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Critical Design Review

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Team

Saurabh Gupta	PCB, Power
Bryan Lavin-Parmenter	Software Architecture
Brandon Pon	PCB, SoM
Neil O’Bryan	Peripherals

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Vision

To build a device that will allow astronauts to path-find on unknown terrains in space

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Design

Assumptions

No trails, roads, or landmarks for way-finding

Localization is available (i.e. GPS)

Astronauts are walking, not traversing via rover

Astronauts are partially physically encumbered

Astronauts are not just navigating, but are multi-tasking while navigating terrain

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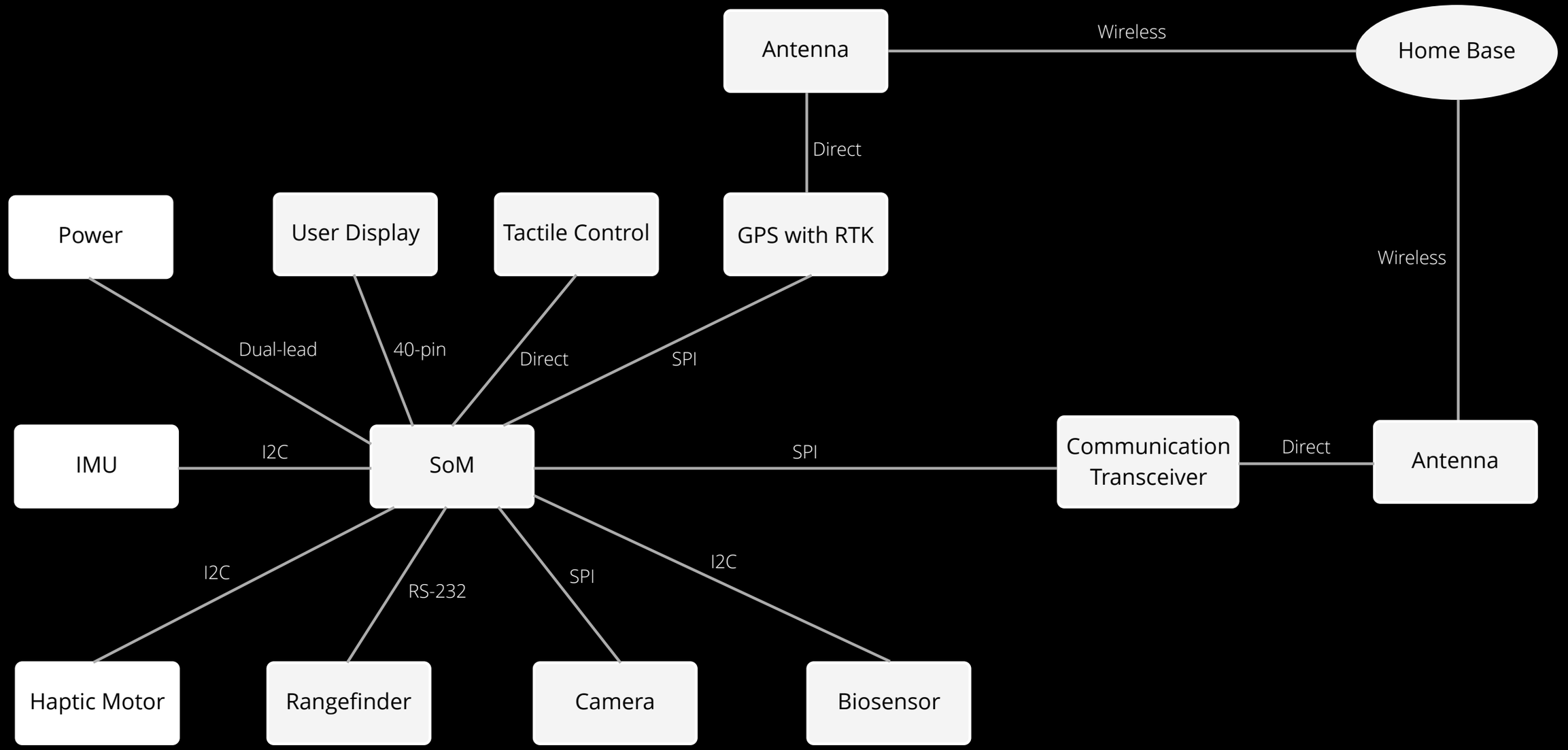
Design

