WBS Level	WBS Item	WBS Number	Description	Owner	Est. Completion	Completion Date	Total Level Up Completion (%)	Total Project Completion (%)	Level Up Progress (%)	Project Progress (%)	Notes
0	Fully Integrated Car Passing Formula Electric Inspections	0.1	Main goal of design project	Hayden			#REF!	100	#REF!	#REF!	
1	All Purely Non-Mechanical Subsystems Integrated in Dyno Room and Running Tests	1.1									
1	All subsystems integrated onto vehicle and functional	1.2									
2	Motor and Mechanical Parts Installed in Dyno Room	2.1	Motor, Motor Controller, and all mechanical parts installed ready for tests in Dyno Room		#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	
2	TSI Installed in Dyno Room, Controlling Throttle, IMD, Precharge, and TSV/GLV Isolation	2.2	TSI Fully connected to all necessary systems in the Dyno Room ready for tests		#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	
2	SCADA Collecting and Writing Data to a File, Presenting Data on Rack Screen, and Sending Data to GLV and TSI	2.3	SCADA software design and development		#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	
2	GLV and Safety Loop Fully Installed in Dyno Room, Monitoring Safety Loop, Providing I/O Access to SCADA, and Supplying GLV Power to Other Subsystems	2.4	GLV Boards and Safety Loop fully connected in the Dyno Room prepared for testing		#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	
2	Cooling System Installed in Dyno Room, Connecting liquid cooling system to MCS and Motor, Communicating with TSI	2.5	Cooling system cooling								
2	TSV Installed in Dyno Room for Testing, Providing High Voltage for Motor via MCS	2.6	TSV Packs Complete and connected to other subsystems in Dyno Room ready for testing		#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	
2	Dyno Testing Plan Prepared and Performed	2.7	Detailed Full Testing Plan for Dyno ready for testing after system completion		#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	
	Pedal Cluster Installed in Dyno Room, Communicating with TSI, and controlling throttle	2.8	Assembly and Functionality of Accelerator and Braking Systems								
2	Dyno Wiring Plan Prepared and Performed	2.9	Detailed Wiring Plan for the Dyno Room prepared for integration of subsystems		#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	NO Integration (1.
2	Cooling System Installed on CAR, Connected to MCS and Motor, Communicating with TSI	2.10	Full integration of COOLING system into the CAR	Hongbo	#REF!	#REF!	#REF!				
2	SCADA System operational on car, acquiring data and creating data logs of vehicle integrated subsystem data, providing vehicle control, displaying vehicle data	2.11	Full integration of SCADA system into the CAR	Sam_Zian	#REF!	#REF!	#REF!				
2	TSI mounted on car, isolating TSV/GLV, Providing Throttle Control, Precharge Circuitry, and IMD	2.12	Full integration of TSI system into the CAR	Antonio, Tianyu, Xiaonan	#REF!	#REF!	#REF!				
2	GLV mounted on Car in Enclosure, Monitoring Safety Loop, Providing I/O Communication with SCADA, and Supplying GLV Power to Other Subsystems	2.13	Full integration of GLV system into the CAR	Robson, Max	#REF!	#REF!	#REF!				
2	TSV Packs Mounted in Car, Providing High Voltage to the	2.14	Full integration of BATTERY system into the CAR	Clement, Yishak, Weston, David	#REF!	#REF!	#REF!				
2	CAR Wiring Plan Prepared and Performed	2.15	Full integration of INTERCONNECT design and the CAR	Drew, Weston			#REF!				
2	Frame Manufactured and Delivered to Lafayette College Car Lab	2.16	Completely Modeled Design of Frame With Key Refference Points and Purchase	David, Brian, Bill	#REF!	#REF!	#REF!				
2	Motor / Drivetrain Installed on Frame	2.17	Fully Attached and Running Motor/DT	Jordan, Nick, Bill	#REF!	#REF!	#REF!				
2	Steering System Installed on Frame and connected to Wheels	2.18	Complete Assembly and Functionality	Adam, Jordan	#REF!	#REF!	#REF!				
2	Pedal cluster installed on Frame, connected to brakes and TSI on car, Illuminating Brake Lights, controlling throttle	2.19		Adam, Justin	#REF!	#REF!	#REF!				NX Integration (1.
