Today:

- Announcements and One Minute Questions
- LRR Feedback
- Launch Logistics
- Launch is in 2 days
- DD Rev C is due today at 4 PM
Announcements:

- Register for Design Expo by November 18th

- One registration per team

- Online FCQ Email on NOV 28th to DEC 9th
## BalloonSat Check-In Times:

<table>
<thead>
<tr>
<th></th>
<th>Time</th>
<th>Team</th>
</tr>
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<tbody>
<tr>
<td><strong>Today</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>1:00 PM</td>
<td>Team #9</td>
</tr>
<tr>
<td>2.</td>
<td>1:45 PM</td>
<td>Team #6</td>
</tr>
<tr>
<td>3.</td>
<td>2:30 PM</td>
<td>Team #3</td>
</tr>
<tr>
<td><strong>Friday</strong></td>
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<tr>
<td>4.</td>
<td>9:15 AM</td>
<td>Team #8</td>
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<tr>
<td>5.</td>
<td>10:00 AM</td>
<td>Team #2</td>
</tr>
<tr>
<td>6.</td>
<td>10:45 AM</td>
<td>Team #7</td>
</tr>
<tr>
<td>7.</td>
<td>11:30 AM</td>
<td>Team #4</td>
</tr>
<tr>
<td>8.</td>
<td>12:15 PM</td>
<td>Team #1</td>
</tr>
<tr>
<td>9.</td>
<td>1:00 PM</td>
<td>Team #5</td>
</tr>
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</table>

**ALL CHECK-INs SHALL BE COMPLETE BY 2:30 PM or you don’t fly**

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*Check In takes 25 to 30 minutes depending on your readiness level*
Announcements...

- Bring Ready for Flight Cards
- Bring them fully completed
- Not all team members need to be present
- Arrive 15 minutes before you check-in time
- All check-ins will occur in my office and SG main area will be available for teams to re-work issues

- “It’s in the DD” or “I emailed it” = BAD

ALL CHECK-INs SHALL BE COMPLETE BY 2:30 PM
Team 6:

- Thursday 2:30 PM – Actual = 3:45 PM
Team 7:

- Thursday 3:15 PM – Actual = 4:10 PM
Team 1:

- Thursday 3:45 PM – Actual = 4:12 PM
Team 3:

- Friday 8:30 AM – Actual = 9:15 AM
Team 4:

- Friday 9:00 AM – Actual = 9:38 AM
Team 2:

- Friday 9:45 AM – Actual = 11:15 AM
Team 6:

- Friday 10:30 AM – Actual = 11:20 AM
Team 10:

- Friday 11:00 AM – Actual = 11:35 AM
Team 8:

- Friday 12:00 PM – Actual = 1:57 PM
Team 5:

- Friday 12:50 PM – Actual = 2:09 PM
Announcements:

- Coming to Launch? Guests? Coming to recovery?

- Weather conditions are…

- Last point to cancel or reschedule is 8:00 PM Friday

- Email updates until 6:00 PM on Friday, then hotline 303-492-4750
LRR Feedback:

You have come a long way since September 19, 2016

- Try to point out items I see that will make you more successful during flight
- Should have data for each sensor at this point (including camera)
- Calibration and characterization
- microSD card file number issues – be sure to remove files 01 to 999 before flight
- Use jpg/pdf versions of excel plots in proposals and reports
LRR Feedback:

- Unlabeled plots = no plot – must analyze and understand it
- Worry about things coming lose in your box
- Cold test should have reached -40C external

- Wires, wires, wires – short, bundled, and soldered
Additional Advice:

- Remove old pictures from camera
- Don’t tape your 9V batteries together
- Secure wires and tape down switches
- Camera settings
- Fresh batteries where possible
- Hot glue and electrical tape
- **Measure and record battery voltage**
- Electrical shorts!!!

- Don’t give up, never surrender
**Additional Advice:**

- Navigator Training today from 2 – 3:00 PM and 3:00 to 4:00 PM at Space Grant

- Not required but looking for 4 to 16 people to be trained

- Help set up in other school cars

- Use in Lead Vehicle navigation

- Show of hands; who is interested?
Tuesday...

Post Launch Recap and Directions
Jay Lindell (CO VIP)
Thursday...

Quick Look Reviews

Not Formal but early start?

Presentations due 7 AM

Colorado Space Grant Consortium
Questions?

Colorado Space Grant Consortium

T-02
Launch Logistics

ASEN 1400

Class #24

Colorado Space Grant Consortium
You are about to launch something to the edge of space…

- Are you ready?

- Launch is in 2 days

- Is Time your enemy or your friend?

