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NAR #94760 SR  
Project Name: The Big One  
Code Name: H<sup>3</sup>RL3

Rocket = Ultimate Wildman kit 6in diameter, 10.5ft long, 98mm motor tube, 1515 rail guides  
RocketPoxy for most all construction and fillets, with West System 5min for little things

Motor = Cesaroni Pro75 4G M1830, total impulse = 5603.7Ns, Burn time = 3.07 sec  
5:1 Thrust to Weight ratio is  $(1830 / 4.45) / 5 = 85.25\text{lb}$

Recovery = Main Top Flight Recovery 96in chute, Drogue Top Flight Recovery 45in chute  
Drogue chute will be a backup recovery in the event the main chute failure.  
1" Tublar Nylon, Main cord length 50ft, Drogue cord length 50ft

Static air ports on ebay are four half inch holes with 4.8in of separation, per Startologger doc.

Electronics = Main StratoLogger SL100, StratoLoggerCF  
Lipo Nano-Tech 7.6v 460mah, Dog House rotor switches, wiring,  
and black powder latex glove fingertip - duct tape burrito

Electronic Charges = Main chute side area is 6" x (36-6-6) 24" -- 4.6 grams of 4F (3x 4-40 pins) backup charge 6.9g  
Drogue chute side area is 6" x (60-4-24) 32" -- 4.0 grams of 4F (3x 4-40 pins) backup charge 6.0g  
Ground testing has been done to get all primary charge values.  
Backup charges are 50% more than tested charges.

Tracking = Red bee 70cm 16mw GPS unit and Red Bee 70cm transmitter, HAM license is N8RSH.  
I will be using APRS GPS message to track down the rocket with ham directional signal finding as backup.

Motor retention = 98mm Aeropac flange mount with an Aeropac adapter from 98mm to 75mm

Estimated empty rocket weight is 37.4lb with no motor case  
Launch Fully Loaded Weight estimate is 49.2 lb with a M1830..... (propellant is ~ 5.87lb, case is ~ 6lb)

Velocity at the rod estimate is 58.2ft/s with 72in of rod  
Maximum expected velocity is 730 ft/s (Mach 0.68)  
Maximum expected altitude is 6849ft  
Maximum expected acceleration is 8.94G

Expected ground hit velocity is 16.1 ft/s (20ft/s is recommended)  
All above calculations done with openrocket

## Estimate drag coefficient is

Component analysis

Wind direction: 0°

Angle of attack: 0°

Mach number: 0.30

Roll rate: 0 r/s

Warnings: No warnings.

Active stages: Stage 1 Motor configuration: [5604-M1830-CS-0]

Stability Drag characteristics Roll dynamics

Component	Pressure $C_D$	Base $C_D$	Friction $C_D$	Total $C_D$
Nose cone	0.00 (0%)	0.00 (0%)	0.03 (7%)	0.03 (7%)
Upper Airframe	0.00 (0%)	0.00 (0%)	0.06 (16%)	0.06 (16%)
switch band	0.00 (0%)	0.00 (0%)	0.01 (3%)	0.01 (3%)
Body tube	0.00 (0%)	0.13 (35%)	0.10 (26%)	0.23 (61%)
Fin set	0.00 (0%)	0.00 (0%)	0.05 (13%)	0.05 (13%)
Launch lug	0.00 (0%)	0.00 (0%)	0.00 (0%)	0.00 (0%)
Launch lug	0.00 (0%)	0.00 (0%)	0.00 (0%)	0.00 (0%)
<b>Total</b>	<b>0.00 (1%)</b>	<b>0.13 (35%)</b>	<b>0.24 (64%)</b>	<b>0.38 (100%)</b>

Reference length: 6.187 in Reference area: 30.1 in<sup>2</sup>

Rocket empty

The Big One - Ultimate Wildman Kit (The Big One Ultimate.ork)

