



# T.H.O.R.

## The Heartland Organization of Rocketry

### THOR's Hammer

The official newsletter of The Heartland Organization of Rocketry!

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December 2004

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Volume 11 Number 8



Skip Legge's PKT 1-2-3 lifts off on a C11-0 (C6-0 and C6-5 for stages two and three) with an egg for a payload. *Inset* – Skip just made scrambled eggs the hard way! The C6-0 second stage failed to light resulting in a lawn dart and a goey mess. (Richard Burney)

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## Internet Links of Interest

<http://www.nerocketry.org/>  
THOR's official web page. Has information on our club, launch dates, and history.

<http://www.tripoli.org/>  
Home page for the Tripoli Rocketry Association.

<http://www.nar.org/index.html>  
Home page for the National Association of Rocketry.

<http://www.rocketryonline.com/index.cgi>  
Rocketry Online is an excellent source of model and high power rocketry related news and information.

<http://www.flyfast.net/>  
Flyfast Industries is the latest onsite vendor for THOR's high power launches.

<http://www.giantleaprocketry.com/>  
Giant Leap Rocketry has been THOR's main vendor at our high power launches for several years.

<http://www.kloubusters.org/>  
Home page for the K.L.O.U.D.Busters Tripoli Prefecture of the state of Kansas.

## December 2004 Calendar

### December

**Event:** Christmas Party.  
**When:** Friday the 3<sup>rd</sup>, 7:00 PM.  
**Where:** Denis Gilbert's house.  
**Fee:** Free... but make sure to bring food and drinks.  
**Description:** THOR's annual Christmas party!  
**For More Information:** Final details for the party will be determined ahead of time. A map for directions to Denis' house is posted on the THOR web page.

**Event:** December Meeting.  
**When:** Tuesday the 7<sup>th</sup>, 7:00 to 10:00 PM.  
**Where:** La Vista Community Center.

## **KLOUDBusters 2005 Launch Calendar**

Below is the planned launch calendar for the Kansas KLOUDBusters. Thanks to Kent Burnett and Lance Lickeig for providing this information.

**Fun Fly** - Sat., January 8, 2005 (EX Sun. 1/9/2005)  
**Fun Fly** - Sun., February 13, 2005 (EX Sat. 2/12/2005)  
**Fun Fly** - Sat., March 12, 2005 (EX Sun. 3/13/2005)  
**KLOUDBurst 14** - Sat.-Sun., April 9-10, 2005  
**EX-Only Fun Fly** - Sat., April 23, 2005  
**Fun Fly** - Sat., July 9, 2005 (EX Sun. 7/10/2005)  
**Fun Fly** - Sun., August 7, 2005 (EX Sat. 8/6/2005)  
**A.I.R.Fest 11** - Friday-Sun., September 2-4, 2005  
**A.I.R.Fest EX** - Mon., September 5, 2005  
**Fun Fly** - Sat., October 8, 2005 (EX Sun. 10/9/2005)  
**Distant Thunder 2005** - Sat.-Sun., November 12-13, 2005  
**EX-Only Fun Fly** - Sun., November 20, 2005  
**Fun Fly** - Sun., December 11, 2005 (EX Sat. 12/10/2005)

**\*\*\*ATTENTION!!!\*\*\***

**Just a reminder that membership dues are due for most members at the beginning of January. Either mail your check to the address on the back of the newsletter or bring it to the next meeting.**

## THOR High Power Launch Pickrell, NE – September 25<sup>th</sup>

*Article and pictures by Richard Burney*

The first high power launch for the fall season turned out to be a pretty nice day: highs in the 70's, plenty of sunshine, and hardly any wind. A total of **18** flyers flew a total of **38** flights. Though there weren't many flights done this day, there were plenty of quality flights including a few K flights. Motors burned in each class were as follows: **A – 1, B – 2, C – 10, D – 2, E – 6, F – 2, G – 6, H – 6, I – 1, J – 5, and K – 2.**

On the next several pages are some of the pictures I took at the launch. I'll let them tell the story. ☺✦



THOR's own Bruce Lee and his PML Pterodactyl. This rocket originally belonged to Mike Mann of Des Moines and was seen in our newsletter over two years ago at Fire On The Farm V.



