Microwave Tracking Ground Station (MTGS)

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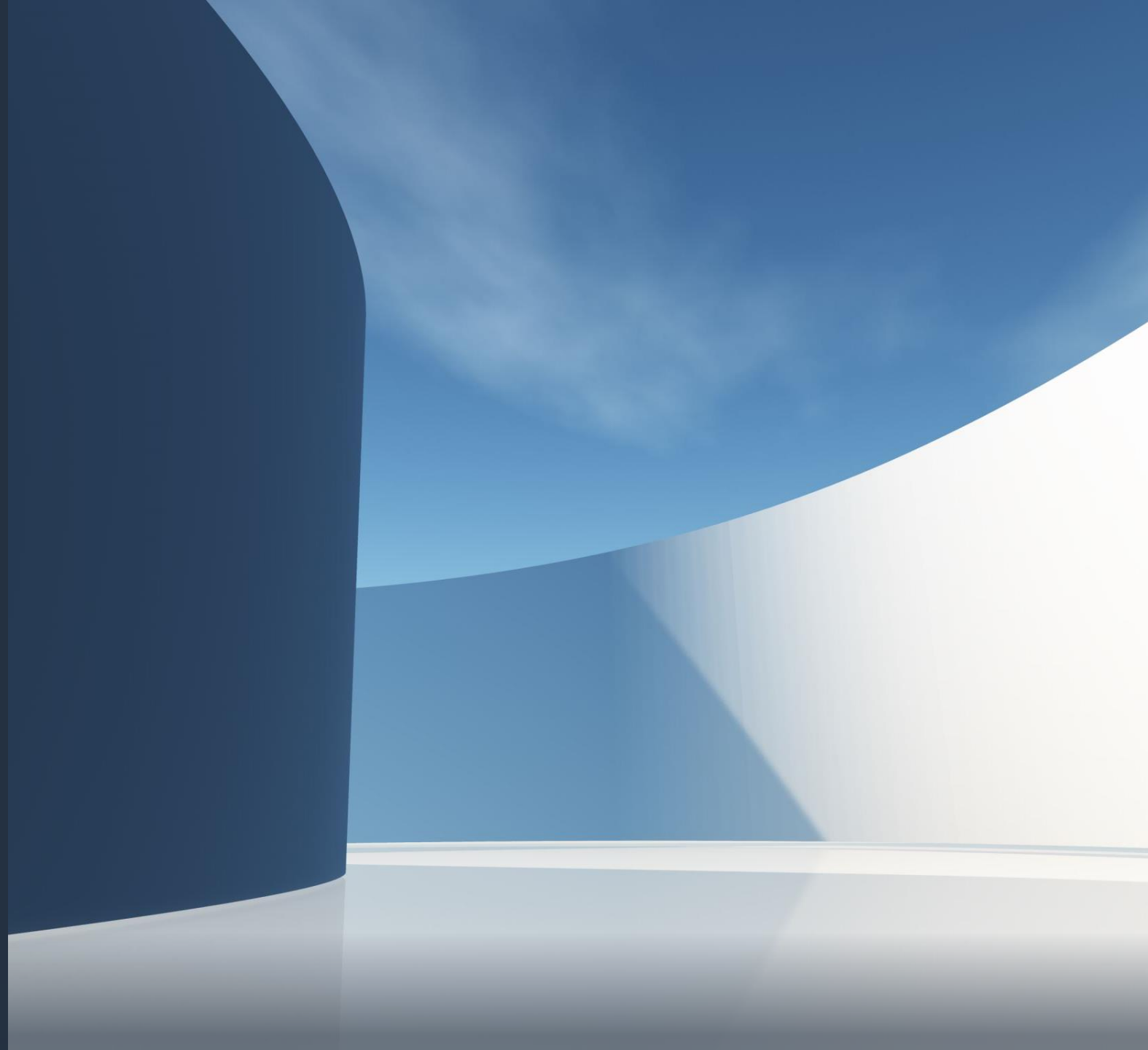