File Edit Tools Help

Rocket design | Motors & Configuration | Flight simulations

The Big One - Ultimate Wildman Kit

- Stage
  - Nose cone
  - weight-foam-tracker bay
  - Nosecone Bulkhead
  - Big Red Bee 70cm GPS
- Upper Airframe
  - Main Parachute, +cord
- switch band
  - Ebay Bulkhead Foward
  - Ebay Bulkhead Aft
  - Tube coupler
  - 1/4x20 Steel All Thread
  - 1/4x20 Steel All Thread
  - Lipo 3.7V 460mah Battery
  - Lipo 3.7V 460mah Battery
  - Strogollogger SL100
  - Strogollogger CF
  - sled plus extra, including bulkheads
- Body tube

Add new component

Body components and fin sets

- Nose cone
- Body tube
- Transition
- Trapezoid
- Bifid
- Freeform
- Tube Fin
- Launch lug

Inner component

- Inner tube
- Coupler
- Centering ring
- Bulkhead
- Engine block

Mass objects

- Parachute
- Streamer
- Shock cord
- Mass component

View Type: Side view Fit (12.8%) Stage 1

The Big One - Ultimate Wildman Kit  
Length 120 in, max. diameter 6.187 in  
Mass with no motors 39.3 lb

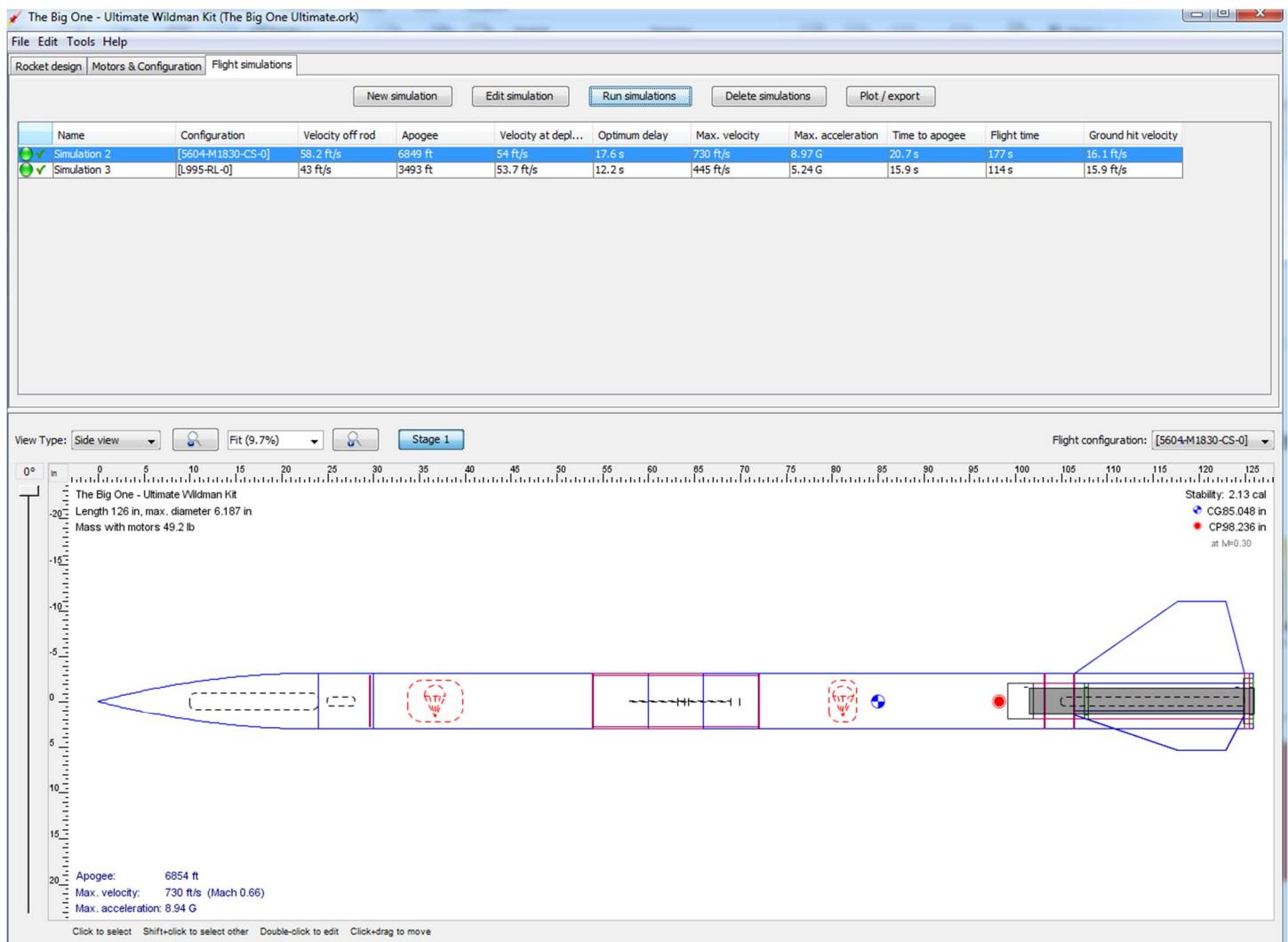
Flight configuration: [No motors]

