This is the shape of the fin as viewed from the side. Swept fins are not swept like dust from a broom. They simply have both their leading and trailing edges slanted forward (swept forward) or back (swept back). Tapered fins are swept fins with a shorter tip than their root. Delta fins are triangular in shape with the leading trailing edge at a right angle (90°) to the airframe. Clipped delta fins are delta fins with their tips 'clipped' off. Raked fins aren't in anyway

related to the farmer's rake nor to the rakes used in raking leaves. They're just angled at the tips. Trapezoidal fins are so named because they're shaped like trapezoids. Elliptical fins are derived from an ellipse.

Airfoil: This is the shape of the fin as seen in cross section or on edge. This has a great effect on how the air flows around the fin. Examples are the rounded, wedge, double wedge, bi-convex, plano-convex and square (see illustrations).

Configuration: This is how the fins are arranged on the rocket. Triform, cruciform, pentaform and hexaform are examples. 🚀

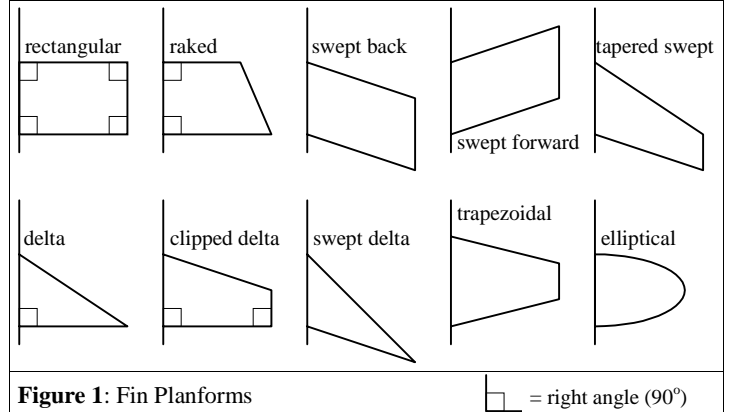


Figure 1: Fin Planforms

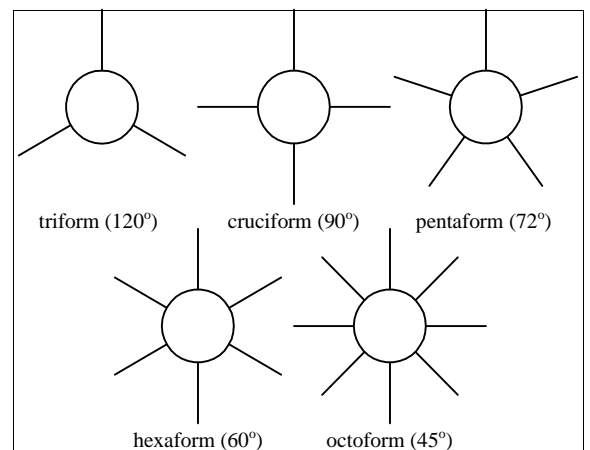


Figure 3: Fin Configurations (all fins spaced equally)

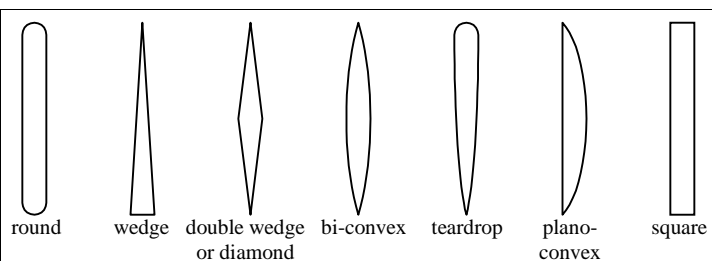


Figure 2: Fin Airfoils

Welcome to the Club!

Wesley and Sonja Dziedzic, Gary Nachman and family, Joseph, Jennifer and Jeff Pawlak have all joined NIRA in the past few months. Welcome to the club!
(If I somehow missed your name, please let me know!) 🌟🌟

(Pathfinder Class/Launch continued from page 10)

rocket's fins came off during the flight, however. (I suspect that his gluing technique needs attention!)

My students were thrilled to see their rocket streak into the sky. No other craft offered at the fair compared to the rocket launching experience!

When everyone else had launched their rockets, I brought out my Estes SR-71 for its inaugural flight (with a B4-2 engine). I inadvertently aligned the "wings" at 90 degrees to the wind direction. When the rocket reached about forty feet it turned into the wind at a sharp angle. I was puzzled by the way it flew.

The kids loved it and were eager to see another launch. One of my students retrieved the recovery wadding and stuffed it back in the rocket. I foolishly neglected to inspect the condition of the wadding and how well it had been packed. I asked the group if they wanted me use a more powerful engine. Naturally, the response was affirmative.

