



MASA Planet

Volume 7, Issue 2

Special Edition: NARCON!

March 2004

Safety First!

Fix-Up Time!

If it moves, glue it!

Ted Cochran, NAR 69921

Flying season is just about here, and, if you are like me, there are some rockets sitting in your workshop that were put there after they were last launched, and haven't been looked at since.

Before you take them out to fly, check them over carefully. Here are some things to look over:

1. Remove any temporary repairs (tape, for example) and make a permanent fix.
2. Give shock cords a good yank--better to break them in your workshop than in flight! While you're at it, check the knots, the attachment hardware, and swivels and quick links.
3. Do the fins wiggle?
4. Is the launch lug secure?
5. How about the recovery device--is the parachute still serviceable?
6. Is the motor mount still tight and straight?
7. Are there any dents or other body tube weaknesses to reinforce? Check that the body tube for long rockets is still straight.

A few quick checks now might save you a lot of grief at the next launch!

Road Trip!

MASA Goes to NARCON

On-scene reports from Kenosha

Written by Russ Durkee, Glen Overby, Mike Erpelding, Mark Thell, David Whitaker, Tom Lawell, Ted Cochran & Seth Cochran.

Edited by Ted Cochran

The 2004 National convention of the NAR began on Friday March 3rd with a sizeable contingent of MASA members in attendance. Mike Erpelding, Mark Thell, Russ Durkee, Ted and Seth Cochran, Glen Overby, Tom and Travis Lawell, and Dave Whitaker made the six-hour drive to Racine, Wisconsin for the two-and-a-half day conference. This was the first NARCON for most of us. Glen attended NARCON 2001 in Dallas, and Russ had a role in organizing NARCON 1997 through NARCON 1999 with the Central Illinois Aerospace (CIA, NAR #527).

The theme of this year's conference was "Building for the Future". Numerous presentations comprised an entire conference track on the subject of model rocketry and education: Model rocketry for primary, intermediate, and high school grades were addressed in additional sessions throughout the weekend. Other sessions covered various aspects of competition, craftsmanship, and high power rocketry.

The convention hotel was about fifteen minutes from the convention center at the University of Wisconsin, Parkside. The University was on spring break, so the convention broke for lunch each day so attendees could drive to a local eatery for a quick bite.

This article consists of our reviews of sessions we attended. Ted lightly edited the comments to reduce duplication, and added his own notes. The initials of the author follow each summary in case you want to

ALSO IN THIS ISSUE

3 Event Schedule; Editor's Note

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20 Milestones; Parting Shot

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find out more. There is no way to do justice to the whole weekend in one article (even a long article) in the Planet, so make plans to go to NARCON next year--it may well be held in Kenosha again!

Let's let Mark Thell begin our coverage of NARCON:

As I write this, the day after returning home from NARCON, I am reeling from the experience. It was great from beginning to end!! I have been flying rockets since 1972, this is my first NAR event.

Driving to Milwaukee with Russ Durkee at the wheel was a lot of fun. Since he had been to NARCON before I picked his brain as to what I should expect, he told me about all the vendors, the past seminars, and how nice everyone was. Upon arrival, I was completely blown away!!! The people were GREAT!!! Extremely friendly. I felt like I "had arrived" Everyone went out of their way to make me feel welcome. I have been at a loss for words to describe my experience there; the closest thing I could think of was "rocket nirvana". For the first time since I started flying in 1972, I was talking to people about my hobby and I didn't get the "eye roll" (that's great, whatever). There are people out there just as nuts as I am.

The hotel was great; the venue was top notch. It was surreal to me. After getting settled in the hotel, we went to the Molinaro Hall to get our registration packets and my T-shirt. We then went to the vendor room and whipped out our wallets and went a little crazy buying stuff. After regaining our senses, we decided to hold off on more spending. We still had two more days.

I brought my modified Estes Saturn 1B two stager along, as I was having trouble deploying a chute out of



Russ Durkee

Robert and Peter Alway admire Mark's Saturn I.

the booster. What better place to get help? I took it out of the shipping tube by Jim Flis's display. Lots of people came over to see it and ask questions. When I separated the stages and the fins deployed people came out of the woodwork to see it. Jim Flis came out from his display with his beautiful Saturn1B and we had our pictures taken together. Lots of pictures, were taken, and naturally I ran out of film at the time. Russ took a couple for me (Thanks, Russ). Everyone was very helpful with suggestions to solve the recovery problem. Peter and Robert Alway arrived later. I called Peter a few years ago while building the 1B. He was interested in seeing it. Between Peter and Robert, I think I have the problem solved. [So we get to see it fly Real Soon Now, right, Mark? --Ed.] Thanks guys.--MT

Glen Overby adds: "This was the second NARCON I have attended (the first was NARCON 2001 in Dallas). The DARS section does a lot of sport and high power flying, so there was a "conference track" that was oriented towards sport and high power flying. This conference was much more oriented towards education (which is not surprising given that it was held at a college campus) but I still had plenty of interesting and informative sessions to attend.

"It also provided an opportunity to hear from the NAR President at Saturday evening's Town Meeting.

"I got to see part of Bob Kaplow's old motor collection, including *holding* an infamous Jerry Irvine motor manufactured by US Rockets. Those motors have propellant cast into fiberglass tubes. --GO

Vendors

Vendors set up early in a common room and were doing a brisk business shortly after opening the doors on Friday evening. The vendor room is always a highlight of these conventions. Not only are products often discounted; attendees get a chance to chew the fat with the rocket designers themselves. Aerospace Specialty products had a large selection of their scale and contest models. Balsa Machining service offered a nice choice of Edmunds boost gliders, as well as an impressive array of nose cones and transitions. Art Upton of Booster Works had an impressive display of his on-board video system and on-board electronics. However the nicest surprise in Art's display was the dozen or so different cloned Centuri kits he had for

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MEETING SCHEDULE

THURSDAY, APRIL 1

Location: [Science Museum of Minnesota, St. Paul](#)

Time: 7 PM to 8:45 PM

Topic: Junkyard rockets building session!

THURSDAY, MAY 6

Location: [Science Museum of Minnesota, St. Paul](#)

Time: 7 PM to 8:45 PM

Topic: RSO/LCO training; Scale model show and tell

LAUNCH SCHEDULE

NOTE: TIMES AND LOCATIONS SUBJECT TO CHANGE!

CHECK THE WEB SITE FOR UPDATES

SATURDAY, MARCH 27

Location: Apple Valley High School

Time: 9 AM - 4 PM

Renegade kit bash launch

TARC Qualification flights

SATURDAY, APRIL 24

Location: TBD

Time: 9 AM - 4 PM

Junkyard rockets competition

SATURDAY, MAY 22

Location: TBD

Time: 9 AM - 4 PM

Tour de Deuce launch

Editor's Note

Paying Forward

First, I want to thank MASA's NARCON attendees for helping to write the most extensive, most timely, to say nothing of longest, MASA article ever! Please offer your kudos to Seth Cochran, Russ Durkee, Mike Erpelding, Tom Lawell, Glen Overby, Mark Thell, and David Whitaker the next time you see them. They all scrambled to get the Planet's coverage of NARCON out within a week of the end of the conference.

Second, you might have noticed Mark Thell's remark in his coverage of the NAR Town Meeting concerning Mark Bundick's announcement that a certain MASA member (that would be me...) will be running for NAR Board of Trustees. I was intending to let you all know at the April 1 meeting (that date somehow seemed appropriate :-), but since Mark let the cat out of the bag already, I'll bring you up to speed.

NAR has a Board of Trustees nominating committee that is always on the prowl for candidates. Some combination of my role in Rocket League and TARC and a fairly long and detailed public response to the BATF NPRM apparently caught their attention. Mark contacted me early this year to ask if I would consider running, and, after some thought, I agreed.

