System Concept Review

FaLling Aerogel Re-entry Experiment (FLARE)

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Smead Aerospace
UNIVERSITY OF COLORADO **BOULDER**

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To develop a Low-Cost Access to Space (LCAS) mission concept that demonstrates the successful deployment and retrieval of low-density ‘space dropsondes’ from a commercial reusable launch vehicle.

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Motivation:

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Project Concept:

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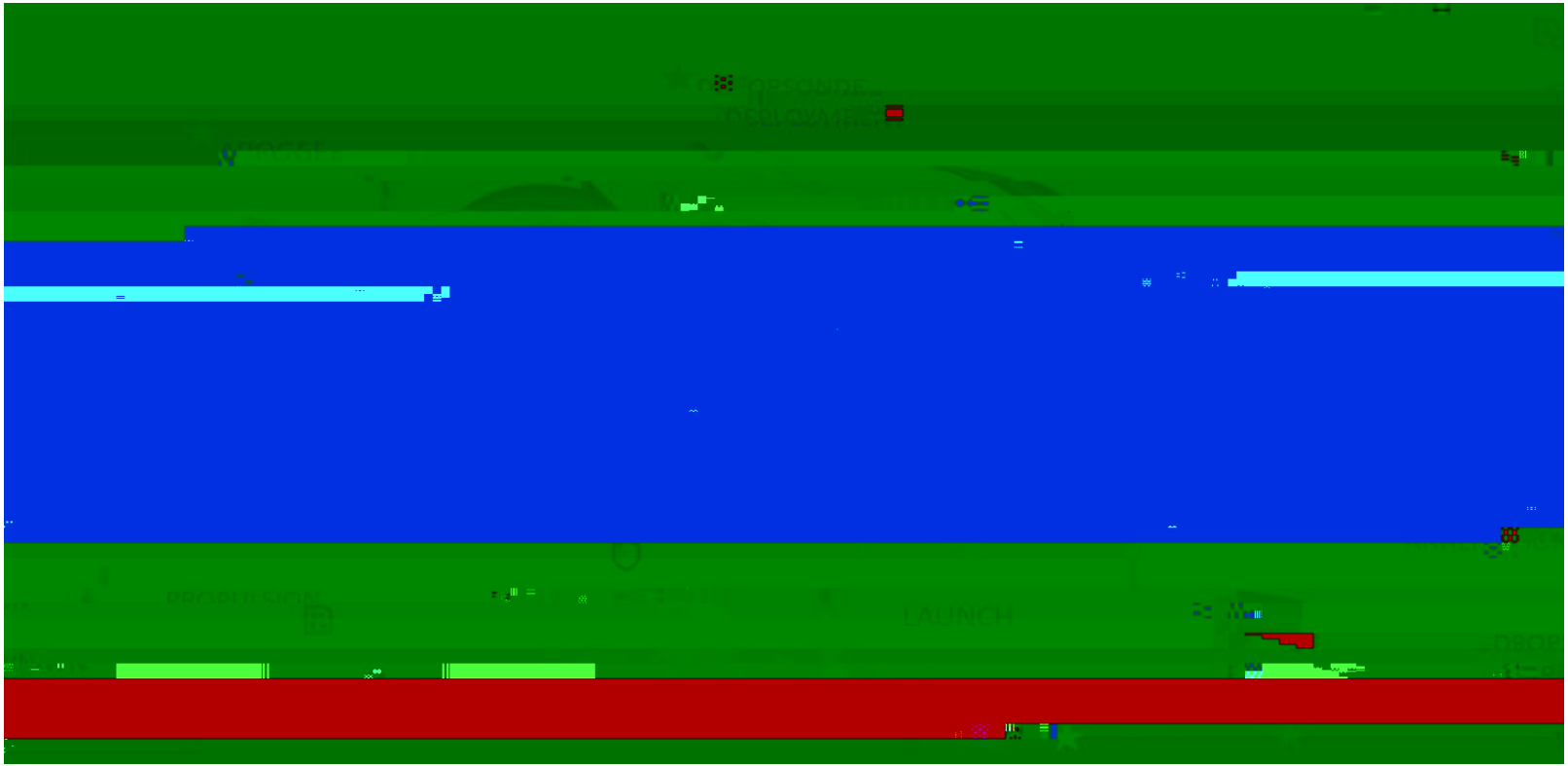

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Propulsion Module Payload must fit JANUS and Dispenser