2	MANAGEMENT	2.20	MANAGEMENT of tasks and processes required to achieve goals	Katie, Alex, Robson, Hayden, Yuqiu	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	

WBS Level	WBS Item	WBS Number	Description	Owner	Est. Completion	Completion Date	Total Level Up Completion (%)	Total Project Completion (%)	Level Up Progress (%)	Project Progress (%)	Notes
2	Motor Mount Mounted in Dyno Room	PART.1			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	Pulley & Shaft Mounted in Dyno Room	PART.2			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	MCS / TSI / Cooling Fixture Mounted in Dyno Room	PART.3			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	MCS Mounted in Fixture in Dyno Room	PART.4			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	Motor Mounted in Motor Mount	PART.5			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	Full System Constructed and Connected	PART.6			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
3	Motor Mount Mechanical Drawing Submitted to Machine Shop	PART.1.1									
3	Motor Mount Fabricated	PART.1.2									
3	Motor Mount Secured in Dyno Room	PART.1.3									
3	Pulley Mechanical Drawing Submitted to Machine Shop	PART.2.1									
3	Shaft Mechanical Drawing Submitted to Machine Shop	PART.2.2									
3	Pulley Fabricated / Purchased	PART.2.3									
3	Shaft Fabricated / Purchased	PART.2.4									
3	Pulley and Shaft Attached to Motor and Belt System in Dyno Room	PART.2.5									
3	MCS / TSI / Cooling Fixture Mechanical Drawing Submitted to Machine Shop	PART.3.1									
3	Fixture Fabricated	PART.3.2									
3	Fixture Mounted in the Dyno Room	PART.3.3									
3	Motor Controller Installed in Mounting Fixture	PART.3.4									
3	TSI Mounted in Fixture	PART.3.5									
3	Cooling System Mounted in Fixture	PART.3.6									
3	Motor Controller Purchase Order Submitted and Approved	PART.4.1									
3	Motor Controller Acquired	PART.4.2									
3	Motor Purchase Order Submitted and Approved	PART.5.1									
3	Motor Acquired	PART.5.2									
3	Motor Installed in Motor Mount	PART.5.3									
3	Motor and Pulley/Shaft Connected	PART.6.1									
3	Pulley/Shaft Connected to Dyno Belt	PART.6.2									
3	Motor Controller and Motor Connected	PART.6.3	See also WIRE.3.12								
3	TSI and Motor Controller Connected	PART.6.4	See also TSI.5.1, WIRE.3.1								
3	Cooling and Motor Controller Connected	PART.6.5	See also WIRE.3.14, COOL.3.1								
3	Cooling and TSI Connected	PART.6.6	See also TSI.5.6, WIRE.3.2, COOL.4.4								
3	Cooling and Motor Connected	PART.6.7	See also WIRE.3.13, COOL.3.2								
3	MCS and TSV Connected	PART.6.8	See also WIRE.3.11, TSV.6.2								

WBS Level	WBS Item	WBS Number	Description	Owner	Est. Completion	Completion Date	Total Level Up Completion (%)	Total Project Completion (%)	Level Up Progress (%)	Project Progress (%)	Notes
2	TSI Board Delivered	TSI.1		Xiaonan	12/30/1899	12/30/1899	100	#REF!	0	0	
2	TSI Firmware Delivered	TSI.2		Hongbo	12/30/1899	12/30/1899	100	#REF!	0	0	
2	Pedal/Throttle Integrated	TSI.3		Antonio	12/30/1899	12/30/1899	100	#REF!	0	0	
2	TSI Test Panel Fabricated/Found and Installed	TSI.4		Tianyu	12/30/1899	12/30/1899	75	#REF!	0	0	
2	TSI Interconnect	TSI.5		Drew	12/30/1899	12/30/1899	100	#REF!	0	0	
2	TSI Enclosure Built and Delivered	TSI.6		Tianyu	12/30/1899	12/30/1899	25	#REF!	0	0	
3	TSI Block Diagram Delivered and Approved	TSI.1.1		Xiaonan			11.1	#REF!			
3	TSI Circuit Schematic Delivered and Approved	TSI.1.2		Xiaonan			11.1	#REF!			
3	TSI PCB Layout Complete and Approved	TSI.1.3		Xiaonan			11.1	#REF!			
3	TSI PSB BoM Purchase Order Approved and Purchased	TSI.1.4									
3	TSI PCB Purchased and Delivered	TSI.1.5		Xiaonan			11.1	#REF!			
3	TSI PCB Populated and Verified	TSI.1.6		Xiaonan			11.1	#REF!			
3	IMD Installed on TSI PCB	TSI.1.7		Tianyu			11.1				
3	Precharge Circuitry Incorporated	TSI.1.8		Tianyu			11.1				
3	TSI Testing Plan Delivered	TSI.1.9		Xiaonan			11.1	#REF!			
3	TSI PCB Debugged and Complete	TSI.1.10		Xiaonan			11.2	#REF!			
3	TSI Mounting Plate Mechanical Drawing Submitted	TSI.1.11									
3	TSI Mounting Plate Fabricated	TSI.1.12									
3	TSI Installed on Mount in Dyno Room	TSI.1.13									
3	Firmware Block Diagram Delivered and Approved	TSI.2.1		Hongbo			8.33	#REF!			
3	2018 Firmware Bugs Discovered and Fixed	TSI.2.2		Hongbo			8.33	#REF!			
3	Firmware Testing Board Delivered	TSI.2.3		Hongbo			8.33	#REF!			
3	Firmware I/O Functionality Delivered	TSI.2.4		Hongbo			8.33	#REF!			
3	Firmware Logic / State machine Delivered and Approved	TSI.2.5		Hongbo			8.33	#REF!			
3	Firmware Tested using Testing Board	TSI.2.6		Hongbo			8.33	#REF!			
3	Firmware Integration Testing Complete	TSI.2.7		Hongbo			8.33	#REF!			
3	VSCADA Communication CANBus Communication Complete	TSI.2.8		Yuqiu			8.33	#REF!			
3	VSCADA GPIO Communication Complete	TSI.2.9		Yuqiu			8.34	#REF!			
3	CANBus Purchased	TSI.2.10		Tianyu			8.34	#REF!			
3	CANBus / TSI Integration Complete	TSI.2.11		Yuqiu			8.34	#REF!			
3	CANBus Integration Testing Plan Delivered	TSI.2.12		Yuqiu			8.34	#REF!			
3	Verify and Correct 2018 Block and Wiring Diagram	TSI.3.1		Antonio			16.6				
3	Block Diagram and Wiring Plan Delivered	TSI.3.2		Antonio			16.6				
3	Throttle Connected	TSI.3.3		Antonio			16.7				
3	Brake Connected and Integrated into Safety Loop	TSI.3.4		Antonio			16.7				
3	Brake Light Connected and Reacts to Brake	TSI.3.5		Antonio			16.7				
3	Demo Pedal Electronics Communicating with SCADA	TSI.3.6	See also PEDAL.2.1	Antonio			16.7	#REF!			
3	2017 TSI Test Panel Located	TSI.4.1		Katie			25	#REF!			
