PDR Week 1

TeaM4C (R Dominick, L Gogley, M Munoz, D Tran)

Requirements

- **The design shall map unknown coordinates through exploration on passable terrain.**
  - Location of choice should not dictate mapping method, i.e. a room vs a field.
- **The design's structural capture shall not be limited by low light settings.**
  - The scans must be accurate enough to recognize a low profile object as an obstacle/structure in its map.
- **The design shall be capable of 2D SLAM.**
  - SLAM shall be used to handle 2D coordinate recognition, and assist in 3D sampling.
- **The design shall be capable of 3D capture.**
  - 3D capture can be pulled from samples or from real-time/soft real-time capture.
- **The design shall be powered from an independent power supply.**
  - This power source shall provide enough power to explore, at minimum, 20 minutes of capture.

Limitations

- **The design is not confined to low light, visible image capture.**
  - High resolution 3D structural capture is used to compensate for loss of visuals under low light.
- **The design is not confined to autonomous navigation, simply the capability of such.**
  - The design will be capable of mapping and localization, but the platform may not drive autonomously as functionality of mapping is the first priority.
- **The design is not confined to real-time 3D mapping, due to limitations of price and available algorithms.**
  - Real-time 3D is sometimes limited to ability of hardware readout, and may be an unrealistic endeavor. 3D may instead be done from sampling.
- **The design is not interested in object recognition.**
  - Point clouds will be used to simply display raw data, and points on a 2D plane will only be used to determine the explored area.

Purpose of Design

For us:

- **Explore high performance embedded system design, power supply design, and 2D and 3D mapping.**

- **Expand territory into industry applications such as point cloud capture, point cloud registration, machine vision, and SLAM.**

Purpose of Design

For the consumer:

- **3D maps introduce depth to a panoramic capture, and allow for implementations such as virtual real estate, virtual visits to landmarks, and cave, ocean, or other exploration.**

  - Serves as a platform to easily explore and assist in the rescue of victims trapped in mines or structural collapses in the event of earthquakes.

- **This platform will serve as a self-contained system capable of remembering where it began its journey, while also creating a map of the area it explores beyond that point.**

Top Level Block Diagram