The Colorado Front Range Flood 2013

Three days ago on September 9th, the rain began to fall in Colorado. It fell not only in the Front Range, but over an area spanning 200 miles south from Colorado Springs and north to Fort Collins. Many saw the rain then as a blessing; drought conditions had been plaguing the State for months. But now the rain is falling in other Colorado areas, too, further west in mountain towns and east toward the plains. Despite rain in over 14 counties, Boulder County seems to be bearing the brunt of the storm.

A cold front has apparently stalled in the skies overhead. It's clashing with warm most air arriving from the Gulf of Mexico far to the south. The rain is expected to continue to fall according to the National Weather Service despite over 9 inches of rain today and over 17 inches forecasted overall before the storm subsides. Forecasters say that the worst of the storm is behind us.

Nowhere is the damage more severe than the mountain town of Gold Hill approximately 30 minutes up the canyon from Boulder. Not only has a large number of homes and property been destroyed by flooding from Four-Mile Creek, but also the residents are unable to escape the devastation. Their escape routes have been cutoff with the collapse of mountain roads and bridges. A group called the Mudslingers has formed to assist the residents. They are asking for much needed rescue supplies such as water, food, and medicines. They report that a glider landing is possible in a large clearning near the town with adequate space for a safe but possibly soggy landing.

Your flight mission:
Deliver much needed rescue supplies. Without such assistance, the people will endure extreme hardship, likely for at least another two or three days. Many are without food, water, and shelter.

Why is it important?
The rescue mission is a matter of humanitarian need and could potentially save life and property.

Measuring your success:
Success will be achieved by safely reaching Goldhill without pilot, glider, and/or payload damage and delivering the necessary rescue supplies safely.

Weather:
Periods of rain on and off, sometimes heavy, with strong headwinds from the west at 20-30 mph.

Engineering Challenge:
Can you make it to the destination despite bad weather conditions and fly the needed distance with a glider and payload you have not carried before? Flight tests are necessary (flying east) to determine feasibility of success.

Boulder County Flooding **Source:** US National Guard

Boulder County home destroyed by flooding

Source: FEMA

NCAR Glider/Sail Plane (now retired)
Source: UCAR

GLIDER FLIGHT TESTS

GLIDER ID: _____

AERONAUTICAL ENGINEERING TEAM: _____

A. LAUNCH POSITION	TEST 1	TEST 2	TEST 3	BEST TEST FLIGHT
SHORT (S)	B-1 /B-2 /B 1/B 2	B -3 / C 0 / C 1 / B 1	C 3 / C 0 / B 0 / C 2	**C 0 (twice) Short** 5 of 12 times reached C w/ short band, & 6 times B
MEDIUM (M)	C 3 / B 3 / B 2 / B -3	B 3 / B 2 / C -3 / C -2		
LONG (L)	B -3 / Fail /	Fail / B-4 / A 2 /	Fail / Fail / Fail	

B. PAYLOAD LOCATION	TEST 1	TEST 2	TEST 3	BEST TEST FLIGHT
CONE (C)	C3,C-3, too far D-3, B0, C0, B3	C-2, C1, C-1	C-3, A-1	C0 in Con
FUSELAGE (F)	A0	A-1, A1	B0	
TAIL (T)	A0,	A1,	A-1, A0	

C. LAUNCH POSITION W/ BEST PAYLOAD LOCATION	TEST 1	TEST 2	TEST 3	BEST TEST FLIGHT
SHORT (S)				
MEDIUM (M)				
LONG (L)				

D. STRONG HEADWIND WEATHER CONDITIONS	TEST 1	TEST 2	TEST 3	BEST TEST FLIGHT
BEST LAUNCH POSITION NO PAYLOAD	Cone went farthest but little control	Cone went farthest but no width control	Cone went farthest but does not get near target B0, C0	C0
BEST LAUNCH POSITION W/ PAYLOAD (S, M, L)	cone/short band C-2, A0, C-3, D-3	Cone/short band B1, C0, A1, D3	Cone/short band C0, B-3, C2, DFar-3,	

WHAT WILL YOU INCLUDE IN THE PAYLOAD? WHAT CONSIDERATIONS AND LIMITATIONSS MIGHT THERE BE?

TEST FLIGHT TEAM FINDINGS , REFLECTIONS, AND RECOMMENDATIONS (Please utilize back of the form.)