3	Test Panel Fabricated and Wired with Needed Buttons/Switches	TSI.4.2	Slide potentiometers for throttle, switch for break overtravel, indicator LEDs, etc	Antonio			25	#REF!			
3	Test Panel Installed in DYNO Room	TSI.4.3		Antonio			25	#REF!			
3	TSI Base Plate Block Diagram Delivered	TSI.4.4									
3	TSI Base Plate BoM Purchase Order Approved and Purchased	TSI.4.5									
3	TSI Base Plate Mechanical Drawing Submitted to Machine Shop	TSI.4.6									
3	TSI Base Plate Fabricated, Wired, and Populated	TSI.4.7	TSI Board, CAN, IMD, etc								
3	TSI Base Plate Installed in DYNO Room	TSI.4.8									
3	TSI and MCS Connected	TSI.5.1	See also PART.6.4, WIRE.3.1				16.6	#REF!			
3	TSI and Test Panel Connected	TSI.5.2	See also WIRE.3.4	Tianyu			16.6	#REF!			
3	TSI and GLV Connected	TSI.5.3	See also GLV.4.5, WIRE.3.7				16.7	#REF!			
3	TSI and TSV Connected	TSI.5.4	See also WIRE.3.5, TSV.6.3				16.7	#REF!			
3	TSI and VSCADA Connected via CAN	TSI.5.5	See also SCADA.2.1				16.7				
3	TSI and Cooling Connected	TSI.5.6	See also WIRE.3.2, PART.6.6, COOL.4.4				16.7	#REF!			
3	TSI - Pedal Throttle Fixture Connected	TSI.5.7	See also WIRE.3.3, PEDAL.2.2								
3	TSI ICD Delivered	TSI.5.8									
3	TSI Wiring Diagram Delivered	TSI.5.9									
3	TSI Wiring Delivered and Accepted	TSI.5.10									
3	Mechanical Drawing of TSI Enclosure Delivered and Approved	TSI.6.1		Antonio	10/7/2018		33.3	#REF!			
3	New TSI Enclosure Fabricated	TSI.6.2		Tianyu	10/21/2018		33.3	#REF!			
3	New Encolsure Populated and Checked for Rule Compliance	TSI.6.3		Tianyu	11/11/2018		33.4	#REF!			

WBS Level	WBS Item	WBS Number	Description	Owner	Est. Completion	Completion Date	evel Up Completi	Project Completio	vel Up Progress (	oject Progress (%	Notes
2	VSCADA Acquiring Motor Data and Controlling DYNO	SCADA.1			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	VSCADA Communicating with TSI over CAN	SCADA.2			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	VSCADA Communicating with GLV	SCADA.3			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	VSCADA Communicating with Motor Controller over CAN	SCADA.4			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	VSCADA Communicating with Cooling System	SCADA.5			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	VSCADA Communicating with TSV over CAN	SCADA.6			12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	VSCADA Logging Data with RTC	SCADA.7									
2	SCADA Software Designed and Implemented	SCADA.8									
2	SCADA User Interfaces Completed	SCADA.9									
3	Individual Data Acquisition Tests Performed Showing Data	SCADA.1.1									
3	SCADA Collecting Data From Subsystems and Writing Data to File	SCADA.1.2									
3	SCADA Writing Raw and Calibrated Data to Database	SCADA.1.3									
3	Demo of SCADA Collecting Data and Displaying Meaningfully to Viewer	SCADA.1.4	Data displayed on Dyno Rack Monitor	Zian							
3	VSCADA and TSI Connected via CAN	SCADA.2.1	See also TSI.5.5								
3	VSCADA Receiving Data from TSI Sensors	SCADA.2.2									
3	VSCADA Transmitting Cruise Control Information	SCADA.2.3									
3	VSCADA and GLV Connected via CAN and GPIO	SCADA.3.1	See also GLV.4.1								
3	VSCADA Receiving Data from GLV Sensors	SCADA.3.2									
3	VSCADA Sends Warnings for Error Sensor Data	SCADA.3.3	If receiving sensor data that is too high or too low, send warning and eventually break safety loop								
3	VSCADA and MCS Connected via CAN	SCADA.4.1									
3	VSCADA Receiving Data from MCS Sensors	SCADA.4.2									
3	SCADA Outputs a Throttle Control to the Motor Controller	SCADA.4.3	Used to mimic cruise control, would be very helpful and more precise than physical switches								
3	VSCADA and Cooling System Connected via CAN	SCADA.5.1	See also COOL.4.5								
3	VSCADA Receiving Data from Cooling System	SCADA.5.2									
3	VSCADA and TSV Connected via CAN	SCADA.6.1									
3	VSCADA Receiving Data from TSV sensors	SCADA.6.2									
