Arduino vs ESP32

Arduino Mega

- Pros:
  - multiple input / output pins
    - ↳ good for using multiple sensors, motors, remote control modules, etc.
  - easy to use, we're familiar with how Arduino boards work from last year
  - stable + reliable
    - ↳ fewer issues with things like overheating or random restarts
  - has multiple PWM (pulse-width modulation) pins
    - ↳ good for controlling motors + servos with precise timing
  - big - might be good for space between wires?
- Cons
  - limited processing power, it might struggle with tasks like real-time telemetry
  - no built in Wi-Fi or Bluetooth
    - ↳ would require external modules like HC-05 for bluetooth, increasing power consumption + complexity
  - less power efficiency + lower storage

ESP32

- Pros
  - uses same code + firmware as Arduino (Arduino IDE with ESP32 board package)
  - high processing power
    - ↳ handles tasks like line-following and remote control navigation simultaneously
  - built in Wi-Fi and bluetooth, removing need for external communication modules
    - ↳ allows easy use of live telemetry systems
  - smaller; might be better for spacing?
  - enough GPIO pins (I assume) and advanced features like interrupts for control methods (useful for switch between auto + manual maybe?)
  - large storage
- Cons
  - not all input/output (GPIO) pins are usable
  - using Wi-Fi and bluetooth at same time may increase power consumption or reduce stability
  - we're not as familiar with it; more of a learning curve
  - complexer systems may require more coding
  - can heat up - would need to keep an eye on it.