

THE LEADING EDGE

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

Volume 26, Number 6
November/December 2003

Club News and Notes

Elections!!! - Yup, it's almost January. See article at right.

Location changing!!! Take note!!! - Our monthly meetings will now be held at the Helen Plum Memorial Library in Lombard, IL. This is just a skip to the next city east of our 30+ year location in Glen Ellyn. See map on page 2 or back cover.

Mailing list - For those of you connected electronically to the NIRA mailing list, rumor has it that a move away from yahoogroups is underway. You will be notified when changes take effect.

Field Search - MRFF-2004 still has no host or location. MRFF needs a large launch site with accommodations for 50+ cars and preferably having vendors on site. Some land-owners, such as the DuPage County Forest Preserve, do not allow vending of any kind on their property. Know any solutions? Let us know today.

Winter Planning - Half our winter schedule is now in place.

December 21 - Art Institute, see article p. 3
January 18 - Building session, Bob Kaplow's
February 15 or TBA - suggest an event!
March 21 - launch or suggest an event!

Building session dates as well as those for other non-launch activities can be flexible. However the closer they are to the third Sunday of the month the more likely they are to be successful.

The sooner we hear something, the sooner people can plan for it. Got an idea? Suggest one today!

Elections! Elections! Elections!

At the January meeting (which will be held at the Helen Plum Library in Lombard) we will be hosting our annual election of officers.

All elected positions are open to nominations. Anybody can nominate anybody, including themselves. Some people will like to submit resumes with qualification listings as well as goals for people to read in the next newsletter. The more common method is to simply shout out the name of the person at the meeting.

The nominations so far include:

Terry House - President
Todd Bavery - Secretary/Treasurer
Martin Maney - Vice President

Traditionally voters must be present to vote. So everyone come to the January meeting!

Cole Arntzen, our current vice president, and Ken Hutchinson, our Secretary/Treasurer have both decided that the positions can be better served by new people. We thank them for their service.

The Long Shot

MRFF and other big events have been missing for a handful of reasons, chief of which is total lack of volunteering to organize the event. Any location can be used, but none will be if nobody steps up to host the event. MRFF is the most fun and rewarding event the club puts together where rocketeers can get together and do what they do best.

If you feel you can host any event, contest, meet, building session, host a class, feel free to present your idea to the club at any time. NIRA is only as strong as its members.

TARC Launches at Fermilab

Tom Pastrick, a Team America Rocketry Challenge mentor, and the Fermilab Association of Rocketry are working together to make sure their groups get their rockets off. The dates scheduled at Fermilab are:

March 6, 20, 27, 28, 12-2pm
April 3 and 4, 12-2pm
Hours for TARC will be short, so be sure you're ready to go at start time.

Blast from the Past



Bring back any memories? As far as we can tell, this is the Estes Saturn V kit from the 70's or even late 60's. And at a price of "ONLY \$9.95" it must have been a big hit! We wonder if this had the 3 motor cluster or an interchangeable motor mount so you can fly it on D13s!



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NIRA Officers

President – Terry House
Vice President – Cole Arntzen
Secretary/Treasurer – Ken Hutchinson
RSO – David Wallis

This Issue's Leading Edge Staff

Editor – Adam Elliott
Production – The Under Appreciated

This Issue's Contributors

Mark Bundick, Jonathan Charbonneau
Ken Hutchinson, Bob Kaplow
Dave Muesing

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 the new editor:

Adam Elliott
0000 Street Drive

or emailed to adamnira at yahoo . com
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
0000 Street Drive

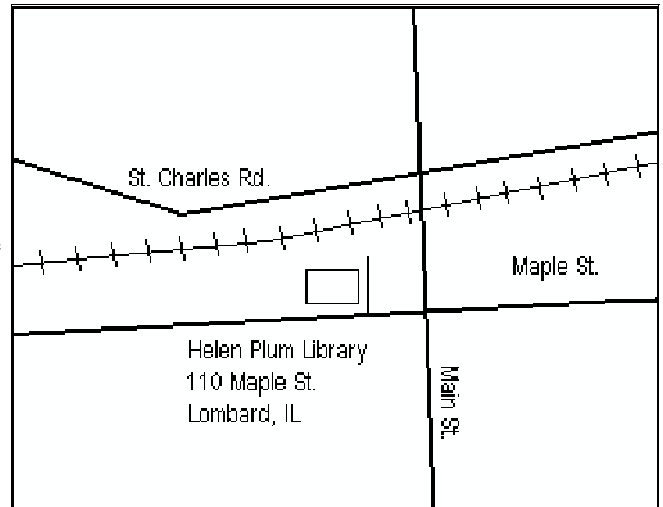
Web site: <http://www.NIRA-rocketry.org>
Email list: <http://groups.yahoo.com/group/NIRA>
InfoLine: volunteer today!



