Apogee Components

PEAK OF FLIGHT

NEWSLETTER

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Construction Ideas for Electronic's Bays

By Mike Momenee

First, I'd like to thank the authors of two fine books for pointing me in the right direction after 30 years away from rocketry: *"Model Rocket Design and Construction"* by Tim Van Milligan (www.ApogeeRockets.com/design_book.asp) and *"Modern High-Power Rocketry"* by Mark Canepa (www.ApogeeRockets.com/Modern_hpr.asp). I was amazed at how much had changed since I last used three Centuri "F" motors in 1977 to boost my two-stage rocket, which carried a Kodak 8mm movie camera (*Peak of Flight Newsletter #254, "How to Add a Camcorder to Your Rocket"* at www.ApogeeRockets.com/Education/Downloads/Newsletter254.pdf).

One of the marvelous developments in rocketry has been the dual event altimeter, which has so far allowed me to use a "J" motor without losing my rocket and camcorder to parachute drift from 3,000+ feet in altitude. There is an entire section in Mark's book which describes design variations of the altimeter bay, which houses the dual event altimeter. This article will give you some additional ideas, some which I found on the web, others just seemed to be the most appropriate solutions for my particular needs.

A Different Way to Make an Altimeter Bed

One of the traditional ways I've seen to make an altimeter bed portion of the altimeter bay is to use a piece of wood or G-10 fiberglass material with brass tubes epoxied to either side, mount the altimeter and battery holder on the wood or G-10 material, and essentially suspend it between the two threaded rods connecting the two bulkhead ends which seal the altimeter bay. These types of kits are available from Apogee Components at: www.ApogeeRockets.com/Electronic_Bays.asp.

By virtue of this construction technique, the altimeter itself is then situated at about dead center in the rocket. For smaller diameter rockets, this can cause a potential obstruction for my own altimeter bay design.

One of the first ancillary items that I really gravitated to during my journey back into rocketry was a round rotary switch which can be used as the altimeter arming switch (I'll get to that switch later in this article). This switch can be purchased at a number of sites on the internet. But the 1" depth of the switch would not work with the center-positioned altimeter bed. The thickness of the altimeter, along with height of the mounting hardware for some brands of altimeters, brought the altimeter in contact with the soldered connection ends of the rotary switch.

Now, I could have mounted the altimeter and battery on the side of the altimeter bed which is opposite the switch side of the altimeter bay to eliminate this conflict. But there was also a potential weight issue to consider, when factoring in the width (and thus weight) of the traditional altimeter bed, and the brass tubes which secure it between the threaded rods.

So I looked at the hardware I had at hand, and selected a 1" corner brace and an extra yardstick. I cut about a 6" length of yardstick (which is about 1 1/8" wide) and attached it to one of the holes in the corner brace with a screw and wing nut. I then attached this altimeter bed

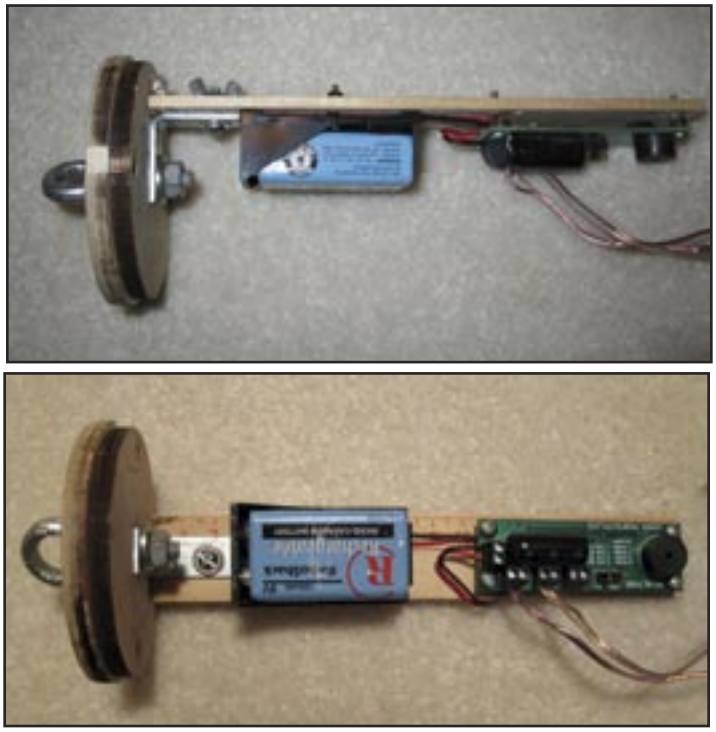

Photo 1 & 2: A corner brace can be used to mount the electronics to one side of the tube.