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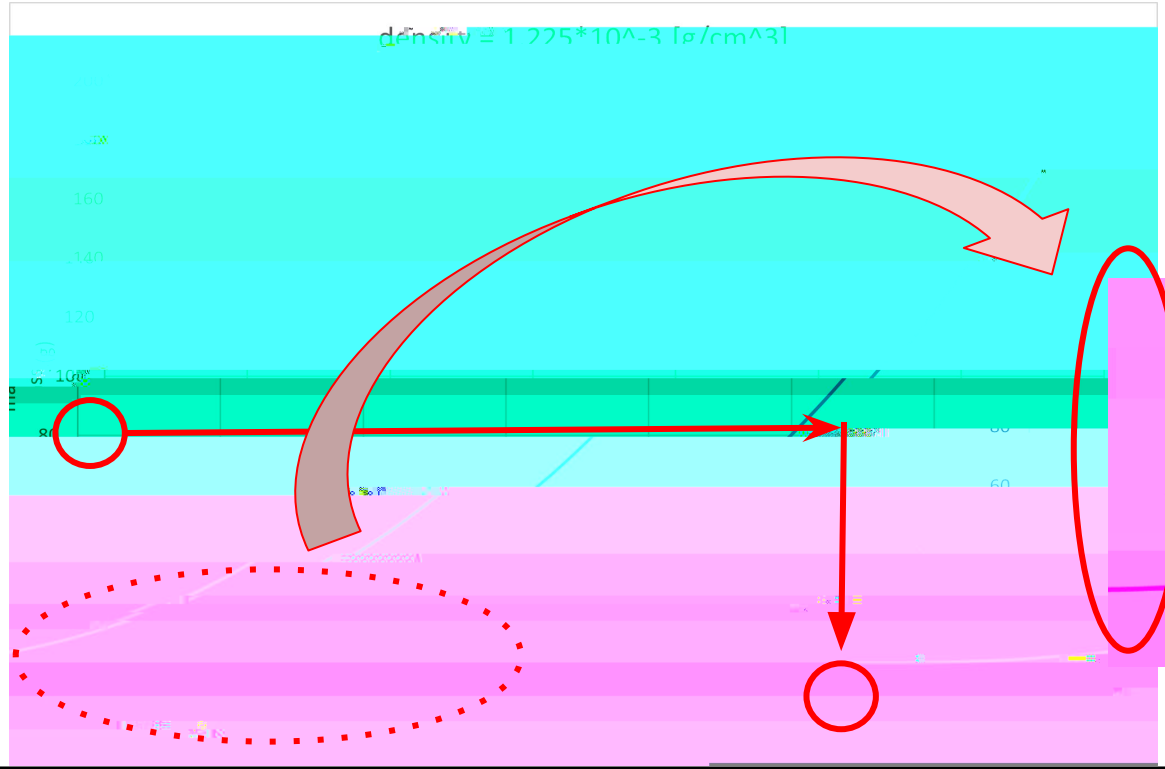
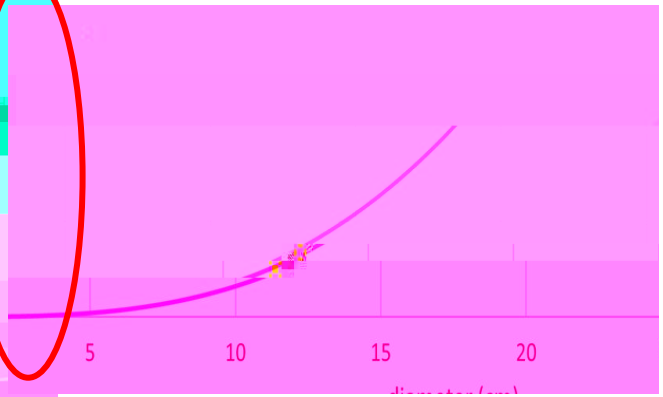


Aerogel sphere shall

1. fit the payload
2. drop to the ground



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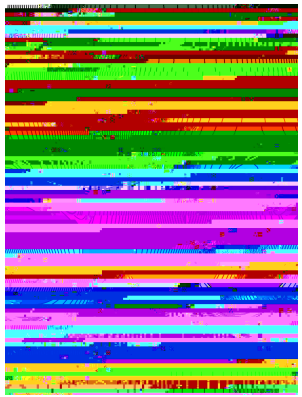

