

Final Presentation: Telescope Interface Module

By: Team 17

Elena Chong, Harlan DuPree

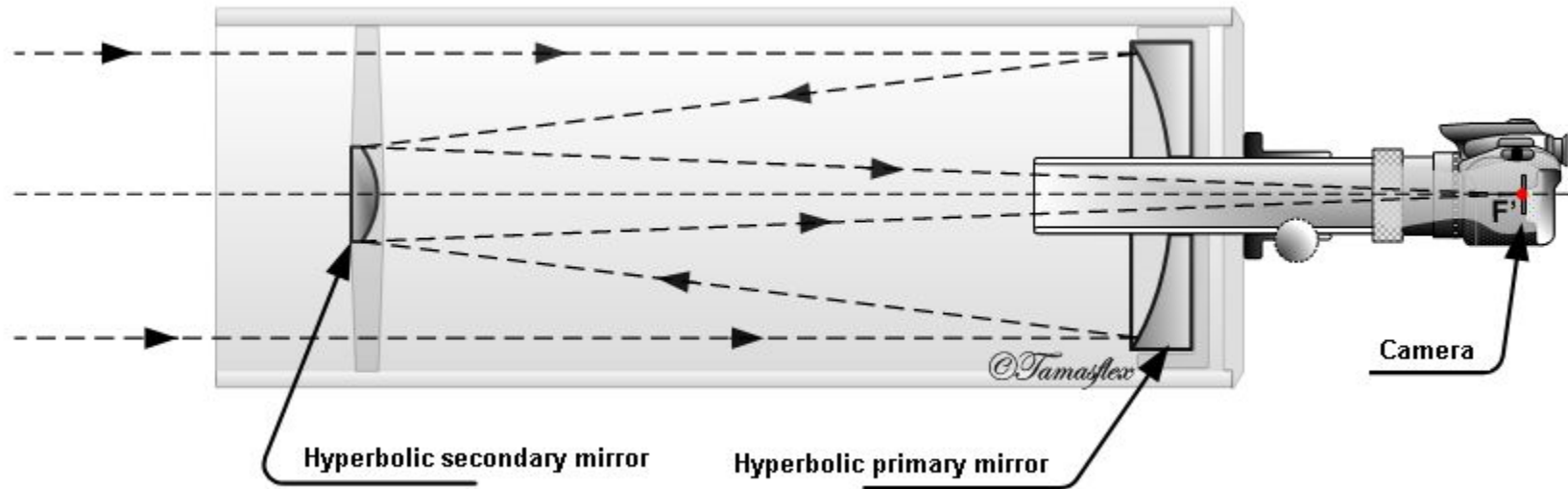
Toba Faseru, Panpan Yuan

Description of Project

- Telescope Interface Module (T.I.M.)
- Dr. Ditteon, Oakley Observatory
- Connects computer application to physical device
- Prone to failure / no longer manufactured
- Create a replacement system / documentation



The Telescope



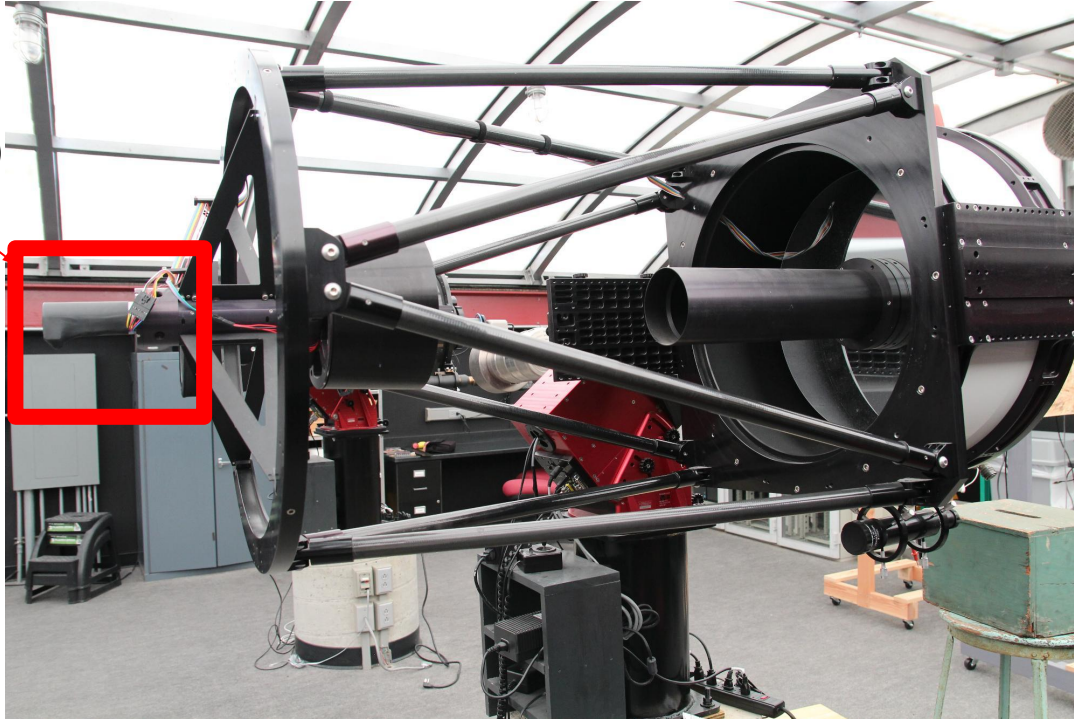
Ritchey - Chrétien (RCT)

