



# 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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September/October 2004

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Volume 11 Number 6



Dionne Vennard and her BSD Horizon at Nebraska Heat VII. (Burney)

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## THOR Rocketry Hotline

**Phone Number (Local): (402) 896-2069**

## 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.

## September/October 2004 Calendar

### September

**Event:** AIRFest IX.

**When:** High power commercial flying from Friday the 3<sup>rd</sup> through Sunday the 5<sup>th</sup>. Experimental flying on Monday the 6<sup>th</sup>.

**Where:** Argonia, KS.

**Description:** This is the awesome high power launch held each year by the Tripoli Kansas Prefecture. The KLOUDBusters have a very excellent field to fly from and this site has been used for several LDRS's. Many members from THOR have attended the AIRFest launch in the past.

**For More Information:**

<http://www.kloubusters.org/airfest.html>

**Event:** September Meeting.

**When:** Tuesday the 7<sup>th</sup>, 7:00 to 10:00 PM.

**Where:** La Vista Community Center.

**Event:** Low Power Launch.

**When:** Sunday the 12<sup>th</sup>, Noon to ?

**Where:** La Vista Sports Complex.

**Fee:** Free.

**Description:** Low power sport flying. This is also HobbyTown's *Field of Wings* event which will be held in conjunction with our launch.

**Event:** Balls 2003

**When:** Friday the 17<sup>th</sup> through Sunday the 19<sup>th</sup>.

**Where:** Blackrock, NV.

**Description:** The big, national, experimental high power rocket launch of the year!

**For More Information:** <http://www.ahpra.org/b2k.html>

**Event:** High Power Launch.

**When:** Saturday the 25<sup>th</sup>, 9:00 AM to 5:00 PM.

**Where:** Pickrell, NE.

**Ceiling:** Our 15,000' MSL (13,650' AGL).

**Fee:** \$5.

**Description:** High power and low power sport flying.

**For More Information:** Check the rocketry hotline for any delays or cancellations if weather looks questionable.

### October

**Event:** Low Power Launch.

**When:** Sunday the 3<sup>rd</sup>, Noon to ?

**Where:** La Vista Sports Complex.

**Fee:** Free.

**Description:** Low power sport flying.

**Event:** October Meeting.

**When:** Tuesday the 5<sup>th</sup>, 7:00 to 10:00 PM.

**Where:** La Vista Community Center.

**Event:** High Power Launch.

**When:** Saturday the 16<sup>th</sup>, 9:00 AM to 5:00 PM.

**Where:** Pickrell, NE.

**Ceiling:** 15,000' MSL (13,650' AGL).

**Fee:** \$5.

**Description:** High power and low power sport flying.

**For More Information:** Check the rocketry hotline for any delays or cancellations if weather looks questionable.

## Nebraska Heat VII

Article by Richard Burney

Pictures by Richard Burney and Jason Vennard

Nebraska Heat VII was held on the weekend of Friday June 18<sup>th</sup> through Sunday the 20<sup>th</sup>. Just like Fire on the Farm VII, the temperatures for the whole weekend were below average, but since this was the beginning of summer, "below average" temperatures equated to upper 60's/low 70's. Also, the wind conditions were much more favorable than at FOTF VII, so all in all this turned out to be a great weekend to do some serious rocket flying.

Friday was spent setting up the launch range. Besides set up, some experimental rocket motor tests and flights occurred.

### Saturday, June 19<sup>th</sup> ...

Saturday turned out to be a pleasant day. Lots of sunshine, little wind, and temperatures in the low 70's. A total of 32 flyers generated a total of 72 flights. The motors burned were as follows: **A – 3, B – 1, C – 1, D – 13, E – 2, F – 10, G – 9, H – 14, I – 12, J – 9, and K – 4.**

One of the K flights for Saturday was Matt Jones' *Dunno*... I "*dunno*" if he intended that as its real name, but he's flown this rocket on a fair number of AeroTech and Cesaroni K motors over the last 4 years. Matt once again had a successful flight, this time with a Pro54 K650 Smokey Sam motor. Besides the flights that he and his wife Ann got in, Matt was also one of the on site vendors for the launch. THOR highly appreciates the services that Matt (Flyfast Industries) and Kent Burnett (Giant Leap Rocketry – also present on Saturday) have provided our club these last few years.