3	RTC Purchased and Acquired	SCADA.7.1									
3	RTC Integrated with SCADA	SCADA.7.2									
3	SCADA Logging Data with Timestamps	SCADA.7.3									
3	Software Block Diagram Delivered	SCADA.8.1									
3	SCADA skeleton Delivered	SCADA.8.2									
3	Demo of Data Read from Sensors	SCADA.8.3									
3	Raw and Calibrated Data Written to File	SCADA.8.4									
3	Communication Protocols Delivered	SCADA.8.5									
3	Set Up Cross-Compilation Platform	SCADA.8.6									
3	Testing Plan Delivered	SCADA.8.7									
3	Testing Plan Performed and Verified	SCADA.8.8									
3	Demo of Transitions between Vehicle States	SCADA.8.9									
3	Config/Setup for Sensors Delivered	SCADA.8.10									
3	Demo of Receiving Raw Data and Writing to a File	SCADA.8.11									
3	Demo of Calibrated Data Being Written to a File	SCADA.8.12									
3	Demo of System Reaction of Data (Blink LED, etc)	SCADA.8.13									
3	Block Diagram of UIs Delivered	SCADA.9.1									
3	Back Display Designed and Delivered	SCADA.9.2									
3	Dashboard Interface Designed and Delivered	SCADA.9.3									
3	Demo of Back Display	SCADA.9.4									
3	Demo of UI Displaying Received Data	SCADA.9.5									
3	Demo of Dashboard Interface	SCADA.9.6									

WBS Level	WBS Item	WBS Number	Description	Owner	Est. Completion	Completion Date	Total Level Up Completion (%)	Total Project Completion (%)	Level Up Progress (%)	Project Progress (%)	Notes
2	GLV BoB Mounted in Dyno Room	GLV.1	GLV BoB PCB fabricated and mounted in DYNO Room	Max	12/30/1899	12/30/1899	100.00	#REF!	0.00	0.00	
2	Safety Loop Side Panels Mounted in Dyno Room	GLV.2	Right and left side panels have safety loop completed and installed in Dyno Room	Robson	12/30/1899	12/30/1899	100.00	#REF!	0.00	0.00	
2	Safety Loop Integrated with GLV Board and Dyno Power Supply	GLV.3	Safety Loop BRBs and Switches capable of powering on / off Dyno Power Supply	Max	12/30/1899	12/30/1899	100.00	#REF!	0.00	0.00	
2	GLV Interconnect	GLV.4		Robson	12/30/1899	0	100.00	#REF!	0.00	0.00	
2	Pi2CAN Adaptor Attatched to Pi and Demonstrated as Functional	GLV.5		Max	12/30/1899	12/30/1899	0.00		0.00	0.00	
2	Dashboard Panel Mounted in Dyno Room	GLV.6	Dashboard panel containing BRB, Drive Button, etc. Mounted in Dyno Room Rack	Robson	0	0	0.00	#REF!	0.00	0.00	
2	GLV Enclosure Manufactured	GLV.7		Max	12/30/1899	12/30/1899	0.00		0.00	0.00	
3	GLV BoB Circuit Schematic Complete	GLV.1.1					14.28	#REF!			
3	GLV BoB PCB Layout Complete and Approved	GLV.1.2					14.28	#REF!			
3	GLV BoB PCB Purchase Order Approved and Submitted	GLV.1.3					14.28	#REF!			
3	GLV BoB Acquired	GLV.1.4					14.29	#REF!			
3	GLV BoB Mount Mechanical Drawing Submitted to Machine Shop	GLV.1.5					14.29	#REF!			
3	GLV BoB Mount Fabricated	GLV.1.6					14.29	#REF!			
3	GLV BoB Installed on Mount in Rack in Dyno Room	GLV.1.7					14.29	#REF!			
3	Left Side Panel Block Diagram Delivered	GLV.2.1					10	#REF!			
3	Left Side Panel BoM Purchase Order Approved and Purchased	GLV.2.2					10	#REF!			
3	Left Side Panel Mechanical Drawing Submitted to Machine Shop	GLV.2.3					10	#REF!			
3	Left Side Panel Fabricated and Wired with Needed Buttons / Switches	GLV.2.4					10	#REF!			
3	Right Side Panel Block Diagram Delivered	GLV.2.5					10	#REF!			
3	Right Side Panel BoM Purchase Order Approved and Purchased	GLV.2.6					10	#REF!			
3	Right Side Panel Mechanical Drawing Submitted to Machine Shop	GLV.2.7					10	#REF!			
3	Right Side Panel Fabricated and Wired with Needed Buttons / Switches	GLV.2.8					10	#REF!			
3	Left Side Panel Installed in Dyno Room	GLV.2.9					10	#REF!			
3	Right Side Panel Installed in Dyno Room	GLV.2.10					10	#REF!			
3	Dyno Safety Loop Block Diagram Complete and Submitted	GLV.3.1					12.5	#REF!			
3	Dyno Power Supply Safety Loop On/Off Mechanism Delivered	GLV.3.2	Relay / switch to open or close contacts on rear of power supply, piece of safety loop				12.5	#REF!			
