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earthrise

The Canadian Association of Rocketry Newsletter

A Word From the Big Chair

Well here it is the long awaited and much anticipated next issue of Earthrise. The first thing that will catch your eye is the color. We all have to thank Anthony Cesaroni and CTI for the opportunity to produce this issue in color.

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As most of you know, this issue was to contain ballots for this year's election, but because we only have one person running for each position, there is no need for ballots. In the position of National Chairman, Mr. Dave Ross takes over from me (Vincent Chichak). In the position of Vice Chairman will be Max Baines, filling a position that has been vacant for nearly 2 years. In Manitoba Dwayne Wiebe steps down as director and Rex Lee takes over. Allen Upward takes over as area director from David Wakarchuk in B.C. These new people start their 2-year terms January 1, 2001 with the next elections in December 2002. The new executive of C.A.R. will continue working on projects started by their predecessors and incorporate new projects into C.A.R. One of these new projects will be the creation of a new position to promote competition meets in model rocketry so that C.A.R. can get back to their roots in rocketry and promote rocketry for youth.

There has been a lot of work done in 2000 in an effort to put on CARNAT 2001. If the funding we seek comes through you will see an event on a scale never seen before in Canada. News on this will be presented as it comes available.

(see Big Chair on page 4)



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We're on the Web
at

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Vince at the Lethbridge Air Show, Canada's first Air Show High Power Demonstration.

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The Lethbridge Air Show High-Power Demonstration

Max Baines

August 5 & 6, 2000

A casual comment about our hobby by Lorna, my wife, to one of our customers soon turned into a very exciting and unique opportunity to showcase High Power Rocketry. It turned out that our customer's son is President of the Alberta Air Show, and as this was the Air Show's 10th Anniversary, they were looking for something new and different to compliment their more traditional performances. Soon a meeting was arranged with the Air Boss, and questions included:

Q Can it be done?

A Well, yes, I think so.

Q Can you control these things?

A Well, not once they're in the air, but you can angle the launch rods so they fly down-range and away from the crowd.

I had attended the air show several times, and I knew that the crowd was located north of the runway. The worst case scenario would be either a South or North wind, and here in Chinook Country, Alberta, we just plain don't get South or North winds in August. Over 300 days a year our wind is from the West, so I thought this to be a pretty safe bet.

We left off that if a sponsor could be found to underwrite the event, that they would get back to me. Little did I know this would only take a few days, and suddenly it was becoming reality.

(see Lethbridge on page 4)

Sullivan Lake 8

Garth Illerbrun

September 23 & 24, 2000

The Eighth Annual Sullivan Lake High Power/Model Rocket Meet proved to be the most relaxed meet in the series to date. Due to a major number of personal commitments conflicting with the timing of the meet, many of the normal attendees were missing over the weekend. This led to very relaxed waits at the check in table, and a great deal of time to wander about and visit with those participants who did attend.

With a blanket waiver to 18,000 ft, we were sure to be well covered for those high altitude shots planned by a few attendees. Another result of the low attendance was a much greater emphasis on the Model Rocket and Competitive side of our hobby.

Three vendors were also present selling their wares, Brian Fanson and Garth Illerbrun with Suborbital Technologies, distributing the imported Aerotech motors, and sold some of their limited edition Clone Kits. Vince Chichak with Advanced Rocket Technologies, distributed his Giant Leap components, Black Brant Kits, and Dr. Rocket Casings. Vince also demonstrated his new Prometheus kit, an excellent high altitude platform for those electronic and optical payloads. This year Max Baines introduced the Cesaroni Pro 38 motor system, and also was seen selling LOC Precision kits and supplies.

Several members made successful certification flights using a variety of kits and motors. Jo

(see Sullivan Lake on page 16)

... Big Chair

As your Chairman for the past 3 years I would like to thank all those volunteers that have worked with me to accomplish all our goals. Without their efforts, my job would have been infinity more difficult. I have a few words of wisdom to pass on to those who replace us and they are... "Delegate your authority". I learned this one thing early on in the job. In the beginning I tried to do it all by myself and quickly learned that it was impossible. Over the past 3 years, I have come to believe that the job of the Chairman is to be the idea gatherer and to delegate the work to others to get the job done. I am proud to be passing on C.A.R. in good shape to the new executive. In the first year as Chairman I had a lot of work to do in smoothing things out and putting out fires but that is all in the past and we are in good shape for the future. In the past 3 years, I have had good times and bad times as Chairman, but I have been happy to serve C.A.R.. I will continue to work with the new executive to make for a smooth transition.

Thank you for the opportunity you have given me and I hope you are happy with the work I have done for C.A.R.

Vincent E.M. Chichak

... Lethbridge

I draft up a preliminary set of guidelines, wherein I specify that:

- a) The rocket must have flown before in it's current configuration
- b) It must have electronic deployment, either as main or back up or both. In future, I would specify that all rockets have complete redundancy, similar to flying an M project, but given the short time frame to prepare this was not feasible in this case.
- c) The flyers should be either CAR Level 3 or TRA Level 2. Because the air show wanted lots of smoke, noise and excitement, this cried out for large I, J or even K motors.
- d) The last parameter was a ceiling of +5,000 feet. There were 2 reasons for this, first if the crowd loses sight of the rocket, the drama tends to decrease. On the other hand, if the spotters lose sight of it the drama for them (and us) tends to increase. No, overall, best if everyone can see it all the way.

Given this preliminary set of parameters, I then contact Lavina Harding of Transport Canada, explaining all the steps I've taken getting to this point, and requesting a launch Authorization. When dealing with an air show, this takes time, and it was several weeks before all the proper channels had been contacted and approval received. Nothing wrong with this, by the way, just be aware of it.

After (too) many meetings, planning sessions and general discussions, the weekend of the air show finally arrives. The weekend starts on the Thursday morning with a 2 day display to be set up in one of the local malls. My thanks to Tim Rempel, Brad Derzaph, Barry Mackadenski, Joel Mackadenski, Marty Mueller, Bruce Aleman and Kyle and Brad Baines for setting up and taking care of the display. It was almost a shame to have to tear it down, but on

(see Lethbridge on page 5)

... Lethbridge



Friday night it was moved from the mall out to the air show grounds, and totally re-set up in the tent the air show provided us.

Friday was a hectic day. Out at the airport early, meet with the Air Boss and get shown the exact launch area. It is 100 meters from the Audience line, and only 30 meters away from the pyrotechnic line (Mental note–gotta meet with the Pyro crew). At least the Snowbirds are parked a long ways away.

I start setting up the launch pads, and soon Dave Ross and Gary Jennings arrive with more launch pads and the Calgary launch system. It is a busy airport, and from our vantage point just a few hundred feet from the runway, we watch the snowbirds lift off carrying a bunch of press people in the right-hand seat. Lavina Harding arrives, and we start discussing the test flights that are set for 7:00 PM that night. The Snowbirds come back and do a super low-level pass right over our heads, then come in and landed, then park less than 300 feet downwind from our launch pads--Yike!!!



We continue prep work, and then at 3 o'clock we phone F.S.S. to confirm the test flights are still on for 7 o'clock. F.S.S. advises that at 7 pm they are forecasting severe thunderstorms and hail, but they have identified a window in the air traffic and could we have our test flight ready in 5 minutes? I jog (run) back to the tent, stuff a G-40 in the Legacy (once again advance prep work pays off), put it on the pad situated closest to the audience line at about a 10 degree angle, phone F.S.S. for clearance, and 40 seconds later hit the button. A great flight, almost straight up (darn it), and when it lands after perfect deployment it lands on this side of the runway, almost directly in the middle of the pyro area. Under any other circumstances I would have been thrilled.

