



Canadian Association of Rocketry
Association canadienne de fuséonautique

RSO Training Program

CAR/ACF High Power Rocket

RSO Training Program

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David Buhler – March 15, 2020 R1.21 added cover page, fixed formatting

Shane Weatherill -March 15, 2015 R1.2 (original)

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CAR/ACF RSO Training Program

The CAR/ACF RSO training Program consists of two programs:

- 1- Technical requirements developed through the Rocket Inspector program
- 2- Safety & Security Requirements developed through the Safety and Security Training Program.

Technical Training

To be eligible for the safety & security training, the candidate must have attained any RI level (and in addition Electronics Endorsement for level 2). Once a candidate has completed the safety & security requirements, their RSO level will replace their RI level. The RSO level can be upgraded by continuing work in the RI program.

- RSO Level 1 – qualified to oversee all rockets with total impulse up to and including I impulse. Prerequisites: CAR/ACF Level 2, Rocket Inspector Level 1, safety and security requirements.
- RSO Level 2 – qualified to oversee all rockets with total impulse up to and including L impulse. Prerequisites: CAR/ACF Level 3, Rocket Inspector Level I2, Electronics Endorsement, safety and security requirements.
- RSO Level 3 – qualified to oversee all rockets with total impulse up to and including O impulse. Prerequisites: CAR/ACF Level 4, RI3, safety and security requirements.

Safety and Security Training

The RSO Safety and Security Training process is based on experimentation and documentation. Many important decisions will be made by the trainee on the rocket range under supervision of a current RSO. You will have to be constantly aware of all the activities around you to protect people and property. Before starting the Safety & Security Training, the candidate should carefully read this program. This program covers all the different aspects of RSO duties. This document gives a list of topics that you will have to acquire.

Steps of the training:

- Each training period is one day. Following each training period, both the trainee and the supervising RSO shall record in writing the details of the training session and forward the report to the CRSO.
- Each RSO trainee will have their training continually overseen by one or more CAR/ACF approved RSOs.
- A minimum of four training periods each being not less than 3 hours long are required. Reports from all training periods will be used in the final evaluation of the candidate.
- The RSO committee will do the final evaluation only when asked by the CRSO and when the trainee feels he/she is ready.
- After the evaluation, the CRSO can require the trainee to acquire additional skills to finalise their training. The CRSO will provide a list of skills needed to complete the training. The trainee must complete these requirements; other capabilities can be added at the trainee's discretion.
- Upon successful completion of the RSO Safety and Security Training and upon receipt of the ratification of the CAR/ACF executive committee, an RSO approval level shall replace an RI level.
- Trainees are encouraged to continue working on their RSO level until they have acquired RSO level 3.

The candidate is encouraged to receive training on different ranges offering different conditions throughout Canada. The candidate is also encouraged to have his training supervised by a former RSO L3 and on level 3 launches.

The supervising RSO is always in charge of the range and responsible for the RSO trainee.

Application process prerequisites:

- CAR/ACF member in good standing
- Rocket Inspector level as required in Part 1- Technical Training
- Electronic Endorsement (needed for RSO level 2 training)

The purpose of the RSO training is to acquire the following skill sets:

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:

1. General

- 1.1. Protecting people, property from safety risks that may arise during the pre-launch, launch, and flight recovery of high power rockets;
- 1.2. 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;
- 1.3. Briefing all spectators and participants of expected behaviour, boundaries, accepted practices for certification flights, review countdown procedure, recovery process for rockets;
- 1.4. Acquiring the expertise to determine cloud heights by use of equipment available from Environment Canada or Transport Canada;
- 1.5. Stopping a rocket launch when the wind exceeds launch limits specified;
- 1.6. Developing and implementing ground and flight safety rules for launches that are consistent with federal, provincial, municipal laws, requirements and accepted safe practices;
- 1.7. Reviewing and approving the schedule of launch operations;
- 1.8. Ensuring persons launching high power rockets are appropriately qualified and/or authorized;
- 1.9. Reviewing and approving launch operations and procedures;
- 1.10. Monitoring launch operations and controlling surveillance areas to minimize risks to all persons;
- 1.11. Monitoring countdowns and procedures for holds and misfires;
- 1.12. supervising and controlling the allocation of safety roles for other participating safety monitors;
- 1.13. Providing a report of all high-power rockets launched, rocket motor type used and altitude achieved for each rocket (if altitude is known);
- 1.14. Investigating and completing a report of anomalies for each rocket launch meet
- 1.15. developing, approving and/or verifying accident contingency plans; and
- 1.16. In the event of a mishap, securing the launch site and ensuring all relevant data and materials are impounded for investigation;
- 1.17. Communicate with Transport Canada, NAVCAN, landowners and local authorities such as but not limited to police, fire departments, airport authorities etc.;
- 1.18. Supervising the RI training program

