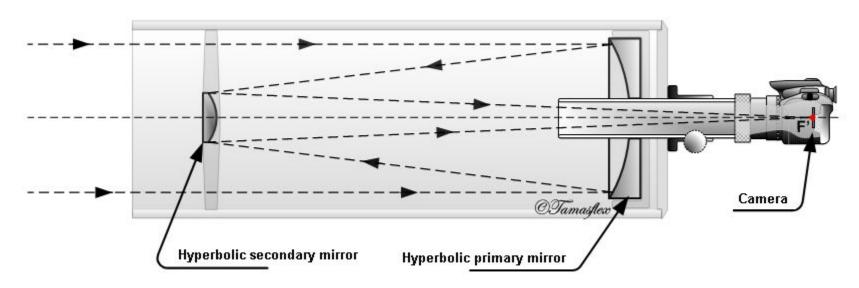
Final Presentation: Telescope Interface Module

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

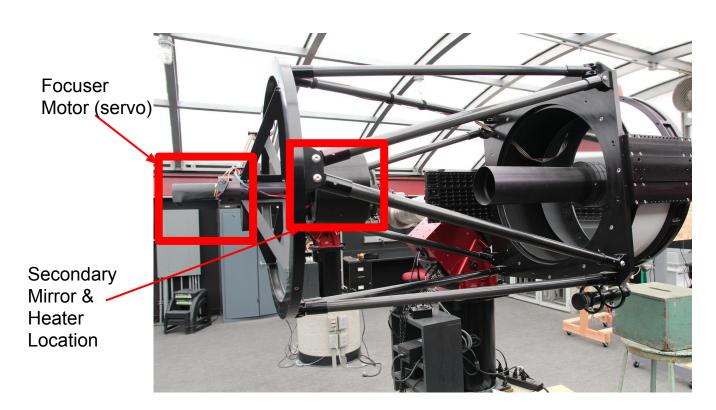




Ritchey - Chrétien (RCT)

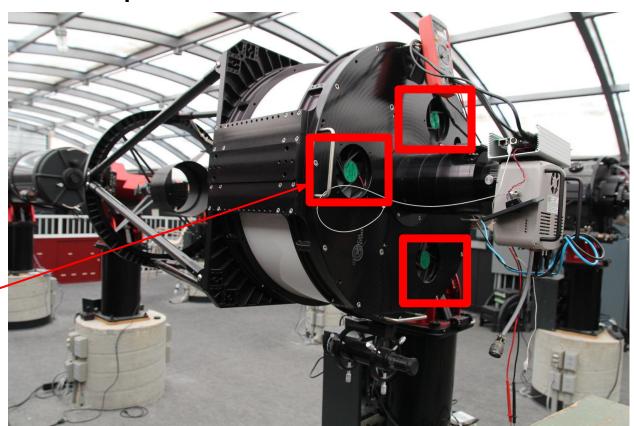




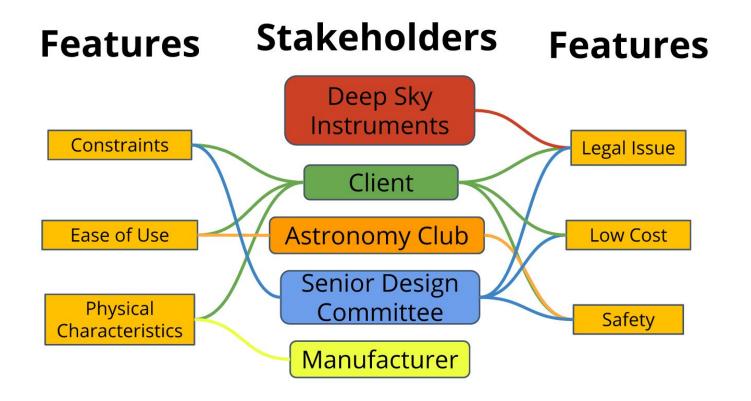




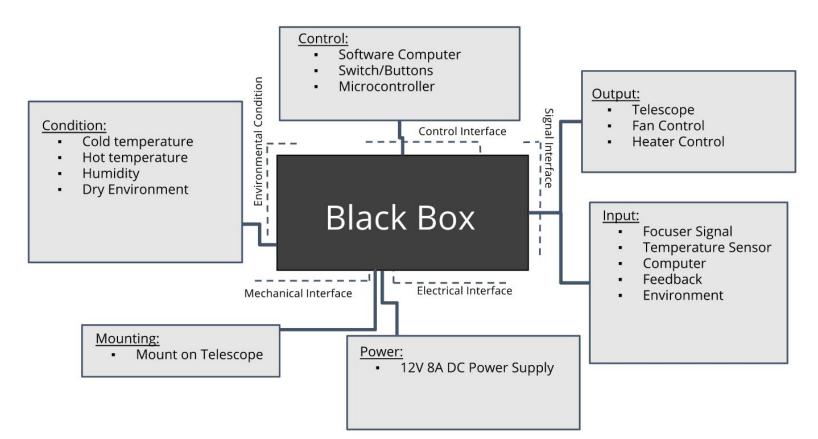
Fans



Stakeholder Diagram



Black Box Diagram



System Architecture

Artificial Intelligence/Control **Outputs Inputs** Software Control Box Temperature Environmental fan Temperature Sensor Focuser Position Servo Processor/Controller Motor Telescope Encoder Fans on/off Servo Mirror Motor Power To all Temperature Power subsystems Conditioning Power

