Argo D4 Javelin 1:8.66 Super Scale™

Flying Model Rocket Instructions
Designed by Matt Steele

VEHICLE DATA SHEET

Physical Data

Parameter	Dimension
Length	67.5” (171cm)
Diameter	2.64” (6.7 cm)
Weight	30 oz (850 g)
Recommended Motors:	Aerotech F50-4T, F67-4W, G79-6W, G80-7T

Predicted Altitudes

Motor	Predicted Altitude
Aerotech F50-4T	500 ft (152 m)
Aerotech F67-4T	440 ft (134 m)
Aerotech G79-6W	972 ft (296 m)
Aerotech G80-7T	1,416 ft (431 m)

- This kit is recommended for adults(18 and older) only. Launch systems, model rocket motors, launch supplies, tools, and building materials are not included.
- Do not modify the design of the rocket! Changes to the design may affect the stability, and hence, the safety of the rocket.
- North Coast Rocketry certifies that it has exercised reasonable care in the design and manufacture of its products. However, as we cannot control the use of our products once sold, we cannot assume any responsibility or liability for product usage.
- North Coast rocketry shall not be held responsible for personal injury or property damage resulting from the use of our product. The buyer assumes all risks and liabilities arising from the use of our product and uses our product on these conditions.
- North Coast Rocketry makes no warranty regarding our products, except for defects in materials or workmanship for a period of one year after purchase.
- If any of these terms are unacceptable, please return the item to the point of purchase.

NCR 9209 (12/20)

Parts List

ID	Part #	Description
A	9579	Honest John Tail Cone
B	1131	Large Diameter White Coupler
C	1128	Honest John Body Tube
D	9580	Honest John Belly Band
E	1107	Motor Tube
F	7224	Honest John Fin Set (4 pcs)
G	9581	Motor Retainer - Male
H	9582	Motor Retainer - Female
I	2102	Forward Centering Ring
J	2116	Aft HJ Centering Ring
K	9583	Honest John/Nike Adapter
L	1116	Large Diameter Brown Coupler
M	2110	Bulkhead Plate
N	9536	Eyebolt Assembly
O	9523	Shrink Tube
P	9579	Cable
Q	9503	Loop Sleeve Connectors (2)
R	9504	Kevlar Line
S	9505	Elastic Line
T	9526	Quik Link
U	9584	Rail Guides (2)
V	9585	Nike Fin Can (2)
W	7225	Nike Fins, Large (4)
X	1129	Nike Body Tubes (2)
Y	7226	Nike Fins, Small (4)
Z	9586	Nike/Nike Adapter
AA	9587	Nike/X-248 Adapter
BB	1130	X-248 Body Tube
CC	3005	X-248 Nose Cone
DD	9500	NCR 36" Ripstop Nylon High Visibility Parachute (2)
EE	822	Javelin Wet Decal Sheet

Before You Start:

Thank you for purchasing this North Coast Rocketry® model kit. We hope you have an enjoyable time constructing and flying this model rocket. Please read all of these instructions to become familiar with them before starting construction. The sequence is important. Check off each step as it is completed.

The following materials are necessary for construction:
5 minute epoxy; 30 minute epoxy; gap filling (thick) cyanoacrylate adhesive (CA); #220, #320 and #400 sandpaper; Tamiya white spray primer; Rustoleum gray spray primer filler; and spray paint in the following colors:

- Tamiya Gloss White
- Tamiya Fluorescent Red
- Tamiya Fluorescent Orange
- Rustoleum Fluorescent Yellow (because there is no Tamiya equivalent)
- Tamiya Oliver Drab
- Tamiya Flat Black
- Tamiya Flat Clearcoat

Tamiya paints are preferred for all colors and spray primer except Fluorescent Yellow (which is not offered). Rustoleum Fluorescent Yellow and Rustoleum Primer/Filler were used for the NCR Photo model.

The following tools are required for construction:
Modeling knife or single edge razor blade; pliers or crimping tool; safety glasses; 6” hemostats; Dremel or other rotary toll with a sanding drum; and an 18” long ruler.