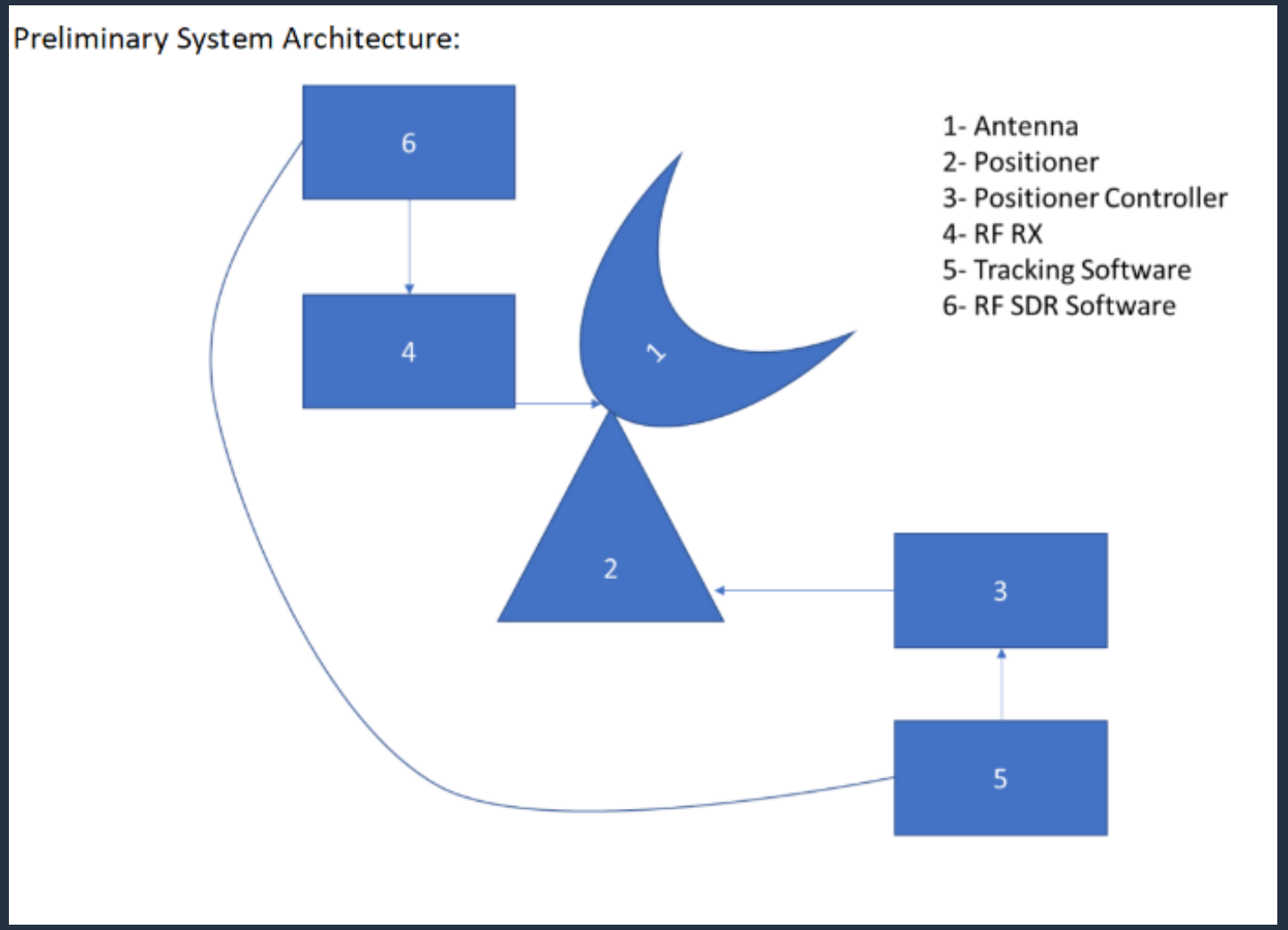
Product Goal

- We will design, fabricate, and demonstrate a prototype microwave ground station that tracks satellites and receives microwave communications. This project will include spacecraft orbit tracking algorithms, integration of the positioning and receiver software, and the graphic user interface.