Another K flight of significance for Saturday was Joe Michel's *Shockwave* which he flew with an Animal Motor Works K530. Joe successfully flew *Shockwave* a few months earlier for a successful Level 2 flight. After reaching an apogee of 5,724 feet, the Missile Works RRC2 altimeter deployed a heavy duty streamer and *Shockwave* began its long descent. At 500 feet, the main chute deployed and *Shockwave* was lowered to the ground. Another successful flight for *Shockwave*! Also, since this was Joe's first time to break a mile, I guess you can say that Joe has now joined the model rocketry "mile high" club! Joe also flew his three-D12-clustered Fat Boy, a heavily modified Estes Executioner with a G80, and his 2.5x upscale of the classic Estes Der Red Max with an H180.

Since Kent Burnett had brought up some of the new single use Ellis Mountain motors (designed to take advantage of the current exemption for Propellant Actuated Devices), I was hoping to join the rocketry "mile high" club myself. With the single

use, 38mm J228 being almost a full J, I was hoping to put my *Macross 20<sup>th</sup> Anniversary* rocket up over a mile; the smaller Pro38 J330 has twice put this same rocket up over 4,700 feet. After several failures to ignite the motor, a Firestar dipped igniter finally brought it up to pressure, the motor immediately catoed causing one of the rail buttons to rip out of the rocket and the payload section to be damaged when the rocket fell to the ground below. Instead of breaking a mile, I broke my rocket instead! Later in the afternoon, I flew my LOC Onyx on an F50. The flight was great, but my Onyx landed in a nearby bean field where it remained lost until found by Kevin Trojanowski the next morning when looking for one of his rockets.

I wasn't the only person to have problems with these new Ellis Mountain motors. Larry Mills had the I69 in his PML AMRAAM 2 cato upon ignition. After the rocket coasted up about 15 feet it plopped to the ground with no damage. Just like myself, Don Rice also decided to give the J228 a spin. Before the flight, Don wrote on his flight card, "time to blow up another Ellis." Just like with my rocket, this J228 also catoed on the pad. With this string of catos at Nebraska Heat VII and the past experiences/testimonies that some of us have of Ellis Mountain's M1000 back during the late 1990's, I think it's going to be a while before any of us give an Ellis Mountain motor a spin anytime soon.

If an award for "most energetic disassembly" was given out at NH VIII, it surely would have gone to Jeff Moon. Jeff's *Moon Dart* was his Level 2 attempt rocket. Being a minimum diameter design powered by a Pro38 J330, this rocket was guaranteed to be a "hot" flight. Just about a 100 feet up, the *Moon Dart* shredded in spectacular form and debris rained down all over the field. At least one good thing going for Jeff on Saturday was that he had more flights than anybody else; Jeff had a total of 11 flights, many of which were in the D through G range.

Scott Frasier's Level 2 flight, however, was successful. Scott's Level 2 was accomplished by a PML Endeavor powered by a Pro54 J280 Smokey Sam motor. Congratulations, Scott. Scott's flight of his PML Hydra didn't go so well when the Pro38 I205 chuffed in mid-flight resulting in the delay element being extinguished. With no ejection charge, Scott's Hydra core sampled. Ouch! Hopefully Scott's Hydra can be rebuilt.

After a days worth of flying, a banquet was held back in Pickrell at one of the local restaurants. After dinner, a bunch of us came back to the field for the NH VII night launch. Among 5 flyers, a total of 10 flights were done. The motors burned were as follows: **C – 3, D – 3, E – 3, and H – 1.**

The two most unique rockets belonged to KLOUDBuster members Jerome Tonneson and Nick Stich. Jerome had a Fat Boy covered with LED's and was appropriately renamed *LED Boy*! Nick's *Night Streak* looked like a big giant Crayon with a

clear nosecone and clear fins; the fins and nosecone were lit up. Nick's rocket was also the most powerful for the evening being flown on an H153. After stumbling around in the dark for a while, Nick was reunited with his rocket.

The most flights for the evening went to your truly. I flew my BT-80 upscale of the Estes Mosquito twice using a D12-5 and then an E9-4. My Super Mosquito was equipped with three large glow-in-the-dark sticks and had one of those strobing toy rings hanging from the nosecone. I also flew my Estes Snitch flying saucer rocket twice on C6-0's. I was able to hang two of those strobing rings on the unused launch lugs to help make it more visible at night.



Joe Michel's 3x D12 powered Fat Boy at liftoff. (Burney)



Drag race between an Estes Executioner and an AeroTech Initiator. One of several drag races throughout the weekend. (Vennard)



The high power pads are busy! Nick Stich leaves his Super Mosquito while Joe Michel and Denis Gilbert work on their rockets. (Vennard)



Scott Frasier and his PML Hydra.



Jerome Tonneson's *LED Boy* as seen with my camera flash on...