(see Lethbridge on page 6)

... Lethbridge

Obviously, we need more launch angle on the rods, and let's move all the pads out as close to the runway as possible. 1 hour later, all this is done, and we load up Dave's Aerotech Mustang on a G-125, phone F.S. S. for a window and are advised it will be 40 minutes before the traffic is clear enough to allow another flight. Oh well, at least 2 of the planes we are waiting for are the F-18's, and they do a number of pretty cool passes right over the runway and almost right over top of us. Sometimes waiting isn't so bad after all. Finally we can fire-- press the button and-- Wow, that is one hot motor. It's way up there, but we finally find the chute (about 30 feet off the ground), and it is across the runway and the rocket never came close to arching over the crowd. Perfect.



Saturday morning we meet at the airport at 8 am and continue setting up the last of the launch pads which had arrived from Calgary. This done we attend a safety briefing and arrange for a high power test flight with F.S.S. for 11:10 that morning. Prepping of the 8 rockets for the show, plus the one test flight is in full swing, and there is a definite air of anticipation and nervousness. Today's wind is less than 5 knots, (a good thing) and from the North (not a real good thing). Our test flight shows that despite a bit of wind-cocking, the angle of the rods are enough to keep the rockets downrange.

At 12:30 we take the rockets to the pads and commence arming altimeters and installing igniters. This task almost complete, at 12:50 we have a safety briefing with the pyro crew: wherein we learn that even at 400 feet distance we will feel a large wall of hot air, and our rockets are positioned less than 100 feet distant. Gary asks if this might be enough to trigger the barometric altimeters, and the consensus is: Yes, it might just be. With only 7 minutes before the show starts (with a bang), we disarm all the altimeters, safe the igniters, and phone the Airboss to explain that we will be out on the line re-arming everything during the first 2 aerobatic performances.



By 1:30 everything is re-armed and set, and our ac starts at 1:38. Our turn comes, with Wayne Gallinger assisting with the announcing, and by now the tension is so thick you could cut it with a knife. The first rocket lifts off on what was supposed to be an H-238, but it looks more like a G-75. What a disappointment. But then Vince's LOC Magnum goes off on a J-275, lots of smoke and noise, and even where we were you could hear the buzz from the crowd-- Hey Mikey, they like it! We have 2 rockets fail to fire because of problems with the clips, but the rest go off without a hitch-- straight, true and while 1 rocket arched back a bit closer to the crowd than I wanted, everything went well, and the buzz of excitement from 17,000 people never changed. The last rocket of the day, my own Quantum Leap boosting on a J-275 to an I-161 in the sustainer lifts off, and 1/2 second after lift-off the pyro guys ignite a huge wall of flame and black smoke right behind it. Even though we knew this was coming, we still jumped a foot off the ground. The crowd loved it! High Five's and Beer all around, and we sat back and enjoyed the rest of the show.

Sunday morning arrives, but Garth had to go back to work so we

(see Lethbridge on page 7)

... Lethbridge

are without a non flying RSO. I make the (painful) decision not to fly, and we prep 7 rockets for the show. The wind today is causing us fits--- 13 to 17 knots, switching from the Southwest to North and back again constantly. At the safety briefing we are given the surface winds, and then the winds at 6000 feet, but nothing on wind speed and direction in the critical 1500 to 4500 foot range. Arrangements are made with F. S.S to launch 2 balloons at 11 AM, followed by 2 test flights at 11:10. Despite the winds, the rockets both fly downrange off the most steeply angled rods. We re-adjust all the rods to match these, and then continue to monitor the winds which stayed very close to 25 - 30 KPH the rest of the morning. Way too close for our safety envelope. We decide to make our decision on a go-no go status at 12:50, ten minutes before the start of the show and about 45 minutes before launch time.

Two more weather balloons are released at 12:50, and these show a north-west flow all the way 'til they are out of sight. Better yet, wind speed is dropping to 5 to 10 knots. You would have to live in Lethbridge to appreciate how unusual both these things are. Decision made-- The launch is a go. 10 minutes later Lavina's plane lifts off, and the show is about to commence.

Launch time, and the first rocket suffers a blow-by, does a graceful cartwheel 100 feet in the air, and lands right in the middle of the Pyro area. Not a good start, tho' the crowd loved it and the Air Boss at least finally understood some of what I had been explaining to him about safety distances etc. The next 3 rockets go without a hitch, and Dave Ross's Fat Boy on a K550 really looked and sounded good. Time for Dave Buhler's 2 stage flight-- Great boost, tracking perfectly downrange but then no sustainer ignition. The parachutes deploy, and then finally the I-161 lit. Looks pretty cool dancing around at 1500 feet, and it presents no danger to anyone except itself.

Again, the last flight of the day is a Quantum Leap, this time Eric Weder's, and again a perfect flight and an even larger wall of flame (seems they had some extra stuff to light and figured What the Hey!)

At last we're done, and it is with a real sense of relief and accomplishment. We are congratulated by the Air Bosses, and invited back for next year. Cool!

Personally, I learned so much about safety and planning for this event that it will take some considerable time to fully sink in. However, if I use even 1/2 of what I learned from the Air show in future high power launches, they will be much safer and better than any I have done before.

A special thanks to all who helped, especially the fliers, Gary Jennings, Vince Chichak, Ron Wier, Dave Ross, Dave Buhler, Eric Weder, and Wayne Gallinger, as well as Garth Illerbrun for acting as RSO on Saturday, and Leon and Peggy Kemp for helping with spotting and the booth. A very special thanks to Lavina Harding, who showed me many doors and ways to open them, which helped immensely. Lastly, my own club members, listed elsewhere in this article, for all their help with the myriad details involved in this launch.



Max Baines

Finding a Field

by Tim Van Milligan

Finding and obtaining permission to use a large field to fly model rockets is a labor intensive task. If it was easy, the hobby would probably be twice as big as it currently is.

In this article, I'll try to give you some ideas that may help finding a flying field. I don't guarantee success though... I don't have too much experience in this area. My limited experience is with getting the site for NARAM-2000; and with getting permission from the neighboring property owners. With NARAM, it was simply a matter of asking Mr. Vern Estes if he knew of any property in Cañon City, Colorado. He said he did; and volunteered his own 400 acre parcel of land. That's about as easy as it gets.

Here is the good news. According to promotional literature about rocketry, more than 5 million rocket motors are sold per year. If the average number of flight per person is five, that means there are a million people flying rockets. Extending this logic further; there are a lot of flying locations. You just have to find one of those other million modelers where they're launching.

In the back of my mind, I don't think getting a launch site is the real task. The real problem is that you don't have someone in your club that has access to a piece of land that you can launch from. In effect, getting a launch site is a "recruitment problem" for your club.

Before you put a lot of labor in tracking down a piece of land, why not have a recruitment drive for your club. If you find someone that has access to a good site, it will save you a lot of time and effort.