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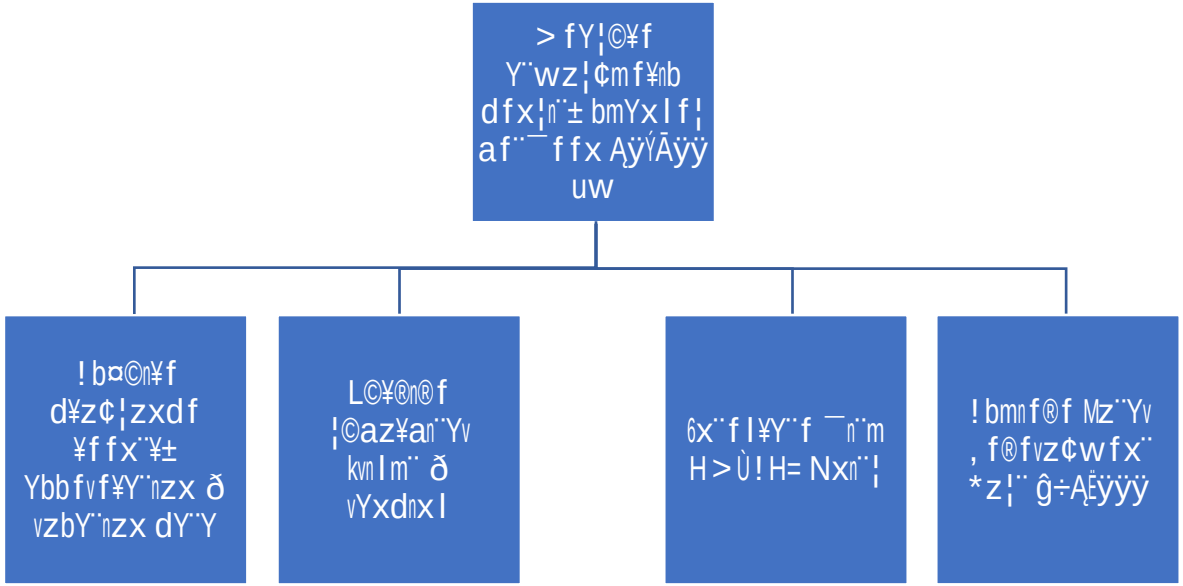

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System Objective	Measure of Effectiveness (MOE)
Acquire Data for Dropsonde Acceleration and Location	Successful retrieval of data from dropsondes
Survive Suborbital Flight and Landing	Dropsondes survive drop tests (e.g. buildings) to qualify reentry, while deployer with dropsondes should survive imposed random vibe/shock/thermal environments given in PM ERD
Successfully integrate with LV/APL Units	Deployer fits the volume constraints given by the PM, while also successfully interfacing electrically and mechanically with the APL JANUS system
Achieve Total Development Cost <$5,000	Total system cost (dropsondes, deployer, testing, etc.) <$5,000

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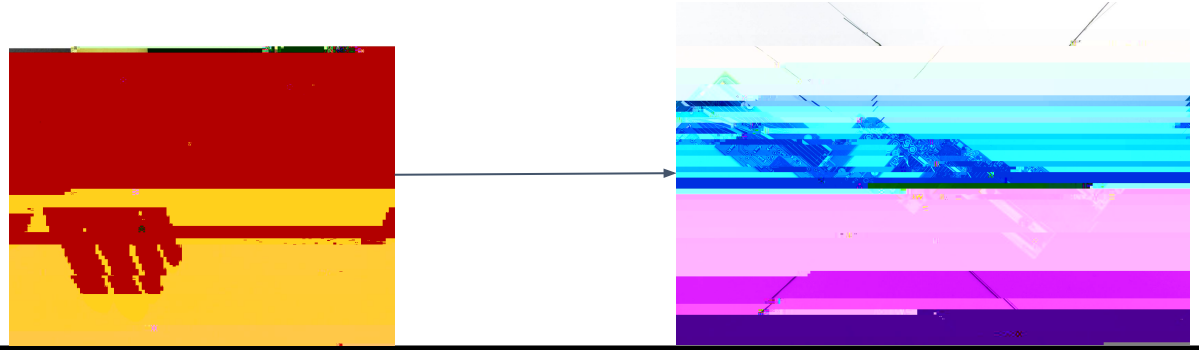

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Parameters	Option A: Aerogel capsule reentry technology demonstration	Option B: Custom Built Transmitter Chipsat/Sensor Array System
Temperature Requirements	High Range (Based on Aerogel)	Medium Range (Based on Electronics)
Manufacturability	Easily manufacturable	Moderate difficulty in manufacturing
Cost (Money)	Lowest cost	Highest Cost
Cost (Time)	Lowest time needed	Most time needed
Data Validity	Materials technology info only	Most valid data expected
Recoverability	More difficult to recover	Easier to recover, transmitter on board
Mass/Weight/Density	Lowest expected payload mass	Moderate expected payload mass
TRL	6-7	4-5
Risk (To Mission Objectives)	Moderate	Moderate-Low

