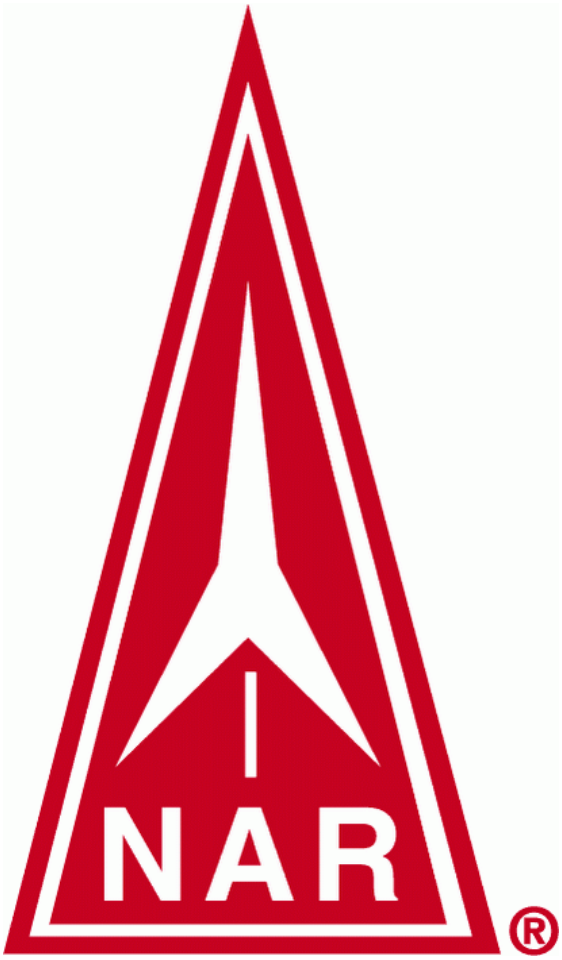
National Association of Rocketry

Section Guide



2013 Edition

This page intentionally left blank.

Table of Contents

Introduction

Welcome to the 2013 edition of the NAR Section Guide. This printer-friendly version of the Section Guide website content (https://sites.google.com/site/xnarsection) is intended to be a handy reference for use at Section meetings, launches, or other situations where a hard copy may be useful. Links, files, and photos which appear on the website have been left out of this document in order to keep it to a manageable size.

The print version of the Section Guide will be revised annually, or whenever a significant change is made to the website. The website is a living document which will be updated whenever a change becomes necessary. When in doubt, the website content supersedes the content of the print version.

Many people provided material for the Guide. We extend our thanks to the following rocketeers: Art Applewhite, Randy Boadway, Mark Bundick, Ted Cochran, John Coker, Ray Cole, Anthony M. Cooper, Steve Decker, John DeMar, Andy Heren, John Hruby, Steve Robb, Larry Shenosky, Bill Spadafora, and Tim Van Milligan.

Please send any comments or suggestions to the editors at ahbarber@alum.mit.edu and mark.wise@nar.org.

Pay forward,

Trip Barber, NAR 4322 Mark Wise, NAR 34702

February 16, 2014

How to Use This Guide

This guide is a resource for NAR members who want to start or run an NAR Section. For assistance with any matter pertaining to running a Section beyond what is covered here, contact the Chair of the NAR Section Activities Committee at sections@nar.org.

This guide is structured in pages covering ten major topic areas. In some cases files are posted at the bottom of the page with more detailed information about that topic:

Section 1: Starting a New Section covers what is required to establish and charter an NAR Section, and to find the local rocketeers to help you do this.

Section 2: Management covers how to write Bylaws, run meetings, and manage a Section once it is established.

Section 3: Publicity covers how to use media and online techniques to publicize your Section's activities and draw in potential new members.

Section 4: Communications covers how to do communications about your Section's activities to members and others: newsletters and websites.

Section 5: Launch Sites covers how to find and keep a launch site.

Section 6: Launch Equipment covers what kind of equipment a Section needs to operate a rocket range, and how to put it together.

Section 7: Running Launches covers how to run a safe and efficient rocket launch with your Section.

Section 8: Section Activities covers things to do with your Section in addition to your launches and regular meetings.

Section 9: Outreach covers how to do programs that reach out to the community, especially young people, to teach them about rocketry and the NAR.

Section 10: Laws and Regulations covers what you need to know about national and state laws and regulations in order to conduct your rocketry activities safely and legally.

In addition, if you need more information on the following areas, there are other applicable resources on the NAR website that you should check:

Launch safety is covered in a whole section of the NAR website; this includes the NAR Safety Codes for model rocketry and high power rocketry. See http://www.nar.org/safety.html for more information.

Competition rocketry, including how to run a contest, is covered in a NAR-run Google site like this one that is connected to the NAR website. See https://sites.google.com/site/xnarcompetition/home for more information.

Education programs and outreach programs for students are covered in a whole section of the NAR website. See http://www.nar.org/teacher.html for more information.

NAR Insurance is covered in a set of “frequently asked questions” on the NAR website.

1. Starting a New Section

Why form an NAR Section?

There are several reasons why it is attractive to become a chartered Section of the National Association of Rocketry. The most important one is social: all of us have started out in the hobby of rocketry by purchasing a kit, building it, and flying it. Fun at first, but it gets old after a while. You need a buddy, or several friends, to fly with. You build models, compare their looks and performance, talk rockets - in short, you have more fun when it's a group activity. Being part of an NAR section gives you a sense of camaraderie, and gives you access to the ideas and enthusiasm of others. This makes everything you do with rockets more fun - every launch, meeting, or get-together. Forming an NAR Section is the best way to find and get together with like-minded people. Clubs also have greater financial resources than individuals, and are able to obtain expensive or specialized equipment that individuals could not.

Being part of a recognized NAR section also gives you important benefits:

- **Insurance coverage.** Through the NAR, you obtain free liability coverage for your club and for your launch site landowner. These policies provide coverage for rocket-related accidents, and their associated personal and property damages. This insurance coverage makes it easier to get launch sites, run launches, and conduct demonstrations. This insurance isn't just "more affordable" through the NAR -- it's practically unobtainable anywhere else.
- **Backing for Dealing with Government Permits.** By working as part of a team backed by the insurance and credibility of the NAR you can navigate the government regulation bureaucracy for important permits such as an FAA Waiver for high-power flying or a local fire marshal permit to fly rockets on a particular site.
- **Experienced Support.** NAR Sections have many NAR volunteers supporting them. Our Section Activities Committee can help both new and established Sections. They have experience in getting launches and demonstrations organized. They are in continual contact with other committees within the NAR that provide services to members. Finally, they have a lifetime of experience to answer questions you might have.
- **National Competition.** NAR Sections can compete in our national contest structure for the title of National Champion Section. Someday, your members may end up on the top of the competition heap. The drama and fun of competition rocketry can fully involve you and your NAR Section as you go onward to the NAR's own Super Bowl: NARAM, the National Championship Contest!
- **National Recognition.** Active Sections with healthy, dynamic service programs within and outside their own membership qualify for the NAR's annual "Section Excellence" awards.

How do you find other rocketeers in order to start an NAR Section?

There are several ways to recruit potential members. Here are some you can try:

- **Contact NAR Headquarters**. NAR Headquarters will supply you with a list of NAR members in your state upon request. A direct mailing/e-mailing to these members could well generate all the members you'll need to form a section. A simple note to the prospective members is your best bet, telling them who you are, what you want to do, and why. Invite them to an organizational meeting at your house, or any convenient meeting place.
- **Contact local hobby shops**. Most hobby store owners will be valuable sources of information. They often have customers ask if there is a rocket club nearby. Most hobby store owners will let you put up posters or distribute flyers in their shops. It's good business for the owners. They know that the members of a local rocket club are ready-made customers. Some will even give club members a discount, and special-order merchandise for rocketeers. It pays to maintain a good relationship with hobby store owners.
- **Put up posters and flyers**. Posters and flyers in public places that are likely to have lots of traffic from the target population you are looking for (normally parents with 4th through 8th grade kids and/or people who go to hobby stores) can be a cheap and effective means to advertise your club. Remember the "Three C's" when creating posters - Colorful, Clear, and Critical. **Colorful** means steer clear of plain old white poster board with black lettering. Opt instead for colored poster board and/or colored text. Graphics help to draw the eyes of your intended audience. Try including some photos of launches, meetings, or construction sessions. Avoid the "crash & burn" shots, and try to show people smiling. Family shots can be quite effective, too. **Clear** means to keep your poster uncluttered. A few graphics or photos are great, but too many can detract from your message. If you are forming a new section, the posters should include information about your organizational meeting. This is where you'll actually form the club, and it's important to make the first meeting a good one. An obvious point, but often overlooked, is to put your name and phone number on the poster or flyer! You do need to know how many people to expect. **Critical**, of course, refers to critical information. As mentioned above, make certain that you include all of the information needed by your prospective members - Where is the meeting? Who should attend? What's it all about? When is the meeting (date/time)?
- **Check for existing rocket clubs.** Sometimes there is already a functioning rocket club in the area in a school or a youth group such as 4-H or Scouts that has never heard of the NAR. If they are open to expanding their membership outside their current community, then this can serve at the nucleus of a new NAR section.
- **Hold a demonstration launch**. If you already have a couple of friends with whom you fly, but do not yet have enough people to be that "critical mass" to form a good Section (remember that it only takes two NAR members to form a section!), then you can try to build your starting core with a public demonstration launch. This takes good publicity; some equipment (particularly

a multiple-pad launch system so you can fly at a fairly fast pace to hold interest); a public address system or bullhorn so you can get your message out to the spectators; and some form of crowd control (flag line, etc.) to keep the spectators at a safe distance from your launches. Remember to have publicity fliers to hand out, and have a signup sheet for people who are interested in being part of your group. Finding a launch site that is close to lots of people where you can get permission to fly before you have NAR site owner insurance might be tricky; try working with a school or hobby shop as your sponsor.

- **Hold an open meeting**. If you can get some publicity going but cannot find a good place to do a public demonstration launch to draw initial interest, then try holding a public meeting at a community facility (library or civic center meeting room, or school) to attract people who might be interested in starting a rocket club. Have lots of "show and tell" rocket stuff at the meeting to make it interesting for those who may choose to attend.

How do you charter your group as an official NAR Section?

You must have at least two (2) NAR members to charter an NAR Section and five (5) to renew the charter once the section has been chartered for two or more years. At least one must be a Senior (adult) member, who is historically referred to as the "Senior Advisor." This advisor is invaluable in assisting a club through the maze of legalities and local government contacts during its operation, as well as dealing with merchants and officials. In clubs with adult officers, the club president can serve as the official "Senior Advisor." Although your club may choose to accept "associate" members who are not NAR members, these members cannot officially belong to your Section, and they gain no insurance benefits through your club.

Fill out the charter application form (in the files below) carefully. The form lets us know to whom to send your Section's mail and information. The contact names you supply for your Section will not only be used by Headquarters, but will be published to other clubs and to people in your area looking for a Section to join. Make sure these people can be reached and are responsive.

Your Section will also be added to the list and locator of NAR sections on our web site, which is updated regularly. Help us put NAR members in touch with you by providing correct address and e-mail information, and by keeping your list of launch events current on the NAR website "Launch Windows" list.

You can send the form to us online, or you can fill it out -- in duplicate, please -- and mail it to NAR Headquarters.

If you send the form to HQ on paper, make sure your Senior Advisor signs the completed application. Unsigned applications cannot be accepted. There is no fee for chartering a NAR section, for renewing a charter, or for getting an insurance

certificate for your launch site landowner; it is all FREE because you are a member of the NAR and we think that Sections are important!

Your application will be processed as soon as we receive it. A Section number will assigned to you, and your charter will be in the mail within a couple of weeks. Once you receive your charter, you will be officially established as an NAR Section.

Please note that due to the mechanics of our insurance policy, all Section charters expire on April 4 of each year, and are renewable at that time. Renewals are automatically granted by NAR HQ without paperwork, but you have to contact them to let them know that you are still operating.

How do you get your NAR Section "up and running"?

Once you have enough people interested in forming a club, you must hold an organizational meeting. See the "Administration" page for details on how to do this. This meeting will be the formal kickoff for your NAR Section. Here you will put up a formal structure for the club and write its bylaws, the rules for conducting club operations and business. You should publicize this organizational meeting, using the same methods described above. If you used posters, flyers, or a demonstration launch prior to forming the club, you may have already advertised this meeting. If not, it's time to put up the posters and print up the flyers telling everyone about your meeting.

If your publicity methods got the names and addresses of rocketeers in your area, touch base with these folks. Give them a call, see if they're still interested -- shoot the breeze about rockets, and remind them of the meeting. You can also get ideas about your club from those interested before the meeting as well. If you only have an address and can't find a phone number in the book, try a mailing. A postcard with the date, time, and place of the meeting, plus a person and phone number to contact will work well. It's also cheaper than a letter.

Next, do the "posters and flyers" bit again. There may be modelers who missed your first run of publicity. Don't deny them the chance to get involved. There will be a lot of work and a lot of fun for them to participate in, so get the publicity machine working again. It's also a good time to touch base with the hobby shop owner. Let him know how things are progressing. He may have ideas that will help.

If your club is mostly youngsters, choose an adult leader to run the first meeting. An adult is more likely to keep things under control, and often has experience getting things organized. He or she will be able to keep the meeting moving toward its objectives. It's all too easy to fall into shooting the breeze about rockets instead of getting the club organized!

2. Management

Getting the Section Started

Now that the organizational meeting is set, you should have a number of people coming. The question that is probably foremost in your mind at this point is what to do at the first meeting. First of all, if most of your prospective members are minors, make sure you have an adult present. An adult supervisor helps to keep the meeting from getting out of hand. A parent, teacher, or local hobby shop owner can often be “drafted” as the adult advisor. If the majority of the people present are not familiar with the hobby, give a brief explanation of what it’s all about. A number of props can be useful here: slides, videos, actual rockets, catalogs, copies of Sport Rocketry magazine, NAR literature, etc.

The first meeting is a time to explain to everyone what you want to do, and get them enthused about the idea. Wait until the second meeting before tackling these jobs. You need to build a solid base first. Top off the first meeting with snacks and an informal discussion session. Have everyone introduce themselves, and tell the group a bit about their rocketry experiences, what they expect from the club, etc. Don’t burden this meeting with lots of bureaucracy about by-laws, etc. or people who just want to fly rockets with friends won’t come back!