So, ask your local club members first. They may own land, or have a relative and/or close friends that do. If they don't, then have another recruitment drive. An upcoming issue of this e-zine will give some suggestions on recruiting new members. If you can't wait for it to come out, you can order Apogee Components product number 1024: "Attracting and Retaining New Club Members."

My second suggestion is to ask local community leaders. Have you asked the local 4-H coordinator? Maybe they have a kid in their program that lives on a farm and flies rockets too. There are other community leaders that you should talk to too. They would be organizations like the VFW, Lions, Elks, and Jaycees.

Another thing you might try is to work with a school. Don't underestimate the power of the educational aspects of rocketry. The teacher or principal probably knows a lot about the parents of the students, and may know which ones have vacant land. If the school is willing to act as an intermediary, you could have your next flying field very soon.

However, I think if you enlist the aid of those organizations, you better be prepared to "give back." This may be something as simple as showing up at a pancake breakfast, or something more elaborate.

If you've exhausted those resources, your next step may be to find a piece of land on your own and track down its owner. Before you start driving around, get on your computer and download some aerial photographs of your local county. My favorite photo site is: <http://www.terraserver.com>. Vacant fields show up real easy on aerial or satellite photos. Print these photos out, so you have a hardcopy.

(see Field on page 9)

... Field

I'm sure you'll be able to quickly find a field that might make a good launch range.

Next, you'll need to track down the owner of the land. This will involve going down to the county clerk's office at City Hall. Show him the aerial photos, and compare them to the County Clerk's maps. County clerks do this type of thing all the time, and will know which section map to look on.

Once the property number is known, the county clerk will can get the owner's addresses; because they send out property tax statements to them every year. They usually don't charge for any of this type of service.

A lot of times, the vacant land may be owned by someone out-of-state. It may also be owned by the Government – such as a National Grassland, or managed by the Bureau of Land Management (BLM). If it is owned by the Government, your chances of using it are probably better. It may also be owned by a land developer.

All this was the easy part. The hard part is trying to persuade the owner to let you use his land to fly rockets. This is tricky too. Look at this from the perspective of the land owner:

He probably doesn't know you, nor how responsible a person you are. He doesn't trust you. Plus, even if you promise to clean up after your launch, it is probably that you will somehow mar the land. This could be caused by driving out into the field in your car, or wearing away the grass from excessive foot traffic.

Before you approach the land-owner with your proposal, find out as much about him as possible. Does he have any kids? What school do they go to? What church does he attend? Maybe you know someone at his church that will give you an introduction. It is the "introduction" by the third party that is the most important. If the land-owner trusts this third person, then he'll be more likely to sit and listen to your proposal.

To repeat: the third party "introduction" is the most crucial step in getting permission to use the land-owner's property. Without it, you don't stand a chance. I wouldn't even bother contacting the land-owner if you don't find a mutual friend.

Finding a mutual friend isn't as tough as you think. The first person to talk to is that County Clerk. They are a wealth of information. They know the history of the county, and know people that know other people. Best yet, often times, they are elected officials. This means they have wealthy friends that helped to pay for their election campaign. Who are the wealthy people? The big land-owners! So prod the County Clerk for information. The more the better.

Another friend might be a local Real Estate agent. They probably sold the property to the owner, so they may know a lot of background information about him.

In a small town, you might even chat with the local barber as you get your hair cut. They seem to know everyone in the town, and all the good background information you may need. Just sit back and ask him if he knows anyone in town with a big vacant piece of land that you might launch your rockets. It doesn't hurt to ask.

After you get your introduction, you can make your sales pitch.

(see Field on page 10)

... Field

I would suggest that you approach the land owner by trying to start small. Don't ask right away to fly J and K motors from his field. Instead, tell him you'd like to fly C & D motors. Invite him to come out to a launch at your current site. Don't try to tell me you aren't launching from somewhere... everyone in rocketry has launched from a field "somewhere". I know my fellow rocketeers; we're resourceful people!

An actual launch is a great way to show the landowner what a small rocket does. You'll be demonstrating your safety rules, and how organized the launch is. Then explain to him that you'd like to find a bigger field because you are losing too many rockets that drift away. The owner will be more receptive to small rockets, than to bigger ones. If you are lucky and get to use his land a few times, you may then come back to him and ask permission to launch a few bigger ones. Work gradually. As he gets to know and trust you, he'll allow the bigger models.

In conclusion, finding a flying field is going to take a lot of effort. I don't know if any of these suggestions will help. I suggest you have a "idea" session at your next club meeting. We did something similar at our local club; and we had a ton of suggestions. It may just be a matter of whittling them down one-by-one.

Reprint Information:

Tim Van Milligan is the owner of Apogee Components (<http://www.apogeerockets.com>) and the new rocketry education web site: <http://www.apogeerockets.com/education>. He is also the author of the books: "Model Rocket Design and Construction," "69 Simple Science Fair Projects with Model Rockets: Aeronautics" and publisher of the FREE e-zine newsletter about model rockets. You can subscribe to this e-zine at the Apogee Components web site, or sending any message to: apogeerockets-subscribe@listbot.com This article may be reprinted as long as this paragraph is included with the text.



KEVIN DRAYSON, CAR Atlantic Regional Director, shown here with his NCR Archer, PML Black Brant Vb, and Estes AMRAAM. Kevin has been flying model rockets continuously since the 1970's but his interest recently ascended to new heights when he obtained level 1 certification at Blazing Archer III in 1999. Kevin helped found the Moncton Area Rocket Society (MARS) and has been the Atlantic Regional Director since 1999. He is known for his skillfully finished rockets, one of which (the PML Black Brant Vb shown here) won the "Best Scale Model Award" at Blazing Archer IV.

submitted by Mark Roberts

High Power Rockets and Public Demonstrations

Max Baines

With the successful completion of the recent Lethbridge Airshow, a number of circumstances arose which I thought might be useful for others to consider in the event they are planning similar types of launches. I am also hopeful that the CAR Executive will take at least some of the suggestions put forth in this article and incorporate them into some form of document which will lay out minimum standards acceptable for future public demonstration launches. It is important to stress that this article deals only with large public demonstrations, and does not deal with standard high power launches conducted under the auspices of the current safety codes already in place.

Public Expectation

This is, to me, one of the major defining differences between the two types of launches. When a person attends an airship, for example, the expectation is to be entertained for the day with little or no thought given that you are in any way endangering yourself or your family. There is in most people a vague awareness that airplanes can, and occasionally do, crash: but this is rare and normally dismissed as any kind of real threat. Upon attending a high power launch, normally conducted miles from anywhere, most people have a heightened awareness of the potential of danger, and the numbers are small enough that the call of "heads up" is both heard and also paid attention to.

Be very aware that the term "heads up" has no meaning to a crowd of 17,000 people. First, only a small percentage will even hear the warning. Second, there is no way to identify to a crowd this large just where exactly the imminent danger actually is or how to avoid this danger. Third, you may just cause panic amongst the crowd, which is potentially more dangerous than the rocket itself. Thus, attention to the smallest of safety details is absolutely critical at a public demonstration as very few in attendance will have any recognition of the potential for danger.

Areas of Concern

1. Engine Cato
2. Deployment Failure
3. Staging Failure
4. Airframe Failure

1. Engine Cato

Personal opinion, but to me this is the least dangerous concern. While engine catos can occur in several ways the most common is blow-by. This results in thrust exiting both ends of a motor, and, while this results in severe damage to the rocket itself, normally the rocket will simply cartwheel in the air and fall to the ground very close to the pad. While Cato's are spectacular to watch, by maintaining a minimum distance of 100 meters they should pose little danger.