The Telescope

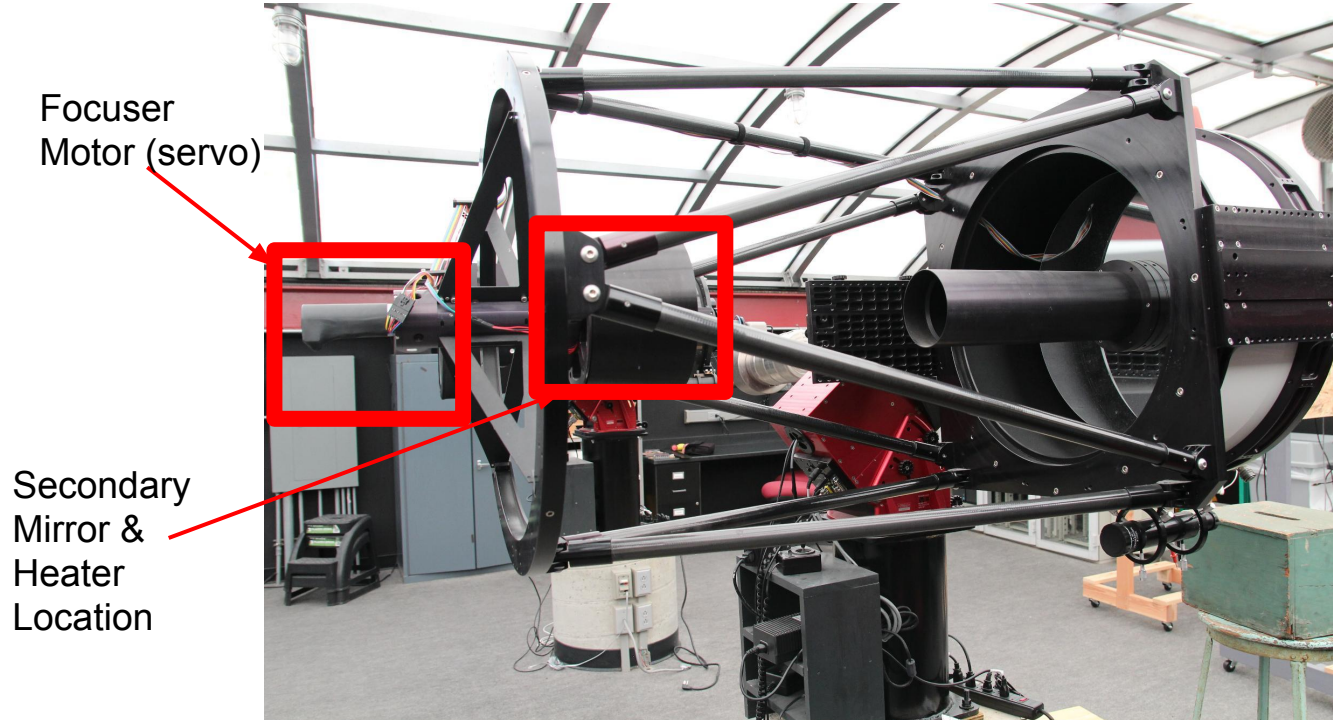


The Telescope

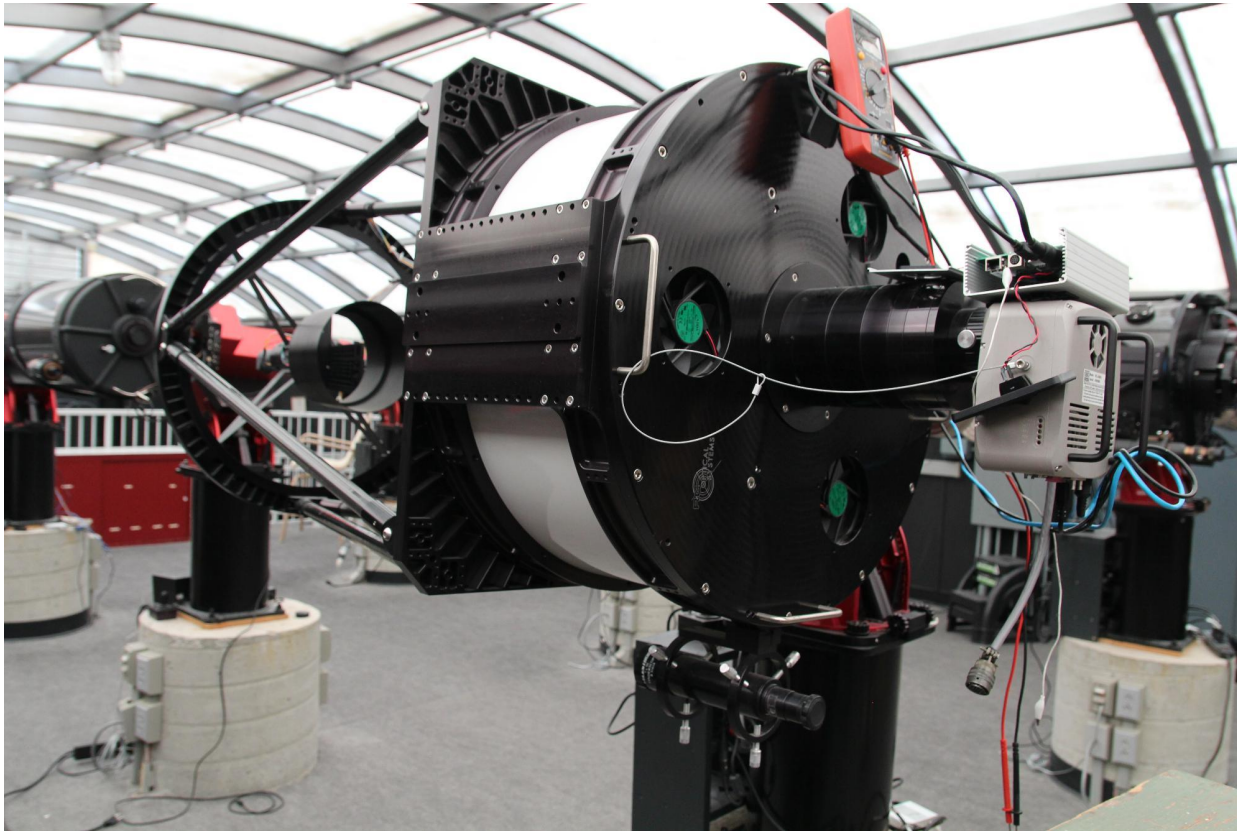
Focuser
Motor (servo)