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Construction Ideas for Electronic's Bays

via the other hole in the corner brace, over the end of the screw eye sticking through the center of the bulkhead of the bay, tightened it down with a nut, and I had an offset altimeter bed.

The offset moves the altimeter bed sufficiently back from the opening for the round arming switch so that everything fits as required. You'll obviously want to mount the altimeter and the battery holder on the portion of yardstick before you make the final hardware connections. I've used this configuration with "J" motors, and everything has held together perfectly.

There is also a modest weight reduction from using the yardstick wood, which is quite lightweight and narrower than the traditional wooden or G-10 altimeter bed. The elimination of the brass tubes which fit over the threaded rods also save some weight. And since I chose to use both a bulkhead (which is the inside diameter of the body tube) and a coupler bulkhead (which is the inside diameter of the coupler tube) to positively seal the altimeter bay against the ejection gases, I want to use any weight reduction opportunities that I can think of to balance out this weight gain from the extra bulkhead.

Is this construction better than the traditional construction? Not at all, but it gives you an additional and very simple option when building your altimeter bay.

Ease of Using A Round Altimeter Arming Switch vs. A Rectangular Switch

For the first two rockets I constructed upon my return to rocketry in 2009, I used rectangular SPST switches available at Radio Shack, as well as many online sites. They work perfectly, and are shallow in depth, so they will not interfere with the altimeter mounted inside the altimeter bay.

My issue was that, when I tried to cut a rectangular hole for the switch, I usually ended up with something other than rectangular. I followed the instructions which came with one of the switches sold specifically for rocketry applications: I drilled two holes which use the same drill bit diameter as the width of the switch, and then used an X-Acto knife to square up the final rectangular hole.

With some practice, I bet I'd get pretty good at this technique. But how often do I need to cut a rectangular hole?

That's when I happened across the round rotary switch. I like the fact that a screwdriver tip is required to arm and disarm the switch. Again, I have nothing against the rectangular switches, but I have irrational worries about that "one in a million" occurrence where, at drogue deployment, part of the rocket bangs against the switch and flips it off or somehow disables it, preventing the main chute deployment from occurring.

But mostly, I wanted an easy method of cutting the hole for the switch. I purchased a 1/2" "Speedbor" bit available at any hardware store. The 1/2" dimension corresponds to the outside diameter of the threaded portion of the rotary switch.

I located the position for the hole on the centered 1" outer sleeve of the altimeter bay coupler tube (the outer

Photo 3: A hole for a rotoray switch can be make easily with a speedbor drill bit.

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Photo 4: Rotorary switch installed in the side of the ebay tube.

sleeve is the same diameter as the rocket body tube), and drilled a small pilot hole for the pointed/ threaded tip of the Speedbor bit. I placed a piece of 1" x 3" scrap wood inside the altimeter bay coupler tube so that the Speedbor bit tip had something to dig into as it cut through the relatively thin coupler tube. This technique seems to give a cleaner cut with less ripping. Clean up any burs created by the drilling with sandpaper (this will be especially necessary with Blue Tube - www.ApogeeRockets.com/blue_tubes.asp).

As well as the relative ease of cutting the mounting hole, I like the professional "look" of this round switch. It also has a low drag profile in comparison to the rectangular switches, which do tend to jut out from the rocket quite a bit more. I'm sure that any drag difference is legible, but my point regarding this switch is just to present another option for you.

Using Quest Q2G2 Igniters In Ejection Charge Holders

I have made e-matches from kits available on the web. They work well, and are quite inexpensive when you produce e-matches in bulk. If you're really not interested in making E-matches yourself, I have found the perfect substitute. Quest Aerospace makes the Q2G2 igniter (www.ApogeeRockets.com/igniters.asp), which is intended as a motor igniter for use with their 9V launch controller system. Apogee Components sells them in packages of six. There is also a newer version with 8 inch long wires that comes in a two-pack.

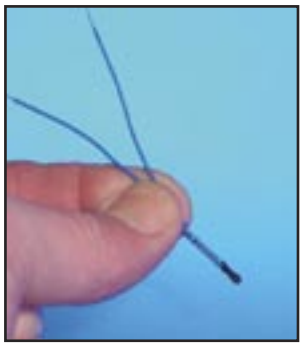

Photo 5: The Q2G2 igniter works great to set off the dual-deployment ejection charges.