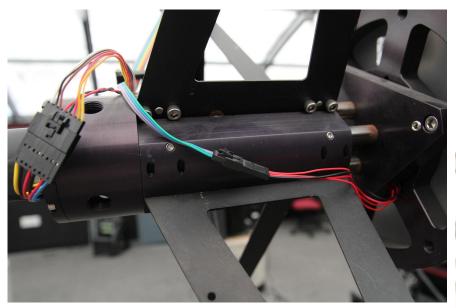
Timeline

Research					Reverse Engineer													
													Create	Telescope	e Load		Future Tasks	i
	Stakeholder Diagram			1 System Proposal										Design PCB				
					- 20								Test	t Created L	.oad	Order parts		
	ВІ	ack Box Di	iagram		Poster												Get PCB prin	ted
																	Get PCB pop	ulated
			White Box Diag	gram													Test PCB	
			0.5 System Pro	posal														
			Elevator Spee	ech														
Week 1	Week 2	Week 3	Winter Break	Winter Break	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Finals	Week 1	Week 2	Week 3	Week 4		

The Process of Reverse Engineering

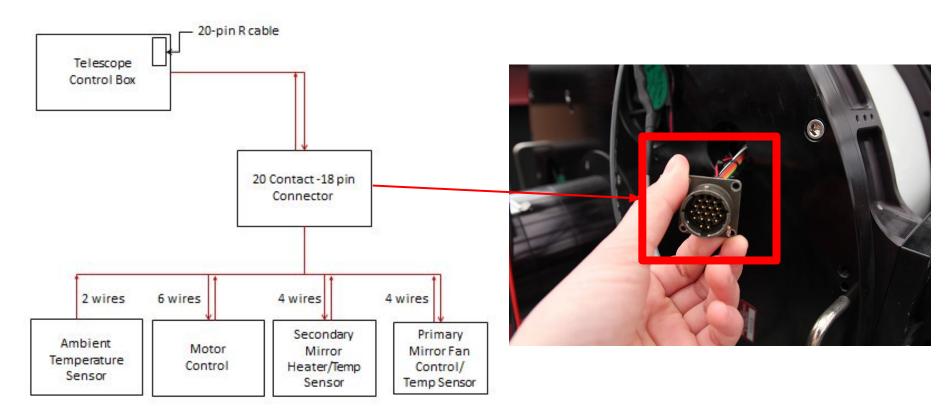
- If info is not visible, we do not have access
- Steps of Reverse Engineering:
 - → Map wires to their associated part
 - Probe control box pins under different conditions
 - Disconnected
 - On (standby)
 - Working
 - Probe with oscilloscope
 - Check load resistances on telescope





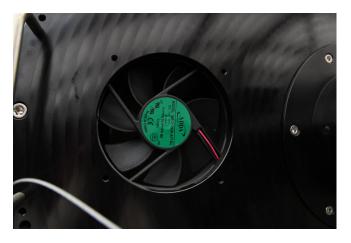


What We Discovered



The Process of Reverse Engineering

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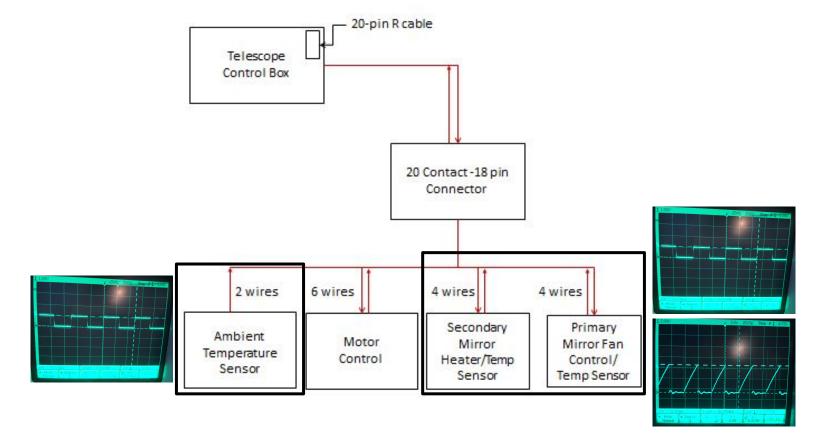
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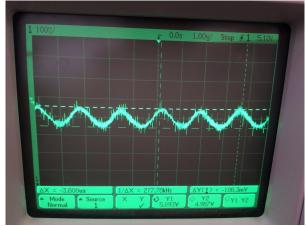
Function	Signal
Motor	?
Ambient Temperature	-Send Square -Return ohmage
Heater w/ Temp Sensor	-PWM saw-tooth -Send Square -Return ohmage
Fan Control w/ Temp Sensor	-PWM saw-tooth -Send Square -Return ohmage

What We Discovered



The Motor



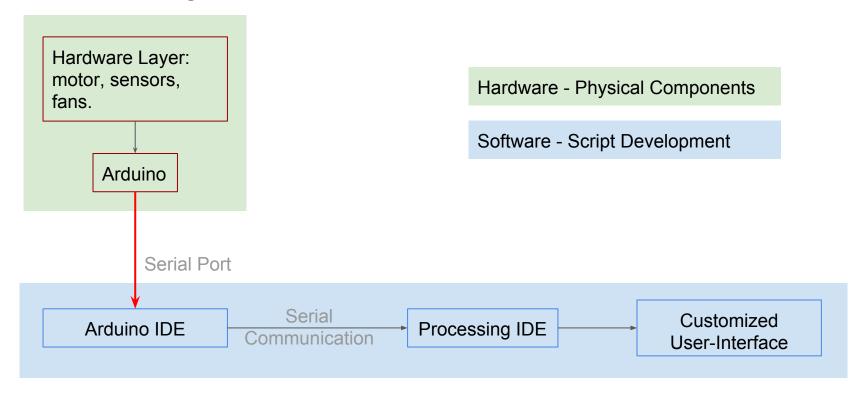


The Process of Reverse Engineering

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Software Integration with Hardware



Questions?