Will Clark and his Estes Saturn V.



A beautiful flight on an K550.



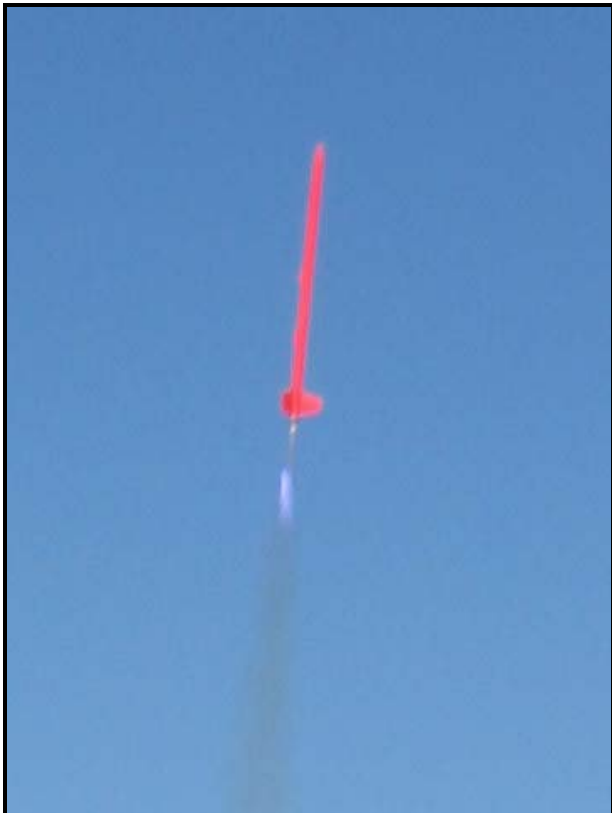
Mark Smith and his Level 1 rocket.



Abby Legge (l) and Bridgete Clark (r) with *Bridge's Skydiver* which was C6-5 powered.



At ignition, *Bridge's Skydiver* was suctioned to the blast deflector. The Bernoulli Effect in action!



Liftoff on an H238. A successful cert. flight!



Another C6-5 got it off the pad.



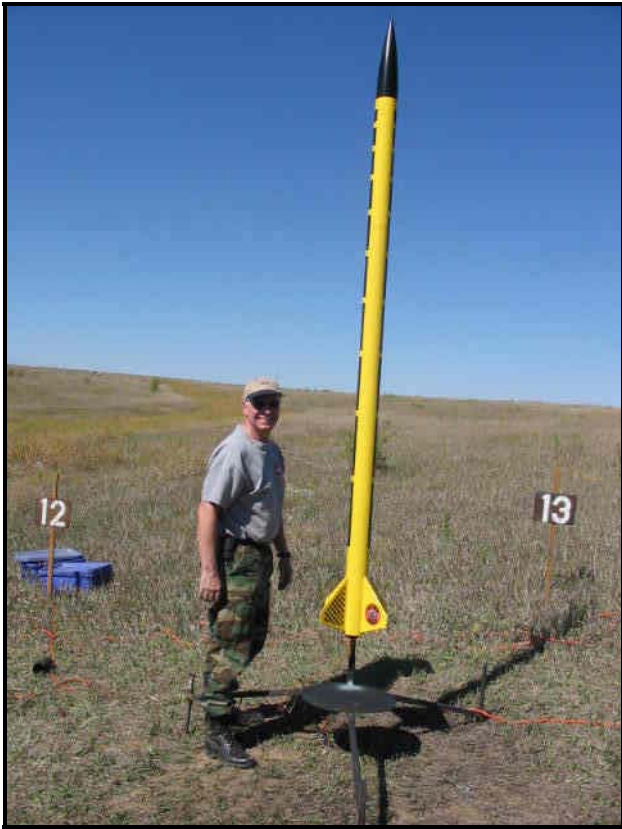
Don Rice and his *Old Glory*.



Liftoff on a Pro38 I540.



Due to a recovery malfunction, *Old Glory* lawn-darted several hundred feet to the east. Ouch!



