

TRIPOLI GERLACH

Research Rocketry



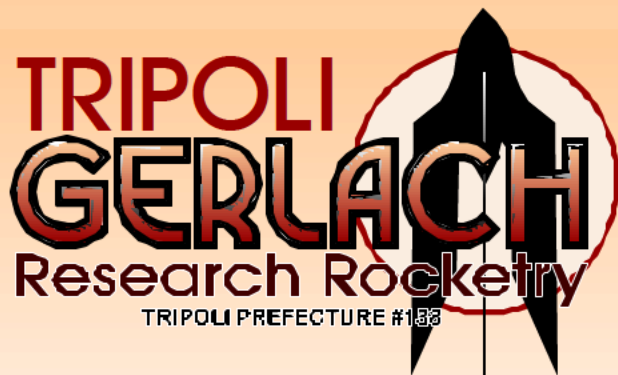
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WWW.TRIPOLIGERLACH.ORG



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**PUBLISHED EXCLUSIVELY FOR
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Tripoli Gerlach was founded as a National Prefecture under the Tripoli Rocketry Association, Inc. Devoted to Research Rocketry and the Black Rock Desert area of Nevada, we welcome all qualified Tripoli Members having a Level 2 certification or higher.

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If you have anything to contribute in the way of information, articles, photos or whatever, please send them to Tripoli Gerlach Headquarters. Visit our WebSite on-line at;

WWW.TRIPOLIGERLACH.ORG

ON THE COVER Andy Limper out of Minnesota stands ready with his Weenie Special HAMSTER DANCE rocket. Andy is a long standing attendee at BALLS every year and will be so as well this coming September. We visit Andy on Page 15.

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ELECTION TIME IS NEAR

Per our By-Laws Election of new members to our Executive Committee will be held at the end of September at our Annual Meeting. Nominations are officially open for Prefect, Secretary & Treasurer.

Our three existing Executive Members are willing to run again however they all feel if someone else wants to step forward it will be just as fine.

Anyone wishing to participate with a position on our Executive Committee please contact TOM at shadow@pghmail.com.

TRIPOLI GERLACH Research Rocketry



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PYRAMID LAKE PAIUTE TRIBE MUSEUM



Most people traveling to Black Rock take Rt 447 from Wadsworth to Gerlach and pass through an intersection before going through the small town of Nixon. The intersection leads to the town of Sutcliff on the west shore of Pyramid Lake. Most notable is a unique structure made of rock and timber resembling a huge Indian TeePee. This is the Pyramid Lake Paiute Museum.

Visitors to Pyramid Lake can learn about its fascinating history and its native inhabitants, the Paiute Indian tribe. Exhibits at the multi-purpose museum describe the tribe's history and culture and offer insight into why the Paiute people hold the lake and its surrounding landscape so sacred.

Other displays at the Pyramid Lake Paiute Tribe Museum focus on Pyramid Lake's natural history and the many creatures that make the lake their home. These include the ancient Cui-ui fish and the world-famous Lahontan Cutthroat Trout, which draws anglers the world over. The lake also features a breeding ground for one of the largest colonies of American White Pelicans, which is certified as a National Wildlife Refuge.

Pyramid Lake Paiute Tribe Museum provides visitors



with information about Pyramid Lake recreation policies, and visitors can purchase camping, boating and fishing permits and daily use permits at the center. Pyramid Lake Paiute Tribe Museum and Visitors Center has displays on tribal history and culture and information on issues and events important to the Pyramid Lake Paiute Tribe.

A visit to the museum is extremely rewarding in more ways than one. Its vast displays of Indian culture is almost over shadowed by the buildings architecture. The outside presents a modern interpretation of living with nature while the inside provides a vast expanse of openness. The displays are presented in the same manner.

Mostly staffed by volunteers we met Ben Aleck, a member of the Paiute Nation and Collection Manager for the Museum. Ben is a very amiable guy with a wealth of information and lore about the Paiute people, Pyramid Lake and the Black Rock Desert.

There is a history of famous Paiutes who served in the Armed Forces and in Government. There is also the



most famous Paiute, Sara Winnemucca who traveled East spreading the Indian way of life to the White Man. The town of Winnemucca is named after her.



Displays present everything from how Indians lived to the surrounding geology. Indian arrowheads, clothing, housing and fossils like this horsehead most unlikely embedded in Tufa rock.