It seems to me that NAR could use some additional help in several areas that overlap with my own interests and expertise. Here are two examples: First, NAR needs to strengthen its appeal to kids in general, and its educational and outreach programs in particular. While there are a lot of neat educational programs out there (check out the NARCON article), there is still no easy way for the average teacher to get help incorporating rocketry in the classroom. Legos? You bet. Rockets? Not yet....

Second, NAR needs to fight the perception that our hobby somehow threatens Homeland Security. I have spent five years working on Homeland Security issues and risk analysis in my professional life, and I think that experience will be helpful.

I believe that NAR these days need members and especially trustees to be active advocates for the sport, and that trustees need to offer a variety of skills beyond rocketry. That's why I've agreed to run. Please let me know if you have questions!



Russ Durkee

Jim Flis shows off an ACME Spitfire with optional wraps.

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sale. Mark picked up an Astro 1 and Laser-X, and Russ could not resist grabbing a Hydra VII which flies on a cluster of up to seven C engines.

Flis Kits displayed their entire line of innovative rockets. Who can resist these creative designs like the Deuce's Wild? This is a neat rocket that uses two rocket engines canted inward pointing at the rocket's center of mass. But the design is not new, "I have been flying the Deuce's Wild since the early seventies and published designs repeatedly, but few people built them," says Jim Flis. "But once I made it into a kit, I cannot make them fast enough!" Jim also brought along a number of photo albums that documented his long history of model rocketry. As Jim explained "I am not a BAR, I just never quit flying rockets since I started back in the 60s." And he had photo albums to prove it.

A large part of NARCON is socializing with other attendees. If you want to make friends at a NARCON, just bring a Saturn IB with you. On Friday evening Mark Thell unveiled his two stage Saturn IB and he instantly became the most popular guy in the room. Rocketeers were eager to offer suggestions and to discuss the details of his rocket's construction. Mark seemed to enjoy his newfound fame. "I felt like Elvis for a few minutes," said Mark. It seemed like everyone had a question about the rocket. It wasn't long before Mark began a productive brainstorming session with Peter and Robert Alway to solve a particularly sticky deployment problem with the lower stage. --RD

There were lots of neat things--to many to resist--in the vendor's area. Seth bought the Deltie B, an upscale model of the Deltie that flies on 18mm motors, to add to his already-extensive Deltie fleet. --TC

Friday

Keynote address

The keynote address on Friday evening featured Bill Stine, the son of G. Harry Stine and the inventor of our hobby. Bill offered NARCON attendees some valuable perspective on the current state of model rocketry. He started his talk with the following statistic: There have been 500 million model rocket launches since Bill Stine and Orville Carlisle flew the first Rock-a-Chute. There have been no known deaths and few injuries. He pointed out that when model rocketry was first



The first model rocket, ever.

invented, the perception of the new hobby was not terribly positive. Fortunately for us, G. Harry Stine was determined to change the popular perception of the burgeoning hobby. He worked to develop NFPA 1122, which differentiated model rockets and fireworks. However once this distinction was made, it took over 30 years of steady work to get all 50 states to adopt NFPA 1122. The problem? Popular perception of model rocketry did not match reality. Model rockets were seen as dangerous fireworks. Legislation and education were the answer. But changes in public perception did not happen overnight, and took decades to become fully accepted. Does any of this sound familiar? --RD

Kevin Wickart, NARCON event director started things out. There was a problem with the PA, but it wasn't a problem-- he worked without one. He did a good job with the opening remarks. Then it was time for our keynote speaker, Bill Stine, to take the podium. His speech was very well done. He talked about his father, G. Harry Stine's, efforts to get the hobby started. He also brought along one of Harry's original Rock-a-Chute models for us to ooh and aah over. The impression I got from him was that the problems we face now are not all that different from the problems Harry faced 40+ years ago and that with perseverance, we can come up with solutions everyone can live with. --MT

Saturday Morning

Saturday's program was organized into parallel tracks, with up to four sessions running at once. Often it was difficult to choose which session to attend. To add to the fun, there was a sport launch about half an hour

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away at the Bong State Recreational Area from 10 AM until 5 PM on Saturday. It was also scheduled for Sunday, but I believe it was called on account of the wind, which was gusting over 30 mph all day.

Section Management 101

Mark Bundick's presentation was titled, *Stealthy Section Management, or, How to Run Your Rocket Club Without Being Labeled A Manager*. Mark is big on sustainability: Ensuring that the creative efforts involved in growing a club with diverse interests and activities do not depend on a few ever-more-burnt-out regulars. He suggests that part of every club leader's job is to recruit and train a replacement person for that job. Mark had lots of suggestions for recruiting members, but reminded us of his "Rule of Tens:" For every 1000 rocket builders at a Make and Take, 100 will show up at a launch; 10 will join the club, and 1 will become an active volunteer. One neat idea was for clubs to make up stickers with club information (telephone number and web site) to attach to rocket products at local hobby stores (with the store's permission, of course!)

Mark is big on getting involved with schools, and provided good suggests for getting started. He also had some suggestions for launch management (and how to get new volunteers for range duty) and meeting activities. Mark Thell also attended, and also thought it was very well done and full of useful ideas MASA can use in planning its activities. I have Mark's Handout if anyone is interested in the details. --TC

Curriculum for Elementary School Model Rocket Education

Mike Erpelding did the elementary school rocketry presentation based on his work last summer (which led to an award-winning NARAM R&D report).



Russ Durkee

Professor Mike.

Mike presented a number of practical ideas to assist with the introduction of rocketry to young kids. He offered a lot of practical advice along with activities that will be helpful to anyone introducing young kids to rocketry. Attendees made

simple lung powered drinking straw rockets, and a simple theodolite. --RD

Building Session: Flying Saucer Attack!

Dan Wolf of the host section WHOOSH hosted a flying saucer building session. Session attendees built two UFO designs, from cardstock and paper. One model looked a lot like the original Centuri UFO while the other was based on a more simple design. The session limped along at first due to a limited supply of scissors and x-acto knives, but everyone played nice and a large number of UFOs were eventually constructed. --RD



Russ Durkee

Seth and Mark plot world domination.

Cluster and Staging Techniques

MASA's own Mike Erpelding gave two sessions back-to-back on Saturday. His first talk was described above. His second talk had less preparation time, but he nevertheless did a good job with the talk. There was a lot of participation from the audience. I threw in a few comments for good measure as well.

Mike started out by passing around several examples of clustered rockets. The first was a newly-built FlisKits "Deuces Wild" which is a very interesting design: It has two canted motors, pointed at the rocket's center of gravity. This rocket is reported to fly straight even if only one motor lights! (*Indeed, this robustness has been demonstrated by at least one MASA member -- Ed.*) Mike's other examples were a 3x24mm cluster (which some of us have seen fly -- and crash -- at

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MASA launches) and a "six-shooter" (6x18mm). Finally, Mike showed off a six-motor cluster rocket that looked strangely similar to the Apple Valley High School TARC rocket from last year with three 24mm motors in a BT-60 base, staging to 3x18mm motors in the sustainer. That rocket was built the Sunday before the conference!



David Whitaker

Mike, wishing he was in TARC!

Mike had some building suggestions, and the audience added some more.

- Buzz relayed an idea from a 2003 TARC team who used a "reverse cone" to stage multiple black powder motors to a single black-powder motor. The paper cone was designed to be easily

replaceable, but could have been soaked in CA or Epoxy to make a cone that wouldn't need replacing (at least, not as often).

