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NOVEMBER 2014 Vol. 04 No. 06 PUBLISHED EXCLUSIVELY FOR THE MEMBERS OF TRIPOLI GERLACH AND ANYONE ELSE INTERESTED All Content Copyright ©2014 by TRIPOLI GERLACH 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 National Tripoli Members, no matter their location or Certification Level.

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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:

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ON THE COVER

The business end of an O Class rocket. Just one of several projects of this type flown every year at Black Rock.

This one is from member Dave Rose of Tripoli Gerlach and a regular BALLS flyer. MAGAZINE STAFF

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THE EDITOR

Well 2014 is winding down. In most parts of the country leaves are falling and snow is replacing the grass. Our membership renewals are off to a great start thanks to those members renewing at the Annual Meeting in Gerlach. There are still many members coming due January 1st. Reminders will be mailed out this month. Those members not paid by February 1st will definitely be dropped.

Our dues are only \$20 a year and after the Banquet we had this year who on Earth could complain.

We also need to find a way to get all members attending the Annual Meeting and BALLS. What better place to launch than Black Rock.

It is obvious not all members can attend every year, especially those in the Northeast and Southeast of the country - and members outside the continental U.S.

Since we do recognize "home" Prefectures all Gerlach Members should make an effort to get their local members out to Black Rock. Sign them up for Tripoli Gerlach. They don't have to come each year, they don't need to go trekking the desert. Just come; fly rockets and join us for a really good dinner.

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THE GERLACH PROJECT AND OTHER STUFF

Tripoli Gerlach is a unique Prefecture in that no members lives in Gerlach. Even still that doesn't mean we can be part of the town. Several members invited the Gerlach school system out to BALLS to see "the big rockets". Needless to say the kids, the entire student body of 14, enjoyed the trip to the playa. - a few enjoyed playing in the dirt.

Back at school the teachers were deluged with questions about rockets. The teachers were at a stump. The kids had interest in rockets - and dirt.

Members of Tripoli Gerlach offered a project to help the teachers, and the kids, keep the interest alive. In 2015 members of Tripoli Gerlach will conduct a rocket "seminar" for the kids of Gerlach. This would consist of a day of rocket information to get the kids oriented in what rockets are all about.

The same day the kids will begin building their own personal rockets. Perhaps the second day the rockets would be finished and the third day the kids could launch their rockets in the High School Football Field behind the school.

If possible maybe we could arrange to have them launch at the BALLS event. - have to see how our insurance covers.

This project would happen the week before the BALLS 24 event in September of 2015. To accomplish this we will need some volunteers from our membership to assist the kids with information and help in building their rockets and at the launch. Actual dates of the project will be announced once we have the BALLS 24 dates.

To this project Tripoli Member Bob Utley stated his home Prefecture, MDRA, will donate Kits and Motors. He also said *ROCKETS MAGAZINE* would donate Magazines and Videos for the school to make available to the students.

With this great start all we will need is glues and paint, which shouldn't be a problem with our generous membership. The KATE Project proved successful. The Prefecture now owns a Mutitroniocs TelemetryPro_{TM}Tracking Receiver. Eight Members have purchased their own KATE Transmitters, with a few more chomping at the bit.

The membership voted to purchase a second Receiver. This would give us an East Coast Receiver for eastern members and the second would be kept on the West coast for West coast launches.

Dave Rose currently has possession of the East coast Receiver and the Executive Committee has yet to assign the keeper for the West coast unit. Once decided the purchase will be made.

Member Vern Knowles of Multitronics holds open the offer to Gerlach members, who purchase a KATE Transmitter, a \$50 discount.

Vern also stated he would be attending many West coast launches making KATE flights available to all.



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FOURTH ANNUAL MEMBER 3 MEETIN 7 & L JQUET

The Fourth Annual Tripoli Gerlach Members Meeting was held on September 19th in the Gerlach Community Center. In conjunction we also held our first Banquet put on by members of the Prefecture. In the past we relied on Bruno's WayBack Room and catering by Skeekie. It goes without saying the Meeting, Banquet and attendance were a great success.

The dinners started and the line was formed. Once things slowed Secretary Tom Blazanin called the meeting to order in place of the missing Prefect Gary Rosenfield.

First on the agenda was a thank-you to the two people most responsible for the Banquet: Gerald Muex for his generosity and Jeanne Leininger for the afternoon spent preparing a great meal. Plans are already in place for next years Banquet.