- How would you feel if you had another week?
You are about to launch something to the edge of space…
ATOMIC BOMBS
PROJECT MAYHEM
Introduction:
BalloonSats

- Interesting burst
Launch Logistics:

- Here are some items we need to cover

  - Meeting Location
  - Transportation
  - Launch Site Directions & History
  - Launch Day Procedures & Personnel
  - Schedule
  - Chase and Recovery
  - Safety
  - Landing
  - Miscellaneous, but very important
**Meeting Location:**

- Leaving parking lot 436 at 4:00 AM Saturday

- We are launching at 7:00 AM

- Can go directly to launch site but be there no later than 6:00 AM

- Be late, be sorry

- We will cover rides in a moment
Transportation:

- 1 CU SUV
- 6-7 people
- Tracking
- Navigation
- Communication
- Entertainment
- Final Exam Answers

- The goal is to have all vehicles stay together
Transportation:

*Students interested in riding in the lead vehicle?*

- Must complete the navigator training today
- Must not be sick (ha!)
- Must be willing to help with all three balloon recoveries
- Must like legos
- Must be willing to help unload vehicle at CU

- Send an email no earlier than 11:00 AM with one sentence as to why you want to be there and your 3 favorite movies
Transportation:

- Who still needs a ride?

- Come to the front of the room if you need a ride

- Stand up if you have seats in your car to take one of these students in need

- Who is left?
Launch Sites:

Fall / Spring are usually out of Windsor or Eaton

Summer we go out of Deer Trail

Why?
Launch Site

Predicted Landing
Lat = 39.44534°
Lon = -104.23009°
B/R: 228° @ 13.2 nmi
(083° @ 5 nmi IOC)
Launch Site:

So Limon it is...
Launch Site:
Where?:

Boulder to Limon ~1 hour 45 minutes
Boulder to Limon
Launch Site:
36 east to 76 east to 270 east to 70 east
Where?:

I-70 east to Limon
Left on Juniper Street
Where?:

Exit 359 on I-70
Where?: Exit 359 on I-70
Where?:

Destination is on right
Where?:

Destination is on right
Where?:

Destination is on right
Where?
Destination is on the right

Food here

Pee here?
2012 Predicted and Actual: (Windsor)
2013 Predicted and Actual (Windsor)

AE055-11 Burst
Timestamp = 15:51:30
Alt = 90,747
Course = 73.1°
Speed = 25.3
Lat = 40.65527°
Long = -103.6446°
GridX = 21.7 mi
GridY = 23.1 mi
Bearing = 79.3°
Range = 70.2 mi

AE055-11 Touchdown
Timestamp = 16:35:00
Alt = 4,078
Course = 70.8°
Speed = 37.2
Lat = 40.72094°
Long = -103.21563°
GridX = 44.1 mi
GridY = 27.6 mi
Bearing = 78.9°
Range = 93.2 mi

Predicted Burst
102,000 ft. ASL
Lat = 40.60865°
Long = -103.82618
GridX = 12.2 mi
GridY = 19.9 mi
Bearing = 81°
Range = 60.3

Predicted Landing
Lat = 40.65766°
Long = -103.29831
GridX = 39.8 mi
GridY = 23.3 mi
Bearing = 81°
Range = 88.2
2015 Predicted (Eaton)
Transportation:
EOSS 200 Flight Celebration
Submitted by Doug Gentges on Mon, 07/28/2014 - 10:04

Greetings to All!
EOSS would like to welcome you to join us for a celebration of our 200th flight. The event will be held November 18, 2014 at the Courtyard by Marriot Cherry Creek, 1475 S. Colorado Blvd. Festivities will start with a cash bar at 6:30, and will evolve into a buffet banquet. Following there will be a special entertainment honoring many of our members, customers, educational officials who have provided enormous contributions to the success of EOSS for the past 20 years.
Payload Plan

**EOSS-234**

Rev A

**0700 MST, 12 Nov 2016**

Limon, CO

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3000 gm latex balloon

15 ft 500# woven nylon

10 ft parachute w/ fast release 1.088 kg (2.40#)

5 ft 500# woven nylon

9 x CU Boulder Gateway to Space BalloonSats

Spaced @ 24” on 500# woven nylon

Total wt (est): 7.776 kg (17.14#)

20 ft 500# woven nylon

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**Table: Weight Summary**

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<tr>
<th>Item</th>
<th>Weight pounds</th>
<th>Weight kg</th>
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<td>Parachute</td>
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<td>Gross Weight</td>
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<td>Gross Lift Factor</td>
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<tr>
<td>Neck Lift</td>
<td>27.10</td>
<td>12.292</td>
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</table>

H2 fill, scf (approx) 456
Burst Altitude, kft km 103.5

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**KCØUUO-11 APRS Digi/ EOSSA**

Slotted at 0:00 and 0:30

144.340 MHz 0.35W 0.500 kg (1.10#)

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**KCØUUO-11 / EOSS-234**

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**www.wxqa.com/sss/balon1.cgi**
### 3 Balloon Launch Scenario

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<th>School/Team</th>
<th>final</th>
<th>lb</th>
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Launch Site:
Launch Site: Not a good plan
Launch Site: - Not a good plan
Launch Site: - Pictures
Launch Day Procedures & Personnel:

- There are several players on the field to ensure our launches are good
- Launch Control and Launch Supporters
- Launch Coordinator
- Payload Handlers
- Guppies
Launch Control and Launch Supporters

- Edge of Space Sciences
- 3 launches 3rd time ever
- Have fancy radios and usually blue hats
- Very nice but run a tight schedule
- Don’t drop their control payloads
- Who is interested in HAM radio?
Launch Control and Launch Supporters

Using Hydrogen instead of Helium so please...

