**Requirements for NASA App Development Challenge 2023**

Create first person visualization of data given:

* Accurate height, slope, elevation angle from astronaut to Earth, and azimuth angle from astronaut to Earth.
* Data is smoothed should be smoothed to make terrain look more natural.
* Texture should be added to make terrain look more natural.
* Visualize the landing site, destination site, and communication links.
* **Bonus 1:** Include accurate mini map in corner of visualization to show 2D perspective.
* **Bonus 2:** Visualize both paths from landing to destination site (15-degree vs 20-degree slope requirement)
* **Bonus 3:** Display length in meters of path
* **Bonus 4:** Display real time latitude and longitude – on minimap (Bonus 1)?

2d display of given data:

* Use color to convey information to scale with corresponding color key.
* Allow user to toggle between height, slope, elevation angle, and azimuth angle.

Finds a path from landing site to destination site (Requires 15-degree max):

* Allows user to toggle between shortest distance, least amount of hill climbing, or percentage of time Earth is visible.
* **Bonus 2:** Get the path if the slope constraint was 20 degrees.

Identifies 10 locations along land->destination path for communication link checkpoints.

* The elevation angle to Earth must be greater than the elevation angle to the horizon at the same azimuth angle.
* Should have some sort of optimization like maximum distance between checkpoints.

Pick landing, destination sites, as well as areas of interest along the path

* Should have scientific evidence/data/rationale for site selection.
* I was thinking a pretty simple 1-page research paper would be good.

Areas of interest for the marketing video:

* Outreach? We need to have at least 2 outreach events that share ‘Quantum Day’ information. Who will be the lead on this?
* Subject Matter Experts? At some point we will need to get in contact with experts and discuss with them how we can improve our app
* **Bonus 5:** Demonstrate limitation of classical radio/laser communication and discuss how quantum communication might bypass that limitation