MAKING HOLES

DRILL—noun

a. a shaftlike tool with two or more cutting edges for making holes in firm materials, especially by rotation.

b. a tool, especially a hand tool, for holding and operating such a tool.

Confusing but a Drill is a tool that holds a tool of the same name. The term refers to both holder and a device.

Just about anyone doing anything requires holes. Our rocketry activities is a major example. We need round holes for vents, shearpins and mounting electronics, fins and the list can go on.

Drilling a hole into an object now days is relatively easy, all you need is a drill motor and a drill bit, right? Well almost: the motor must have the right capacity, the drill bit must be the right type and size for the material that is being drilled. There is also a number of other items needed: a center punch, lubricating oil, a vise, depth marker, etc.

SAFETY FIRST ALWAYS

It's pretty hard to protect your hands except with your eyes, and you can protect your eyes by wearing safety glasses of some sort. They come in all kinds from regular glasses to coverover goggles that will offer side protection from flying debris. It is most important at all times to have your eyes watch where your hands are.

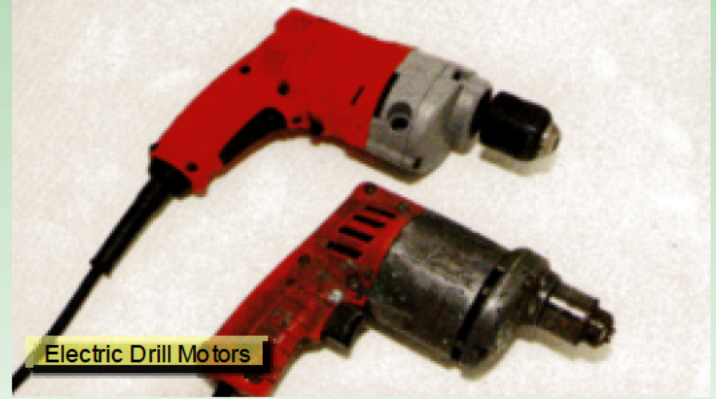


DRILL MOTORS

The first tool for consideration is the drill motor. It has to have enough power, rated in amps, to rotate the largest drill bit diameter you plan to use to make a hole in the hardest material you are using.

Today hand drill mounts have been replaced with electric or battery powered versions that make this work easy. The advantage with an electric drill motor is they never die in the middle of a job. And while today's battery powered drill motors are more powerful then

ever they still don't compare with an electric powered one for durability in the long run. Even still a good quality battery powered drill motor works for most jobs.



Electric Drill Motors



Battery Powered Drill Motor



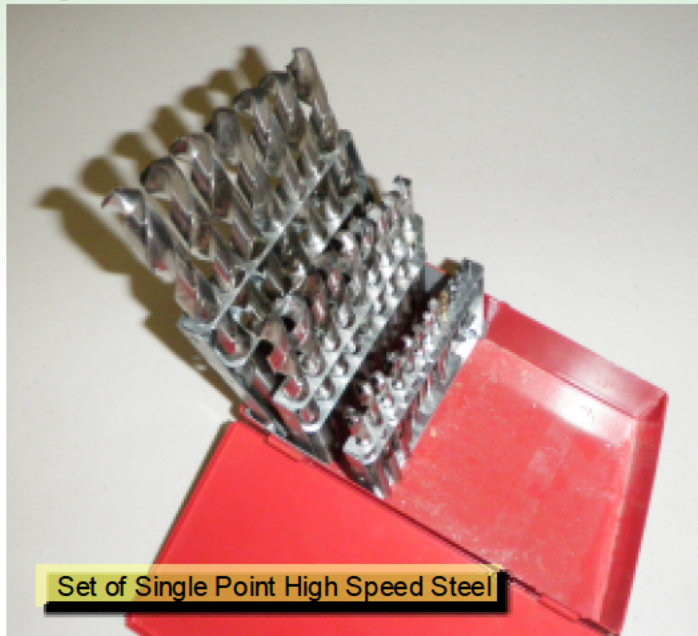
Floor Mount Drill Press

Nothing can freehand drill a holes as does a Drill Press. They come in either a floor model or a smaller bench model. Both offer the ability to more carefully feed the drill bit into the work piece.

A hand drill motor should be kept to a 3/8" chuck while a drill press can easily handle up to a 1/2" bit.