The Telescope

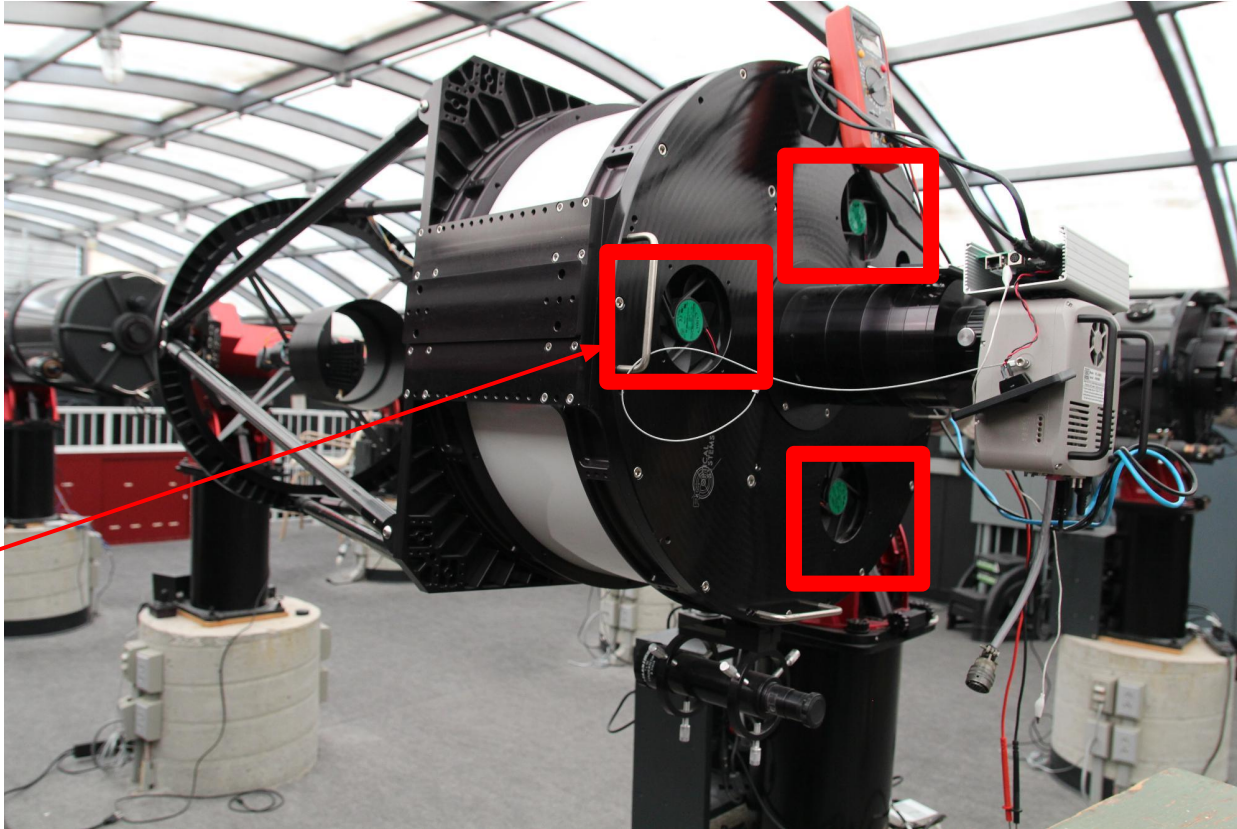


The Telescope

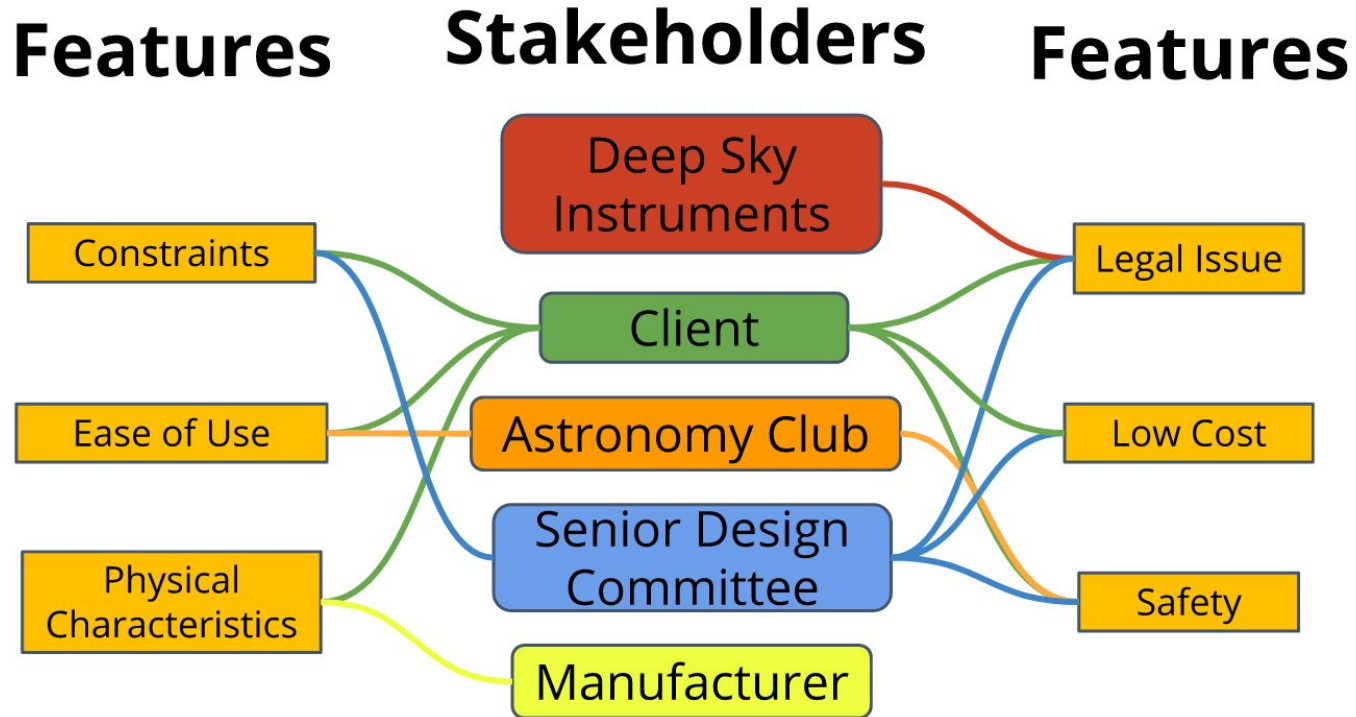


The Telescope

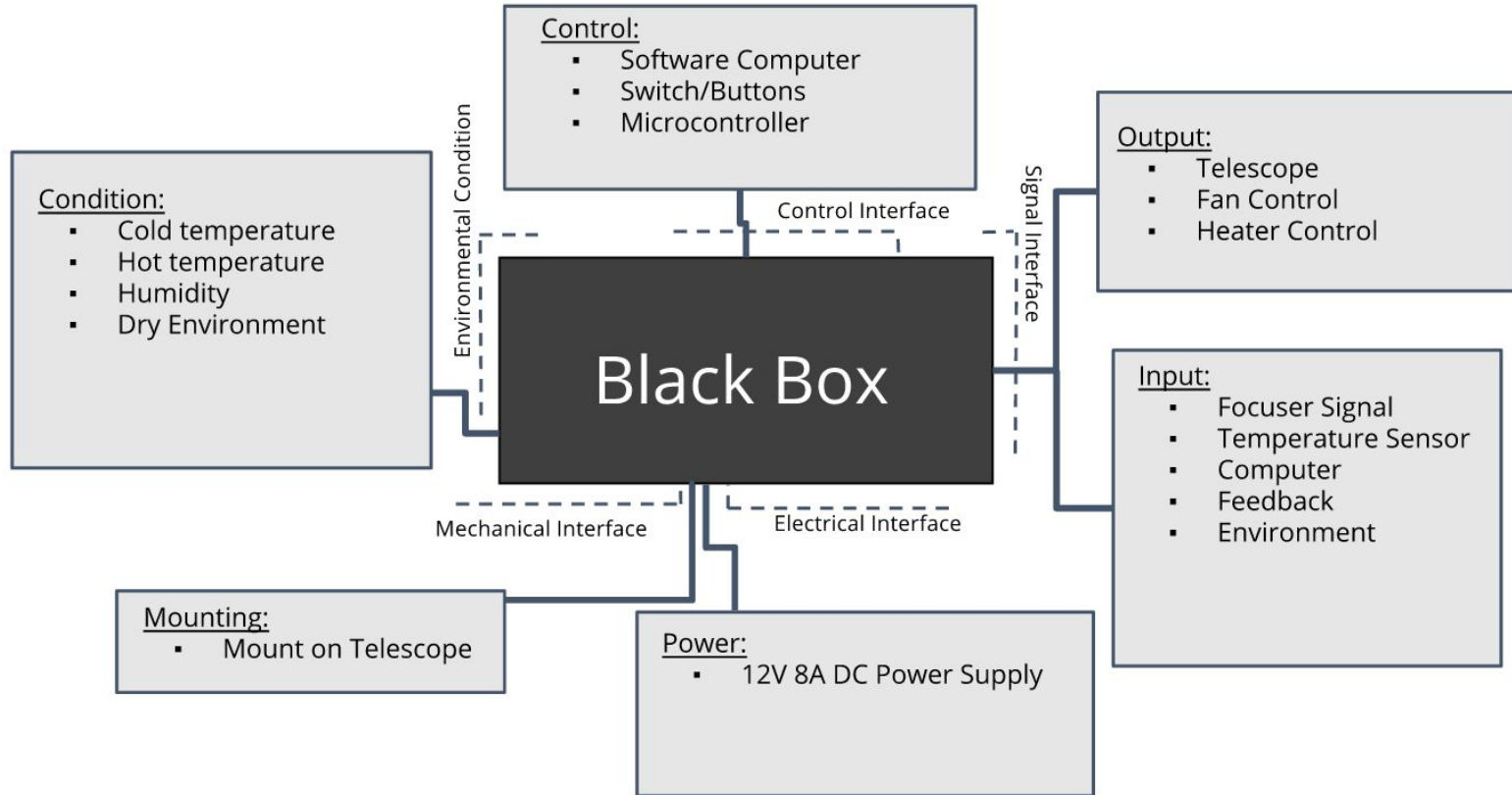