System Architecture



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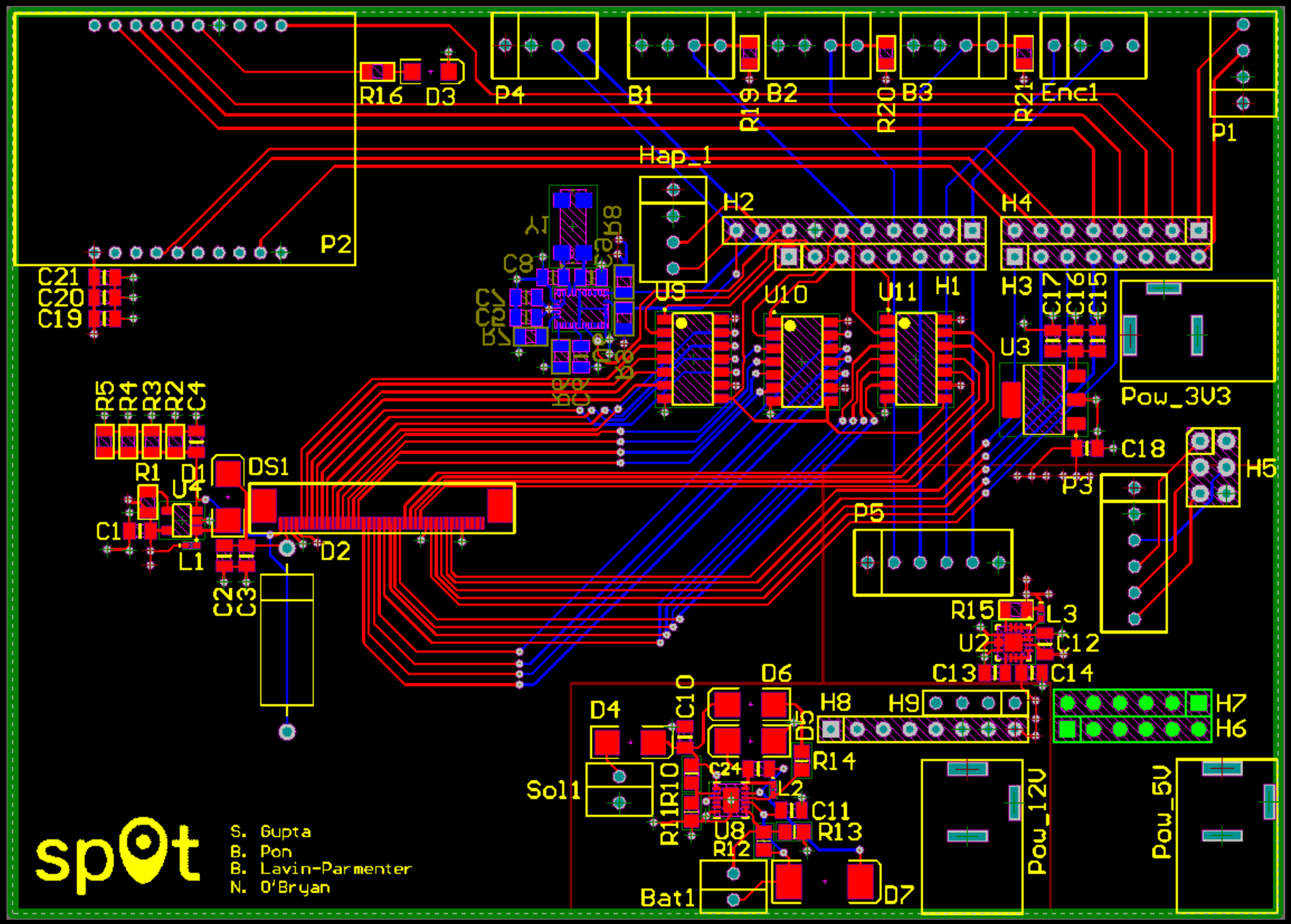
Design