DRILL BITS

Next on our list are drill bits themselves. There are so many different types of drill bits such as high speed steel, carbide tip and special points, each handles specific purposes. Working on metal, or composite material, use a standard single point, uncoated, high speed steel bit. They work well as long as you keep them sharp and let the bit do the cutting. Never apply force when drilling a hole. You'll only dull the bit faster and get nowhere.

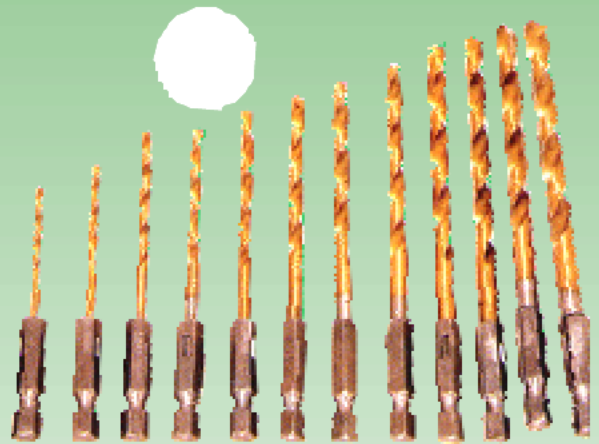


Set of Single Point High Speed Steel

For drilling sheet metal Step Drills work best. They make cleaner holes than standard twist drills and they are less likely to grab thin sheet metal and rip it. Again don't force it, let it do its thing. Large Step Bits are called Knock Out Bits.



A Pair of Step Drills are great for Sheet Metal



The latest in drill bits are the titanium coated twist drills that are mounted in 1/4" quick-change hex shanks. Ideal for hand held battery powered drill motors or a drill press.

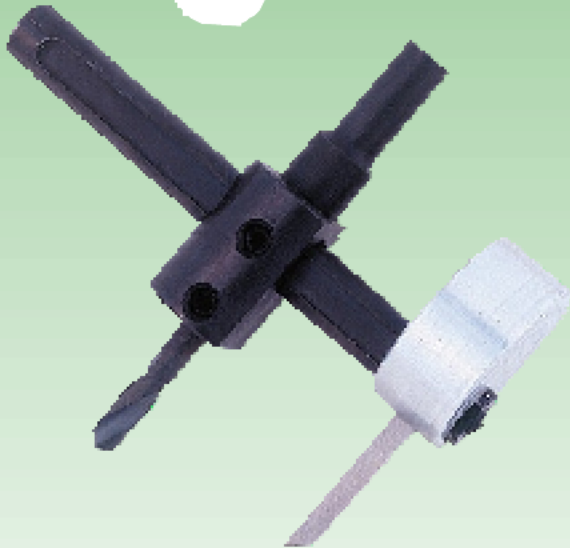


Hole Saws are for making large holes. They usually come in sets but can be purchased separately. Be warned, not all Hole Saws cut metal. A good set like these MATCO or the Craftsman Professional line will. They are designed to operate at 150rpm with plenty of lubrication.

There is another method for making large holes. A special bit called a Fly Cutter has an extendable cutting bar. It can be adjusted to make a hole in very large sizes. Fly Cutters, while being able to be used on a Drill Press, are mainly designed for doing metal work on a Milling Machine.



Another type of specialty bit for making large holes is mistakenly called a Fly Cutter as well. It is actually a Circle Cutter.



A Circle Cutter has an adjustable bar which carries the cutting tip. The cutting tip is reversible so you are able to make inside OR an outside hole. It is NOT intended for use on metal objects.

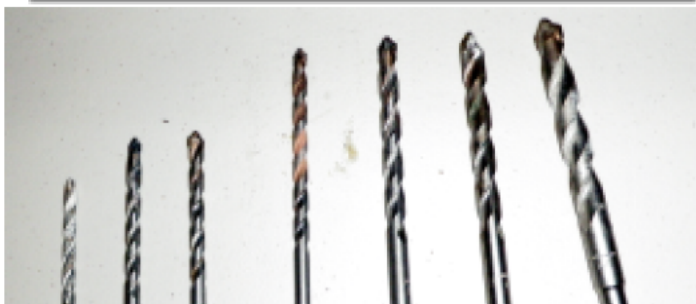
It is designed to operate on a Drill Press. Never ever use a Circle Cutter in a handheld Drill Motor.