A Treasurer's Report was given by Dave Rose which will be sent to member's via our member's E-mail list. Member's Dues are all due by January 1st, 2015. A whole crap load of members renewed but we still have many who didn't attend and are coming due. Our membership is solid and we should go into the new year financially secure.

TRIPOLI GERLACH NEWS was discussed. Articles and photos were requested and members were asked to get involved. It was announced that members having commercial businesses would have free advertising on a space available program beginning with the January

2015 issue.

Nominations for our Executive Committee were called for with, as usual, no responses. Paul Holmes had previously entered his name into the ring and since he was unable to attend this year's meeting he was immediately nominated and elected.

Dave Rose was nearly automatically re-elected as Treasurer and Tom Blazanin wasn't even given time to submit a resignation as he was made Prefecture Secretary again.



Tripoli Gerlach Executive Committee for 2015:

Paul Holmes	Prefect
Tom Blazanin	Secretary
Dave Rose	Treasurer

The results of HAMSTER DANCE IV was announced. The review of this years launch can be found in this issue, though there's not a lot to talk about.

This years winners were:

Best Looking Rocket	Bill Good Sr
Lightest Rocket	Bill Good Sr
Heaviest Rocket	Larry Benek
Highest Altitude	Gary Dickinson

Gary was awarded an engraved wooden plaque as Alpha Hamster of 2014. This was his second time with the title and he'll be back for HAMSTER DANCE V.

The members agreed to hold it on the Playa again due to the fact the original location for 2014 was scrubbeddue to haze from the California fires and winds running 12 to 15 mph.

The KATE project was discussed next. At LDRS in Wisconsin Tom discussed a deal with Vern Knowles, owner of Multitronics and creator of KATE; the talking GPS. The deal was to get at least six Gerlach members to purchased KATE Transmitters and the Prefecture could purchased a Receiver with a \$100 discount. Vern offered a \$50 discount to members of Tripoli Gerlach who would make up the six. We got eight to commit.

We asked for donations from the members toward the purchase the receiver unit. Member's response and generosity was so great we discussed and approved the purchase of a second receiver. One will go to the east coast and the second unit would stay on the west coast.

There was a discussion on LDHB 2016. Several key members had talked about putting on a week long event at Black Rock in 2016. The event would begin on a Monday with LDRS covering three days. Thursday would be HAMSTER DANCE and Friday, Saturday and Sunday would be BALLS. Thus we would hold Large & Dangerous Hamster BALLS !

The attending members voted rather unnanimously for the idea and a committe is being formed to plan and present it formally to the Tripoli BoD for a 2016 approval.

More to come.

The members discussed additional projects. In addition to getting the students from the Gerlach School to attend the BALLS flight line Tom has lined up a project to introduce rocketry to them. In September 2015 Tripoli Gerlach will conduct rocketry classes with the students, supplying them with kits, motors and a launch system.

Bob Utley has already stepped forward donating any number of rocket kits on behalf of *ROCKETS MAGAZINE*. Other suppliers will be approached for donations to cover the program.

Volunteers will be asked to assist, which would require an early arrival for the BALLS event in 2015. Several members already arrive a week early. But we probably could use a few more. We will bring this before the membership in time to make better plans.

We next held the official election of Paul Holmes as Prefect for 2015. Needless to say as before - he won.

Vern Knowles of Multitronics gave a nice and quick run down on the evolution of his TelemetryProTMTracking System, better known to people at KATE. Of all presentions ever given at a rocket oriented meeting Vern holds the record as being the best.



Information was presented with quick, informative and complete statements. No double talk, no aiming above the heads and most of all clear, concise and fast.

In an effort to raise additonal funds for the purchased of the TelemetryProtMTracking System Receiver we created a raffle. The dollars raised at the door for raffle tickets took us far past the necessary funds for the purchase of the Receive. The membership voted to purchase a second receiver.

Tripoli Gerlach will have a dedicated TelemetryProTMTracking System receiver on both the East and West Coasts for launches attended by Tripoli Gerlach members owning KATE Transmitters.Great thanks to those people and manufacturers who donated AeroTech RouseTech Graphix & Stuff Deb Koloms Dave & Tom

The raffle concluded the meeting for 2014 and it was brought to a close with the date for the next meeting set for the Friday evening of BALLS 2015. Look out for another great free meal !!