2. Establish range layout:

- 2.1 Launch Control Officer (LCO) position (placed away from range entrance)
- 2.2 Rocket Inspection post located at the range entrance (to control access to the range)
- 2.3 Pad distances
- 2.4 Rod/Rail angles (determined only by the RSO)
- 2.5 Sterile ballistic zone
- 2.6 Parking and public gallery layout and location
- 2.7 Site-specific safety or security considerations (ex: road blocks, wildlife warnings)
- 2.8 Designated smoking zone (10m from any possible motor assembly, signage)

3. Experience in range duties:

- 3.1 Pad manager (minimum 3 duty periods)
- 3.2 LCO (minimum 1 duty period)
- 3.3 Maintenance of rod angles (must be done during all the training periods except during LCO duty)

4. Learn and be familiar with:

- 4.1 CAR/ACF High Power Rocketry Safety Code
- 4.2 CAR/ACF Model Rocket Safety Code
- 4.3 CAR/ACF RSO Requirements
- 4.4 CAR/ACF RI training process
- 4.5 CAR/ACF High Power Rocketry Certification Process
- 4.6 TRA High Power Rocketry Safety Code
- 4.7 TRA High Power Certification Process
- 4.8 NAR High Power Certification Process
- 4.9 NAR High Power Rocketry Safety Code
- 4.10 Canadian Aviation Regulations, Sections 602.43 / 602.44 / 602.45
- 4.11 "Requirements for Launching High Power Rockets in Canada"; Jan 4,2000
- 4.12 "Authorization Requirements for the Use of Hybrid High Power Rocket Motors"
- 4.13 The Explosives Act; Natural Resources-Explosives Regulatory Division
- 4.14 Aeronautics Act – Definitions
- 4.15 Any notice, decision or update made by the CAR/ACF

Approval of an RSO

1. Nomination for approval:

- 1.1. After a minimum of 4 periods of training with each period being a minimum of 3 hours each, and when the trainee and supervising RSO(s) feel ready for his/her evaluation, the trainee asks the CRSO to start the evaluation process. The trainee shall submit their record of training to the CRSO for review. The CRSO will review the documentation to ensure that the required has been completed. If the requirements for training have been satisfactorily completed, the CRSO will ask the RSOs for a nomination for approval by the RSO committee.

2. Approval process:

- 2.1. Nominations for approval shall be accompanied by a detailed outline of all of the trainee's training and experience relating to the qualifications of a potential RSO and that information which related to RSO approval Level.
- 2.2. All applications shall be subject to discussion by the RSO Committee and all questions asked by the committee members shall be answered by RSO's who have supervised part or all of a trainee's training.
- 2.3. Upon completion of a discussion of the trainee's nomination, a vote will be called for by the CRSO. To gain the endorsement of the RSO committee, the vote must greater than 90% in favour of the nominee. Abstention is equivalent to a negative vote.
- 2.4. In the event that a trainee displays a disregard for the duties and responsibilities of an RSO while undergoing training at a launch event, the RSO of record shall discontinue the training and file a report to the CRSO and the President.
- 2.5. Approval of a new RSO shall be made by a simple majority vote by the Board of Directors.

