



THOR.

July/August 2002

VOLUME 9 NUMBER 4

Summer Meeting Schedule :

Tuesday July 2nd, Tuesday August 6th,
and Tuesday September 3rd. Each
meeting will start at 7:00 PM at the La
Vista Community Center.

July/August 2002 Events Calendar

July

Event: 4th of July Party.
When: Thursday the 4th (duh...), exact time to be determined.
Where: Bruce Lee's house.
Fee: Free... but bring your own food such as meat and chips!
Description: The club's annual 4th of July party.
For More Information: Final details will be determined before the party.

Event: Low Power Launch.
When: Sunday the 7th, Noon to ?
Where: La Vista Sports Complex.
Fee: Free.
Description: Low power sport flying.
For More Information:

Event: LDRS XXI.
When: High power flying from Thursday the 11th through Sunday the 14th. Experimental flying from Monday the 15th through Tuesday the 16th.
Where: Amarillo, TX.
Description: Large and Dangerous Rocket Ships number 20! This is TRA's big national high power launch of the year.
For More Information: Go to www.ldrs21.org.

Event: Low Power Launch.
When: Sunday the 21st, Noon to ?
Where: La Vista Sports Complex.
Fee: Free.
Description: Egg lofter contest and low power sport flying.
For More Information:

August

Event: Nebraska Heat V.
When: Friday the 2nd through Sunday the 4th, 9:00 AM to 5:00 PM each day.
Where: Pickrell, NE.
Ceiling: TBA.
Fee: TBA.
Description: THOR's big annual high power rocketry get together!
For More Information: Go to the calendar at www.tripol.org. More details of the launch will be hammered out in the next two months.

Event: NARAM 44.
When: Sunday the 4th through Friday the 9th.
Where: McGregor, TX.
Description: NAR's week of model rocketry competition. Typically there is a lot of sport and some high power flying, too.
For More Information: Go to www.naram2002.org.

Event: Low Power Launch.
When: Sunday the 18th, Noon to ?
Where: La Vista Sports Complex.
Fee: Free.
Description: Low power sport flying.
For More Information:

Event: AIRFest VIII.
When: High power flying from Friday the 30th through Sunday September the 1st. Experimental day on Monday September 2nd.
Where: Argonia, KS.
Description: This is the awesome high power get together thrown together 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: Go to www.kloudbusters.org/airfest.html.

Fire on the Farm V Photo Gallery Day 1 – Saturday, April 13th

By Richard Burney

With Fire on the Farm V passing off into memory along with the fact that I neither have the time nor desire to write up a detailed article, I decided to once again provide a photo gallery of the event with captions. I should have the gallery for day 2 of FOTF V in the September/October newsletter (by then Nebraska Heat V will have come and gone... ughhh, am I getting behind or what!).



A mass of rocketeers lines up at the registration table ready to fly!



Dave's Pterodactyl Jr. takes off while Mike Mann's full size Pterodactyl waits for its turn.



Dave Leninger and Lincoln Kibsgaard with Dave's PML Pterodactyl Jr. powered by an I357.



Mike's K550 powered Pterodactyl hits the sky.



Some students from Iowa State who are part of an aviation program at that college, built and designed a minimum diameter rocket powered by an F39 reload. What looks like an upper stage is an unpowered "dart" which drag separates from the booster after motor burnout. This has got to be the smallest rocket that I have seen that uses a launch rail! The first flight resulted in a recorded altitude of 800-900 feet (altitude was recorded using a Perfect Flight M9K). Another flight took place later.



Liftoff of Randy's Excel Plus.



Randy Braye and his Binder Design Excel Plus (not to be confused with Bruce Lee's FDR ETC Plus!) powered by an I211.



Kent Peterson and his H180 powered PML Arial.



Everyone looks to the sky keeping their eyes out on an ascending rocket.

