

Preliminary Design Review				Team 5160		Total PDR Score: 97.87%			
Judge 1		Score	Comments	Judge 2		Score	Comments		
Introduction	Expectations			Introduction	Expectations				
Presentation Outline	Identify all major sections with page numbers	2		Presentation Outline	Identify all major sections with page numbers	2			
Team Organization	Show organization of team. No more than 10 students allowed. Faculty not counted.	2		Team Organization	Show organization of team. No more than 10 students allowed. Faculty not counted.	2			
Acronyms	List of words and abbreviations with definitions.	2		Acronyms	List of words and abbreviations with definitions.	2			
Systems Overview				Systems Overview					
Mission Summary	Description of mission. Copying from the guide is fine.	2		Mission Summary	Description of mission. Copying from the guide is fine.	2			
System Requirement Summary	List of high level requirements. Deployment, events at specific altitudes, mode of descent.	2		System Requirement Summary	List of high level requirements. Deployment, events at specific altitudes, mode of descent.	2			
System-Level CanSat Configuration Trade & Selection				System-Level CanSat Configuration Trade & Selection					
Configuration A, with diagrams	Picture and description of overall structure showing payload descent method, container.	2		Configuration A, with diagrams	Picture and description of overall structure showing payload descent method, container.	2			
Configuration B, with diagrams	Same as above but has to be different design.	2		Configuration B, with diagrams	Same as above but has to be different design.	2			
Selection and rationale	Identifies selection and provides a list of reasons for selection.	2		Selection and rationale	Identifies selection and provides a list of reasons for selection.	2			
Physical Layout				Physical Layout					
Dimensions	Picture of payload showing dimensions of structure and any significant structure. Picture and dimensions of container.	2		Dimensions	Picture of payload showing dimensions of structure and any significant structure. Picture and dimensions of container.	2			
Placement of Major Components	Shows location of electronic components, batteries, GPS antenna, radio antenna, actuators.	2		Placement of Major Components	Shows location of electronic components, batteries, GPS antenna, radio antenna, actuators.	2			
Launch Configuration	Shows payload inside container with any parts that need stowing in stowed position.	2		Launch Configuration	Shows payload inside container with any parts that need stowing in stowed position.	2			
Deployed Configuration	Shows payload outside of container with all parts deployed.	2		Deployed Configuration	Shows payload outside of container with all parts deployed.	2			
System Concept of Operations	Description of flight operations from launch to landing and all the steps in between.	2		System Concept of Operations	Description of flight operations from launch to landing and all the steps in between.	2			
Launch Vehicle Compatibility	Shows or indicates overall dimensions of cansat and compares to envelope dimensions provided in guide.	2		Launch Vehicle Compatibility	Shows or indicates overall dimensions of cansat and compares to envelope dimensions provided in guide.	2			
Sensor Subsystem Design				Sensor Subsystem Design					
Sensor Subsystem Overview	Brief description of sensors	2		Sensor Subsystem Overview	Brief description of sensors	2			
Sensor Subsystem Requirements	List all requirements related to sensors	2		Sensor Subsystem Requirements	List all requirements related to sensors	2			
Payload Air Pressure Sensor Trade & Selection				Payload Air Pressure Sensor Trade & Selection					
Trade (2 or more sensors)	Show 2 different air pressure sensors with specs for each.	2		Trade (2 or more sensors)	Show 2 different air pressure sensors with specs for each.	2			
Selection (with criteria)	Selection made and reasons provided	2	Altitude is in meters?	Selection (with criteria)	Selection made and reasons provided	2			
Payload Air Temperature Sensor Trade & Selection				Payload Air Temperature Sensor Trade & Selection					
Trade (2 or more sensors)	Show at least 2 different temp. sensors with specs for each.	2		Trade (2 or more sensors)	Show at least 2 different temp. sensors with specs for each.	2			
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2			
GPS Sensor Trade & Selection				GPS Sensor Trade & Selection					
Trade (2 or more sensors)	Show at least 2 GPS units with specs.	2		Trade (2 or more sensors)	Show at least 2 GPS units with specs.	2			
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2			