Lower Risk

Moderate Risk

Higher Risk

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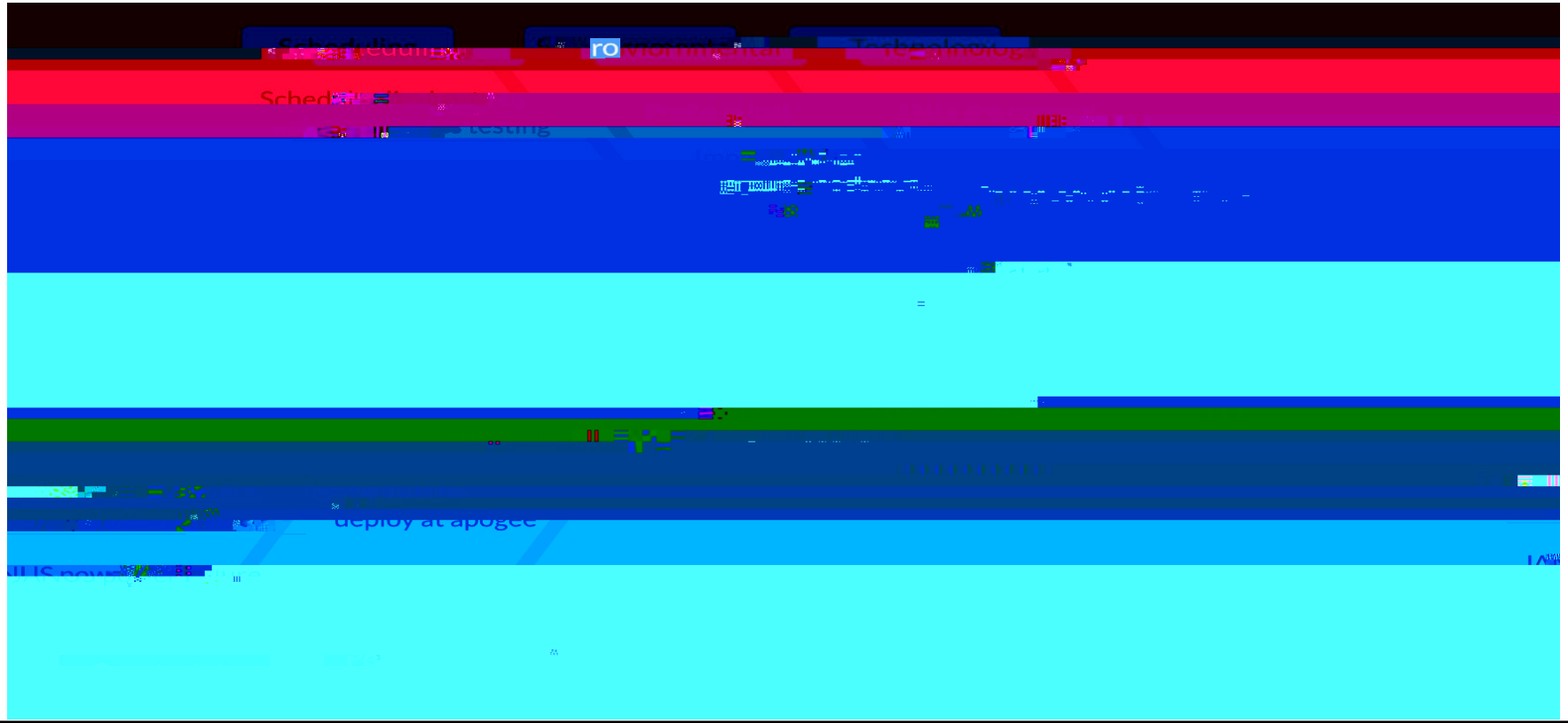

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Option A

- Limited scientific return.
- Greater risk of losing probe.
- Less risk of electronics failures.
- Less risk of schedule slip.