The second launch looked very much like the first. I somehow managed to orient the wings at a right angle to the wind again. At about forty feet the SR-71 turned sharply upwind. (I finally realized that this rocket is very susceptible to weather-cocking.) With the more powerful C6-5 engine, the SR-71 traveled much farther upwind but hardly achieved any additional altitude.

At ejection the parachute and nose cone combination separated from the body of the rocket. As the lower section tumbled and flipped towards earth, I pointed out that we were getting an impromptu demonstration of "tumble recovery". Sometimes the best educational opportunities are those unexpected mishaps!

An astute adult caught the tumbling SR-71 and prevented any damage. A brief inspection revealed that the "stock" Estes elastic shock cord had been incinerated at the shock cord mount. Apparently the wadding was installed with a "blow-through" path.

We briefly reviewed the SR-71 flights on a friend's digital camera (in "movie" mode), packed up the equipment, and sent the gang on their way, rockets in hand, and exciting memories in their minds. 🌟🌟

AeroTech Announces Motor Certifications

AeroTech, Inc. is pleased to announce that, in addition to the recently certified H210R and I218R Redline™ reloads, TMT and NAR S&T volunteers are working to complete testing of the full range of Redline™ reloads.

We sincerely thank each and every one of these individuals for the time that they have contributed, and will continue to put forward, towards the completion of the test series.

The pre-ordered Redline™ reload kits have been in production for several weeks and will be shipped as certification of each of the Redline™ high power reloads is received.

AeroTech estimates that the timing of the product delivery to dealers, from the date of NAR or Tripoli certification, will range from approximately two weeks for the 29/38 mm reloads to three weeks for the 54/75/98 mm reloads.

Deliveries to California dealers may be delayed somewhat until the reloads are certified by the State Fire Marshal and other State requirements have been completed.

No LEUP is required for purchase of any of the 29/38 mm Easy Access Redline™ (or any of the other AeroTech E/A) reload kits.

As a side note the 54 mm Redline™ reloads are being tested and certified with the new RMS Plus™ delay system. Already proven in the 29/38 mm systems, this will add increased reliability to the 54mm line of motors. 🌟🌟

NARAM-43 Secures FAA Waiver

Geneseo, NY (ROL Newswire) -- NARAM-43, the week-long rocketry championships being held 4-10 August in Geneseo, NY, has secured its FAA waiver for the entire week. The waiver permits rocket flights up to 8000 feet AGL.

Due to better-than-anticipated demand, the official host motel is already sold out. The organizing committee has made arrangements with two additional properties to accommodate the overflow. The alternate choices are within a block of the main host hotel. Information about the alternate hotels is available at the official NARAM website (www.naram43.com). The local committee recommends booking early.

Information on the launch and contest is available on-line at the official NARAM website. Persons wishing to make complex flights (more than one engine) over a total of K impulse are especially urged to visit the website. 🌟🌟

Quad-Pod by Impulse Aerospace

(ROL Newswire) -- Impulse Aerospace, a new company under new ownership, is once again producing the industry leading Quad-Pod Launching Pad. The Quad-Pod is still being produced using the same high quality material and craftsmanship as originally maintained by former Rocket Vision Company.

Impulse Aerospace is also pleased to introduce a new and exciting Quad-Pod Pro-Series, which includes new innovations that allow for heavy usage while reducing maintenance and wear. For example, the Quad-Pod Pro-Series is now equipped with a ceramic-coated blast plate. This ceramic coating prolongs the life and quality of the launch pad as well as reduces the clean-up time of propellant residue.

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New PerfectFlite Altimeter Released

AMHERST, Massachusetts (ROL Newswire) -- A kit version of the tiny microAlt altimeter is now available from PerfectFlite. This data logging dual-event deployment altimeter measures just 2.75" long by 0.8" wide and weighs only 0.7 oz with battery. The microAlt lets lower-powered model rockets employ the advanced electronic recovery and precise altitude determination capabilities of an altimeter -- benefits previously reserved for high power rocketry due to the size and expense of the electronics. The kit includes all parts and documentation and sells for just \$44.95.

A kit version of the microTimer staging/ejection timer is also available. This single event digital staging/ejection timer is smaller than a quarter, and sells for just \$9.95 in kit form.

Because the kits utilize surface mount components, a detailed surface mount assembly tutorial is provided on CD ROM. The documentation CD also includes assembly and operation manuals for the entire line of PerfectFlite products. The newly-released kits can be assembled without the need for exotic tools, but a small-tipped soldering iron and good eyesight are necessary. These are not beginner's kits!

For more information, see their updated web page at www.perfectflite.com. The site now includes the majority of the documentation from the CD ROM in downloadable Adobe .pdf format. A printed catalog and the documentation CD are also available separately, call (413) 549-3444 for more details. 🌟🌟



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