2. Deployment Failure

This is the single most dangerous consideration. A rocket coming in on a ballistic trajectory at 200 plus miles per hour is a very scary thought. Steps necessary to minimize the potential in this regard include the following:

a) Launch Angle

At the Lethbridge Airshow there was a considerable amount of time and effort spent on determining a launch angle which would carry the rockets away from the crowd and across the runway to a safe location, regardless of wind direction. We fired several

(see Public on page 12)

... Public

model rockets on G motors on the Friday, followed by High Power test flights on each of the Saturday and Sunday mornings prior to the crowds arriving. We settled on an angle of almost 20 degrees, which our tests showed that even with a wind coming from the crowd line direction, the rockets would not weather cock over the crowd. It is very strongly recommended that test flights be conducted prior to the event. Despite this, we had 1 pad which later proved to be about 5 degrees less angle than the rest, and sure enough this rocket arched back almost to the crowd line. Check and re-check every pad!

b) Wind Speed and Direction

On the 2nd day of the Airshow this was causing us a lot of stress. In the morning we had winds of 13 to 17 knots, which was higher than our tests had been conducted at. The wind direction would result in the rockets weather cocking directly over the crowd. With the assistance of the Lethbridge Flight Safety Service (FSS) we launched 4 weather balloons to help determine upper level flows, as the weather briefing provided only surface winds and winds at 6000 feet. The weather balloons helped give us some information of wind speed and direction at 1000 plus feet. Also, FSS is in contact with many other planes in the air, and they can often give advice on wind speed and direction in the 3000 to 5000 foot range. Work with the local FSS and conduct whatever tests you feel are appropriate.

c) Work With Transport Canada Officials

I was fortunate to have Lavina Harding present at the launch, and she helped to arrange a number of the tests outlined above. It is critical to have a meeting with the Airboss, FSS personnel and the Transport Canada official in charge of the event PRIOR TO THE EVENT. Explain the nature of the tests you want to conduct, what role they will play in each of the tests, and the critical importance of the information each test will give. Remember, Transport Canada is the one who has authorized you to fly High Power Rockets at this event, and it is definitely in their best interest to help facilitate any reasonable request if it has a safety aspect. An accident will have as much impact on them as it will on the rocketeers.

The same is true of the Airboss. While he is charged with keeping the event running on time and with minimal delays, he too is charged with ensuring that safety be the paramount concern. Each safety briefing we attended, it was stressed that it is better to not perform at all than to perform when there is a risk of failure.

Both Transport Canada and the Airboss will be on your side when safety is the primary concern.

Our local FSS would identify a 5 or 10 minute window where no aircraft would be in the vicinity. We would prepare our test vehicle, and when it was ready for launch, contact FSS again for final clearance to launch. They would give us an exact time, and the test flight would go. For the record, while most of our flights were 2 minutes 30 seconds from lift-off to landing, a 10 minute window should be considered minimum. Also, before you hit the launch button, check up and down the runways. Shortly before one of our test flights there was an emergency landing occurred where the pilot had lost all electrical components and thus was unable to radio FSS and advise he was in the area.

(see Public on page 13)

... Public

d) Duties of the RSO's

I make this plural, as experience has now shown one person cannot do all that is necessary to ensure a safe launch.

One RSO should be assigned to monitor the preparation of the rockets. For something like this I feel motors should be assembled in a group setting, so that questions can be answered immediately, amount and type of grease used can be checked and the snugness of fittings can have a second opinion, ALL OVERSEEN BY A NON FLYING RSO.

Be absolutely ruthless as regards shock cords etc. Even a small amount of wear or burning should result in the shock cord being replaced. Check for snugness of all joints, and ensure there is no rough spots or over sprayed paint etc. on the coupler surfaces which could result in non deployment. In other words, being on the anal side is definitely a positive.

The RSO should be a part of how large a black powder charge is being used in every instance, so that if necessary calculations can be done to ensure proper deployment.

The other RSO will have their hands full attending safety briefings, obtaining weather information, ensuring the launch system is working properly, placing sandbags or other restraining devices on the launch pad legs (remember-- Our rockets were leaning at 20 degrees with the wind at their back), coordinating the placement of the spotters to be used for recovery, staying in contact with FSS and the Airboss, and a hundred other small details.

There is simply too much at stake to risk an avoidable accident, and too many details to be done by only 1 person.

Unlike a regular launch where activities occur at a leisurely pace throughout the day, our demonstration had a precise start time, and we had only 12 minutes to fire 8 rockets. There is no time to fix a small problem between launches-- all small problems have to be identified before the first rocket goes.

e) The Rockets

When I was first asked to do this launch, I made the decision that one of the requirements would be that the rocket must have flown successfully at least once before in it's current configuration. I believe this still to be a valid pre-requisite. However, while I specified that electronics must be employed, I did not require that all systems be redundant. We have the technology to significantly improve the chances of successful deployment. These are found in Tripoli's Level 3 and CAR level 4 requirements REDUNDANCY.

I would strongly recommend that all rockets used in public demonstrations be equipped with fully redundant deployment systems. It may be argued that the expense involved in redundancy is high and would eliminate many otherwise qualified rocketeers. My response is two-fold:

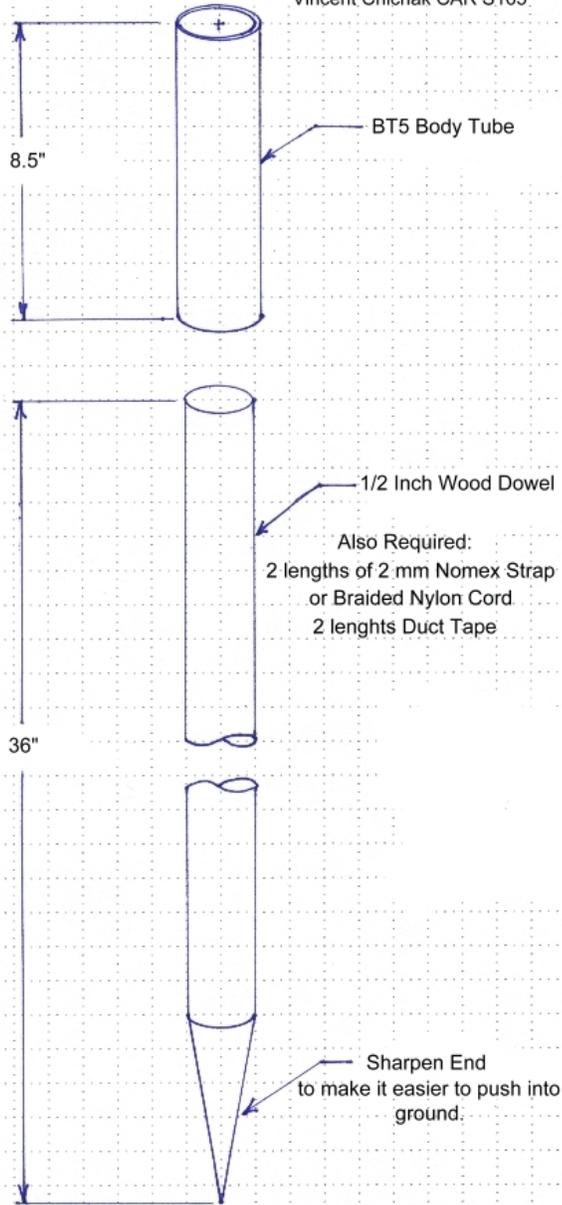
What is the price a human life?