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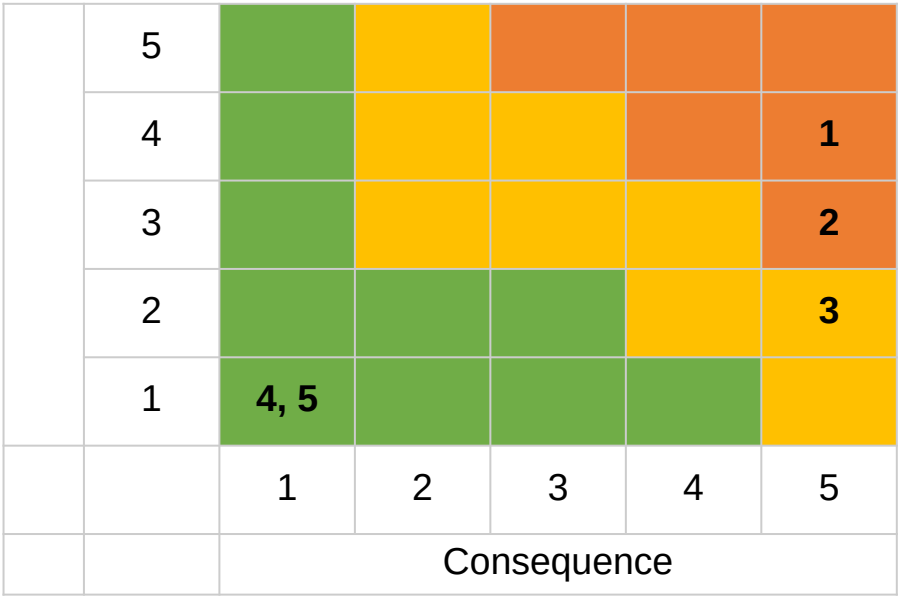

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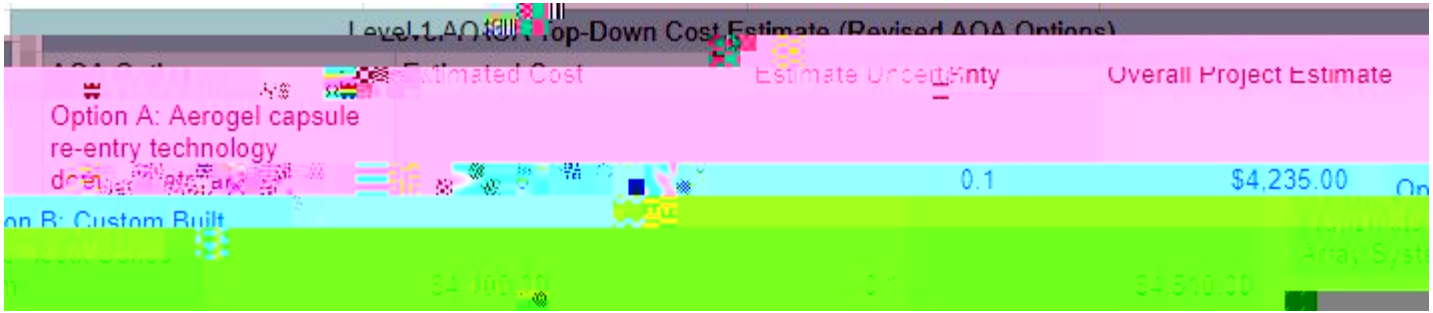

