This Week
- Transfer breadboard circuit to PC board.
- Verify everything still works.
- Get data logger working.
- Pass off consists of:
  - Power PC board with data logger & start logging.
  - Test each sensor.
  - Stop logging and display logged data on computer.

Next Week
- Finish all circuit and rocket construction.
- Test that everything works.
- Go through complete launch checklist.
- Prep your motors.
- Make sure you’ve tested and practiced everything.
Before you get on the bus
- Practice the rocket checklist.
- Practice electronics prep.
- Practice recovery and analysis.
- You’ll want to do analysis between flights.
- Practice anything else you’ll need to do in the field.

Rocket Modifications
- Fiberglass for * motors
- Longer Motor Mount
- Motor Retainer instead of Motor Hook, Thrust Ring, & Thrust Ring Flange
- Longer or shorter Payload Section

Flight Dates
- 18 APR 2015
- 25 APR 2015
  - Meet in Parsons Parking Lot
  - Buses leave at 6 AM sharp
  - All teams expected to go
  - Bring your rocket
  - We will have food, water, & sunscreen
11 APR 2015 (Optional)
- ROC Monthly Launch
- Fill out Liability Waiver and take with you.
- Level 1 cert
- Test Flight
- There are rocket supply vendors on site.

18, 25 APR 2015
- Must fill out checklist & E80 Flight Card.
- Might want team checklist.
- You may launch personal projects after your team finishes their launch.
- We will have set up:
  - Tables
  - Computers
  - Canopies
  - Low power and high power launch stands
  - PA system

Launch Site
https://goo.gl/maps/Wfg39
Weather Conditions
- Can range from cold (upper 20’s) to hot (mid 80’s)
- Usually sunny and clear (high to very high UV index)
- We cannot launch if:
  - Wind >20 mph
  - Precipitation
  - Actual lake or mud
  - Clouds lower than 5000 feet AGL

Risk Mitigation
- About ½ of the time, one of the two Saturday launches gets scrubbed.
- If it’s the first Saturday, all four launches on second Saturday and return delayed.
- If second Saturday scrub looks likely, you may fly three motors first Saturday.
- If second Saturday scrub looks certain, all four launches on first Saturday and return delayed.
Dress Code
- Long pants required, cotton recommended (I know, just deal with it)
- Close-toed shoes required
- Hats recommended
- Sunglasses recommended
- Safety glasses required around motors and loaded rockets
- We will bring sunscreen

High Power Safety Codes
- **Tripoli Rocketry Association** (TRA)
- **National Association of Rocketry** (NAR)

Distance Table

<table>
<thead>
<tr>
<th>Installed Total Impulse (N-sec)</th>
<th>Equivalent Motor Type</th>
<th>Minimum Site Dimensions (ft.)</th>
<th>Minimum Personnel Distance (ft.)</th>
<th>Minimum Personnel Distance (Complex Rocket) (ft.)</th>
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</thead>
<tbody>
<tr>
<td>1.25</td>
<td>1/4A, 1/2A</td>
<td>50</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
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<td>A</td>
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<td>5.00</td>
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<td>200</td>
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</tr>
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<td>400</td>
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<tr>
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<td>500</td>
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<tr>
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<td>J</td>
<td>% max alt</td>
<td>100</td>
<td>200</td>
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<tr>
<td>2500.00</td>
<td>K</td>
<td>% max alt</td>
<td>200</td>
<td>300</td>
</tr>
</tbody>
</table>
Our Safety Rules
- Follow the checklist.
- Obey all PA announcements.
- Drink plenty of water.
- Wear safety glasses around motors, black powder, and loaded rockets.
- Never point loaded rocket at anyone.
- Igniter goes in motor as last thing on launch pad.

From countdown until safe 'chute deployment
- Everyone on their feet
- Everyone watches rocket

Flight Safety Video

Get Your Rocket to Fly Right
The Delay Grain

Delay Insulator (Chamfered)  
Aft Delay Spacer

Don't get grease on the Delay Element.