In addition to these drill bits presented there are a mired number of other specialty bits which we may not need in the pursuit of our rocket activities.

Paddle Bits used for wood and Masonry bits that have a special carbide tip for boring through rock & cement, both shown below, serve their purpose well.



Above: Wood Paddle Bits • Below: Carbide Masonry



Forstner-style bits can go where no other drill bits dare. The reason is simple: A Forstner bit is rim-guided while other bits are center-point guided. That means you can use all or only part of the bit's diameter to drill overlapped, angled or partial holes. Forstner bits also shine when it comes to drilling clean, precise 90-degree holes and large-diameter holes. Carbide-tipped Forstner-style bits excel at drilling the precise, flat-bottomed holes required for Casting Tube holders. Plus, unlike other drill bits, the rim-guided Forstner bit can drill into end grain without deflection.



Forstner bits do have their drawbacks and are not a substitute for your everyday twist- or brad-point bits. For one thing, they are more expensive: A 1/4-in. Forstner bit costs between \$3 and \$23. They're also designed primarily for use in a drill press, although Forstner bits that are 1 in. or smaller can be used in a hand drill if the bit's center point is firmly engaged. Forstners also require a very slow rpm rate and thus are slow cutting. Finally, they are very difficult to sharpen.



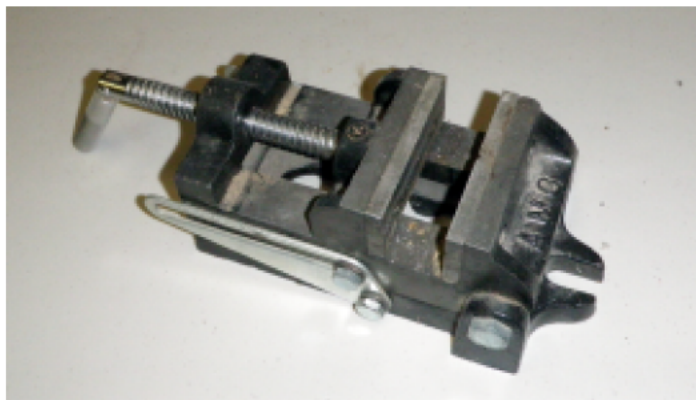
It doesn't end with a Drill Motors and Drill Bits. A set of Drill Stops come in very handy. These are circular "rings" that slide over the Drill Bit. A set screw can secure it for any depth hole you want to drill. Usually Drill Press' have depth gauges built in. Some don't.



Basically there is a simple solution requiring only maskingtape!



This brings us to another Safety Issue. Never hold an object being drilled in you hand. Drill Motor torque can be quite surprising and if the Drill Bit snags you will rip open your hand. Invest in a Drill Press Vise. Even when drilling by hand the vise can be mounted on a table top for safety. The one shown here has an adjustable tilt.



Before you begin drilling you should always make a center mark. This is a dent in the object being drilled to keep the bit tip centered and to make sure your hole is exactly where you need it.

Shown below are three Center Punches. To the left is a spring loaded push punch. Center is a standard you-hit-with-a-hammer model. To the right a long reach center punch. Always use them.



Drilling into metal creates heat - another reason not to hold things in your hand! It is always advisable to lubricate the drilling process. This can be done with simple 30wt motor oil. Other "cutting" oils are available. A particularly good one for aluminum is called A9.




You'll soon end up with a bunch of worn out Drill Bits. It's easy to go out and buy new ones but a cost saving answer is at hand. Invest in a Drill Doctor. This is a machine designed specifically for resharpening Drill Bits.

Below is a standard Drill Doctor with its cam aligning bit holder. Its easy to use and worth every penny if you do a lot of drill work.



Last thing is to get your hands on a Drill Chart. It shows the conversions between inches and mm and really comes in handy figuring out those in between sizes.