Payload Power Voltage Sensor Trade & Selection				Payload Power Voltage Sensor Trade & Selection					
Trade (2 or more sensors)	Show at least 2 different Payload power voltage sensors with specs for each.	2		Trade (2 or more sensors)	Show at least 2 different Payload power voltage sensors with specs for each.	2			
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2			
Air Speed Sensor				Air Speed Sensor					
Trade (2 or more sensors)	Show at least 2 different air speed sensors with specs for each.	2		Trade (2 or more sensors)	Show at least 2 different air speed sensors with specs for each.	2			
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2			
Particulate/Dust Sensor				Particulate/Dust Sensor					
Trade (2 or more sensors)	Show at least 2 different particulate/dust sensors with specs for each	2	Is any calibration needed?	Trade (2 or more sensors)	Show at least 2 different particulate/dust sensors with specs for each	2			
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2			
Container Air Pressure Sensor Trade and Selection				Container Air Pressure Sensor Trade and Selection					
Trade (2 or more sensors)	Show at least 2 different air pressure sensors for the container, with specs for each or statement that none is used.	2		Trade (2 or more sensors)	Show at least 2 different air pressure sensors for the container, with specs for each	2			
Selection (with criteria)	Selection made and reasons provided or statement none is used.	2		Selection (with criteria)	Selection made and reasons provided	2			
Descent Control Subsystem Design				Descent Control Subsystem Design					
Descent Control Subsystem Overview	Overview of selected descent control configuration for container and payload.	2		Descent Control Subsystem Overview	Overview of selected descent control configuration for container and payload.	2			
Descent Control Requirements	List of all requirements related to descent control.	2		Descent Control Requirements	List of all requirements related to descent control.	2			

Payload Descent Control Strategy Selection and Trade				Payload Descent Control Strategy Selection and Trade			
Descent Control Strategy Trade (Pre payload deployment, 2 or more	Show at least two different strategies	2		Descent Control Strategy Trade (Pre payload deployment, 2 or more	Show at least two different strategies	2	
Descent Control Strategy Trade (Post payload deployment, 2 or more	Show at least two different strategies	2	Why is design high cost but scored higher in cost	Descent Control Strategy Trade (Post payload deployment, 2 or more	Show at least two different strategies	2	
	Selection made and reasons provided	2			Selection made and reasons provided	2	
Descent Stability Control Strategy Selection and Trade				Descent Stability Control Strategy Selection and Trade			
Type of stability control identified (passive or active)	Identify the type of stability control	2		Type of stability control identified (passive or active)	Identify the type of stability control	2	
Description of stability control, how is nadir direction maintained	Show/explain how stability is	2		Description of stability control, how is nadir direction maintained	Show/explain how stability is	2	
Trade (2 or more strategies)	Show at least 2 methods	2		Trade (2 or more strategies)	Show at least 2 methods	2	
Selection (with criteria)	Selection made and reasons	2		Selection (with criteria)	Selection made and reasons provided	2	
Descent Rate Estimates				Descent Rate Estimates			
	Show how the descent rate in m/sec for the container and payload were calculated	2			Show how the descent rate in m/sec for the container and payload were calculated	2	
Container + Payload (post rocket separation, with clear final results)				Container + Payload (post rocket separation, with clear final results)			
	Show how the descent rate in m/sec for the container after release of the payload is calculated	2	Why are densities different here?		Show how the descent rate in m/sec for the container after release of the payload is calculated	2	
	Show how the descent rate in m/sec for the payload after release is calculated	2			Show how the descent rate in m/sec for the payload after release is calculated	2	
Payload (following separation from container, with clear final results)				Payload (following separation from container, with clear final results)			
	Show how the descent rate in m/sec for the payload after release is calculated	2			Show how the descent rate in m/sec for the payload after release is calculated	2	
Payload with parachute released.				Payload with parachute released.			