Fans



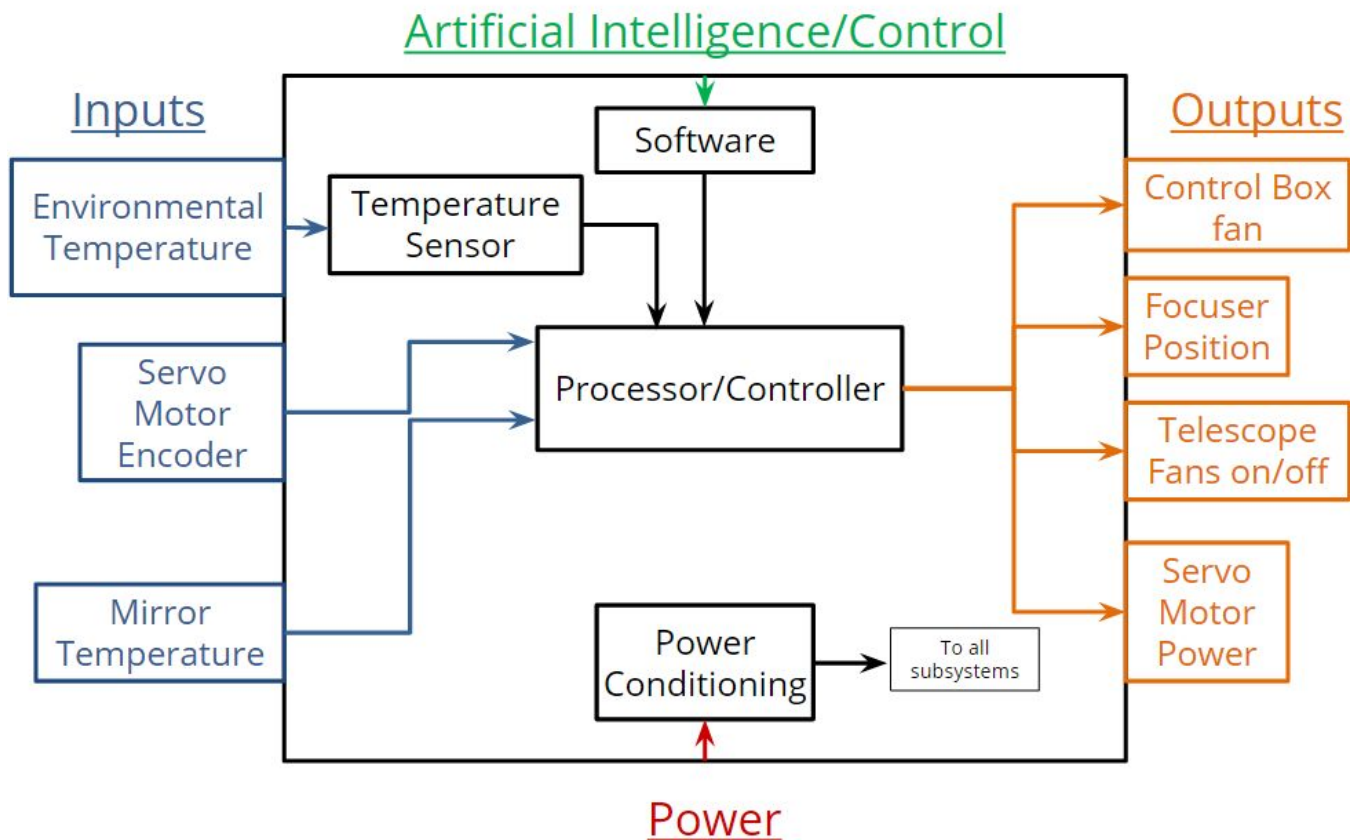
Stakeholder Diagram



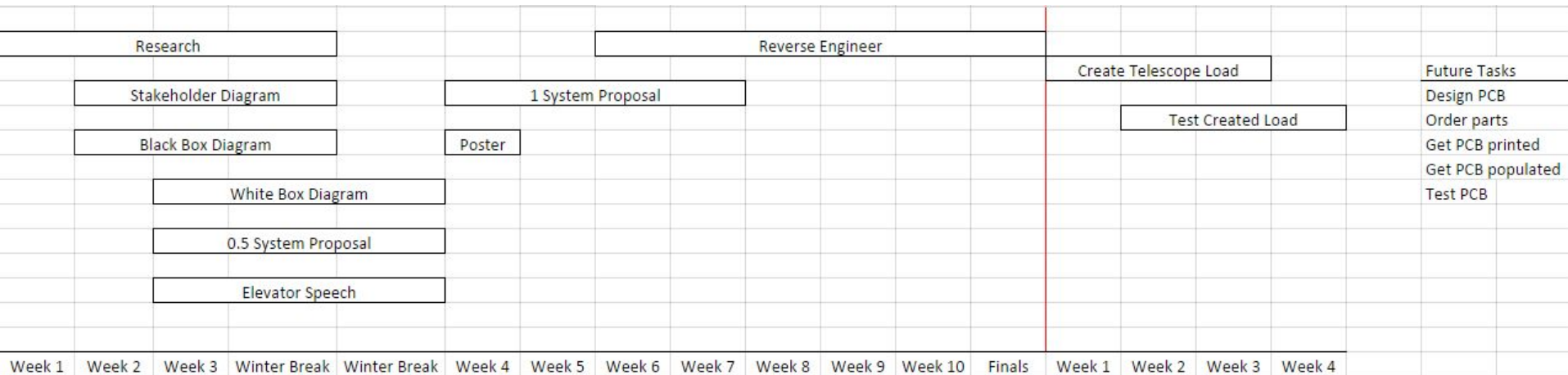
Black Box Diagram



