Dexter Labs Superlight Scratch-build Rocket Features

- **Designed for high performance flights**
- **Can be adapted to any manufacturer's micro or mini-hybrid motor.**
- **Altimeter deployment – ideal for use with the Altus Metrum Easy Mini, Eggtimer Apogee or Quark, Perfectflite Stratologger CF, or similar altimeter.**
- **Optional 2-stage boosted bi-hybrid configuration.**
- **Optional dual-deploy configuration.**
- **Optional piston launch configuration**
- **Robust design and construction to handle these heavier motors.**
- **Extended stump tail:**
  - **Provides for an alternative motor retention method.**
  - **Provides a possible adapter for piston launching**
  - **Provides for an interstage coupler for two-stage flying**
  - **Provides impact protection to the fin can.**
  - **Serves as an igniter lead anchor mandrel.**
  - **Reduces drag interference.**
- **Minimum diameter for low drag.**
- **Low launch weight to showcase the small hybrids capabilities.**
- **Uses a 3D printed nose cone or a 3rd party molded plastic nose cone.**
- **Unique wire motor retention.**
- **Rocket diameters range from approximately 1" (25 mm) to 1.3" (29 mm).**
- **Rocket length range from approximately 20" (69.2 cm) to 36" (91.4 cm).**
- **Rocket weights (very approximate)**
  - **Airframe For micros 30-40 g Launch wt 135-150 g**
  - **Airframe For minis 45-55 g Launch wt 200-230 g**
  - **Airframe For mini max 90-100 g Launch wt 310-325 g**
- **Peak altitude = 1,000' to 2,000' (305 – 610 m) but has reached almost 3,000' (915 m) boosted.**
- **Skill level 3 or 4 depending on techniques actually employed.**

A typical Dexter Labs Superlight Scratch-build Small Hybrid Rocket

Dexter Labs Superlight Scratch-build Small Hybrid Rocket

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Designed especially for high performance/high altitude flights with small hybrid motors. This rocket may also be of interest to my international motor customers where shipping costs often make sending kits overseas cost prohibitive. These instructions are easily scalable and I have made versions for use with micros, minis, mini-max and turbo bi-hybrids.

NOTE: For advanced micro or mini-hybrid flyers, if you have access to commercial black powder hobby rocket motors (like Estes of Klima C or D class motors) this build can optionally be constructed to be used as the sustainer for a two-stage bi-hybrid rocket (requires extra parts). If you are interested in flying as a bi-hybrid, be sure to refer to the appropriate sections section in the Dexter Labs Micro and Mini-hybrid Users Manual and Rocket Construction Techniques and Examples manuals before building this kit. You can certainly fly the sustainer the same as the single-stage version. Also achieved altitude can be appreciably increased by using a piston launch system.

1. **Parts and materials required:** This instruction set is meant for individuals who have some previous modest kit building skills (other model rockets, model airplanes etc.) and who also can search out materials from a number of suppliers accessible from within your country. You will need to start with one of two basic approaches. 1) Purchase commercial kits from a supplier available in your country (i.e. Estes, Quest, and Klima etc.) and pirate parts for this rocket or, 2) have access to a 3D printer, sheet balsa wood and a source for cardboard tubes 24 mm to 30 mm in diameter and about 60 cm long. I will use the various tubes available from Balsa Machine Services (BMS) as reference standards, hopefully you can source similar sizes in your country:

   www.balsamachining.com/

   Also you will need to have access to a small electronic altimeter/deployment device, an electrical squib (e-match or homemade from nichrome wire, steel wool fibers or very thin copper wire strands) and some form of black powder (may be available from antique firearms suppliers/users) and a small nylon parachute or streamer. If you can meet these requirements you can consider building your own hybrid rocket airframe pretty much from scratch! Here are the basic parts you will need to find or make:

a. One body tube section scalable from 1 to 1.3” (24 to 29 mm) diameter and 17 to 31” (43 to 79 cm) long to serve as the body tube and altimeter bay.
    i. For the micro-hybrid use BT-50 tube (Balsa Machine Service tube BMS T-50-34).
    ii. For the mini-hybrid use ST-10 tube (Balsa Machine Service tube BMS T104-34).
    iii. For the mini-max use 29mm tube Balsa Machine Service tube BMS T30mm-34).
b. A 1” long scrap left over from the body tube cutting to serve as a stump tail for all minimum diameter versions (mini, mini max and turbo bi-hybrid).
c. No separate motor mount tube is needed except for the micro-hybrid versions which need a BT-50 sized coupler tube to be used for a motor mount.
    i. Estes BT-50 couplers.
    ii. Balsa Machine Service coupler C50-34.
d. One about 6” (15 cm) long piece of coupler tube
    i. For BT-50 use BMS tube C50-34.
    ii. For ST-10 (BMS 104) use the thick walled BMS T50H-34.
    iii. For BMS T30mm use a Dexter Labs mini to 29mm adapter or generic 29 mm coupler.

   to fit inside your selected body tube.
    i. One piece will be cut about 2” (5 cm) long will be the coupler between the altimeter bay and the lower body tube.
    ii. Two pieces will be cut about 1” (2.5 cm) long each will be the lower anchor ring for the tether (optional but needed for two-stage flying).
    iii. One piece will be cut about 1 ½” (4 cm) long to be the stump tail for the micro only.
e. One sheet of 1/16 to 1/8” (1.6 to 3.2 mm) thick balsa wood about 4 by 12” (10 by 30 cm) for fins.
f. One sheet of standard copy paper to be used to skin fins.
g. One small sheet (2” x 2” or 5 x 5 cm) is plenty) of thin plywood or Luan (about 1/8” or 1.6 mm) thick to use for an altimeter bay bulkhead.
h. One nose cone (injection molded or 3Dprinted plastic) to fit the tube used. I can send .STL files for those with 3D printing capabilities.
    i. Estes BT-50 compatible (many versions) for the micro-hybrid size.
    ii. Estes Air Walker kit tube and nose cone for the mini-hybrid size.
    iii. Quest 30mm cones for the mini-hybrid size.
    iv. Any size can be achieved by scaling the .STL file for 3D printing available via download from me.
i. Two launch rod lugs or rail guides.
    i. 1/8” (1.6 mm) or 3/16” (4.8 mm) tubes for launch rod lugs.
    ii. .STL files available via e-mail from me for micro rail guides or 10-10 rail size.
j. Four feet (1.3 m) Kevlar braided cord 300 lb. (135 kg) test.
k. One split ring about ¼” (6.4 mm) ID to anchor the shock tether to the motor (optional).
l. Three feet (1 m) elastic shock cord.

m. One nose cone securing screw (four screws need for two-stage and piston launched flights).

2. **Other necessary or very useful items:**
    a. 5-minute epoxy
    b. Wood glue or white glue
    c. Ruler
    d. 3/4" to 7/8” (19.1 to 22.2 mm) dowel or small broom handle about a foot long
    e. Medium and coarse grit sandpaper
    f. Hobby knife
    g. 3/4” (19.1 mm) angle aluminum stock about a foot long (3 foot (1 m) lengths available at most home and hardware stores)
        i. Using a hacksaw, cut a 1/8” (3.2 mm) deep notch in the edge of one leg of the angle stock
        ii. This notch should be about an inch from one end of the angle stock
    h. Small block of 1x lumber about 1” (25.4 mm) wide and 3” (76.2 mm) long
    i. 1 or 2 C-clamps or similar
    j. Hand drill and 1/16” (1.6 mm), 3/32” (2.4 mm), and 1/8” (3.2 mm) drill bits
    k. A small diameter stick like a dowel or a bamboo cooking skewer (1/8”- 3.2 mm diameter is best)
    l. Pencil
    m. Rubbing alcohol
    n. Paper towels
    o. Masking tape
    p. Lightweight altimeter (Altus Metrum Easy Mini or Eggtimer Apogee recommended)
    q. Thin nylon parachute (Top Flight 12” to 15” Thin Mill model recommended)
    r. Nomex patch (3” x 3”) (75 x 75 mm) or cellulose blown insulation for recovery wadding
    s. A copy of *Dexter Labs Rocket Construction Manual*