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 **NEW** location is the Helen Plum Library, 110 Maple St, Lombard IL. (check the board in the lobby or ask at the desk for the room number).

January 2
February 6
March 5

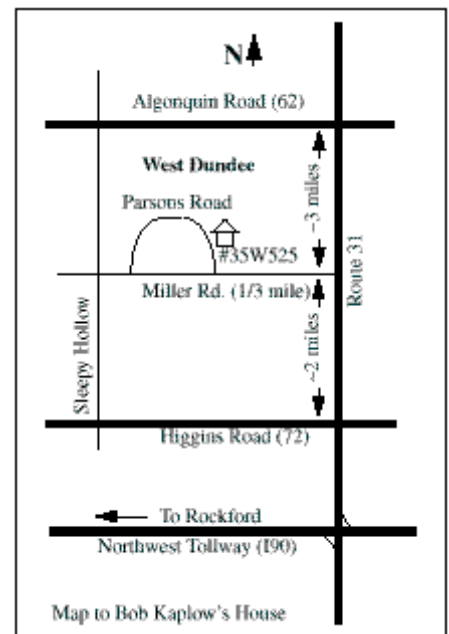


CLUB LAUNCH DATES AND OTHER ACTIVITIES

Launches are BYOL (bring your own launcher). Call the NIRA infoline for pre-launch information. **There is no infoline. Volunteer today!**

Our launch field is the East Branch Forest Preserve but the arrangement may not be permanent! **Please** call/check the infoline/website before coming!

December 21 Art Institute, 12 noon
January 18 - Building session at Bob Kaplow's. See map at right.
February 15 - open! suggest an event
March 14 - open! suggest an event



OTHER STUFF

NARCON 2004 will be held March 12th-14th at the University of Wisconsin - Parkside located in Kenosha, WI. This is the NAR's annual convention with emphasis on education and knowledge rather than a sporting event. Check them out soon at: <http://www.narcon2004.org/>

NSL 2004 will be held in McGregor, TX and hosted by the Austin Area Rocketry Group May 29 through Monday May 31 2004 (Memorial Day weekend). This is the same site as NARAM 44 in 2002. See details at: <http://aarg.org/nsl>

Winter Outing at the Art Institute

December 21

By Bob Kaplow

NIRA members and families should meet at the Columbus street (Lakeside) entrance at noon. Those who want to arrive earlier can gather at the **12 noon** at the same entrance, at the northeast corner of the museum. If you've got an FRS radio, use channel 11 subcode 7 as usual to track us down.

The Art Institute of Chicago
111 South Michigan Avenue
Chicago, Illinois 60603
(312) 443-3600

Museum Hours
Sunday 10:00-5:00

Gallery 227

Aerospace Design: The Art of Engineering from NASA's Aeronautical Research explores the architecture and engineering of wind tunnels by displaying approximately 90 objects from NASA's collection, including wind tunnel models and flight artifacts, past and present. The exhibition commemorates the centennial of powered, controlled flight that began with the landmark take off of the Wright brothers on December 17, 1903.

Objects included in the exhibition date back to NASA's predecessor, the National Advisory Committee for Aeronautics (NACA), founded in 1915. Created out of that agency at the beginning of the space race in 1958, NASA has a wealth of often unexhibited and unpublished artifacts that not only document technological advances in flight over the past century but are also aesthetically striking. Beyond the historic dimension, the exhibition showcases some of the latest research being done for aircrafts with "morphing" wings, self-healing vehicle "skins" and biologically inspired sensors elements that NASA hopes will make future air travel accident free, environmentally friendly, and affordable and accessible.

In all, the project presents the history of aeronautically engineered forms in relation to architecture and design, much as previous Art Institute exhibitions have analyzed architecture and design for commercial aviation, space travel, and contemporary railroad travel. Visitors are shown another example of how aviation design is as beautiful as it can be functional.

Also featured this month:
Manet and the Sea
Through January 19, 2004
Regenstein Hall

Pee Wee Flyer By Mark Bundick

After reading the latest edition of RC Microflight, I ran off to Wal-Mart to look for a new Estes product which appeared in one of the magazine's columns. Estes now sells a small, 14" span, single channel electric airplane, vaguely resembling a Monocoupe (for those of you familiar with that aircraft). I plunked down my \$20, got some C cells and a 9v battery and went back home to see what awaited.