Check the kit for completeness, using the parts list and reference photograph. If parts are missing or damaged, or if for any reason you are dissatisfied with this product, please let us know at www.NorthCoastRocketry.com. We will gladly replace any item found to be defective. Our goal is for you to be satisfied with your purchase, and to have fun!

In each step, test fit parts together before bonding. It is may be necessary to sand lightly some parts to obtain a precision fit. Due to variations in the 3D printing process, we have purposely made the parts to have tight fits. You may have to sand them (using a Dremel and a rotary tungsten carbide sanding drum) to get a good, precise fit.

Please be extremely careful using CA and epoxy. Avoid getting either in your eyes or on your skin. Use safety glasses when using adhesives and when cutting. Be sure to use adhesives and paints only in areas with adequate ventilation, and do not breathe in fumes.

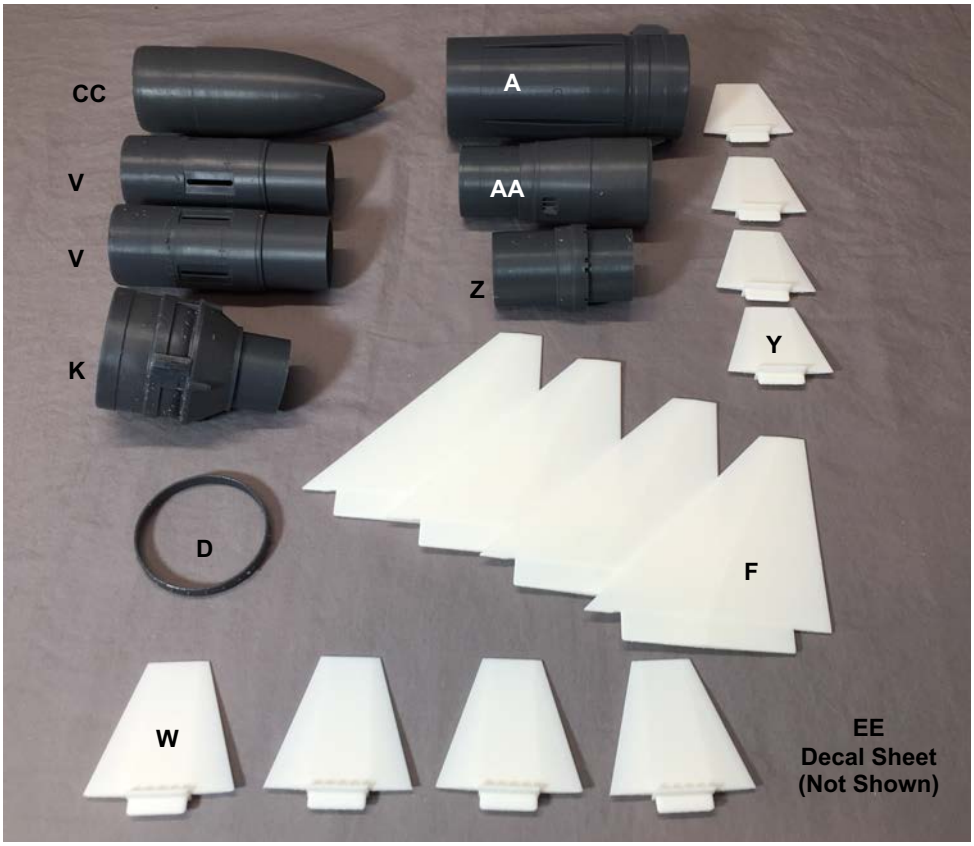
This model is designed for flight with a 1010 rail at least 72” long. Launch lugs for a rod are not provided.

3D parts designed by Josh Tschirhart and Mike Nowak. 3D parts printed by Galactic Manufacturing.