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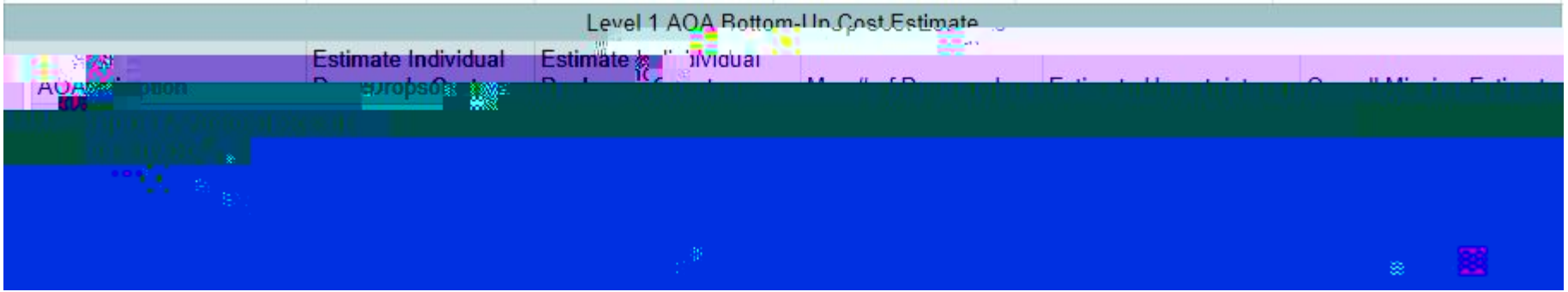
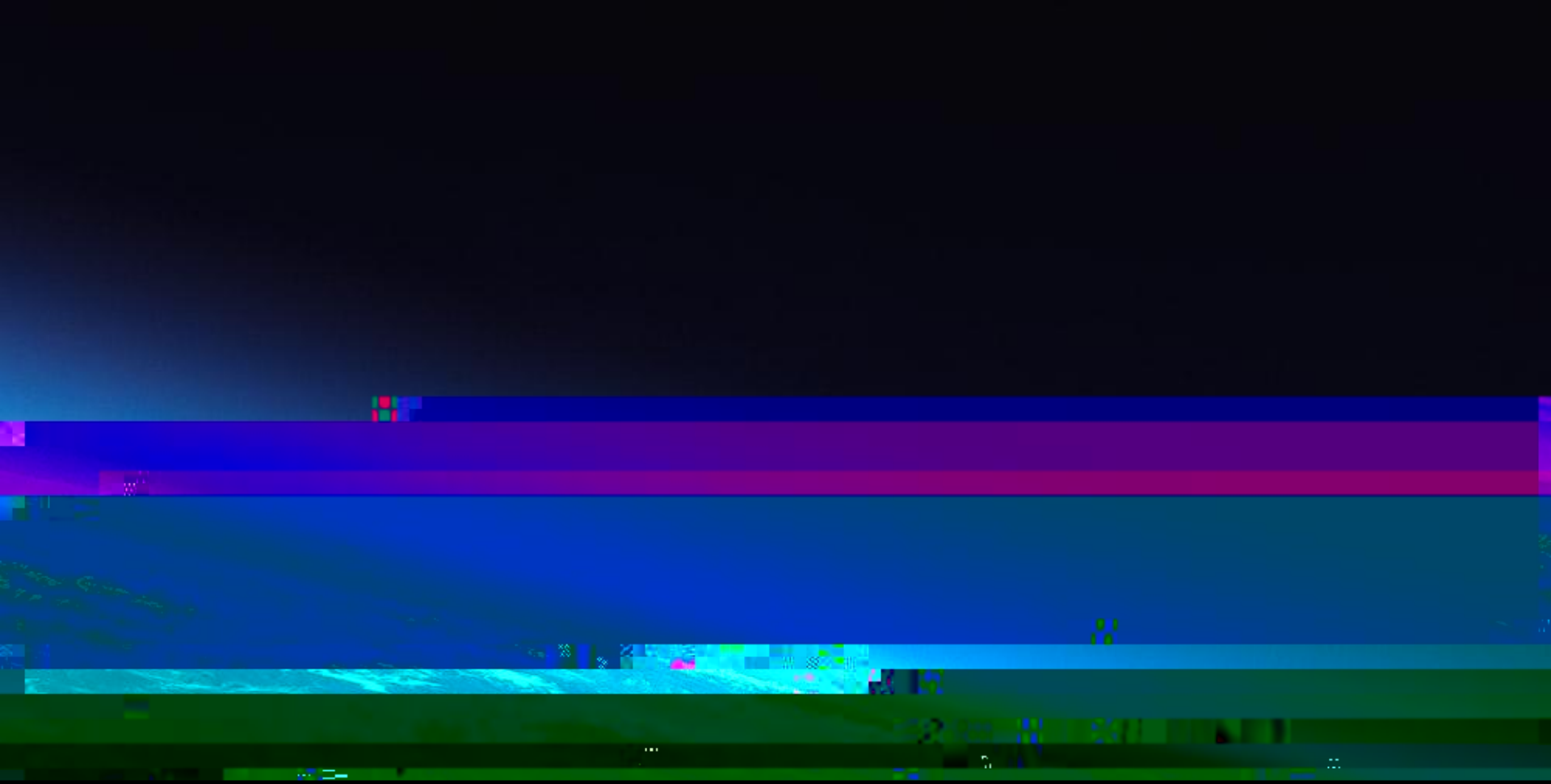


Questions?



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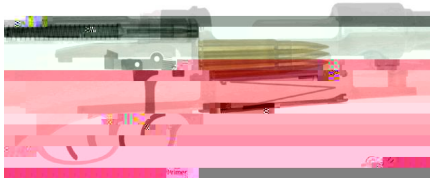

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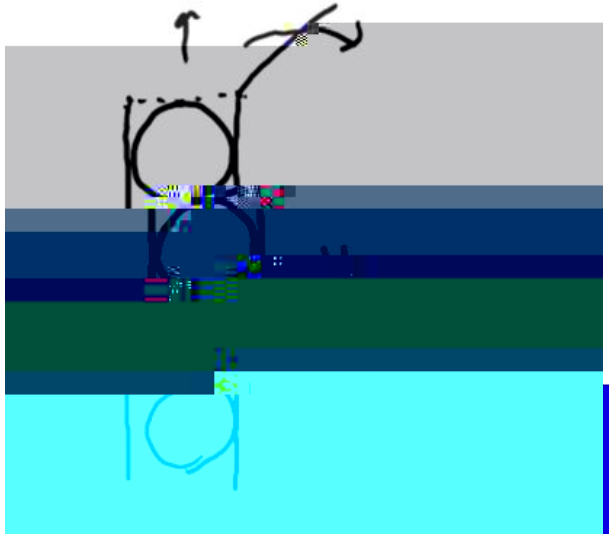