A Brief History of Rocketry (Part 2)

Courtesy KSC/NASA

As the 20th Century began, Wilbur and Orville Wright were preparing to become the first men to fly. Goddard, however, was already designing rockets to probe the upper atmosphere and delve into space. Half a world away -- and unknown to Goddard -- a Russian school teacher, Konstantin Tsiolkovsky, was thinking along much the same lines. Both came to the conclusion independently that, if a rocket was going to do the things they dreamed of, it would have to be powered by liquid fuels. Solid fuels of the time simply didn't have sufficient power. Tsiolkovsky lacked Goddard's practicality. While Tsiolkovsky worked out many principles of astronautics and designed suitable rockets, he never built any. By contrast, Goddard was a technical man. He could and did build rockets. By the time he died in 1945, Goddard held 214 patents in rocketry -- patents which still produce royalties for his estate.

Goddard began his experiments in rocketry while studying for his doctorate at Clark University in Worcester, Mass.

He first attracted attention in 1919 when he published a paper titled, "A Method of Reaching Extreme Altitudes." In his paper he outlined his ideas on rocketry and suggested, none too seriously, that a demonstration rocket should be flown to the Moon.

The general public ignored the scientific merit of the paper -- latching instead onto Goddard's Moon rocket proposal. At the time, such an endeavor was absurd and most dismissed Goddard as a "crank."

The experience taught Goddard a hard lesson -- one which caused him to shy away from future opportunities to publicize his work. Publicity was far from Goddard's mind on the morning of March 16, 1926. On that day, barely a year after Wernher von Braun's rocket wagon fiasco, Goddard launched a liquid-powered rocket he had designed and built from a snow-covered field at his Aunt Effie Goddard's farm in Auburn, Mass. The rocket flew only 46 meters (152 feet) -- about the

same distance as the Wright Brothers' first manned flight -- but it did fly! It was the first flight of a liquid-fueled rocket in history.

When Goddard was later approached by the American Interplanetary Society in 1930 to publicize his work, Goddard refused. The society, rebuffed and learning that no one in the United States aside from Goddard was working with rockets, turned its attention to rocket research under way in Europe, where rocketry was beginning to develop a following.

In the spring of 1931, two founder-members of the American society, husband and wife Edward and Lee Pendray, travelled on vacation to Germany where they made contact with the German Rocket Society, which had been formed in 1927. The visiting Americans were given a preview of the future when a member of the German Rocket Society -- Prof. Willy Ley -- took the pair to the Germans' rocket flying test ground in the suburbs of Berlin.

Returning home, the Pendrays filed an enthusiastic report of their visit, prompting the American society to build its first rocket. The attempted test flight in November 1932 ended with the American design firmly on the ground. It's unfortunate the Pendrays didn't meet another future rocketry hall-of-famer who also was a member of the German society. Rumanian-born Hermann Oberth wrote, in 1923, a highly prophetic book: "The Rocket into Interplanetary Space." The book enthralled many with dreams of space flight, including that precocious German teenager, Wernher von Braun, who read the book in 1925. Five years later, von Braun had joined Oberth and was assisting with rocket experiments.

By 1932, the German Army was beginning to show an interest in the German Rocket Society's efforts, and in July of that year, a "Mirak" rocket was launched as a demonstration for the head of the newly created German Army rocket research group, Captain (later Major General) Walter Dornberger. Mirak didn't impress Dornberger.

Von Braun did.

Three months after the demonstration flight, von Braun was engaged to work on liquid propelled rockets for the Army. Most of the German Rocket Society followed von Braun into national service and the society disbanded.

By December 1934, von Braun scored his first successes with an A2 rocket powered by ethanol and liquid oxygen. Two years later, as plans for the follow-on A3 rocket were being finalized, initial planning began for the A4 rocket -- a rocket that was to be, in Dornberger's words, a practical weapon, not a research tool. As noted earlier, most know the A4 by another name -- the V-2. The rocket researchers quickly outgrew their facilities at Kummersdorf on the outskirts of Berlin and, in 1936, operations were transferred to a remote island on Germany's Baltic coast -- Peenemuende. Between 1937 and 1941, von Braun's group launched some 70 A3 and A5 rockets, each testing components for use in the proposed A4 rocket.

