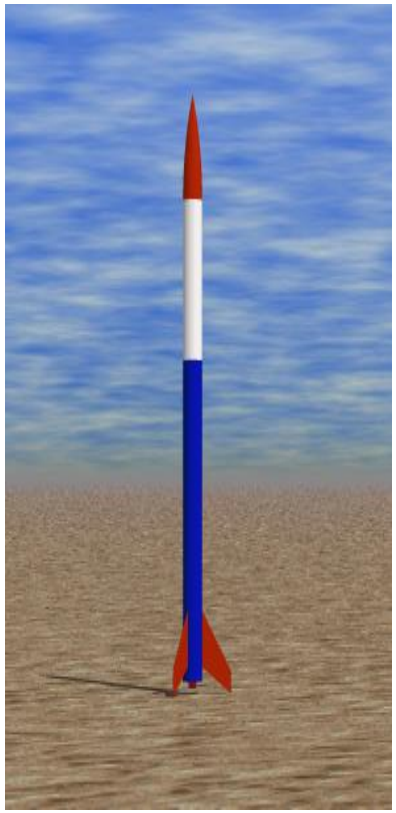
Syracuse University's
COLLEGE OF ENGINEERING
AND COMPUTER SCIENCE

LOCKHEED MARTIN

Central New York
Rocket Team Challenge



Rocket
Launch Preparation
Instructions

Note: There are considerable varying discussions that can be found on rocket web sites on launch preparation methods. While the teams are allowed to prepare their rocket in any acceptable safe manner they see fit, these instructions and methods are recommended for rockets built as recommended by the Central New York Rocket Team Challenge assembly instructions and competing at the Rocket Team Challenge. These instructions should be saved for future use.

Motors

Each rocket launched at The Central New York Rocket Team Challenge will use one single-use 29 mm diameter preloaded rocket motor. One motor is provided at the launch for each team at no cost.

If you have a LOC IV Rocket Kit, your team will use an Aerotech G80-7T. If you have a Graduator, you will use an Aerotech F50-6T.

Motor Insertion and Securing

The motor needs to be properly inserted and secured into the motor mount tube to assure that it won't eject out the end of the rocket during the deployment of the recovery system. The securing is accomplished by using the screw-on motor retainer provided with your kit.

It is critical that the inner ring of the motor retainer is securely glued to the motor mount tube with epoxy.
New F50 and G80 motors have a thrust ring molded into the motor casing.

Slide the motor into the motor mount tube until the thrust ring on motor casing abuts the motor retainer.

Secure the motor into place by screwing on the outer motor retainer ring.

The motor is now securely in place and ready to provide thrust for acceleration and a blast to eject the recovery system.

Note: The igniter used to initiate the burning of the rocket fuel will be inserted at the launch pad by one of the launch control personnel.

Loading and Packing the Recovery System

Proper care needs to be taken when loading and packing the recovery system to assure that the hot gases from the ejection charge do not burn any of the parts of the system and that the system successfully deploys from the blast of the ejection charge.

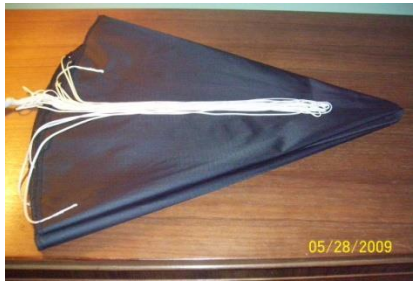
Begin the process of packing and loading the recovery system by first making sure that all components of the system are out of the main air frame (main body tube). To protect the system, flame retardant material (recovery wadding) is first put into the air frame and will lie on top of the motor. The material that will be used at the Rocket Team Challenge will be loose cellulose insulation. This material will be available on launch day in bags at the end of the Participants' and Spectators' Waiting & Tenting Area. (See map of Skytop Launch Field.) Place enough wadding to fill up a space in the air frame equal to the diameter of the air frame's tube. In other words, if the rocket has a 3 inch diameter tube, 3 inches of tube should be filled with recovery wadding.

Lay out the parachute so that the shroud lines are all even and loops are all together to form a single loop.

If your team followed the recommended assembly directions for the shock cord, there should be a 3 inch loop in the shock cord about two feet from the payload section. Feed the loops of the parachute shroud lines part way through the 3 inch loop of the shock cord. Take the top of the parachute and feed it through all the shroud line loops at once.