3. Approved nominations:

- 3.1. Nominees receiving approval by the RSO Committee shall have their names forwarded to the CAR/ACF executive for ratification. The nominations of trainees having demonstrated the ability to perform the duties of an RSO competently and to the satisfaction of the CAR/ACF will be ratified.

Removal of an RSO or an RSO in training

The RSO represents CAR/ACF at rocket launches, to members and non-members, and is generally seen as a role model in many respects within the organization. As a leader within the organization, an RSO needs to believe in the strategic goals and objectives of the organization. An RSO in training shall also abide by this standard.

The President, Vice-president or the CRSO may temporarily suspend either an RSO or an RSO in training. In such an event a written report must be submitted to the CAR/ACF President for review within 30 days if the person's actions are not consistent with achieving those goals. The President shall take the matter before the executive within 14 days.

The CAR/ACF Executive can remove an RSO from the CAR/ACF RSO current list, if his actions are not consistent with achieving those goals.



Canadian Association of Rocketry Association canadienne de fuséonautique

Rocketry Club Launch Sites

Member Information / Information sur le membre

Name / Nom		CAR/ACF #	
Certification Level Niveau certification	Electronic Endorsement Formulaire de certification électronique	<input type="checkbox"/> Yes/Oui <input type="checkbox"/> No/Non	RI Level If niveau

Site Number 1:

Site Name	Geographical Coordinates:	Training Date
Municipality	Site Size	Altitude (ASL)
Province	Site Hours	Unique Items:
Description of Launch and Launch Site (attach Map)		

Site Number 2:

Site Name	Geographical Coordinates:	Training Date
Municipality	Site Size	Altitude (ASL)
Province	Site Hours	Unique Items:
Description of Launch and Launch Site (attach Map)		

Site Number 3:

Site Name	Geographical Coordinates:	Training Date
Municipality	Site Size	Altitude (ASL)
Province	Site Hours	Unique Items:
Description of Launch and Launch Site (attach Map)		

Endorsing RSO Info

Name / Nom	CAR/ACF #
Certification Level / Niveau certification	RI Level / If niveau
Signature	Date

Submission / Dépôt de la demande

Complete this form and mail to memberships@canadianrocketry.org or CAR/ACF / Complétez et envoyez ce formulaire à CAR/ACF:

CAR/ACF
71 Bermuda Close NW
Calgary AB T3K 1G4

**Note: this form must be filled out completely – any missing information will result in the form being sent back to the member.
Note: Ce formulaire doit être entièrement complété ; Si une information est manquante, le formulaire sera retourné au membre.**

Date Received date entered into database	Date Approved
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Summary of [Applicant's] Functions:

Each range is unique and requires analysis as per the high power rocketry guidelines stipulated in the RSO Training Requirements document. [Applicant] will assess the each site and determine the placement of launch pads, Launch Control tables, spectators, rocket inspection tables, wind direction, wind speed, altitude of clouds, field flammability, airspace restrictions in place, location of obstacles (trees, buildings, ditches, streams, power lines, roads, etc.), as well as any other requirements.

Application to Launch High Power Rockets:

http://www.tc.gc.ca/media/documents/ca-standards/26-0659e_0711-03_e.pdf

[Applicant] has also completed the "Application to Launch High Power Rockets" for Transport Canada, which is required for a rocket launch to receive approval to proceed.

[Insert Image of Completed Form]



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RSO Experience Capture Form

Member Information / Information sur le membre

Name / Nom		CAR/ACF #	Date of Application Date d'application
Certification Level Niveau certification	Electronic Endorsement Formulaire de certification électronique	<input type="checkbox"/> Yes/Oui <input type="checkbox"/> No/Non	RI Level If niveau

Please outline your high-power experience:

Fully complete the form. A separate form is to be used for each calendar day in which training has occurred. If there is insufficient space for any answers, use the reverse side of the form.

Endorsing RSO Info

Name / Nom		CAR/ACF #
Certification Level Niveau certification		RI Level If niveau
Signature		Date

Submission / Dépôt de la demande

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Date Received date entered into database	Date Approved	CAR_Elec_Endorse_Certification_Form_v1.3_20170126.doc
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