- For long first stages, "stuffer tubes" are needed to guide the powder particles up to the upper motors. TARC teams that staged to Estes E9 motors had "significantly more reliable" flights when using that technique due to the smaller nozzle opening on the E9.
- Some motors (the E9 in particular) might have a thin layer of clay over the propellant left over from the nozzle forming process. Many TARC teams discovered that and scraped away the clay (there was a discussion about whether or not this met the letter or the spirit of the NAR safety code, but it has apparently been a common practice for many years).
- To reduce damage from heat of ejection charges, try coating the inside of the lower stage body tube with a thin layer of epoxy, particularly when there

is a gap between the lower and upper stage motors.

- The ratings of 9V batteries at 32 degrees Fahrenheit is half the voltage and half the amperage of the same battery at room temperature. This may have contributed to the staging problems experienced by many fliers.
- During a discussion of clip-whips, I relayed Ted's idea of soldering long wires to Estes igniters. Mike offered a suggestion of using 24 gauge wire nuts to attach longer wires without soldering.
- One audience member was quite adamant about continuity checking all igniters before inserting them in the motor, and afterwards. I asked him to avoid doing this in his hotel room :-)--GO

Rocketry Education in Primary Education

Matt Costabile gave a truly inspiring talk about the trials and tribulations associated with starting up an rocketry club at Cordley Elementary School in Lawrence, Kansas. The main point of the talk was that undertaking something like this requires "rainmaking"--gathering resources and making interlocking connections far and wide in order to create and sustain both a need and a way to fulfill it. For example, Matt used the local library to host demonstrations and workshops in order to build demand for rocketry experiences without having to work out the issues with the more restrictive school administrators. He also created an administration manual and had it reviewed by members of school boards *from other districts* before presenting it to the local school board for approval.

Matt handed out his green book--a fifty-page manual that describes his program from end to end. The manual is chock full of pictures, graphics, and data. It tries to answer all of the questions of administrators and parents, and the information is presented "countdown style," with chapters numbered starting at 10 and counting backwards.

Like me, Matt believes that anything that drags kids away from video games is good, and that rockets are often a good way to do that. Over three years, the program has grown so that this year more than 40 students will make and fly their own model rockets as well as payloads for high power rockets. --TC

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Saturday Afternoon

Parts Fabrication Methods

This session, led by David Miller, started out with an example of a one-part mold, using a silicon-rubber mold mixture (available from Micro Mark). David's example mold used two BT-5 plastic nosecones as the form and poured the mold mixture around them, inside of a box made from thin plastic scraps. Styrene plastic typically doesn't need a mold release applied to it.

The silicon-rubber mold mixture takes about 24 hours to dry. For more complex parts, particularly parts that have 'cut ins' that would prevent their smooth removal, a two-part mold is used.

The plastic resin is also a two-part mixture and has a working time of a minute or two. The resin took about 10 minutes to fully set for a 2" long BT-5 nose cone.

The second part of the session demonstrated vacuforming wraps for Sirius Rocketry's Saturn V. Using a commercially manufactured vacuforming system, this seemed like a very simple process.

The vacuform system has a 2-stage vacuum box (shop vacuum and bicycle pump with a reversed valve) with a electric heating element suspended a couple of feet above the box. The mold forms are placed on top of the vacuum box and a sheet of plastic to be formed (.010" is used for wraps) is placed on a holder. The holder is moved to just below the heating element and heated until it is soft enough to bow down a half-inch or so. When it softens, the shop vacuum is started to create a good base suction then the then plastic is quickly lowered on to the form and the bicycle pump is pumped quickly a few times. The plastic cools quickly and the result is a nice plastic wrap.

Nose cones can also be formed, typically using heavier plastic that is heated more so that it will form over the larger nose cone surface. --GO

Glider Design and Optimization

Bernard Biales presentation "Glider Design and Optimization" would have been more suitably titled "A Summary of 40 Years of Boost Glider Design." Mr. Biales has competed for decades at both the national and international level. In addition he was a member of the famous MIT rocketry group. He had intimate knowledge of every significant advancement in boost

gliders in the last 40 years. The presentation was a fascinating reminiscence of boost glider competition and design. --RD

Scale Modeling with Stone Knives and Bearskins

Peter Alway's "Scale Modeling with Stone Knives and Bearskins" was also worth seeing. He brought lots of his finely crafted scale models for us to drool over. --MT

Rocketry Education in Intermediate Grades

MASA member Andy Heren talked about his program at the Eau Claire Lutheran School in Eau Claire, WI. Andy distributed a nifty booklet for teachers: Have a Blast With Your Class: Model Rocketry in School. The book includes a step by step program for preparing teachers to conduct a rocketry program, and a set of lessons and worksheets appropriate for middle school students. The session was highly worthwhile. --TC

Rocket Stability for Dummies

Kevin Wickart conducted the seminar on Rocket Stability for Dummies. Kevin indicated, to no one's surprise, that rocket stability is actually quite complicated, and suggested that for his first 30 years of flying rockets, he knew little about the science of stability. Using a series of graphics, he explained the basics of "center of gravity" and "center of pressure", and explained terms such as angle of attack, restorative force, damping, and pitch roll coupling. He then reviewed the various methods by which rocketeers have determined rocket stability through the ages, namely, *Religion*, *Philosophy*, *Physical Education*, *Arts & Crafts*, and finally, *Science*.

The *Religious* approach is simple enough... "I hope and pray this rocket is stable enough to fly". The *Philosophical* approach is not much better... "the rocket exists, it looks good, therefore it must be stable". The *Physical Education* approach involves the classic swing test. This approach can be entertaining to watch, but according to Kevin, it is not all that accurate in modeling high-speed vertical rocket flight. The *Arts & Crafts* approach involves cutting out a cardboard model of a rocket to determine the center of pressure. Kevin explained that this approach yields a very conservative CP determination, and that in the early days of rocketry, Estes relied exclusively on this method in deciding which designs to manufacture. As

a result, most all early Estes rockets were way over-stable. Kevin then briefly explained the *Scientific* method of defining stability as offered by James and Judith Barrowman. After struggling through a few minutes of math on the blackboard, all present were thoroughly confused, and we all resorted back to the religious approach by offering up a prayer of thanks for RockSim.--TL

Range Safety Officer Training

Bob Kaplow gave a nice presentation to a smallish audience. His theme was that doing the RSO job is easy if you know what three questions to ask. The kicker is that the three questions are always different, depending on the rocket, the flyer, the field, the motor, etc. Most of the talk was about the roles and responsibilities involved in running a safe range, range layout and operational issues, and specific things to watch for such as low thrust models, waiver-busters, and excessive use of the term "Heads Up!". I'm pleased to say that I think Bob would be quite content with MASA's range practices. --TC

Zen and the Art of Boost Glider Construction

Mark "Bunny" Bundick's talk, "Zen and the Art of Boost-Glider Construction" covered selecting balsa, shaping airfoils, using Japanese tissue for covering your models, and becoming "one" with your glider. Boost gliders are a thing of beauty to Mark, and according to him, beautiful boost gliders can only be made from natural materials. No carbon fiber, epoxy, or markers are used on Mark's vehicles. Mark is obviously on to something as his models are simple, beautiful, and graceful in flight. --RD

Mark Bundick's boost glider construction seminar was very informative. I had all kinds of trouble with my boost gliders, so I gave up on them. After listening to Bunny and getting the handouts, I decided that I gotta get going on some B/Gs. Where do I start?? Hmmmm. --MT

Airborne Electronics

Art Upton gave an overview of the major types electronic systems available: timers for staging, altimeters and accelerometers for deployment and video cameras.

Starting with timers, Art discussed techniques for drop-off and parallel staging. He passed around a small timer called the "Zit" that is used by competition models as a dethermalizer.