With the meeting officially closed Vern stayed to answer one on one questions from those who purchased their receiver units. A nice way to end the evening.





Let Kate Find Your Rocket

This system features a synthesized voice named Kate that reports the rocket trajectory in real time during the flight based on GPS and accelerometer telemetry data. A GPS locator is also built into the receiver and will guide the user directly to the landing site. An easy to use software program automatically generates a flight summary report, data plots, Excel file and Google Earth trajectory for the flight.



TelemetryPro[™] Receiver

The receiver is a battery operated handheld unit that can receive telemetry data from the transmitter inside the rocket and also send commands to it. The receiver has an internal GPS that allows it to determine the location of the rocket with respect to itself. During flight, a synthesized female voice (Kate) gives updates as to altitude, velocity, distance, bearing, descent rate, ground speed, direction, drift rate and so on. After the flight, the receiver can also guide the user to the landing site to recover the rocket. No need to transfer GPS coordinates to some other GPS navigation device. It is all built in. This is a fully integrated system and very easy to use.





The Rouse-Tech fin can assembly is designed to be light weight, extremely strong, easily installed and is attached directly to your airframe tubing with epoxy. This fin can design has the ability to be installed in either a three or four fin configuration.

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* Apologies to all as all known photos of our 2014 Flyers were lost in "transit"

The Tannal WEENIEX Launch

California fires took their toll on HAMSTER DANCE IV. September 19th found a Black Rock Playa hazed and overcast with winds between 12 & 15 mph.

After assisting AHPRA set up the range for BALLS we evaluated the situation and decided to scrub the September 19th launch date. We would conduct HAMSTER DANCE IV launches during the BALLS event the following day, provided the haze from the fires cleared.

September 20th found clear skies and good flying weather. The BALLS event began and the HAMSTER DANCE Flyers did their things between the much larger activities of BALLS.

Needless to say the Dancers were over shadowed by the rockets of BALLS and not all flyers got off. Several had larger projects to work with.

Unfortunately photos for the HAMSTER DANCE activities were lost in transit so no real record of the

"launch" can be shown. We did however keep tabs on the flite cards and all results were recorded.

HAMSTER DANCE IV had 11 Flyers registered:

Dave Rose
Bill Good Sr
Andy Limper
Rich Hagensick

Larry Benek Ken Finwall Ron Freiheit Deb Koloms Bill Good David Wilkins Gary Dickinson

With HAMSTER DANCE Flight Cards turned in during the BALLS launch we came up with four award recipents:

> ALPHA HAMSTER 2014 (9,574ft) Gary Dickinson



TRIPOLI GERLACH NEWS

NOVEMBER 2014

THE GOLD MINE

Those who spend the nights out on the Black Rock Playa often look to the far East and the lights of the town of Sulphur.

The actual town of Sulphur is long gone. The lights observed are those of a 24 hour gold mining operation owned and run by Hycroft Mines.

The Hycroft gold mine is located in the Sulfur Mining district, 54 miles west of Winnemucca in Humboldt County, Nevada. The mine encompasses approximately 61,389 acres, including both patented and unpatented claims. While in production under previous owners (1987-1998), Hycroft produced over one million ounces of gold using an open pit heap leaching process.



What you never get to see is the many open pits that swallow up gigantic trucks and machenery. Below is one of the many giant earth movers constantly on the go.



Hycroft operates twenty-four hours a day, seven days a week. Currently, open pit mining of the Brimstone and Cut-5 heap leach mineralization is by simple drill, blast and truck haulage of ore to the north heap leach pad complex. Lower grade ore is placed as run-of-mine ore and higher grade ore will be crushed using large threestage crushing plant. Current performance of the heap leach pad shows run-of-mine recoveries of 56.6% for gold and 12% for silver. Metallurgical testing suggests crushing approximately 32% of the oxide material will improve overall recoveries to an average of 62% for gold and 16% for silver, though this may vary slightly depending on the type of material crushed. Solution from the heap leach pad is processed through the current 5,000 gpm capacity Merrill-Crowe plant and 6,500 gpm capacity carbon-in-column circuit. A 21,500 gpm capacity Merrill Crowe circuit will be operational in late 2013, allowing for all solution to be processed through that plant. The metals are further processed in the refinery to create doré bars, which are sold.