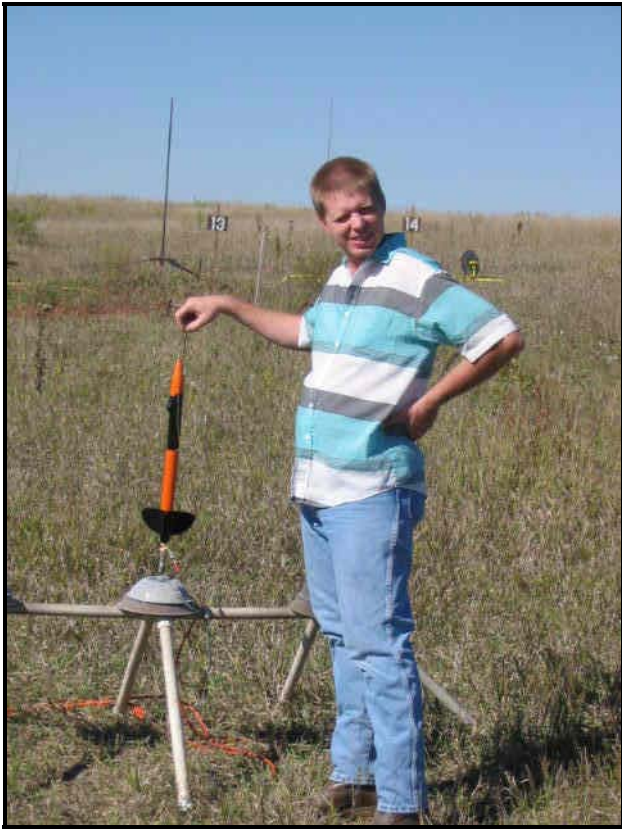
Denis Gilbert and his *Super Bee*.



Liftoff on a Pro38 J330.



This was Denis' first dual-stage deployment flight and it was a success. It even landed a few feet away!



Doug Holverson and his video-transmitting camera rocket.



Doug's receiving antenna and video equipment. Though the sound and footage were from a low power rocket, it looked and sounded like a high power flight when replayed!



Doug flew this rocket several times on C6-3's.

## THOR High Power Launch Pickrell, NE – August 28<sup>th</sup>

*Article by Richard Burney*

Since **A)** I wasn't at the launch with my digital camera and **B)** nobody e-mailed me any pictures, there isn't much to report about this launch! But since I did get my hands on the flight cards and some accounts of what happened this day, I do have a brief write-up to present. ☺ All together, there were a total of **17** flyers who flew a total of **53** flights this Saturday; some of the new faces present had found out about THOR and about this launch as a result of seeing our stand at the **Offutt Air Show** just a week earlier. The motors burned in each class were as follows: **A – 1, B – 13, C – 9, D – 13, E – 7, F – 2, G – 5, H – 6, I – 3, J – 1, and K – 1.** For a day in late August, it was a pleasant day in the 80's.

Two of the notable flights of the day belonged to Matt Jones. Matt's 9 foot tall, 7.5 inch in diameter, 21 pound **Dunno** rocket has normally spent the last four years flying on AeroTech and Cesaroni K motors. Today he decided to see how low he could go with Cesaroni's new Pro38 I540! The first flight just barely got a few hundred feet off the ground with the parachute opening up in the nick of time. The second flight did not go so well when the chute did not fully open in time. I **Dunno** when this rocket will be flyable again! ✨

## BSD ROCKETRY 3" THOR REVIEW

Article by Joe Michel. Pictures by Joe Michel and Richard Burney

### BRIEF:

I wanted a 3" BSD THOR ever since they first came out. I really like the idea of having smaller, high performance rocket. After doing a couple of scratchbuilt HPR rockets, I felt that building a kit would be a nice break from designing rockets and chasing parts for them. This rocket is 3" in diameter, and stands 64" tall. It has six fins and is dual deployment capable. My completed rocket weighed 5lbs 1oz ready to fly when configured for dual deployment.

