Preliminary Design Review — Team 1095

Total PDR Score: 70.51%

Judge 1	Expectations	Score	Comments	Judge 2	Expectations	Score	Comments			
Introduction				**Introduction**						
Presentation Outline	Identify all major sections with page numbers	2		Presentation Outline	Identify all major sections with page numbers	2		4	2	4
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		4	2	4
Acronyms	List of words and abbreviations with definitions.	2		Acronyms	List of words and abbreviations with definitions.	2		4	2	4
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		4	2	4
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		4	2	4
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.	1	missing pictures/diagrams	Configuration A, with diagrams	Picture and description of overall structure showing payload descent method, container.	1		2	2	4
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		4	2	4
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		4	2	4
Physical Layout				*Physical Layout*						
Dimensions	Picture of payload showing dimensions of structure and any significant structure. Picture and dimensions of container.	0	Slide number 23 is the template.	Dimensions	Picture of payload showing dimensions of structure and any significant structure. Picture and dimensions of container.	0		0	2	4
Placement of Major Components	Shows location of electronic components, batteries, GPS antenna, radio antenna, actuators.	0		Placement of Major Components	Shows location of electronic components, batteries, GPS antenna, radio antenna, actuators.	0		0	2	4
Launch Configuration	Shows payload inside container with any parts that need stowing in stowed position.	0		Launch Configuration	Shows payload inside container with any parts that need stowing in stowed position.	0		0	2	4
Deployed Configuration	Shows payload outside of container with all parts deployed.	0		Deployed Configuration	Shows payload outside of container with all parts deployed.	0		0	2	4
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		4	2	4
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		4	2	4
Sensor Subsystem Design				**Sensor Subsystem Design**						
Sensor Subsystem Overview	Brief description of sensors	2		Sensor Subsystem Overview	Brief description of sensors	2		4	2	4
Payload Air Pressure Sensor Trade and Selection				*Payload 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 or statement that none is used.	2		4	2	4
Selection (with criteria)	Selection made and reasons provided or statement none is used.	2		Selection (with criteria)	Selection made and reasons provided or statement none is used.	2		4	2	4
Payload Air Temperature Trade & Selection				*Payload Air Temperature Trade & Selection*						
Trade (2 or more sensors)	Show at least 2 different sensors with specs for each	2		Trade (2 or more sensors)	Show at least 2 different sensors with specs for each	2		4	2	4
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2		4	2	4
Payload Battery Voltage Sensor Trade & Selection				*Payload Battery Voltage Sensor Trade & Selection*						
Trade (2 or more sensors)	Show at least 2 different designs with specs for each	2		Trade (2 or more sensors)	Show at least 2 different designs with specs for each	2		4	2	4
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2		4	2	4
Payload Tilt Sensor Trade & Selection				*Payload Tilt Sensor Trade & Selection*						
Trade (2 or more sensors)	Show at least 2 different sensors with specs for each	2		Trade (2 or more sensors)	Show at least 2 different sensors with specs for each	2		4	2	4
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2		4	2	4
Payload GPS Sensor Trade & Selection				*Payload GPS Sensor Trade & Selection*						
Trade (2 or more sensors)	Show at least 2 different sensors with specs for each	2		Trade (2 or more sensors)	Show at least 2 different sensors with specs for each	2		4	2	4
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2		4	2	4
Payload Camera Trade & Selection				*Payload Camera Trade & Selection*						
Trade (2 or more sensors)	Show at least 2 different sensors with specs for each	2		Trade (2 or more sensors)	Show at least 2 different sensors with specs for each	2		4	2	4
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2		4	2	4
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		4	2	4
Container Descent Control Strategy Selection and Trade				*Container Descent Control Strategy Selection and Trade*						
Descent Control Strategy Trade (Pre payload deployment, 2 or more strategies)	Show at least two different strategies to control the descent of the container after deployment.	1	No visuals for the container stowed configuration	Descent Control Strategy Trade (Pre payload deployment, 2 or more strategies)	Show at least two different strategies to control the descent of the container after deployment.	1	missing pics?	2	2	4
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2		4	2	4
Payload Aerobraking Descent Control Strategy Selection and Trade				*Payload Aerobraking Descent Control Strategy Selection and Trade*						
Aerobraking descent control and design, 2 or more designs.	Show at least two different strategies for aerobraking.	1	If you're not going to use pictures, you need more description	Aerobraking descent control and design, 2 or more designs.	Show at least two different strategies for aerobraking.	1		2	2	4
Selection (with criteria)	Selection made and reasons provided	1		Selection (with criteria)	Selection made and reasons provided	1		2	2	4
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		4	2	4
Description of stability control, how is nadir direction maintained	Show/explain how stability is maintained. Keep the payload from swaying.	1		Description of stability control, how is nadir direction maintained	Show/explain how stability is maintained. Keep the payload from swaying.	1		2	2	4
Trade (2 or more strategies)	Show at least 2 methods	1	No discussion of how nadir direction is maintained	Trade (2 or more strategies)	Show at least 2 methods	1		2	2	4
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2		4	2	4
Payload Parachute Descent Control Strategy Selection and Trade				*Payload Parachute Descent Control Strategy Selection and Trade*						
Description of stability control, how is nadir direction maintained	Description of parachute designs, materials.	2		Description of stability control, how is nadir direction maintained	Description of parachute designs, materials.	2		4	2	4
Trade (2 or more strategies)	Show at least 2 designs	2		Trade (2 or more strategies)	Show at least 2 designs	2		4	2	4
Selection (with criteria)	Selection made and reasons provided	2		Selection (with criteria)	Selection made and reasons provided	2		4	2	4
Descent Rate Estimates				*Descent Rate Estimates*						