System Architecture

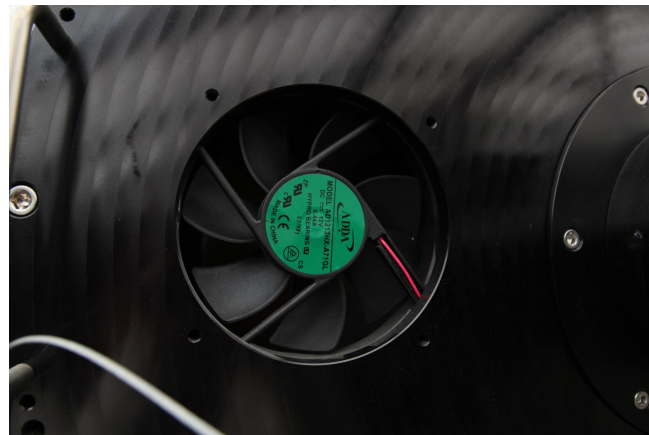


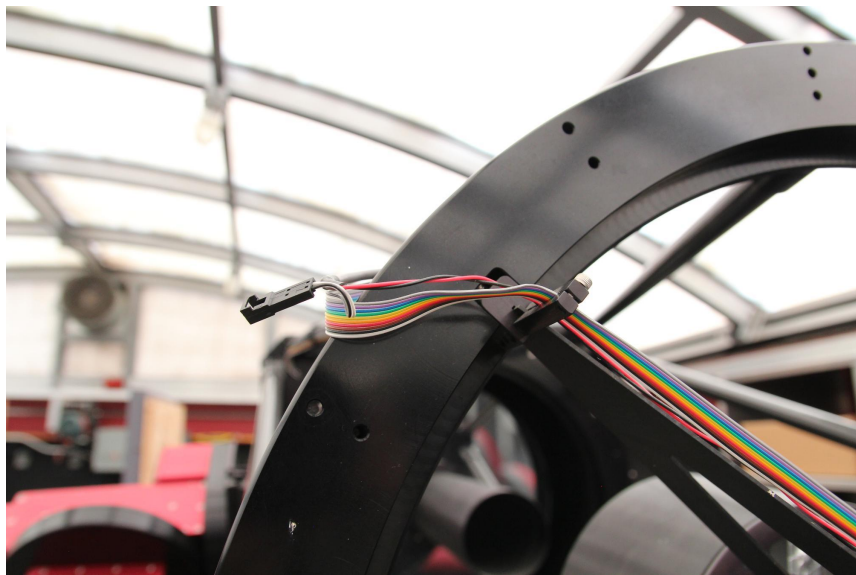
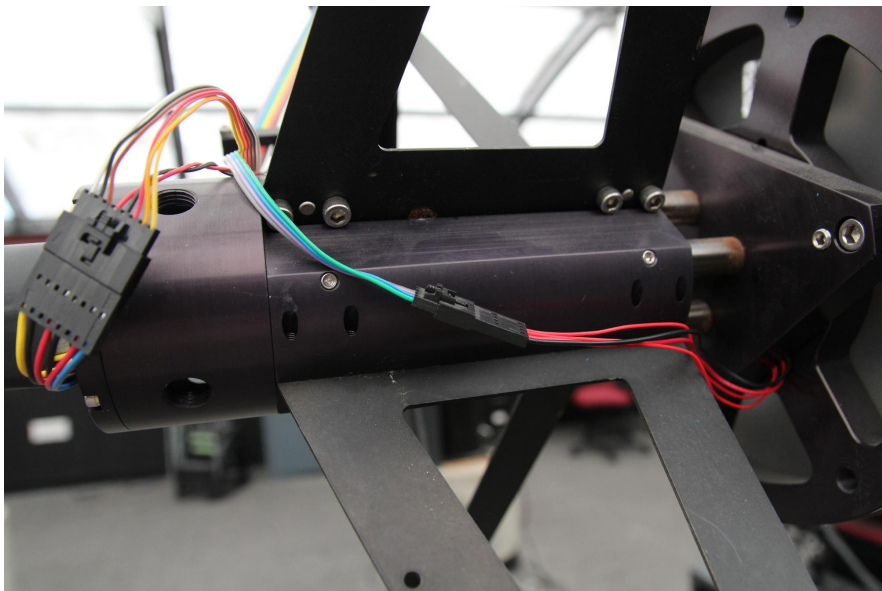
Timeline