Art likes the Oxral electric matches because they don't require a lot of current to fire. He brought in a 7-motor cluster rocket to show one method for mounting staging electronics, and used that timer to demonstrate firing of an Oxral e-match.

For altimeters, he prefers the PerfectFlite family of altimeters (he also sells them).

He showed another brand of altimeter that included push-on/push-off switches for power and arming, but those switches had proven to be unreliable and he now uses twisted wires to power up his electronics when it's on the pad. [*Oh, ish! --Ed.*]--GO

Secrets of the Master Competitors

This was a fun panel discussion. The panel was made up of a number of highly successful competitors, including 2/3 of "The Good, The Bad, and The Ugly" team, the Alway brothers (A.K.A. Bumbling Brother's Flying Circus), three-time national champion Pavel Pinkas, and Lila Schmaker. The basic advice was to

- keep your entries simple (Bob Alway repeatedly held up a drawing of an Alpha and a Big Bertha to reinforce that point).
- Enter something in every event.
- Try to qualify in every event.
- Fly the field (e.g., keep parachutes--even in duration events--small for small fields).
- Maximize the visibility of the rocket--for example, gliders should be black on the bottom and bright on the top (the better to find after they've landed).

Just qualifying in every event at NARAM is usually enough to make the top fifth of competitors. I asked if they thought there was still room for technical breakthroughs in competition, as opposed to endless optimization of the current designs. Several examples of significant innovation were cited, including new approaches to helirocs and the use of backsliders in Superroc duration events. --TC

Old Rocketeers' Open House

The old rocketeers open house was an informal gab session with some of the more well-known rocketeers at NARCON. In addition, attendees brought in their old collectable models for viewing. Bob Kaplow brought some old model rocket catalogs and his famous rocket engine collection which includes a sample of nearly every model rocket motor manufactured. At least it seemed that way. Bob had everything from the tiny Czech motors that look like a half sized micro-max, to early Aerotech composites, and the exceedingly rare US Rockets single use engines, "Don't ask me how I got that one!" said Kaplow.

Buzz McDermott and Peter Alway made an appearance to reminisce with fellow rocketeers and talk shop. --RD

Saturday Sport Launch

Around 2 P.M. Mike headed out to the Bong State Recreation Area for the sport launch. Here's his report:

Bong was about a 20 minutes drive from U of WI Park side. When I arrived and paid my \$10 park fee I was told that I had to enter the runway area from a different



Mike Erpelding

Tour de Deuce rockets with their creator.

entrance on the far end of the field, about 4 miles from the front gate. I have never driven all the way down to the end of the runway before. I was impressed by how large this field is. The gravel road that ran from the far gate and all the way along the runway was very wet with several small holes with standing water. The launch range was set up at about in the middle of the runway. When I pulled up there was a pretty good turnout of about 30- 40 people. There were several kids on the field, having fun flying their rockets, and waiting for each of the numerous prize drawings. The wind was a little brisk; about 10 - 15 mph. There were occasional HPR launches taking place, mostly using I motors.

Wildman Rocket Supply, Inc. was the onsite vendor. I got a chance to see the two Tour de Deuce Deuces fly. Both motors successfully ignited both times; but the second launch had a rough landing on the gravel road along the runway. There was very little damage because the models had been lightly fiber glassed. One fin had a little scuff and the paint was slightly creased on the body tube above the fin can; but the tube was still solid as a rock and straight as an arrow. Later I got to hold one of the Deuces while Jim Flis took a couple pictures of another rocketeer's Deuce's Wild with a cow paint scheme. I was surprised how light that model was even after it was fiberglassed. It didn't really feel much heavier than my stock Deuces Wild. Jon Hatch was WOOSH 's sponsor of the Wisconsin leg of the Tour de Deuce.

Later on, Jon launched an HPR rocket that landed on the pond near the park paved road; which I rescued for him before leaving the field for the day.. Full story on TRF thread, *My new hero!!!(and I didn't even know he was a TRFer!)* (Editor's note: A quick summary for bashful Mike: Jon's rocket landed on an ice-covered marsh pond. Mike, apparently believing that any water that is liquid, or at least partially liquid, is warm enough to go swimming in, broke a trail through the ice, wading in up to his waist to retrieve the rocket. This was Mike's second wading adventure at Bong, and suffice it to say that he is a very welcome guest there, especially in cold, wet conditions :-).

Tour de Deuce is coming to Minnesota for the May 22 MASA launch.

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The last raffle prize was given out around 3 P.M. The launch was pretty much wrapped up then. --ME

Saturday Evening

NAR Town Meeting

The NAR town meeting took place Saturday evening. NAR president Mark Bundick gave rocketeers his yearly "State of the NAR" address along with leading a very spirited and informative discussion on the complicated state of model rocketry. This meeting alone was worth the trip of driving to NARCON. --RD

The NAR Town Hall Meeting was something I looked forward to. After hearing Mark Bundick speak about the thorny issues we face I am convinced that with his leadership, we WILL prevail in the end. It is going to take quite a while to resolve the issues. He reiterated the fact that just because it seems that nothing is happening, rest assured that the NAR is working extremely hard on our behalf. Upon leaving the meeting, I was left with the feeling that we are in good hands. On a happier note, we were told that MASA's own Ted Cochran has been recruited to run for the NAR Board of Directors! Way to go, Ted! --MT

Mark made a lot of interesting points during his talk. In addition to those mentioned above, I'll add a summary of a few more. Mark handed out a statistical analysis of membership trends that showed membership as flat over the past three years, although section membership and HPR appear to be growing.

He stated that NAR has no position on the practice of EX rocketry, provided it isn't at NAR launches, of course. His exact words were "What you do with EX is your own business, not NAR's." Apparently he felt the need to say this in response to some members' concerns that they might be kicked out of NAR for doing EX with Tripoli--that should certainly set their minds at ease!

He announced that details of a program to enable NAR members under the age of 18 to obtain some version of high power certification are going to be announced very soon. The program will apparently be patterned after CAR's and will allow junior and leader members to build the rocket, but not handle the motors.

He announced the projected budget for next year. Revenue is expected to be up about 10%, but

insurance and legal expenses are rising. Mark also wants to invest more in recognition of volunteer efforts. To balance expenses with income, the 2004 budget reduces administrative and printing expenses (Sport Rocketry will be returning to black and white glossy interior pages, at least for a while).

Sunday Morning

TARC Briefing

Buzz McDermott was all set to go with a presentation on how the TARC finals were organized. Alas, due to a computer crash, the presentation had to be moved from Saturday morning to Sunday morning, and attendance suffered. Buzz, Tom Pastrick, and I spent the time talking with the one TARC team that did attend the talk, and they got lots of advice and answers to their questions about the competition. --TC

NAR Competition Primer

This session provided an overview of the various NAR competition events--boost and rocket glider, parachute and streamer duration events, payload events, altitude events, craftsmanship events, and miscellaneous events such as spot landing. Rockets suitable for most of these events were available for viewing. The organization of meets and the role of the Pink Book was also discussed. The session was a good general introduction for beginning competitors. --SC

The Business of Model Rocketry

Manufacturers and dealers discussed their experiences in the Model Rocket Business. It turns out that running a rocket company involves much more than designing rockets and getting loads of wholesale motors. Running a rocket business is a lot of work, 90 percent of which is not at all related to rocketry. Employees, inventory, assembly, shipping, web sites, the changing political climate, and customer satisfaction are constant challenges for rocket companies. Vendors Bill Stine of Quest Aerospace, Dale Windsor of East Coast Rocketry, Bill Saindon of Balsa Machining Service, Peter Alway of Saturn Press, Andy Jackson of Aerospace Specialty Products, and Jim Fliss of FlisKits Inc. provided a behind-the-scenes peek into what it takes to bring us those products we so desperately crave. --RD . *[As the joke goes, the*

best way to make a small fortune in this business is to start with a large fortune! --Ed.]