The Company has been increasing the mining rate over the last two years with the addition of larger scale mining equipment including Komatsu 320-ton haul trucks and Hitachi EX5500 shovels. In 2013, two wire rope shovels were brought into operation, one of which has double the bucket capacity of an EX5500.



Gold and silver sales at Hycroft are expected to increase in 2013 to approximately 180,000 to 200,000 ounces of gold and 0.9 million to 1.1 million ounces of silver.

In the immediate Sulphur area there are two sites of interest other than the Gold Mining operations. First is the actual town of Sulphur. The town has been long abandoned when all of the rights where bought out by the big-time corporation.

Today the town of Sulphur is an area of wooden remains of rotting and flattened buildings along the passing rail road tracks.



10% of the rest are holes in the ground



In addition to flattened buildings are several open cold cellars. Places were they kept meat and food cold during the hot Black Rock Summers.

Long gone yet easier to find than one would imagine. Bottle collectors will find stuff if they look. Rock

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TRIPOLI GERLACH NEWS

NOVEMBER 2014

Pulpit Rock, different anyway you look at it.

colletors will find nice sulphur rocks and crystals.

All of this is easily found if you really look. And without really looking you'll see Pulpit Rock. A large rock formation almost like Sulphur's Light House. It stands at the northern bend of Jungo Rd marking the road's turn east to Winnemucca.

Vehicles can be driven up to its base but it's hiking after

that. Good climbers could probably mount its top but it is highly unadvisable. A small hike will reward you with a super view of the Black Rock area, the Western Pacific railroad and if you look; a Geocache.

One of the neat things about Pulpit Rock is it looks entirerly differrent from any point of view as the photos below show. Note the person in the one photo.







CYANOACRYLATE GLUE Good For Gluing Stuff to Stuff, Stuff to Fingers and Fingers to Cheeks

To the hobbyist Cyanacrylate Glue (CA) is quite familiar in brand names such as Super Glue, Crazy Glue, Loctite or Insta-Bond. Cyanoacrylate glue is the general term for the quick-bonding super glues used to mend or combine anything from plastics to wood to metal. Unfortunately for some, this list also tends to include human skin.

Cyanoacrylate glue is actually an acrylic resin, not a traditional adhesive in the mold of water-based school glues. Some crafters or automotive repairmen may be familiar with other acrylic resins such as bondo or the clear liquid used to embed small objects. Usually an acrylic resin consists of two separate liquids, one for pouring into the mold and another used sparingly as a hardener. In the case of cyanoacrylate glue, the hardener is, of all things, water.

The main ingredient in super glue is called cyanoacrylate. If cyanoacrylate glue is placed on a perfectly dry surface or certain plastics, the cyanoacrylate cannot form a bond with the surface. But if there is even the slightest amount of water present, including moisture from the air, the molecules of the glue have a chemical reaction and form into tight chains between the two surfaces being bonded. This reaction happens within seconds of the water and cyanoacrylate making contact. Traditional white glues rely on evaporation to form their bonds, but cyanoacrylate glue generates its own heat for faster curing.

Some users of cyanoacrylate glue may

become frustrated by the occasional lack of bonding between materials. This may be caused by a lack of moisture or the non-porous nature of the materials. Applying a thin layer of water or even breathing on the material may create enough moisture for a stronger bonding reaction. Some materials, such as the heatresistant plastics used in some coffee mugs, cannot be successfully bonded with cyanoacrylate glues. An epoxy resin may be required for repairs not achieved with super glue.

Because human skin is naturally moist, full of ridges and very porous, a user of cyanoacrylate glue may find himself an involuntary participant in the bonding process. It is not unusual for super glue users to bond their fingertips together or become stuck to the project. While the effects may seem permanent at the time, most cyanoacrylate glue products can be dissolved with acetone (nail polish remover) or even hot water. There are also commercial super glue removers available from leading cyanoacrylate

glue manufacturers. Any residue should wear off naturally as body oils break down the bonds.

Although accidental skin bonding may be an unfortunate event, there are several medical procedures which use this property of cyanoacrylate glue to their advantage. Instead of the commercial super glue formulas, medical cyanoacrylate glue uses a safer form of alcohol to promote healing and reduce infection. Instead of traditional stitches, some blood vessels and incised tissues are sutured back together with medical super glue. The glue is eventually broken down by the body and the patient has a lower chance of post-op infection. Midwives have also been known to use cyanoacrylate glue to repair any torn skin following childbirth.