The second meeting should be held about two weeks later. This is the one where the real business of formally starting the Section should be worked out. Don’t let too much time elapse, or some people will lose interest. Remind everyone by phone, e-mail, or post card a few days before the meeting. By now, most of the “merely curious” will have lost interest and the group that attends the second meeting will be ready to start seriously writing by-laws (rules that govern the organization and operation of the club) and will have had a chance to think about the problems facing the club discussed at the first meeting. You should have a secretary writing down the discussions and resolutions of this meeting. Following are the major divisions of the by-laws of most rocket clubs. Some people may think that by-laws aren’t needed, but they can save a lot of arguments and hurt feelings later on. After you’ve formulated the by-laws, have everyone vote on them before formal adoption. See the file below for a set of sample bylaws for your use. These are meant to serve as examples only, and should not be followed verbatim. Your bylaws should apply to your situation. After you have your bylaws written up and voted on by your membership, remember to send a copy to NAR Headquarters.

Set an agenda to cover the following topics:

- Name of the club
- Purpose of the club
- Membership -- i.e., who can join
- Dues and payment schedule
- Schedule of regular meetings
- Officers needed

- Schedule of elections
- Regular committees
- How to amend the bylaws

Name

You need a name for your club. While important, don't take too much time on this. Many clubs use acronyms, like the "Centreville Rocket Society" being referred to as "CRS." Also clubs often include the name of their town or locality in their title. You are certain to have lots of fun coming up with a name you all like. Take suggestions from those present, conduct a straw vote, and put the top two or three names up for consideration at the next meeting. If you do come up with a name that leads to a catchy acronym, be sure to check the list of already-chartered NAR Sections to see if anyone else has already chartered under that name or acronym; the NAR won't let two Sections have the same name or acronym.

Purpose

The official purpose of the club is important to you and to outsiders. Outsiders, like park districts and local authorities, want to know that you will provide community benefits. By mentioning safety education, and community service in your bylaws, the community leader will see you as an asset. Besides, conducting classes or demos can be fun for your members.

You'll probably want to keep the purpose as general as possible in keeping with the aims of your club. Don't make your purpose so specific that it's impossible to live up to it or that it excludes too many people's interests.

Membership

Membership is critical. Will you accept only rocketeers from your town? Your county? Only NAR members? Will there be an age limit? All these questions need consideration. Most NAR Sections allow any NAR members in good standing to be members. Some larger Sections allow non-NAR members as well -- but remember that you can't count non-NAR members against the minimum required to charter.

Dues

Dues provide revenue for your Section and should be collected from all members. The amount must be set to satisfy two conflicting requirements. First, you need funds to operate a range store, build range equipment, or print a newsletter. On the other hand, you need to keep dues low enough so that as many interested people as possible can afford to join. Some clubs put regular dues in their bylaws, and allow for special assessments for special projects. Some clubs have innovative sources of revenue other

than dues, such as range store sales, food sales at launches, income from commercial demonstrations, and so on.If your dues are high, try to spread the cost over a period of time, to lessen the burden on each member. For example, you could charge $1.00 per month instead of $12.00 on the 1st of January.

Meetings

Set a regular meeting period and a quorum limit. Most clubs meet monthly. Meetings can, of course, be held more frequently than the bylaws call for, but should not be held less frequently. The quorum limit is important, and establishes the legality of any action taken by the club. You should also include provisions to ensure that all club members have had adequate notification of the meeting. These are standard provisions in non-profit organizations' bylaws and good, common sense. Include such provisions in your bylaws, too.

Officers

Officers are the chief administrators of any club. Their duties should be spelled out in the bylaws. Most clubs have a president, vice-president, secretary, and treasurer. Some clubs have a single person serve as secretary-treasurer.

- The **president** runs the meetings and is the chief administrative officer of the club.
- The **vice-president** assists the president and serves in his stead when the president cannot function for any reason.
- The **secretary** keeps membership lists, meeting minutes, and handles correspondence and official paperwork.
- The **treasurer** collects dues and other fees and pays bills.

By spreading the work out over several people, no one gets overloaded.

Elections

Regular elections should be established in the by-laws. Due to turnover and simplicity, one-year terms are virtually universal among rocket clubs. Making the first meeting of the year the election meeting keeps the interest up during the winter months.

Committees

Committees are a club's means of getting work done. Different clubs choose to define and staff different types of committees. Small clubs or those first starting often do not have enough members to make up committees. Here are some common ones many clubs use:

- A **Launch Operations** committee keeps track of the club launcher, PA system, and other flying range equipment, ensures that it is available at club launches, and ensures that launches are conducted safely.
- An **Activities** committee is charged with organizing non-launch events such as meetings and social events and with promoting and publicizing the club.
- A **Newsletter or Website** committee is in charge of the club's communications and makes sure that information is put out on time with interesting and useful content and club event news.
- A **Competition** committee establishes rocket contests, secures awards and prizes and makes sure all contestants are informed of the results.

The people most interested in a particular committee's activity are the best choice to put in charge of that committee. When they're interested, they do a better job. Their enthusiasm can be catching! When you see a committee person having fun doing work for the club, your members can't help but have fun along with him. When you set up your committees, make sure they meet your needs -- you should choose committees that make sense for your club.

You must provide some means to change or "amend" the by-laws. What seemed like a good idea at the start may not work out once you get started. Change the by-laws by a regular procedure to fix these minor mistakes and adjust to changing circumstances. To prevent hasty or foolish changes the amendment procedure should be fairly difficult. For example, "the amendment must be approved by 3/4 of the members present at each of two meetings held al least five days apart with written notice to be given to all members of the meetings and the amendment."

Use the sample by-laws posted in the files below as a source of ideas. Feel free to modify and adjust them as meets your needs. Just remember to be fair and forthright in your club's bylaws.

Congratulations! You now have an "official" operating NAR Section!

Running a Successful NAR Section

It takes work to make an NAR Section succeed. Getting one started is one thing, and the material above gave you some guidelines on how to do this; keeping it going for a sustained period of time is another. The two most common reasons for Sections going out of business are (1) loss of their launch site; and (2) volunteer burnout. The business of finding and retaining a good launch site is described in the "Launch Site" section. The "NAR Section Management Guide" in the files section of https://sites.google.com/site/xnarsection/home/section-administration is an excellent tutorial on many aspects of running a Section that is successful over a sustained period of time.

Finances

It takes money to run an NAR Section and all its associated services and activities. Money to do this can come from four places: dues paid by members; launch fees; sponsorships or donations; or sales of something that the Section or its members provide (concessions at a launch ,etc.). Most sections have at least some regular expenses that are the recurring cost of doing business, and new sections in addition have the challenge of getting together the equipment to run launches. Recognizing the value of Sections to the organization's health, the NAR does not charge its Sections any fees for chartering or for launch site insurance, and it offers cash grants to Sections (described below) for one-time costs such as purchase of launch or safety equipment. This still leaves a challenge for Sections to figure out how to finance their recurring costs. In doing this it is important to budget, manage, and account for income and expenses through a single point, the Section Treasurer.

Dues are usually the first source of a Section's income. They need to make up the difference between all of the creative other ways the Section can find to raise money and the Section's annual operating costs. Dues in the range of $10-25 per year are common, with a lower figure for younger members. Launch fees are also common, often in the range of $3-5 per day or $1 per flight (for model rocket launches) to considerably more for Sections that run big high-power launches with large amounts of expensive range equipment; normally Section dues-paying members pay lower fees than others, or none at all. Donations can range from merchandise provided by vendors, individuals, or community businesses that is then sold to members via an annual auction or regular raffle, to actual cash donations from local civic groups for Sections that do significant public youth outreach, or a donation jar at launches for the public and spectators to contribute. Other sources of income can include sales of drinks or food at launches, or resale of popular rocket merchandise for Sections without onsite vendor support at launches.

Expenses for a Section are typically dominated by the cost of acquiring and maintaining launch range equipment. However, payment of a fee of some sort to the land owner for the launch site is also common, and these fees can range up to well over $1000 per year depending on how many people use the site how often for launches. Other expenses may include the meeting room (if no public facility or private residence is available or suitable); launch site support costs (e.g. porta-potty, grass cutting, etc.); printing a paper newsletter or paying for a domain name and host for the website; and supplies or publicity for public outreach sessions.

Accounts

When the Section begins to accumulate any significant amount of money, then it is probably time to set up a checking account to hold it and permit accountable disbursement of funds. Normally banks will let non-profit groups set up accounts without too much hassle or expense. Sometimes a copy of the NAR's tax-exempt status letter from the IRS may be required. The document providing this is in the files below.

Sections are not authorized to use the NAR's Employer ID Number (EIN), they must get their own from the IRS if one is needed for the account. Make sure that the account has two or more authorizers users and check signers, so that if someone moves away or loses interest in the hobby, etc. the Section's money isn't trapped with no way to get it out.

As the section grows, and particularly if you are going to have the capability to have people join online through your website, then you will want a system to be able to collect money (dues) online as well. Typically this is PayPal. To set up a PayPal account requires an e-mail address and an associated bank account. Create a convenient email address such as "treasurer@myrocketclubname.org" from the control panel of your club's web site. Test it to make sure you can receive email at that address. Then go to http://www.paypal.com/ and create an account using that email address. Link your bank account to your new PayPal account. PayPal will deposit a small (i.e. less than a dollar) amount into your account. Log onto your bank's web site to view your account and discover how much was deposited by PayPal. Feed that amount back to PayPal as verification that you have access to the bank account. People can log onto the paypal.com site and send money to your "treasurer@myrocketclubname.org" email address. The money will show up in your PayPal account. Many rocketry vendors use PayPal and so the money can stay in your PayPal account. You can log onto PayPal to force the money back into your bank account if you need to write a check off of your bank account.

Section Grants from the NAR

Recognizing the importance of having sections be successful on a sustained basis, the NAR Board of Trustees has established a program of Section grants that provides funding of up to $250 per Section per year for safety equipment, launch equipment, and marketing activities, in that priority order.

For safety equipment, Sections may apply for all or part of the cost of firefighting equipment, rope line, windsocks, first aid kits, PA systems, launch rails, and other equipment deemed by the Section to be useful for improving safety.

For launch equipment, Sections may apply for all or part of the cost of buying or building launch pads, launch controllers, and other ground support equipment.

For marketing activities, Sections may apply for all or part of the cost of brochure design and printing, banners, signs, advertisements, and other costs of publicizing the Section.

To apply, send an email to NAR Headquarters with "Section Grant" in the title, and include the following information:

- Name and number of NAR Section
- Name of Section Officer Certifying Grant Application
- Email and evening phone number of Section Officer
- Brief description of the problem you are trying to solve

- Description of the funding requested; please provide detailed description of any equipment to be purchased (copies of catalog pricing, quotes, cost estimates)
- Description of any matching resources your Section can provide (funds, labor, parts)

There is no deadline; the grants are awarded on a continuing basis.

3. Publicity

Publicity is critical both to forming and to sustaining an NAR Section.

Print and Broadcast Media

Try using public service announcements in local paper and radio stations. Newspapers, particularly local weekly or biweekly editions, carry a “Community Calendar” of events. Your rocket club meetings and launches are legitimate candidates for these columns. Keep the information down to a minimum: time, date, place, and who to contact for further information. Also remember to keep sending in these announcements after your club gets going. It’s free advertising, and every spot you advertise may bring you more members. Check with your local papers’ requirements before submitting your announcements. Most will have no problem with an announcement like the sample below:

- *The Centreville Rocket Society will hold its meeting Friday, March 4, at 7:30 p.m. The meeting will be held at the Town Hall, Room 310. Contact Bill Jones, 555-1234, for further information.*

Local radio stations also run “Public Service Announcements.” Generally, the same text you sent to the newspaper will work here. Make sure you indicate you want a “public service announcement” made on behalf of your group when you write or call the radio station. Local TV stations sometimes have similar announcements, so check them out as well.

There are several ways you can use cable TV to your advantage. The first and simplest is to submit a form with a text ad announcing your new club. These ads typically run on page-oriented “community bulletin board” screens, or as “crawls” under the on-line program guide.

Even better, if you can spare the effort, you can videotape a club launch and submit it for airing on the local “public access” channel. Many cable operators are required to show whatever people in their community submit -- but keep in mind, the more professional the product, the better it will draw new members. Most cable operators will help you edit and add titles to the video, and many can even teach you how to put together a professional production and even loan you the equipment to film it!

The Internet

When you use the internet for publicity you can reach people directly, without having to convince an editor to publish a story. Once you have chartered with the NAR, your club will go up on the NAR Section List on the NAR website itself. If you have supplied an e-mail contact, you will start receiving inquiries from motivated modelers. Put up a web page for your club as almost a first order of business, and

ensure that this web page address is also available on the NAR Section List, in addition to the e-mail contact information. A web page won't get you a sudden influx of new members, but it can provide you a steady supply of interested modelers. The better it looks and the more it talks about the fun activities of your Section, the more effective it will be. See the "Communications" section of this guide for more tips on good websites. To get a sudden influx of attention, you can try kick-starting your club with a brief announcement in online rocketry forums such as The Rocketry Forum (TRF). Also, don't forget to post a notice to your general-interest regional community activity calendar, if one exists.

Finally, don't forget social media. A section Facebook page may catch the attention of people who might not otherwise hear about your club. A Facebook or similar page is also a great place to post photos and videos from launches. That can help maintain members' interest in the club, as well as attract interested non-members. You may also pick up some outreach opportunities that way.

Don't restrict your publicity efforts to those outlined here. Keep your eye open for any opportunity to get your message out to the public. And remember to keep up the publicity effort. It doesn't stop after you have a club formed. You will always need to replace members who drop out, move away, or go to college.

Demonstration Launch

One good way to attract attention and members for your new club is to host a rocket demonstration launch, usually known as a "demo" for short. This requires some equipment and some fellow modelers willing to help out -- one individual cannot run a demo alone. Once you have four to seven dedicated modelers, you can make use of this method to start or expand your Section.

Line Up Sponsors

Hobby shops can provide a base of support for your demonstrations. A hobby shop owner may be willing to sponsor your demo -- to arrange for your launch site, help with publicity, and perhaps even obtain engines or kits for you at low or no cost. Tell him in detail why you want to run a demo: to attract support and members for your club, and to show the public the safety, educational value, and fun of rocketry.

Arrange for a Launch Site

Secure permission to use the launch site. While this may seem obvious to many rocketeers, it is often overlooked in the enthusiasm of getting ready for one's first demo. Many site owners will be unfamiliar with rocketry, so be prepared. Explain the basics of the hobby to the owner. Have explanatory drawings, photographs, or even actual models on hand for examination. Stress the impressive safety record of sport rocketry. Tell the owner about the public service he is providing to the community.