The first A4 rocket flew in March 1942. The rocket barely cleared some low clouds before crashing into the sea a half mile from the launch site. The second launch in August 1942 saw the A4 rise to an altitude of 11 kilometers (7 miles) before exploding.

The third try was the charm. On October 3, 1942, another A4 roared aloft from Peenemuende, followed its programmed trajectory perfectly, and landed on target 193 kilometers (120 miles) away. This launch can fairly be said to mark the beginning of the space age. The A4, the first successful ballistic rocket, is the ancestor of practically every rocket flown in the world today.

Production of the A4 began in 1943 and the first A4s, now renamed V2s, were launched against London in September 1944.

The V-2 offensive came too late to affect the course of the war. By April 1945, the German Army was in full retreat everywhere and Hitler had committed suicide in his bunker in Berlin.

At an inn near Oberjoch, the Haus Ingeburg, von Braun and over 100 of his rocket experts waited for the end. The entire team had been ordered executed by Hitler to prevent their capture. Wernher von Braun's brother, Magnus, however, managed to contact nearby American forces before Hitler's SS henchmen could reach the rocket team. On May 2, the same day Berlin fell to the Soviet Army, von Braun and his rocket team entered American lines and safety.

With the fighting over, von Braun and his team were heavily interrogated and jealously protected from Russian agents. V2s and V2 components were assembled. German rocket technicians were rounded up. In June, General Eisenhower sanctioned the final series of V2 launches in Europe. Watching each of the three V2s which rose from a launch site at Cuxhaven was a Russian Army colonel, Sergei Korolev. Ten years later, Korolev would be hailed as the Soviet Union's chief designer of spacecraft and the individual responsible for building the Vostok, Voshkod and Soyuz spacecraft which, since 1961, have carried all Soviet cosmonauts into orbit.

Few members of von Braun's team participated in the Cuxhaven launches. Most had already begun setting up shop at Fort Bliss, near El Paso, Texas. Piled up in the desert near Las Cruces, New Mexico, were enough parts to build 100 V2s. Von Braun and his team soon moved to nearby White Sands Proving Ground where work began assembling and launching V2s. By February 1946, von Braun's entire Peenemuende team had been reunited at White Sands and, on April 16, the first V2 was launched in the United States. The U.S. space program was under way!

Up to 1952, 64 V2s were launched at White Sands. Instruments, not explosives, packed the missiles' nosecones. A V2 variant saw the missile become the first stage of a two stage rocket named Bumper. The top half was a WAC Corporal rocket. The need for more room to fire the rockets quickly became evident and, in 1949, the Joint Long Range Proving Ground was established at remote, deserted Cape Canaveral, Fla.

On July 24, 1950, a two-stage Bumper rocket became the first of hundreds to be launched from "the Cape."

The transfer of launch operations to the Cape coincided with the transfer of the Army's missile program from White Sands to a post just outside a north Alabama cotton town called Huntsville. Von Braun and his team arrived in April 1950. It was to remain his home for the next 20 years, a period in which the city's population increased ten fold.

The von Braun team worked to develop what was essentially a super-V2 rocket, named for the U.S. Army arsenal where it was being designed -- the Redstone.

In 1956, the Army Ballistic Missile Agency was established at Redstone Arsenal under von Braun's leadership to develop the Jupiter intermediate range ballistic missile. A version of the Redstone rocket, known as the Jupiter C, was used on January 31, 1958, to launch America's first satellite, Explorer I. Three years later, Mercury Redstones launched Alan Shepard and Virgil I. "Gus" Grissom on suborbital space flights, paving the way for John Glenn's first orbital flight.

In 1958, NASA was established, and, two years later, von Braun, his team, and the entire Army Ballistic Missile Agency were transferred to NASA to become the nucleus of the agency's space program.