- No Smoking
- No open flame
- No goofing around during balloon fill
Launch Coordinator:

When you arrive at the launch site, Payload Handlers IMMEDIATELY check in with me
Payload Handlers:
“Did I flip the switches?”
Payload Handlers:
Payload Handlers - What Not To Do At Launch Site…
Payload Handlers - What Not To Do At Launch Site…
Taking One For The Team

In Slow Motion & Enhanced
Guppies:
**Schedule:**

- 6:00  Arrive at launch site
- 6:10  Payload handler come to your payload
- 6:20  Team Pictures
- 6:31  Food is served
- 7:00  EOSS 234 Balloon Launch
- 7:20  EOSS 235 Balloon Launch
- 7:40  EOSS 236 Balloon Launch
- 7:45  Report to cars with bladders empty
- 7:50  Begin Chase

From 7:00 – 7:30 AM get map and radios for chase
Chase and Recovery:

Between first and third launch…

- Cheer
- Celebrate
- Go to the bathroom
- Get your car’s radio and map
- Get yourself ready to roll
Chase and Recovery:

- Demonstration: Using a FRS Radio
Chase and Recovery:

Looking for 2 organized and friendly volunteers

- Will hand out radios and maps to students in this class as well the 6 other colleges joining us on Saturday
- Must get name and cell number for all those receiving radios and maps
- Send me an email today if interested
Chase and Recovery:

If you are driving yourself…

- Arrive fully fueled and ready to go

- Gas Station at exit of highway

- Cars must be in good shape and suitable for highway driving as well as various terrains (4WD recommended)
Chase & Recovery:

- Chase should be over no later than 3:00 PM

- Chase will be as follows:

- Each car will be provided a radio to communicate with our lead SUV and 1 detailed map

- One to two cars from CU will have tracking system including GPS and real-time telemetry from balloon

- Cell phone aprs.fi
Chase and Recovery:

APRS/CWOP weather 2015-11-05 08:53:16: show weather charts
Temperature 37°F Humidity 92% Pressure 1009.8 mbar
Wind 157° 0.9 MPH (Gusts 2.9 MPH)
Rain 0.0 inches/1h 0.0 inches/24h 0.0 inches/since midnight

[APRS via TCPXX*,qAX,CWOP-3]
start tracking · track in Street View

weewx-3.1.0-Vantage
Chase and Recovery:

Navigator Training today from 1:00 to 3ish
Chase and Recovery:
Chase and Recovery:

- Make sure you bring the following:
  - Pants
  - Good shoes, no sandals
  - Sun Block
  - Hat and gloves
  - Warm clothing and coats
  - Sun Glasses
  - Water

- Relieve yourself before launch, no time after launch

- Don’t drink too much on the ride
Safety:

- Speeds can get high...
Safety:
Safety:
Safety:
Landings…

To see a landing is rare…

Depends on many factors but plan on not seeing it land
Landing:

- Be prepared to have fun, Be prepared for a hike
- Wait for permission before entering landing site
- Rural Coloradoans are “packin heat” Spring 2014
- Don’t wander too far from landing site
Landing:

- Christmas Morning...
Launch Recap:
Launch Recap:
Landing:
Landing:

- When reaching actual landing site, please wait for everyone to have a chance to see landing orientation before handling hardware
Landing:
So...

- Don’t break it now
- Don’t let the smoke out
- Make sure box is clearly labeled
What is it?

Joe Nelson found this box on his Hazelton farm, and is at a loss as to what it is.
HAZELTON — Joe Nelson of Hazelton made an interesting discovery in one of his fields recently while he was harvest ing.

A silver box approximately 5 1/2 inches square with wires and bolts sticking out of it was laying among the vines in the field. It was near dark and difficult to see any details.

“My first thought was that it was a bomb,” Nelson said.

The next morning after having a closer look, Nelson could see a hole cut in one side of the box with a camera in it. There is also what appears to be an antenna on one side and a switch on another. A long bolt appears to be running through the contraption, sticking out 3 inches on each side.

The box looks to be made of foam board held together by foil and duct tape. Several stickers of badgers and American flags decorate the box.

In another nearby field, he found a similar contraption. This one was white with stickers saying USA1 and a second box was connected to it by a cable.

Nelson said that the boxes may have been part of a school science experiment and someone may want to retrieve the cameras from the boxes.

For more information, call Trena at 677-4042, extension 600.
So…

- Don’t give up now, do what it takes to get it done

- You will remember this event for the rest of your life
Miscellaneous:

- We will be going directly back to Boulder
  - After a few relief stops

- Check for final launch NO/GO status at 303-492-4750 after 8:00 PM Friday night

- Lost, running late, call 303-378-4765
Balloon Attachment
Balloon Attachment

- Balloon attachment tube hole should run through center of box on non-opening side

- Make hole diameter as close to tube diameter as possible

- Secure with paper clip

- Make sure paper clip does not interfere with inner diameter
Questions?

Colorado Space Grant Consortium