*Sponsor’s information:*

*Name: Phone: Email: Department:*

Range Safety Officer Name:

Sky Watch Name:

*Rocket Launch Date: Time: Duration:*

*Alternate Date/Time (in case of Inclement Weather):*

**Roles and Responsibilities**

Range Safety Officer: Ensure the safety of everyone within the launch site perimeter. Before allowing each launch, receive confirmation from the Sky Watch, clear the launch site and make the announcement followed by a countdown. Instruct everyone that the rocket will not be launched until these checks have been completed. Note: Must have NAR certification if standard model rockets will be used.

Sky Watch: Stand where there is a full view of the sky. Before each launch, look and listen for commercial planes and helicopters. Notify the Range Safety Officer if a plane or helicopter is nearby, flying towards the field, etc. because the rocket launchers must give the right of way to the manned aircraft. Continue to watch during the preparation for the launch.

Building and Grounds Supervisor for Athletics: Verify that there isn’t any dry grass/ brush within 30 feet of the launch pad. If there is a drought and/or water ban, Athletics will inform the sponsor that only soda bottle rockets can be launched because standard kit model rockets could start a fire on the Athletic field.

*Description of Rocket Launch Event:*

*A) Rocket Type and Launching Mechanism/ Safety Specifications and Precautions-*

**Safety precautions required for both standard kit model rockets and soda bottle rockets:**

* Launch Site Location Set Up (Option 1): Reserve the Baseball Field, Softball Field, and Field C. Set up the launch pad on the Softball Field, 30 feet from the outfield fence (the fence between the Baseball Field and Softball Field). Mark a 30 feet and 75 feet perimeter around the launch pad (using cones or other visible physical indicators). Spectators and rocket operators should stand on the Baseball Field side of the outfield fence during rocket launch. Refer to the diagram of the field on the last page. *(Please delete this section if using Launch Site Location Set up Option 2).*
* Launch Site Location Set Up (Option 2): Reserve Fields C, D, and E. Set up the launch pad at the center of Field D. Mark a 30 feet and 75 feet perimeter around the launch pad (using cones or other visible physical indicators). Refer to the diagram of the field on the last page. *(Please delete this section if using Launch Site Location Set up Option 1).*
* Spectators must stand outside the 75 feet perimeter during rocket launch. Only the rocket owner and a supervisor can stand within the 75 feet perimeter. During rocket launch, the rocket owner and supervisor must stand outside the 30 feet perimeter. The rocket owner and supervisor must wear eye protection, and it is recommended that the spectators also wear eye protection.
* Countdown before the launch and ensure that everyone is paying attention. Range Safety Officer is responsible for this.
* Position several spotters where they will be close enough for the audience and any passersby (all Non-fliers) to hear their instructions so they will stay clear of the rockets as they return to the earth. The spotters will convey the rocket’s direction and clear the area. The spotters should remind everyone that catching falling rockets is dangerous and that everyone must watch the rocket from the time it is launched until it has landed.
* Rockets must be made of low density materials so that they are very light when they return to the earth. This will reduce the risk of personal injury and property damage. No metal nose weights, fins, or other metal parts are allowed. Materials should not fragment into sharp, hard pieces during launch or upon impact. The payload must not contain anything hazardous.
* A qualified person should inspect all rockets prior to launch.
* Usea commercially available launching mechanism or an alternative launching mechanism that has the safety features required by the NAR, including the following. It must be stable without needing to put stakes\* in the ground but additional weights should be used if necessary. It must be wind-resistant. Thread the string from the launching mechanism through the fence.
* Launching rod must always have a protective cap on it when a launch is not in process. Position the rod so the end is above eye level to avoid injuries.
* If a misfire occurs: wait at least 60 seconds and disconnect the battery (or use an alternative method to disable the launching mechanism) before allowing anyone to approach the rocket.
* If the wind speed or gusts are 20 mph or greater, then the launch will be cancelled. Refer to the weather section below.

\*Request for an exception to use stakes: Because of the irrigation system on the fields, the placement of stakes must be first approved by Sandra Lett ([slett@mit.edu](mailto:slett@mit.edu)) from Athletics.