The Army Missile Command, which owns Redstone Arsenal, continued its vital national defense mission after the transfer of ABMA to NASA, chalking up a remarkable number of successful programs to augment America's landpower. MICOM's successes include the Pershing II, the NIKE weapons systems, the HAWK system, Improved HAWK, Corporal, Sergeant, Lance and Chaparral, to name a few.

Pursuing a separate course -- that of developing rockets for space exploration -- the Marshall Space Flight Center's past quarter century has been a time of superlatives.

In 1961, almost as Alan Shepard was drying off from his landing in the Atlantic following his riding a Marshall-designed Redstone rocket on a sub-orbital flight which made him the first American in space, President Kennedy committed this nation to being first on the Moon. NASA's Marshall Center was charged with developing the family of giant rockets which would take us there.

The Saturn rockets developed at Marshall to support the Apollo program and to honor President Kennedy's pledge were, at the time, the most powerful space launch vehicles yet to have been invented.

Engineers, scientists, contractors, and other support personnel built well. On July 20, 1969, a transmission from the Moon's Sea of Tranquility reported: "The Eagle has landed."

Marshall's Saturn rockets first took us around the Moon, then to its cratered surface. Marshall-developed lunar excursion vehicles -- the ungainly Moon Buggies -- carried astronauts on far-ranging excursions in pursuit of samples of lunar soil and rock.

Closer to home, the team at Marshall developed America's first space station -- Skylab. Built to replace

the upper stage of a Saturn V moon rocket, the Skylab module was successfully placed in orbit early on May 14, 1973.

Placing Skylab in orbit marked a major transition in the story of rocketry. Up until Skylab, the rocket had been the star -- the featured attraction. The focus had been on the up and down -- launch and recovery. Skylab, in essence stole the show. For the first time, space became a place in which to live and work. Flying aboard a rocket was about the Earthside equivalent of driving the family car to work. Just as having to drive to work is only incidental to work itself -- flying aboard a rocket became secondary to the work done once Skylab had been reached. The rocket, simply stated, became a means to an end -- the end in this case being the opportunity to learn to live and work in space.

A rash of malfunctions plagued Skylab's early days -- problems which tested the resourcefulness of the entire NASA team. The problems were overcome, however, and Skylab went on to become one of Marshall's proudest achievements.

A Marshall-developed Saturn I-B also carried aloft America's half of the first joint U.S.-Soviet space endeavor, the Apollo-Soyuz project.

After Apollo, the team at Marshall tackled designing a revolutionary national space transportation system, which came to be known simply as "The Space Shuttle."

It is anything but simple!

The space shuttle main engines are among the most powerful, most sophisticated devices ever invented. They represent a quantum leap in technology advancement over the engines which powered the Saturn V. Each of the three main engines in tail of the shuttle can provide almost a half-million pounds of thrust, a thrust equal to that produced by all eight of the Saturn I's first stage engines. Unlike most previous rocket engines, which were designed to be used only once -- and then for only a few minutes -- the space shuttle's main engines are designed to be used again and again, for up to 7.5 hours. The thrust to weight ratio for these engines is the best in the world -- each engine weighs less than 7,000 pounds but puts out the power equivalent of seven Hoover Dams!

Twenty-four successful flights of the space shuttle lulled America into a sense of complacency. Shuttle launches became routine -- a ho-hum event which had to scramble for an inch or two on page 2. Then came the Challenger disaster....

The time since the loss of Challenger has been the busiest in the history of Marshall Space Flight Center. Teams of experts have been organized to find and fix the problems which led to the accident.

Investigation quickly focused on a defective joint in the space shuttle's solid rocket motors. Rocket propulsion experts devised a number of modifications to the solid rocket motor design to remedy the fault.

A vigorous test program was undertaken to show that the problems had been solved.

The disaster-enforced hiatus in shuttle operations gave Marshall -- and other NASA installations

-- an opportunity to address other shuttle-related concerns. Major steps were taken to enhance the reliability and safety of the turbine blades and turbo pumps in the shuttle's main engines. An escape system was created for the shuttle crew. Improvements were made to the orbiter's landing gear and brakes.

