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AIR FORCE JROTC  
MODEL ROCKETRY PROGRAM  
HANDBOOK

## **Model Rocketry Program**

OPR 1. Construct, launch, and evaluate at least one model suitable for the altitude competition described in the NAR United States Rocketry Sporting Code (NARUSRSC).

OPR 2. Construct, launch, and evaluate at least one model rocket suitable for the scale, plastic scale, or payload competition described in the NARUSRSC.

OPR 3. Construct, launch, and evaluate at least one model rocket suitable for the drag race, parachute duration, boost, or glide competition described in the NARUSRSC.

OPR 4. Construct, launch, and evaluate at least one model rocket suitable for the aerospace systems or research and development competition described in the NARUSRSC (Optional for advanced rocketry program only).

OPR 5. Prepare a diagram of a typical model rocket launch site. This diagram may be as elaborate as desired, but must include: launcher, model rocket, igniter, and land area requirements.

OPR 6. Submit for evaluation a journal of all activities completed in the model rocketry program. The journal must indicate completion of all OPRs.

LPR 1. Demonstrate a knowledge of the AFJROTC model rocketry program and its concepts and techniques by satisfactorily implementing, administering, supervising, and evaluating model rocketry activities.

LPR 2. Demonstrate a knowledge of the organization of AFJROTC model rocketry program activities, including personnel required, skills necessary, and the job responsibilities of cadets and adult supervisors for rocketry activities.

LPR 3. Demonstrate knowledge of the physical facilities required for all model rocketry operational activities, to include facilities for storage, handling, and building static models, flying and safety precautions, and spectator protection.

LPR 4. Demonstrate the leadership skills necessary to conduct an individual test, group test, and NAR-sanctioned model rocketry competitive meet.

LPR 5. Serve successfully as the safety officer in addition to a minimum of three of the remaining positions listed in para 2.4.2.6.

LPR 6. Pass an oral examination covering the topics of model rocketry techniques, procedures, operations, and safety precautions.

Particular attention should be given to the selection of instructional personnel. Although desirable, it is not necessary that instructors be experts. Before a program has begun, units should decide how many instructors are needed and provide enough time for them to become knowledgeable in the specialties they will teach.

Units will conduct the model rocketry program according to the provisions of this instruction and the following guidelines:

National Association of Rocketry (NAR)  
United States Model Rocket Sporting Code.  
NAR Model Rocket Safety Code.  
Contest rules and safety regulations of the  
National Aeronautics Association (NAA) and  
the Federation Aeronautique Internationale (FAI)  
Federal Aviation Regulations, Part 101, Manned  
Balloons, Kits, and Unmanned Rockets.  
Federal Communications Commissions, Part 95,  
Citizens Radio Service.  
State and local governments.

Cadets will keep a record of their rocket launchings to include aircraft flown on an individual, group, or competitive basis. Flight records will include duration of flight, fuel, repairs (if any), type of aircraft, and whether the operation is under supervision of a qualified flight instructor. Cadets should be prepared to provide flight information to the SASI.

Conduct individual model rocketry program activities involving launchings or flying under the supervision of the range officer, safety officer, and first aid officer.

Responsibilities and minimum positions necessary to supervise an AFJROTC model rocket competitive meet include:

**Range Officer or Contest Officer.** The range or contest officer takes complete charge of the range or flying field, directs all action, gives all orders, makes all decisions, supervises all operations, and is normally positioned at the control center. For AFJROTC launches or meets sponsored by AFJROTC, the range officer will be an AFJROTC instructor.

**Safety Officer.** The safety officer is responsible for checking all critical points of the operation in advance to ensure safety regulations are followed. The safety officer conducts safety briefings prior to launches and instructs all personnel in safety procedures. No launching or flying will take place until the safety officer issues clearance to the range officer.

**First Aid Officer.** The first aid officer administers first aid to participants and spectators as required. The first aid officer will be an individual who qualifies for the job by completing a Red Cross first aid course or similar training required by school officials.

**Launch Supervisor, Flight Line Officer, or Contest Security Officer.** Ensures established procedures are followed at the launch site/flying field, monitors launches and landings, and certifies a clear launch/flight area to the range officer before activity begins. This officer is responsible for ensuring the security of displayed static models.

**Spectator Control Officer.** The spectator control officer is responsible for clearing launch areas of all personnel not assigned to specific posts and ensuring spectators and personnel are at a safe distance before giving clearance for activity to the range officer.

**Range Guards.** Range guards are responsible for keeping passers-by out of the area, scanning the sky for aircraft, and certifying to the range officer that it is safe to launch rockets.

Observers and Trackers. Observers and trackers are responsible for tracking the path of the rocket and taking observations on the azimuth and angle of the elevation at the peak of the trajectory for plotting. They are also responsible for advising the range officer of in-flight emergencies and dead-stick landings, assisting in the safe recovery of downed aircraft, and reporting all pertinent data to the control center.

Public Affairs Officer. The public affairs officer arranges for advance publicity and provides for newspaper, radio, television, and magazine coverage of the activities, seeking favorable public relations. The public affairs officer is also responsible for maintaining lines of communication with supporting organizations, parent booster clubs, and school authorities as to the current activities of the program.

Units conducting model rocketry programs encouraged to establish a NAR section or have interested cadets apply for membership in local NAR sections. AFJROTC units or cadets may then enter into competitive meets with other NAR units on section, area, regional, and national levels. Applications for membership or establishment of an NAR Model Rocketry Section may be obtained from the National Association of Rocketry.

### **Suggested 6-Week Program of Instruction for Model Rockets**

Week #	Classroom/Period/Activities	Laboratory Period/Activities
1	<ul style="list-style-type: none"> <li>a. Introduce basic model rocketry glossary</li> <li>b. Discuss construction of body tubes, nose cones, and fins</li> <li>c. Explain construction of commercial model rocket engines and their principles of operation</li> <li>d. Present the Model Rocketry Safety Code</li> </ul>	<ul style="list-style-type: none"> <li>a. Demonstrate the tools and materials needed to construct a simple single-stage rocket</li> <li>b. Demonstrate types of engines available (borrow from model shops)</li> <li>c. Provide lists of tools and materials needed to construct a single-stage rocket; provide plans for a rocket</li> </ul>
2	<ul style="list-style-type: none"> <li>e. Explain techniques of constructing recovery devices</li> <li>f. Explain rocket aerodynamics</li> </ul>	Begin construction of single-stage rocket (all cadets use same basic plan)
3	<ul style="list-style-type: none"> <li>a. Explain rocket ignition techniques</li> <li>b. Explain paints and finishes suitable for rockets being constructed</li> <li>c. Explain launching devices suitable for launching rockets</li> <li>d. Decide which launching device</li> </ul>	<ul style="list-style-type: none"> <li>a. Continue construction of rockets</li> <li>b. Begin construction of a launching device from materials available; procure remainder of needed materials before next meeting</li> </ul>
4	<ul style="list-style-type: none"> <li>a. Explain basic techniques of altitude determination and the type of tracking device used at unit rocket launching activity</li> <li>b. Get volunteers to construct or obtain a suitable tracking device</li> </ul>	<ul style="list-style-type: none"> <li>a. Complete construction of rockets</li> <li>b. Continue construction of launching device</li> </ul>
5	<ul style="list-style-type: none"> <li>c. Plan rocket launching activity</li> <li>d. Make assignments (range officers, special details, etc.)</li> <li>e. Review safety code</li> </ul>	<ul style="list-style-type: none"> <li>c. Complete launching and tracking devices</li> <li>d. Inspect completed model rockets</li> </ul>
6.	Unit model rocket launching	