DECIMAL EQUIVALENTS		
FRACTIONS	INCHES	MILLIMETERS
1/16	0.0625	1.5875
1/8	0.1250	3.1750
3/16	0.1875	4.7625
1/4	0.2500	6.3500
5/16	0.3125	7.9375
3/8	0.3750	9.5250
7/16	0.4375	11.1125
1/2	0.5000	12.7000
9/16	0.5625	14.2875
5/8	0.6250	15.8750
11/16	0.6875	17.4625
3/4	0.7500	19.0500
7/8	0.8750	22.2375
1	1.0000	25.4000



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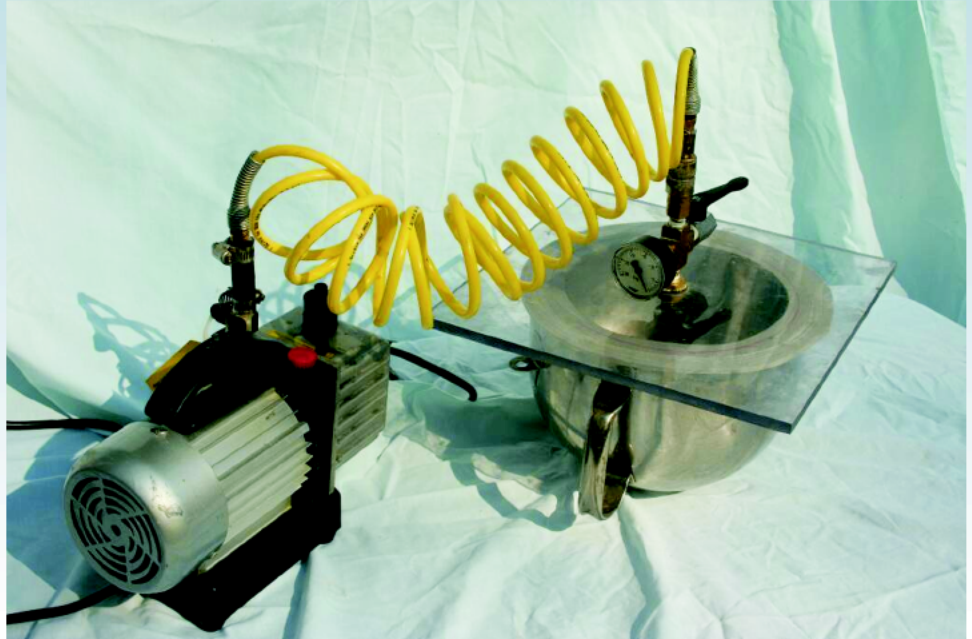
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VACUUM LID FOR MIXING BOWLS

CHRISTINE RIAL

Christine Rial has put together information regarding a standard Vacuum Lid. Below is the McMaster Carr part numbers for the parts that were used in creating this airtight lid. The advantage of this lid is it will let you vacuum propellant right in the mixing bowl.

Use this as a reference in creating your own lid, things like the vacuum gage is optional, but it's nice to have when your trying to trouble shoot your setup. Plus knowing how much vacuum you're pulling might be useful if you are trying to create a vacuum chamber. The quick disconnects are useful in separating the lid from the pump, making it easier to transport, and the valve helps to break the vacuum when the propellant starts to rise too fast. When you order your parts just make sure the parts you get are rated for vacuum. No assembly instructions are needed, just look at the photo.



The following list describes the parts needed to assemble a Vacuum Plate as shown. In most cases a McMaster Carr part number is given in bold however, all of these items can be purchased most anywhere.



VACUUM PUMP
Ebay or Anywhere
At least 2.5 CFM vacuum
to draw 29" of Mercury.



QUICK-DISCONNECTER
6534K16
Make sure you get the correct
M/F fitting there are several
brand styles.



**12 FOOT VACUUM RATED
AIR LINE**
5245K11
The coiling keeps the hose out
of the way.



LEVER VALVE
4912K7
Not required, but it makes life
a lot easier and could save your
plexiglass lid.



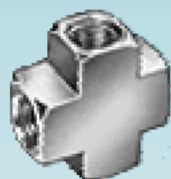
**QUICK-CONNECT HOSE
COUPLER(S)**
1077T11
Make sure you get the correct
M/F fitting.



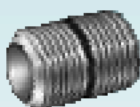
VACUUM GAUGE
3935K11 or 3935K21
Not required, but it is sure
nice to have.



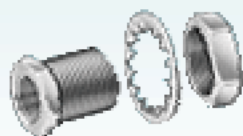
**1/4" to 1/8" PIPE REDUCER
50785K61**
Required to adapt and connect
the vacuum gage.



**4 WAY CONNECTER
50785K233**
1/4" pipe tread sizes.



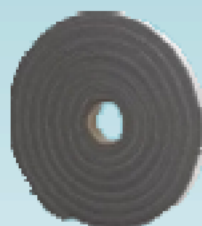
**PIPE NIPPLE
50785K152**
Needed to hook up 4 Way to
bulkhead.