Item	Criteria	Score		Item	Criteria	Score	Comment			
Container descent rate with payload	Show how the descent rate in m/sec for the cansat with the parachute.	0		Container descent rate with payload	Show how the descent rate in m/sec for the cansat with the parachute.	0		0	2	4
Payload Aerobraking descent rate	Show how the descent rate in m/sec for the payload with the heat shield deployed	0		Payload Aerobraking descent rate	Show how the descent rate in m/sec for the payload with the heat shield deployed	0		0	2	4
Payload Parachute descent rate	Show how the descent rate in m/sec for the payload with the parachute.	0		Payload Parachute descent rate	Show how the descent rate in m/sec for the payload with the parachute.	0		0	2	4
Mechanical Subsystem Design				**Mechanical Subsystem Design**						
Mechanical Subsystem Overview	Overview of selected mechanical configuration for container and payload.	1		Mechanical Subsystem Overview	Overview of selected mechanical configuration for container and payload.	1		2	2	4
Container Mechanical Layout of Components Trade & Selection				*Container Mechanical Layout of Components Trade & Selection*						
Trade (2 or more strategies)	Should show major components and where they are located. Should not be a list of materials.	1		Trade (2 or more strategies)	Should show major components and where they are located. Should not be a list of materials.	1		2	2	4
Selection (with criteria)	Selection made and reasons provided	1		Selection (with criteria)	Selection made and reasons provided	1		2	2	4
Container Parachute Attachment Mechanism				*Container Parachute Attachment Mechanism*						
Attachment to container	Show design of container attachment mechanism. Should be a simple device where the parachute is attached. Should be passive.	1		Attachment to container	Show design of container attachment mechanism. Should be a simple device where the parachute is attached. Should be passive.	1		2	2	4
Release method	Explain how it works	1		Release method	Explain how it works	1		2	2	4
Payload Mechanical Layout Trade & Selection				*Payload Mechanical Layout Trade & Selection*						
Structure of payload	Should show two structure designs.	0		Structure of payload	Should show two structure designs.	0		0	2	4
Identify location of electrical components	Point out electrical subsystems, sensosrs, battery, etc.	0		Identify location of electrical components	Point out electrical subsystems, sensosrs, battery, etc.	0		0	2	4
Identify location of mechanisms and major machanical components	Point out mechanisms used to release components or change mechanical configuration.	0		Identify location of mechanisms and major machanical components	Point out mechanisms used to release components or change mechanical configuration.	0		0	2	4
Selection (with criteria)	Selection made and reasons provided	0		Selection (with criteria)	Selection made and reasons provided	0		0	2	4
Payload Aerobraking Pre Deployment Trade and Selection				*Payload Aerobraking Pre Deployment Trade and Selection*						
Trade (2 or more strategies)	Show at least 2 strategies used in the selection of how the heatshield is stowed while in the container.	0		Trade (2 or more strategies)	Show at least 2 strategies used in the selection of how the heatshield is stowed while in the container.	0	No trade	0	2	4
Selection (with criteria)	Selection made and reasons provided	0		Selection (with criteria)	Selection made and reasons provided	0		0	2	4
Payload Aerobraking Deployment Trade and Selection				*Payload Aerobraking Deployment Trade and Selection*						
Show mechanism concepts of how heat shield is deployed.	Show at least 2 strategies used in the selection of how the heatshield is deployed.	0		Show mechanism concepts of how heat shield is deployed.	Show at least 2 strategies used in the selection of how the heatshield is deployed.	0	No trade	0	2	4
Selection (with criteria)	Selection made and reasons provided	0		Selection (with criteria)	Selection made and reasons provided	0		0	2	4
Payload Parachute Deployment Configuration Trade and Selection				*Payload Parachute Deployment Configuration Trade and Selection*						
Trade (2 or more strategies)	Should show two ways to stow and release the parachute. Include parachute attachment to payload.	0		Trade (2 or more strategies)	Should show two ways to stow and release the parachute. Include parachute attachment to payload.	0		0	2	4