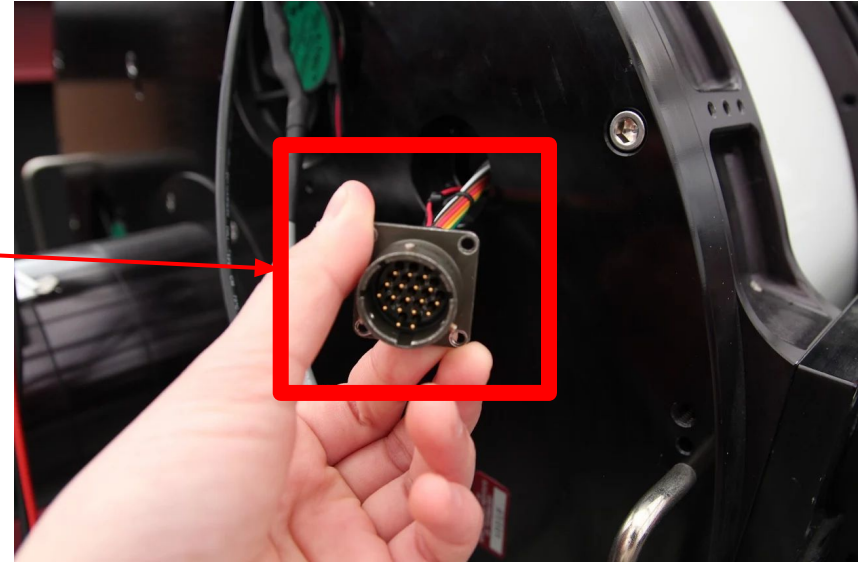
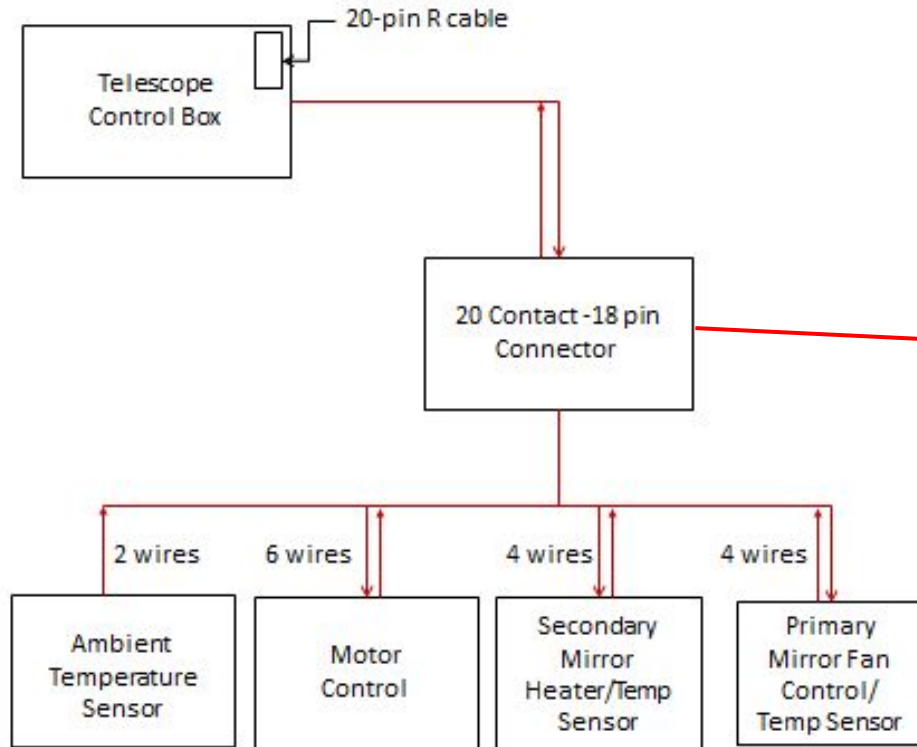
The Process of Reverse Engineering

- If info is not visible, we do not have access
- Steps of Reverse Engineering:
 - ○ Map wires to their associated part
 - Probe control box pins under different conditions
 - Disconnected
 - On (standby)
 - Working
 - Probe with oscilloscope
 - Check load resistances on telescope