3. **Please read through these instructions before beginning assembly and do dry run assembly before actually cementing parts together.** There are a couple of steps where you may choose not to cement parts together. If you want to fly two-stage, do not cement the stump-tail in place, leave it removable so you can install the thicker-walled interstage coupler as described later.

4. **Parts preparation:**
    a. You will need to cut various tubes. The set up shown in Figure 1 works well. Assemble the notched aluminum angle stock, wood block, and C-clamps to form a cutting jig for the body tube as shown in Figure 1:
        i. Arrange the angle stock near, and parallel to, the edge of a bench.
        ii. Make sure that the notch in the angle stock is positioned on the top edge of the vertical leg, and that the horizontal leg faces out toward the edge of the bench.

    iii. Position the wooden block against the side of the vertical leg away from the edge of the bench and so that the end of the block is the appropriate cutting distance away from the notch.
    iv. Use the clamps to hold these pieces firmly to the bench.

b. Cut the body tube (see Figure 1). One section of body tube is used for the altimeter bay (typically 2 to 6" or 5 to 15 cm long) and the other is for the lower airframe and keep a small 1" to 2" (2.5 to 5 cm) scrap for the stump tail.
    i. Do this by laying the full length body tube section alongside the angle stock simultaneously pressing the end of the tube against the wooden block.
    ii. Place the blade of the hobby knife in the notch of the angle stock and position the knife tip directly against the side of the tube.
    iii. Rotate the tube while slowly pressing the knife tip through the tube wall. Be sure to maintain enough pressure to keep the end of the tube firmly against the wooden block.
    iv. With care and a sharp new blade, this procedure will produce clean cuts of the body tube. Lightly sand the tube ends if needed.
    (Hint: if you have not done this before you can practice on a paper towel roll tube. If you can cut this kind of tube successfully you will have no trouble with cardboard rocket body tubing).

c. Cut any coupler tubes you may need also using the same method as step b.
    i. You will need at least one 2" long coupler for the altimeter bay (Figure 5).
    ii. Optionally two 1" (2.5 cm) sections of standard coupler or one thick-walled motor tube from a spent Estes 24 mm motor if you choose to use a built in lower tether anchor (Figure 6).
    iii. And finally a 1 ½" (4 cm) long section for the stump tail if you are using a micro.

d. A motor mount/tube for the micro-hybrid version only. There are 3 possibilities; 1) use two standard BT-50 coupler rings from a kit maker like Estes, 2) cut a 5 ½" (140 cm) length of BT-50 coupler stock like that from BMS or, 3) you can split a 5 ½" (140 cm) section of your standard body tube lengthwise and telescope it into the body tube (Figure 3).
    i. Using the angle stock as a ruler, mark two parallel pencil lines 3/16" (4.8 mm) apart along the full length of the motor tube.
    ii. Use your clamps to secure a section of dowel or small broom handle so it hangs out over the edge of the bench by about 8" to 10" (20.3 to 25.4 cm) (see Figure 2).
    iii. Slip the motor tube over the dowel with the marks visible at the top.
    iv. With the angle stock as a cutting guide, use the hobby knife to cut out the 3/16" (4.8 mm) wide strip. Discard the strip.