3	Left Side Panel Connected to GLV In Dyno Room	GLV.3.3					12.5	#REF!			
3	Right Side Panel Connected to GLV In Dyno Room	GLV.3.4					12.5	#REF!			
3	Dyno Power Supply Connected to GLV Safety Loop	GLV.3.5	See also WIRE.3.10				12.5	#REF!			
3	Demo of Left Side Panel Closing / Opening Safety Loop	GLV.3.6					12.5	#REF!			
3	Demo of Right Side Panel Closing / Opening Safety Loop	GLV.3.7					12.5	#REF!			
3	Demo of Safety Loop shutting off the Dyno Power Supply from Safe Distance	GLV.3.8					12.5	#REF!			
3	Demo of Dashboard Panel Closing / Opening Safety Loop	GLV.3.9									
3	Demo of Dashboard Panel Putting Car / Dyno into Drive Mode	GLV.3.10									
3	GLV ICD Delivered	GLV.4.1									
3	GLV Wiring Diagram Delivered	GLV.4.2									
3	GLV Wiring Delivered and Accepted	GLV.4.3									
3	GLV and VSCADA Connected via CAN	GLV.4.4	See also SCADA.3.1				25				
3	GLV and TSI Connected	GLV.4.5	See also TSI.5.3, WIRE.3.7				25				
3	GLV and TSV Packs Connected	GLV.4.6	See also WIRE.3.9, TSV.6.1				25				
3	GLV and Cooling Connected	GLV.4.7	See also WIRE.3.8, COOL.4.7				25				
3	GLV and Safety Loop Connected	GLV.4.8	See also WIRE.3.10								
3	Pi2CAN GPIO Board Circuit Schematic Complete	GLV.5.1		Max							
3	Pi2CAN GPIO Board PCB Layout Complete and Approved	GLV.5.2		Max							
3	Pi2CAN GPIO Board PCB Purchase Order Approved and Submitted	GLV.5.3		Max							
3	Pi2CAN GPIO Board Acquired	GLV.5.4		Max							
3	Pi2CAN GPIO Board Installed on Pi / GLV Mount	GLV.5.5		Max							
3	Pi2CAN GPIO Board tested with CAN Shield for all GPIO Pin Functionality	GLV.5.6	Make sure all of the GPIO Pins are still usable with the CAN Shield sitting on top	Max							
3	RTC Attached to GPIO Board and is Accessable by SCADA	GLV.5.7	SCADA Can demo this by accessing the RTC and producing data related to this functionality	Max							
3	Dashboard Panel Block Diagram Delivered	GLV.6.1		Max							
3	Dashboard Panel BoM Purchase Order Approved and Purchased	GLV.6.2		Max							
3	Dashboard Panel Mechanical Drawing Submitted to Machine Shop	GLV.6.3									
3	Dashboard Panel Fabricated and Wired with Needed Buttons / Switches	GLV.6.4									
3	Dashboard Panel Installed in Dyno Room	GLV.6.5									
3	GLV Enclosure Mechanical Drawing Delivered	GLV.7.1		Max	9/30/18		14.3	#REF!			
3	GLV Board Installed in Enclosure	GLV.7.2	All wiring connecting GLV to box parts completed	Max			14.3	#REF!			
3	GLV Dashboard Display Installed	GLV.7.3		Max			14.3	#REF!			
3	GLV Dash Display Tested and Approved	GLV.7.4		Max			14.3	#REF!			

WBS Level	WBS Item	WBS Number	Description	Owner	Est. Completion	Completion Date	evel Up Completi	Project Completi	vel Up Progress (	oject Progress (%	Notes
2	Cooling System Manufactured	COOL.1		Hongbo	12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	Cooling System Installed in DYNO Room	COOL.2		Hongbo	12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	Liquid Cooling System Connected to MCS and Motor	COOL.3		Hongbo	12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	Cooling System Communicating with TSI	COOL.4		Hongbo	12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00	