Even though Super Glue is incredibly strong, it has one weakness: acetone.

Acetone is often found in household nail polish remover, and a small amount on the end of a Q-tip or cotton swab applied directly to the glue should dissolve the bond without damaging the skin. Be very cautious in gently peeling the skin apart as in removing a bandage from the skin; pulling the skin apart may rip the skin! Read the label to make sure that the remover actually contains acetone,

REACTION WITH COTTON

Applying cyanoacrylate to materials made of cotton or wool (such as cotton swabs, cotton balls, and certain yarns or fabrics) results in a powerful, rapid exothermic reaction. The heat released may cause serious burns, ignite the cotton product, or release irritating white smoke. Material Safety Data Sheets for cyanoacrylate instruct users not to wear cotton or wool clothing, especially cotton gloves, when applying or handling cyanoacrylates.

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We've all had mandrels get stuck in propellant. Sometimes even with the best prepping with release agents they seem to stick and we find ourselves using a rubber mallet to get the pesky ones loose.

You could machine your mandrels to have a tapered end, but that's really not a good way to get easy release.

A simple jig will do the job. Along with a Snap Ring Motor Case like a Kosdon or a Loik, appropriate for the diameter of the grain you are working.

Study the diagram and you'll see how simply tightening the top nut will draw the mandrel upward and out of the propellant. Once the mandrel releases it will just about fall out by itself.

The hardest part is you must drill and tap a hole in the mandrel itself. It's not really hard if you have a drill press and a 1/4'20 tap.

ITEMS NEEDED:

- •76mm case
- 76mm nozzle washer
- 76mm snap ring

• 2" schedule 40 PVC pipe (actual OD 2.375)- about 1" long or 2"schedule 40 coupler (actual OD 2.719)about 1" long

•1/4" or 5/16" all thread (depending on mandrel thread)- at least 3" long or at least 3" long full threaded bolt w/ head cut off.

- Nut to fit the all thread.
- •Washer to fit bolt

•3" OD fender washer or thick birch ply to cover PVC pipe, or strip of thick steel to cover PVC.

WHAT TO DO

Install snap ring and nozzle washer.

Install 2" fender washer or optional homemade backup disc. Not necessary, but prevents the grain from cracking.



The Disc center is opened for mandrel and disc OD to cover nozzle washer. Doesn't have to be perfectly round.

Screw in the all thread, or cut off bolt. into the mandrel bottom, screw into mandrel until it stops.

Insert grain w/ mandrel at bottom, into case.

insert the PVC pipe or coupler. Coupler is less expensive.

place the 3" fender washer on top of PVC. If the large washer is hard to find. Make out of thick plywood instead. It can be square or otherwise. Enough to cover PVC. Hole in plywood for all thread, or strip of thick steel washer for screw.

Tighten nut for extraction.

The mandrel should pop out the first 1/8" or -1/4" of extraction.

If its still hard to turn the nut, more than likely grain adhered to mandrel somewhere, probably because of poor release application.



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TRIPOLI GERLACH NEWS

LAUNCHING EQUIPMENT CARE & MAINTENANCE CHRIS PEARSON

One of the best things about going to a launch sponsored by another club or organization is that you don't have to drag your own equipment to the launch field, only your rockets and motors. The down side associated with this is the headaches that come with equipment that has been poorly maintained or totally neglected. We all had it happen. Malfunctioning launching systems, corroded, broken or missing electrical lead clips, burned wires, rusty launch rods, dirty rails, pads that won't pivot, missing rod/rail stops, dead batteries ... etc, etc.

It is easy to invest many thousands of dollars in equipping a launch range, depending of the number of pads and sophistication of the electrical launch system. That isn't even taking into account the range sound system, tents, tables, all the other support equipment and the trailer to carry it around in! I'm not going to get into where a club gets the funds for such equipment; however, if you want a decent launch system, you've got to spend some serious money for acquisition and support, even if it comes in the way of donations from members or out of the pockets of the club founders or officers.

If you've spent all this money on the range support hardware, it only makes sense that you spend a little bit of time and effort maintaining your equipment investment properly. You owe this to your fellow club members and anyone else that has traveled to fly at your launch.

I know that the last thing that you want to do after a launch is clean range equipment. Unfortunately, many times the range equipment isn't thought of again until you open the trailer on the first day of the next launch or the start of the next season and by then, the damage is done.

