## Lockheed Martin's Explorer Post 1010's: TARC Natianal Competition <br> Seen enough rockets yet <br>  <br> Jay Soni <br> Connor Armstrong Stephen Redlack

 today?
## "Magnum" (First Rocket)



- Engine: F24-4W
- Mass (on final test): 413 g
- Booster Recovery: 10X chute
- Cargo Recovery:

2- 7"x70" Streamers
First Rocket This Team Has Ever Built.

## Flight Testing of "Magnum"

- November 21, 2009 (Mt. Airy, MD)
-Test 1 Results: 770 feet high, 30 seconds long
Additional Details: Egg broke
-Test 2 Results: 907 feet high, 34 seconds long
December 30, 2009 (Mit. Airy, MD)
-Test 1 Results: 994 feet high, 40 seconds long
-Test 2 Results: 806 feet high, 31 seconds long
Additional Details:
Used E30-4T instead of F24-4W
亏 January 16,2010 (Mt. Airy, MD)
-Test 1 Results: 838 feet high, 35 seconds long
-Test 2 Results: 916 feet high, 26 seconds long
Additional details: Used F24-7W instead of F24-4W


## Last Test of "Magnum"

- February 21, 2010 (Manassas, VA)
-Test 1 Results: 799 feet high, 15 seconds long
Additional Details:
-Official Qualification (Score: DQ)
-Ejection charge failed; result of that shown below:


It was given a proper burial.

In our filing cabinet.

Photo courtesy of Connor Armstrong

## "Blue Steel" (New Rocket)



Photo courtesy of Explorer Post 1010

- Engine: F24-4W
- Mass (most recent): 463 g
- Booster Recovery:
$6^{6 " x} \times 60^{\prime \prime}$ streamer
- Cargo Recovery (most recent):

3- 7"x70" Streamers

## Flight Testing of "Blue Steel"

- March 20, 2010 (Great Meadow, VA)
-Test 1 Results: 744 feet high, 30 seconds long
Additional Details:
Used E30-4T instead of $\mathrm{F} 24-4 \mathrm{~W}$
2-7" $\times 70^{\text {" }}$ Streamers instead of 3
Not High Enough.
-Test 2 Results: 659 feet high, 28 seconds long
Additional Details:
Used E30-4T instead of F24-4W
2-7"x 70 " Streamers instead of 3
Definitely Not High Enough


## Flight Testing of "Blue Steel" (Continued)

- March 20, 2010 (continued)
-Test 3 Results: 925 feet high, 51 seconds long Additional details: 2-7"x70" Streamers instead of 3
Too High, But The Time Is Proportional
- March 27, 2010 (Great Meadow, VA)
-Test 1 Results: 838 feet high, 31 seconds long Additional details:

$$
\text { 2- 7"x70" Streamers instead of } 3
$$

Great But Still Too Low and Too Short, Getting

# Flight Testing of "Blue Steel" (Continued) 

- March 27, 2010 (continued)
-Test 2 Results: 859 feet high, 36.5 seconds long
Additional Details:
Used 2-7"x 70 " streamers and $1-4$ " $\times 40$ "
streamer
Official Qualification (Score: 51.6)
First Official Qualifier, Not Good Enough For TARC Though.


## Miracle Test of "Blue Steel"

- Also on March 27, 2010 in Great Meadow, VA
- We decided to switch out the 4 " $\times 40^{\prime \prime}$ streamer for another 7 "x70" streamer
- This decision gave us results as follows:
- 823 feet high, 40.6 seconds long
- Since this was an official qualification launch, we earned an official score of 2 , which made our team a finalist at the 2010 National Team America Rocketry Challenge
o. And the Bragging rights were nice too.


## Lessons Learned

1. Build it right the first time. Design is important.
2. What is your Data telling you? Its telling you what you're doing right and wrong.
3. Testing, Do it a lot.
4. Crash 7 times, launch 8. Design, build, launch, crash, repeat. Gravity, it happens.
5. Do everything carefully. There's a price to pay for error
6. Have a little fun too. It keeps the mind healthy.

Wait, what's apogee again?

## Teamwork: <br> No Rocket Scientist Left Behind

- Teamwork was essential to every procedure in the process.
- Each team member specialized in a system on the rocket. One covered engines. Another specialized in the recovery system. The last member focused on the altimeter and payload.
However, we all understood every component.
-And we get along pretty well too.


## I mean who wouldn't want this guy on their team?