**BULKHEAD PANEL MOUNT
THRU FITTING
50785K273**
You will need an O-Ring to
make it air tight •



**LEXAN POLYCARBONATE
SHEET 12" x 12"
8574K31**
* At least 3/8" thick, anything
thinner will crack under
vacuum.



**OIL RESISTANT
BUNA-N-RUBBER
3/32" x 12" x 12" (not shown)
5727T72**
Gasket for lid to make it air
tight or CLOSED CELL
HIGH DENSITY FOAM
WEATHERSTRIPPING
(shown)
Lowe's Part Number# 66682

Everyone making Propellant should have a Vacuum Lid
such as this. Be very careful when vacuuming as the
propellant will swell up faster than you can imagine.
The Shut-Off valve could be your best friend and save
the Propellant from hitting and ruining the see through
plexiglass.

This set up can also be used to confirm Altimeter
operations. The lower the vacuum the higher the
altitude. Not the greatest but it does work.

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ROCKET CARS

The majority of us "older" rocket people who lived in towns having good size amusement parks, have had the luxury of riding in a big silver rocketship in our youth. These were large shiny multi-seated sleek and streamline Buck Rogers type rockets that hung suspended by cables and whirled us in a continuing circle of fantasy. As young youths we would dream of space and boy what we could do if we had one of these beauties all our own.

New York, LA, Chicago, Pittsburgh, Atlanta and many many other towns all over the country had a ride of this type. One such park was Euclid Beach Park in Cleveland Ohio. The Euclid Beach Rocket, as it was known, was originally built in 1938. There were three rocket ships on the ride. They hung on cables from a 105' tower. People would climb stairs to a 30' high platform where they would board the fantasy ships. Most of these Rocket rides were nearly exactly the same.



In 1969 Euclid Beach Park was razed. In the demolition a local guy saw the stainless steel creations lying in abandon and was able to purchase one of the ships in a desire to capture and preserve part of his youth. Problem was now that I have it, what do I do with it?

Ron Heitman took a dream and did what he likes best, turned it into a car!! A 1973 Oldsmobile Toronado drive train was used to transform the ROCKET into a legal street vehicle, at least legal in Ohio. The original rocket frame was mated to the Toronado sub-frame. The engine is a modified 455 cu.in. Olds with an automatic front

wheel drive transaxle. This conversion gives the ROCKET disc brakes, power steering and a torsion bar suspension with Carrera coil over-shocks. The steering is coupled together using gears and chain from some heavy equipment. The rear axle is a solid tube axle with coil springs and airbags from the rear of the Toronado.

The ROCKET is 28 feet long nose to tail, and covered entirely with polished stainless steel panels. Along with the driver it will seat 10 adults or 15 kids very comfortably. All of the seats are upholstered in heavy red naugahide with seatbelts and automatic lock bars.



To make life even better Ron found another one of the old Euclid Beach rockets and created a second ROCKET! The two are almost indistinguishable going down the road. . . .And we talk about High Power Drag races. Picture two of these babies side by side at 100 MPH!!

To the right both cockpits are shown. While the basics remain the same, chain drive, controls, etc; each has its own character.

Both ROCKETS have been featured in the New York Macy's Thanksgiving Parade for five years. They also seen very often in various Ohio parades and events. It has been used by Goodyear at the Indy 500 Race, Shopping Center openings, Weddings, parties, movies and gatherings were people needed some form of entertainment or transportation.





It has been inspected by the Ohio State Police and is registered and licensed in Ohio as a legal street vehicle. It is highly maneuverable and very smooth riding. It can do 98 MPH in a standing quarter mile in 17.58 seconds. Ron has had the top speed confirmed at 138 MPH! The ROCKET is covered with a one million dollar insurance policy and the passengers are also insured.

The top left photo shows the head-on view of the ROCKET. All stainless steel panels have been removed and repolished. The original side “boosters” have been maintained as steps into the passenger seats.

The rear view shows the rear airbag suspension. All of the original stainless was reused, some requiring major restoration.

The four protrusions sticking up at the front and the rear are the cable mounts from the original ride. Ron decided to keep them on to enhance the Theme Park appearance.

The three lower photos show one of the five passenger compartments that spaciouly hold two people each, with seat belts.

