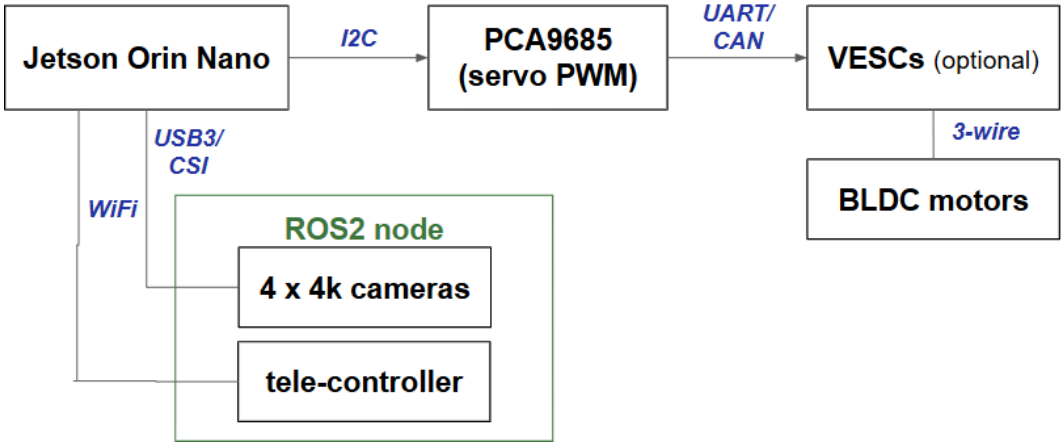
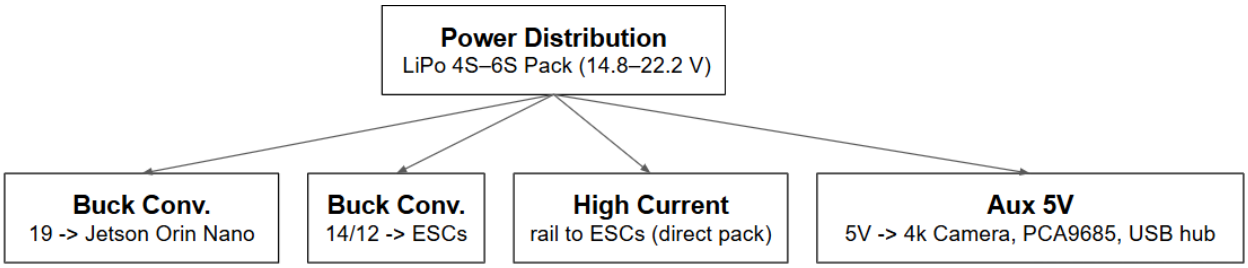
BRAVE2.0 Controls (new)

Conceptual Framework (without the disruptor and claw arm):



- **Differential chassis:** 2 or 4 BLDC ESCs (left/right).
- **Driver choices:**
  - PCA9685 → simple PWM for servo or hobby ESCs (same from 1st design)
  - VESC → robust BLDC control via UART/CAN (duty/RPM/FOC)

Power Design:



- **Battery:** 4S–6S LiPo (14.8–22.2 V)
- **Jetson Orin Nano:** stable 19 V (or 12–20 V) @ ≥5 A via quality DC-DC or PSU.
- **ESCs/BLDCs**
- **PCA9685:** 5–6 V rail from a separate buck (≥3 A for peak servo current).
- **Cameras/USB Hub:** 5 V rail using USB3 hub (if needed)
- **Recommended converters:**
  - **Buck #1** → Jetson: 19 V / 90 W
  - **Buck #2** → 5–6 V servo rail
  - **Powered USB3 hub**: for multiple 4K USB cams (if not CSI).
  - **Grounding & EMI:** Common ground between Jetson, PCA9685, ESCs.

Data/Control Flow:

1. Remote operator sends velocities (cmd_vel) via ROS 2 (Wi-Fi/Ethernet).
2. Jetson node limits/sanitizes commands → maps to Ackermann or Diff kinematics.
3. Jetson drives PWM (PCA9685) or VESC duty/RPM to BLDCs
4. Four 4K cameras stream to topics and local 2×2 preview window; operator can view via RViz/WebRTC.