Issue Press Releases

Issue press releases to local TV, radio, and print media. Here is a sample:

FOR IMMEDIATE RELEASE TO ALL MEDIA REPRESENTATIVES

Centreville Rocket Club Hosts Launch

The Centreville Rocket Society, in conjunction with Bob's Hobby Shop, 123 Main Street, is conducting a public demonstration launch on Saturday, March 15. Over 50 rockets of various types will be flown from Memorial Park starting at 2:00. Included in the launches will be a scale model of the Space Shuttle "Discovery," constructed by club member Fred Smith, and scheduled for flight at 2:30. At 3:00, club member John Miller will attempt to launch a raw egg 300 feet into the air and recover it undamaged. Further information on the launch is available from club president Bill Jones at 555-1234.

Local papers find stories on rocket activities interesting copy. Including a good photograph can actually help your chances of getting run -- editors love visuals.

Send the release to the media about two or three weeks in advance of your event. The coverage after the demo will continue to bring members to your doorstep.

Prepare Launch Equipment

Assemble the equipment necessary for the demo. There are several key pieces of equipment needed to run a proper demo:

- A good public address (PA) system;
- A rack or satellite launch system with central control of all pads;
- Flag or rope barriers to separate the launch and prep areas from the public;
- Chairs and tables for your workers to use during the demo;
- Tested, proven, safe models;
- Engines, wadding, igniters, and other supplies for the models;
- Flyers describing your club, its activities, and launches.

Run the Launch Professionally

To run your demonstration launch, it helps to have someone comfortable with talking to the public. Your "Master of Ceremonies" should keep the public fully and continuously informed about what is happening. He should describe the models and engines used, and comment about flight characteristics.

Many successful demos start by showing a variety of model types. Fly streamer recovery first, followed by parachutes, gliders. multi-stage, cluster, scale, and specialized models. Talk up the impressive models' flights beforehand, and let people know they are coming. This builds anticipation and holds crowd interest.

Also, remember you are supposed to be having fun. If you make the demo too serious and structured, your members will get stressed and the public is going to be unimpressed. Have your MC ask for rounds of applause for a particularly impressive flight. You will know you have got one when the crowd goes "Ahhh."

Capture New Members in Real Time

Always have information about your club available and have one member assigned to signing up all rocketeers interested in joining. This is the key reason for running the demonstration. People's interest will be high, so take advantage of the situation. Flyers like those you put in hobby shops are okay, but applications are better.

Another trick to keep the crowd buzzing is to raffle off a few simple kits every hour or so. This gets you names and addresses of potential members. You can buy the kits for the demo, get a hobby shop to donate them, ask members to donate a model, or raid your range store.

After the demo is over, have some members available to answer questions and sign up stragglers. There will always be a few spectators who want to ask questions after the demo is over, even if you had someone answering them during the demonstration.

Finish Up Responsibly

Clean the launch site thoroughly, especially if you ever hope to launch there again. If you passed out flyers, over 90% may be left as litter. People also leave soft drink cans and candy wrappers. Put all equipment away neatly.

Before you leave, get impressions from all members who helped out as to what could be improved next time. You may want to take notes while events are fresh in everyone's memory.

Within two weeks of the demo's conclusion, write thank you notes to everyone involved. Since so few people take time to say "Thanks" in writing, your group will be sure to be noticed by the site owner, hobby shop sponsor, and local authorities. Don't neglect this important final step!

Making The Most of Your Media Exposure

by Larry Shenosky

Spreading the word about rocketry isn't as hard as it might seem. It takes effort, some creativity, and knowing to whom you should direct your message. This article offers you some inside tips for getting coverage for your club. We'll focus on media attention before and during your next major launch.

You really have two goals at work:

- Draw a crowd (and get some new members).
- Expose the media (and thus the public) to model rocketry.

Recruiting new members for your local rocket group is easier when word of your next meet is spread by the mass media. Radio, print and television can be powerful supplements to the most direct way of reaching hobby enthusiasts: putting up posters in schools and hobby shops. The posters will spread your message to people who already are hobbyists... much like direct mail advertising is used in business.

The advantage of media coverage lies in its ability to reach a mass audience. Start to harness the media's power by examining your club's commitment to publicity. Do you have a public relations or media committee to handle the job of getting the word out? Good P.R. takes time, tenacity... and usually lots of typing! A committee of three means there is one person each to contact the print, radio and television outlets in your area.

Before you can contact the press, you need a list of the local newspapers. Be thorough and include major daily papers as well as their weekly suburban supplements. Be sure to check the phone book or library to make sure that you know about all the smaller community newspapers. Don't forget to look for monthly magazines in your club's geographic area. Supermarket shopper's tabloids and TV viewing guides often list community events to fill excess space between ads.

Once you're confident you have listed the available print contacts, start on the broadcasters. Local radio stations usually have one person who handles Public Service Announcements (PSA's). Radio's value to your club is that it reaches the age group you're looking for. Call the radio outlets in your area and ask to talk to the person who handles such announcements. Find out how much notice is needed and keep a note of the lead time.

Television is harder. Today, fewer TV stations maintain a public service department that produces PSA's for the local audience. If your local stations don't have a PSA contact, ask what department handles broadcasting notices of community events.

You might find local news departments with a noon or 5 pm newscast that has a feature called For Kid's Sake. Those stations have purchased syndicated rights to a

community service campaign targeted toward children and their parents. Many such TV stations do a weekly feature called the “For Kid’s Sake Calendar,” where the goal is to list community events suitable for family participation. Your rocketry club activities are just what they’re looking for!

While you are calling the television station, learn the names of three key people: the Assignment Manager, the Weekend Assignment Editor, and the Executive Producer. Later, you’ll see why these three people are the primary gatekeepers who can make or break your television publicity efforts. Compile a list of these three people for every local TV station that does news. The list will need to be updated every three months or so for all your media contacts.

Now that you have a master list of local media, you have some event planning to do! If you have an upcoming contest, you need to double - check your manpower on the flying field. The last thing you want to do is to be surrounded by 100 spectators and 3 TV station crews while you and your range crew fumble around looking for spare igniters.

Check the date of your launch against any type of community calendar you can find. Are you competing with a county fair or other major local event? Your chances for publicity are greatest when there is no significant event that might otherwise attract the attention of the local media.

Once you’re satisfied that everything is ready, assemble a press release. Some tricks of the trade are:

- Make the releases short -- no more than one page.
- Boldface the date and nature of the activity.
- Print or copy the release on something other than white paper. ALWAYS provide a contact person who is reachable during regular business hours as well as nights and weekends.

Releases should be mailed or delivered to each of the media outlets in enough time for the station to process the information. Send two releases to stations from which you want both pre-event publicity and day-of coverage. Your releases must be addressed to a specific person, usually the assignment manager for television news departments or the features editor for newspapers. Releases that look promising are filed according to date; others are simply pitched. Your goal is to get noticed. That’s where the boldfacing and colored paper come in, since your release is competing for attention with a few hundred others.

Once your releases are out, you’ll have the urge to call to ask whether they were received. Don’t! Newsrooms get zillions of such calls daily, and they end up damaging your chances. If you’ve done a good release, you’ll see and hear notices of your event in newspapers and on radio.

A day or two before your launch, an assignment manager or features editor will leaf through their press releases file and come up with a few stories to parcel out to the

reporters and photographers. If your release is doing its job, you'll get a call from a newspaper or TV news manager to set up the story. That's why it's important to have a phone contact during and after business hours.

Even if you get one phone call, you can employ some tactics the PR firms use. Call the newspaper feature reporter or the TV station Executive Producer. Tell them you don't want them to be embarrassed by missing your event because one of their competitors has called to set up the story. Be sincere about it and you'll stir their news gathering paranoia!

Another favorite PR trick is to deliver something to the newsroom that will generate talk about your event -- like a ready-to-fly rocket! Make an appointment and tell a feature reporter or weekend assignment editor that if their news people bring the rocket to the launch, you'll fly it for them.

By the day of the event, your advance work is over. The media will either come to cover your launch or they won't. If they do arrive, have a PR committee member introduce him or herself and offer to answer any questions. For TV, offer to provide rocketeers who are glib and can "talk in 20-second sound bites." You'll end up launching a few demonstration rockets, so make sure you have something big and slow so the photographer can follow. Above all, let the reporter and photographer do their work without being pestered. You're the expert at rocketry, they're the pros at getting you to tell and show them what it's all about.

After you get coverage, a nice thank-you note to the responsible parties is in order. Don't forget the people back at the station or newspaper who helped you publicize the event. You might do well to note when you have a future event coming up so they can mark it on their calendar.

The media love rocketry because it's visual and unusual. Capture those elements in your contact with the media and you'll see just how easy it is to get coverage. Good Luck!

4. Communications

Section Newsletters

by Steve Decker, NAR 9695

Many NAR Sections publish a newsletter -- mostly now distributed by electronic means rather than paper -- but why? What should be the purpose of a newsletter? Is it worth the time and effort? “Having a good newsletter on a regular schedule...was instrumental in keeping people interested in the section...Eventually I decided ‘why let these guys have all the fun?’ and got more involved.”

Purpose

The basic purpose of a Section newsletter is communication. It provides a means by which essential information about your club’s activities can be communicated from the leadership to the members. When the club grows beyond the size which allows the President to easily telephone every member before each important club activity, it is time for at least a one-page newsletter or basic news bulletin e-mail. This “letter from the president” serves to notify the membership of upcoming events, and acts as a reminder to forgetful or only partially active members to come to meetings, launches, lectures, etc. Though designed primarily as a means of communication with the members of the Section, the newsletter can also serve the purpose of communicating your Section’s activities and accomplishments to other clubs if your distribution list is expanded to include other Sections. In addition, you can ask your local hobby shop to give out copies of the newsletter to his rocketry customers, and thus attract new members to your Section.

Your Section’s newsletter can serve to impress on the club members and on potential new members that the Section conducts a variety of interesting activities. Furthermore, by keeping members advised of the results of activities they were unable to attend, the newsletter can help to develop a spirit of unity among the membership.

In addition, a newsletter allows the club to attract new members whose principal interests are not strictly rocketry oriented, but who would like to participate in the writing, editing, or distribution of the newsletter. All successful rocket clubs will have many non-rocketry jobs (newsletter, publicity, planning, range operations, etc.) available for persons interested in developing their skills in these areas.

Content

The most important item in any Section newsletter (and on any Section website) is the Calendar of Events, a listing of the meetings, launches, field trips, and other activities on the club's schedule. In addition, it can include a listing of events sponsored by other area clubs which your members have been invited to attend.

As the club grows, and some of your members are unable to attend every event, you can add summaries of contest or launch results and reports of actions taken at business meetings, so these members can keep up with the club's activities.

A listing of the club's rocket performance records in all of the events your Section has flown will help to stimulate competition among the members. There is nothing like having an established record to beat, and knowing that some recognition will be attained by surpassing it, to keep your members interested in the Section's launches and contests.

You can get a plan and design section started by printing the construction plans for each model holding a Section or NAR performance record. This will allow your other members to duplicate the model or exercise their own skills by trying to improve upon the design. More plans can be obtained by having a "Design of the Month" contest, in which all members are encouraged to submit designs of their favorite rockets for possible publication in the newsletter. The winners can be awarded a rocket kit, a gift certificate, or a free club membership.

Members engaged in development of new designs or technologies can use the newsletter to propose their new ideas and to report the results of their projects. If the newsletter is distributed outside your own Section (and it should be), this will allow members throughout the country to benefit from your member's research.

Special feature articles can be written by knowledgeable members of your Section or by friends from other Sections who are particularly skilled in one or more aspects of the hobby. Other subjects which can be included as your newsletter expands are information about the outside activities of club members, news from other Sections, summaries of regionals, conventions, NARAM, puzzles, cartoons, NAR news, new product information, etc.

Distribution

When your club is young you may only be able to produce a one- page bulletin for distribution to your members only. Don't feel embarrassed about this, as the Section newsletter is probably the most valuable benefit you can provide to your members, especially to inactive or non-local members. As your club grows, you can increase the number of pages and try for a wider distribution.

One good way to increase your circulation, and gather material, is to set up a newsletter exchange program with as many other sections as possible. This is basically a win-win

proposition, for you get news from other sections, including plans and construction articles, and all you need to do for it is to send out a few extra copies of your newsletter. Be sure to include the Rockwell Trophy judges on your distribution list, whether that distribution is done by paper or electronically.

Many Sections have turned to electronic distribution of Section news, either as an adjunct to, or a replacement for a printed newsletter. Almost every Section, manufacturer, and vendor have web pages as well. Online discussion forums are the best way to keep up-to-date with the hobbies of model and high-power rocketry. The NAR runs a Yahoo Group, a moderated online forum, for officers of NAR Sections and some sections run one of these as well. Another great source of industry news and views is Facebook, where most manufacturers and the NAR have pages that you can "like" and then receive in your own Facebook feed. Some sections also have Facebook pages.

Staffing

As the newsletter grows beyond a single page calendar of events, the work required to write, edit, and distribute it will require a staff of more than one person. The editor's task is to decide what material should be published in the newsletter, to encourage the members to write the necessary articles, and edit them into final form. A typist will then type the material in the required format. Most Sections have access to page layout and graphics software packages, which can really add to the appearance of a newsletter. The editor should proofread all material after it is entered on the computer, before the product is sent out electronically or sent to the printer for paper distribution.

Finally, for newsletters that are sent in paper form someone must take responsibility for distribution, which includes folding, stapling, affixing postage, addressing, and mailing. Distribution is very time-consuming, and errors can cost you plenty.

Printing

Most Sections just e-mail their newsletters, generally in Adobe Acrobat format. A few still photocopy their newsletters; in this case commercial print chains such as Staples and FedEx Office (formerly Kinko's) can do this cheaply and efficiently. The use of color, though expensive, really makes your work look great! Spend some time talking with the owner of the print shop you plan to use, and find out all you can about the options available to you.

Costs and Financing

Sections photocopying their newsletters generally find that copies can be had for as little as 3 or 4 cents per page. Use of color will increase this cost exponentially. Any charges for layout, setup, or halftones will also increase the cost. Electronic distribution is, of course, free.

The most irksome cost of newsletter production will be postage. You can save some money by sending newsletters Third Class, although the delivery service is much slower than First Class, and this may well not make it worth the money saved. Check with your post office for Third Class rates and requirements.