This was a great question and answer session on the topic of what it's like to start/ be a model rocket company. I missed the first 20+ min. because I went to church in the morning. Most of the presentation was by Bill Stine of Quest Aerospace. Bill also acted as kind of a moderator for the discussion. Bill talked about the challenges of running a business. He covered everything from coming up with new kit ideas, to managing the costs of production to maintain profitability. Bill answered several questions about his time working for Centuri/Estes and his experiences starting Quest Aerospace. Jim Flis of Flis Kits talked about how he came to start Flis Kits and what he has learned in the process. Bill Saindon from Balsa Machining Service and Andy Jackson from Aerospace Specialty Products also talked about their experiences in starting their companies. Several topics were discussed, like how many years it takes before your business is in the black? (The answer ranged from 3 to about 7 years).

It was also mentioned that starting a business might:

- Be a way to wreck your hobby, but not always.
- Take up all of your time, leaving little time for flying rockets or other activities.
- Absorb vast amounts of your money before you start to turn a profit.

Everyone agreed that you need to have a strong passion for rocketry to become a successful model rocket company. --ME

Tom Lawell adds: This session was advertised as an opportunity to hear the procedures, benefits and pitfalls of starting your own model rocketry company, but I suspect most in attendance were just interested in hearing some good rocket stories. Bill Stine, the son of rocket legend G. Harry Stine, was the Guest of Honor and Keynote Speaker for the weekend, and Bill had the most to say at this session as well. Bill recounted the history, decline and eventual elimination of Centuri as he observed it as a child. He also spoke at length about the rise, fall and rebirth of Quest. The company that, according to Bill, once proudly produced their products in the USA, eventually moved its production facilities to Mexico, then decided to close the factory

because it could make more money renting the factory to a manufacturer of blue jeans! Bill eventually regained control of the company, and it is now headquartered in Phoenix with about 14 employees. But the story doesn't end there... production is soon to be moved to China and about eight of the current employees will get the axe. Ah... the perils of a global marketplace.

Another interesting speaker was Jim Flis, co-owner of Fliskits Inc. out of New Hampshire. Jim and his wife had a large booth in the vendor hall, and they appear to be quite successful, having only been in business for 18 months. Jim formed the company after he was laid off from Compaq Computer, and says he is having the time of his life. Jim made quite an impact on the crowd when he described how his involvement in teaching high school rocketry served to reunite a daughter and father who were estranged from one another. Jim also shared the history of a few of his better-known kits, most notably the Deuce's Wild. --TL

Plastic Model Conversion

Kevin Wickart's talk was oriented towards plastic model conversion for NARAM competition. In a recent NARAM, there were a lot of Jupiter C models that had substandard workmanship. Much of this was because the model is a rather old model that the manufacturer had not produced for a number of years. While the molds sat idle, they became warped so the model doesn't fit together very well.

However, the Jupiter C is a good beginner's model: it's shaped like a rocket and a BT-55 fits inside.

A lot of planning is required for a successful conversion. When picking a kit, these things need to be considered:

- Where does the engine go?
- What direction do they need to point? Many airplane models have off-center engines
- How big of a motor will fit the model?
- How big of a motor will it need to fly safely?

A Bell X-1 model was used as an example: A 13mm motor could fit, but it was unlikely to be safe flying on a motor that small.

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Bigger models are usually longer and easier to stabilize. The Monogram Saturn V is a good example.

Removing internal stuff like wheel wells can reduce weight. Another use for a Dremel tool!

Dry-fit the model, and tape it together

The thrust line of motor needs to go through model's CG. Many models need additional weight to be added to make this happen. To get good results, try this:

- Insert a motor and hang a string out the back. With the model suspended from the string.



David Whitaker

A sample of Kevin's PMC models.

- Observe how the model hangs and add off-center lumps of clay to the make model hang straight.
- Check all directions (pitch and yaw) -- plastic isn't always symmetrical.

Clear buterite sheet can be used for fins.

For filling irregularities in the plastic, one audience member suggested Polyester Body Putty (the one with a catalyst) available from auto supply shops.

A caution about plastic model cement (that comes in tubes): The cement is melted styrene in solvent. It's bad stuff; among other things, it leaves plastic "strings" everywhere. Instead, use Liquid plastic cement: It's just solvent (Amberoid brand was recommended).

However, be careful when using it: It has nasty

chemicals. Another glue recommendation was Plasti-Zap, which is CA for plastic.

Amberoid Easy-mask is useful to mask things like cockpits when painting. Decals go on much better when applied using a Microsol decal setting solution

Kevin's choice of primers is Krylon white primer. --GO

Dave Whitaker adds: The presentation was oriented to building a rocket for the plastic model conversion competition event as defined in the pink book. Kevin pointed out that PMC is a craftsmanship event and not a scale event. At the last NARAM, several people submitted scale data packets to the judges which is completely unnecessary for PMC.

The key to a PMC conversion seems to be selecting a plastic kit that can be converted into a flying model rocket. Some are easy and some are virtually impossible.

Kevin recommended the Glencoe Jupiter C model or an F-104 Starfighter as a first PMC. Weight in a PMC is critical. Many plastic models are too heavy to fly on 13 or 18 mm motors. Kevin recommended weighing the model while it was still on the sprues.

A basic PMC consists of an extended motor tube surrounded with various bulkheads that hold the engine tube inside of the plastic model. Kevin recommended taping everything together and then inserting an empty engine in the model. A string inserted through the nozzle is used to hang the model upside down. Examination of the model will determine if the thrust-line of the engine passes through the center of gravity of the model. Clay must be added and the location of the engine tube changed to get the thrustline through the center of gravity. Kevin commented that this is of critical importance for a safe, stable flight.

Many PMC models use rear ejection to get the parachute out. Some plastic models can use front ejection if mold or trim lines are present near the nose. The model can be cut apart along the trim line for front ejection.

While finishing the model, Kevin recommended using thin coats of paint. Too many coats of paint will obscure surface detail on the model. --DW

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High School Rocketry Programs

Bill Bertoldi, a teacher at Kingsford High School in Kingsford, Michigan, discussed his spectacularly successful High School rocketry club. This is the program that was reviewed in a great article in the January issue of *Sport Rocketry*. The program is an after-school activity for juniors and seniors, in which high power rockets and electronic payloads are constructed which are flown at Bong or at the Rockets for Schools launch in Sheboygan. As was the case with the other presenters in the Education track of the conference, a lot of organizational, financial, and practical hurdles had to be overcome.

This program is particularly creative with regard to fund raising-- It sent a team to the TARC finals last year with over 100 sponsors! The club exhibits their rockets at High School basket ball games, has students make presentations to local organizations such as the Rotary Club and Lions, distributes hundreds of videotapes of their activities, and aggressively solicits volunteers and donations of equipment from local and not-so-local businesses. There was a particularly funny(?) story of how, in making a telephone request for a GPS system, Bill was bounced around an aerospace company until he ultimately was given a number to call which was not supposed to be a public number--leading to a visit the next day by the FBI confirming that his story wasn't a cover for more nefarious activities. --TC

Obtaining a LEUP

The full title of this session was "Obtaining a Low Explosive User's Permit #34 from the BATFE (Your Results May Vary)", which should give you an indication of the presenter's experience. The session was conducted by Scott Goebel, the President of WOOSH, and an avid high power flier. Scott and his club decided to apply for the permit in order to establish a common Club Box for motor storage. The location of the Club Box or "magazine" is in Scott's detached garage. He had no trouble with the distance requirements, but described in great detail the ups and downs he experienced with other aspects of the permit process. He first contacted the Fire Marshal from his city and established a good working relationship with him. The Fire Marshal basically deferred to the ATF on the specific requirements of the magazine. The details are all set forth in an orange booklet put out by the

ATF entitled, Federal Explosives Law and Regulations (publication ATF P 5400.7). Scott also recommended those interested in applying for such a permit should check out the NAR web site where they have detailed instructions on how to fill out the permit application.