Each club should designate a person or persons to take

care of the range equipment, an "equipment guru" so to speak. This doesn't have to be any of the people running the launches or club officers, as it's easy to get overloaded with club responsibilities. Many clubs have equipment cleaning parties a couple of weeks after the launch season ends or before the new one begins.

What follows is a listing of the equipment used on the launch field and what can be done to service and maintain your range hardware either between launches or year to year. In doing so, you insure a smoother running launch with a minimum of technical problems caused by equipment breakdown.



BATTERIES – Your launch isn't going to happen if you don't take care of your range batteries. The size and amp-hour capacity of the battery will determine its usability on the range. Many people use small tractor or

motorcycle batteries for their launchers, as buying full size car batteries can be an expensive proposition. Even a quality tractor battery will cost \$50. It doesn't matter if you use traditional flooded or AGM batteries. Unless you have a battery



powered PA, you're going to be flying monster clusters, or powering a large number of pads, it's usually not worth getting full-size car batteries.

Rechargeable NiCad batteries are usually not a good choice for range batteries. But if you want to go in that direction, Li-Ion batteries would be a better, if more expensive choice. They charge faster, have a higher output and don't develop "memory" like NiCad's will. Whatever battery you use, the last thing you want is to have it die half-way through the launch. Making sure that whatever battery you use is fully charged is very important.





Multiple station trickle chargers are available that will keep your batteries conditioned and at peak power while prevent sulfation during the lulls in the launching season. Many keep

their batteries charging indoors during long periods of non-use. A warm battery will work better the day of the launch than one that has cold-soaked in the trailer all winter. However, lead acid batteries actually discharge <u>less</u> when kept cold. So leaving them in a cold garage, hooked up to a charger, will not damage them. Always have a spare battery available to replace one that might unexpectedly die during the course of a launch. At big launches where large numbers of rockets are flown every day, it's a good idea to put the batteries on the charger overnight between launch days so it is up to peak power the next day.

LAUNCH SYSTEMS – The launch leads and igniter clips will take great abuse during a launch season. Sparky motors seem to cause more damage to launch pad components than any other type. Because of this reason and the fire hazard, many clubs or launches have



leads wires are damaged, trim them back if possible, or replace them. Replace or wire brush the igniter clips and battery leads and spray with WD-40. Clean all launcher cables with a rag soaked with soapy water. Clean any electronics boxes including the controller.







Do a functions check of the whole system including PA before the next launching season to eliminate any potential problems on the first spring launch day. Now is the time to plan and work on any repairs, changes or additions to your system, and not when the trailer is buried in snow and the equipment inaccessible.



LAUNCH PADS – These are probably the most expensive single part of your launching system. If vou've built them yourself or purchased commercial ones, they will still probably have cost you hundreds of dollars per pad. Most people paint them with conventional spray enamel, but this offers little protection from rocketry related wear and tear. Enamel will wear, chip or burn off in a couple of seasons, the pad will rust and then you are faced with repainting them. If possible, have your pad components powder painted when purchased or at the first repainting. It's more expensive, as the pieces need to be sand blasted before painting, but the end result is worth it. Powder paint is almost indestructible compared to conventional paint. Spray epoxy or polyurethane is a good choice too. Regardless of the finish, the pads need to be cleaned at the end of the season (or more often if needed) and sprayed with WD-40. Wire brush all exposed threaded surfaces if corroded and grease. If possible, have the pads made with stainless steel fasteners or replace them with stainless when repainted.

LAUNCH RODS – These take a lot of abuse but are the most frequently ignored part of the launching system. If at all possible, use stainless steel rods and rod standoff hardware. They are more expensive than conventional steel but will eliminate the problem of corrosion and you won't be replacing them every year. I've seen steel launch rods so rusty that launch lugs would not slide over them. You still need to keep them clean and at the end of the season scrub them with steel wool and coat with WD-40. Regular steel hardware will need to be cleaned with steel wool and oiled after each launch. Soaking in hot water and wire brushing clean can clean the rod stand-offs. Check the straightness of the rods after each season. Replace if damaged or bent beyond the ability to straighten them.

LAUNCH RAILS - Since they are made of aluminum, many people think they are maintenance free. Wrong! They still need to be kept clean or the corrosive nature of composite rocket exhaust will eat through the protective coating on the rails and damage them. Clean them after each launch either with a hose or with a rag soaked with soapy water. At the end of the season, hose them down and then use a 3M Scrunge pad and soapy water to clean, dry and then spray with WD-40. The same goes for the rail supports. Even with this level of preventative maintenance, rails should be replaced every few years of normal use or sooner if they become damaged.