### COMPONENTS:

The 3" BSD THOR comes in two variations, one in 38MM and the other in 54MM. I chose the 38MM version because it was a little easier on the wallet. The basic kit includes the following components:

- \* (1) 3" plastic nosecone
- \* (1) 17" airframe tube
- \* (1) 10" airframe tube
- \* (1) 24" airframe tube
- \* (1) 17" 38MM motor tube
- \* (3) 6" airframe couplers
- \* (2) 4" airframe couplers
- \* (2) 3" bulkheads
- \* (3) 3" to 38MM centering rings
- \* (6) 1/8" plywood fins
- \* (2) 1" nylon straps 45" long w/ grommets
- \* (1) 25' section of 9/16 tubular nylon
- \* (1) 30" parachute
- \* (1) Decal set
- \* (1) Instructions manual and fin template



THOR components. (Michel)

The kit also included one 1/4 x 20 eyebolt, one 3/16" quick link, two 6-32 T-nuts, two 6-32

screws, two motor clips, eight reusable plastic rivets and two rail buttons. I was impressed with all the components. They were of good quality. BSD seemed to think of everything one would need to complete and fly this rocket. My only complaint is that one of the decal sheets seemed to have been stepped on. They were crinkled, and there was dirt and fuzz in between the vinyl decal and backing sheet. This was a minor annoyance that proved to be no big deal.

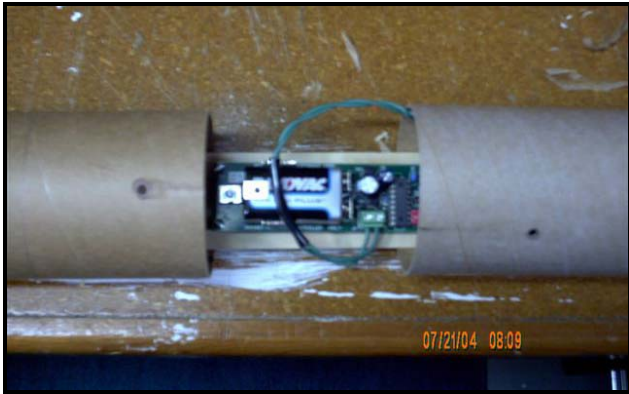
### CONSTRUCTION:

I started by building the motor mount first, epoxying the front and middle centering rings to the motor tube. At this point, I decided to replace the nylon recovery strap with 5' of tubular Kevlar. I did this because a 3" airframe is too small to get in and replace a nylon cord if it became heat-damaged. After that was complete, the motor mount was installed in the booster section airframe. I cut the fin slots, and ran in to my first gotcha. The instructions say to cut the slots 3/16" wide, however the fins are only 1/8" thick. I carefully cut in 1/8" wide fin slots in the positions and spacing called out in the directions. Next I installed all the fins, which went smooth. I left off the rear centering ring so that I could do internal fillets on the lower fins. I installed machine inserts in the rear-centering ring so I could use my PML motor retainer instead of the supplied motor retention. I felt that the PML retainer would be an easier solution for retaining the variety of 29 and 38MM motors that I would be flying this rocket on. This was my personal preference, and is not a ding on the kit or its components.

When all the filleting was complete, I tried to install the rear-centering ring, and ran in to another gotcha. I had cut in the lower fins 3/16" from the end of the tube per directions. The rear centering ring was 1/4" thick, so it would not seat flush with the end of the bodytube. The solution ended up being cutting groves in to the backside of the rear centering ring to let the fin in to it, and allow it to seat flush with the end of the body tube.



Nearly complete booster section. (Michel)



**Altimeter bay with electronics. (Michel)**

With the booster section complete, I moved on to the electronics bay and payload section. I decided to hold the payload section to the electronics bay with 8-32 screws instead of the supplied plastic rivets. Again, this was due to personal preference, is not a ding on the kit or its components. I don't have the fingernails or patience to use plastic rivets. I drilled screw holes in the airframe and couplers, and hardened the edges with thin CA. After the CA was dry, an 8-32 tap was run through each hole to thread it. This creates nice smooth clean threads in the cardboard. The rest of the build focused around setting up the electronics bay for use with my Missile Works RRC2 altimeter.

#### **FINISHING:**

When the build was complete, all the bodytube spirals and woodgrain were filled with Elmer's Fill 'N Finish prior to priming. I chose to go with the stock color scheme, so the booster section was painted yellow and the altimeter bay and payload section were painted black. Once the paint was dry, the decals were put on. Decaling was a real pleasure, as BSD's decals are top notch. Once the decals were applied, the rocket received a clearcoat finish. The finished rocket gets a "10" on the gawk scale.