Mechanical Subsystem Design				Mechanical Subsystem Design			
	Overview of selected mechanical configuration for container and payload.	2			Overview of selected mechanical configuration for container and payload.	2	
Mechanical Subsystem Overview				Mechanical Subsystem Overview			
	List of all requirements related to mechanical design.	2			List of all requirements related to mechanical design.	2	
Mechanical Subsystem Requirements				Mechanical Subsystem Requirements			
Payload Mechanical Layout of Components Trade & Selection				Payload Mechanical Layout of Components Trade & Selection			
	Should show major components and where they are located. Should not be a list of materials.	2			Should show major components and where they are located. Should not be a list of materials.	2	
			How are you deciding how much tension to put on the springs? Explain a little about differences how cost per design is different here than in system Level Configuration Overview (slide 18)				
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2	
Payload Pre Deployment Config. Trade & Selection				Payload Pre Deployment Config. Trade & Selection			
How stowed configuration is maintained: Trade & Selection (2 or more	Should show 2 strategies of how the	2	Carbon fiber and what?	How stowed configuration is maintained: Trade & Selection (2 or more	Should show 2 strategies of how the	2	
	Selection made and reasons provided	2			Selection made and reasons provided	2	
Selection (with criteria)				Selection (with criteria)			
Payload Deployment Configuration Trade and Selection				Payload Deployment Configuration Trade and Selection			
	Show at least 2 strategies used in the selection of the payload deployment configuration.	2			Show at least 2 strategies used in the selection of the payload deployment configuration.	2	
Trade (2 or more strategies)				Trade (2 or more strategies)			
	Selection made and reasons provided	2			Selection made and reasons provided	2	
Selection (with criteria)				Selection (with criteria)			
Container Mechanical Layout of Components Trade and Selection				Container Mechanical Layout of Components Trade and Selection			
			Where are material values from? Is this per fiber, per tow, per ply? How do you think the chosen resin affects the material properties in this analysis? How is cost considered here and throughout, is 10 the cheapest?				
Trade (2 or more strategies)				Trade (2 or more strategies)			
	Selection made and reasons provided	2			Selection made and reasons provided	2	
Selection (with criteria)				Selection (with criteria)			
Payload Release Mechanism				Payload Release Mechanism			
			For how long is wire heated? What is the configuration of the wire, is it attached to something on the inside?				
Design (with diagrams)	Show mechanism used to hold and release payload from container	2		Design (with diagrams)	Show mechanism used to hold and release payload from container	2	
Operation description	Explain how the release works.	2		Operation description	Explain how the release works.	2	
Container Parachute Release Mechanism				Container Parachute Release Mechanism			
	Show design of container attachment mechanism. Should be a simple device where the parachute is attached. Should be passive.	2			Show design of container attachment mechanism. Should be a simple device where the parachute is attached. Should be passive.	2	
Attachement to Payload design				Attachement to Payload design			
	Release mechanism design	2			Release mechanism design	2	
Release mechanism design	Explain how it works.	2		Release mechanism design	Explain how it works.	2	
			Come back to this if not presented later, any wiring and how it is managed				
Electronics Structural Integrity	Explain how parts will be secured so nothing breaks during flight.	2		Electronics Structural Integrity	Explain how parts will be secured so nothing breaks during flight.	2	
Mass Budget				Mass Budget			
Mass of all components	A complete list of all of the components and their mass in grams	2		Mass of all components	A complete list of all of the components and their mass in grams	2	
Mass of all structural elements	A complete list of all of the structural components and their mass in grams	2	Do wings take into account hinges?	Mass of all structural elements	A complete list of all of the structural components and their mass in grams	2	
Sources or uncertainties	Must document sources of and any uncertainties	2		Sources or uncertainties	Must document sources of and any uncertainties	2	
Total Mass	Must document the total masses of components and structural elements	2		Total Mass	Must document the total masses of components and structural elements	2	
Margin (with methods for correction)	Mass requirement - Total Mass = Margin. Document the method(s) of correction.	1	How will you correct weight once you are assembling and you are under? Topology optimization is part of early design.	Margin (with methods for correction)	Mass requirement - Total Mass = Margin. Document the method(s) of correction.	1	
C&DH Subsystem Design				C&DH Subsystem Design			
CDH Overview	Overview of selected components	2		CDH Overview	Overview of selected components	2	