• Try to use one-piece rails to eliminate connectors and all the problems associated with them. Both 1" and 1.5" rail sizes are available in 6, 8, and 10-foot lengths, so if it is possible to store and transport the longer lengths, use them instead of two short lengths coupled together.

RAIL STOPS - There are better ways to keep your 25-

pound rocket off the d e f l e c t o r than using a s o d a can, stick or rock. Rail stops



are usually non-existent at most of the launches I go to, so I wind up using my own. Make sure that all rails have some sort of method to prevent the rocket from sliding off the bottom of the rail, or allowing the motor nozzle to touch the deflector. Even an F motor can blow torch through a thick steel deflector in a fraction of a second if the rocket is prevented from leaving the pad. And since one stop height won't fit all rockets, have tools available at the pads to move the stops up or down. These stops might have to be replaced each year, but they aren't that expensive. **BLAST DEFLECTORS** – Easily the most heavily damaged and abused component of the launching system. If you are using steel deflectors, you'll need to clean and oil them after each launch or they will be completely corroded by the end of the season. Stainless steel ones require less care, but if you're using regular steel ones you can coat them with



barbecue paint for more pro-tection. You'll still need to clean them after each launch



though, and sandblast or wire brush and repaint them at the end of the season.



HYBRID SUPPORT- The GSE required for flying hybrids is much more complex compared to flying conventional composite motor powered rockets. Depending on what system you use, Hypertek or monotube, you'll need to maintain the tanks, valves, hoses and assorted other hardware needed to fly these. It might be good to have someone in your club who flies hybrids take care of the GSE for this reason. Making sure the nitrous and O2 (if needed) tanks are kept filled during the flying season and before the new season starts is important. Watch for leaks on the valve stem of the nitrous bottle Make sure you've got all the hoses and fittings necessary for monotubes, and igniter wire for Hypertek hybrids. Make sure the fill stems are in good shape, as they can become easily damaged in routine flying. Clean them after every launch and replace the fill stems if necessary after the season is over. Many clubs have abandoned flying hybrids and disposed of their GSE because of the steep learning curve, GSE cost and large amount of equipment and set-up time required for hybrid flying. Because of this, it is easy to acquire additional spare or replacement GSE components relatively cheaply. This is advisable if you want to continue flying Hypertek hybrids as Hypertek no longer sells their GSE system.

SOME OTHER THINGS NEEDED ON THE LAUNCH RANGE

TRASH CANS – Believe it or not, this is one of the most neglected items on the launch range. Most launches I go to have no trash cans on the flying field or in the spectator area. Flying rockets generates refuse like used igniter wires and expended single use motor cases so you need someplace to dispose of them, instead of taking them home with you and stinking up the car. Having them saves time after the launch checking the whole range for trash, and if you are like us, and fly on farm fields, the farmer will appreciate you leaving his field clean of trash that won't get plowed into the soil. Those orange Home Depot plastic 5 gallon buckets are good candidates for trash containers at the pads.

LADDERS – Some rockets can get very tall, and once erect on the pad might be taller than a person can reach to activate the on-board electronics. Most launch pads aren't strong enough to support a person's weight, if you could actually climb on them. A 4-foot ladder will usually suffice for all but the tallest rockets, in which case a 6-footer will usually do.

CLEANING SUPPLIES – Your hands can get pretty dirty tearing down the launch system after a launch. Having a number of cleaning supplies handy is a good idea and will keep the inside of your car and your clothes much cleaner. An abrasive waterless hand cleaner like GoJo, shop rags, paper towels, a degreaser like Zep Fast 505, a hand brush and some Wet Wipes are usually enough for the dirtiest hands. A gallon container of water can be kept in the trailer for washing. Or, if you have one, you can use a water fire extinguisher for rinsing.



HERMANN JULIUS OBERTH

Hermann Julius Oberth, born June 25, 1894 in the Transylvanian town of Hermannstadt, is, along with the Russian Konstantin Tsiolkovsky and the American Robert Goddard, one of the three founding fathers of rocketry and modern astronautics. Interestingly, although these three pioneers arrived at many of the same conclusions about the possibility of a rocket escaping the earth's gravitational pull, they seem to have done so without any knowledge of each other's work.