When America returned to manned spaceflight in 1988, it did so in a space vehicle which was vastly safer and more capable.

NASA also is examining using expendable launch vehicles on missions which do not require the shuttle's unique capabilities, and is looking into development of a new generation of heavy lift launch vehicles.

These will become the next chapter in the story of rocketry -- a story whose first chapters were written more than 2,400 years ago.

No one can say where our path will lead or when -- hopefully never -- the last chapter in this history will be written.

THOR Meeting Minutes:

May/June 2002

Compiled by Richard Burney, Secretary

THOR Meeting Minutes 5/7/02

Attendance: Larry Drake, Tony Nicklin, Jeff Moon, Arley Davis, Candy Davis, Jacob Davis, Shaun Landgraf, Greg Rothman, Kevin Rich, Kevin Trojanowski, Doug Holverson, Jon Damme, Mike Slater, Richard Burney, Devin Rich, Tyson Christiansen, and Kathy McGinnis.

Meeting starts at 19:20.

Larry is having trouble with the company that we have rented porta potties from. The porta potty we were suppose to have delivered at the Pickrell launch site back in August for permanent use apparently was never delivered and was never seen by any of the local farmers. We may have to declare it stolen to the local sheriff.

Tony Nicklin is introduced to the group. Tony is in the Navy and was stationed in Italy for the last several years and was unable to participate in model/high power rocketry like he did while still in the US.

Larry wants to fix the *Nebraska Heat* rocket for a possible flight at this LDRS (*Editor's note: with two weeks until LDRS, I sort of doubt it;*)).

Mike Slater shows his PML Cirrus Dart. Mike hopes to incorporate dual stage deployment. Also passes around a print out taken from the web page of a special effects/science company, Tri-Ess Sciences (www.tri-esssciences.com). Tri-ess produces smoke making

devices that could be used on rockets (though NAR and Tripoli frown on such things).

Jeff Moon's *Express Mail* is projected to reach 8,000 feet using the 29mm I200.

AeroTech is a bit behind on getting out motors (Ellis Mountain is helping with the manufacture of AeroTech's motors). Construction of AeroTech's new building is in progress.

Rich Burney says the May/June newsletter will be finished in the next few days (*Editor's note: now I'm behind with the July/August issue!*).

Jon Damme passes around some classic Estes balsa nose cones. Some of the nose cones include that of a Big Bertha, a Mercury capsule, a Gemini capsule, and an Alpha nose cone.

Kevin Trojanowski and Kevin Rich show off different motor retention systems they have (blacksky and Defy Gravity).

Arley shows one the new Estes Super Shot sets.

Motion is made and passed to reschedule the Spot Landing contest to May 19th.

FOTF V – THOR and I-SOAR each made about \$400 from the event.

Meeting adjourned at 21:25.

THOR Meeting Minutes 6/4/02

Attendance: Richard Burney, Jon Damme, Denis Gilbert, Bruce Lee, Jeff Moon, Arley Davis, Jacob Davis, Candy Davis, Shaun Landgraf, Caitlin Rothman, Greg Rothman, Kevin Rich, Devin Rich, Tyson Christiansen, Doug Deden, Tob Wood, Larry Drake, Dave Pares, Allyson Pares, and Alex Pares.

Meeting starts at 19:20.

Everyone with an e-mail address will receive the PDF file of the newsletter from Bruce or will get a link for downloading it.

Bruce Kelly will not be running for reelection for the Tripoli presidency. Will continue to be heavily involved with the BATF lawsuit (*Editor's note: as Bruce Kelly mentions in the latest Tripoli Report, he desires to remain on the board in order to continue his involvement with the lawsuit. Also will be able to devote more time to High Power Rocketry magazine*).

Rich Burney passes around a lot of the pictures he took at Fire on the Farm V. Got a new PC a week earlier!