The real Argo D-4 Javelin had four stages and could lift a payload of around 125 pounds (57 kg) to an apogee of 1100 kilometers. There were a total of 82 launched between 1959 and 1976. The vehicle consisted of an Honest John first stage plus two Nike upper stages plus a X-248 fourth stage. It was developed by the Air Force to replace its Jason rocket with the mission of measuring radiation in space after high-altitude nuclear explosions. It was subsequently used by NASA for a variety of high-altitude near-space scientific experiments.

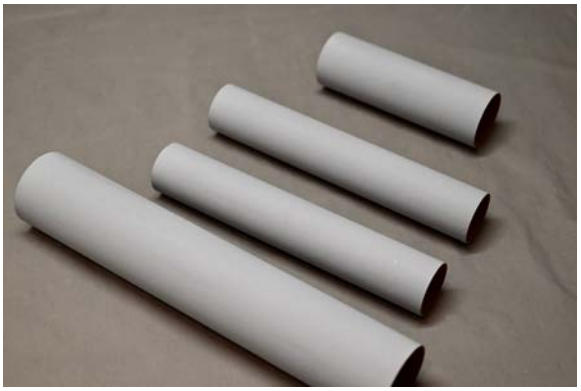
Sources for scale data from this kit are drawings by Josh Tschirhart and *Rockets of the World* by Peter Alway.

The label photo is NASA W-70-277. I believe this is a flight that occurred at Wallops Island on October 5, 1970 at 09:05 GMT. The payload was a MPE Barium release/Plasma mission for NASA reached an apogee of 550 mi (900 km).



Assembly Instructions

☐ Locate the four the body tubes (Honest John, two Nike, and the X-248 tube). Fine sand the tubes with #220 then #320 sandpaper. Apply two coats spray primer/filler. Sand the tubes smooth. Apply two more coats of spray primer/filler, and sand smooth. Repeat as necessary to all fill the tube seams. When satisfied with the surface finish, sand all four tubes with #400 paper.



☐ Test fit the male end of the motor retainer onto the aft end of motor tube. Using epoxy, bond the male retainer on the motor tube. Do not fillet the retainer/tube joint.

☐ Mark the forward end of the motor tube ¼" from one end. This is where the forward centering ring will be bonded.

☐ Paint the female motor retainer flat black. Set aside.

☐ Test fit each centering ring on the motor tube to ensure they fit properly. Sand the rings if the fit is too tight.

☐ Locate the aft centering ring and slide it onto the motor tube until it butts up against the motor retainer. Using epoxy, bond the ring in place.

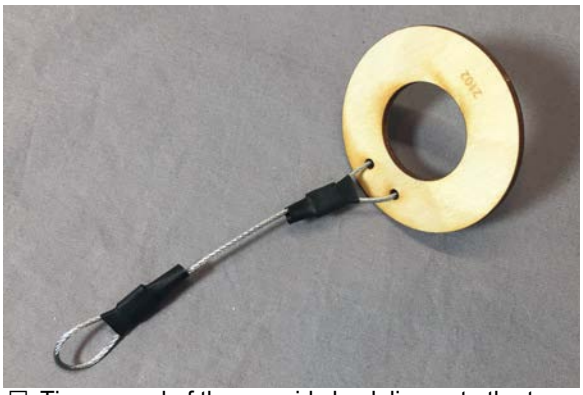
☐ Test fit the large diameter white coupler into the forward end of the Honest John fin can to ensure it fits properly. Sand the inside diameter of the fin can if the fit is too tight. Using 30-minute epoxy, bond the coupler in place.

☐ Test fit the aft centering ring/motor tube assembly into the aft end of the Honest John fin can. To ensure they fit properly. Sand the ring if the fit is too tight. Using 30-minute epoxy, bond the aft centering ring/motor tube assembly into the aft end of the Honest John fin can.

☐ Locate the forward centering ring (the one with the two holes in it), the steel cable and one of the loop/sleeve connectors. Thread one of the loop/sleeve connectors on to the cable. Then, thread the cable down through the top of one hole in the centering ring. Pull it back through the other hole and thread the end of the cable back through the loop/sleeve connector, making a 1-2" loop. Crimp the loop/sleeve connector with a crimping tool or a pair of pliers. Apply a drop of CA to the joint.