Most Section newsletters are financed from the club treasury, but if there are still hobby shops selling rocketry supplies in your area you can approach them about advertising in the newsletter. The ad rate should only be enough to defray the printing and mailing costs. You're not out to make a profit, you just want to keep costs down.

Frequency of Publication

The newsletter should be published frequently enough that it serves its purpose of communicating timely information to the club members. If it is published infrequently (less than bimonthly), the calendar of events will generally be inaccurate or incomplete towards the end of the time period unless your Section plans its activities well in advance. But don't try to publish so frequently that the staff has too much work, or is unable to find enough good material to include. Most clubs have found that 6 to 12 issues per year adequately fulfill their needs.

Although a newsletter requires a good deal of work on the part of the Section, most clubs have found that the increased communication and the spirit of unity it produces make it worth the effort.

The LAC Newsletter Award and the Rockwell Trophy

The NAR long ago recognized the value that section newsletters provided to the membership. This value was acknowledged in the creation of a special annual award, the LAC Newsletter Award. L.A.C. stands for Leader Administrative Council, an organization for teenage NAR members formed within the NAR many years ago but which was later disbanded. The one remaining legacy of the LAC is the Rockwell Trophy (originally donated by North American Rockwell) for the best NAR Section newsletter. This trophy was first awarded in 1969 and is presented at NARAM every year to the Section publishing the winning newsletter.

The awarding of the Rockwell Trophy to a Section newsletter acknowledges it as the best. The trophy is a fitting and historical award. It is also big and heavy. Today it requires two people to carry it for any long distance. The reason for this also has to do with a tradition. The trophy is hollow inside with lots of room. The winning Section is permitted to open the trophy and place in it rocketry memorabilia. The contents of the trophy are not to be divulged outside of members of the winning section. This tradition has survived the years without being compromised.

This curiosity about the contents of the Rockwell Trophy has created situations where sections want to win the trophy just to find out what is inside it. Reliable sources do

state that one of the items stored in the trophy is a Model Missiles, Inc. Rock-A-Chute rocket motor. The rest of the contents remain a mystery.

The LAC Newsletter Award. Is steeped in Glory, Honor, Tradition, and has a nice trophy too! Become part of the history, create a newsletter for your Section today! If you do this, someday you may be present at a NARAM when the announcement is made, "... The winner of this year's LAC Newsletter Award and the coveted Rockwell Trophy for best newsletter is..."

The judging criteria and list of judges for the LAC Newsletter Award are provided on the NAR website at http://www.nar.org/LAC.html.

Section Websites

by Trip Barber, NAR 4322

Websites have become the dominant means by which NAR Sections communicate to their members and to the public. A good website facilities timely communication with your members, and attracts people who do a web search for rocketry activity in your area to come check your Section out, then become members. They are a very effective membership-recruitment tool over the long term. Your goal in publicity is to get people to check out your website; the website then needs to convince them that your Section is a fun group that they want to come do activities with. If you have good and enjoyable activities when they do this, they will join. Good websites take work; they have to be set up, which is a significant one-time effort requiring a combination of software and artistry skills; but then they have to be kept current with accurate information about the Section's scheduled activities and other programs, which is a day-to-day chore. Your webmaster needs to have both skillsets, or you need a division of labor (and multi-person access) that lets different people handle each feature. If the website is ugly and poorly structured it will not attract people. If its information is outdated it will not provide potential new members with the information necessary to find you, and it will leave those who have joined dissatisfied with the information flow that they were counting on as members.

Setting up a website requires renting a "domain name", then finding a hosting service that will provide the digital space on which your website resides. There are many ways to get a domain name; the most straightforward is to rent one via a commercial service such as Dotster (http://www.dotster.com/). This is $15 or so per year. Getting a domain name that uses your section name in some easy to remember manner is desirable, but may be difficult depending on how many versions of this name have already been claimed by others. Hosting services can be provided for free if someone in your Section has a block of server space already that they are willing to let you use part of. Or you can rent space from a commercial service such as Dotster or the one the NAR uses, Blastzone (http://blastzonewebhosting.com/); Blastzone is $5/month. You want a reliable hosting service that does regular backups of the content and has backup power sources, which is not always the case for privately-owned server space. A person's

name and credit card is attached to the rental agreements for both domain name and server space and they have some sort of password-enabled access to these accounts; make sure that this access and password is held by more than one person.

The type of software, graphics, etc. that you use for your website can be a source of great debate among those in your Section who are familiar with website design. There is no single “best” solution. Regardless of which type you use, be sure that more than one person in the Section can use it so that updates are not at risk of single-point failure if the single key person departs or loses interest. And ensure that there is a means by which several Section officers can update at least the portion of the website that has the schedule and status of your current events.

The NAR has a Website Award Program to recognize sections whose websites do things the right way. The criteria for defining excellence are laid out in the document in the files section below. Even if you do not have in mind to compete for this recognition, any website needs certain minimum elements of content and structure in order to be useful at all. These are:

- Identification of the Section name and a statement of what the Section is all about, or the focus of its activities (youth outreach, high-power flying, etc.)
- Calendar of Section activities (meetings, launches, etc.) with date, time, and place -- that must be kept up to date
- Contact information for people who want to learn more or ask questions
- Maps/directions to the locations of the Section’s activities (launch site, meeting room) and any special limitations on the launches (motor size limit, waiver altitude, launch fees, etc.)
- “News” bulletin space where people can go to check the night before a launch to see if weather or other factors have forced a cancellation or limitation of activity

Expansion beyond these basic minimums is always desirable, if you have volunteers with the energy and skills to do it. Adding photo galleries from launches or other activities, lists of local hobby vendors, reference resources and links, member contact information, an ability to join online (with PayPal payment), a member online forum, and member e-mail addresses using your domain name, etc. are all good things to do. Four sections whose websites are routinely evaluated as the best are listed below; check out how the different ways in which each of these sections does things as an example to learn from when you are planning your own Section’s website.

- Central Massachusetts Spacemodeling Society (CMASS) http://www.cmass.org/
- Rocketry Organization of California (ROC) http://rocstock.org/
- Northern Colorado Rocketry (NCR) http://www.ncrocketry.org/
- Southern Colorado Rocketeers (SCORE) http://www.scronline.net/

5. Launch Sites

by Trip Barber, NAR 4322

Rocket clubs exist to support flying rockets, so your Section has to have a launch site in order to survive. With a great site, you can do more than survive, you can thrive and grow. But how do you find a place to fly? First, you have to decide what you need to have in order to support your members' interests, and what your minimums are. If you are a high-power oriented Section, you will need a pretty big field -- minimum site dimension at least 1500 feet with airspace above it that supports an FAA waiver and an access road to a launch spot that is 1500 feet or more from any road or inhabited building. If you are a model rocket/student outreach oriented section, then a city park or a couple of football fields might do and the FAA waiver does not matter. Or maybe you can structure the Section's activities so that you can operate with a good HPR field that you can only use a few times a year, with a smaller model rocket field available for more frequent use in between. Be realistic; near an East Coast metropolitan area, you are probably not going to get a site that supports "O" motor flights to 30,000 feet or one that you can fly on seven days a week!

Attributes of a Good Launch Site

In addition to overall size, which determines how large a rocket you can fly on a launch site, and to what altitude, it important to remember to check for other features:

- Access -- can people and vehicles reach the part of the site where the launch pads are going to be located without a major overland hike (and carry)
- Parking -- are there places with suitable surface for the number of cars that you expect (fliers and spectators) to be able to park without getting stuck or damaging the property
- Bathroom facilities -- if there are none built-in or nearby, then you are going to have to rent a porta-potty for every launch, which can add $100/month to your budget
- Recovery area -- beyond the cleared area that you will be using as the official "launch site", are there trees, houses, or crops cluttering the areas where rockets may drift under recovery,
- Fire hazard -- is the ground covered with vegetation that is likely to become dry and be a burn hazard for rockets lifting off from pads or those that may crash before ejection
- Seasonal limits - is the field a farmer's crop field that is only available when the crops are not growing, or is it a field with poor drainage that makes access impassable if it rains

Finding the Launch Site

The key to finding a launch site is energy. Make it your Section's top priority and put someone with initiative, available time, and good interpersonal skills in charge -- but with everyone else in the Section contributing ideas and legwork. Pursue every option; do not assume that any promising lead will result in success until it is actually finalized, and keep pursuing every angle until then. If you end up with two sites, so much the better! Here are some ideas for where and how to look:

- Personal contacts. Does anyone know about a possible spot already, or know somebody who might? Does anyone have a contact with a local agency (park authority, school district, farmer collective, sod farmer, etc.) who might control tracts of open land, or with a farmer or rancher who might own such a tract? Does anyone have a connection through 4-H, NAR's partners in aerospace education? Is there a connection (TARC team, etc.) to a school with a large set of athletic fields? Have everyone in the section ask everyone they know.
- Google Earth. Use this online service to do "aerial reconnaissance" of your area for open fields without having to rent your own airplane to do it!
- U.S. Geological Survey Maps. These fine-scale maps (generally 1 inch = 2000 feet) show topography, major tree stands, power lines, water courses, and urban development. They are available from local map stores or stores that support hikers, campers, or hunters.
- Regional Plan Commission. Most metropolitan areas have some form of regional planning commission or a council of governments agency . Aerial maps and surveys are often used by the commissions to record changes. Most areas are surveyed about every five years with the results being made into maps of approximately 1 inch=400 feet for the urban areas and 1 inch=8000 feet for the rural sections. You can get a print showing about 4 to 8 square miles for a small fee. In order to find out which agency serves the areas you want to look at, contact: National Association of Regional Councils, 1700 K Street, NW, Washington DC 20006.
- County Plat Books. You can obtain these from your county office, usually from the County Agricultural Agent, or from map stores. Details shown include the owner of the land, the acreage, and an outline of the shape of a piece of property.
- Zoning Maps: This may not be a source of finding open fields, but it will be important to know if the field that you find is zoned for the kind of recreational use represented by rocket flying -- particularly if you are going to be holding big launches with lots of traffic that gets noticed by local citizens.

Using the Airspace

If you plan to fly high-power rockets at your launch site, you will have to get prior approval for each launch event from the Federal Aviation Administration. This approval is granted as a "waiver" to use the nation's airspace, which FAA controls. The FAA has exempted model rockets (G motors and below, rockets weighing 1500 grams or less)

from requiring such prior approval. For larger rockets, you must apply for an FAA waiver using the procedures described on the NAR website. Before you commit to a launch site, if you plan to use it for high power, you need to contact the FAA to verify that there are no special restrictions on airspace use at that spot that would prevent you from ever getting a waiver, and to see what the maximum flight altitude is for which they will grant a waiver..

Once you have an FAA waiver, you are required to call the regional FAA Air Traffic Control (ATC) facility the day before your launch to activate the waiver. The ATC office will publish a NOTAM or NOtice To AirMen regarding an unmanned rocket launch with location, diameter and altitude of affected airspace. Pilots flying in the area should check NOTAMs for their route of flight. The waiver or authorization provides us with the FAA's approval to use the airspace. ATC will not vector IFR traffic through the waiver cylinder, and they will provide advisories to VFR traffic requesting flight following, but there is no expectation by the FAA that VFR pilots will avoid the area. In general, pilots are governed by FAR 91.13, "Careless or reckless operation - No person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another." Buzzing the launch area at low altitude or intentionally colliding with airborne rockets would be reckless, but simply flying into an area of unmanned rocket launching, or parachute jumping, or high terrain, is not reckless behavior. The bottom line is that the responsibility for avoiding conflicts with manned aircraft rests with the launch officials. The launch airspace is not sanitized for our use. Per FAR 101.23 (a)(4) "You must operate an amateur rocket in such a manner that it does not create a hazard to persons, property, or other aircraft."

Gaining Permission to Use the Launch Site

Locating the Owner

If a club member knows a landowner personally, your problem is easy. If you locate open land without knowing who its owner is, neighboring property owners may be able to tell you all you need to know to locate that owner. When dealing with neighbors be polite and do more listening than talking. Remember that if you gain use of the land these people will be affected, and it pays to have them sympathetic to your goals and needs rather than asking for injunctions against your activities and signing petitions to have you evicted later.

If personal contact is not an option, county land records will reveal the owners of a given tract of land although the process of going through records to determine this may be time-consuming. If the land is controlled by one person, your approach can be direct and personal. However, if the land is controlled by a government agency, other organization, or private business, you will have to find out who the key people are in that entity and how to set up your approach to them. If the governing body is an elected group (School Board, Parks Commission, etc.), it is best to work through the full-time staff before approaching that body for an approval.

Salesmanship

Whether dealing with an individual or an organization in requesting a launch site, your whole approach must be planned in advance. If you can, use people who are skilled in either sales or public relations as your representatives; certainly use people who look professional and can present your case articulately. Whoever approaches the owner has to get across an image of mature, responsible people who are involved in a safe, family-oriented activity that is a great influence on young people. Have your documentation, particularly on safety and on the NAR insurance, well prepared and use it judiciously. Bring an example rocket and some photographs of a launch. Sell your self, your hobby, the NAR, and your Section. Emphasize the value of rocketry as an educational activity for young people and what you will be doing to include them in your activities on the site. Be sure to mention the magnitude of the rocketry hobby, with more than one million fliers nationwide each year. Emphasize the NAR's international activities such as world championships teams, which bring honors to the US, and our sponsorship of the Team America Rocketry Challenge national student rocketry program, with the base for all of this being the local NAR Sections like yours all across the country. Use appropriate safety-related materials drawn from those posted on the NAR website as part of your pitch to the owner -- as a minimum the "Sport Rocket Safety Handout," or the more comprehensive "Launch Site Land Owner's Packet." Both may be found in the files section of https://sites.google.com/site/xnarsection/home/launch-sites

Put yourself in the landowner's shoes. How would you feel if someone came to you and asked for the use of *your* land for an activity with which you were totally unfamiliar? This gets magnified when you have to deal with an elected committee where every member could have different questions or concerns. On a committee, seldom can one member grant you permission to use the land, but quite often one member's opinion or vote can deny you the use of the property. The risk-averse decision is to say "no"; you have to offer more powerful reasons for the key decision-makers to say "yes". The property owner is not primarily concerned about whether you and your club are protected by NAR insurance and whether the hobby is safe for you; he or she wants to be sure that he or she is protected and that the activity offers minimal risks to them. So the fact that they are protected through your NAR site owner coverage is the point to stress. Get a site owner insurance certificate made out to cover the prospective site owner and take it to hand him at your "clinch the deal" meeting; NAR headquarters can arrange one of these with a couple of weeks notice.