The RC system is one that's a throwback, but making a resurgence in small RC plane communities. The system is 27 Mhz single channel; I didn't experience any interference with the system. The plane is set up such that if you do nothing, it pulls a constant left turn. The transmitter consists of a handheld unit, slightly smaller than a TV remote, with one button on it. You push the button to drive the rudder full right, and by pulsing it, adjust the rate of turn. Range reported in RC Microflight was 100' on the ground, which means more in the air.

A charging unit takes 6 C cells (which tells me you could substitute a 7.2V RC car or plane pack if you soldered in the supplied keyed charging jack). You make sure the sliding switch on the plane is set to off, plug the charging unit into the plane, then hold down a pushbutton for 45 sec. Unplug, flip the switch on, and launch. The motor had a surprisingly decent amount of thrust produced by a supplied 3" prop of unknown pitch.

The plane itself is foam, decorated with stickers, and all tail surfaces pre-installed. The wing is a one piece, undercambered, rather thin foam design, elliptical planiform. To "build" the plane, you attach the wing with rubber bands. There's also a display only landing gear, and a replacement prop.

The instructions were vintage Estes rocketry, clear directions, step by step with profuse illustrations. There's a preflight checklist, a bit of problem debugging hints and an 800 number to call during Mountain time zone business hours for problems and replacement parts.

There's a decent set of trim instructions, the most innovative of which tells you how hard to throw the plane. Estes recommends practicing with an empty soda can, until your tossing motion lands the can 5-7 feet from you. Clever.



Fig. 1: The Pee Wee Flyer is an RTF electric, all-foam, RC rudder-only plane that uses a 3-cell NiMH pack.

My first two flights were cut short however by busted props. My plane didn't exhibit an aggressive climb. The trim adjustments recommended in the instructions said to bend the stab to increase the climb rate, and I didn't get that right before I busted both props. I'll try the 800 number tomorrow and see how the replacement process works.

Also of note, even though the plane seemed to land pretty hard (well, hard enough to bust props anyway), the model itself was undamaged. I was a bit surprised by that, particularly given the thinness of the wing. The slide switch is installed such that momentum moved it to the off position both times, preventing damage to the motor. Replacing the prop was simple; pop the old one off, push the new one on.

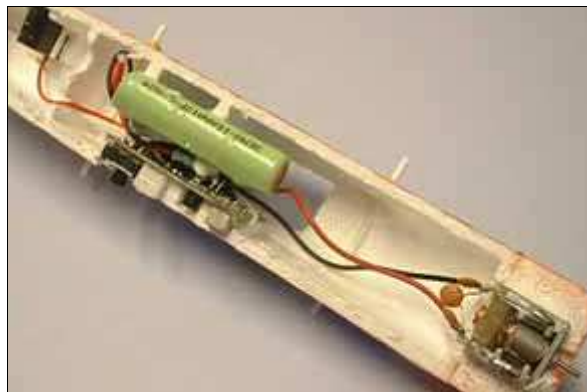


Figure 2: With the Pee Wee fuselage bottom removed, the power and RC systems are visible. The motor shuts off after 1 minute, but rudder control continues for landing.

Overall, this thing looks like: (a) a pretty well designed piece of work for \$20. (b) to be a whale of fun once I get the trim sorted out and (c) it's dying for someone to open it up and convert the control portion of the beast to a very low investment A BG RC system. If somebody doesn't show up at a launch in the next 6 months doing that, I guess I'll give it a go myself.

Anybody else try this little cutie yet?

Rocket Man by David Clary
Reviewed by Ken Hutchinson

There has been a recent biography of Russian rocket pioneer Sergi Korolev, titled *Korolev*, and another book *Rockets For The Reich* naturally covered Werner von Braun although a fuller examination of his life is certainly possible. Where is the modern treatment of the earliest of the practical 20th century rocketeers? David Clary's *Rocket Man*, a biography of Robert Goddard, supplies the answer.

Clary's contention is that the Robert Goddard we know is the product of two successive public relations campaigns and that the real man has been somewhat lost in the glare of those efforts. He attempts to dig beneath the surface gloss to find the truth. I found his book quite convincing in this regard.