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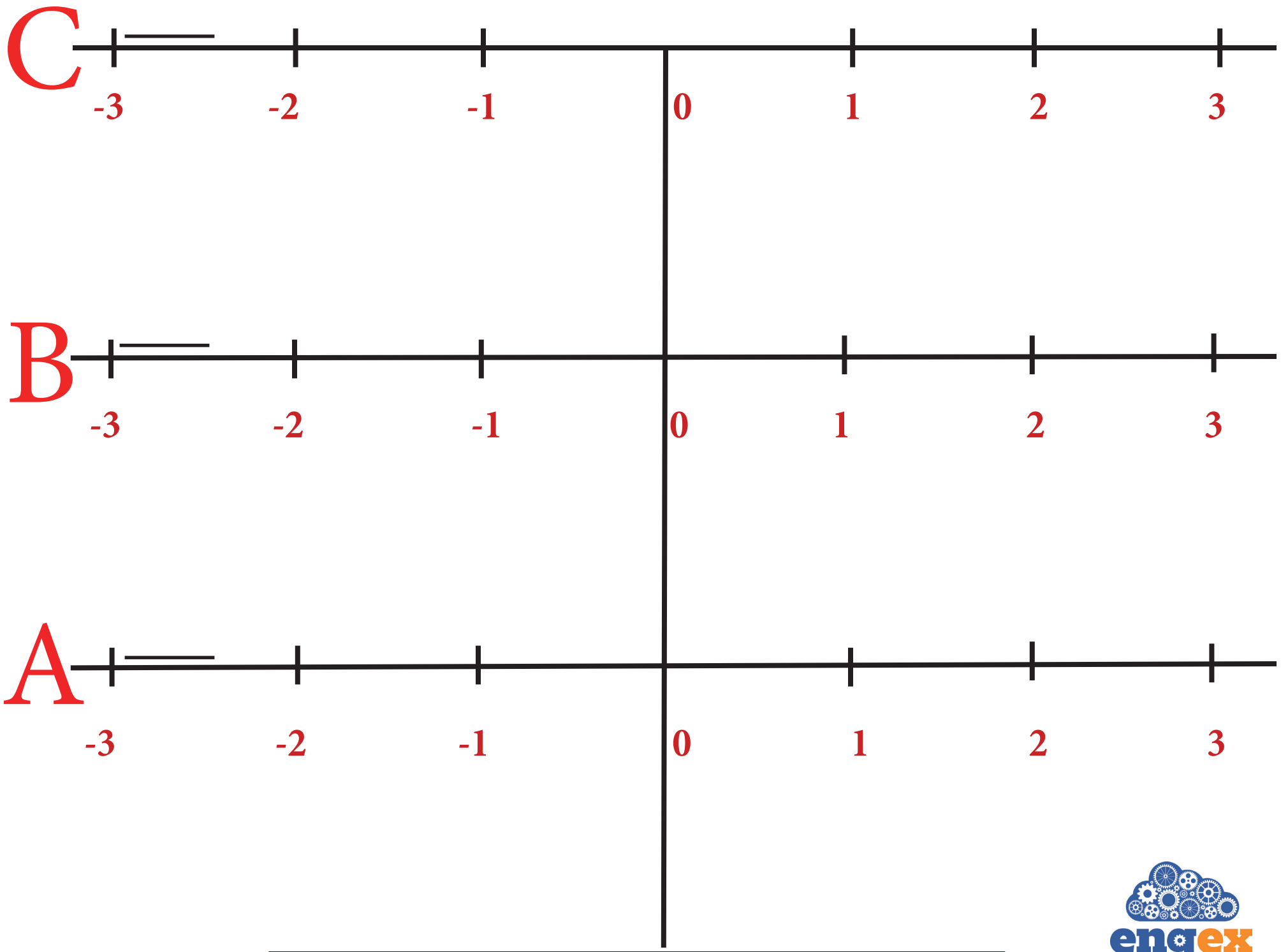

RUNWAY LAUNCH & TEST FLIGHT MEASUREMENTS

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What were the designers or engineers of the item trying to improve?

What aspects of the design did they change (e.g., materials, shape)?
What were the results of the redesign?
Have you ever flown on an airplane? If so, how did your ears feel as the airplane climbed to cruising altitude and later descended for landing?
Have you ever traveled on a long-haul flight? If so, how did you feel after getting off the plane?
Do you remember times during the flight when the airplane experienced turbulence? How did it make you feel?
Have you ever heard a sonic boom? What did you see when you looked up?

The first step in the design process is for the team to identify a need:
What are we trying to accomplish, and for whom?
Why is this problem important or necessary to solve?
What criteria will we use to measure whether our solution is a success?
Asking and answering these questions helps engineers define their task. They can then start developing a solution.