e. Make an important decision at this step! Decide if you want to use a cemented-in lower tether anchor ring (less hassle at launch, a bit heavier, needed for 2-stage flying but limits you to one case length)(Figure 6) or if you would prefer to anchor the lower end of the tether directly to the arming screw of the motor with a metal split ring and forego any upper thrust ring (lighter, simpler, allows any motor case length, but requires more attention at launch)(Figure 7). IMPORTANT NOTE: If you think you will want to fly your Superlight in a two-stage configuration or with piston launching you will most likely want to make and install the anchor tubelette (less the attached Kevlar) as an upper thrust ring even if you will still want use the split ring to tether the shock cord directly to the motor. Don't worry too much if you are unsure at this point, you can omit it and it can be retrofit at a later date in all cases except for the micro; but, once it has been installed, that's it!!
    i. If you want to use the metal split ring there is nothing to do here, skip on to step f.
    ii. For the built-in anchor, thread the end of the long Kevlar cord through a 1" long section of coupler. Preferably use thick walled like a section of spent Estes motor case; or, nest together 2 standard weight coupler tubes. Loop the end of the cord back, and tie the tube inside a 1 to 2" (25 to 50 mm) loop like a bead on a bracelet (Figure 6).

f. Prepare the fins:
    i. Cut out 3 rectangular pieces of sheet balsa wood slightly larger than the fin outline you intend to use.
    ii. Print or draw 3 fin templates based on the attached figure and dimensions onto standard white office/copy paper.
    iii. Cut out the 3 templates slightly oversized so you can still see the lines.
    iv. Cut out 3 rectangles larger than the fin from the same kind of paper.
    v. Using white glue and some available water for thinning glue the 3 templates onto each of your sheet of balsa, keep the grain along the long direction of the fin.
    vi. Quickly glue the rectangular sheets of paper onto the back side of each balsa sheet.
    vii. For the next few minutes gently pat and/or flex the drying sheets of balsa so that the paper is without wrinkles and the balsa sheet is not warped.
    viii. Let these blanks dry overnight.
    ix. When completely dry trim the excess paper and sand the edges smooth. As you finish this task it pays to stack all three fins together to get a matching shape.
    x. Apply a thin bead of CA cement to the fin edge to toughen up it up.

g. Prepare the altimeter bay bulkhead:
    i. Draw a circle the size of the ID of your body tube onto the small sheet of plywood or Luan. If you intend to use a saw to cut the part out, put masking tape over both sides of the wood surface before drawing the circle (helps reduce splintering).

ii. Cut out the disk.
iii. Sand the disk to finish.
iv. Drill two 3/32” (2.4 mm) tether cord “button-holes” along a centerline drawn across the diameter of the bulkhead.
v. Position these holes about 3/8” to 1/2" (9.5 to 12.7 mm) apart in the middle of the bulkhead.
vi. Drill a third hole to serve as a wire port for the ejection charge. Position this hole in a triangular arrangement with the two shock cord holes already drilled.
vii. This is the suggested hole pattern for the upper tether anchor and deploy charge port. You may choose to modify this pattern or use another anchor method.

h. Use a hobby knife to cut the Kevlar cord into two pieces, one 10” (25.4 cm) long and the other about 36” (63.5 cm) long or so. By applying a bit of wood glue or CA cement about ½ inch (12.7 mm) on either side of the measured cut point and then cutting the cord on a diagonal, two rigid “threading needles” will be formed.
i. This completes the parts preparation work.

5. Lower airframe assembly

a. If you prepared a lower tether anchor/thrust ring (with or without the Kevlar tied in) now is the time to install it. If you plan on using the metal split ring anchor connected directly to the arming screw you can skip on to step b.
    i. Using a marked stick, spread a ring of epoxy about ½ inch long applied just a bit deeper than the length of the motor case you are using (for the micro that is 6 to 6 1/2” (15 to 17 cm), for the mini that is 8 to 8 1/2” (20 to 22 cm) and for the mini max that is 7 to 7 1/2” (18 to 20 cm) into either end of the long piece of body tube. This is end of the body tube now becomes the tail end of the rocket.
    ii. Feed the Kevlar cord (if used) through the body tube ahead of the cardboard ring. Pull the end of the Kevlar cord out the open front end of the body tube (note: a small weight lightly tied to the end of the Kevlar will simplify threading it down the length of the body tube).
    iii. Using a dowel marked to the length of your motor from its end, push the anchor ring up into the body tube (while simultaneously pulling on the Kevlar shock cord). Make sure the ring encounters the epoxy. Upon reaching the mark on the push stick, remove the dowel leaving the ring the appropriate distance up from the bottom of the body tube to serve as the rear shock cord attachment and forward thrust ring for the motor. Let cure.
b. In general, you will not need any kind of motor tube or separate motor mount. Most of the time these are minimum diameter airframes and the ID of the body tube is the motor tube. So unless you are using a micro skip to step c.
    i. In the case of the micro-hybrid inside of a BT-50 tube you will most likely need a motor mount as discussed in step d of the parts prep section.
    ii. If you are using the two separate coupler tubes:

1. Cement one into the body tube far enough in to be centered on the top of the motor or directly up against the tether anchor/thrust ring if used.
2. Cement the other far enough into the bottom of the body so that ½” of bare tube remains below the lower motor ring.

iii. If you are using either the 5 ½” (13 cm) coupler or the 5 ½” (13 cm) split body tube options, cement them in so that there is ½” (13 mm) of bare body tube remaining below the lower end of the motor mount tube. If you happened to have installed a tether ring earlier it will seat right up against the ring.

iv. Apply just a few very light smears of epoxy in the body tube below the thrust ring. Do not use too much epoxy here or the excess will ooze to the inside of the motor mount preventing easy insertion of the motor. You do not need much epoxy to secure the motor tube/mount in place!

v. All this should now leave about 1/2” (12.7 mm) of bare body tube for the lower stump-tail / motor retention tubelette (or the optional interstage tubelette) to slip in below the motor mount. Do not cement either of these items in place, they are supposed to be removable, unless you do not intend to ever fly two-stage.

c. Use the aluminum angle or a door frame to mark a line along the lower body tube to guide launch lug attachment. Make sure this line is midway between any two of the three fin marks applied in the next step.

d. Attach the fins which have been allowed to thoroughly dry.

i. Lay out three marks evenly spaced around the circumference at the edge of the bottom of the body tube.

ii. Using a piece of 1/2" (13 mm) angle aluminum or the corner of a door frame, extend the marks into lines about 5” (12 cm) long up from the bottom of the airframe. If you are unsure of your fin attaching skills you can obtain or make very fancy fin alignment guides or jigs but I have had good luck using just a paper template (Figure 9).

iii. Mix a very small amount (just a few drops) of 5-minute epoxy and let it thicken for a minute or so. Apply a thin epoxy coat to only the root edge of a fin and attach that fin along one of the three reference lines with the base about ¼” above the tail end. Eyeball this first fin alignment and hold it in place.

iv. After a couple minutes the bond should begin to firm up. When the first fin is reasonably firmly attached but still pliable, repeat this process for the next fin. Now, using your alignment template, check the angular separation of the two attached fins and tweak as needed while the second bond begins to take.

v. Finally attach the last fin and repeat this alignment procedure. This technique allows for fairly quick tacking of the fins and yet allows for easy and mostly stress-free corrective alignment.

e. Apply the fin fillets. Once the fins have cured, lay in generous epoxy fillets along the base of each fin.

i. This is best done with the body supported horizontally on a rack with one fin oriented at 10 o'clock and another fin oriented at 2 o'clock in a V shape like hands on a clock.
   If you want to be a perfectionist you can also add temporary strips of masking tape about 3/16 (4.8 mm) to 1/4" (6.4 mm) away from each of the fin roots to prevent overspread of the fillet.
ii. Lay in a smooth and even bead of epoxy at the joint between each fin and the body tube.
   You can choose to use 5 minute or 30 minute epoxy here; usually the longer setting time epoxies will leave smoother fillets requiring little or no sanding.
iii. While the mix is still fluid use a plastic spoon tip or small diameter rod to smooth out the fillet. Now remove the masking tape strips if used. If you make an epoxy mistake use 91% isopropyl alcohol to clean unwanted drips away and also to smooth stubborn bumps along the fillets themselves.
iv. Once the epoxy cures rotate the rocket 120^{o} and repeat the filleting then repeat once more to complete the job. You will be amazed at how well the fillets will come out. This combination of paper skins and epoxy fillets adds a surprising amount of strength to any surface-mounted balsa finned kit!