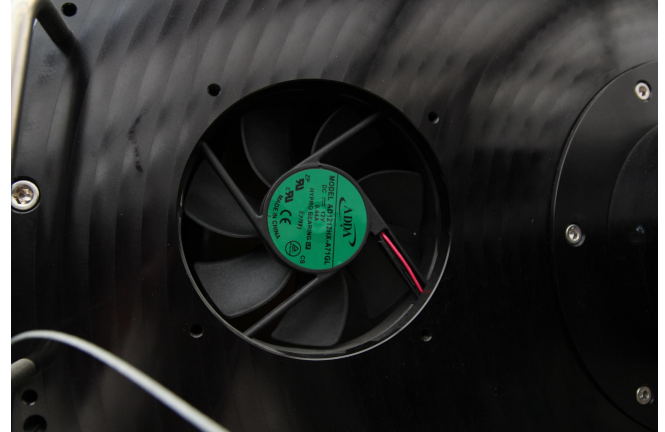


What We Discovered



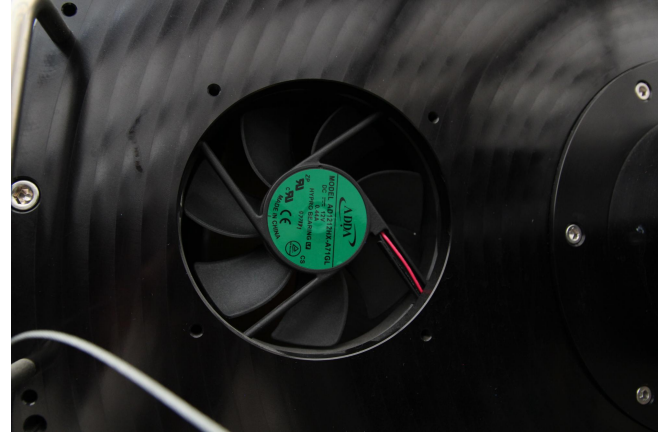
The Process of Reverse Engineering

- If info is not visible we do not have access.
- Steps of Reverse Engineering:
 - Map wires to their associated part
 - ○ Probe Control Box pins under different conditions
 - Disconnected
 - On (Standby)
 - Working
 - Probe with oscilloscope
 - Check load resistances on Telescope



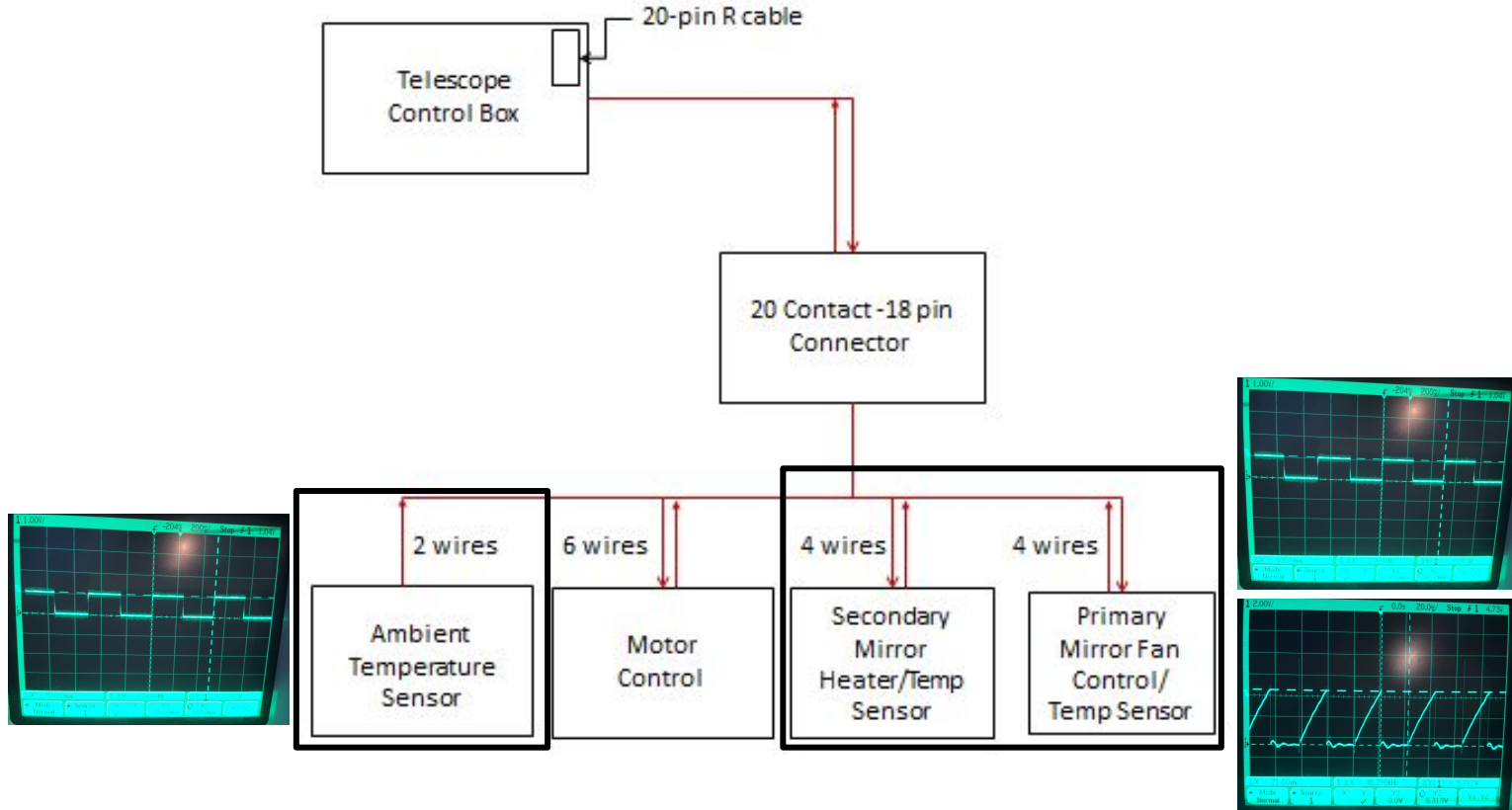
The Process of Reverse Engineering

- If info is not visible we do not have access.
- Steps of Reverse Engineering:
 - Map wires to their associated part
 - Probe Control Box pins under different conditions
 - Disconnected
 - On (Standby)
 - Working
- ○ Probe with oscilloscope
- Check load resistances on Telescope