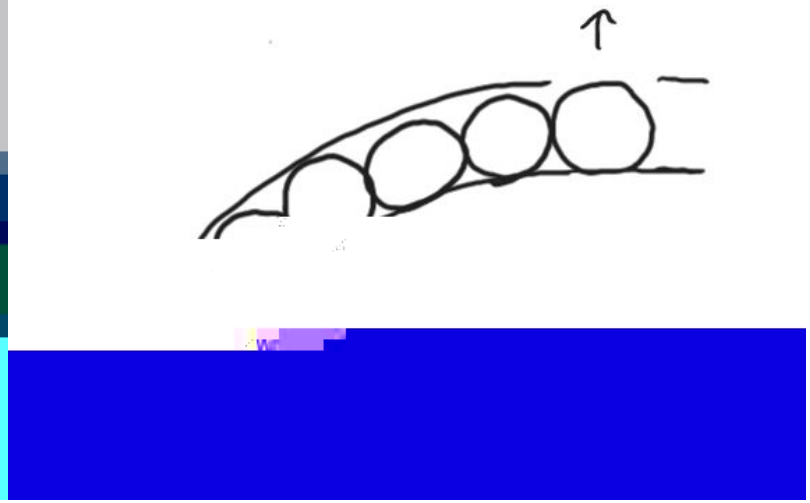

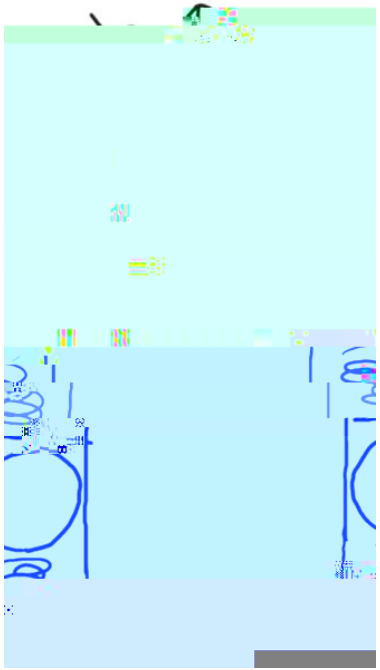

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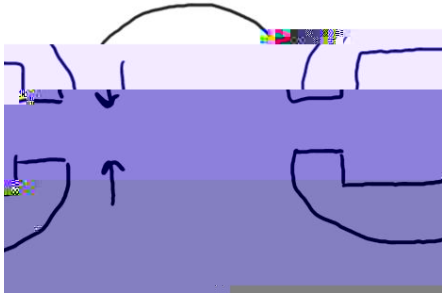