☐ Place the other loop/sleeve connector on the free end of the cable. Slide both of the heat shrink sections onto the cable. Make a 1” diameter loop and thread the free end back through the loop/sleeve connector. Measure the length of the cable with the loops. It should **NOT** be any longer than **6”** from the top of the centering ring to the top of the other loop, or it will hang outside the tube at ejection and cut the tube. Crimp the loop/sleeve connector with a crimping tool or a pair of pliers. Apply a drop of CA to the joint.

☐ Slide the heat shrink tubing over each loop sleeve connector, and, using a heat gun or hair dryer, shrink the tubing over the connector to prevent the parachute from snagging on it.



☐ Tie one end of the aramid shock line onto the top cable loop and triple knot it. Secure the knot with a drop of CA. Trim the excess off.

☐ Tie one end of the elastic shock line onto the top cable loop and triple knot it. Trim the excess off.

☐ Insert the forward centering ring on to the motor tube, so that it sits on top of the coupler. Carefully align the centering ring and the coupler so the outer edges are even. This will make it easy to slide the body tube over both parts. Tack it in place. Using 5-minute epoxy, fillet the ring/tube joint.

☐ Coil up both the aramid and elastic shock lines and stuff them into the forward end of the motor tube. This will keep them out of the way when the HJ tail can is bonded in place.

☐ Test fit the HJ body tube onto the HJ tail cone assembly. Check to see that it fits the forward centering ring and the coupler properly. Remove the tube, apply 30-minute epoxy about 2” inside the tube, and slide back onto the tail cone. Set aside to cure.

☐ Make a mark on the large tube 6.5” from the forward end. This mark is the forward edge of where the belly band is located. Locate the belly band, and test fit it on the tube. Slide it so the forward edge of the belly band is even with the mark. Using thin CA, bond the belly band in place.

☐ For this model, it is easier to prime and paint the HJ fins prior to bonding them to the tail cone. Locate the four large HJ fins, clean up any blemishes, and prime with Tamiya white spray primer. Follow up with a coat of Tamiya gloss white, and then paint three fins with Tamiya Fluorescent Red and one fin with Rustoleum Fluorescent Yellow.

☐ Locate the eye bolt, washers, and nuts. Thread one nut on to the eye bolt; then add a washer; the bulkhead plate; the remaining washer; and the nut. Tighten the nut and then apply a drop of CA to secure the assembly. Run a thin bead of CA around the washers on both sides of the plates.

☐ Test fit the large diameter brown coupler into the HJ/Nike adapter. Using epoxy, bond the coupler in place.

☐ Epoxy the bulkhead plate into the aft end of the coupler. Sand the inside of the payload tube to allow the coupler to slide inside. Epoxy the coupler into the payload tube. Fillet the joint. Sand the coupler to ensure it slides smoothly in the main tube.

☐ Tie a small loop approximately 18” from the free end of the Kevlar line. This is where one of the parachutes will attach to the model.

☐ Tie the free end of the Kevlar line to the eyebolt on the HJ/Nike adapter. Secure the knot with CA. Locate and tie the free end of the elastic to the Quick Link, then attach the Quick Link to the eyebolt.

☐ Coil up the Kevlar and the elastic and insert it into the Honest John tube. Insert the HJ/Nike adapter into the Honest John tube.