Because the igniter was developed for use with Quest's 9V launch controller system, it works perfectly with most all altimeters powered by a 9V battery. As with any e-match or igniter, I recommend that you check the continuity with a multi-tester before you install them into your ejection charge system. I have had 100% success using the Quest Q2G2 igniters in my dual deployment systems (and neither Quest nor Apogee has compensated me for this endorsement!).

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I've included a photo looking down at a well-used altimeter bay bulkhead with a new ejection charge holder so that you can see the business end of the Quest igniter inside it. The igniter insulation is sometimes blue; sometimes red. The bare wires are much farther apart than the perspective of the second photo suggests. The white "European" terminal block was purchased at Radio Shack in a long strip and can be cut to size. I use blue painters tape to hold the igniter in place on the ejection charge holder. And the three extra little holes on the bulkhead were from previous projects, and were sealed shut with epoxy.

Photo 6: Tape is wrapped around the outside of the ejection cannister to hold the igniter in place.

Moving Your Altimeter Bed Between Rockets

As long as you position the holes in the bulkheads in the same positions for the threaded rods in your like-diameter altimeter bays, and as long as the altimeter bays themselves and the threaded rods are the same length, you should be able to switch the altimeter bed/ bottom bulkhead portion between rockets with a minimum of effort.

I hope that there may be an idea or two here that is of interest to you. And if you ever want to check out my inflight videos, search YouTube for jmomenee.

About the Author:

Mike Momenee began flying model rockets during the late 1960's. He says he was a science fair and research paper nut. His paper, *"Determining the Efficiency of Ducted Propulsion Systems in Model Rocketry"*, won one of ten national scholarships in a 1971 national contest, complete with a trip to Washington, DC and a group picture on the Capitol steps. Mike graduated from Notre Dame in 1975 with a science degree, and had a successful healthcare-related sales/sales management career, from which he retired in 2008. Mike and his wife Jackie, live in sunny Valrico (Tampa) Florida, and fly at the monthly TTRA launches in Plant City.

Mike Momenee in 1971 on the Capital steps. Inset: Mike shown in 2009 flying one of his Cinema rockets.

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Recognition Rewards for Participation

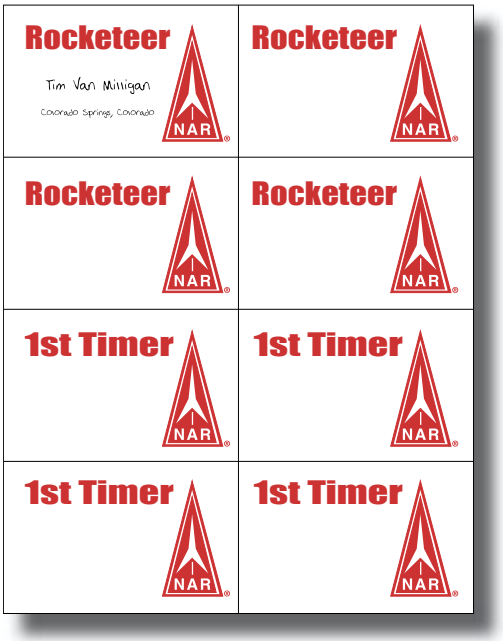
By Tim Van Milligan

In Newsletter #268 (www.ApogeeRockets.com/Education/Downloads/Newsletter268.pdf), I gave out one of my secret business tips, which I thought would also help out rocketry clubs to get more participation. The secret was "recognition."

In this short little article, I thought I'd give you three simple ways to recognize the members in your club, so that you can get more participation at events, such as rocketry contests.

First: give out name stickers. You know what I'm talking about, because you've seen them. "Hello, my name is...."

This is so simple, and very cheap to do. It allows your active members and your visitors to feel at home. Even if you have a small club, and everyone thinks they know everyone, that is rarely the case. Everyone forgets names. So when they see a name-tag sticker, they really appreciate the effort.