If you are dealing with land owned by the government, your case will have to include the issue of equity of access for public recreational activities. Other activities with comparable numbers of participants are permitted to use public property under appropriate conditions, and your request is for a comparable right of access. Make sure that you know what other activities or operations are already using the site, so you can present a plan to work around or work with these other already-approved users. If you are dealing with land controlled by the military, you will have significant challenges with security concerns; free and open access by the public is not in the cards, so your request would have to include a way to ensure that the military commander will know in

advance who will be on the facility and how access to other parts of the facility will be controlled.

Sealing the Deal

It may be necessary, and is probably desirable in any case, to put on a demonstration launch for the site owner in order to show them what the activity really involves and prove its safety before you can get approval. Once they see rockets fly -- if they never have before -- it is almost always a positive. They may even like it enough to become fliers themselves! Naturally, make sure that you put on your best effort of safe, reliable rockets for any demonstration and talk the owner through the safety procedures and the access, crowd control, and parking procedures that you will enforce at launches.

Depending on the owner, you may need to have a formal written, signed agreement on terms of use. It is a good thing to do even if not an absolute requirement of the owner. This agreement would typically specify the limitations on what you can do, what areas you can use and not use, how the owner will be notified and approve of your planned flying dates, and what your responsibilities are for taking care of the property and repairing any damage done by people or cars, etc.. This is where you sort out what (if any) payment you will be making in exchange for use of the land. If you are charging a launch fee to fly, the owner should be getting compensation for the use of the land.

Local Authorities

It often requires more than the approval of the land owner in order to conduct rocket launch activities on a site. While model rocketry and high power rocketry, when conducted in accordance with the NAR Safety Codes, are legal activities in all 50 states, some states impose specific restrictions on the activity (California being the worst example of this) and many local jurisdictions require some form of either notification or prior approval of the fire marshal. It is prudent and highly recommended that before you commit to a launch site you meet with the fire marshal having jurisdiction over the site to make him aware of what you plan to do there and build a relationship with him just as you did with the land owner. See the page in this Section Manual on Laws and Regulations for more information and resources on safety, particularly fire safety. The fact that NAR rocketry is recognized and its safety and launch site requirements are codified in Codes 1122 (Model Rockets) and 1127 (High Power Rockets) by the National Fire Protection Association will be a very powerful part of your discussion with any fire marshal.

Keeping the Launch Site

Access to a launch site is a privilege, not a right. The land owner is graciously allowing a bunch of strangers to fly on his land, and is unlikely to be making enough money (if any) from your use to compensate for any aggravation this may cause. And the neighbors are part of the deal, as your activity creates noise and traffic that affects them

as well. The land, its owner, and your neighbors should be treated as friends; do not abuse your privilege of use. Have clear rules of procedure and behavior that protect the site owner's property and the neighbors' sensibilities that you enforce at your launches. Since your club is a group rather than an individual, field rules must be enforced by the RSO (and every club member) with concern for keeping the field and not for avoiding the possibility of hurting a flier's feelings. The most important thing is keeping the flying site.

Suggested Launch Site Rules

- Park only in designated areas.
- Spectators are not permitted in the launch pad area.
- Small children must be accompanied by an adult at all times.
- The NAR Safety Codes must be adhered to for all flights, all of the time.
- Each flier is responsible for any property damage he or she causes.
- No retrieval of rockets from neighboring property without the owner's permission.
- All trash must be placed in appropriate receptacles and none may be left behind on the field.
- Instructions and warnings from the RSO will be adhered to by all flyers and spectators.

If you are using private property, you should compensate the owner in some manner, explicitly (by an agreed fee) or indirectly (by gifts or donations). If you are using public property, such as schoolyards or parks, without a use fee then consider sponsoring a benefit event (launch, auction, raffle, etc.) with entry fees or using proceeds from a concession stand at launches (if one is permitted) to provide funds for a donation of something of value to that organization. Invite your landowner and neighbors to the annual club banquet or barbecue and remember them at holidays with a gift. Never take for granted the people or organization whose good graces make it possible for your Section to do what it exists to do -- fly rockets.

6. Launch Equipment

NAR Sections exist to fly rockets as a group effort, and it takes launch pads, electrical ignition controllers, and other equipment to run a safe rocket launch for a group. Even a “misfire alley” range setup where people bring their own launch systems (see the section on “Running Launches”) needs some support equipment.

What kind of equipment should a section have in order to run a launch? It depends somewhat on the size of the launch and the size of the rockets that will be launched, but obviously it starts with launch pads and a launch control/firing system that complies with the requirements of the NAR Safety Code: “My launch system will have a safety interlock in series with the launch switch, and will use a launch switch that returns to the “off” position when released.” and “I will launch my rocket from a launch rod, tower, or rail that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up, and I will use a blast deflector to prevent the motor’s exhaust from hitting the ground. To prevent accidental eye injury, I will place launchers so that the end of the launch rod is above eye level....”

Whatever the technology of the launch control system, it needs to deliver at least ~15 amps of current to the clips at each pad that it serves in order to reliably light heavy (HPR) igniters or clusters of model rocket igniters. With a standard car battery as the power source (12.8 Volts), located at the launch control panel, this means that the wires from the launch controller to the pad (if they are 10 meters long) need to be no less than 16 gauge (based on resistance to current flow including the battery’s internal resistance), and preferably 14 gauge (based on heating from a long firing pulse). If the pads are just 5 meters away then 16 gauge wire should be OK. It also means that for high-power pads located 100 feet to 500 feet from the launch control panel, the firing battery needs to be close to the pad and the launch control system needs to control a firing relay near the pad rather than being the direct source of the firing current.

The photographs below show some of the launch systems that various NAR members and groups have used. Most of this equipment is designed and built by individual fliers; few systems are available from vendors, and unfortunately rocketeers are much more diligent about writing up plans for their rockets than they are plans for their rocket launchers!

In addition to the equipment directly involved with launching the rockets, a wide range of general support and safety equipment is often used on NAR section ranges. This includes:

- A public address system to provide the Safety-Code-required warning of impending launches and/or air horns to provide a “heads up” warning to people of unsafe situations
- Folding-leg tables to accommodate the launch control panel and PA system, and to serve as working tables for safety checkin and other range administrative functions.

- Fire fighting equipment such as a pressurized water or an“indian pump” fire extinguisher (the best kinds for grassfires) and fire swatter or fire rakes to smother grass fires.
- A foldable “E-Z Up” type of canopy tent to provide shelter from the sun or weather for the RSO and safety checkin
- Flag line or caution tape and 3-4 foot tall stakes to establish a “do not cross” safety perimeter around the launch area to keep spectators at the required safe distance.
- Signs to indicate where rockets are to be safety checked, and to provide any local field rules that spectators must be aware of

Any of this capital equipment, and particularly the equipment associated with safety, can be funded through an NAR grant to the Section (see the page on “Management” for details on the terms of these grants). Acquiring, doing maintenance on, storing, and transporting the equipment for a Section range can be a big job. Splitting custody of the equipment between multiple individuals can lead to real problems if one of them does not make a launch, so this generally means one person has it all -- unless the Section becomes big enough to afford a trailer that can be used to store the equipment between launches and transport it to launches. Even then, somebody has to tow the trailer. The volunteer who handles a Section’s range equipment is truly an MVP among the Section’s volunteers who deserves thanks and recognition from his fellow Section members! It is also a job that should be rotated periodically if possible, to avoid volunteer burnout.

Model Rocket Launch Pads

Pratt Hobbies (https://www.pratthobbies.com)sells a multi-pad launch controller that can support up to 6 separate launch pads, or 6 positions on a rack-type launcher.

Mid-Power Launch Pads

Apogee Components published the plans for an inexpensive rail launcher suitable for mid-power and lower-end high-power rockets in their Newsletter Issue #235

Knight Manufacturing makes heavy duty launch pads suitable for mid-power through low-end high power rockets.

High Power Launch Pads

Giant Leap Rockets (https://giantleaprocketry.com) sells some of the key components (rails, rail stops, etc.) for HPR launch systems.

7. Running Launches

by Steve Decker, NAR 9695

For almost all rocket clubs the first order of business is launching, and the first piece of club equipment will be a launcher. The least complex rocket firing range consists of nothing more than a single launch rod mounted on a sturdy base, a firing battery, some hook-up wire, and firing and safety interlock switches. Equipment of this type is available from the rocket manufacturers or can be home-built by one of the members. Such a firing system is fine for one or two model rocketeers, but an organized club will soon require a more elaborate firing range in order to avoid long delays between launches. At this point a decision must be made. The club members can elect to purchase or construct more individual launch systems and operate a “Misfire Alley” range, or a multiple position “Launch Rack” firing system can be constructed for model rockets. Sections that fly a lot of high power rockets will want a different kind of system, one that controls launching from a number of widely spaced and large pads a considerable distance away. Each system has its own advantages and disadvantages, so each Section should carefully consider its own needs and available resources before making the decision.

Range Operations and Safety

In all cases, as the launch operations expand and the club becomes bigger more rocketeers and spectators will be present on the range during firing operations. At this point, and when any high power rockets are launched, safety considerations dictate that one there be individual, the Range Safety Officer (RSO), who has overall responsibility for all activity on the range. The RSO must decide if the conditions are safe for a launching before the countdown can begin. He must be sure that:

- The model on the pad is safe for flight,
- The engine is a NAR Safety Certified type,
- The sky is clear of conflicting aircraft,
- The rocketeers and spectators are at a safe distance, (see the safety code)
- The rocketeers and spectators are attentive to the fact that a rocket is about to be launched, before he allows the launch countdown to begin.
- Immediate fire hazards (tall grass, etc.) are cleared from the launch pad areas.

In addition the RSO should ensure that certain “best practices” are followed when operating the range:

1. Ensure that launch rods/rails are angled so that all flight paths (with weathercocking) result in trajectories that do not go over any spectators.

2. Have a means of alerting everyone on the range of a dangerous situation (PA system, FM broadcast, air horn, etc.) so they can go “heads up”, but do not abuse the use of this for minor rocket malfunctions that

do not represent a real danger.

3. Know who to call or what to do in case of a personal injury or fire on the range.

4. Ensure that immediate-action firefighting equipment is available and in working order in the launch area.

5. Take prompt, definitive corrective action when a safety incident or “near miss” occurs; find the problem that caused the incident and correct it before flying continues.

Additional information in provided in the files below concerning how to conduct safety check in for rockets and how to run a safe rocket range. In addition, launch safety is covered in a whole section of the NAR website; this includes the NAR Safety Codes for model rocketry and high power rocketry. Competition rocketry, including how to run a contest, is covered in a NAR-run Google site like this one that is connected to the NAR website.

Insurance and Damages

Despite the best efforts of fliers to be safe and make rockets that work, and of RSO’s to run a safe range, sometimes accidents happen at rocket launches. These generally fall into two categories: a rocket hits something and damages it, generally during the recovery phase as the result of a failed recovery system; or a rocket’s exhaust at launch, or ejection charge on landing after a crash, starts a grass fire. By setting up the range with the spectator and parking areas crosswind from the launch area, and by angling the launch rods/rails slightly away from the spectator and parking area, the probability of impact damage is greatly reduced. If grass is cleared away from launch pads as required by the NAR Safety Codes, the probability of fire damage is greatly reduced; and with proper firefighting equipment readily at hand a fire can be stopped before it spreads.

If an incident happens that causes significant damage, the Section and the flier of the rocket causing the damage (if they are an NAR member) will both be covered by NAR insurance up to $2 million ($1 million for fire damage to the launch site). NAR insurance has a $5000 deductible (of which the member or section is responsible for the first $1000), so it should not be used for minor claims for dents from rockets landing on cars under recovery systems. Some sections make it quite clear to people attending their launches (fliers or spectators) that with respect to such minor damages they are attending at their own risk, and have them sign a “hold harmless” agreement such as the one on the files section below. The details of NAR insurance are covered in a set of “frequently asked questions” on the NAR website at http://www.nar.org/insurancefaq.html.

FAA Waiver

If you plan to fly high-power rockets at your launch, you will have to get prior approval for each launch event from the Federal Aviation Administration. This approval is granted as a “waiver” to use the nation’s airspace, which FAA controls. The FAA has exempted model rockets (G motors and below, rockets weighing 1500 grams or less) from requiring such prior approval. For larger rockets, you must apply for an FAA waiver using the procedures described on the NAR website (http://www.nar.org/cabinet/waiverinst.html). Once you have an FAA waiver, you are required to call the regional FAA Air Traffic Control (ATC) facility the day before your launch, and then both that facility and any nearby airport control towers two hours before the launch to activate the waiver. The ATC office will publish a NOTAM or NOtice To AirMen regarding an unmanned rocket launch with location, diameter and altitude of affected airspace. Pilots flying in the area should check NOTAMs for their route of flight. The waiver or authorization provides us with the FAA’s approval to use the airspace. ATC will not vector IFR traffic through the waiver cylinder, and they will provide advisories to VFR traffic requesting flight following, but there is no expectation by the FAA that VFR pilots will avoid the area. In general, pilots are governed by FAR 91.13, “Careless or reckless operation - No person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another.” Buzzing the launch area at low altitude or intentionally colliding with airborne rockets would be reckless, but simply flying into an area of unmanned rocket launching, or parachute jumping, or high terrain, is not reckless behavior. The bottom line is that the responsibility for avoiding conflicts with manned aircraft rests with the launch officials. The launch airspace is not sanitized for our use. Per FAR 101.23 (a)(4) “You must operate an amateur rocket in such a manner that it does not create a hazard to persons, property, or other aircraft.”

Range Layout

Independent of the type of firing system employed, the basic range layout will remain the same. (See figure below). The range itself is a large, open area relatively clear of trees and other obstacles. Its size depends on the power of the models to be flown, and a guide to field size can be found in the launch site dimension table following the NAR Safety Codes. Selection of a field of the recommended size or larger will not guarantee that all rockets with properly functioning recovery systems will land within the range area, but only that a malfunctioning rocket will not be likely to impact outside the recovery area should a recovery system failure occur.

