

# Apollo Control Box

- Goal = Self-contained control box
  - Focus
    - **Safety**: detect all failure scenarios
    - **Ease of use**: User experience and maintainability. Large (3.5”) touch screen for diagnostic messages, medical-grade buzzer
  - Can drive with PSA-based O2 concentrator (Oxikit, PIOC, Apollo reference O2 concentrator)
    - Open source, modular PCB design. Works with a variety of sensors
  - Self-tuning AI
    - learning mode for adjusting valve timing, auto-adjusts to changes in compressed air input pressure
  - Continuous **and** pulse mode of operation
    - Adjust PSA operational cycle in sync with patient breathing
    - Pulse mode = key to greatly reduces compressor size and power consumption
- Patient sensor/data integration
  - O2 flow regulation: adjust O2 flow in response to oximeter readings
    - SpO2 oximeter Bluetooth sensors
    - Breathing rate detection through pressure sensors and flow rate measurement
  - GTS/Teladoc integration
    - push medical data to the cloud for doctors to remotely monitor patients)
- Integration
  - Oxikit: proportional valve flow control, GTS/Teladoc integration, Bluetooth oximeter
  - PIOC, Oxikit: control box
  - LifeMech – ventilator integration (TBD)
- Status
  - v1..v3 designs published and tested, with Apollo O2 concentrator reference design
  - Apollo control box: Working on v4 (ETA November/December 2020 for first prototypes)
  - Pursuing GTS/Teladoc prototyping with Oxikit

# PSA/Ventilator integration points

- Goal
  - Unified solution?
- Requirements
  - Breathing rate detection
    - Ventilator can provide that info
    - Enables efficient pulse mode operation at PSA concentrator level
  - Flow regulation
    - Adjusts O2 concentration dynamically by adjusting PSA timings
    - Oximeter pulse reading (Bluetooth)
  - GTS/Teladoc integration
    - Patient data (SpO2 data)

# Prototypes