**Joe's THOR is primed and ready for paint. (Michel)**



**Virtually finished booster section. (Michel)**



**Joe's finished THOR. (Michel)**

## FLIGHT:

Flight day did not go as planned. My initial plan was to fly it single deploy on an H-128, then an H180, and finally dual deploy on a J-350. I quickly found out that the 4" deep bay in the booster section is just too small for a good length of harness, heat pad, and parachute. It was also very difficult to just get in 15' of harness, heat pad and streamer for dual deploy. I scrapped the H-128 and flew it dual deploy on the H-180. This flight was great! I had planned on flying it on a J-350 next, but low cloud cover nixed those plans.

## RECOVERY:

The flight was good and straight, but the recovery was nearly a disaster. The main and drogue harness got tangled together. The chute managed to get un-tangled enough to open up and save the ship. I attribute the tangling problem to flying dual deploy on a smaller motor. I feel that if it had more fall time before the mains deployed, the airframe components would be better separated, lessening the chance of a problem. While I'm talking about recovery, the parachute that BSD supplies with the kit is too small. My rocket weighs 5lb, 1oz ready to fly. That translates to a 30 FPS decent rate with the stock 30" chute. I replaced the stock chute with a 48" chute to lessen the possibility of landing damage.

## SUMMARY:

I really like BSD's rockets. This was my first kit from them, and it won't be the last. BSD makes it clear in the directions that this kit is for the experienced flier, and I'd agree with that.

### Some PROS:

- \*Included hardware, i.e. rail buttons, motor retention is great.
- \*Decals are top quality! None better!
- \*Finished kit flies straight and looks impressive
- \*Kit was priced within reach

### Some CONS:

- \*Parachute too small
- \*Errors in the directions
- \*Parachute bay in the booster section could be bigger.

Overall, I rate this kit 4 of 5 ✨



Joe and his BSD THOR ready for flight number 2 at the September 25<sup>th</sup> launch. (Burney)



A J350 took Joe's THOR to 4,266 feet. This time the dual-stage deployment worked without a hitch. Awesome flight, Joe! (Burney)

## V(b)etter late than never!

*Pictures by Larry Vetter*

Sometime late in 2001/early 2002, Larry had mailed these pictures to me for inclusion in the newsletter. Unfortunately I didn't have a scanner at that time so I gave them to Bruce to scan. When Bruce had to move during the late spring of 2002, these pictures got lost in the process, "never to be seen again." After disappearing into the ether for over two years, Bruce finally found the envelope that contained Larry's pictures. Bruce gave them back to me, and now they are finally ready for publishing! These set of pictures were from a few flights that Larry did with his Estes Dude and his Estes Mercury Redstone back in the fall of 2001. ✦



Larry's Dude at liftoff.



Another good shot from another flight.



Though not as big as THOR's 1/3<sup>rd</sup> scale Mercury Redstone from 1999, at least this one works!

## NASA's Space Place

<http://spaceplace.nasa.gov/en/kids/>  
**A Summer Vacation Tracking  
Down UFOs**

Erin Schumacher's summer job for NASA was to look for UFOs. Erin is a 16-year-old high school student from Redondo Beach, California, attending the California Academy of Mathematics and Science in Carson. She was one of ten students selected to work at NASA's Jet Propulsion Laboratory (JPL) in Pasadena as part of the Summer High School Apprenticeship Research Program, or SHARP.

But is studying UFOs a useful kind of NASA research? Well, it is when they are "unidentified flashing objects" that appear in certain images of Earth from space. Erin worked with scientists on the Multi-angle Imaging SpectroRadiometer (MISR) project to track down these mysterious features. MISR is one of five instruments onboard the Earth-orbiting Terra satellite. MISR's nine separate cameras all point downward at different angles, each camera in turn taking a picture of the same piece of Earth as the satellite passes overhead. Viewing the same scene through the atmosphere at different angles gives far more information about the aerosols, pollution, and water vapor in the air than a single view would give. Ground features may also look slightly or dramatically different from one viewing angle to another.