The exact set-up of the “Firing Area” will depend on the type of launch system chosen. However, the Firing Area is generally located at the center of the range so that it does not have to be moved if the wind shifts during the launch session. On small fields the Firing Area may be located nearer the upwind edge of the range so that models will drift down over the range area. However, the Firing Area should never be located along the edge of the range area, to avoid problems caused by malfunctioning rockets impacting outside the range area. The designated Firing Area should be marked off with rope or flag line barriers at all launches where more than a few rocketeers or spectators will be

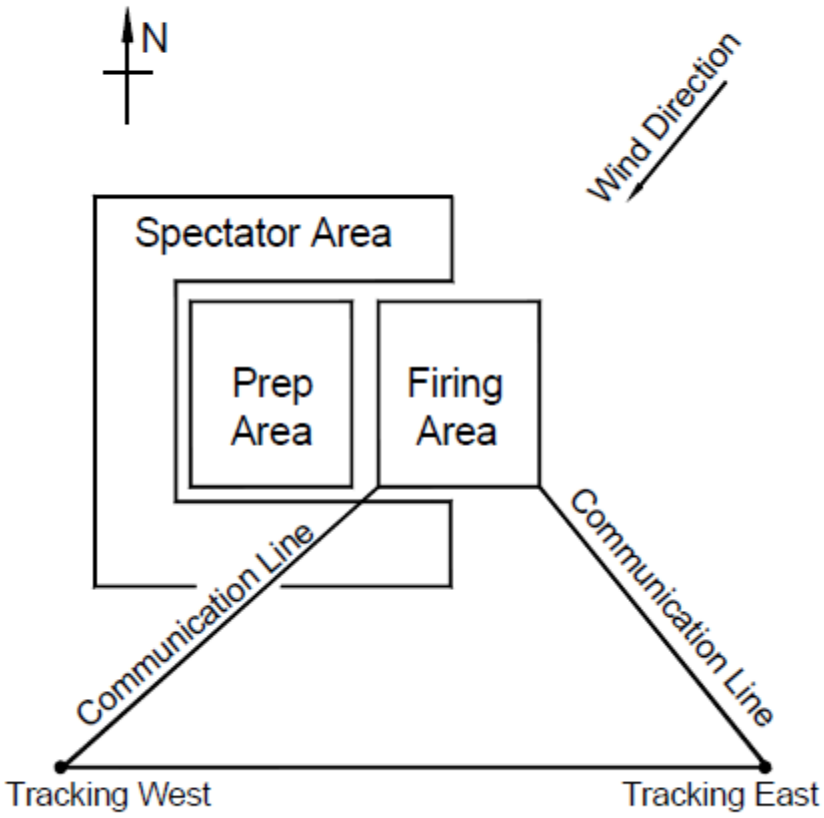
present, to avoid the hazard of having an inattentive modeler or uninformed spectator wander into the Firing Area during a launching.

Modelers readying their rockets for flight use the “Prep Area”. For large launch sessions or contests the Prep Area may be equipped with folding tables as a convenience for the modelers. Unless the launch is a small one, with few spectators present, the Prep Area should be roped off to keep spectators from disturbing (i.e., stepping on) the models. The Prep Area is generally located downwind from the Firing Area since marginally stable rockets will usually tend to “weathercock” and fly into the wind. Thus the area upwind of the Firing Area is generally more hazardous than the other three sides. At all launches where high power rockets are to be flown, this area should be kept clear of rocketeers and spectators.

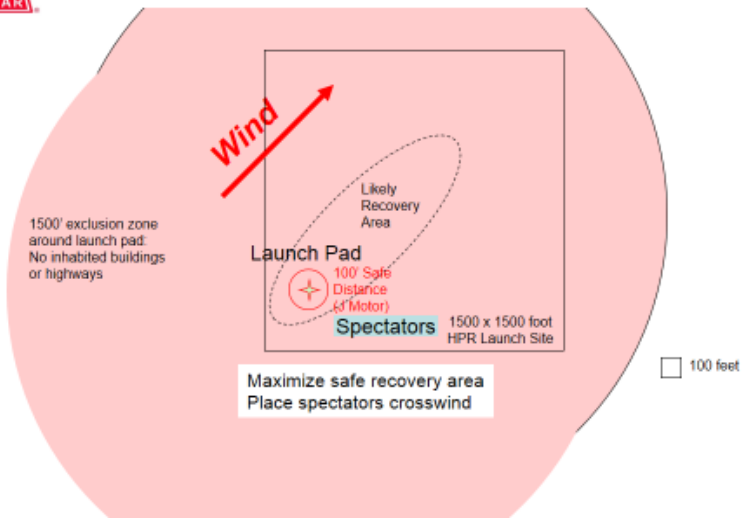
A Generalized Model Rocket Range

If the launch site is located in an area where large numbers of spectators would be likely (such as a public park) or if advance publicity makes it likely that there will be a large number of spectators, a specially roped off “Spectator Area” should be provided. For safety reasons, the Spectator Area should be crosswind from the Firing Area, not upwind (where weathercocking rockets with recovery failures will crash) or downwind (where rockets on recovery devices will be landing). Since spectators at rocket launches are already showing some interest in the hobby, a table with club information packets encouraging them to join your section can be located in the Spectator Area. A club member should wander through the Spectator Area occasionally, answering questions, explaining model rocket safety, and promoting your Section.

A Generalized Model Rocket Range



Ideal launch site layout for small fields



Misfire Alley Range

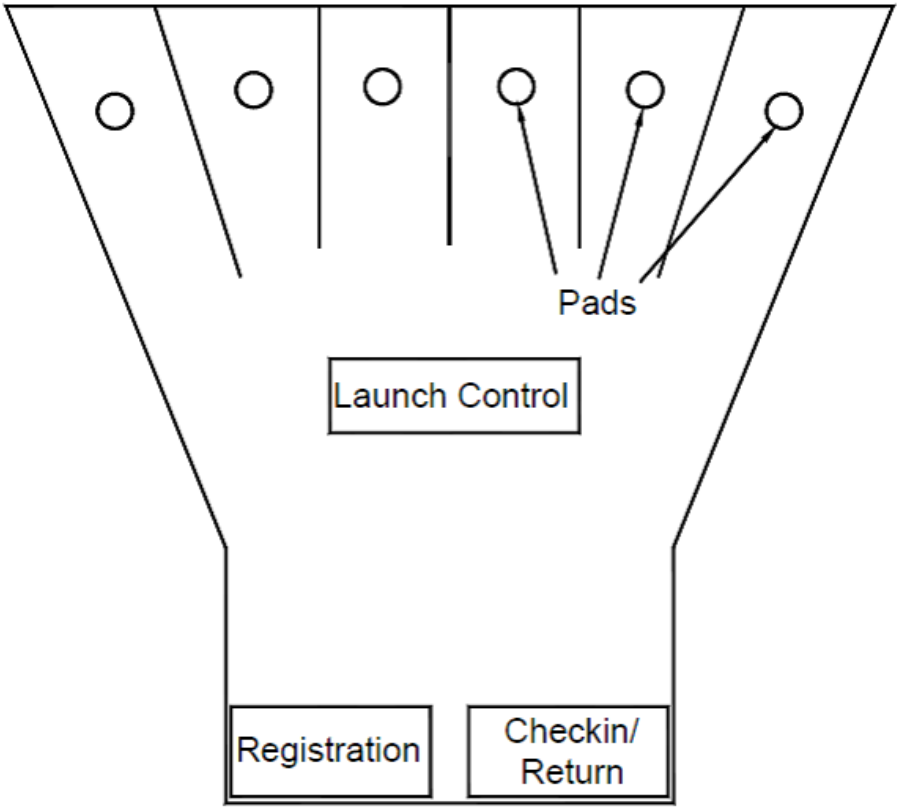
The Misfire Alley system is an “individual responsibility” system for model rocket ranges. Everyone who wants to fly at a club function provides his own personal launcher, firing system, and firing battery; or he arranges to use the system provided by another club member. Each participant sets up his own launch system in an area designated by the RSO. Usually the launching stations are placed in a straight line or U-shaped arrangement, with each launch pad located at least 5 meters from the next one. A large sign adjacent to each launcher designates the launching station by number. Each participant is free to prepare his own models for flight in the area of his launching station, without interference from other participants. Since he is located at least 5 meters from the next nearest launcher, he may continue preparing his model while other rockets (D powered or below) are being launched. When large models are being flown, the RSO may require that all persons on the range stand and observe the flight path in order that they will be immediately aware of any malfunction, and that rocketeers in adjacent firing stations leave their areas during the actual firing.

The RSO conducts range operations from the center table and each pad functions independently under his control. The RSO, who is centrally located and has a clear view of all participants, spectators, and launching stations, as well as the area surrounding the range, gives a range safety clearance by announcing to all participants “Pad number 5 is clear to launch.” The modeler at station 5 then arms his firing system, either he or the RSO gives an audible 5 second countdown, and the modeler launches his rocket.

The only range equipment which the club must supply is a public address system or bullhorn for the RSO, so that his announcements may be heard by everyone on the range, numbered signs for each launching station, and a barrier to keep spectators out of the Firing Area. None of this equipment is expensive, difficult to build, or difficult to transport, and it requires virtually no maintenance. The Misfire Alley system avoids the problem of appointing a club member to keep the firing panel and launch racks in good shape. Each rocketeer is responsible for keeping his own launch system in working order, and he has only himself to blame if it fails to function properly. However, a disadvantage of the Misfire Alley system is that it requires each rocketeer to purchase his own launch system, thus taking away some of the monetary advantage of joining a club to save his money.

A small club whose members already own simple launch systems should certainly consider the misfire alley system, especially during the early growth stages of the club. Some larger clubs have also found that this system meets their needs. Other clubs find that the launch rack system is more suitable when membership increases or for large contests where rocketeers will be traveling on public transportation and carrying a personal launch system would be inconvenient.

The Misfire Alley System



Launch Rack System

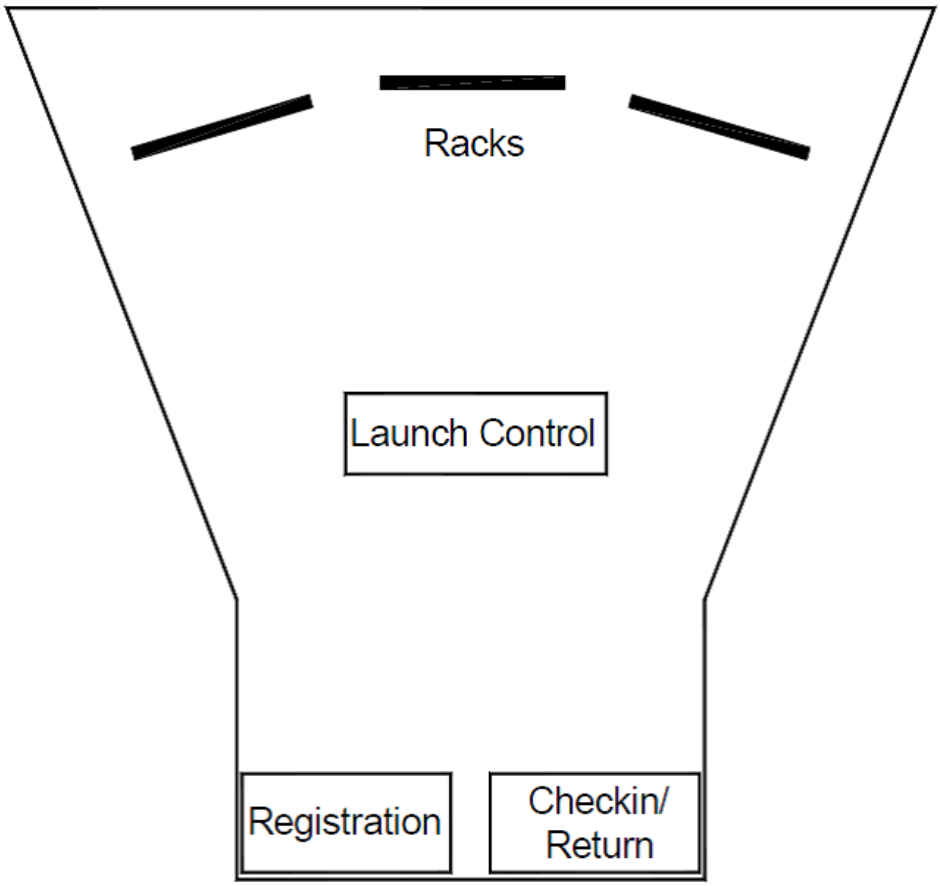
The Launch Rack System for model rocket ranges attracts new rocketeers to the club by allowing them to get involved in the hobby without investing in their own launch system. A single rack, consisting of nothing more than a wood sawhorse with holes drilled in the crossbar to accept 6 or 8 1/8” x 36” launch rods, will not require a great financial investment on the part of the club. A firing panel, with individual launch cables running from the battery through a firing switch on the panel to each launch position on the rack can also be easily constructed at low cost from parts available at any electronics supply store.

Generally, the rack launcher is set up at least 5 meters in front of the firing table, and a multiple position firing panel is located on the firing table. The Launch Control Officer (LCO), acting under instructions from the RSO, launches each model from the rack in sequence. When the rack is empty, the LCO removes the “safety key”, making it

impossible to launch a rocket accidentally. The RSO then announces that the “rack is safe for loading.” The next group of rocketeers then goes out to the pad to load their models on the rods. The LCO does not arm the panel by inserting the safety key until he is instructed to do so by the RSO, who has determined that all rocketeers have left the pad

On busy ranges, several rack launchers (spaced at least 5 meters apart), are controlled from the same firing table. With this arrangement one rack can be loaded while the second is being fired, making range operations more efficient by allowing rockets to be flown almost continuously.

Launch Rack Firing System



High Power Launch Range

High power rockets are those powered by motors above the “G” power class and/or weighing more than 1500 grams (3.3 pounds), or that are powered by a “sparky” or hybrid rocket motor. They can go all the way up to over 100 pounds. The launch equipment that they require is proportional to their size -- large and heavy. The launchers are all for single rockets, have heavy steel bases with widely-spread legs, and typically use rails 6 to 12 feet in length rather than rods. The minimum safe distance that the LCO, RSO and spectators must be away from any active launch pad is 100 feet (for J motors and below), and it can range up to over 300 feet, so significant amounts of wire are required from the launch control point to each launch pad. The launchers are usually set up in rows, a few tens of feet apart and spaced at 100 feet from the launch point (for H through J powered rockets), 200 feet (K powered rockets or rockets with multiple motors of lower power classes), 300 feet (L power) and “away”, or 500 feet. for larger rockets. See the “Running a Big Rocket Range” file below for more details on how to set up a high-power range.

Running a high power range requires a significant investment in heavy capital equipment in addition to very careful attention to safety given the large size and high energy of these rockets. Rigorous pre-flight inspection at check in by an experienced high-power-certified NAR member is essential to safety. And of course an FAA waiver for use of the airspace is required. For all these reasons, people tend to band together in Sections in order to purchase, set up, and operate such a range.