The original safety bars, hand operated by the ride technician in the “old” days, are now hydraulically operated from the driver’s cockpit.

Each compartment also has stereo speaker powered by a really hefty stereo system.



LET'S VISIT ANDY LIMPER

Andy Limper works as a lung physician and heads the division of Pulmonary and Critical Care Medicine at the Mayo Clinic in Rochester, MN. He has been involved in high power rocketry since 1998. He certified level 3 in 2002 on his High Anxiety Project (shown on the right) at LDRS-21 in Amarillo Texas. The project was TAP supervised by Ron Freiheit and Pat Gordzelik. High Anxiety was a 58-pound behemoth boosted on an M1315 to 5,500 feet over the prairie.



54 mm reloads. He is currently casting 54 and 76 mm reloads. These KNO_3 -SB projects were quick, easy, and generally reliable. Indeed, he is looking forward to launching his Hot Dog Shaped OddRoc (Cover Photo) on a KNO_3 -Sorbitol I-220 single use motor at HAMSTER DANCE 2 at BALLS-21. These projects have further enticed him to become seriously interested in research endeavors.

Andy has been a member of Tripoli Southern Minnesota since its founding in 1999, and has participated in its team projects, including the Miss September two-staged P-to-P project that flew successfully at BALL-19 in 2010, and the previous Sky Maven project that flew at LDRS-27. Andy travels annually to BALLS and most years also makes his way out to LDRS along with his rocketry mentors and buds, Ron Freiheit and Richard Hagensick.

Eventually, Andy (as many others before him) has learned that scaling up the KNO_3 -sorbitol motors can be quite a challenge due to the brittleness and weight of this fuel source and its lower Isp compared to ammonium perchlorate. Andy's reluctance to initially adopt formulating his own APCP reloads has not stopped him from burning plenty of other people's fuel preparations. The last several years at BALLS, Andy has boosted his three-inch minimal diameter Magic Carpet Ride on Richard Hagensick's slow moon burning APCP M-650's attaining an altitude of 28,000 feet this past year.

Andy began working in research rocketry approximately six years ago. Despite his background in chemistry, he was a little slow to adopt working with APCP. The reasons were largely related to his professional background. To quote Andy, "To be honest, for a long time I shied away from making APCP formulations, because the di-isocyanates used as curatives can have some pretty significant lung effects including severe hypersensitivity if proper precautions are not taken to prevent inhaling these compounds."

So, Andy began his research rocketry program experimenting with potassium nitrate sorbitol motors, experiencing good success on 38 and

Rocket Storage Area Is Just Outside The Basement Workshop



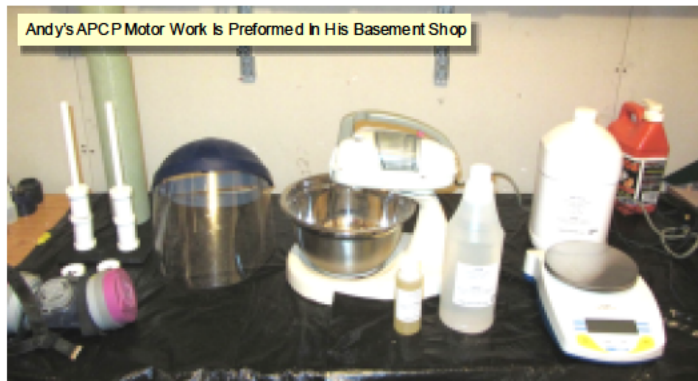
Over the last year, Andy has finally bit the bullet. After reading Terry McCreary's book several times, he bought a fair amount of protective equipment and lab supplies and is now busily making his first batches of APCP. He is currently working on basic and smoky formulations. Hopefully he will have both some APCP and KNO_3 -sorbitol motors to fly at BALLS this year.