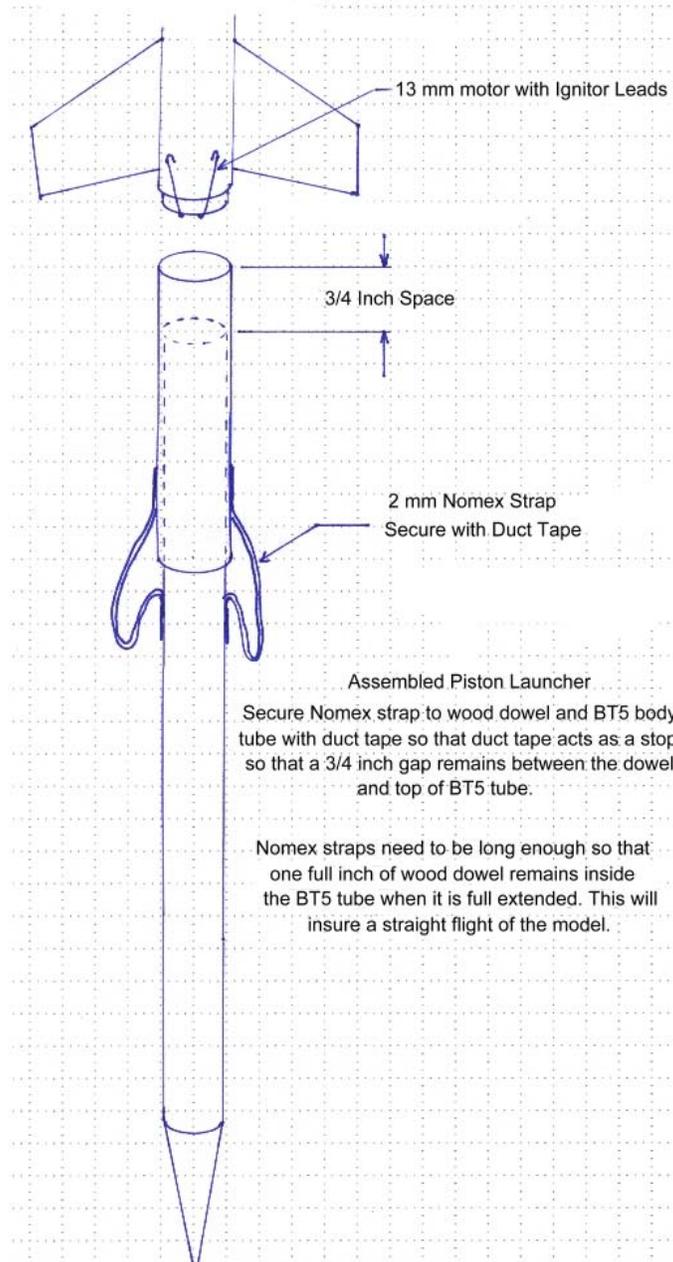
Most air shows or other large format demo's also have large format budgets. The costs associated with redundant deployment can be amortized out over the long run with appropriate launch fees being used to supply the equipment.

(see Public on page 16)

Cheap and Easy Piston Launcher

Vincent Chichak CAR S165





... Public

Similarly, shock cords can, and should, be only the best type available. Nylon strapping or kevlar are not only extremely strong, but are also not prone to the burn through of elastic type shock cords. These are not certification flights, and thus a small zipper in the body tube is a small price to pay for the increased safety provided.

I would also recommend that the rockets be equipped with dual deployment, firing either a streamer or small drogue at the top and then the main chute lower down. I was very surprised to see just how small a landing area was available at the Airshow, and it would have been better to reduce wind drift as much as possible. I would have to concede there are several designs where this is impractical, but it would be nice.

3. Staging Failures

We fired a total of 3, 2 stage rockets. Two of the flights were perfect, while the third suffered a very late ignition of the 2nd stage. Post flight analysis revealed the G-switch activated timer likely hung up on some electrical wires inside the bay, and it was the shock of parachute deployment that finally freed the G-switch to operate. The delay time was fairly long in this design, fully 4 seconds after first motor burnout before ignition of the second stage, thus all the chutes were fully deployed prior to ignition. While 2 stage rockets have their safety concerns, they are also a real crowd pleaser and are one of the most state of the art designs in hobby rocketry. Some suggestions would be that the delay between 1st motor burnout and ignition of the 2nd motor be kept to a minimum, and that the timer bays be kept as un-littered as possible with wiring etc. Also, spend some real time and effort in designing the rocket to stay together even after parachute deployment. My comments on shock cords has great application here.

4. Airframe Failure

If the criteria that the rocket must have flown at least once before on a motor of at least the same size and impulse being used at the demonstration is adopted, then much of the chances for airframe failure are eliminated. It is then a function of the RSO to carefully examine the rocket for any signs of structural damage or fatigue, and to once again carefully examine the shock cords for signs of wear. If all of the above are adhered to, then airframe failure should not pose a major concern.

There is, no doubt, much that I have left out, but then this is simply a discussion paper which hopefully will help point us in the right direction. Your thoughts and input is greatly welcomed, and can be sent to me at "andrewh@telusplanet.net"

Max Baines

... Sullivan Lake

Ann Bilodeau from Drayton Valley flew her beautifully constructed Rocket R7D Black Brant 5B, this gorgeous Red and White model flew perfectly on an H242 Blue Thunder motor to net her first level certification. She then attempted a second level on an I211 White Lightning motor, but her faith in the use of electronics for primary recovery went un-rewarded as the model meet its demise with a sickening thud into the dry lake. JoAnn took it in stride and went off hunting Vince for some replacement parts, to rebuild for Med Wheel next spring! Greg Bilodeau certified level three with a J 350 powered Rocketman Wa-Hoo.

(see Sullivan Lake on page 17)

... Sullivan Lake

Chris Wyckham from Calgary successfully flew his modified LOC Graduator on an Aerotech H128 motor and also entered the realm of the High-Power enthusiast. Leon Kemp also from Calgary loaded his nicely finished Blackhawk Black Brant 10 powered with a H180 White Lightning motor, to his delight, and with the crowd's encouragement the flight was nominal, ejecting its twin chutes right at apogee. Brad Derzaph from Lethbridge met the challenge with an H97 powered PML Amraam 2. Rob Mignon hailing from Regina, certified level 2 with a PML Sudden Rush on a J275. Congratulations to all certifiers, we'll see you all again next year with even bigger and more challenging projects.

This year for the first time, a group of Air Cadets spent the day watching the flights, and constructing a bunch of Suborbital Technologies Challenger Kits. Their feedback was positive, and they may be instrumental in a major resurgence of the hobby within the Cadet system in Alberta.

One of the most trying situations that the Range Safety Officer (RSO) is presented with is that one model that could prove to have disastrous consequences if allowed to fly. This year Doug Banks, that wizard at oddroc design brought forward his two stage Hawk/Blackhawk upscale.