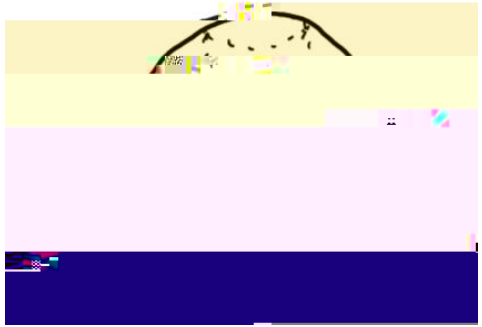

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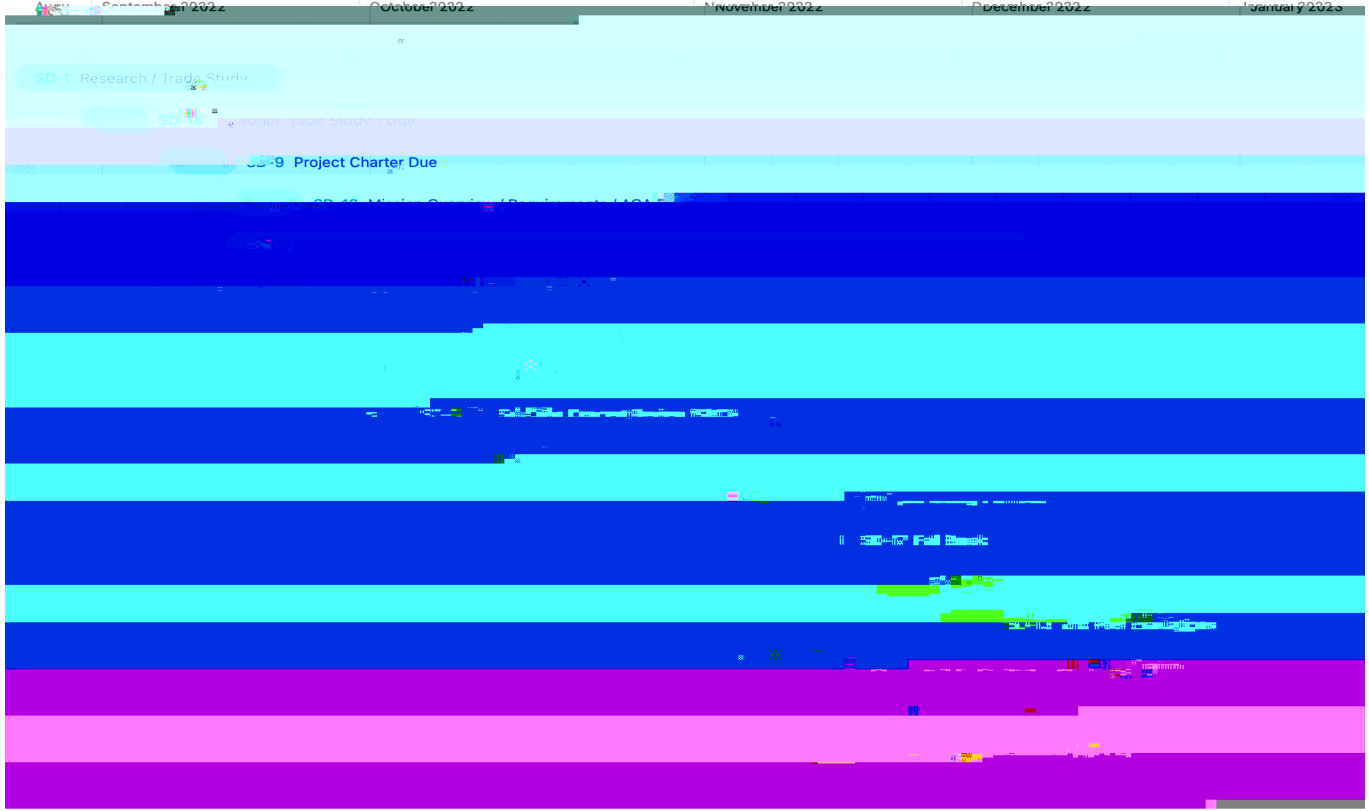

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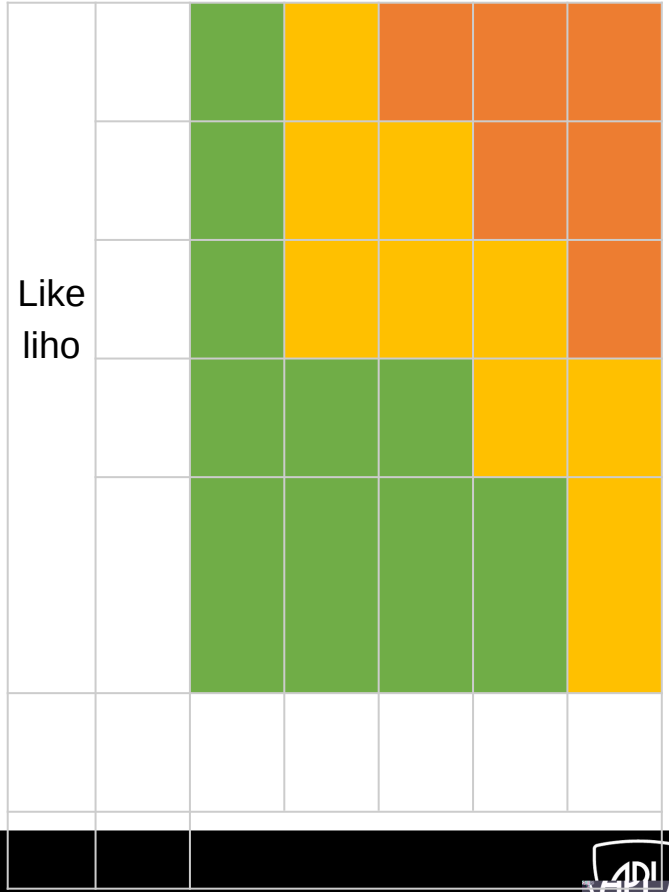
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