Erin's job was to carefully examine the pictures looking for any flashes of light that might be visible from just one of the nine angles. Such flashes are caused by sunlight bouncing off very reflective surfaces and can be seen if a camera is pointed at just the right angle to catch them. Because the satellite data contain precise locations for each pixel in the images, Erin could figure out exactly where a flashing object on the ground should be. Her job was then to figure out exactly what it was that made the flash-in particular, to see if she could distinguish man-made objects from natural ones.

When Erin began working at JPL, scientists on the MISR project had already identified two large flashes out in the middle of the Mojave Desert in Southern California. These turned out to be from solar power generating stations. Soon, Erin began finding flashes all over the place. She learned how to apply her math knowledge to figuring out how the objects would have to be oriented in order to be seen by a particular MISR camera. One time, she and a team of MISR scientists and students went on a field trip to the exact locations of some flashes,

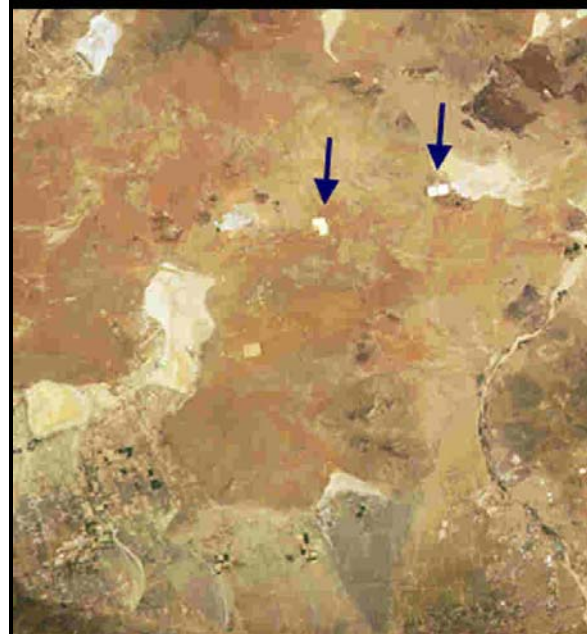
where they found greenhouses, large warehouses with corrugated metal roofs, a glass-enclosed shopping mall, and a solar-paneled barn. For some flashes, they could find nothing at all. Those remain "UFOs" to this day!

Learn more about SHARP at [www.nasasharp.com](http://www.nasasharp.com) and Earth science applications of MISR at [www-misr.jpl.nasa.gov](http://www-misr.jpl.nasa.gov). Kids can do an online MISR crossword at [spaceplace.nasa.gov/en/kids/misr\\_xword/misr\\_xword1.shtml](http://spaceplace.nasa.gov/en/kids/misr_xword/misr_xword1.shtml).

*This article was written by Diane K. Fisher. It was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration. ✦*