This twin pod, winged upperstage with a booster constructed of Plywood sheet and lexan fins was to be powered with a K550 Booster staging to an I211. Now both of these stages have successfully flown, separately. Doug wanted to fly it in the staged configuration, but could not prove that the model was in the least bit stable. After much discussion with the three senior RSO's present, it was decided that the model would not be allowed to fly, but Doug would be allowed to fly the components separately. This proved fortuitous as the upper stage BlackHawk performed flawlessly, but the K powered Hawk booster failed under power and was successfully retrieved by "Confetti Recovery". "Go Fever" can certainly color any RSO's decision process, but we must sometimes make unpopular decisions to preserve the safe conduct of our hobby. Doug by the way, has promised to return in the spring with a sturdier and STABLE two stage configuration, a hearty "Go For It" was expressed by all.



 An advertisement for High Power Rocket Technologies. At the top, the text reads "HIGH POWER ROCKET TECHNOLOGIES" in red. Below this, it says "Canada's Authorized Dealer of:" followed by a list of retailers: "Dr. Rocket Motor Hardware", "Acme", "Giant Leap Rocketry", "Blackhawk R&D", and "HPRT Prometheus Kits". The central image shows a rocket launching vertically, creating a large plume of white smoke and fire against a blue sky and a mountain range in the background. At the bottom, it says "Visit the web page at: <http://www.planet.eon.net/~vemo/hprt.html>".

(see Sullivan Lake on page 18)

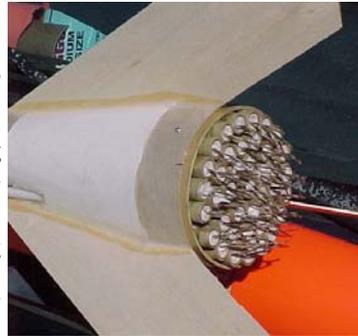
... Sullivan Lake

Darcy Mosser, Dale Adams, Peter Meier, and Dave Ross obtained some of the more interesting HP flights. Darcy out did himself, successfully flying his PML Endeavor on the long burn J135; the Tera Mosquito on a J570; PML Bull Puppy on an I 211; Rocketman Wa-Hoo on an I 357; and the Rocketman Rocketboy on a J350. Dale broke the early morning silence by flying two long burn motors, the H45 in a L'I Wed Wocket, followed by a K185 in his Fluorescent Orange PML Nimbus, the drogue function worked, but the main chute failed to eject, and the



Nimbus landed hard downrange. Dave Ross continuing his FAT BOY tradition flew his 8-inch diameter version successfully on a Cesaroni J 360 motor. Perhaps the most dramatic flight of the weekend was the self immolation of Peter Meier's K'netic Express (NCR Hobgoblin) modified to fly on a K1100 airstarting twin K550s followed by airstarted J350's. Liftoff was perfect on the long violet flame of the Blue Thunder, second stage ignition worked as the twin K550's lit up. About two seconds into the burn, induced vibration, caused the 6mm aircraft plywood fins to depart the model, leading to a high-speed tumble and crash into the lake. Thankfully everything was recovered, and the J350's failed to light up.

Competition continues to gain ground in Alberta, and this year was no exception six events were held in the two age divisions, and for those of you hard core HP types who think competition is too easy, think again. In Senior Unlimited Cluster Parachute duration was won by Don Hladiuk with a cloned Estes Ranger flying on 3 B6-4 motors, his was the only qualified flight (1 min 52 sec) in the division, after Vince Chichak's 40 x 1/4A3-3T failed crashing in the rangehead, and Garth Illerbrun's D12 + 8 1/2A3-2T cluster model being DQ'd for expelling most of the spent 1/2A's like a "cluster bomb" peppering the rangehead with tumbling motors.



E Streamer duration was won by Kyle Baines with an E15 powered Quest "Maggie"; again the only qualified flight (58.5sec). Stripped Streamers still plagued the rest of the competitors, and Vince Chichak's "E Be Gone", powered by an Apogee E6 motor actually landed on Darcy Mosser's noodle, now that's serendipity! Garth Illerbrun's Clone Estes Goblin failed when the HOT E15 ejection charge melted the braided nylon static line, and set the balsa nose cone on fire! Thankfully the fire had extinguished prior to landing, as over half the cone shoulder was burnt away. Don Hladiuk's two stage Estes Delta Clipper was also disqualified for a stripped streamer.

In G Dual Eggloft Duration there were NO Qualifiers, on every flight at least one of the two frag-

(see Sullivan Lake on page 19)

... Sullivan Lake

ile payloads was damaged. Brad Baines, Don Hladiuk, Vince Chichak, Andrei Chichak, and Garth Illerbrun all tried valiantly, and all went away with egg on their respective faces (pun intended). Guess its back to the drawing board over the winter.

As with most competitions, the juniors proved more adept at the task and in B Streamer duration the three Hladiuk siblings, flying identical Clone Estes Sprints all landing within 0.5 seconds of each other with Marla coming out in top with a flight of 57.5 seconds! The event winner was Bethany Kemp flying an Estes Viking and a flight of 1 min 40 sec.

Streamer duration was also flown using C motors with Bethany again coming out on top with a flight of 1 min 35 sec, followed by Marla Hladiuk with her Sprint, and a clocked duration of 58 seconds.

Parachute duration was won by Marla Hladiuk flying an Estes Alpha for a time of 24 seconds, followed by Jessica Bilodeau's 6-second flight of her Mach 1 Mosquito, which ejected, and successfully deployed its chute 4 feet above the ground for a qualified flight!

I'm sure that with all the haranguing Greg B took, next year he will ensure that his entire family will be ready with the necessary competitive models in hand! Kit prizes were awarded to all places in both divisions, and as always it seems that everyone who participated learned some new techniques to be applied next season.

In general sport flying several interesting models proved entertaining, including Keith Allen's Launch Pad Sparrow AIM 7F, on an E 18, and the Alarm on an E28. Doug Elson's many flights using ancient Estes /Centuri motors from circa 1969/1970, event the D13 and B14 motors all performed flawlessly. Doug Banks continued to wow us with his James Bond, and Hair of the Doug models, he sure has an active imagination. The Hladiuk children flew their Estes

(see Sullivan Lake on page 20)



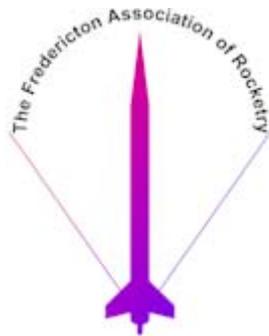
... Sullivan Lake

Airwalker Payloaders loaded with several captured grasshoppers, and all the insectonauts survived their rapid ascents. Dave Johnson's Star Flight 3 Circular glider continues to impress, flying well on E15 and F32 Aerotech motors. Many other fun flights were made, with most recovering safely and with few lost to the very calm winds.

Saturday night we held the usual CAR meeting with little controversial being discussed. Several executive positions are up for new volunteers, and the general state of CAR was discussed, again thanks to the current board must be extended as things are generally running very smoothly within our organization. The meet officially ended at 17:00 hours on Sunday, following a quick clean up everyone departed, and we look forward to next season.