Other Range Features

As the number of rocketeers and spectators attending your launches increases, many other additions can be made to make your range more comfortable and convenient to use. When running a contest, a bulletin board can be used to post up-to-the-minute contest results. This allows participants to know what performance they must beat in order to move into first place, and allows spectators to get more involved in the excitement of the contest.

A “Range Store” selling various rocketry supplies is a great convenience for the modeler who forgets something, or needs to make an on-the-field repair. If the club already maintains its own supply of parts and engines for sale to club members, this “store” can be brought out to the range and manned by club members during the flying session. For large gatherings, the local hobby shop or one of the numerous traveling rocketry vendors may be agreeable to the idea of bringing out a trailer full of rocket supplies to sell on the range.

A refreshment stand, with cold soda in summer and hot chocolate in winter, can be a profitable operation for your section. At all-day launches, or weekend regionals, you can add snacks or sandwiches if there is no restaurant within easy traveling distance of the range. At each launch you will discover more little things you could add to the range to make its operation more fun.

8. Section Activities

Regular Section Activities

Think back to the time before you got busy with the process of organizing your Section. Remember all the things you wanted to do in a group then? Well, you've just accomplished everything it takes to begin to make your plans come true. Don't be afraid to try anything, but don't try everything at once. There's plenty of time for all the projects you dreamed about before you formed your Section.

Launches

Schedule regular sport launches. This simple, easy-to-organize activity is undertaken by every NAR Section. It's a chance to get together at the flying field, see the new models and new designs, and fly until dark -- or maybe beyond that, if you have a night launch with lighted rockets. Your members benefit tremendously from these launch sessions; they are the fundamental reason most people join a rocket club. Your "rookie rocketeers" get to see more experienced members strut their stuff, and they will learn. Your experienced members often get new ideas from one another, and everyone can have a few laughs over those less-than-perfect flights. And don't forget, you're much less likely to lose rockets when you have all those extra pairs of eyes to help watch the launch. Like meetings, they should be on a regular schedule at a regular location. Don't over-organize the launch. Schedule one . . . your members will show up. Schedule them on a regular, predictable basis at the same launch site and eventually people (members and others) will build this club routine into their personal routine.

Don't start off by having formal competitions at launches. Get your feet on the ground first. Let the members fly or not fly as they wish. The bulk of the time at most launches is spent inspecting one another's models and predicting flight performances. This kind of interaction is really educational. Your younger members will learn building and finishing skills, engine selection and flying tips from the older members. And the younger crowd will often be the source of new model ideas you never thought of.

Fly local demonstration launches. They are excellent ways to attract new members and inform the public of the fun, education, and safety of sport rocketry. Some Sections make this their primary activity. They have so much fun putting on the show, they can't stop! Hearing the cheers and applause for a really super flight can't be beat!

Organize your own contests. Your first contests do not have to be NAR-sanctioned. You can gain valuable experience by running simple contests with two or three events. In fact, some NAR Sections host "funny meets" with bizarre events created by the club. Try "A-Engine Ping Pong Ball Duration" for some side-splitting flights. Night launches with fully-illuminated rockets are also popular.

Membership Recruitment

If your town has a public library, ask about setting up a static display of rockets, posters, engines, etc. Other places to look include park district offices and malls. These displays are great publicity. Since space is nearly always limited, use only the best models you have available. Setting things up is a pleasant way to spend an afternoon, and you get to repeat the performance when taking down the display.

What about a promotion in conjunction with your local hobby shop owner? Many clubs have built a nice kit, and raffled it off at a hobby shop. It gets the club a lot of new names and addresses to contact. The hobby shop owner gets more traffic through his store. If you build several kits, you can hit multiple hobby shops, getting more members involved in the building, printing up the entry blanks, and contacting the hobby shops. A raffle lets you build rockets, but more importantly, it trains more of your members in public relations. What more could you want from a club project than active members, better relations with your local hobby shop, and publicity, all for the cost of a couple of kits?

Meetings

Surprisingly, business meetings can be an activity your members will look forward to. They should be held regularly, at the same time and same place every month. NIRA and NARHAMS sections have held their meetings in the same spot and time for years. Even now, members who have left the area often return on vacation or for visits and know where to find them. Your members will know where to find you if you stay in one spot. Meetings are the place to conduct club business. The president runs the meeting, usually with the help of a prepared agenda. The agenda keeps the meeting on track, and assures that important business is attended to. The secretary should read the minutes of the last meeting. This allows those not present last month to know what went on. The treasurer should give his report, then old and pending business is reviewed. New business follows that, then adjournment.

Have experienced members give talks at your meetings. Since all of your club is there, why not have everyone benefit from the experience of your best boost/glider builder or scale modeler? Your youngsters need instruction too. Give someone a chance to teach those forgotten techniques: filling body tube seams, getting good airfoils on fins, correctly packing parachutes, building a good launch system. These talks break up the meeting’s tedium and keep interest up.

You can set aside certain meetings as group building sessions -- have everyone bring their parts and tools and spend the evening building a particular plan or type of model. This activity is so popular that some clubs do it at almost every meeting.

Don’t leave fun out of your meetings. NIRA section always begins its monthly meetings with its “Model of the Month” contest, where members vote on models displayed and select the best one for this club honor. They also show NASA films and movies or tapes of our own launches and contests. Members have also given talks about modeling

techniques, and hardly a month goes by that someone doesn't mention a new product they've tried and liked. These items aren't really club business, but they keep the meetings lively and interesting. Don't be afraid to include a few of them.

Other Activities

Try a social outing after your meetings or launches. NOVAAR leaves their meetings only to immediately gather at a local fast food restaurant. Several hot competition sections have hosted various victory parties after contests. You'll need to find someone willing to host the event, but the costs can be low if you make it a "pot luck" affair. When you socialize, you can continue to shoot the breeze, discuss the latest products and laugh over flights at the last contest or launch. After-launch or meeting socializing is another quick, easy-to- organize activity that costs you nothing, so try it.

Organize trips to contests, sport launches and conventions. Every rocketeer remembers his "first" trip experience. Contests give you the chance to see really first-rate rocket performance. Conventions give you a chance to learn about topics ranging from basic building to plastic model conversion to running rocket clubs! Hear experienced NAR members pass on their tips for success in flying and organization. You can also see manufacturers displaying and selling their latest and hard-to-find products. Many conventions also feature auctions or swap shops. Your members can clean out their workshops or pick up some bargains!

How about visiting a local science museum, aviation museum, or NASA facility? Schedule a day when the whole club can make it. Inquire about group rates, special programs, and tours of "insider" areas.

Informal, non-flying competitions can be great fun. How about a static display contest where every member builds the same model or kit bashes the same kit? Remember to recognize the winners at the meeting following the judging.

Club Emblematic Items

Shirts, patches, hats, decals, and similar "emblematic" items are a great way to reinforce team spirit in your Section and have your members show their pride in belonging. They might even be a money-maker for the Section depending on your business model for how they are bought and sold.

9. Outreach

by Trip Barber, NAR 4322

G. Harry Stine, founder of the hobby of model rocketry and of the NAR, used to tell adults who wanted to thank him and offer to pay him back for the work he had done to inspire them with rocketry as young people “don’t pay back, pay forward to the next generation”. Wide support among our members for “paying forward” has been a hallmark of the NAR since its beginning. If those of us who are adult leaders in the NAR and its Sections do not make outreach a priority and spend at least some of our rocketry time on it, reaching out both to young people and to school and community leaders, the hobby and the NAR will fade away over time. Outreach programs are a way in which NAR Sections can pay forward and spread enthusiasm for our hobby and for aerospace sciences in general. These programs involve having experienced rocketeers conduct a structured activity that passes along rocketry information and skills, and enthusiasm, to those not familiar with the hobby or with the techniques of building and flying rockets. There are four general types of outreach activities:

1. Demonstration launches for large groups or for the general public, with a public address message about the hobby and with information brochures available (covered in the “Publicity” section in these web pages)

2. Classes for groups about how rockets work and about elements of the hobby.

3. Group rocket-building sessions, potentially with a launching session either immediately afterward or within a few days.

4. Support for participants in structured national rocketry programs such as the NAR/AIA Team America Rocketry Challenge or the NASA Student Launch Initiative

In general, outreach ought to be targeted to people whom it is likely will have some interest in and ability to participate in rocketry activities (either academic or hobby-related) following that day’s interaction. It should have a message that is being communicated (“join our Section and have this kind of fun with us” or “study math and science so you can be a rocket scientist”) or an objective that is being pursued (earning a Merit Badge, completing a class learning objective) and must have content targeted to this message and to the age group and interests of the audience in order to be effective. Typically events that include a hands on activity such as building and/or flying a rocket are more effective in stimulating follow-on interest than more passive classroom type activities. Of course, presentations to groups can reach a much bigger audience, so if these are your opportunity, livening them up with videos of rocket launches or using pass-around examples of rockets may help enhance audience interest.

Don’t expect huge return from any single outreach activity; persistence is the key to long-term success. And “Bunny’s rule of tens” (named by and for a former NAR President) generally applies: for every ten interested people who are in a participating

group you will normally at best get one who takes the next step (coming to a launch after a building session, for example); and then for every ten who take this second step, one may take the final step by becoming an actual member of the Section or active hobbyist. Combining steps with your participants, such as by having a launch after a building session at the same site on the same day, may improve your return ratio.

If you have young people fly their first-ever rocket with you as part of one of your outreach programs, you can give them an NAR certificate of accomplishment (see the file below). We started this certificate as a “Fly 50K” program where we were working toward getting 50,000 young people to do their first rocket flight with an NAR Section as part of celebrating our 50th anniversary as an organization in 2008. We still have not reached that goal officially, so if you hold a launch where you award these certificates, be sure to report your number of first flights to the NAR using the online Fly 50K report form, available at http://www.nar.org/fly50K.html. Another NAR program that is well-suited to working with young rocketeers and recognizing them for the achievement of their first couple of flights within a more structured process with specific, but easy-to-attain objectives is the NARTREK Cadet Program.

Here are some examples of the types of groups with which your Section can make a connection as part of an outreach program:

- Schools

Science teachers are often open to ideas about how to build enthusiasm in their students for science-related activities. Some of them may already use model rocketry in their school classrooms, or as a club after school. Seek out these teachers and invite them to join your Section. If they are into rocketry, offer to help. If they are not, offer to teach them how – use the educator resources on the NAR website (http://www.nar.org/teacher.html) as a starting point. Time is a limiting factor for teachers; they have many learning objectives to cover in their classroom time, and many school-related tasks they have to perform in their time outside of the classroom. So their capacity to spend their own time on rocketry may be limited, and your help may be welcome. Liability and risk from rocketry may be an issue for school administrators; use the resources about safety on the NAR website (http://www.nar.org/safety.html) to make the case with them about the hobby’s safety.

- Camps

Summer camps or youth after-school “camp”-like activity groups with a science-education theme may include or be willing to include rocketry in their programs. These types of groups typically have much more time available than schools for their participants to devote to a single activity such as rocketry. They can also become long-term commitments for repeated programs, which can be either good (lots of young people get the rocketry experience) or bad (the volunteers who do this may burn out or not be able to keep up with the time demand).

- Scouts

Boy Scouts of America is a natural for model rocketry as one of their Merit Badges in in Space Exploration. One of the requirements of this merit badge is to build and successfully launch a model rocket, and then launch it a second time with some kind of mission in mind. This mission does not have to be a complicated one. It can be to simply land a rocket within a specific distance of a flag in the launch area. There are also many knowledge requirements connected with this merit badge (see the web link above), but the rocketry part of it gives the local Section a perfect opportunity for outreach. Members of the Section could start by having a demonstration launch, and follow with a building session and launch with the scouts who choose to participate. 4 or 5 evening sessions with the scouts or one full weekend day should be enough to complete all the Merit Badge requirements.

- 4-H

The NAR has a national partnership agreement with 4-H (http://www.nar.org/4-H.html). They have a mission to engage young people in science, engineering, and technology (SET) activities through their local 4-H chapters, and we are their official source of information and volunteers to help local 4-H groups that want to do this using rocketry. 4-H is in every county in the US, has more young people as participants that Girl and Boy Scouts combined, and has adult supervisors in many of its chapters who own farm land and pastures! They do not have a national program like a merit badge for rocketry, but lots of local 4-H chapters have science as their principal activity, and quite a number have rocketry specifically as their core activity.

- Civil Air Patrol (CAP) and Air Force Junior ROTC

The Civil Air Patrol is an aerospace education and military skill development program run by the US Air Force for young people. There is a structured (but optional) rocketry program within CAP (http://www.gocivilairpatrol.com) that a number of “squadrons” (units or clubs) choose to follow, and that was drawn significantly from NAR programs. CAP encourages its cadets to become NAR members and its squadrons to become NAR sections. Like any youth group, CAP units often value the advice and contribution of volunteer experts to run particular educational units or to provide support such as operating a launch range for a unit rocketry session. The Air Force also runs junior ROTC units at over 800 high schools around the country and some of these units have model rocket programs (not exactly the same as CAP). Check with your local high school to see if they have a unit that might be interested in a rocketry program.

- Community

Sections have run rocketry displays and demonstration launches in local community or county fairs and community day celebrations, and at air shows. They have partnered with local hobby stores to do “make it, fly it, and take it” sessions where the store offers the kits at a discount and provides a building spot and potentially a launching site nearby. They have set up and run displays about rocketry and the NAR in science or aviation museums, teacher conventions, or conventions of other groups likely to have an interest in rocketry. They have worked with Challenger Learning Centers or local

science or aviation museums that run programs including model rocketry. Every community has its own unique opportunities for an audience you can reach out to; just make sure that the audience is one that is likely to include the kind of people who will actually follow up and engage in rocketry and potentially join your Section.

Many outreach programs involve building, or better yet building then flying, a model rocket. A Section that pays for all the materials to do this with a large number of people can run through their entire treasury in a hurry. It may be possible to get local grants from businesses or civic groups to support this, or to charge a nominal fee to participants in a building session to cover the cost of the kit and building materials. The list below describes all the bulk-pack vendors that currently provide the kinds of inexpensive rocket kits and supporting products needed to do this type of activity.