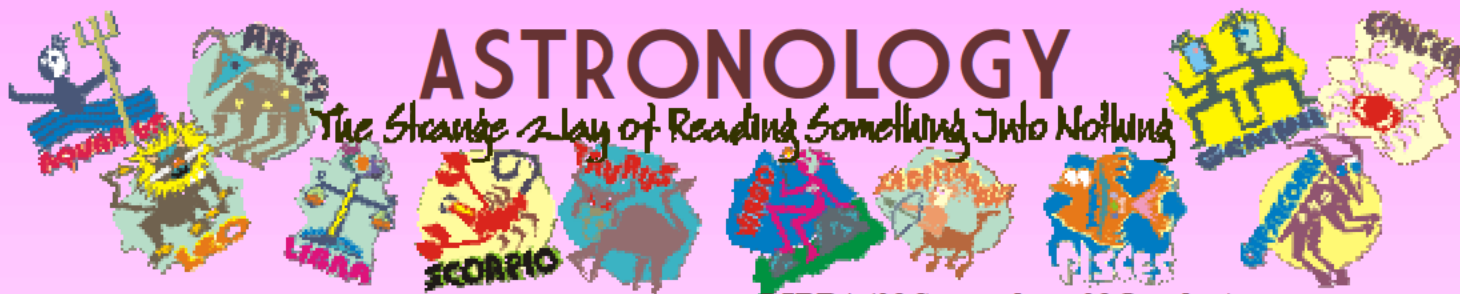
Besides High Power Rocketry, Andy enjoys spending time with his wife and three daughters. He remains a life-long committed booster of the St. Louis Cardinals baseball club, and is an avid fan of musical theater.

Andy's Sugar Motor (KNO_3)s Bench Is Located In His Garage



Andy's APCP Motor Work Is Performed In His Basement Shop





ARIES (21 March - 19 April)

A good month to do something you've never done before. Before the month ends, a strange transformation will take place before your eyes. Something red will cross your path. You won't think much of it until you realize it is a black cat with severe sunburn.

TAURUS (20 April - 20 May)

After much bullheadedness, it is time to take a valium and calm down before you have an emotional breakdown. Clean your ears well after your morning shower so you will be able to hear what is said about you this month. It's time to put that troll doll collection into retirement and make room for the "Raindrop Collection."

GEMINI (21 May - 21 June)

This month will be a time of constant consternation as you continually check your checkbook but find it still won't balance correctly. If you have a notion to make some major purchases this month, check the consumer guide to see if what you want to buy is an actual product.

CANCER (22 June - 22 July)

Once again you are being stalked by the cranky cross-dressing crab from the local army/navy store. GI Joe has nothing on this guy as he goes on maneuvers. You will be best served by staying out of the limelight and setting your sights a little lower this month. A surprise is headed your way so be prepared.

LEO (23 July - 22 August)

Now is the time to revisit some of the new year's resolutions of the past. You know which ones I mean. Don't be argumentative this month - let your fists do your talking. Beware of falling glass, as it could be a real pain for you. Avoid any restaurant that hasn't been in business for at least 5 years. Check for dust bunnies under your bed.

VIRGO (23 August - 22 September)

This could be a stressful month as a power struggle will emerge and you will be one of the combatants. You've been keeping quite a bit bottled up and are due for a power surge. Let sleeping dogs lie unless you want to risk a tetanus shot. Don't step on a crack or you might twist your ankle and fall.

LIBRA (23 September - 23 October)

If you think your life is spinning out of control, you've probably been staring at a front loading washing machine at the Laundromat again. It is time for a little fluff and fold but watch the starch. If your psychiatrist prescribes a happy meal as a way to turn that frown upside down, get a second opinion from Mayor McCheese.

SCORPIO (24 October - 21 November)

Leave nothing to chance this month as you could become the victim of a makeover gone badly wrong on a local talk show. Sign up for a charitable cause and the rewards will be yours for the taking, especially if you don't turn in that donation container. Be careful with the toenail clipper or one of those little piggies will never go to market again.

SAGITTARIUS (22 November - 21 December)

This is a tremendous month for starting a new project, just don't let the sales associate at Home Depot load the supplies in your car. Always remember and never forget to always remember and never forget. For every burned out light on Broadway there is an electrician looking for a new bulb. Don't be one of those bulbs.

AQUARIUS (20 January - 18 February)

If you ever wanted to be self-employed, a serious look at the Hare Khrishners is in order. No experience is necessary but owning a tambourine is a plus. Be careful of drive thru's - they may hold many mysteries that can't be explained nor redeemed with a half price coupon.

PISCES (19 February - 20 March)

If you are a risk taker, then this is a good month to hide under the bed. If you don't hear the doorbell ring then there is probably no one at the door. Have lunch delivered to your house this month and give yourself a well-deserved treat. Call a friend you haven't talked to for while.

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