Liftoff on a Pro38 I205. As a result of the motor chuffing, the delay element was extinguished and the rocket core sampled. (Burney)



... now with the lights out! (Burney)

## Sunday, June 20<sup>th</sup> ...

Sunday turned out to be a mostly overcast day. Other than a brief sprinkle in the morning, the day remained dry and in the upper 60's for a high. Due to the cloud cover, nothing larger than a J was flown. A total of 18 flyers had a total of 60 flights. The motors burned were as follows: **1/2A - 1, A - 2, B - 5, C - 16, D - 7, E - 6, F - 6, G - 5, H - 3, I - 6, and J - 3.**

Dionne Vennard joined our small, but ever growing, group of women who fly high power model rockets when she successfully flew her Dale Earnhardt Jr. themed BSD Horizon on an AeroTech I218 Redline motor. Welcome to high power, Dionne! Dionne's husband Jason flew a stretched BSD Horizon with an AeroTech J350 for a successful, dual-stage deployment flight up to 3,620 feet. For those interested, I highly recommend checking out Jason's web site <http://www.firemanrocketry.com/>. He has many pictures he has taken at NH VII and many other launches.

Andrew Wimmer had one of the few other J flights for the day. This was to be Andrew's first hybrid flight, in this case a J144. The kit for this flight was a LOC Caliber ISP. Since Andrew is well under 18, the flight was supervised by our own Kevin Trojanowski. Soon after liftoff, the rear end of the motor apparently just ripped right open taking the nozzle and part of the case with it. With the rear closure gone, there was nothing to hold the motor in, and the case fell out and landed in the nearby brush. After a handful of us looked around for the motor for about 20 minutes, it was finally found. The rocket will be flyable again, but the motor case is toast! Besides this flight, Andrew and his parents had 9 more flights on Sunday.

Even with all the flights Andrew did, the most prolific flyer of the day was yours truly with a total of 13 flights for the day. After 2 flights the night before, I was able to squeeze 4 more flights out of my Super Mosquito: first a C11-3, then a D12-5, then an E9-4, and then finally an F21-6 powered flight in a drag race against Rick and Sherri Bosworth. At ejection, the nosecone and chute separated from the rest of the rocket drifting off to the northeast. The fin can part of my Super Mosquito went into the ground dinging up the forward part of the tube. I will probably rebuild it, but after having flown this rocket nearly a 100 times over the last 8 years, I think it's time to build a new one! I also got multiple flights out of my Snitch, Skywinder, Python, and Onyx throughout the day.

The last day of the launch ended with a drag race between Andrew Wimmer and myself. It was a race between my Estes Snitch and two of Andrew's Snitches. Just by an inch or so, my Snitch was the first off the pad. After that, the launch range was dismantled and everyone left for home. Nebraska Heat VII was history.

## Conclusion...

All together, a total of 142 flights were generated throughout the weekend... and those were just the commercial flights that were recorded! It's been quite a few years since we've had a multi-day launch like this where we were able to get this many flights accomplished. The cooperative weather conditions were definitely a blessing in making this all happen.

A special thanks goes to who helped in running the launch, Matt Jones and Kent Burnett for providing their services, and to all who attended and thus made Nebraska Heat VII a reality. ✦



**A PML AMRAAM hits the skies. (Vennard)**



Jason Vennard and his stretched BSD Horizon.  
(Vennard)



Liftoff on a J350. (Vennard)



Jason's Horizon heads straight up. (Vennard)



Mark Kahler and his LOC EZI-65, aka *Le Monster*.  
(Burney)



Jason's viewpoint of the launch. (Vennard)



Liftoff on an I285 Redline. (Burney)



**Last flight of Nebraska Heat VII! Estes Snitch drag race! (Burney)**



**Richard Burney's Snitch beats out Andrew Wimmer's Snitches by a hair. (Burney)**

## SpaceShipOne

*Pictures by Bruce Lee*

On June 21<sup>st</sup>, 2004, Scaled Composites' SpaceShipOne, piloted by Mike Melvill, became the first manned private spaceship to reach space. THOR's own Bruce Lee and Ky Michaelson were in attendance!

Below are pictures that Bruce took at this historic event. For more information, check out <http://www.scaled.com/projects/tierone/index.htm> or <http://www.brucelee.com/>.



The White Knight heads down the runway with SpaceShipOne attached.



World's first private, civilian astronaut Mike Melvill waves from SpaceShipOne after its historic flight.



Ky Michaelson and Bruce Lee in front of SpaceShipOne and the White Knight post flight.