Kevin Trojanowski is busting his hump getting his Level 3 project ready for LDRS. Kevin's got an offer from Rocket City Rocketry for some high power rocket igniters/matches for \$.75 apiece. Kevin will pick them up at LDRS. Anyone interested in buying must have their money into Kevin by June 29th.

Kevin Rich is making the parachute deployment bag for Kevin Trojanowski's Level 3 rocket.

Greg is making a remote controlled launch controller. Greg might lend it for club usage.

Arley shows a new kit (Moondance) he got from Bel Air Hobbycraft which is made by the Canadian company Sunward Model Aerospace.

Jeff Moon talks about his recent experiences with the brand new AeroTech F21W single-use, 24mm motor (*Editor's note: the F21W is the same exact length as the Estes E9. I've flown two of them myself and would have to say that I am satisfied with their performance!*).

Sky Wars won't be taking place/filming at LDRS. Bruce is not sure what the future of the program is.

Arley shows how much stronger PML's Quantum Tubing is compared to standard cardboard tubing (LOC and equivalent) and PML's own standard phenolic cardboard tubing. By using a hammer, Arley demonstrates how soft regular cardboard is and how brittle phenolic tubing is, but the Quantum Tubing sure can take a beating!

The details of the 4th of July party at Bruce's new house, will be discussed at the July 2nd meeting.

Ky Michaelson's next CSXT space shot is planned for late June/early July. The FAA waiver has been approved for the launch. Bruce will hopefully be back in time for the July meeting to discuss the launch.

Money is being accepted right now to pay for the Hypertek equipment.

Kevin Trojanowski brings up the possibility of THOR having a booth/flying demonstration at a future Offutt air show/open house.

New contest dates: June 9th – spot landing, July 21st – Egg Loffer.

Night launch planned for Nebraska Heat V, but rockets will have to be under the 3.3 lb. and less than H rule.

Meeting ends 20:50.

CLUB OFFICERS

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NEWSLETTER EDITOR - Richard Burney

THOR on the Super Information Highway!

TRIPOLI NEBRASKA WEB PAGE

www.tripoli.org/tra_ne/nebraska.htm

THOR WEB PAGE

www.tripoli.org/tra_ne/THOR/thor.html

What is THOR?

The Heartland Organization of Rocketry (THOR) is both an officially sanctioned prefecture of the Tripoli Rocketry Association (Tripoli Nebraska #46) and is an officially sanctioned Section (#562) of the National Association of Rocketry. THOR conducts low through high power model rocket activities through out the year. THOR strictly adheres to the safety guidelines that have been established by the NAR and Tripoli.

When and where does THOR meet?

Meetings are usually held the first Tuesday of the month at 7:00 PM (different days or times will be announced in advance) at the **La Vista Community Center at 8116 Parkview St., La Vista, NE** (turn east at the Sinclair Gas Station on 84th St. and go a block east). Visitors are welcome to attend.

For additional information...

For club launch times, launch locations, or for those with additional questions call THOR at (402) 896-2069 or 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 to 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 number to the applicable organization):

NAR# _____ TRA# _____ NERO# _____

Are you certified for high power rocketry (check mark your applicable TRA or NAR Certification Level):

Level 1 _____ Level 2 _____ Level 3 _____

Membership Rates

½ year memberships will divide by 2 and add \$1. Write your check payable to "The Heartland Organization of Rocketry" or "THOR". Mail it to the below address or pay at the next meeting.

Family Membership - \$36

Senior Membership- 18 and over - \$24

Junior Membership - Under 18 - \$12

Correspondence Membership - \$10

(Members over 50 miles from Omaha)

Newsletter Only (6 issues a year) - \$6

I agree to comply with THOR's policies as pertains to the safety guidelines set forth by the NAR and Tripoli. Failure to do so is grounds for expulsion.

Signature: _____

Dated: _____

The Heartland Organization of Rocketry

6211 South 141st St.

Omaha, NE 68137

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