Team Members:

Wade Mackey   Brent Cole   Matthew Hebert   Maximino Rios   Thomas Paveglio
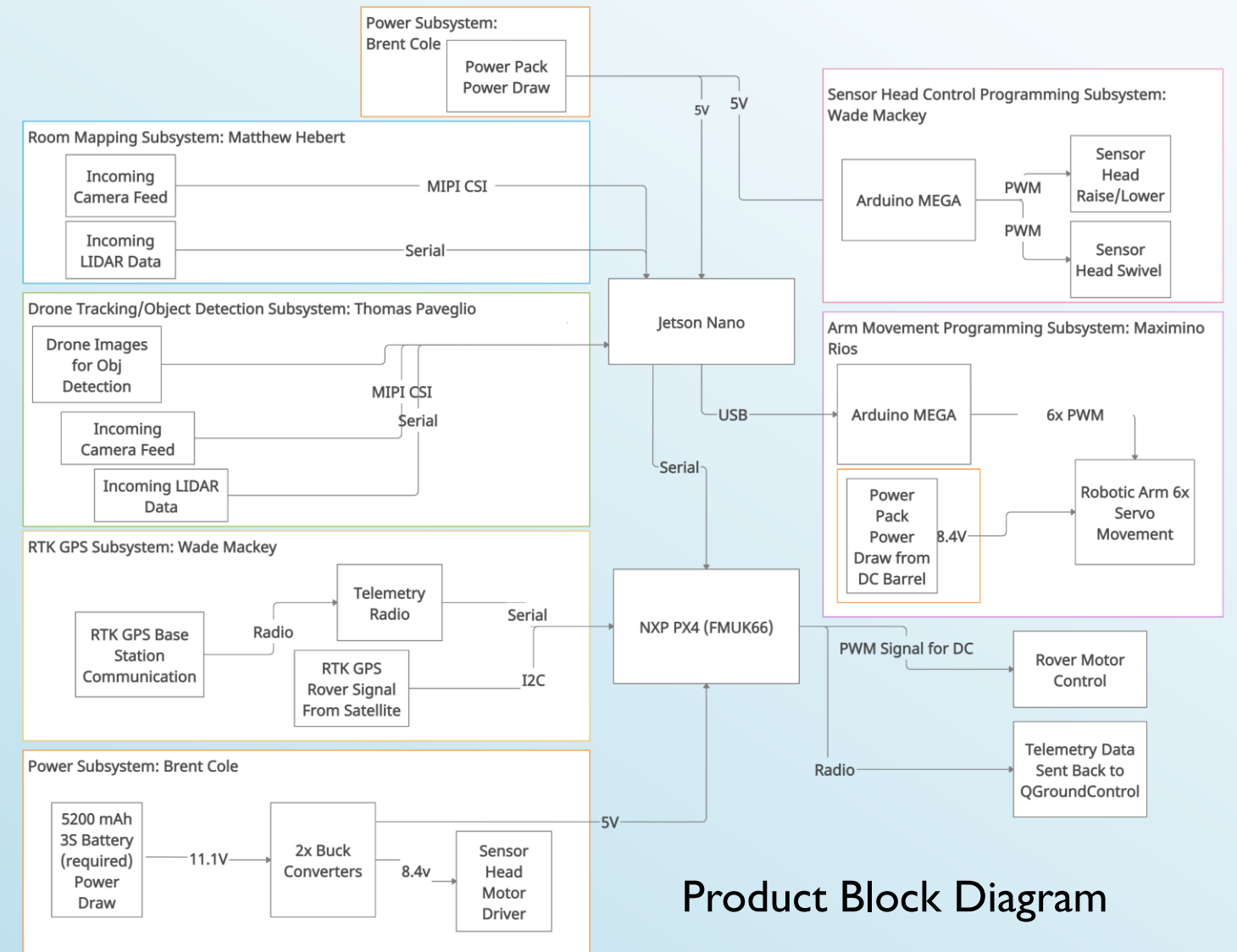
1.04: Drone Recovery Rover

Next semester we will complete development of the software running the rover's autonomous systems. This includes fully autonomous drone retrieval, where the rover autonomously detects when a drone has fallen and navigates around obstacles to retrieve it. By the end of Senior Design 1, we will have the hardware requirements fulfilled to have user-controlled capabilities for the rover, and we will have all hardware systems completed and mounted to the rover.

Goals

- Complete software testing to ensure all hardware communicates properly
- Ensure reliable pickup of crashed drone using robotic arm
- Achieve full autonomy with room-mapping and drone tracking software

airogistic

TEXAS ★ STATE
INGRAM SCHOOL OF
ENGINEERING

Product Block Diagram

Power Subsystem: Brent Cole
- Power Pack Power Draw

Room Mapping Subsystem: Matthew Hebert
- Incoming Camera Feed — MIPI CSI
- Incoming LIDAR Data — Serial

Drone Tracking/Object Detection Subsystem: Thomas Paveglio
- Drone Images for Obj Detection
- Incoming Camera Feed — MIPI CSI / Serial
- Incoming LIDAR Data

RTK GPS Subsystem: Wade Mackey
- RTK GPS Base Station Communication — Radio
- Telemetry Radio — Serial
- RTK GPS Rover Signal From Satellite — I2C

Power Subsystem: Brent Cole
- 5200 mAh 3S Battery (required) Power Draw — 11.1V — 2x Buck Converters — 8.4v — Sensor Head Motor Driver — 5V

Jetson Nano — USB / Serial

Sensor Head Control Programming Subsystem: Wade Mackey
- Arduino MEGA — PWM — Sensor Head Raise/Lower
- — PWM — Sensor Head Swivel

Arm Movement Programming Subsystem: Maximino Rios
- Arduino MEGA — 6x PWM — Robotic Arm 6x Servo Movement
- Power Pack Power Draw from DC Barrel — 8.4V

NXP PX4 (FMUK66)
- PWM Signal for DC — Rover Motor Control
- Radio — Telemetry Data Sent Back to QGroundControl

5V 5V

Subsystem Legend:
- **Orange:** Power Subsystem – Brent Cole
- **Blue:** Room Mapping Subsystem – Matthew Hebert
- **Green:** Drone Tracking Subsystem – Thomas Paveglio
- **Yellow:** RTK GPS Subsystem – Wade Mackey
- **Purple:** Arm Movement Subsystem – Max Rios
- **Pink:** Sensor Head Control System – Wade Mackey