PCB



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Design

Enclosure

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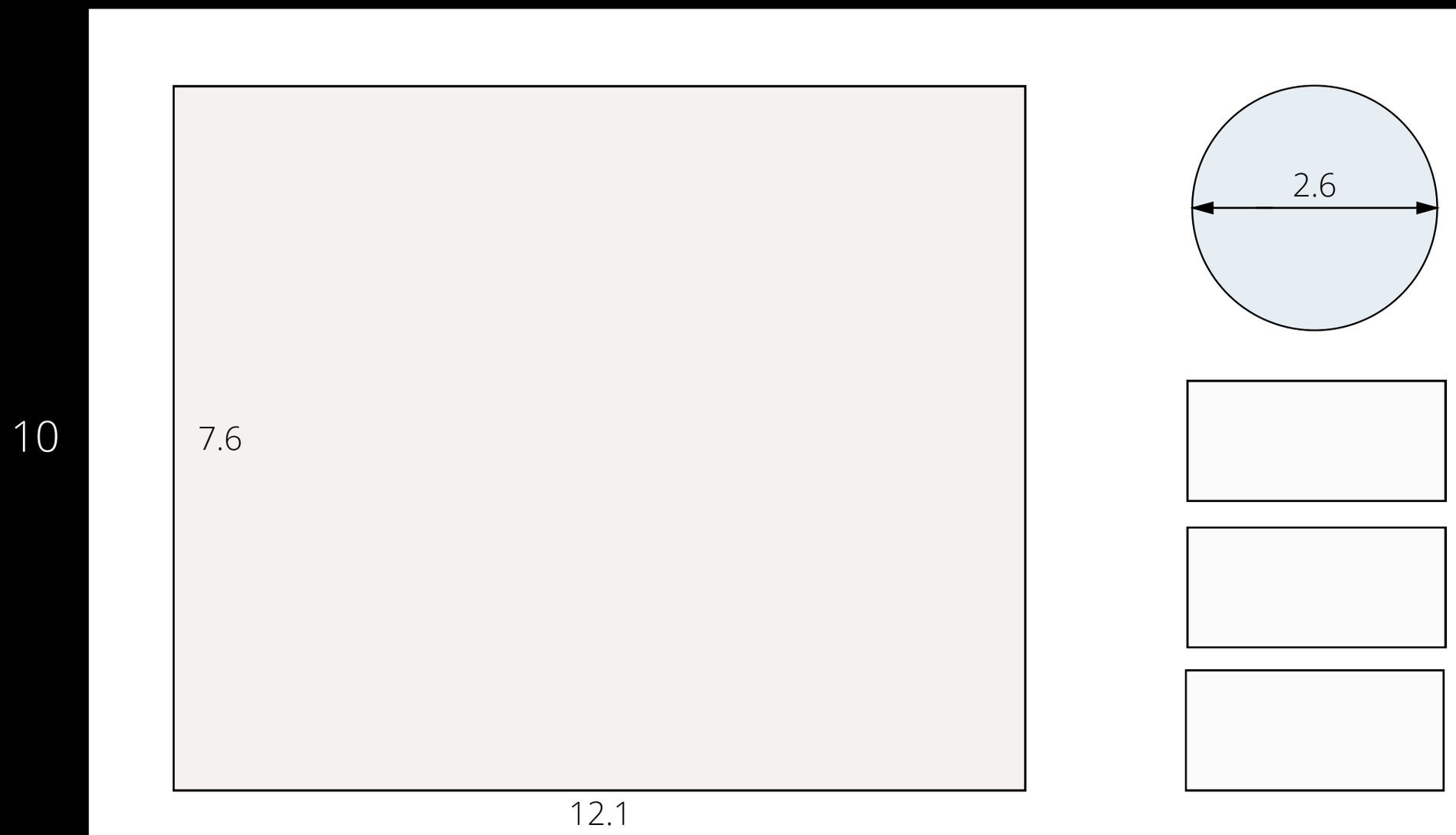