2	Cooling System Communicating with VSCADA	COOL.5		Hongbo	11/11/2018	12/30/1899	75.00	#REF!	0.00	0.00	
2	Cooling Interconnect	COOL.6		Hongbo	11/11/2018	12/30/1899	25.00	#REF!	0.00	0.00	
3	Mechanical Drawing of Mounting Delivered	COOL.1.1		Hongbo							
3	Block Diagram of Cooling System Delivered and Approved	COOL.1.2		Hongbo							
3	Electrical Schematic Delivered and Approved	COOL.1.3		Hongbo							
3	Controller Algorithm Delivered and Approved	COOL.1.4		Hongbo							
3	Mechanical System Fabricated and Assembled	COOL.1.5		Hongbo							
3	Controller and Mechanical System Testing Plan Delivered	COOL.1.6		Hongbo							
3	Cooling System Tested Against Testing Plan	COOL.1.7		Hongbo							
3	Cooling loop filled with water and tested for leaks	COOL.2.1		Hongbo							
3	Leaks in loop identified and repaired	COOL.2.2		Hongbo							
3	Cooling System mounted on Fixture in Dyno Room	COOL.2.3		Hongbo							
3	Cooling System Loop connected to Motor Controller	COOL.3.1	See also PART.6.5, WIRE.3.14	Hongbo							
3	Cooling Loop connected to Motor	COOL.3.2	If not using liquid cooling for motor, ignore this item, See al	Hongbo							
3	Demo of cooling loop passing water through all of the connected items	COOL.3.3		Hongbo							
3	Cooling ICD Delivered	COOL.4.1		Hongbo							
3	Cooling Wiring Diagram Delivered	COOL.4.2		Hongbo							
3	Cooling Wiring Delivered and Accepted	COOL.4.3		Hongbo							
3	Cooling Connected to TSI via CAN	COOL.4.4	See also PART.6.6, WIRE.3.2, TSI.5.6	Hongbo							
3	Cooling Connected to VSCADA via CAN	COOL.4.5	See also SCADA.5.1	Hongbo							
3	Cooling Connected to GLV	COOL.4.6	See alsos WIRE.3.8, GLV.4.7	Hongbo							
3	Cooling Connected to Safety Loop	COOL.4.7		Hongbo							
3	Communication Protocol Developed and Delivered	COOL.5.1		Hongbo	11/4/2018		25	#REF!			
3	Communication Implemented Between COOLING-SCADA	COOL.5.2		Hongbo	11/11/2018		25	#REF!			
3	Communication Implemented Between COOLING-TSI	COOL.5.3		Hongbo	11/11/2018		25	#REF!			
3	Demo of Communication Capabilities	COOL.5.4		Hongbo	11/11/2018		25	#REF!			

WBS Level	WBS Item	WBS Number	Description	Owner	Est. Completion	Completion Date	evel Up Completi	Project Completio	vel Up Progress (	oject Progress (%)
2	Mechanical Drawing, Schematic, and Delivered Physical Pack	TSV.1		Brian	12/30/1899	12/30/1899	0	#REF!	0	0
2	CellMen Boards designed, fabricated, and tested	TSV.2		Yishak	12/30/1899	12/30/1899	0	#REF!	0	0
2	PackMan boards are designed, fabricated, and tested	TSV.3		Hayden				#REF!	0	0
2	ChargeMan boards designed, fabricated, and tested	TSV.4		Yishak				#REF!	0	0
2	State of Charge Algorithm Implemented	TSV.5		Clement				#REF!	0	0
2	TSV Interconnect	TSV.6		Hayden				#REF!	0	0
3	Pack High Level Electrical Block Diagram Delivered and Accepted	TSV.1.1		Hayden						
3	Pack Mechanical Drawing Submitted and Accepted	TSV.1.2		Hayden						
3	Pack BoM Purchase Order Approved and Purchased	TSV.1.3		Hayden						
3	Pack 1 Enclosure Fabricated	TSV.1.4		Hayden						
3	Pack 2 Enclosure Fabricated	TSV.1.5		Hayden						
3	Pack Testing Plan Submitted and Approved	TSV.1.6		Hayden						
3	Pack 1 Populated and Verified with Testing Plan	TSV.1.7		Hayden						
3	Pack 2 Populated and Verified with Testing Plan	TSV.1.8		Hayden						
3	Demo of Pack 1 Functionality with Testing Plan	TSV.1.9		Hayden						
3	Demo of Pack 2 Functionality with Testing Plan	TSV.1.10		Hayden						
3	CellMen Block Diagram Delivered and Approved	TSV.2.1		Hayden						
3	CellMen Circuit Schematic Delivered and Approved	TSV.2.2								
3	CellMen PCB Layout Complete and Approved	TSV.2.3								
3	CellMen BoM Purchase Order Approved and Purchased	TSV.2.4								
3	CellMen Purchased and Delivered	TSV.2.5								
3	CellMen Boards Populated and Verified	TSV.2.6								
3	1st CellMen Board Debugged and Tested	TSV.2.7								
3	CellMen Testing Plan Delivered	TSV.2.8								
3	CellMen Boards Debugged and Tested	TSV.2.9								
3	PackMan Block Diagram Delivered and Approved	TSV.3.1								
3	PackMan Circuit Schematic Delivered and Approved	TSV.3.2								
3	PackMan PCB Layout Complete and Approved	TSV.3.3								
3	PackMan BoM Purchase Order Approved and Purchased	TSV.3.4								
3	PackMan Purchased and Delivered	TSV.3.5								
3	PackMan Populated and Verifed	TSV.3.6								
3	PackMan Testing Plan Delivered	TSV.3.7								
3	PackMan Boards Debugged and Tested	TSV.3.8								
3	ChargeMan Block Diagram Delivered and Approved	TSV.4.1								
3	ChargeMan Circuit Schematic Delivered and Approved	TSV.4.2								
3	ChargeMan PCB Layout Complete and Approved	TSV.4.3								
3	ChargeMan Purchased and Delivered	TSV.4.4								
3	ChargeMan Populated and Verified	TSV.4.5								
3	ChargeMan Testing Plan Delivered	TSV.4.6								
3	ChargeMan Boards Debugged and Tested	TSV.4.7								
3	Pseudo Code for Algorithm Delivered	TSV.5.1								
3	Testing Plan for SOC Algorithm Delivered and Approved	TSV.5.2								
3	SOC Algorithm Implemented and Verified	TSV.5.3								
3	Testing Plan for SOC-CellMan Integration Delivered and Approved	TSV.5.4								
3	SOC-CellMen Verified Against Testing Plan	TSV.5.5								