Garth Illerbrun

New Club in New Brunswick



The **Fredericton Association of Rocketry**, New Brunswick's latest club, is now actively seeking members and looking for a site to hold regular monthly launches. We're dedicated to providing a fun, learning environment to all rocketeers in the Fredericton area both young and old alike. For more information, contact Neal Hickey at (506) 459-8796 or by email at hickeynk@nbnet.nb.ca

Cesaroni Technology Hosts Transport Canada HPR Authorization Course

Between June 20-22 Cesaroni Technology Inc. hosted and participated in the first Transport Canada course provided to inspectors from various regions across Canada who will be taking over the provision of high power rocket launch authorizations. Mrs. Lavina Harding, General Aviation, Prairie and Northern Region, and Mr. Anthony Cesaroni combined to present materials related to high power rocketry authorization requirements and technical aspects of high power rockets.

Mrs. Harding covered information relating to launch proponents - both individuals and high



(see Course on page 21)

... Course

power rocketry groups or associations; university projects; regulations and safety requirements; launch authorization process; inspection and monitoring requirements and training requirements.

Mr. Cesaroni presented material pertaining to rocket construction, rocket motors, ignition and ignition systems, launchers and launching techniques, stability, rocket aerodynamics, recovery devices, payloads and altitude determination. Additionally, Mr. Mike Dennett, of Cesaroni Technology Inc. spoke on solid rocket motor composition and construction of rocket ignition devices.

Mr. Cesaroni also discussed in detail hybrid rocket motor composition and followed-up the presentation with a dramatic firing of a "M" class hybrid rocket motor. The sound woke everyone up.



Mike Dennett of CTI guiding course participants through the assembly of various reloadable motors.

Transport Canada would like to thank Mr. Cesaroni for providing the facility to hold the course and so generously making himself and Mr. Dennett available to present the technical aspects of the course. An enormous amount of material was covered and everyone appreciated the effort put forth by those involved.

Transport Canada
General Aviation

Lavina Harding is the Launch Safety Inspector for General Aviation in the Prairie and Northern Region and was previously the Technical Launch Officer for the former Canadian Launch Safety Office. Lavina is a HPR Enthusiast and active CAR member. On behalf of the HPR community, I wish to congratulate Lavina for the excellent effort in organizing and presenting the course. I would also like to thank the participants from Transport Canada for their interest and support. Welcome to High Power Rocketry. It was a pleasure hosting Transport Canada and we look forward to continue working with them in the future.

Anthony J. Cesaroni
President
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CAR S250 L4



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Who are the Heroes in Rocketry?

Tim Van Milligan

For me, the answer to the question "who are the heroes in rocketry?" is a simple one. The heroes are the ones that teach and inspire others about rocketry.

If you were going to write down a list of your own personal heroes, the first name you'd probably come up with is the person that got you hooked on rocketry. For me, it was a guy named Patrick McCarthy. While Pat didn't first introduce me to rocketry (I can't recall the name of the guy that lead the boy's group were I built my first rocket), but it was Pat that showed me all the neat things that could be done with rocketry. Until I hooked up with him, I didn't know about things like: helicopter and glider recovery, clubs, competitions, national events like NA-RAM, technical information, magazines, or bigger rocket motors. The point of all this is that there are lots of people out there that fly rockets, but yet haven't been exposed to the really neat stuff about rocketry. It was by pure chance that I met my rocketry mentor. And until others meet theirs, they will be caught in an endless cycle of RTF models. Where there is nothing wrong with RTF models, they'll get more pleasure and satisfaction out of rocketry when they step up to the next stage.

The benefit to all us other rocketeers is great too. When a modeler gets more consumed by rocketry, he gets more involved in the group and the organized aspects of the hobby. He may run for a local club officer position. But more importantly, he becomes an ambassador for the hobby. He will tell others, and maybe even help lobby the government for reduced regulations.

Even though there can be only one person that inspires us personally that very first time, I have other heroes too. I think of the guy in our local club that shows up every month with the launch equipment. He also takes it out to schools that want to do rocketry demonstrations. This is one of the most important jobs in the club, and I'm glad that he does it. I guess that most anyone that drags themselves down to a local school (on their own time -- taking time off from work) is also a hero of mine.

The same goes for the guys in the clubs that produce the newsletter. It is a tough job (I speak from experience). This guy has to come up with content for every issue. He usually ends up writing most of the issue himself. It is a thankless job. But if he doesn't do it, the other members of the club let him know his failings.

I've been fortunate in that I've had plenty of opportunities to see rocketry heroes in action. I haven't had a chance to thank them personally, but I hope that they know their efforts haven't gone unnoticed. Also, their efforts have had a positive effect on the hobby. They shouldn't get discouraged because they don't get the recognition that they deserve. More people are enjoying rocketry because of their passion for the hobby, and their willingness to share it with others.

In conclusion, I hope that more people become rocketry heroes. It has made this hobby more fun for me, as well as for others. The only criteria is a willingness to become more involved on a one-to-one level.

I salute all the rocketry heroes.

New Rocketry Club in Manitoba

The **Winnipeg Rocketry Group** is a volunteer organization that has been created to provide an outlet for interested rocketeers of all ages to experience this exciting hobby as a club, here in Manitoba. WRG holds regular launches, building workshops, and other events. We are a Canadian Association of Rocketry affiliate club and encourage CAR membership. WRG in conjunction with CAR also provides an outlet for rocketeers to take part in High Power Rocketry here in Manitoba.

WRG is taking an active part in community events. This year we are attending the "Mid-Canada HOBBY and TOY Show 2000" on October 14 and 15. As a sponsored exhibitor we will be holding demo launches, free rocketry building workshops, and more.

WRG looks forward to being involved in the "Sullivan Lake" and other large HPR launches in the years to come. We would also like to thank CAR and the editors for the opportunity to announce our group in Earthrise. You can E-Mail us at winnipegrocketrygroup@hotmail.com

Product Review

Max Baines

Cesaroni Technology PRO-38

The first time I heard of this product was 2 years ago at LDRS 17 at the Bonneville Salt Flats. Scott Bartel, of Blacksky Research, had some of the casings on display, and I listened to his hype on what was to be a new and revolutionary High Power Motor. With the fate of both Vulcan and APS fresh in my mind, a decided wait and see attitude was adopted.

However, rumors persisted, followed soon enough by performance reports and photos. Things were definitely now beyond the wait and see point. Then, earlier this year, with the release of the Pro-38's due in the U.S. at LDRS 19, there was a lot of fevered activity. The motors had been sent to Tripoli Motor Testing for certification, Cesaroni Technologies was recognized as an official motor manufacturer allowing them to conduct demo flights at Tripoli launches, and at the same time Canada's ERD was starting their own review.

ROC Stock at Lucerne California was chosen to be the U.S. debut of these new motors. As luck would have it, Roc Lake 3 at Lethbridge was scheduled for the same weekend. After much effort on Anthony Cesaroni's part, the Pro 38's were approved for a series of demo flights in Canada at Roc Lake. While in an ideal world Anthony could have attended himself, I was personally thrilled to be able to demo these motors and later provide him a report on my experience with them.

When they arrived, the first thing I really liked is that the 6 different casings each comes in its own plastic tube. You can throw these in your field kit knowing that they will not get scratched and dented in transit—nice touch. Each of the re-loads came in its own cardboard tube, and again, you cannot hurt the threads or any other part of the re-loads in transit. Nice, thoughtful, and easy.