Esther Goddard, immediately on his death, began a campaign to portray her husband as a reclusive pioneer who single handedly invented all of liquid fueled rocketry. Everything we see today is directly derived from his work and the German V2 was a case of outright theft. The Goddard's long time friends, Charles Lindbergh and Harry Guggenheim, gave Esther considerable help with this effort. For a long time this notion carried the day in public opinion and is still with us.

A reaction against this eventually set in and produced the almost equally exaggerated counter story that while Goddard's work produced the

earliest practical liquid fueled rocket his paranoia drove him to a secretiveness that made his efforts a dead end. He is no more important than Oberth or Tsiolkovsky.

In this book you will be invited to see the truth as somewhere in the middle. You will find a man who is no more visionary than Oberth or Tsiolkovsky but who produced a more rigorous scientific analysis and who actually put that science into practice. You will not find a man driven to secrecy and paranoia by mistreatment at the hands of the press but a man who was a publicity hound, who played the press like Hendrix played guitar. You will find a man of great ego who refused cooperation because he wanted to maintain his primacy in the field and who was very abusive of his relationship with Clark University. Yet you also find a warm, personable man who was

greatly loved by his friends and greatly respected by his colleagues. In short I think you will find a man, a couple in fact, who would have made delightful friends. By the way, you will also find a quote from a model rocketry author you know or know of (page 45).



I found *Rocket Man* to be well written in contrast to a couple of other technical biographies I have read lately, perhaps that is why I found *them* in the bargain bin. Clary repeats his themes a little more often and a little more forcefully than I think he needs to. That doesn't distract too much from an interesting, well told story. The book might also have included a summary of Goddard's rocket flights for the benefit of the general reader. NIRA

members know to turn to Peter Alway's *Retro Rockets* for this information. This is a book you will want to check out of the local library or buy for your own.

Confused Stages - Stage 35
By Jonathan Charbonneau

A scale model of a Black Brant II takes off on a D12-7 engine. "Wow is that fast!" Tom chatters. "Not as fast as the real thing," Syed exclaims. The dispute continues between Tom and Syed. Tom shows Syed video of the model and the real Black Brant II pointing out how much "faster" the model took off versus the real rocket. "But....," exclaims Syed. "No if's, and's, or but's!" Tom screams, interrupting Syed.

This argument could drag on for who knows how many hours or even days. Can you resolve the conflict? Think carefully and don't be too hasty. If you have the resolution, good for you. If you're stumped, read on.

Answer: The real rocket is faster than the model, but the model appears to be faster. How, you ask? The paradox lies in scaling. Scaling isn't just in the size of the model. It's in the speed and acceleration too.

The real speed and real acceleration of the model are slower than the speed and acceleration of the real rocket. The "scale speed" and "scale acceleration" are faster than the real rocket's speed and acceleration. The factor by which the model is slower is smaller than the factor by which the model is smaller. In the above examples, the real Black Brant II has an acceleration of around 30 G's. The model which is about 1/12 the size of the real rocket, has an acceleration of 10 to 20 G's. Even 10 G's is 1/3 of the real rocket's acceleration. One third is four times as great as one twelfth. Therefore, the model, while slower than the real McCoy, is faster for its size than the real

rocket for its size.

The model takes less time to travel its own length than the real rocket takes for its own length.

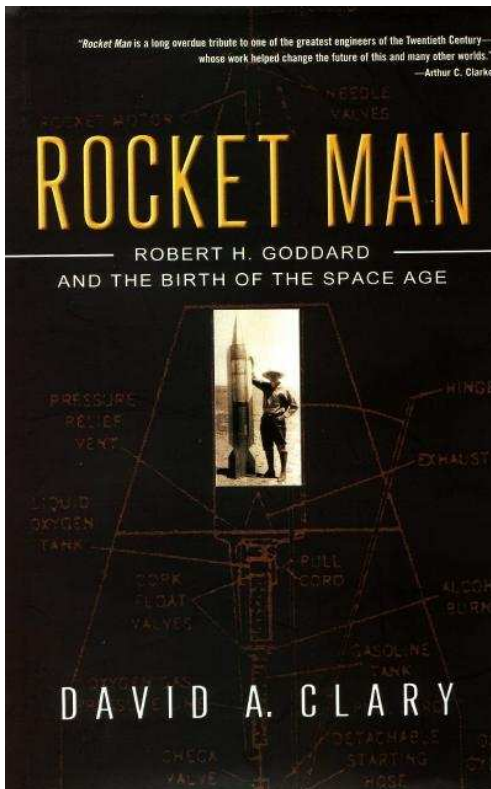
To calculate scale speed multiply the model's actual speed by the factor of scale. Example: Scale speed of a 1/12 scale model is 12 times its actual speed.

