

RANGE SAFETY OFFICER REQUIREMENTS

1. Scope

This paper will define the safety program and the technical safety requirements that all Canadian rocket organizations will require for individuals acting as Range Safety Officers in order to comply with Transport Canada's Requirements for Launching High Power Rockets In Canada. It is needed to protect new members certifying to fly high power rockets, launch proponents, the general public and private property from hazards associated with failure of rocketry components and inexperience.

2. Safety Programme

The Range Safety Officer (RSO) shall be appropriately qualified and/or certified to oversee the rocket launch. This will occur by proof of experience and knowledge of high power rocketry systems and regulations governing launching rockets.

KNOWLEDGE:

The Range Safety Officer shall have knowledge of the following documents:

- Transport Canada, Requirements for Launching High Power Rockets in Canada, Jan. 4, 2000.
- Transport Canada, Authorization Requirements for Use of Hybrid High Power Rocket Motors
- CAR, High Power Rocketry Safety Code
- CAR, High Power Rocketry Formal Certification Process
- Natural Resources-Explosives Division, The Explosives Act
- Tripoli Rocketry Association, High Power Rocketry Safety Code
- Tripoli Rocketry Association, Tripoli Certification
- National Association of Rocketry, High Power Certification
- National Association of Rocketry, Safety Code
- Aeronautics Act - Definitions
- Canadian Aviation Regulations, sec.(s) 602.43; 602.44; 602.45

The Range Safety Officer shall have written the CAR High Power Rocketry Exam and achieved an acceptable mark as well as the Transport Canada Regulatory Exam, and obtained an acceptable mark.

EXPERIENCE:

The Range Safety Officer shall have:

- built and successfully flown high power rockets at the impulse level being readied for launch at the meet that he is the responsible RSO.
- understand how to calculate center of pressure (CP) and center of gravity (CG) to determine whether the rocket is stable in flight.
- determined that the recovery system used is appropriate for the size and type of rocket being flown.
- experience to recognize if electronics are used for recovery systems, the electronics are connected appropriately for the expected “g” force and altitudes.
- used computer software programs to determine a rockets expected altitude, location of CP and CG, best rocket motor for optimum performance and thrust computations.

RESPONSIBILITIES:

The RSO’s responsibilities vary among rocket launch meets. General allocation of the safety responsibilities and requirements for pre-launch, launch and post launch can include:

- protecting people, property and the environment from safety risks that may arise during the pre-launch, launch, flight recovery of high power rockets;
- validating that temporary restricted airspace is in place for the rocket launch, validating the times the airspace is activated for, and advising participants of times;
- briefing all spectators and participants of expected behavior, boundaries, accepted practices for certification flights, review countdown procedure, recovery process for rockets;
- acquiring the expertise to determine cloud heights by use of equipment available from Environment Canada or Transport Canada,
- stopping a rocket launch when the wind exceeds launch limits specified;
- developing and implementing ground and flight safety rules for launches that are consistent with federal, provincial, municipal laws, requirements and accepted safe practices;
- reviewing and approving the schedule of launch operations;
- ensuring persons launching high power rockets are appropriately qualified and/or authorized;
- reviewing and approving launch operations and procedures;
- monitoring launch operations and controlling surveillance areas to minimize risks to all persons;
- monitoring countdowns and procedures for holds and misfires;
- supervising and controlling the allocation of safety roles for other participating safety monitors;
- providing a report of all high power rockets launched, rocket motor type used and altitude achieved for each rocket (if altitude is known)
- investigating and completing a report of anomalies for each rocket launch meet
- developing, approving and/or verifying accident contingency plans; and

- in the event of a mishap, securing the launch site and ensuring all relevant data and materials are impounded for investigation.

ACCIDENT CONTINGENCY PLAN:

The Range Safety Officer is responsible for, and shall carry out, actions necessary to ensure the safety of persons and property at launch operations. This checklist sets out primary elements that should be addressed, in whole or in part, in the event of a mishap causing significant damage to property or injury or death to persons.

- 1) Attend to injured person(s)
- 2) Call Emergency Services, as required
 - Ambulance
 - Hospital
 - Fire Department
 - Police
- 3) Establish security of accident site - restrict site access, ensure site and debris are not disturbed pending accident investigation
- 4) Secure all documentation/evidence pertaining to launch operations
- 5) Notify responsible authorities, as required
 - Police
 - Transportation Safety Board
 - Transport Canada
- 6) Notify NavCanada that operations have ceased, airspace can be opened
- 7) Document names, addresses, telephone numbers of participants and witnesses

ACCIDENT INVESTIGATION:

The primary purpose of investigating accidents is to determine the cause, identify corrective actions and take preventative measures in future rocket launch operations.

The following procedures are suggested:

- secure the location of the accident
- control access to the mishap scene/area
- rescue of personnel shall always take precedence over safety investigations
- a photographic record should be made if possible
- get witness accounts, as they often provide important details
- advise appropriate authorities
- have technically qualified individual assist in evaluation
- complete a written report detailing facts of occurrence as soon as possible, to keep details accurate