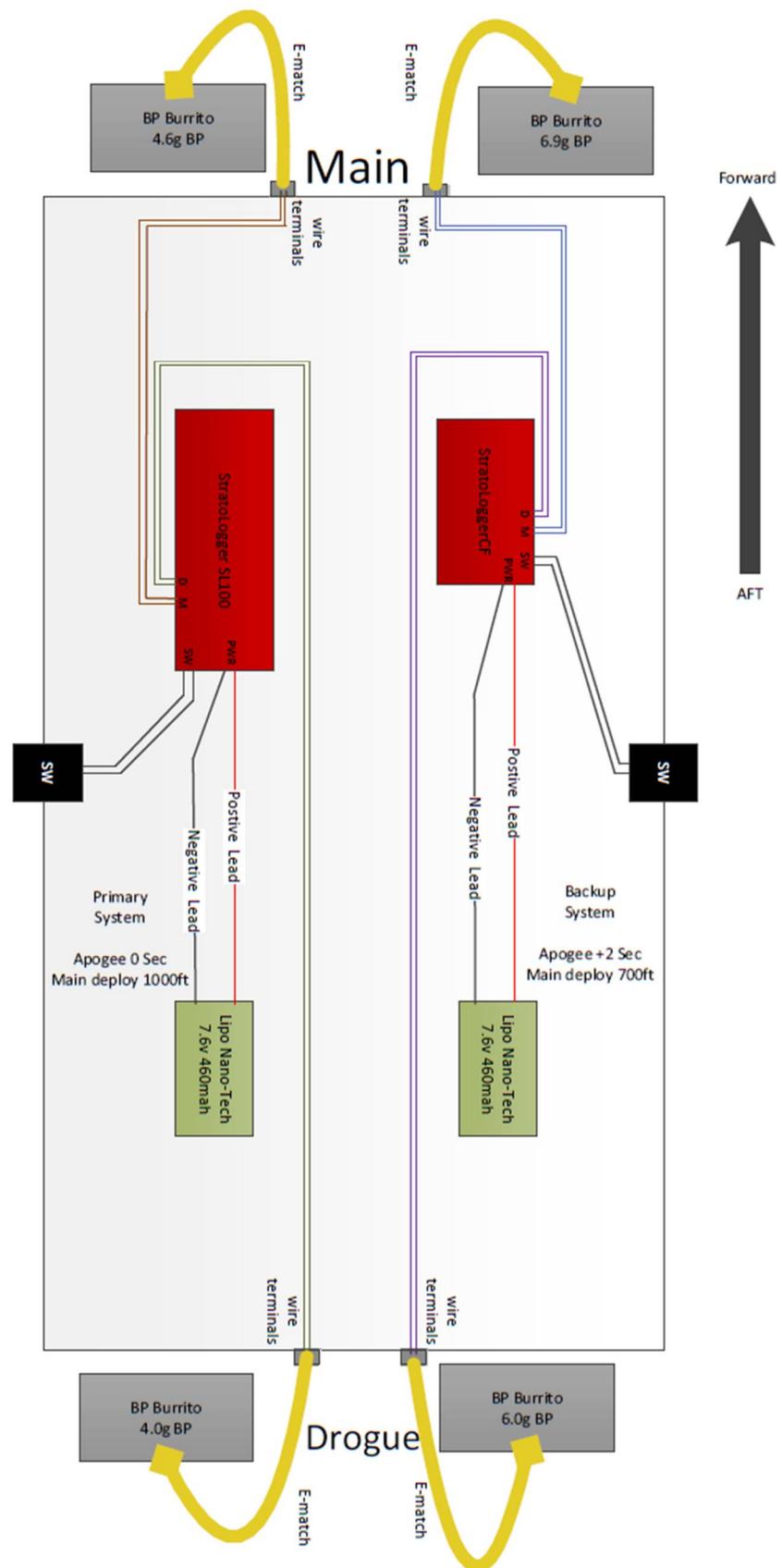
Stability: 3.31 cal  
CG77.744 in  
CP98.236 in at Mh0.30