Now, my instructions were that once the motors arrived I should resist temptation and wait for the arrival of both the instruction sheet and the delay adjustment tool before "playing" with the motors. NOT!!!! Within 5 minutes I had all six re-loads out of their tubes, and had figured out instinctively where the delay module separates from the main motor, had made a good guess at how the delay adjustment tool might work, and had noticed the "pellet" of different looking

(see PRO-38 on page 25)

... PRO-38

propellant at the top end of the propellant grain. I even figured out that you could screw the reload into the casing, unscrew it and, in spite of the snug o-ring on the delay module, still remove the delay module again in the event that you needed to re-adjust the delay.

A few days later the instructions arrive, and I phone Mike Dennett at Cesaroni for a walk through of these motors. I discover through this that all that I had discovered on my own was totally correct. Anthony Cesaroni had said on the phone that these motors are instinctive, and he's right. They are the easiest thing I've ever used. The best part is loading the casing. You get, in essence, 5 parts. The casing, the re-load which simply screws into the casing, the delay module which slips into the top of the re-load, the ignitor and ignitor cap. Note that the ignitor cap has a hole already in it which is where the ignitor wires separate. That's it! No o-rings to lose, no pieces to lube, and a much reduced risk of engine failure.

Mike walked me through several key points with the Pro-38's. The delay adjustment tool is simplicity personified. There are 2 halves, you simply put the arrow on the number (3,5,7 etc.) and this is how many seconds you will REDUCE the delay by. On the plastic cap on the top of the motor, it tells you how many seconds the delay starts out at. So, a 137-G60-12 is as follows:

A total of 137 NS total thrust (G)

An average thrust of 60 NS

A delay time of 12 seconds.

Thus, if you need a 7 second delay, take 12 (the starting delay) and subtract the 7 seconds you want left which will equal 5, or the amount you need to reduce the delay by. Set your delay adjustment tool on the 5, insert the delay module into the tool and twist. The drill bit will create a hole in the center of the delay equal to a 7 second delay. Pop the delay module onto the top of the propellant grain, insert into the casing and tighten. You are now ready to fly.

Remember, however, that once you adjust the delay you cannot lengthen it again. You can make it shorter, but not longer. Also, an application of some sort of lubricant, i.e. silicone spray et al will make it easier to tighten the threads. It is very easy to machine aluminum to close tolerances, and the casing is aluminum. It is, however, very difficult to machine hard plastic to close tolerances, and the reloads are made from plastic. The use of a pair of vice grips or other gentle persuasion will not be unusual.

As to the pellet of different looking propellant at the head of the propellant grain, my understanding is that this is a form of compressed black powder and is the reason that these motors light so predictably. These motors are extruded, not poured, and in layman's terms, will thus have a thin layer or film on the inside of the propellant grain which would normally make these motors hard to light. The pellet at the head lights easily (it is black powder, after all) and burns hot enough and long enough to penetrate this film and get the propellant going. And it is predictable-- The G lights almost instantly, while the 4, 5 and 6 grain motors take almost exactly 1 second to come to pressure. Remember, if you are staging or clustering, these times are repeatable and consistent.

At last, Roc Lake arrives. For the first flight we choose Brad's "Mystical Journey". This has flown several times on a G-40-7, so we chose a 7 second delay. Put it on the pad, grab the camera and wait for the countdown. Normally, I hear 5-4-3-2-1-Fire, wait for the first puff of smoke and then press the shutter. Even then I am sometimes too early. This time 5-4-3-2-1-Fire and the first puff of smoke is THE puff of smoke, and I end up with a picture of a now

(see PRO-38 on page 26)

... PRO-38

empty pad. And man- that rocket is really moving for a G motor! I had a stopwatch to time the delay, and at 7 seconds after motor burnout the delay charge fired. Problem was, the rocket was still moving upward at an uncomfortably quick rate. Bear this in mind These are fairly quick burn high thrust motors which need more delay time than you think. As to the Mystical Journey- it will fly at Hellfire on a Cesaroni H motor with a longer than you might think delay.

When I first received these motors I thought that perhaps there would be some consumer resistance as they are, well, almost too easy. People may miss the intimacy of building their own motors, I thought. Since then, several things have happened which causes me to re-think this.

At Roc Lake, Brad used a Cesaroni H motor for his Level 1 cert flight. My other son, Kyle, and Tim Rempel were using an H motor from another company for their cert flights. As circumstances worked out, Brad, Kyle and Tim all began motor prep at the same time. Brad built and loaded his Cesaroni motor, put it on the pad, fired it (successfully) and retrieved it before Kyle and Tim had finished building their motors. Hmmm.

Two weeks later at a club launch, Gary opened the package on his J-135 only to discover that 1 of the o-rings was missing. Fortunately, I had brought one of my J-135's with me, so that Gary could borrow the missing piece and still fly.

Then, at the Airshow, Dave discovers that the phenolic liners for his K550's were not delivered with the rest of his re-load kits. Several frantic phone calls later, and the liners were delivered the next day just before our scheduled launch time. The KISS principal does apply.

The H motor, and both the I motors function absolutely flawlessly. Lots of kick off the pad, a subtle but noticeable smoke trail, and I REALLY like the sound of these motors. The I240 was used in Kyle's "Poetry in Motion", which is a fairly heavy 4 inch rocket. I was glad I had convinced Kyle to fiberglass the fins, as this motor really snapped this rocket off the pad. Thanks to a very aggressive cold front blowing in, the Sunday of Roc Lake is canceled, and the 2 J flights are postponed 2 weeks to our next club launch.

Man, the J motors do have some serious kick off the pad. Fast and clean, with a decidedly waspy roar, these motors will lift a lot of weight off the pad. Again, prep time is under 1 minute, and the motors are flawless. The Quantum Leap with the 5 grain J leapt off the pad way lots faster than it has with the J-275, and the Alarm screamed with the 6 grain J. Cool!

Congratulations to Cesaroni Technologies on a great new product. And of the future? Well, other sizes, i.e. 54 mm et al are a definite possibility. Adjusting the burn rates, color of the flame etc. are also all compatible with the technology used to produce the Pro-38's. Once the dust has settled on the introduction of the 38 mm motors, the team at Cesaroni will make decisions on future products, but in essence, the sky is the limit thanks to the advanced engineering used in this design.

Max Baines

Help!

Earthrise is built by Rocketeers for Rocketeers.
Do you have a great story to tell? If so, please send it in!

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I can scan photos, but if you mail your article, please send it in an electronic format (plain text is best). Be sure to send captions with your photographs and enclose a self addressed envelope with sufficient postage if you would like original material returned.

Submission Deadlines

Our goal is to publish Earthrise quarterly in January, April, July, and October. In order to provide ample time to edit, print and distribute, please have your content to the editor no later than the following dates:

Issue 1: December 8
Issue 2: March 15
Issue 3: June 15
Issue 4: September 15

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Motor Type	Dimensions	Propellant Weight (g)	Delay Times
137G60-12A	1.5" x 4.94"	64.5	12,9,7,5,3
260H110-13A	1.5" x 7.25"	129.0	13,10,8,6,4
402I170-15A	1.5" x 9.53"	193.5	15,12,10,8,6
540I240-15A	1.5" x 11.88"	258.0	15,12,10,8,6
670J300-15A	1.5" x 14.19"	322.5	15,12,10,8,6
800J360-15A	1.5" x 16.50"	387.0	15,12,10,8,6

137G60-12A

Total Impulse, 137 Ns Total Impulse Class, G Average Thrust, 60 N 12 sec Adjustable Delay

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