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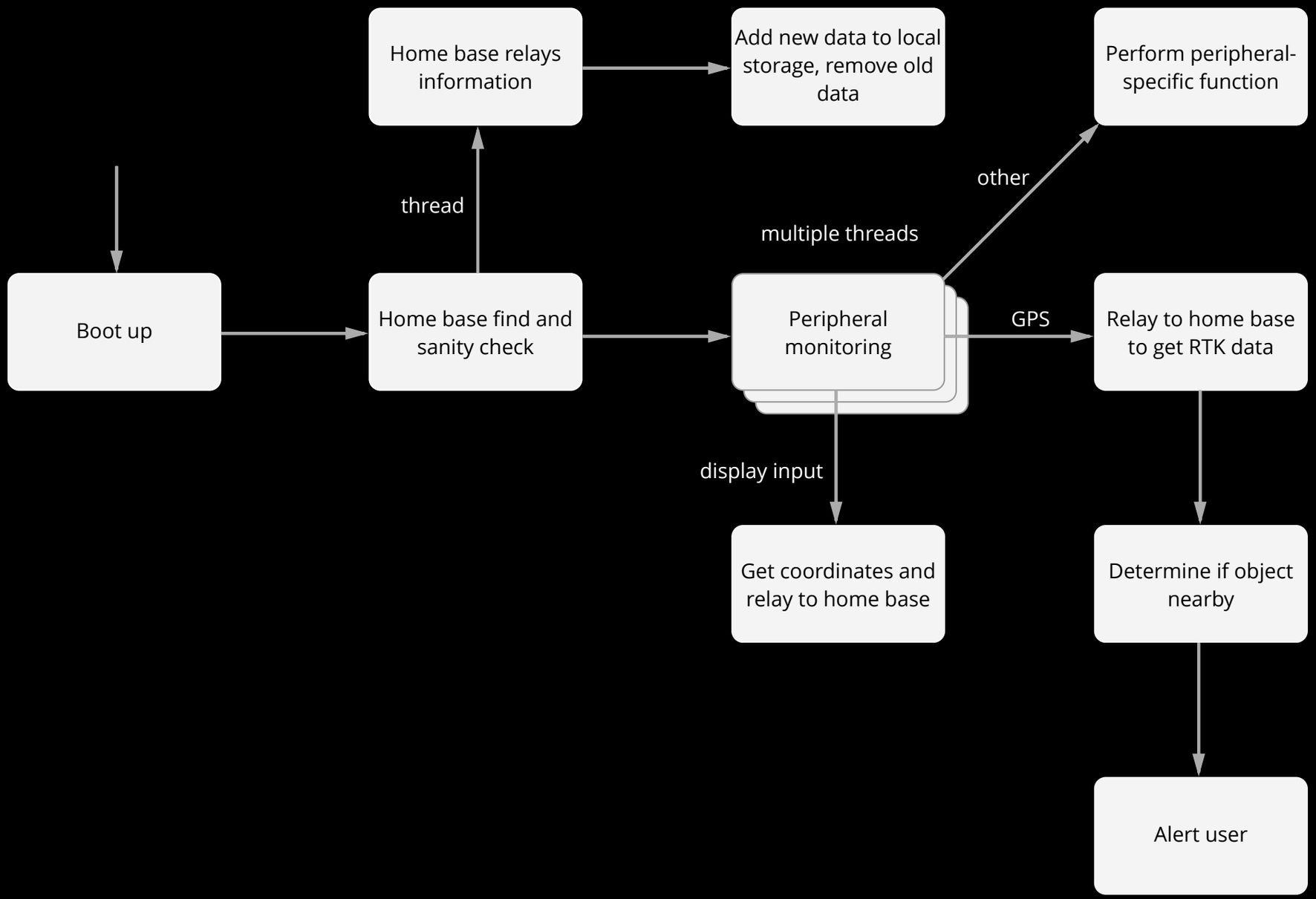
Design