- Aerospace Speciality Products Educational Kits, http://www.asp-rocketry.com
- Apogee Components Educator Bulk Rocket Packs, http://apogeerockets.com
- Balsa Machining Service School Rocket Kit, http://balsamachining.com
- Custom Rocket Company bulk packs of beginner kits, http://www.customrocketcompany.com
- Estes Industries Educator Bulk Packs of rocket kits, http://www.estesrockets.com
- Pratt Hobbies school kit bulk packs, https://www.pratthobbies.com
- Quest Aerospace Group Value Packs, http://www.questaerospace.com

10. Laws and Regulations

by Trip Barber, NAR 4322

The hobby of sport rocketry is well recognized as a safe and legal activity under the laws and regulations of the Federal government and of every state. There are, however, significant limitations and conditions on the activity, which every hobbyist must understand and obey. Strict compliance with the law and cooperation with public safety officials has always been a hallmark of the National Association of Rocketry and its affiliated individuals and sections. It is vital to the future health of the Association and its credibility as a responsible spokesman for the hobby that we all remain fully informed of the applicable laws and set the example for the public in following them.

This article summarizes those Federal or nation-wide laws and regulations, which the average hobbyist is likely to encounter; there are a few more (not mentioned here) that apply only to those few who are manufacturers, dealers, or amateur motor-makers. Some states and local jurisdictions also have more restrictive laws or ordinances, so it is wise to check with a local fire marshal prior to holding a new section's first public or organized launch event.

The hobby of sport rocketry is divided into two general "classes", model rocketry and high-power rocketry. The dividing line between them is based on two factors: rocket motor characteristics, and rocket liftoff mass. Rockets using motors above the 'G' power class (or motors with an average thrust greater than 80 Newtons regardless of power class), having combined total impulse greater than 320 Newton-seconds, or having a liftoff mass above 1500 grams are always called "high power rockets".

There are two foundations for the hobby's regulatory coverage: the Codes of the National Fire Protection Association (NFPA) and the Code of Federal Regulations (CFR). The NFPA is a non-governmental public-safety organization dedicated to writing safety codes and model laws for fire prevention. These Codes are recognized nationwide as the single authoritative public safety source for fire marshals; most (but not all) states and local jurisdictions adopt them unchanged--check with your local fire marshal about your area. Both the NAR and the Tripoli Rocketry Association (TRA) belong to the NFPA and participate in writing its codes governing sport rocketry safety. The Code of Federal Regulations is the multi-volume set of regulatory details produced by the various enforcement agencies of the Executive Branch that "flesh out" the implementation of laws passed by Congress. The CFR's have the force of law. As a result of decades of work by the NAR and manufacturers, special and fairly liberal rules for sport rocketry are specifically mentioned in numerous spots in the various volumes of the CFR.

This article is divided into sections based on specific regulatory topics. The applicable legal basis is noted in the discussion under each topic and all are listed in the references. Launch safety and its associated regulations and lessons-learned are

covered in a whole section of the NAR website; this includes the NAR Safety Codes for model rocketry and high power rocketry.

Safety Codes

The NAR has two Safety Codes, one for model rockets and another for high-power rockets. The main differences are in the specified distances everyone must stand back from a launch, and in the extra rules for high power requiring user certification and compliance with FAA airspace rules. The NAR high-power and Tripoli Rocketry Association safety codes are virtually identical because both are based on the specific requirements for rocket construction and operation found in Chapter 2 of NFPA Code 1127 (High-Power Rocketry). The NAR model rocket safety code follows Chapter 2 of NFPA Code 1122 (Model Rocketry). NAR insurance does not cover accidents resulting from violations of the safety code, and such violations are illegal in states that have adopted the NFPA Codes as law.

Minimum Ages

There is no minimum age for purchasing or flying model rockets and most types of model rocket motors under Federal regulations or NFPA Codes, although most manufacturers recommend adult supervision for those under 10 years of age. Some states (such as California) and local jurisdictions have minimum age requirements for purchasing motors, particularly D and larger sizes.

Motors above ‘F’ power class, and all motors that use metallic casings (including reloadables) regardless of power class, may only be sold legally to those 18 years of age or above. This is because while model rocket motors are specifically exempted from regulation under the Federal Hazardous Substances Act (FHSA) law by the Consumer Product Safety Commission (CPSC) under paragraph 1500.85(a)(8) of Title 16 of the CFR, larger or metallic motors are not exempted. The FHSA requires that non-exempted items such as these motors be classified as “banned hazardous substances”, and such items may not legally be sold to minors.

Under NFPA Code 1127, “high power motors”--motors above ‘G’ power class, and any motor whose average thrust is above 80 Newtons --may be sold to or possessed by only a “certified user” (see the “user certification” heading below). One requirement for becoming such a user is to be age 18 or older.

User Certification

NFPA Code 1127--and the safety codes of both the NAR and TRA--require that “high power motors” be sold to or possessed by only a certified user. This certification may be granted by a “nationally recognized organization” to people who demonstrate competence and knowledge in handling, storing, and using such motors. Currently only the NAR and TRA offer this certification service. Each organization has slightly different

standards and procedures for granting this certification, but each recognizes certifications granted by the other. Certified users must be age 18 or older.

Explosives Permits

Hobby rocket motors (including high power) no longer require a Federal explosives permit to sell, purchase, store, or fly. Certain types of igniters, and cans or other bulk amounts of black powder do require such permits. Under the Organized Crime Control Act of 1970 (Public Law 91- 452). A Federal Low Explosives User Permit (LEUP) from the Bureau of Alcohol, Tobacco, and Firearms (BATF) is required to purchase these items outside one's home state, or to transport them across state lines. These items, once bought under an LEUP, must thereafter be stored in a magazine that is under the control of an LEUP holder. A "Type 3" portable magazine or "Type 4" indoor magazine (described under NFPA Code 495) is required, and it can be located in an attached garage. BATF must inspect such magazines.

Federal permits can be obtained from the BATF using their Form 5400.13/5400.16, available from the ATF Distribution Center, 7943 Angus CT., Springfield, VA 22153. These are issued only to U.S. citizens, age 18 and older, who have no record of conviction of felonies and who pass a background check conducted by the BATF. This check includes a personal interview by a BATF agent.

Launch Site Requirements

The first requirement for any launch site is permission of the owner to use it for flying rockets! Use of land--even public property--without permission is usually illegal and always a bad way for a NAR member to demonstrate responsible citizenship. The NAR will issue "site owner" insurance to chartered sections to cover landowners against liability for rocket-flying accidents on their property-- such insurance is normally required.

The NAR safety codes and NFPA Codes establish some minimum requirements for the size and surroundings of launch sites. Model rocket launch sites must have minimum dimensions which depend on the rocket's motor power as specified in Rule 7 of the model rocket safety code and its accompanying table. The site within these dimensions must be "free of tall trees, power lines, buildings, and dry brush and grass". The launcher can be anywhere on this site, and the site can include roads. Site dimensions are not tied to the expected altitude of the rockets' flights.

According to the high-power safety code, high-power rocket launch sites must be free of these same obstructions, and within them the launcher must be located "at least 1500 feet from any occupied building" and at least "one quarter of the expected altitude" from any boundary of the site. NFPA Code 1127 establishes further requirements for the high-power site: it must contain no occupied buildings, or highways on which traffic exceeds 10 vehicles per hour; and the site must have a minimum dimension no less

than either half the maximum expected rocket altitude or 1500 feet, whichever is greater--or it must comply with a table of minimum site dimensions from NFPA 1127 and the high power safety code.

While model rocketry and high power rocketry, when conducted in accordance with the NAR Safety Codes, are legal activities in all 50 states, some states impose specific restrictions on the activity (California being the worst example of this) and many local jurisdictions require some form of either notification or prior approval of the fire marshal. It is prudent and highly recommended that before you commit to a launch site you meet with the fire marshal having jurisdiction over the site to make him aware of what you plan to do there and build a relationship with him just as you did with the land owner. See the page in this Section Manual on Laws and Regulations for more information and resources on safety, particularly fire safety. The fact that NAR rocketry is recognized and its safety and launch site requirements are codified in Codes 1122 (Model Rockets) and 1127 (High Power Rockets) by the National Fire Protection Association will be a very powerful part of your discussion with any fire marshal.

Airspace Clearance

The Federal Aviation Administration (FAA) has jurisdiction over the airspace of the U.S. and whatever flies in it. Their regulations concerning who may use it and under what conditions are known as the Federal Aviation Regulations (FAR)--which are also called Title 14 of the Code of Federal Regulations (14 CFR). Chapter 1, Subchapter F, Part 101 of these regulations (14 CFR 101.1) specifically exempts model rockets that weigh 16 ounces or less and have 4 ounces or less of propellant from FAA regulation as long as they are “operated in a manner that does not create a hazard to persons, property, or other aircraft.” When operated in this safe manner, model rockets may be flown in any airspace, at any time, and at any distance from an airport--without prior FAA approval.

Rockets larger than these specific limits--i.e. all high-power rockets--are referred to as “unmanned rockets” by the FARs and are subject to very specific regulations. Such rockets may not be flown in controlled airspace (which is extensive in the U.S. even at low altitudes and includes all airspace above 14,500 feet), within 5 miles of the boundary of any airport, into cloud cover greater than 50% or visibility less than 5 miles, within 1500 feet of any person or property not associated with the operation, or between sunset and sunrise. Both NFPA Code 1127 and the NAR high-power safety code require compliance with all FAA regulations.

Deviation from these FAR limits for unmanned rockets requires either notification of or granting of a “waiver” by the FAA. Such a waiver grants permission to fly but does not guarantee exclusive use of the airspace. The information required from the flier by the FAA is detailed in section S 101.25 of the FAR (14 CFR 101.25). If the rockets are no more than 1500 grams with no more than 125 grams of propellant, no notification of or authorization by the FAA is required. Larger rockets require a specific positive response from the FAA Regional Office granting a waiver before flying may be conducted; and the waiver will require that you notify a specific FAA contact to activate a Notice to Airmen

24 hours prior to launch. The waiver is requested using FAA Form 7711-2, available from any FAA office or the FAA website. This form must be submitted in triplicate to the nearest FAA Regional Office 30 days or more in advance of the launch, and it is advisable to include supplemental information with it, including copies of the Sectional Aeronautical Chart with the launch site marked on it and copies of the high-power safety code. The FAA charges no fee.

Ignition Safety

The NAR safety codes and the NFPA Codes both require that rockets be launched from a distance by an electrical system that meets specific design requirements. Ignition of motors by a fuse lit by a hand- held flame is prohibited, and in fact both NFPA Codes prohibit the sale or use of such fuses. All persons in the launch area are required to be aware of each launch in advance (this means a PA system or other loud signal, especially for high-power ranges), and all (including photographers) must be a specified minimum distance from the pad prior to launch. This “safe distance” depends on the power of the motors in the rocket; the rules are different for model rockets and high-power rockets. Both the field size and the pad layout at a rocket range--particularly a high-power range--must take into account and support the size of the rockets that will be allowed to fly on the range.

For model rockets, the “safe distance” depends on the total power of all motors being ignited on the pad: 15 feet for 30 N-sec or less and 30 feet for more than 30 N-sec. For high-power rockets, the distance depends on the total power of all motors in the rocket, regardless of how many are being ignited on the pad, and on whether the rocket is “complex”, i.e. multistaged or propelled by a cluster of motors. The distance can range from 50 feet for a rocket with a single ‘H’ motor to 2000 feet for a complex rocket in the ‘O’ power class. These distances are specified in a table in NFPA Code 1127 and the NAR high-power safety code.

Motor Certification

Both NAR safety codes and both NFPA Codes require that fliers use only “certified” motors. This certification requires passing a rigorous static testing program specified in the NFPA Codes. The NAR safety codes and insurance require that NAR members use only NAR certified motors; and since the NAR currently has a reciprocity agreement with TRA on motor certification, this means that TRA- certified motors also have NAR certification. The NFPA Codes recognize certifications granted by any “approved testing laboratory or national user organization”, but only the NAR and TRA can provide this service in most parts of the country. The California Fire Marshal has his own testing program for motors in that state. Motors made by private individuals or by companies without proper explosives licenses, and motors not formally classified for shipment by the U.S. Department of Transportation, are not eligible for NAR certification and may not be used on an NAR range.

Shipping of Motors

Sport rocket motors generally contain highly flammable substances such as black powder or ammonium perchlorate, and are therefore considered to be hazardous materials or explosives for shipment purposes by the U.S. Department of Transportation (DOT). There are extensive regulations concerning shipment in the DOT's section of the CFR--Title 49, Parts 170-179. These regulations cover packaging, labeling, and the safety testing and classification that is required prior to shipment. These regulations are of great concern to manufacturers and dealers, and there are severe penalties for non-compliance. Basically, it is illegal to send rocket motors by UPS, mail, Federal Express, or any other common carrier--or to carry them onto an airliner--except under exact compliance with these regulations. The reality of these regulations, and the shippers' company regulations, is that it is virtually impossible for a private individual to legally ship a rocket motor of any size. Transportation of motors on airlines is very difficult to do legally and should be avoided if at all possible. It takes weeks of advance effort with the airline, and in the post-September 11 world is probably not even worth attempting.

Insurance

Most property owners, whether government bodies or private owners, will demand the protection of liability insurance as a precondition to granting permission to fly sport rockets on their property. The NAR offers such insurance to individual fliers, to chartered NAR sections, and to flying site owners. Individual insurance is automatic for all NAR members. It covers only the insured individual, not the section or the site owner. Under the current underwriter this insurance runs for a 12 month period, coincident with NAR membership.

Sections are insured as a group for a year; remember that section insurance is coincident with the section charter and expires on April 4 each year. Site owner insurance is available to all active sections for free. Each site owner insurance certificate covers only a single site (launch field or meeting room).

NAR insurance covers only activities that are conducted in accordance with the NAR safety code using NAR-certified motors. It provides $2 -million aggregate liability coverage for damages from bodily injury or property damage claims resulting from sport rocket activities such as launches, meetings, or classes and $1 million coverage for fire damage to the launch site. It is "primary" above any other insurance you may have.

References

NFPA Code 495, Explosives Materials Code, National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.

NFPA Code 1122, Code for Model Rocketry. NFPA Code 1127, Code for High Power Rocketry.

Code of Federal Regulations, Title 14, Part 101, Federal Aviation Regulations by the FAA for unmanned rockets.

Code of Federal Regulation, Title 16, Part 1500.85(a)(8), Consumer Product Safety Commission exemption for model rockets.

Code of Federal Regulations, Title 27, Part 55, Bureau of Alcohol, Tobacco, and Firearms regulations.

Code of Federal Regulations, Title 49, Parts 170-177, Department of Transportation hazardous material shipping regulations.

Model Rocket Safety Code, National Association of Rocketry.

High Power Rocketry Safety Code, National Association of Rocketry.