## NASA's Space Place

<http://spaceplace.nasa.gov/en/kids/>  
**Waiting for Cassini's "Safe Arrival"  
Call**

The evening of June 30, 2004, was nail-biting time at Cassini Mission Control. After a seven-year journey that included gravity assist flybys of Venus, Earth, and Jupiter, Cassini had finally arrived at Saturn. A 96-minute burn of its main engine would slow it down enough to be captured into orbit by Saturn's powerful gravitational field. Too short a burn and Cassini would keep going toward the outer reaches of the solar system. Too long a burn and the orbit would be too close and fuel reserves exhausted.

According to Dave Doody, a Cassini Mission Controller at the Jet Propulsion Laboratory (JPL) in Pasadena, California, there was a good chance the Earth-bound Cassini crew would have to wait hours to learn whether or not the burn was successful. Of the three spacecraft-tracking Deep Space Network (DSN) complexes around the globe, the complex in Canberra, Australia, was in line to receive Cassini's signal shortly after the beginning of the burn. However, winds of up to 90 kilometers per hour had been forecast. In such winds, the DSN's huge dish antennas must be locked into position pointed straight up and cannot be used to track a tiny spacecraft a billion miles away as Earth turns on its axis. "The winds never came," notes Doody.

The DSN complex at Goldstone, California, was tracking the carrier signal from Cassini's low-gain antenna (LGA) when the telltale Doppler shift in the LGA signal was seen, indicating the sudden deceleration of the spacecraft from the successful ignition of the main engine. Soon thereafter, however, Goldstone rotated out of range and Canberra took the watch.

After completion of the burn, Cassini was programmed to make a 20-second "call home" using its high-gain antenna (HGA). Although this HGA signal would contain detailed data on the health of the spacecraft, mission controllers would consider it a bonus if any of that data were actually captured. Mostly, they just wanted to see the increase in signal strength to show the HGA was pointed toward Earth and be able to determine the spacecraft's speed from the Doppler data. If possible, they also wanted to try to lock onto the signal with DSN's closed-loop

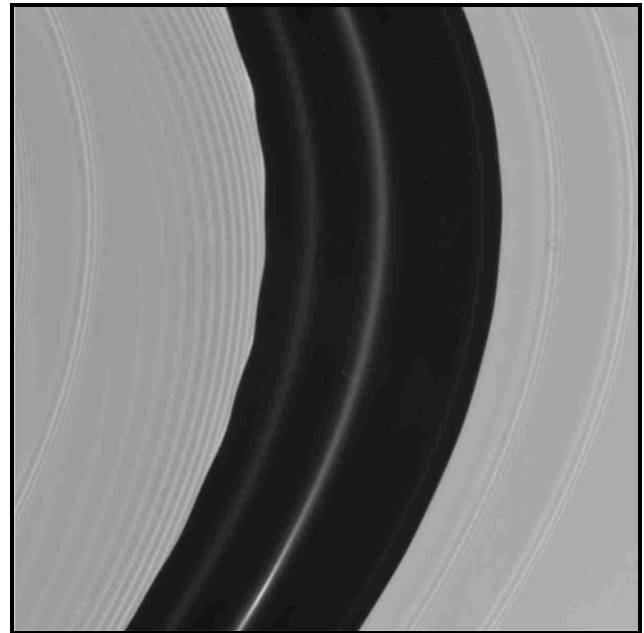
receiver, a necessary step for extracting engineering data.

Normally it takes around one minute to establish a lock on the HGA signal once a DSN station rotates into range. Having only 20 second's worth of signal to work with, the DSN not only established a lock within just a few seconds, but extracted a considerable amount of telemetry during the remaining seconds.

"The DSN people bent over backwards to get a lock on that telemetry signal. And they weren't just depending on the technology. They really know how to get flawless performance out of it. They were awesome," remarks Doody.

Find out more about the DSN from JPL's popular training document for mission controllers, Basics of Space Flight ([www.jpl.nasa.gov/basics](http://www.jpl.nasa.gov/basics)) and the DSN website at [deepspace.jpl.nasa.gov/dsn](http://deepspace.jpl.nasa.gov/dsn). For details of the Cassini Saturn orbit insertion, see [www.jpl.nasa.gov/basics/soi](http://www.jpl.nasa.gov/basics/soi). Kids can check out The Space Place at [spaceplace.nasa.gov/en/kids/dsn\\_fact1.shtml](http://spaceplace.nasa.gov/en/kids/dsn_fact1.shtml) to learn about the amazing ability of the DSN antennas to detect the tiniest spacecraft signals.