Payload CDH Requirements	List of all requirements related to C&DH.	2		Payload CDH Requirements	List of all requirements related to C&DH.	2	
Payload Processor and Memory Trade & Selection				Payload Processor and Memory Trade & Selection			
Processor selections (including processor speed)	Include: boot time, processor speed	2		Processor selections (including processor speed)	Include: boot time, processor speed	2	
Memory selections (including memory storage requirements, if applicable)		2		Memory selections (including memory storage requirements, if applicable)		2	
	Should include the type of pin (GPIO, Analog, Digital, etc.), if it is an input or output, and how many of that type of pin are available.	2			Should include the type of pin (GPIO, Analog, Digital, etc.), if it is an input or output, and how many of that type of pin are available.	2	
Data Interfaces (types and numbers)				Data Interfaces (types and numbers)			
	At least two processor & memory configurations presented	2			At least two processor & memory configurations presented	2	
Trade (2 or more)				Trade (2 or more)			

Selection (with criteria)	Indicate which selection and why it was chosen	2		Selection (with criteria)	Indicate which selection and why it was chosen	2	
Payload Real-Time Clock				Payload Real-Time Clock			
Trade (2 or more)	Can be hardware or software. Purpose is for software recovery in case of a system reset.	2		Trade (2 or more)	Can be hardware or software. Purpose is for software recovery in case of a system reset.	2	
Selection (with criteria)	Indicate which selection and why it was chosen	2		Selection (with criteria)	Indicate which selection and why it was chosen	2	
Payload Antenna Trade & Selection				Payload Antenna Trade & Selection			
Trade (2 or more)	Include range and radiation pattern.	2		Trade (2 or more)	Include range and radiation pattern.	2	
Selection (with criteria)	Indicate which selection and why it was chosen	2		Selection (with criteria)	Indicate which selection and why it was chosen	2	
Payload Radio Configuration				Payload Radio Configuration			
XBEE Radio Selection	XBEE radio selection, and NETID	2		XBEE Radio Selection	XBEE radio selection, and NETID	2	
Discussion of Transmission Control	How often is data transmitted, how does landing handled for end of transmission?	2		Discussion of Transmission Control	How often is data transmitted, how does landing handled for end of transmission?	2	
Payload Telemetry Format	Team must show an example of data transmission matching data format from section 3.3 in Mission Guide	2		Payload Telemetry Format	Team must show an example of data transmission matching data format from section 3.3 in Mission Guide	2	
Container CDH Requirements		2		Container CDH Requirements		2	
Container Processor and Memory Trade & Selection				Container Processor and Memory Trade & Selection			
Processor selections (including processor speed)	Include: boot time, processor speed	2	PCB coverage? Any concerns with shorts and contamination?	Processor selections (including processor speed)	Include: boot time, processor speed	2	
Memory selections (including memory storage requirements, if applicable)	Identify possible memory devices for storing data as a backup.	2		Memory selections (including memory storage requirements, if applicable)	Identify possible memory devices for storing data as a backup.	2	
Data Interfaces (types and numbers)	Should include the type of pin (GPIO, Analog, Digital, etc.), if it is an input or output, and how many of that type of pin are available.	2		Data Interfaces (types and numbers)	Should include the type of pin (GPIO, Analog, Digital, etc.), if it is an input or output, and how many of that type of pin are available.	2	
Trade (2 or more)	At least two processor & memory configurations presented	2		Trade (2 or more)	At least two processor & memory configurations presented	2	
Selection (with criteria)		2		Selection (with criteria)		2	
Electrical Power Subsystem Design				Electrical Power Subsystem Design			
EPS Overview	Overview of EPS, diagram and components	2		EPS Overview	Overview of EPS, diagram and components	2	
EPS Requirements	List of all requirements related to EPS.	2		EPS Requirements	List of all requirements related to EPS.	2	
Payload Electrical Block Diagram	High-level schematic, including voltages and major components	2		Payload Electrical Block Diagram	High-level schematic, including voltages and major components	2	
Payload Power Trade & Selection				Payload Power Trade & Selection			
Battery selection	No lithium-polymer; a lithium-polymer selection shouldn't be counted as a valid selection	2		Battery selection	No lithium-polymer; a lithium-polymer selection shouldn't be counted as a valid selection	2	
Battery configuraiton (series/parallel/other configurations)		2		Battery configuration (series/parallel/other configurations)		2	
Trade (2 or more)	Show at least two types of batteries	2		Trade (2 or more)	Show at least two types of batteries	2	
Selection (with criteria)		2		Selection (with criteria)		2	
Payload Power Budget	All power consumption should be in watt hours (Wh) only	1	Battery power capacity calculation	Payload Power Budget	All power consumption should be in watt hours (Wh) only	1	Battery power capacity is not correct.