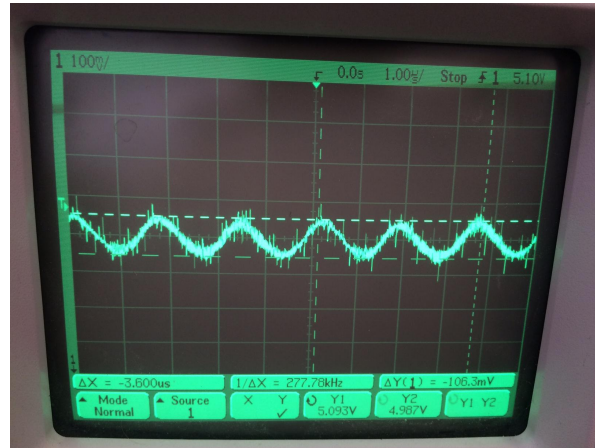
Function	Signal
Motor	?
Ambient Temperature	<ul style="list-style-type: none"> -Send Square -Return ohmage
Heater w/ Temp Sensor	<ul style="list-style-type: none"> -PWM saw-tooth -Send Square -Return ohmage
Fan Control w/ Temp Sensor	<ul style="list-style-type: none"> -PWM saw-tooth -Send Square -Return ohmage

What We Discovered



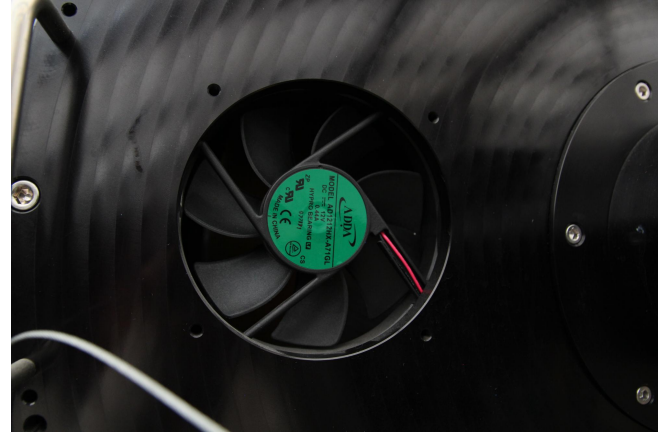
The Motor

MOTOR				two square waves?	
COLOR TO MOTOR	MOTOR COLOR	POSSIBLE FUNCTION		90 degree out of phase	
		R	signal		
		S	ground		
NOT USED	X				
*		POWER	power to motor		
*		POWER	power to motor		
NOT USED	X				
		H	5v	to power encoder	
		D	signal		

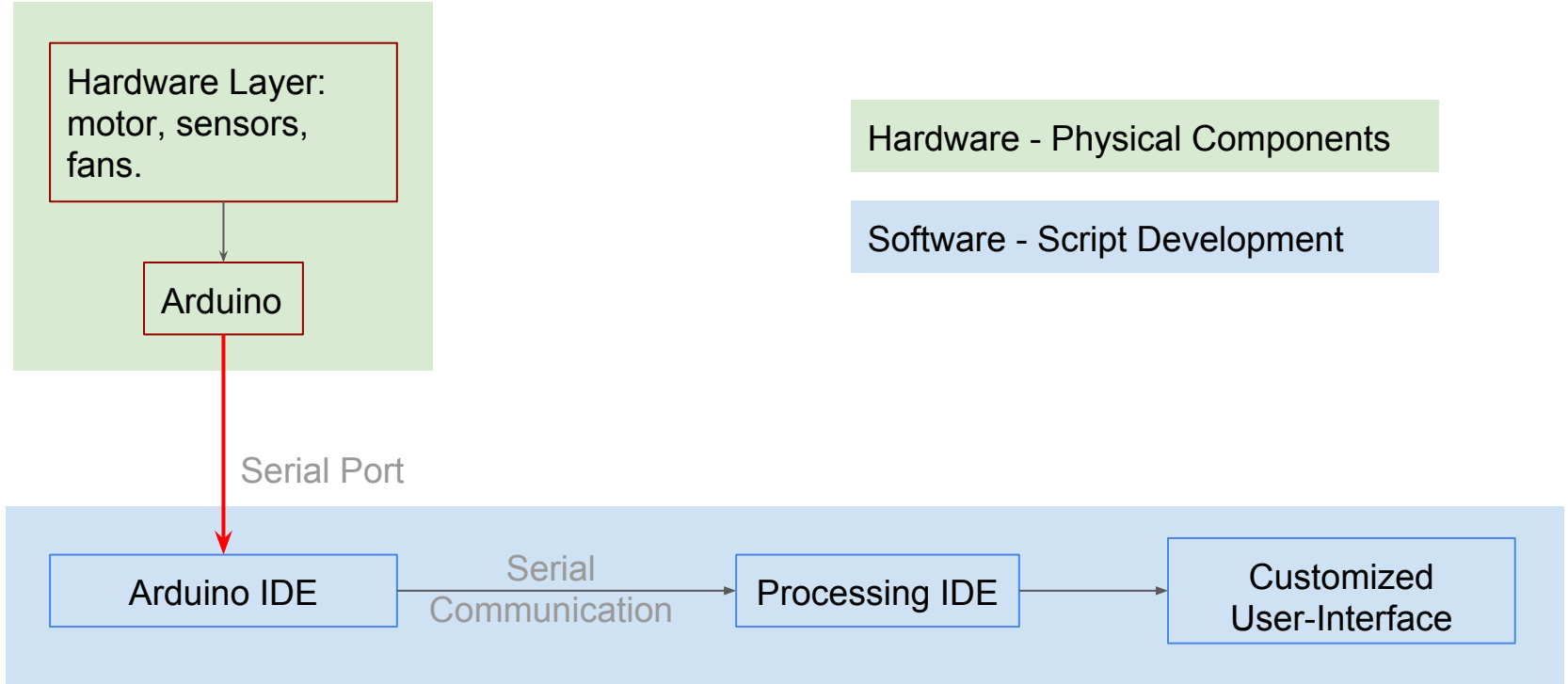


The Process of Reverse Engineering

- If info is not visible we do not have access.
- Steps of Reverse Engineering:
 - Map wires to their associated part
 - Probe Control Box pins under different conditions
 - Disconnected
 - On (Standby)
 - Working
 - Probe with oscilloscope
 - ○ Check load resistances on Telescope



Software Integration with Hardware



Questions?