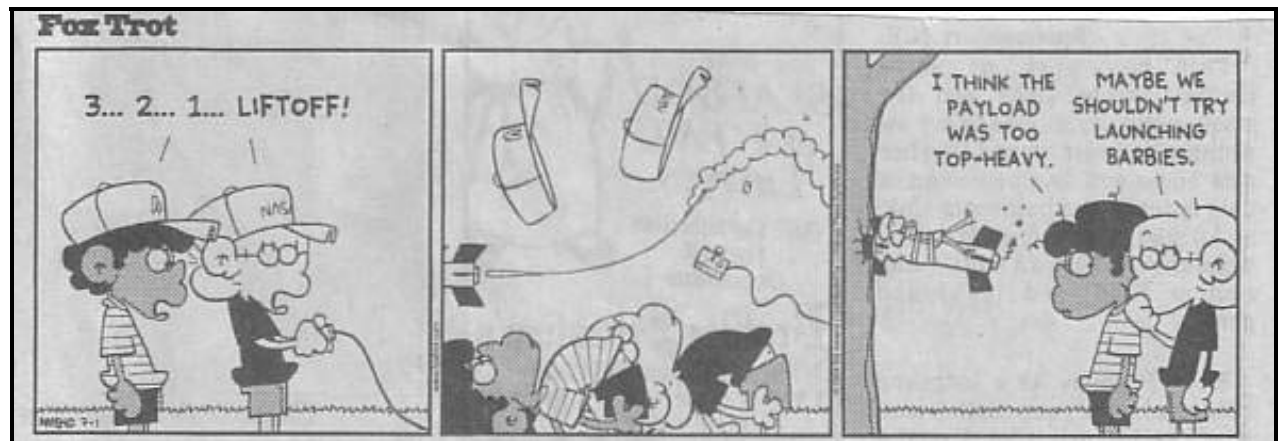
26° backward



26° forward

## Rocket Humor

To end this issue with a smile, here's an "interesting" picture Dan Cramer sent me a few weeks ago and a few strips of **Foxtrot** from this past summer. Enjoy! ✦





**T.H.O.R.**

**The Heartland  
Organization of  
Rocketry**

**What is THOR?**

The Heartland Organization of Rocketry (THOR) is both an officially sanctioned Prefecture of the Tripoli Rocketry Association (Tripoli Nebraska #46) and Section (#562) of the National Association of Rocketry. THOR strictly adheres to the safety guidelines established by both rocketry associations.

THOR has been actively involved in the hobby of model rocketry (low power, high power, and experimental) in southeast Nebraska and southwest Iowa since the early 1990's. THOR members, along with their projects, have appeared on national television programs such as **Rocket Challenge** (The Discovery Channel), **Extreme Machines** (The Learning Channel), **Junkyard Wars** (TLC), and **Ripley's Believe It Or Not** (TBS).

**When and where does THOR meet?**

Meetings are usually held the first Tuesday of the month at the **La Vista Community Center at 8116 Parkview St., La Vista, NE** – turn east at the Sinclair Gas Station on 84<sup>th</sup> St. and go a block east (look for the big US flag). Visitors are welcome to attend.

**When and where does THOR fly?**

From March through November, THOR conducts one low power launch (1/4A – F class) and one high power launch (1/4A – N class) each month. Low power launches are held at the soccer fields south of 66<sup>th</sup> and Harrison in La Vista, NE. High power launches are held east of Pickrell, NE which is 30 miles south of Lincoln. THOR conducts two three-day high power rocketry events each year: **Fire on the Farm** and **Nebraska Heat**.

**THOR's Hammer...**

**THOR's Hammer** is the official newsletter of THOR. On average, it is published on a bimonthly basis. **THOR's Hammer** is available to THOR members in PDF format (via e-mail) or is mailed to those without Internet access. Members are welcomed to contribute articles and pictures to the newsletter.

**For additional information...**

For any additional questions or to check on the status of an upcoming launch, call THOR locally at **(402) 896-2069** or toll free at **1-888-546-0396** (there is a voice mail option at the end of the message). Interested parties may also write their inquiries to the address at the right and are also welcome to contact any of THOR's officers.

**THOR Membership Application  
Personal Information**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Phone Number: \_\_\_\_\_

E-mail: \_\_\_\_\_

**Hobby Information**

How long have you been in model rocketry: \_\_\_\_\_

Do you belong to a national rocketry organization - enter your membership number to the applicable organization:

NAR# \_\_\_\_\_ TRA# \_\_\_\_\_

Are you certified for high power rocketry – check mark your applicable TRA and/or NAR Certification Level:

Level 1 \_\_\_\_\_ Level 2 \_\_\_\_\_ Level 3 \_\_\_\_\_

**Membership Rates**

Half year membership rates will be divided by 2 and will add \$1. Write you check payable to "The Heartland Organization of Rocketry" or "THOR". Mail check and form to the below address or bring to the next meeting.

- Family Membership - \$36
- Senior Membership (18 and over) - \$24
- Junior Membership (18 and under) - \$12
- Correspondence Membership (members over 50 miles away from Omaha) - \$10

I agree to comply with THOR's policies as pertains to the safety guidelines set forth by Tripoli and the NAR. Failure to do so or conduct deemed unbecoming may result in expulsion from the club.

Signature: \_\_\_\_\_

Dated: \_\_\_\_\_

**The Heartland Organization of Rocketry  
13828 Washington Circle  
Omaha, NE 68137**

**Membership in The Heartland Organization of  
Rocketry is open to all interested parties.**