The Delay Grain (cont.)

Forward Delay Spacer (13/16" O.D. Washer)
Delay Cavity
Apply Grease to This Surface

Don't get grease on the Forward Delay Spacer.


The Delay Grain (cont.)

Delay Charge Assembly Inserted Completely Into 28mm Forward Closure
Fill with grease when using plugged forward closure ONLY

Make sure the Aft Delay Spacer is behind the Delay Grain.

We have the following Long Delays (14 seconds):
- RDK-06 – H238T, H165R
- RDK-07 – H128W, G79W

How to Set the Delay Time (1):
- Set the delay time to 10 seconds for “M”.
- Set to 14 seconds for “14A” or “L”.

How to Set the Delay Time (2):
- Set Flight Event to Deploy at Max. ejection delay.
How to Set the Delay Time (3)
- Set Launch guide length to 48 or 60 In.

How to Set the Delay Time (4)
- Set Launch conditions to those at your launch site.

How to Set the Delay Time (5)
- Click Launch and then plot your results.

Delay is too long by this amount (about 4 seconds in this case).
Adjust the Delay, RMS vs. DMS

- The RMS motors use the metal reusable cases.
  - Adjust the delay as first step in assembly.
  - Use the RMS Delay Drilling Tool.
  - The drilled end faces the propellant grains.
- The DMS are single use motors.
  - Adjust the delay as first step in assembly.
  - Use the Universal Delay Drilling Tool.

RMS Delay Drilling Tool

- Use the Delay Drilling Tool on your delay grain.
- The drilled end faces the propellant grain(s).

Adjust the Delay DMS (1)

1. **WARNING:** Do not重任 and ensure that there are no sharp tips or hard edges before cutting the delay delay. According to the Universal Design drilling tool, the DMS delay drilling tool will be a 5 seconds delay in the end of the tool (contact the impacted drill bit).

2. **Optional:** Place the washer between the delay and the grain if you want to adhere. I prefer to have a 5-second delay at the base and a 1 second delay at the top - 5 seconds removal marked at the top label (primary impact drill bit) and 1 second at the main delay (secondary impact drill bit).
Adjust the Delay DMS (2)

1.3 Place the open end of the tool over the motor bulkhead, hold the tool and motor firmly against each other and turn the drill knob several times clockwise until the drill knobs sit flush against the delay tool body.

1.4 Remove the tool and shake out the shavings from the tool and motor bulkhead. Collect the shavings to give to a proctor or professor for proper disposal.

Flight Safety Video II

CTI-Style Igniter Installation


Important notes:

1. Only use the igniter provided with the reload kit. Do not interchange with other Pro29 igniters or with any other type of igniter.

2. The following motors do not use an igniter pellet, but use a fortified (dipped) igniter instead: 282H399 and 348I204.

WARNING

Twist the bare igniter leads together several times BEFORE proceeding with igniter installation. NEVER check continuity of an electric igniter after it has been installed in a rocket motor unless done remotely from launch control while all personnel are in the safe location for rocket launch.

WARNING

Never store rocket motors with igniters installed. Do not install igniters until the rocket motor is installed in the rocket vehicle and the rocket vehicle is completely prepared and ready for launch. If weather, safety or other conditions result in a delay of the launch, disconnect all igniters from the launch system and replace the shunts. If the launch is aborted for any reasons, remove the igniters from the motors and install the shunts.

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Securing your microSD card (v3)

1. Attach electrical tape on the underside of your data logger.
2. Insert the microSD card part way.
3. Wrap the tape around the card to fully insert it.
4. Secure the tape on top of the card holder.
Questions for you
- How many teams want a stand-alone altimeter?
- How many potential Level 1 Certs do we have?

Your Questions?
- Data Logger?
- PC Board layout?
- $50 Budget?
- Calibration?