f. Epoxy the launch lugs or rail guides centered along the line drawn in step c (note: a short section of guide rod can be inserted at this step to be sure both launch lugs line up). It is best to lightly tack the lug first to be sure of the alignment, then add more epoxy as fillets on each side of the lug. Let cure.
g. Tie a 1" to 2" (25 to 50 mm) loop in the forward end of the Kevlar shock cord.
h. Use the short section of body tube (or coupler tube in the case of the micro) as the removable stump tail which is inserted ahead of the motor into the bottom of the body tube at launch time.

6. Altimeter bay and nose cone assembly:

a. Thread the short 10" (25.4 cm) piece of Kevlar cord through the two "button-holes" in the 3-hole bulkhead and tie it off in a knot to form the shock cord attachment loop. Secure the resulting knot with wood glue if desired.
b. Insert the bulkhead and loop 3/4" (19 mm) into the altimeter bay tube. The long Kevlar loop should drop out the bottom of the coupler tube.
c. Apply a ring of epoxy to the inner diameter of the altimeter bay tube to about 3/4" (19 mm) deep below the loose bulkhead. Work around the loop as best you can.
d. With the Kevlar loop running through its center, insert the coupler into the altimeter bay tube and continue to push the coupler about half its length into the altimeter bay tube.
e. Turn the altimeter bay tube vertical with the coupler down. Excess epoxy should pool and form a fillet between the bulkhead and the tube. Let the epoxy cure.
f. If you want to use the nose cone to house wires and pig-tail switch for the altimeter you can cut or sand the base off to leave an open-ended nose cone (not required).

g. Insert the nose cone into the altimeter bay tube. If the fit is too loose apply some tape to the step to build up the diameter. Using the 1/16" (1.6 mm) bit, drill a securing screw hole through both the altimeter bay tube and nose cone shoulder underneath. This hole should be located about 3/16" (4.8 mm) below the top of the altimeter bay tube. Tap the hole by screwing in the supplied sheet metal screw.
h. Drill a 1/8" (3.2 mm) diameter static port into the lower end of the altimeter bay. Avoid placing this hole in a direct line below the nose cone screw. Alternatively, if you prefer, drill three equally spaced static ports using the 1/16" (1.6 mm) drill bit.
Be sure these holes are drilled into the altimeter chamber above the bulkhead, not just into the coupler area.
i. Using the elastic cord, thread the Nomex patch onto the shock cord and then join the Kevlar loop from the altimeter bay with the other Kevlar loop from the lower airframe.