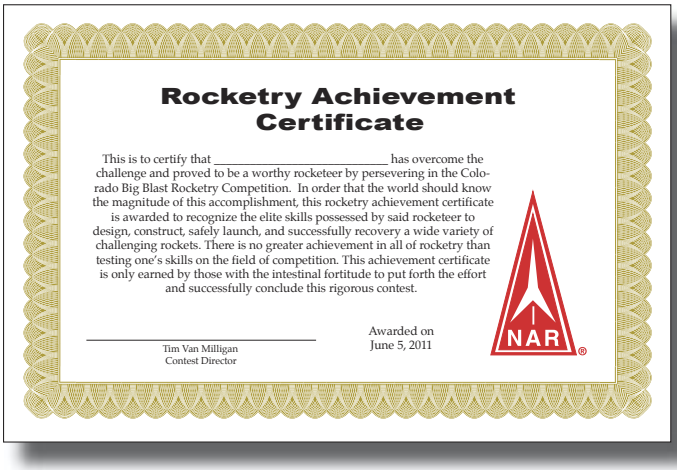


I made up my own at a recent launch. I made the graphics on my computer, using the NAR logo and a easy-to-read font that can be see by us rocketeers with bad eyesight. I just found some label sheets that I could run through a laser printer, and in no time at all, I had a sheet of eight name-tags. Cut them apart, write down the names of your rocketeers, and instantly, no one is an unknown anymore.

The second method of recognition, which costs even less than making name-tag stickers, is a simple achievement certificate.

The only investment needed is some time to create them in a graphics program. Then all you have to do is print them out and present them to the rocketeer whenever they complete some important milestone. A couple of years ago, our local club gave one to my daughter on the completion of her first rocket launch. That certificate hangs here in my office (I'm a proud poppa...). But they can be given out at almost any occasion:

- Participation in a rocket contest
- First rocket flight
- First glider flight
- High-power certification flight
- Breaching 1-mile high (the Mile-High Club)



Rocketry Achievement Certificate

This is to certify that _____ has overcome the challenge and proved to be a worthy rocketeer by persevering in the Colorado Big Blast Rocketry Competition. In order that the world should know the magnitude of this accomplishment, this rocketry achievement certificate is awarded to recognize the elite skills possessed by said rocketeer to design, construct, safely launch, and successfully recovery a wide variety of challenging rockets. There is no greater achievement in all of rocketry than testing one's skills on the field of competition. This achievement certificate is only earned by those with the intestinal fortitude to put forth the effort and successfully conclude this rigorous contest.

_____
Tim Van Milligan
Contest Director

Awarded on
June 5, 2011

NAR

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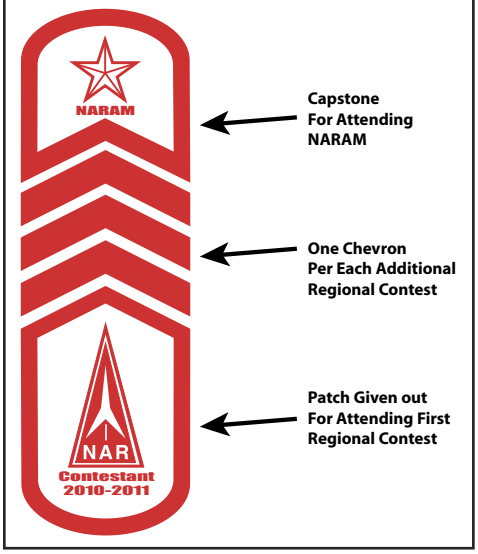
Recognition Rewards for Participation

- Conducting a school workshop
- Being a TARC mentor
- Performing a first successful dual-deployment

You get the idea. You can create an acheivement certificate for just about any note-worthy accomplishment.

The third method of recognition takes a little bit more ingenuity, but it can be pretty powerful. It is a serial-accomplishment badge. In my case, I used label paper to create stickers that the contest participants could place on their range-box.

Range-Box Stickers To Show NAR Contest Participation



By "serial," I mean that there are different levels of participation that they have to work toward. For example, in the sticker image shown here, they get their first sticker at the bottom for participating in their first contest of the contest-year. Then they get a stripe (called a chevron) for each additional regional launch they attend. A full contest year of flying would be a total of 4 regionals, so they could earn a maximum of three chevrons. Finally, to top off the flying year, if they attended NARAM in the summer, they could earn a capstone sticker to go on top of their chevrons.

This past weekend, I got to hand out four complete sets to rocketeers that completed their four regional events, and were heading off to NARAM this summer. You could see a bit of jealousy in the eyes of the other competitors that didn't get the complete set of five stickers. That was exactly the effect I was going for. To get all of them, you have to earn them. That means the person must participate.

Obviously, that benefits the club, which is the point of the whole system. We want to get people coming back again and again.

And there is one other thing that I've built into the system. The stickers for next year will look different from this year's, so they have to start collecting them all over again after they get back from NARAM. So they have to keep participating. Can you imagine what their range box would look like after doing this for several years? They'll have everyone envious of their accomplishments.

I don't mind if you steal this idea for your own club. In fact, I encourage it. I'd love to see this go national, so that every club gets more people involved. It is good for all of rocketry when that happens.