**Standard kit model rockets** *(Delete if using soda bottles)*:

* If there is a drought and/or water ban, only soda bottle rockets can be launched because standard kit model rockets could start a fire on the Athletic field.
* Only Class 1 Rockets are allowed to be used at MIT because Class 1 is not prohibited by the FAA. Class 1 is defined by FAA: a model rocket that uses no more than 125 grams (4.4 ounces) of propellant; uses a slow-burning propellant; is made of paper, wood, or breakable plastic; contains no metal nose weights, fins, or other heavy metal parts; and weighs no more than 1,500 grams (53 ounces) including the propellant. Use solid motors that are no larger than Size B with parachute recovery mechanisms or streamers. Parachutes are required because falling rockets soon reach their terminal velocity.
* Limit the maximum altitude to 400 feet. The FAA regulations prohibit exceeding 400 feet.
* Purchase certified commercially-made rocket motors that meet the specifications of the NAR and Consumer Product Safety Commission.
* Operate in accordance with the NAR Model Rocket Safety Code. <http://www.nar.org/NARmrsc.html>
* Use an electrical launch system and electric motor igniters/ starters that are certified for this use. Electrical safety interlock must be in series with the launch switch, which must return to the off position when release. This is to prevent inadvertent activation. Refer to the [Estes Learning Guide](http://www2.estesrockets.com/pdf/2811_Estes_Model_Rocket_Launch_Systems.pdf).
* Normally a 12 volt battery is used. For lithium battery users: MIT EHS Office recommends charging lithium batteries in the safe area of your lab/shop to prevent a fire on the athletic field.
* The launcher must include a non-combustible metal “blast deflector” plate, which is the appropriate size to prevent hot exhaust gases from igniting the grass. Nationwide many fields have been burned.
* Use only flame-resistant recovery system wadding.
* Payload must not include anything that is flammable, explosive, etc.

**Soda bottles filled with Water and pressurized with a bike pump:**

*(Delete if using standard kits):*

* Limit the maximum altitude to 400 feet. The FAA regulations prohibit exceeding 400 feet.
* Inspect of the integrity of the soda bottles to ensure that they free of major defects and can withstand the increased pressure. This should be done by a knowledgeable person to ensure a safe launch.
* 2-liter soda bottles are partially filled with water and then pressurized with a bicycle pump. For safety, the launch pressure will not exceed 40 psig to limit the maximum altitude. This will also reduce the risk of the rocket breaking a window of a building or a car.
* **While the rocket is pressurized, the Range Safety Officer will ensure that no one is allowed to stick their head or arms above the rocket. This is to avoid being struck accidentally.**
* Launching will take place by pulling a pin that holds the bottle to the launching mechanism.
* Parachutes **or other methods to avoid accidents** are required because falling rockets soon reach their terminal velocity.
* To prevent Soda bottle rockets from taking an unexpected trajectory, ensure that the nozzle hole is large enough.
* Soft foam nose **or other methods to avoid accidents** are required.
* **Calculate the maximum empty weight, nose, fins, water and pay load (if any). Then include the justification that this can be safely launched and landed.**

*B) Launch Zone and Weather Considerations-*

The shortest side of the launch zone must be 400 feet. (Extra fields will be reserved to comply with the NAR code). Athletics will verify that this area does not have dry grass/ brush so the launch does not present a risk of a fire.

We will be orienting the launch pads on the upwind side of Briggs field and away from all buildings and roads. We will check the wind speed before the launch (weather.com or weatherbug.com) and the launch will be postponed if the wind speed is 20 mph or greater. We will ensure that spectators are upwind. If there is no wind, the launcher will be tilted slightly away from the spectators.

If the launch is cancelled, we will follow the Athletic Department’s procedure for weather-related cancellations.

*C) Number of participants (Specify # of minors and chaperones if applicable)-*

There will be (Number of) participants. There will be (Number of) MIT volunteers on hand to check the safety of the rockets before they are launched and aid in range safety.

If the participants are minors, there will be (Number of) adults.

*D) Communication (MIT Police, Emergencies, etc.)-*

Cell phones will be used to call MIT Police 617-253-1212 to report an emergency. We will use the MIT emergency phones (blue-light phones) as a backup method for summoning help if the cell phones don’t work.

We will call MIT Police 617-253-1212 at least 30 minutes before the first launch. We will send them the approved plan so they know where the rockets will be launched, how many people are involved, and the age range of the audience.

*E) Clean-up-*

All debris must be cleared off the field when launch is done. The debris could be a hazard to groups using the field after the rocket launch. If a rocket lands on a roof, contact Facilities to retrieve it.

Reviewed by: (Handwritten signature is not required and email date/ time is acceptable)

MIT EHS reviewer’s name and date of email:

MIT Athletics reviewer’s name and date of email:

**Set Up for Rocket Launches on Briggs Field**