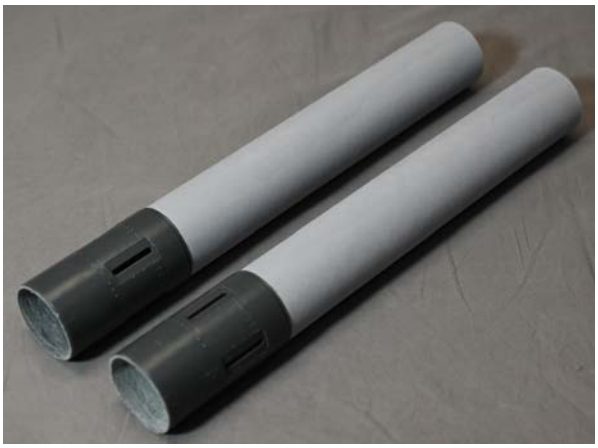
☐ Locate the rail guides. Using five-minute epoxy, bond one on the HJ tail cone 90 degrees away from the HJ launch shoe as shown. Using five-minute epoxy, fillet the joint for added strength.

☐ Using five-minute epoxy, bond the remaining rail guide on the HJ/Nike adapter as shown. Using five-minute epoxy, fillet the joint for added strength. When the epoxy is cured, twist the forward adapter so that the forward and aft shoes line up.

☐ Prime and paint the Honest John body and Honest John/Nike Adapter with Tamiya white spray primer. Follow up with a coat of Tamiya gloss white,

☐ Test fit each HJ fin into the slots on the HJ fin can. Sand the tabs as necessary to get a good fit. Note the location of the Yellow fin, and glue it into the slot on the HJ fin can first, using 30-minute epoxy. Follow up by bonding the remaining three red fins in place.

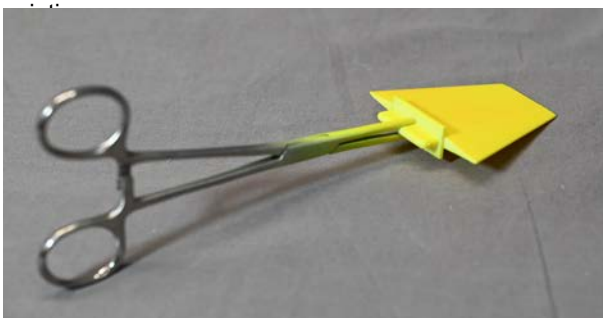
☐ Test fit the lower Nike body tube onto the lower Nike tail can (Note: the lower and upper fin cans are identical and interchangeable). Check to see that the tube fits properly. Remove the tube, apply 30-minute epoxy about 2” inside the tube, and slide back onto the fin can. Set aside to cure. Repeat the process for the upper Nike body tube and the upper Nike tail can.



☐ Prime and paint the Nike stages with Tamiya white spray primer. Follow up with a coat of Tamiya gloss white. Paint the lower stage with Tamiya Fluorescent Orange. Paint the upper stage with Rustoleum Fluorescent Yellow.

☐ Prime and paint the Nike fins prior to bonding them on the Nike fin cans. Note that the fin sets are NOT identical – there are a large set that goes on the lower Nike stage, and a smaller set that goes on the upper Nike stage.

☐ Locate the four large Nike fins, clean up any blemishes, and prime with Tamiya white spray primer. Follow up with a coat of Tamiya gloss white, and then paint three fins with Tamiya Fluorescent Red and one fin with Rustoleum Fluorescent Yellow. A pair of hemostats works well to hold the fins during the



☐ Prime and paint the small Nike fins prior to bonding them on Nike fin cans. Clean up any blemishes and prime with Tamiya white spray primer. Follow up with a coat of Tamiya gloss white, and then paint three fins with Tamiya Fluorescent Red and one fin with Rustoleum Fluorescent Yellow.

☐ Test fit each large Nike fin into the slots on the upper Nike fin can. Sand the tabs as necessary to get a good fit. Note the location of the Yellow fin, and glue it into the slot on the lower Nike fin can first, using 30-minute epoxy. Follow up by bonding the remaining three red fins in place.

☐ Test fit each small Nike fin into the slots on the lower Nike fin can. Sand the tabs as necessary to get a good fit. Note the location of the Yellow fin, and glue it into the slot on the lower Nike fin can first, using 30-minute epoxy. Follow up by bonding the remaining three red fins in place.

☐ Remove any blemishes from the Nike/Nike adapter. Paint it Tamiya Olive Drab.