3	TSV and GLV Connected	TSV.6.1	See also GLV.4.6, WIRE.3.9							
3	TSV and MCS Connected	TSV.6.2	See also WIRE.3.11, PART.6.8							
3	TSV and TSI Connected	TSV.6.3	See also WIRE.3.5, TSI.5.4							

WBS Level	WBS Item	WBS Number	Description	Owner	Est. Completion	Completion Date	evel Up Complet	Project Complet	evel Up Progress (	oject Progress (%)
2	Motor Testing Plan Complete and Performed	TEST.1		Hayden	12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00
2	GLV Testing Plan Complete and Performed	TEST.2		Hayden	12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00
2	TSI Testing Plan Complete and Performed	TEST.3		Hayden	12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00
2	TSV Testng Plan Complete and Performed	TEST.4		Hayden	12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00
2	SCADA Testing Plan Complete and Performed	TEST.5		Hayden	12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00
2	Full System Testing Plan Complete and Performed	TEST.6		Hayden	12/30/1899	12/30/1899	0.00	#REF!	0.00	0.00
3	List of tests to be performed on motor detailed with specific desired outcomes printed and posted in Test Plan Binder	TEST.1.1	List of all the tests to be done on the motor with some outcome that you expect to get from the test	Hayden						
3	Risk assessment of each test for motor produced with solution plan for failure	TEST.1.2	If something should fail a test, how will it be fixed? Will it be retested? Is it critical that this is fixed?	Hayden						
3	Tests performed on motor according to testing plan	TEST.1.3		Hayden						
3	Testing Analysis of Motor Testing Data complete and submitted	TEST.1.4	Document summarising results of the tests from the motor compared to testing plan	Hayden						
3	Retesting of Motor following adjustments to meet desired test outcomes	TEST.1.5	If something failed a test and is determined to need retesting, do so here	Hayden						
3	List of tests to be performed on GLV detailed with specific desired outcomes printed and posted in Test Plan Binder	TEST.2.1	List of all the tests to be done on the GLV with some outcome that you expect to get from the test	Hayden						
3	Risk assessment of each test for GLV produced with solution plan for failure	TEST.2.2	If something should fail a test, how will it be fixed? Will it be retested? Is it critical that this is fixed?	Hayden						
3	Tests performed on GLV according to testing plan	TEST.2.3		Hayden						
3	Testing Analysis of GLV Testing Data complete and submitted	TEST.2.4	Document summarising results of the tests from the GLV compared to testing plan	Hayden						
3	Retesting of GLV following adjustments to meet desired test outcomes	TEST.2.5	If something failed a test and is determined to need retesting, do so here	Hayden						
3	List of tests to be performed on TSI detailed with specific desired outcomes printed and posted in Test Plan Binder	TEST.3.1	List of all the tests to be done on the TSI with some outcome that you expect to get from the test	Hayden						
3	Risk assessment of each test for TSI produced with solution plan for failure	TEST.3.2	If something should fail a test, how will it be fixed? Will it be retested? Is it critical that this is fixed?	Hayden						
3	Tests performed on TSI according to testing plan	TEST.3.3		Hayden						
3	Testing Analysis of TSI Testing Data complete and submitted	TEST.3.4	Document summarising results of the tests from the TSI compared to testing plan	Hayden						
3	Retesting of TSI following adjustments to meet desired test outcomes	TEST.3.5	If something failed a test and is determined to need retesting, do so here	Hayden						
3	List of tests to be performed on TSV detailed with specific desired outcomes printed and posted in Test Plan Binder	TEST.4.1	List of all the tests to be done on the TSV with some outcome that you expect to get from the test	Hayden						
3	Risk assessment of each test for TSV produced with solution plan for failure	TEST.4.2	If something should fail a test, how will it be fixed? Will it be retested? Is it critical that this is fixed?	Hayden						
3	Tests performed on TSV according to testing plan	TEST.4.3		Hayden						
3	Testing Analysis of TSV Testing Data complete and submitted	TEST.4.4	Document summarising results of the tests from the TSV compared to testing plan	Hayden						
3	Retesting of TSV following adjustments to meet desired test outcomes	TEST.4.5	If something failed a test and is determined to need retesting, do so here	Hayden						
3	List of tests to be performed on SCADA detailed with specific desired outcomes printed and posted in Test Plan Binder	TEST.5.1	List of all the tests to be done on the SCADA with some outcome that you expect to get from the test	Hayden						
3	Risk assessment of each test for SCADA produced with solution plan for failure	TEST.5.2	If something should fail a test, how will it be fixed? Will it be retested? Is it critical that this is fixed?	Hayden						
3	Tests performed on SCADA according to testing plan	TEST.5.3		Hayden						