Container Electrical Block Diagram	All power consumption should be in watt hours (Wh) only	2		Container Electrical Block Diagram	All power consumption should be in watt hours (Wh) only	2	
Container Power Trade & Selection	<i>Team must indicate in slides below if they do not have electronics in the container</i>			Container Power Trade & Selection	<i>Team must indicate in slides below if they do not have electronics in the container</i>		
Battery selection	No lithium-polymer; a lithium-polymer selection shouldn't be counted as a valid selection	2		Battery selection	No lithium-polymer; a lithium-polymer selection shouldn't be counted as a valid selection	2	
Battery configuraiton (series/parallel/other configurations)	Must indicate if parallel, serial or none because only a single cell is used.	2		Battery configuration (series/parallel/other configurations)	Must indicate if parallel, serial or none because only a single cell is used.	2	
Trade (2 or more)	Show at least two types of batteries	2		Trade (2 or more)	Show at least two types of batteries	2	
Selection (with criteria)		2		Selection (with criteria)		2	
Container Power Budget	All power consumption should be in watt hours (Wh) only. Lose a point if team adds up currents.	1	Battery power capacity calculation	Container Power Budget	All power consumption should be in watt hours (Wh) only. Lose a point if team adds up currents.	1	Total power from battery is not correct.
Flight Software Design				Flight Software Design			
FSW Overview	Should discuss basic FSW architecture including a flowchart showing the software flow, programming languages, development environments and a brief summary of the FSW tasks.	2		FSW Overview	Should discuss basic FSW architecture including a flowchart showing the software flow, programming languages, development environments and a brief summary of the FSW tasks.	2	
FSW Requirements	A table showing the FSW sub-system requirements. It should indicate which competition guide requirements are allocated to the subsystem and any derived requirements	2		FSW Requirements	A table showing the FSW sub-system requirements. It should indicate which competition guide requirements are allocated to the subsystem and any derived requirements	2	
Payload FSW State Diagram	Software state diagrams for payload defining the states and transition conditions of the flight software. Also include sampling of sensors with rates, communications, data storage, mechanism activations, major decision points in the logic and power management.Should also include FSW recovery to correct state after processor reset during flight.	2		Payload FSW State Diagram	Software state diagrams for payload defining the states and transition conditions of the flight software. Also include sampling of sensors with rates, communications, data storage, mechanism activations, major decision points in the logic and power management.Should also include FSW recovery to correct state after processor reset during flight.	2	
Container FSW State Diagram	Software state diagrams for container defining states and transition conditions of the flight software. Or state no software for container	2		Container FSW State Diagram	Software state diagrams for container defining states and transition conditions of the flight software.	2	

Software Development Plan	The software development plan should include prototyping, software subsystem development sequence, development team and test methodology.	2		Software Development Plan	The software development plan should include prototyping, software subsystem development sequence, development team and test methodology.	2	
Ground Control System Design				Ground Control System Design			
GCS Overview	A simple context diagram showing major components	2		GCS Overview	A simple context diagram showing major components	2	
GCS Requirements	Overview of GCS requirements in tabular form. May be expanded to multiple charts as needed.	2		GCS Requirements	Overview of GCS requirements in tabular form. May be expanded to multiple charts as needed.	2	
GCS Design	Should have a diagram of the ground station, including components and how they connect	2		GCS Design	Should have a diagram of the ground station, including components and how they connect	2	
GCS Antenna Trade & Selection				GCS Antenna Trade & Selection			
Trade (show at least 2)	Should include antenna patterns	2		Trade (show at least 2)	Should include antenna patterns	2	
Discuss Antenna Mounting Design	Handheld or table top	2		Discuss Antenna Mounting Design	Handheld or table top	2	