☐ Remove any blemishes from the X-248 adapter. Paint it Tamiya Olive Drab.

☐ Remove any blemishes from the X-248 tube. Prime with Tamiya white spray primer. Follow up with two (2) coats of Tamiya gloss white.

☐ Remove any blemishes from the nose cone. Prime with Tamiya white spray primer. Follow up with two (2) coats of Tamiya gloss white.

☐ Test fit the lower Nike section to the HJ/Nike adapter. Using 30-minute epoxy, bond the lower Nike section to the HJ/Nike adapter.

☐ Test fit thelower Nike section to the Nike/Nike adapter. Using 30-minute epoxy, bond the lower Nike/Nike adapter to the forward end of the lower Nike section.

☐ Using 30-minute epoxy, bond the upper Nike section to the Nike/Nike adapter, paying careful attention to the alignment of the yellow fins on both Nike sections.

☐ Using 30-minute epoxy, bond X-248 adapter to the the upper Nike section.

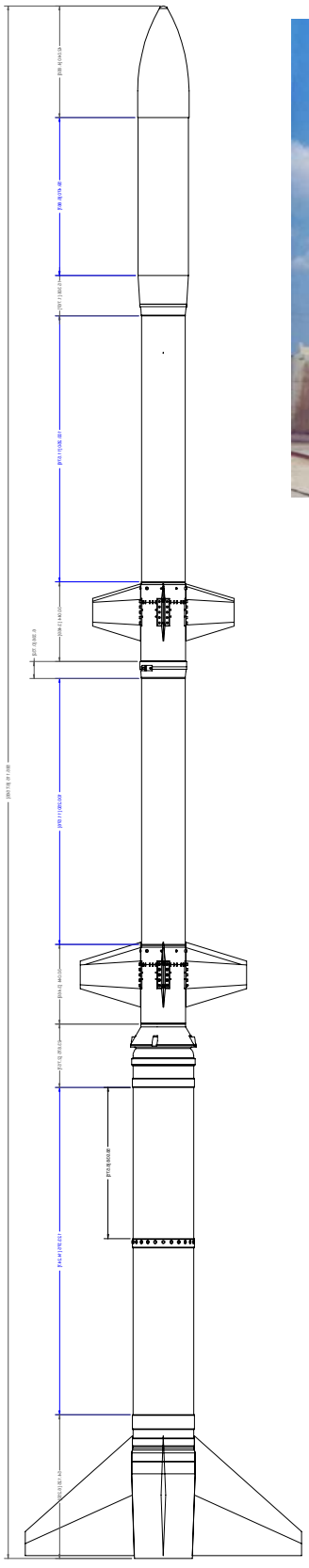
☐ Using 30-minute epoxy, bond the X-248 tube to the to X-248 adapter.

☐ Insert the nose cone into the X-248 tube. The nose cone should be friction fit into the tube. Add tape to the shoulder to ensure it does not come off easily. If desired, an altimeter can be placed in this section.

☐ Attach the one 36” parachute to the screw eye. Attach the other 36” parachute to the loop in the Kevlar line.

☐ Carefully cut out each decal from the sheet, leaving as little extra material around the printed portions. Apply the decals as shown on the cover art.