3	Testing Analysis of SCADA Testing Data complete and submitted	TEST.5.4	Document summarising results of the tests from the SCADA compared to testing plan	Hayden						
3	Retesting of SCADA following adjustments to meet desired test outcomes	TEST.5.5	If something failed a test and is determined to need retesting, do so here	Hayden						
3	List of tests to be performed on Full Dyno detailed with specific desired outcomes printed and posted in Test Plan Binder	TEST.6.1	List of all the tests to be done on the Full Dyno with some outcome that you expect to get from the test	Hayden						
3	Risk assessment of each test for Full Dyno produced with solution plan for failure	TEST.6.2	If something should fail a test, how will it be fixed? Will it be retested? Is it critical that this is fixed?	Hayden						
3	Tests performed on Full Dyno according to testing plan	TEST.6.3		Hayden						
3	Testing Analysis of Full Dyno Testing Data complete and submitted	TEST.6.4	Document summarising results of the tests from the Full Dyno compared to testing plan	Hayden						
3	Retesting of Full Dyno following adjustments to meet desired test outcomes	TEST.6.5	If something failed a test and is determined to need retesting, do so here	Hayden						

WBS Level	WBS Item	WBS Number	Description	Owner	Est. Completion	Completion Date	evel Up Completi	Project Completio	vel Up Progress (	roject Progress (%	Notes
2	Pedal Manufactured and Installed in DYNO Room	PEDAl.1			12/30/1899	12/30/1899	0.00%	#REF!	0.00%	0.00%	
2	Pedal Interconnect	PEDAL.2			12/30/1899	12/30/1899	0.00%	#REF!	0.00%	0.00%	
3	Pedal Pivot Collar Designed and Approved	PEDAL.1.1									
3	Pedal Pivot Collar Manufactured	PEDAL.1.2									
3	Pedal Pivot Collar Installed	PEDAL.1.3									
3	Pedal Pivot Shaft Designed and Approved	PEDAL.1.4									
3	Pedal Pivot Shaft Manufactured	PEDAL.1.5									
3	Pedal Pivot Shaft Installed	PEDAL.1.6									
3	Potentiometer Purchased and Installed	PEDAL.1.7									
3	Pedal Mount Designed and Approved	PEDAL.1.8									
3	Pedal Mount Manufactured	PEDAL.1.9									
3	Pedal Mount Installed	PEDAL.1.10									
3	Accelerator Pedal Spring Spec'd and Purchased	PEDAL.1.11									
3	Accelerator Pedal Spring Installed	PEDAL.1.12									
3	Pedal-Throttle Fixture and TSI Connect	PEDAL.2.1	See also TSI.3.6								
3	Pedal Cluster and VSCADA Communicating via CAN	PEDAL.2.2	VSCADA will be connected to TSI; See also TSI.5.7, WIRE.3.3								

WBS Level	WBS Item	WBS Number	Description	Owner	Est. Completion	Completion Date	evel Up Complet	Total Project Completion (%)	vel Up Progress	oject Progress (%)
2	Dyno Room Wiring Diagram Completed and Posted in Workspaces	WIRE.1	Detailed wiring diagram describing connections between subsystems drawn and printed for reference when wiring system	Drew	12/30/1899	12/30/1899	0.00%	#REF!	0.00%	0.00%
2	Dyno Room Wiring Materials Purchased and/or Produced	WIRE.2	All materials for the wiring between all subsystems purchased and ready for connecting all subsystems together	Drew	12/30/1899	12/30/1899	0.00%	#REF!	0.00%	0.00%
2	All Subsystems connected together according to Wiring Diagram	WIRE.3	All systems wired correctly according to the wiring diagram and verified to make sure that	Weston	12/30/1899	12/30/1899	0.00%	#REF!	0.00%	0.00%
3	Dyno Room Wiring Diagram Complete	WIRE.1.1								
3	Dyno Room Wiring Diagram Printed and Posted in AEC 400	WIRE.1.2								
3	Dyno Room Wiring Diagram Printed and Posted in AEC 134	WIRE.1.3								
3	Full Wiring BoM Submitted and Approved	WIRE.2.1								
3	Full Wiring BoM Purchase Order Submitted and Approved	WIRE.2.2								
3	TSI - MCS Wires Complete	WIRE.2.3								
3	TSI - Cooling Wires Complete	WIRE.2.4								
3	TSI - Pedal Throttle Fixture Wires Complete	WIRE.2.5								
3	TSI - Test Panel Wires Complete	WIRE.2.6								
3	TSI - TSV Wires Complete	WIRE.2.7								
3	GLV - Safety Loop Wires Complete	WIRE.2.8								
3	GLV - TSI Wires Complete	WIRE.2.9								
3	GLV - Cooling Wires Complete	WIRE.2.10								
3	GLV - TSV Wires Complete	WIRE.2.11								
3	Safety Loop Panels - Dyno Supply Wires Complete	WIRE.2.12								
3	TSI - MCS Connected	WIRE.3.1	See also TSI.5.1, PART.6.4							
3	TSI - Cooling Connected	WIRE.3.2	See also TSI.5.6, PART.6.6, COOL.4.4							
3	TSI - Pedal Throttle Fixture Connected	WIRE.3.3	See also TSI.5.7, PEDAL.2.2							
3	TSI - Test Panel Connected	WIRE.3.4	See also TSI.5.2							
3	TSI - TSV Connected	WIRE.3.5	See also TSI.5.4, TSV.6.3							
3	GLV - Safety Loop Connected	WIRE.3.6	See also GLV.4.8							
3	GLV - TSI Connected	WIRE.3.7	See also TSI.5.3, GLV.4.5							
3	GLV - Cooling Connected	WIRE.3.8	See also GLV.4.7, COOL.4.7							
3	GLV - TSV Connected	WIRE.3.9	See also GLV.4.6, TSV.6.1							
3	Safety Loop Panels - Dyno Supply Connected	WIRE.3.10	See also GLV.4.8							
3	TSV - Motor Controller Connected	WIRE.3.11	See also TSV.6.2, PART.6.8							
3	MCS and Motor Connected	WIRE.3.12	See also PART.6.3							
3	Cooling System and Motor Connected	WIRE.3.13	See also PART.6.7, COOL.3.2							
3	Cooling System and MCS Connected	WIRE.3.14	See also PART.6.5, COOL.3.1							