Scott dealt with several different ATF agents in pursuing the permit, some in the Milwaukee area and some out of St. Paul. He indicated that all of the people he dealt with have been very good, and were basically just "people just trying to do their jobs well". Scott said the biggest mistake he made was in selecting a large Knaack toolbox as the secure magazine. While the box was certainly well built, the special locking mechanism on the box was a bit too unconventional for the ATF. Unfortunately this wasn't known up front, and Scott thought he was home free in July of 2003 when he received his official permit in the mail. Unfortunately, in November of 2003 he received a letter from the ATF which indicated that, after further review, the locking mechanism on the magazine and the locks on the garage itself, did not meet their requirements after all. Scott is now in the process of trying to determine how to remedy the ATF's concerns, and hopes to have the permit finalized in time for this year's flying season. Anybody interested in trying to establish a MASA Club Box? --TL

I found Scott's presentation very informative and useful. One suggestion was the proper order of steps to pursue the permit. Take care to deal with all of your local officials first; before filing with the BATFE. This made Scott's application process smoother. Be very thorough in filling out the application. Make sure you have all of the pages of the application, the official fingerprint card, and the correct size photo included before sending it in. Be careful in selecting the box to purchase to convert into a Type 4 magazine. For example, a tool box with an internal pin locking device with only one exterior lock is not acceptable to the BATFE. Make sure that the building that you are storing your magazine in is as secure as the magazine itself: You need two locks, and a doorknob lock doesn't count. *[Otherwise, you'll need two locks on the magazine. --Ed.]* After I attended this session, I also learned that if you have a magazine in a shed or garage, the distance table doesn't apply. Maybe I won't have to build a concrete bunker this summer after all! --ME

Building with Ultralight Materials

Jim Hartman demonstrated how to "roll your own" lightweight body tubes using 1/4 oz fiberglass cloth and Japanese tissue. Jim uses aluminum mandrels, with tapers for the forms. In some models, Jim uses Kapton plastic taped together and attached to a lightweight fiberglass fin canister. His fins are made from 1/32 balsa laminated with Japanese tissue. These models must be seen to be believed. Mr. Hartman's models weigh a few grams. Yes grams not ounces! Jim provided a live demonstration and allowed audience members to give it a try. --RD

Sunday Afternoon

Fifty Ways to Lathe Your Lumber

This talk and demo was presented by one of the conference organizers, Kevin Wickart of WOOSH. Kevin brought a cheap 8" drill press that he used to demonstrate turning of a BT-20 nose cone, a BT-55 to BT-20 transition and a BT-55 tail cone. I'm not going to repeat the entire hand-out here, but there are a few valuable points to pass along:

Critical Things: Dust Mask, Safety Glasses

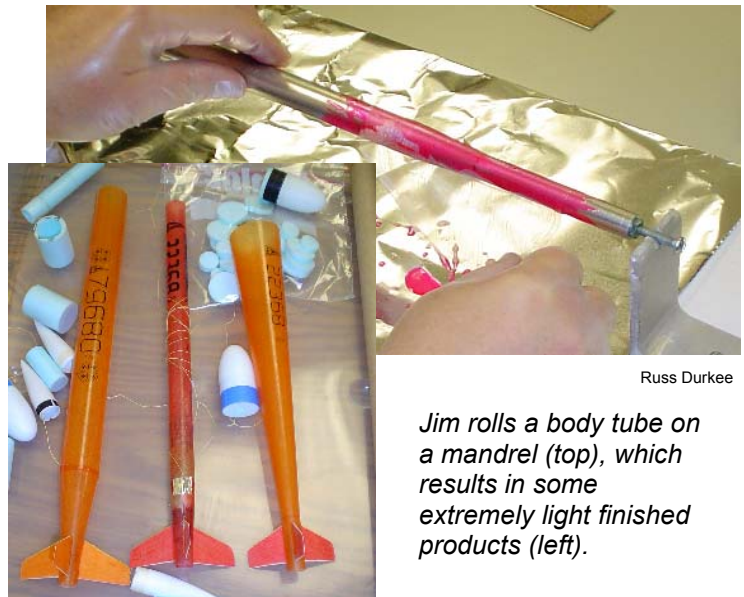
Scrapey Things: Wood Rasp, Hacksaw Blades, Sanding Sticks (from Walgreens nail care section)

A dust mask is very important. Some NAR members have acquired a sensitivity to balsa dust severe enough that they break out from contact with small amounts of balsa dust. I am quite cautious around power tools, so I found Kevin's "hands on" style to be a bit dangerous.

Kevin uses three tools to turn balsa:

- A rasp that is used primarily to round out the square balsa stock.
- A hacksaw blade that is used for finer sizing and shaping.
- Sandpaper sticks of varying grits for fine shaping and polishing.

Kevin's first demonstration was to turn a BT-20 nosecone. He started with a square piece of balsa which had a dowel glued in the center of the short dimension. With the drill press running at 2000 RPM, he used the rasp to slowly take the corners off of the

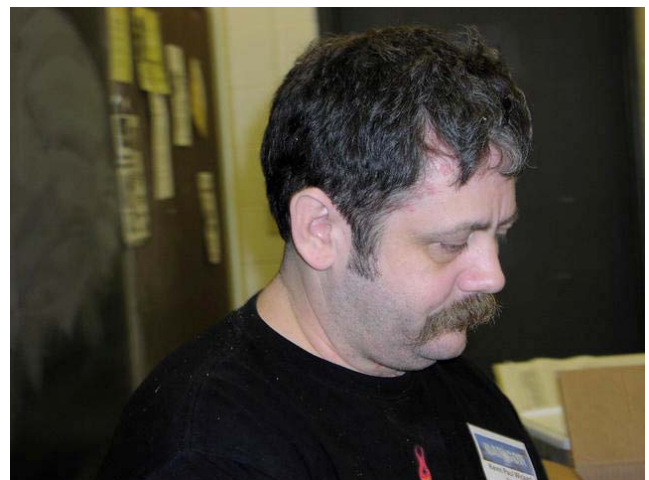


Russ Durkee

Jim rolls a body tube on a mandrel (top), which results in some extremely light finished products (left).

work piece, creating a nice round balsa dowel. To make sure the work was really round, and not lopsided, he held a ball-point pen up to it. The high spots will leave a darker mark than the lower spots. The work piece can start out out-of-round if the dowel is off center or the rasp work isn't done exactly, and that can carry through to the end product.

To create the nosecone shoulder, a small scrap of BT-20 tube is placed over the dowel, between the drill chuck and the work. This provides a convenient measuring tool. First, a hacksaw blade is used to cut in close to the target size. Kevin holds the blade carefully with the tips of his fingers, in case it grabs. This way, the blade can be easily taken out of his fingers without any harm done (just don't stand where it might fly at you!).



Professor Wickart.

Dave Whitaker

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Kevin turned the press off frequently to check the size, and once he got the balsa down to about the outer size of the BT-20 tube, he switched to a 180 grit sandpaper stick for the fine work. After getting the right size, he used the saw blade held vertically to cut a nice sharp shoulder (this can also be used to make the shoulder longer).