Apogee: N/A  
Max. velocity: N/A  
Max. acceleration: N/A

Click to select Shift+click to select other Double-click to edit Click+drag to move

## Rocket loaded with M1830-CS





## 1. Pre-launch checklist:

5. Verify dog barf is in place
  6. Verify connecting airframe tubes are secured with shear pins
  7. Shake test with it standing up
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7. Final assembly
    1. Check all wires in ebay and make sure batteries are connected, and lock down nuts to ebay.
    2. Connect the main shock cord to the ebay threw the payload bay
    3. Connect Pyro charges on the main and drogue side of the ebay
    4. Connect Payload bay to ebay with well nuts.
    5. Load dog barf in payload bay on top of pyro charges ~ 5-6inches
    6. Connect main chute and chute protector to main shock cord
    7. Pack the chute and cord into the payload bay
    8. Load tracker in nose cone and verify it's powered up
    9. Connect main shock cord to nose cone
    10. Install 4-40 shear pins threw nose cone into payload bay
      - \*\* This point the front of the rocket is ready
    11. Secure adapter to motor, load motor in model, secure motor retainer
    12. Connect drogue shock cord to booster tube
    13. Connect drogue chute and protector to shock cord
    14. Pack drogue chute, protector, shock cord in to booster tube
    15. Load booster tube with dog braf
    16. Connect drogue shock cord to ebay
    17. Connect ebay/front assembly to booster tube
    18. Install 4-40 shear pins threw booster tube into ebay
    19. Shake test.. Make sure nothing sounds too funny, and it gets the dog barf to settle.
      - \*\*\* Model is ready to fly
    20. Present model to RSO for permission to fly, make sure L3CC member is good to go as well.
    21. Verify electronics remain in a safed condition
    22. Verify igniter is available for installation (not installed)
    23. Verify CG location; is it forward of the aft allowable limit?
    24. Verify alignment of launch pad interfaces (if applicable)

## **2. Launch checklist**

1. My dad will be helping me transport the model to the launch pad and getting it on the rail
2. Equipment list including
  1. Ladders, step stools for loading and access
  2. 1515 8ft Rail is required
  3. Launch pad tools (e.g. wrenches, allen wrenches)
  4. Recovery support items, club radio and ham radio
3. Place model on launcher
4. Verify launch angle/trajectory
5. Install igniter into motor and DON'T CONNECT TO launch system
6. Have helpers on field stand back from rocket and have them be quite while checking beeps
7. Arm recovery systems
  1. Verify all removable items are removed
  2. Verify switch locking devices or connector bayonets are engaged
  3. Verify both StratoLogger are beeping to the correct tune.
8. Turn on non-flight critical electronics/payloads
9. Connect igniter to launch system
10. Verify Flight Witnesses are ready
11. Indicate flight readiness to LCO/RSO

## **3. Post flight checklist**

1. Verify all pyrotechnics are discharged
  1. Safe the pyrotechnic systems if live devices are present
  2. Attempt to identify the reason for the unfired pyrotechnic
2. Record or save any flight data indicates that will be lost after power removal
3. Remove power from electronic systems
4. Present model to L3CC member in attendance for confirmation of safe flight and completion of Level 3 paper work.