Software Architecture



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Testing

Software Methodology: Test-Driven Development

TDD: Testing before implementation

Write code tests that fail before writing new implementation logic

2P Review: All code must be reviewed and critiqued by another team member

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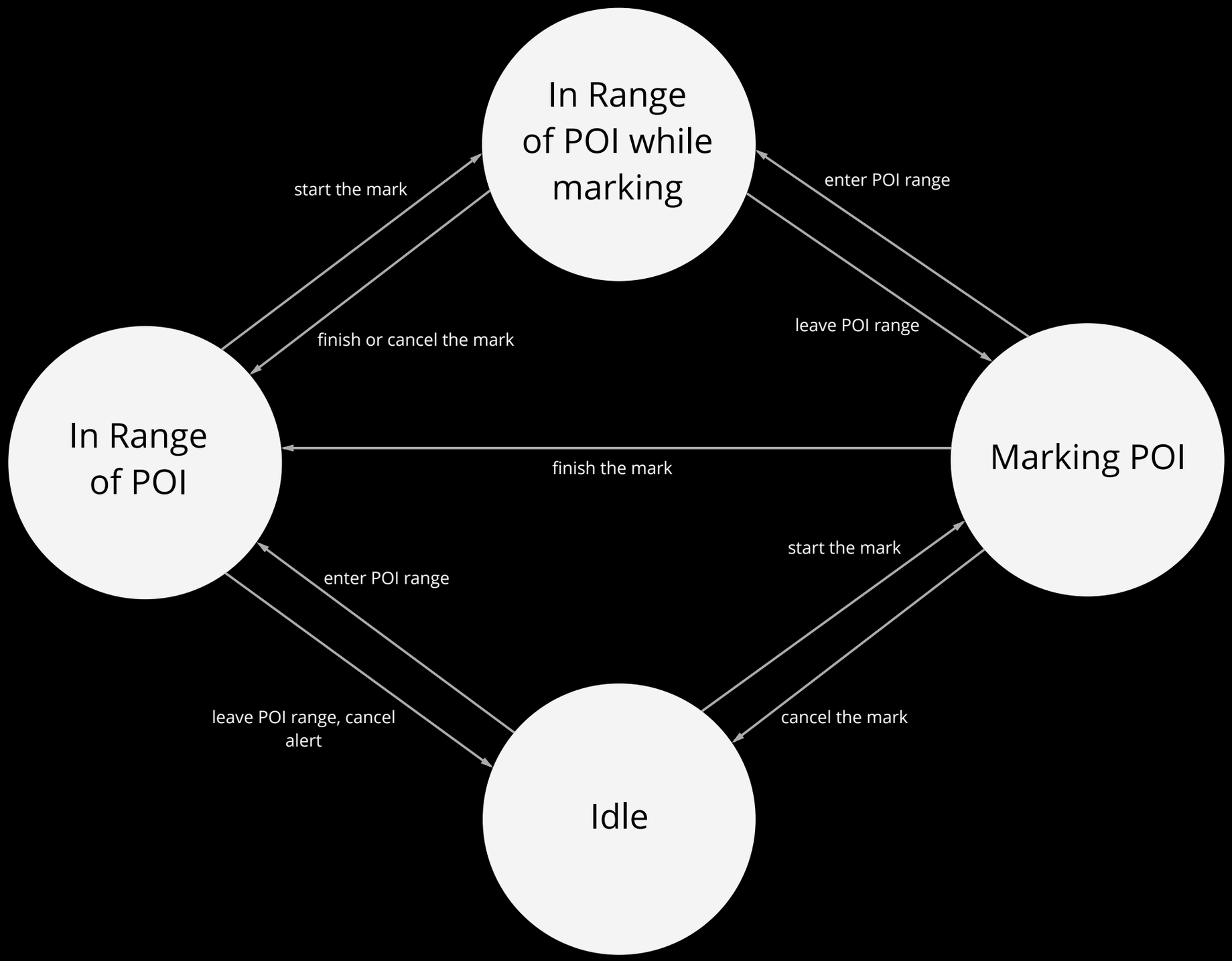
Flow


In Range of POI while marking
start the mark
finish or cancel the mark
enter POI range
leave POI range
In Range of POI
Marking POI
finish the mark
enter POI range
start the mark
leave POI range, cancel alert
cancel the mark
Idle

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Bill of Materials

SMT + PCB Fabrication	90
PYNQ	65
XBee Transceiver	43
XBee Antenna	8
Display	30
GPS Breakout	240
GPS Antenna	12
Rangefinder	55
Haptic Motor + Controller	10
Heart Rate Sensor	20
Camera	69
Total	**approx. $650**

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Timeline

Winter 2018

Interface PCB with peripherals

Continue building software architecture and testing protocols

Prepare for PCB spin #2

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Collaborators

Dr. Luke Theogarajan

University of California, Santa Barbara

Dr. Jessica Marquez

NASA

Dr. Richard Joyce

NASA

Q & A