Continue to carefully pull the top of the parachute through the shroud line loops, keeping the shroud lines as even as possible, until a knot is formed around the shock cord's 3 inch loop.

Lay out the parachute with the shroud lines straight out from the parachute. Then fold the parachute in a triangular form with each section of the parachute folded into pleats. Put the same number of pleats on each side of the folded parachute. Place the straighten shroud lines on the center of the folded parachute.

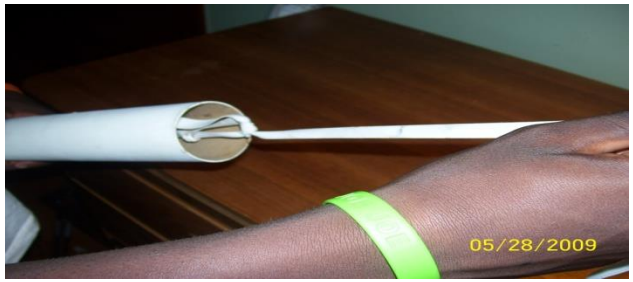


Fold each side of the parachute over the shroud lines that are now in the center of the pleated parachute.

Fold the top half of the folded parachute over the bottom half.

Feed the lower portion of the shock cord, below where parachute is attached, into the top of the air frame.

Insert the folded parachute with the shroud lines facing out the top of the tube. The parachute should not be packed in too tightly or it may not eject properly.



If the parachute is loaded correctly, it should slide out of the air frame with limited force. Test the packing of the chute by lightly pulling on the top part of shock cord to feel if the parachute starts to slide easily. If the packing seems too tight, pull out the parachute and refold it.

Feed in the remaining top portion of the shock cord, and then slide on the payload section of the rocket. **The two parts should go together snugly but *not* so tightly that excessive force is required to put the payload section in place.**

The recovery system is now packed, loaded and ready for deployment during the flight.

Payload Section Preparation

Important payload section design specifications should have been followed by your team during construction of the rocket. **These specifications must be met to be allowed to compete at the Rocket Team Challenge.**

Reserve Spacing in the Top of the Payload Section for the Altimeter

To allow for the placement in the payload section of an altimeter, a portion at the top of the payload section's airframe down must be available.

The space needed from the top of the payload's airframe by kit is as follows:

Graduator	5.875 inches
LOC IV	7.125 inches

The variation in the reserve space by kit is due to differences in the nose cone shoulder length (the part of the nose cone that inserts into the tube.)

Pressure Equalization Port

Within the reserved payload space a 1/8-inch hole needs to be drilled through the payload section airframe for altimeter pressure sampling.

Securing the Altimeter

At the launch, the altimeter will need to be secured to the inside of the payload section within the reserved space. The MOST will provide encapsulated altimeters at the launch. These capsules will be secured within your payload section with Velcro. A ¾ inch wide strip, 2 ½ inches long of the hook side (the rough part) of the Velcro must be placed vertically inside the reserve space of the payload section. Be sure to place the strip far enough down so that it does not interfere with the insertion of the nose cone.

Securing the Video Camera

At the launch, a video camera will be secured to the outside of the main body tube section. The MOST will have at the launch video cameras ready to go. The camera will be secured to the outside of your main body tube section with Velcro. A ¾-inch wide strip, 4-½ inches long of the loop side (the felt-like part) of the Velcro must be placed ¾-inch below the top of the main body tube section. Be sure you do NOT place the Velcro in line with the rail buttons.

Stowing Egg

Your team is responsible for the design and construction of an inner structure of the payload section that will safely hold and protect the egg during flight and landing. The egg should be protected and secured in the payload section in the area below the reserved space. The MOST asks that each team put their egg in plastic bag in case the egg should break during the flight. The contents of the egg could damage the electronics.

Attaching the Nosecone

The nose cone of your rocket needs to be secured to the top of your payload bay to prevent it from coming off during the flight and releasing the payload. A small hole should have been drilled through the payload section's tube (air frame) and into the part of the nose cone that inserts into the airframe (the shoulder). Screw into the hole a #6 x ½ Inch Pan Head sheet metal screw.

Good Luck with Your Flight!