Selection	Indicate selected design and reasons for selection.	2		Selection	Indicate selected design and reasons for selection.	2	
GCS Software	Should include telemetry display prototypes, commercial off the shelf software packages used, real time plotting software design, how the calibration command for the barometric sensor and row/pitch angles will be transmitted and verified, telemetry data recording and media presentation to judges, .csv telemetry file creation for judges.	2		GCS Software	Should include telemetry display prototypes, commercial off the shelf software packages used, real time plotting software design, how the calibration command for the barometric sensor and row/pitch angles will be transmitted and verified, telemetry data recording and media presentation to judges, .csv telemetry file creation for judges.	2	
CanSat Integration and Test				CanSat Integration and Test			
CanSat I&T Overview		2		CanSat I&T Overview		2	
Subsystem Level Test Plans	Description of the test plan(s) and how implemented	2		Subsystem Level Test Plans	Description of the test plan(s) and how implemented	2	
Integrated Level Functional Test Plans	Description of the test plan(s) and how implemented	2		Integrated Level Functional Test Plans	Description of the test plan(s) and how implemented	2	
Environmental Test Plans	Description of the test plan(s) and how implemented	2		Environmental Test Plans	Description of the test plan(s) and how implemented	2	
Mission Operations and Analysis				Mission Operations and Analysis			
Overview of Mission Sequence of Events	Should start with arrival at the launch site and proceed through recovery and data analysis	2		Overview of Mission Sequence of Events	Should start with arrival at the launch site and proceed through recovery and data analysis	2	
Mission Operations Manual Development Plan	Development and content of the MOM should be discussed.	2		Mission Operations Manual Development Plan	Development and content of the MOM should be discussed.	2	
CanSat Location and Recovery	How the Cansat container and payload will be located and recovered	2		CanSat Location and Recovery	How the Cansat container and payload will be located and recovered	2	
Requirements Compliance				Requirements Compliance			
Requirements Compliance Overview	Present in tabular form, with columns for the requirement number, description, and on which slide the requirements are discussed and met.	2		Requirements Compliance Overview	Present in tabular form, with columns for the requirement number, description, and on which slide the requirements are discussed and met.	2	
Complete Table (All 55 Requirements and All Columns)	All requirements should be present and numbered. There should be a column for the pages that show how they are meeting the requirement.	2		Complete Table (All 55 Requirements and All Columns)	All requirements should be present and numbered. There should be a column for the pages that show how they are meeting the requirement.	2	
Management				Management			
CanSat Budget - Hardware	All component with prices should be listed in a table	2		CanSat Budget - Hardware	All component with prices should be listed in a table	2	
CanSat Budget - Other Costs	All other costs should be listed in a table. There should be a table for overall cost of mission.	2		CanSat Budget - Other Costs	All other costs should be listed in a table. There should be a table for overall cost of mission.	2	
Program Schedule				Program Schedule			
Gantt Chart Summary (One Page showing Major Milestones)	One page Gantt chart showing only major milestones	2		Gantt Chart Summary (One Page showing Major Milestones)	One page Gantt chart showing only major milestones	2	
Gantt Chart or Table Summary Showing Full Schedule	Table or ANOTHER Gantt chart, which should include detail, including exams and school vacations	2		Gantt Chart or Table Summary Showing Full Schedule	Table or ANOTHER Gantt chart, which should include detail, including exams and school vacations	2	
Major Development Activities with Assignments Shown	Development activities should include team or team members assigned to each task	2		Major Development Activities with Assignments Shown	Development activities should include team or team members assigned to each task	2	
Conclusions		2		Conclusions		2	
Quality				Quality			
Quality of Powerpoint Presentation	Average is 7.	8		Quality of Powerpoint Presentation	Average is 7.	7	
Handling of Questions	Did the team answer the questions ask by the reviewer	2		Handling of Questions	Did the team answer the questions ask by the reviewer	2	