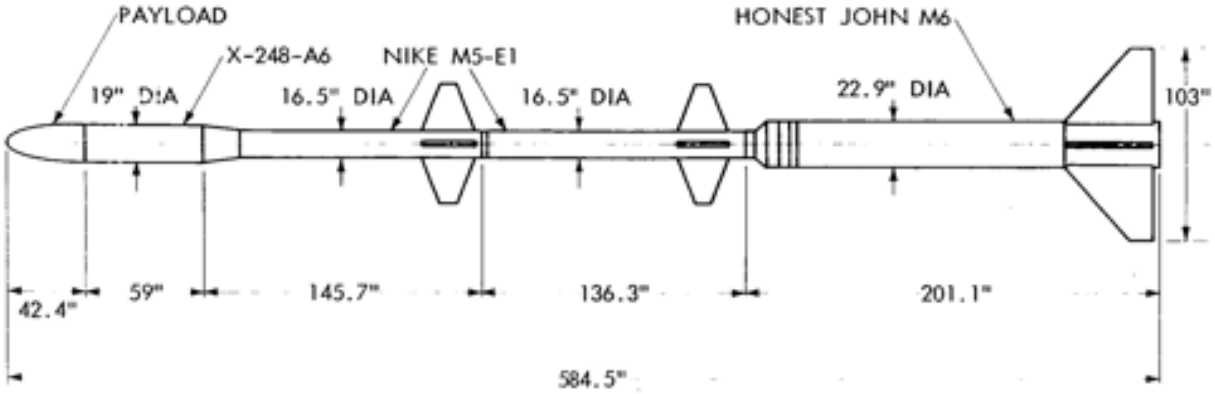
☐ Spray the entire model with a flat clear coat to protect the finish.



ARGO D-4 JAVELIN 1:8.66 SCALE

DRAWN BY J.TSCHIRHART 4-28-2015

NASA 8.--
Javelin (Argo D-4)



Javelin (Argo D-4) is a four-stage, solid-propellant sounding rocket. It consists of an Honest John M6 as the first stage, Nike M5-E1 as second and third stages and the X-248-A6 as the fourth stage. Cruciform fins are fitted on the first three stages to provide stability. The Javelin is launched from a modified, tubular, Sergeant launcher. The first stage is ignited at launch, burns for 5 seconds and falls away. The second stage ignites at 9.7 seconds, burns for 3.5 seconds and falls away, lock pins between stages 2 and 3 having been pulled during burning. Stage 3 ignites at 25 seconds, burns for 3.5 seconds, and then stages 3 and 4 coast together for a preset time. Stage 4 ignites at 53 seconds and burns for 40 seconds. Stage 3 is explosively disconnected at stage-3 ignition.

Flight Preparations

IMPORTANT!
READ BEFORE LAUNCHING!

□ Select one of the recommend motors shown on the first page. For an updated list of recommended motors, check the kit listing at NorthCoastrocketry.com.

□ Install the motor into the motor mount. Places a few wraps of 1/8" wide tape around the aft end if the motor does not have an aft engine ring. Screw the female motor retainer on the mail part, making sure the engine is tight.

□ Remove the payload section. Check to ensure the shock cord is securely mounted. Check for any damaged, burnt or frayed sections of the shock cord or Kevlar and replace if necessary. Install wadding, using an amount at least equal to one diameter (3" or so) to protect the parachute. Insert the shock cord and Kevlar back into the tube.

□ Carefully lay the canopy of the parachute out on a flat surface with the underside of the canopy facing up. Pull the shroud lines towards you. Fold the canopy in half by bringing the "top" half of the canopy down toward you. Fold the left corner over to make a quarter disk. Place the shroud lines on the parachute, then fold it lengthwise again. Then, from the top to bottom of the chute, fold it into three sections in a manner resembling a "Z". Place the chute in the tube with the shroud lines facing out.

□ Replace the payload section. Ensure the payload section is snug but slides freely.

□ Ensure the nose cone fits tight on the payload section tube. Use tape if necessary to shim the nose cone shoulder until it is tight.

□ The model's calculated center of pressure is 67" aft of the nose cone.

□ Check the model's center of gravity prior to flight. **The Center of Gravity (balance point) should be no farther aft than 33.5" aft of the nose tip with the motor, wadding, and recovery system installed. Add nose weight if necessary.**

□ Install the igniter per manufacturer's instructions.

□ Perform a pre-launch check to ensure that:
• The fins and launch lugs are not broken, damaged, or loose in any way;
• The body tube and other components are not damaged or dented;
• The model slides freely on the launch rod or rail, with no binding, sticking or misalignment of the launch lugs or buttons.
• If any problems are detected, correct them before attempting to fly.