7. **Finish your rocket as desired.**

8. **Congratulations, you are ready to fly your Dexter Labs Superlight!**

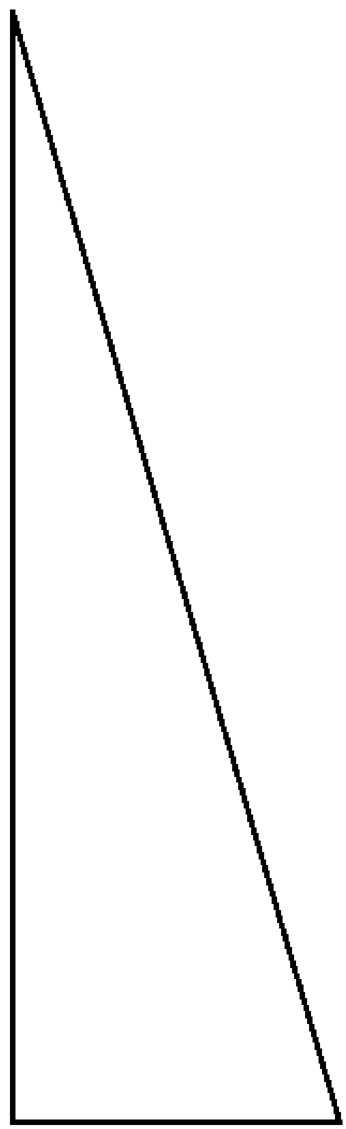
9. **Notes on additional performance enhancements, boosting, piston launching etc.** This rocket has been specifically designed to obtain the maximum performance (as defined by peak altitude) from my line of small hybrid motors. The basic airframe will perform quite well on its own; but, it is also very adaptable to a number of performance enhancing modifications. As with my other kits, the most recent designs incorporate a recessed motor mount/thrust ring allowing for a removable and interchangeable stump tail. By making an interstage coupler to replace the basic stump tail you can easily adapt booster airframes and/or piston launching tubes:
   a. <u>Boosting</u>. The bi-hybrid (2x1) and boosted bi-hybrid (3x2) concept has been treated in a number of sections of this and other of my manuals. This is the easiest way to fly any of my hybrids in two stage configurations. Please refer to pages 71-82 and 91-92 of the Rocket Construction Manual to see how boosting is implemented in these rockets. The same concepts apply here but one note of caution, since there is no fin can on this minimum diameter airframe, the screws holding in the interstage coupler 1) can more easily tear the skirt of the body tube (be careful, or better, reinforce the screw holes on this rocket), and 2) will most likely penetrate through the coupler into the exhaust (should be no problems with this). Note: to make an interstage coupler for the ST-10 (mini version) tube -based airframes, cement a 1" (2.5 cm) long section of a spent Estes 24mm motor case inside the same length of a BMS T50H tube. To make an interstage coupler for the 30 mm (mini-max) version just use a 1" long section of Dexter Labs mini to 29 mm adapter tube. And for the BT-50 (micro) version just use a 1" long piece of heavy BT-50 coupler like the BMS C50-34. Also note that interstage couplers char and need to be replaced occasionally.
   b. <u>Piston Launching</u>. I have recently come to like piston launching as the most simple and effective way to add altitude to your flights. This is because the piston is so effective at getting these heavy rockets moving fast right off the ground!

See pages 69-71 and 99-101 of the Rocket Construction Manual for tips on applying piston launching to your rocket.

c. Dual Deployment. When you start achieving higher altitude flights (say over a thousand feet) the chances of losing your rocket increase quickly (see pages 90-91 of the Rocket Construction Manual for an example). For these small hybrid powered rockets there are not many ways to solve this problem that don't involve a lot of extra weight (typical rocketry GPS trackers) or a lot of extra expense (bird radio tracking systems for example). One compromise solution I have found is a striped-down dual-deployment technique that makes use of the Altus Metrum Easy Mini or Perfectflite SLCF, Eggtimer Quark, or Featherweight Raven dual-deploy altimeters which you need to fly anyway. See pages 96-101 of the Rocket Construction Manual for details and a flight example.

Launch of a piston-enhanced, boosted, mini bi-hybrid, powered dual deploy Dexter Labs Superlight airframe. This particular flight reached 2,845' (867 m)!

FIN TEMPLATE



Airframe	Tube Type	Tube OD"	Min Tube Length"*	Template Scale %	Root Length"
Superlight Micro	BT-50	0.98	17.5	94.2	5.7
Superlight Mini	ST-10	1.04	20.5	100.0	6.0
Superlight Mini Max	30 mm	1.18	27.0	113.5	6.8
*Excluding nose cone					

Superlight Scratch-build Figures

Figure 1. Body tube cutting jig

Figure 2. Body tube splitting jig

Figure 3. Motor mount assembly Option

Figure 4. Bulkhead hole layout

Figure 5. Altimeter bay parts

Figure 6. Tether anchor ring option

Figure 7. Tether anchor split ring option

Figure 8. Stump tail and retention method

Figure 9. Fin placement

Figure 10. Fin assembly

ROCKSIM DRAWING