Oberth's interest in rocketry was sparked at the age of 11. His mother gave him a copy of Jules Verne's From The Earth To The Moon, a book

which he later recalled he read "at least five or six times and, finally, knew by heart." It was a young Oberth, then, that discovered that many of Verne's calculations were not simply fiction, and that the very notion of interplanetary travel was not as fantastic as had been assumed by the scientific community.

By the age of 14 Oberth had already envisioned a "recoil rocket" that could propel itself through space by expelling exhaust gases (from a liquid fuel) from its base.

He had no resources with which to test his model, but continued to develop his theories, all the while teaching himself, from various books, the mathematics that he knew he'd need if he was to ever challenge gravity's dominion.

Oberth realized that the higher the ratio between propellant and rocket mass the faster his rocket would be able to travel. Problem: as the rocket expends fuel, its mass (not including fuel) remains the same, in essence becoming heavier and heavier in relation to the engine's ability to provide thrust. Solution: stages. Hermann Oberth reasoned that as one section of the rocket cylinder becomes expended, and therefore also becomes dead weight, why not just get rid of it? This idea is especially important, in light of the fact that in space, velocity is additive. Oberth wrote, "the requirements for stages developed out of these formulas.



If there is a small rocket on top of a big one, and if the big one is jettisoned and the small one is ignited, then their speeds are added."

In 1912 Hermann Oberth enrolled in the University of Munich to study medicine. His scholarly pursuits, however, were interrupted by the First World War. In an indirect way, Hermann Oberth's participation in the war, mostly with the medical unit , was, in some ways, fortunate for the future of rocketry. Hermann Oberth stated it best when he wrote that one of the most important things he learned in his years as an enlisted medic, was that he "did not want to be a doctor". When the war was over,

Professor Oberth returned to the University of Munich, but this time to study Physics with several of the most notable scientists of the time.

In 1922 Oberth's doctoral thesis on rocketry was rejected. He later described his reaction: "I refrained from writing another one, thinking to myself: Never mind, I will prove that I am able to become a greater scientist than some of you, even without the title of doctor." He continued: "In the United States, I am often addressed as a doctor. I should like to point out, however, that I am not such and



shall never think of becoming one." And on education he had this to say: "Our educational system is like an automobile which has strong rear lights, brightly illuminating the past. But looking forward things are barely discernible."

In 1923, the year after the rejection of his dissertation, he published the 92 page Die Rakete zu den Planetenraumen (The Rocket into Planetary Space). This was followed by a longer version (429 pages) in 1929, which was internationally celebrated as a work of tremendous scientific importance. That same year, he lost the sight in his left eye in an experiment while working as a technical advisor to German director Fritz Lang on his film, "Girl in the Moon."

In the thirties Oberth took on a young assistant who would later become one of the leading scientists in rocketry research for the German and then the United States governments; his name was Werhner von Braun. They worked together again during the Second World



War, developing the V2 rocket, the "vengeance weapon" for the German Army, and again after the war, in the United States at the U.S. Army's Ballistic Missile Agency in Huntsville, Alabama. However, three years later Professor Oberth retired and returned to Germany.

That Hermann Oberth is one of the three founding fathers of rocketry and modern astronautics is indisputable. That all three have advanced the science of rocketry is also indisputable - Professor Oberth, though, possessed a vision that set him apart, even from these great men. In 1923 he wrote in the final chapter of Die Rakete zu den Planetenraumen (The Rocket into Planetary Space), "The rockets... can be built so powerfully that they could be capable of carrying a man aloft." In 1923, then, he became the first to prove that rockets could put a man into space.

By all accounts Hermann Oberth was a humble man (especially considering his achievements) who had, in his own words, simple goals. He outlined them in the last paragraph of his 1957 book *Man into S p a c e*: "To m a k e available for life every place where life is possible. To m a k e inhabitable all worlds as yet uninhabitable, and all life purposeful."



Hermann Julius Oberth

died in a Nuremberg hospital in West Germany on December 29, 1989 at the age of 95.



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AND IT JUST KEEPS COMING! MISS CHERIOBLE 2014





Every kid today wants to be Batman, Supermam or Spider-Man. Personally, I blame the parents. If parents were better at parenting, kids wouldn't want to be orphans.

STATISTICS ABOUT STATISTICS



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