He slid the BT-20 tube back over the shoulder and used the hacksaw blade to size the rest of the work piece to the outer diameter of the body tube. He did this slowly, making small cuts in to the work piece, starting from top and working towards the bottom. His nosecone was fairly long for a BT-20, and he had to be very careful as he neared the bottom.

The final shaping was done primarily with the sanding stick. He used the stick vertically set an angle (starting with making sure the work piece was the same diameter from top to bottom) and eyeballing in an approximate ogive shape.

If you have an exact shape to make the nose cone, it is during this stage that you would use a "negative" template held up next to the work piece to establish the shape you want (Kevin makes templates from basswood). Final finishing was done with a 600 grit sanding stick and that left the cone VERY smooth! A couple of coats of balsa filler and the cone is ready to use.

Alternatively, Kevin's "secret method" of finishing balsa cones is to coat the nose cone with medium/heavy Cyanoacrylate while it is still on the drill press. After allowing the CA to dry, he sands the cone again. Before applying coats of CA, he uses black magic marker to color the cone and again as a final coat (typically 2-3 coats of CA). This gives him black nose cones that look like they're made from some composite.

Kevin says that this is very easy to learn to do; typically a beginner needs at most one "learning nose cone" to get the hang of it.

Transitions are done similarly to cones, but with two longer shoulders. The smaller shoulder is done at the bottom to keep the work piece from coming apart. A

boat tail was also demonstrated, as an extension of a transition. A shoulder for a BT-20 was cut on the bottom of the boat tail and a tube scrap placed on it as a tool guide.

When he's done with nosecones, Kevin cuts off the dowel 1/4" out from the base of the cone, then drills a hole through the dowel to provide an "eyelet" for attaching shock cords to. This eliminates the need for attaching a metal eyelet.

I can't wait to try this myself! --GO

The Incredibly Strange Common Objects That Stopped Being Household Items and Became Mixed-Up Rockets

This session ran way over its time slot, so I was able to see about 10 to 15 minutes of it. WOOSH member Mark Stehlik presented the session. Mark's presentation was extremely humorous! His odd roc collection varied from an angel rocket to various Halloween head rockets. Basically if a motor can fit inside of an object it could become a rocket. He had a very funny story about each design plus an entertaining tongue-in-cheek demonstration of how to walk through a dark alley with a flashlight to look through dumpsters for interesting parts (imagine a cartoon burglar on tippy toes....) The fact that he was wearing a black and yellow horizontal striped shirt added to the effect. This session was so hilarious, I wished that I could have seen the whole class! --ME



Creativity enabled by dumpster diving!

David Whitaker

Rockets for Schools

This session provided an overview of the revitalized Rockets for Schools program, in which teams of

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students build high power rockets and payloads and fly them at the Sheboygan Space Port.

The program requires the rockets and payloads to be constructed during the winter and brought, unflown, to the site for judging and launching. The students do not handle any of the motors; they are assembled and installed by certified TRA volunteers.

Participation costs \$400 per team, which includes a Level I rocket and an I motor. Level II rockets can also be constructed and flown, at a somewhat higher cost.

The launch itself is a big deal, with flyovers by B1s, talks by astronauts, and a huge range safety, mission control, and tracking operation involving the U.S. Coast Guard, amateur radio clubs, and civic authorities. "Mission control" is set up inside the Sheboygan armory, with multiple projection screens providing closed-circuit video of range operations.

Rockets are made from Quantum Tube so that they float and are impervious to water. This is important, because they are launched off a long pier on a trajectory that takes them away from the crowd and into Lake Michigan, where they are recovered and the data from their payloads retrieved and analyzed. This year's launch is May 15; there is still some hope that a launch of a NASA Loki Dart sounding rocket can be arranged. --TC

Certifying in High Power Rocketry

Certifying in High power Rocketry was presented by three people including Tim Lehr, who was on the Rocket Challenge show and who has been interviewed in Extreme Rocketry, and Gabe Kolesari.

The session was fairly unorganized and was intended to be more of a panel discussion than a presentation of a step-by-step guide.

I did not agree with some of the suggestions that were made but found the discussion to be interesting overall. The discussion covered L1, L2 and L3 certification attempts.

Tim Lehr is a big proponent of using 9/16-inch tubular nylon for shock cord. Tim didn't like kevlar since it has no give.

The entire panel agreed that a 38mm motor mount should be used for L1. They commented that you can

always adapt down but not up. Gabe made both his L1 and L2 attempts using the same rocket with a 38mm motor mount.

With the discussion of motor mount sizes, someone in the audience asked whether a 38mm Aerotech motor system or a Cesaroni Pro38 system was preferred. The entire panel agreed that the Cesaroni system was superior and preferred. I found this surprising.

All three were strong proponents of using either a U bolt or a forged eyebolt for shock cord attachment.

There was also a discussion of cost for an L1/L2/L3 attempt. The general feeling was that L1 costs about \$150, L2 costs about \$400 and L3 could be as high as \$2500 (the L3 number was disputed). There was general agreement that the best way to save money on certification attempts is to borrow a motor casing.

All three speakers agreed that you should use a sonic beeper on certification attempts (especially at Bong recreation area). Tim felt that electronics (other than beepers) should be avoided on L1/L2 certification attempts. --DW

Follow-on to Rocketry Education Issues

I attended this open panel forum, my last event at NARCON. I was very disappointed in the turn out. Only one teacher attended the discussion. The rest of the audience was the Rockets for Schools volunteers and Kevin Wickart. Basically there were not any more technical questions about rocketry. For the most part we discussed how well NARCON went and several suggestions that Kevin heard from educators on improving our outreach efforts. One suggestion that one educator gave to Kevin and Bunny was to try to get more educators to attend programs like NARCON for "hands on" learning. That way when they approach their school's administration to use rocketry in the classroom, they know how to answer all of the questions, like "Is rocketry dangerous?", "How are you going to tie rocketry into your curriculum?", etc. This educator felt that actual workshops for teachers would be more effective than just sending out newsletters and activity sheets. --ME

Dave Whitaker and I went out to the Texas Roadhouse in Kenosha for supper with some of the WOOSH members. We had a good meal and a good time

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visiting. Both Dave and I stayed at the hotel one more night and headed for home Monday morning. --ME

In Closing....

Whew! It's hard to cover a weekend's worth of rocketry presentations, even in a fifteen-page article. I know I wanted to be two or three places at once on several occasions, and I really regret missing some of the presentations. If this article has left you wanting more, the only advice we can offer is to go to NARCON next year!

We've heard that WOOSH might sponsor NARCON again at the same venue, so there is a good chance we can all go again. It is absolutely, positively worth your time to go.

NARCON 2004 was a resounding success. Hats off to WOOSH for organizing this fantastic event, especially to Scott Goebel and Kevin Wickart for doing an excellent job in putting the event together in just a few months. Thank you as well to all the nice people we met at NARCON. It really is true, rocket people are the nicest people on the planet. We had a BALL at NARCON 2004, and we can't wait until next year.



David Whitaker

Kevin Wickart's incredibly detailed PMC Passenger Rocket, a NARAM team division first-place finisher.

Kit Reviews

Micro Classics

Jewels from the past

Stuart Lenz

There is a new kit manufacturer in town: Micro Classics. Debuting at the 2003 MASA Holiday party were two Micro Maxx versions of classic Estes kits dating from the 1970s, the Andromeda and the Alien Explorer. Additional kits are in development.

At recent local club launches I have seen Micro Maxx version of other classic Estes, Centuri and other well-known vendors' kits. Pricing of these first kits was still somewhat uncertain, but in this reporter's opinion, the kits will be in the \$12.00-\$15.00 range. Plans will be available for only \$2.00. This is a great opportunity to own versions of classic rockets, whether you are launching them or just displaying them.