*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. ✦*



**Right after entering Saturn orbit, Cassini sent this image of the part of the Encke Gap in Saturn's rings. Image credit NASA/JPL/Space Science Institute.**

## THOR Meeting Minutes

Compiled by Richard Burney, Secretary

### THOR Meeting Minutes 7/6/04

**Attendance:** Richard Burney, Nathan Warner, Denis Gilbert, Kevin Trojanowski, Greg Rothman, Bruce Lee, Bill Richardson, Rich Baker, Arley Davis, Doug Buhrman, Kevin Rich, Devin Rich, and Jon Damme.

#### **Meeting starts at 19:00.**

Watch "G" rated version of **Apollo 12 "spoof" video**. Yes, there was an "R" rated version!

Bruce presents the nosecone and payload section from the **CSXT** which became the first civilian rocket to go into space on May 19<sup>th</sup>.

Bruce, along with Ky Michaelson, was in attendance at the historic flight of **Burt Rutan's SpaceShipOne** on June 21<sup>st</sup>. Bruce talks about what transpired before, during, and after the flight. SpaceShipOne made it into space just by a matter of hundreds of feet. Bruce shows pictures he took pre and post flight. After some other stops in California, Bruce went straight out to **LDRS XXIII** (in New York); Bruce just got back to Omaha yesterday!

Bruce talks about this year's Balls launch and some of the planned flights.

Bruce reads off some of the notes he took at the LDRS officers' board meeting. Bruce then talks about LDRS itself; the field, launch conditions, etc. Due to altitude restrictions, (8,000 ft AGL), this was one of the smallest LDRS's in quite a few years. Due to only a few people running the event, LDRS XXIII was a bit of a disorganized mess, but it was still a fun event. **Ken Good** was elected in as new Tripoli president.

Bruce passes around the latest two issues of **High Power Rocketry** magazine.

Greg Rothman was contacted recently by a police officer from Papillion regarding a camp for children with cancer. They are interested in THOR doing a rocketry demo for them. Greg does a demonstration of how to make one's own Magnalite.

Rich Burney talks about the planned contents of the next newsletter. Rich is really interested in putting the new Pro54 L motor to use.

Matt Jones shows the Cesaroni 75mm case for their M1400. The M1400 is intended to also be compatible with AeroTech's case for the M1315.

Doug Buhrman talks about his projects he is currently working on.

Arley shows some printouts of some of the new Estes kits coming out soon. One of the new kits is a digital video movie camera!

Bruce talks more about LDRS, ATF, and some other issues.

#### **Meeting adjourned at 21:45.**



The payload section of the Civilian Space eXploration Team (CSXT) rocket. (Burney)



The CSXT payload section is presented by Bruce to the rest of the club. (Burney)

#### THOR Meeting Minutes 8/3/04

**Attendance:** Richard Burney, Barry Conner, Bruce Lee, Thomas Kernes, Bill Richardson, Arley Davis, Doug Holverson, Andrew Wimmer, Ann Beckenhauer, Sherri Bosworth, Rick Bosworth, Matt Jones, Kevin Trojanowski, Denis Gilbert, Jeff Moon.

#### **Meeting starts at 19:20.**

Bruce says that a search will be made in a few weeks to look for the booster section of the **CSXT**.

Barry Conner shows a long safety cone (like the one **Terry Smemo** has) that he plans on making flyable.

Rich Burney also recently acquired a safety cone from a local Menards for about \$7. Plans on sticking a 38mm motor mount in it for I and J motors. In the new issue (#38) of **Extreme Rocketry** magazine, is a letter Rich wrote responding to **Dan Stroud's** article **China vs. U.S. – The New Space Race** which appeared in issue #36. Some of what Dan wrote, in particular his bashing of religion here in the U.S., has generated some controversy.

Jeff Moon shows the parts for his **Level 22** rocket which he plans on using for his second Level 2 retry.

Doug Holverson passes around some rockets he stylized off of the old Estes Goony Bird model rockets. They might serve as the basis for new **Holverson Design** kits.

**AIRFest 10** will be this Labor Day weekend. Commercial Flying will be on Friday the 3<sup>rd</sup> through Sunday the 5<sup>th</sup>. Experimental flying on Monday the 6<sup>th</sup>. A "From the Ground Up" style contest will be held on Saturday the 4<sup>th</sup>.

The **Offutt Air Show** will be on the weekend of August 21<sup>st</sup>-22<sup>nd</sup>. We will need volunteers to help run our display.

The next high power launch will be on Saturday August 28<sup>th</sup>.

**Meeting adjourned at 20:33. ✦**



**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.**