Flight Instructions

□ Fly your rocket from the largest field possible on a clear and calm day. At a minimum, you need a field at least 1.5 times the expected altitude. For example, if you expect your model to fly to 1,000 ft (305 m), then the field should be at least 1,500 ft (457 m) on each side.
□ Do not fly near trees, power lines, or tall buildings. Do not fly in the vicinity or low flying airplanes or airports.
□ Be sure that the area is clear of dry weeds, grass, or other flammable materials that may be ignited by the rocket exhaust. Always use a large blast deflector.
□ Use a launch pad with at least a 5 ft (1.5m) rod or rail. Fly from a minimum distance of 30 ft (9 m) for safety and a better view of the flight.
□ Follow ALL Federal, State, and local regulations and ordinances when flying model rockets
□ ALWAYS follow the NAR Safety Code when flying model rockets.

Flight Profile

Give a five second countdown to warn all others in the area of a launch.
When the launch button is pressed, an electrical current causes the igniter to heat up, igniting the propellant in the motor. This may take as long as one second. The motor quickly builds up thrust and moves the rocket into the air. When the motor's propellant is consumed, a delay grain generates tracking smoke. When the delay grain is consumed near peak altitude, the motor's ejection charge fires, activating the model's recovery system. The recovery system permits the safe landing of the model to the ground.

Fly safely and have fun!

National Association of Rocketry
MODEL ROCKET SAFETY CODE

March 2009 Revision

ALWAYS FOLLOW THIS CODE WHEN USING NORTH COAST ROCKETRY® PRODUCTS!

Materials. I will use only lightweight, non-metal parts for the nose, body, and fins of my rocket.
Motors. I will use only certified, commercially-made model rocket motors, and will not tamper with these motors or use them for any purposes except those recommended by the manufacturer.
Ignition System. I will launch my rockets with an electrical launch system and electrical motor igniters. My launch system will have a safety interlock in series with the launch switch, and will use a launch switch that returns to the "off" position when released.
Misfires. If my rocket does not launch when I press the button of my electrical launch system, I will remove the launcher's safety interlock or disconnect its battery, and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.
Launch Safety. I will use a countdown before launch, and will ensure that everyone is paying attention and is a safe distance of at least 15 feet away when I launch rockets with D motors or smaller, and 30 feet when I launch larger rockets. If I am uncertain about the safety or stability of an untested rocket, I will check the stability before flight and will fly it only after warning spectators and clearing them away to a safe distance.
Launcher. I will launch my rocket from a launch rod, tower, or rail that is pointed to within 30 degrees of the vertical to ensure that the rocket flies nearly straight up, and I will use a blast deflector to prevent the motor's exhaust from hitting the ground. To prevent accidental eye injury, I will place launchers so that the end of the launch rod is above eye level or will cap the end of the rod when it is not in use.
Size. My model rocket will not weigh more than 1,500 grams (53 ounces) at liftoff and will not contain more than 125 grams (4.4 ounces) of propellant or 320 N-sec (71.9 pound-seconds) of total impulse.
Flight Safety. I will not launch my rocket at targets, into clouds, or near airplanes, and will not put any flammable or explosive payload in my rocket.
Launch Site. I will launch my rocket outdoors, in an open area at least as large as shown in the table below in safe weather conditions with wind speeds no greater than 20 miles per hour. I will ensure that there is no dry grass close to the launch pad, and that the launch site does not present risk of grass fires.
Recovery System. I will use a recovery system such as a streamer or parachute in my rocket so that it returns safely and undamaged and can be flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rocket.
Recovery Safety. I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places.

Installed Total Impulse (N-sec)	Equivalent Motor Type	Minimum Site Dimensions (ft.)
0.00--1.25	1/4A, 1/2A	50
1.26--2.50	A	100
2.51--5.00	B	200
5.01--10.00	C	400
10.01--20.00	D	500
20.01--40.00	E	1,000
40.01--80.00	F	1,000
80.01--160.00	G	1,000
160.01--320.00	Two Gs	1,500

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Visit www.nar.org for details!