In interviews with the recipients of these first kits, I have learned that they are signed and numbered by the developer. The instructions are still a little rough but the recipients were amazed by the number and detail of the parts.

Micro Classics can be contacted at microclassics@aol.com. If you have seen the web site, these people still need some help.

In a *MASA Planet* exclusive, here are the soon-to-be released plans for the Micro Classics Andromeda!

Micro Classics Andromeda (Skill Level 3)

1. Lay out all of the parts on the exploded drawing of the Andromeda.
2. Clean up the ends of all of the tubes T1-T7.
3. Clean up and airfoil all of the (non-root) edges of the fins F1-F7.
4. Mark tube T2 1/4 inch from each end.
5. Apply plastic adhesive (for best result only use plastic adhesive designed for the plastic used) on the outside of one end of Tube T2 and the inside of one end of tube T1 and insert T2 into T1 up to the 1/4-inch mark. Roll the tubes on a flat surface to check proper alignment.

6. Drill a small hole into T2 at 3/16 inch from the end (if the hole is not already present). Tie one end of



MicroClassics Alien Explorer

Stuart Lenz

the Kevlar thread into the hole, then slip the Kevlar thread into T2 and repeat Step 5 for T2 and tube T3.

7. Make a copy or cut out the marking template.
8. Roll the template around tube T1 and mark all four points, then extend the marks the length of T1 using the Line Guide.
9. Extend 2 of the lines on opposite sides of T1 onto T2 at the 2-1/8 inch to 3-inch point.
10. Attach fins F1 and F2 onto T1 along the 2 extended lines from Step 9. Plastic fins are best attached to plastic tubes by applying plastic adhesive designed for the plastic along the line on the tube and to the root edge of the fin. Tweezers

help to hold the small parts while aligning them. Masking tape can then be used to hold a fin in place while it sets.

11. Attach fins F3 and F4 onto T1 at the forward (toward the nose cone) on the remaining 2 lines on T1.

12. Attach fins F5 and F6 onto T2 at the extended lines from Step 9, with the thinnest end toward the forward end of T2 with the forward end of F5 and F6 at the 3-inch mark.

13. Attach one end of rod R1 and R2 into the

notches in F1 and F2 and the other end onto F5 and F6. Cut off any of R1 and R2 that extends past the end of F5 and F6, save these pieces for Step 15.

14. Draw a line along tubes T4 and T5 and attach T4 and T5 centered on the ends of F3 and F4.
15. Attach F7 in the remaining slot in F1 and attach the short rods from Step 14 to the ends of F7. If the rods are different length, cut the longest one to the length of the shortest one.
16. Attach the launch lugs tubes T6 and T7 onto F1 and F5 at a distance from T2 that will allow the launch rod to clear T1 and T3.



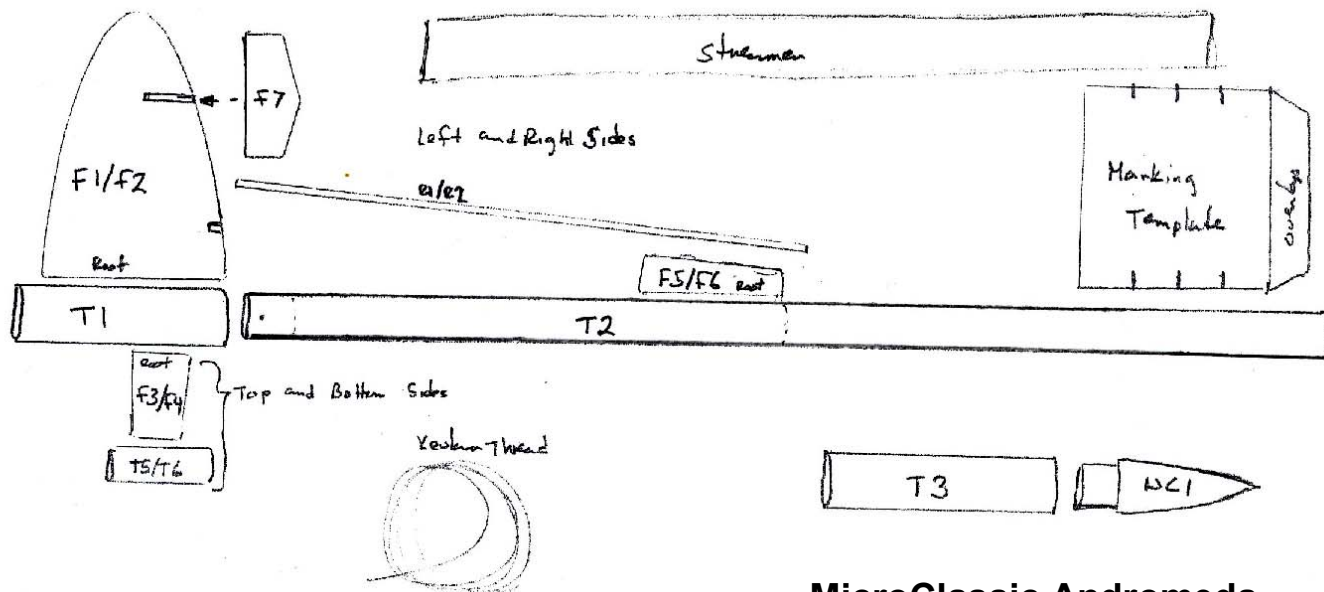
MicroClassics Andromeda.

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17. Fish the Kevlar thread out of T2, drill a small hole into the center of the nose cone NC1 (if the hole is not already present). Then tie a knot near the end of the Kevlar thread, apply wood glue into the hole in NC1 and insert the Kevlar knot into the hole in NC1.
18. Tape the streamer onto the Kevlar thread using cellophane tape, fold and roll the streamer up and insert into T3. Then insert the remaining Kevlar thread into T3, and insert NC1.
19. An alternate recovery method is to cut T2 just ahead of F5 and F6 and then glue the small remaining tube (paper) into T2. The streamer may not be required with this center separation method.
20. The **Micro Classics Andromeda** is best finished using permanent Magic Markers. The paint scheme can be viewed in Estes Plan # 1273 on the JimZ web site (<http://www.dars.org/jimz/rp00.htm>) or from the picture below.
21. Insert a Micro Maxx engine into T1 using cellophane tape as required to fit the engine and you are ready to launch your new **Micro Classic Andromeda**.

Always follow the **NAR** Safety Code. Have fun flying your MicroClassic!



MicroClassic Andromeda
Stuart Lenz March 2004



NARCON photos by Tom Lawell: Scale models, Bowling Ball lofter, cool green fins, MicroMaxx scale rockets.

The *MASA Planet* is the official newsletter of the Minnesota Amateur Spacemodeler Association, Section 576 of the National Association of Rocketry. It is published bimonthly as a service to its members. MASA authors and photographers retain rights to their submissions, which are used by permission. The *Planet* is available in color on MASA's web site:

<http://www.mn-rocketry.net/masa/>

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Alan Estenson	Webmaster & President Emeritus
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Submissions may be made to the editor at: masa.planet@mn-rocketry.net. (Volunteer quickly, lest you be asked to define "Propellant Actuated Industrial Tool"!)

If your email address, U.S. Mail address, or phone number changes: Please send notice of your change to masa@mn-rocketry.net. Include your name, old email address, and new address. We depend on email for communicating important information. When an email address starts "bouncing", we lose contact with you.

Welcome New MASA members!

David Voissem and Family, Coon Rapids MN

Andy Heren, Eau Claire WI

Matthew Murphy, Farmington MN

Brett McDowell, Osseo, MN

Parting shot (so to speak....)



A Standard missile CATOs during a test launch <Sigh>.



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