Scale acceleration is calculated in the same way. If the actual acceleration of the model is 10 to 20 G's and the model is 1/12 the size of the real thing the scale acceleration is 120 to 240 G's.

Editor's note: fortunately our eyeballs and legs are not required to move along with these scale speeds.



A real Black Brant II gets a checkout.



Spacecraft News

The Stardust spacecraft, seen blasting off at right in 1999, completed a flyby of Asteroid Annefrank on November 2, 2003. During this part of the mission a full dress rehearsal was performed for Stardust's flyby of Comet Wild 2 in January 2004. "We couldn't have asked for better performance from Stardust," spacecraft engineer Allan Chevront said. Stardust will collect cometary matter and return them to Earth in 2006.



Model of the Month Winners

Here's the October and November winners. We'd print more, but this is all we've got. If you have any that haven't been printed yet, let us know.

October - Greg Cisko carefully holds his Cox Saturn V which he found at an online auction. This is where determination pays off because he *really* wanted to have this model. It's old. We don't remember exactly how old, but we do remember how much he paid. And we aren't telling. =)

Hopefully Greg will bring it to the first launch in the spring and have a safe and clean flight!



November - Mark Knapp caresses his 1:33 scale Cosmodrome Vostok. This is a rather large model with lots of parts.



Miscellaneous Thoughts

By Mr. Fiberglass

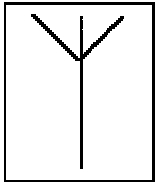
Composite Construction-- Building something by combining 2 or more materials. This could be glass fabric held in place by a matrix. The matrix could be epoxy or another plastic or could even be concrete. A steel mesh or rebar in concrete is a composite.

Common to our hobby is glass, Carbon (Graphite) or Kevlar (Aramid) fabric in a matrix of epoxy. Epoxy is a thermoset plastic, so is Polyester resin plastic. Thermoplastic is like polystyrene, PVC or Plexiglass, etc. Glass is the most common fabric used. It's cheap and can do a very good job of strengthening and stiffening. There are several glass compositions used including E and S. E is used commonly but also in Electrical/Electronics work. S is a higher Strength (30%) composition. Carbon (Graphite specifically) is used when much more stiffness and strength is needed without adding much weight. Graphite fabric in an epoxy matrix is 3 times as stiff as the same weight of glass fabric in epoxy. Unfortunately, Graphite can cost several times as much as glass. One drawback of Graphite is its stiffness while applying it. It doesn't bend around curves as good as glass or Kevlar. Kevlar (Aramid) is normally used when toughness is needed. It can be punched and poked without breaking like glass or Graphite.

Fabric comes in different weaves. The most common is plain weave. It's like a common cloth that clothes might be made of. The plain weave is very stable but is not very pliable. For body tubes and fins, it's normally just fine. The second popular weave is the HS (Harness Satin). This comes in 4HS (also referred to as Crowsfoot), 5HS, 8HS, etc. The main characteristic here is that it can conform to compound curves much better than other weaves. Leno weave is a much more open weave. Twill weave is used when fabric drapability and stability better than HS is needed. Another characteristic of reinforcing fabrics is the weight. Normally, it's specified in oz/sqyd (ounces per square yard) or g/sqm (grams per square meter). Generally weights run from .5oz/sqyd to 40+oz/sqyd. Fabrics also have what's known as balance. This refers to how much strength there is in each direction of the fabric. Generally, it's about 50% in the roll direction and 50% in the width of the roll direction. Some fabrics might have up to 90% and 10%. A unidirectional fabric will have 100% of the strength in one direction.

Mr Fiberglass products can be ordered from <http://www.mrfiberglass.com>

This may be your last newsletter! Check your label for the expiration date.



IMPORTANT NOTICE

NIRA will NO LONGER be meeting at the Glen Ellyn Civic Center. Our new meeting place is at the Helen Plum Memorial Library in Lombard, IL. At least for now.

Circumstances and decisions by everyone involved have resulted in a move from our old home in Glen Ellyn to the Lombard Library, now known as the Helen Plum Memorial Library, 110 Maple St, Lombard, IL. Their phone is 630-627-0336.

Our first meeting there will take place Friday, January 2, 2004 at 7:30pm. Look for a sign or ask at the desk for what room we might be in.