Current Progress:

1. Received information on project
2. Began reviewing previous project
3. Began research on optimizing said product
4. What to outsource vs what to keep
5. Began designs on antenna for next semester

System Architecture

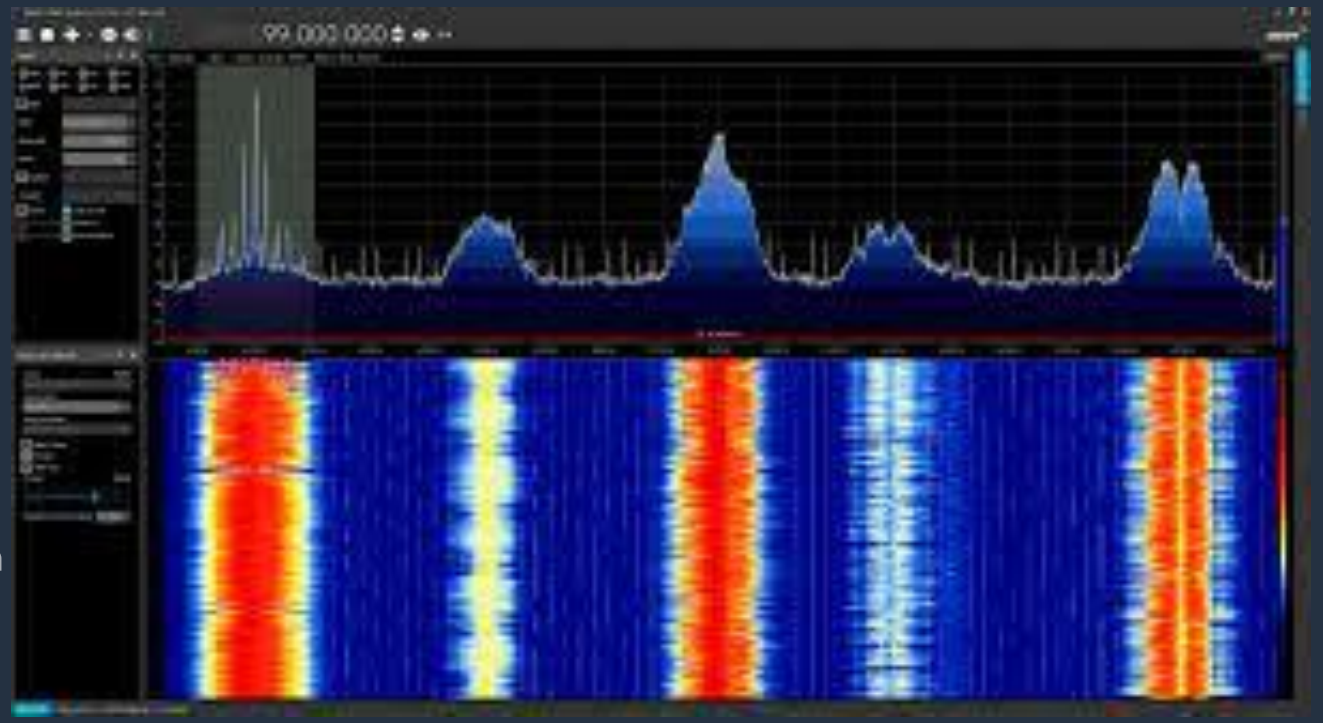


Hardware:

1. Directional motors (positioner)
2. Ground station mount (bolt on or wheels)
3. RF RX (Receiver)
4. Computer (for antenna orientation control and SDR)
    1. Positioner controller
    2. SDR Receiver
5. Antenna (S-Band 2 – 3 GHz)

Software:

- Open-source SDR Software
  - SDRSharp
- Satellite Tracking Software
  - Developing software to maintain antenna alignment
  - Uses Keplerian elements to calculate direction and control motors



Functional Requirements

- Must receive a signal from, track, and continue to position towards a satellite
- Our ground station must be able to perform in the S-Band (2-3 GHz)
- The ground station may be mobile or fixed
- Construct a functioning prototype by Sprint 3, with a final product by the end of Spring 2024
- Operate within a $1000 budget
- Create a physically smaller ground station system than the previous team's (dimensions unknown)

Current Obstacles:

- Receiving access to the previous project information and getting caught up to speed on the previous work done
- Receiving clear guidelines on requested tasks to be performed
- Finding a satellite to track and obtaining its Keplerian coordinates as well as its operating frequency to receive properly in S-Band