Selection (with criteria)	Selection made and reasons provided	0		Selection (with criteria)	Selection made and reasons provided	0		0	2	4
Payload Upright Operation				*Payload Upright Operation*						
Trade (2 or more strategies)	Should show two ways that the payload is uprighted after landing.	0		Trade (2 or more strategies)	Should show two ways that the payload is uprighted after landing.	0	template slide	0	2	4
Selection (with criteria)	Selection made and reasons	0		Selection (with criteria)	Selection made and reasons	0		0	2	4
Electronics Structural Integrity	Explain how parts will be secured so nothing breaks during flight.	0		Electronics Structural Integrity	Explain how parts will be secured so nothing breaks during flight.	2		2	2	4
Mass Budget				**Mass Budget**						
Mass of all components	A complete list of all of the components and their mass in grams	1		Mass of all components	A complete list of all of the components and their mass in grams	1		2	2	4
Mass of all structural elements	A complete list of all of the structural components and their mass in grams	1		Mass of all structural elements	A complete list of all of the structural components and their mass in grams	1		2	2	4
Sources or uncertainties	Must document sources of and any uncertainties	0		Sources or uncertainties	Must document sources of and any uncertainties	0		0	2	4
Total Mass	Must document the total masses of components and structural elements	0		Total Mass	Must document the total masses of components and structural elements	0	incomplete	0	2	4
Margin (with methods for correction)	Mass requirement - Total Mass = Margin. Document the method(s) of correction.	0		Margin (with methods for correction)	Mass requirement - Total Mass = Margin. Document the method(s) of correction.	0		0	2	4
C&DH Subsystem Design				**C&DH Subsystem Design**						
CDH Overview	Overview of selected components	2		CDH Overview	Overview of selected components	2		4	2	4
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		4	2	4
Memory selections (including memory storage requirements, if applicable)		2		Memory selections (including memory storage requirements, if applicable)		2		4	2	4
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		4	2	4
Trade (2 or more)	At least two processor & memory configurations presented	2		Trade (2 or more)	At least two processor & memory configurations presented	2		4	2	4
Selection (with criteria)	Indicate which selection and why it was chosen	2		Selection (with criteria)	Indicate which selection and why it was chosen	2		4	2	4
Payload Real-Time Clock				*Payload Real-Time Clock*						
Trade (2 or more)	Hardware clock for maintaining correct time in case of a system reset.	2		Trade (2 or more)	Hardware clock for maintaining correct time in case of a system reset.	2		4	2	4
Selection (with criteria)	Indicate which selection and why it was chosen	2		Selection (with criteria)	Indicate which selection and why it was chosen	2		4	2	4
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		4	2	4
Selection (with criteria)	Indicate which selection and why it was chosen	2		Selection (with criteria)	Indicate which selection and why it was chosen	2		4	2	4
Payload Radio Configuration				*Payload Radio Configuration*				0	0	0
XBEE Radio Selection	XBEE radio selection, and NETID	2		XBEE Radio Selection	XBEE radio selection, and NETID	2		4	2	4
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		4	2	4

Item	Description	Score	Item	Description	Score	Comment	Max	Score	Max
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		4	2	4
Payload Command Formats	Team must show list of commands and formats	2	Payload Command Formats	Team must show list of commands and formats	2				

Electrical Power Subsystem Design

Item	Description	Score	Item	Description	Score	Comment	Max	Score	Max
EPS Overview	Overview of EPS, diagram and components	2	EPS Overview	Overview of EPS, diagram and components	2		4	2	4
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		4	2	4

Payload Power Trade & Selection

Item	Description	Score	Item	Description	Score	Comment	Max	Score	Max
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		4	2	4
Battery configuraiton (series/parallel/other configurations)		0	Battery configuraiton (series/parallel/other configurations)		0		0	2	4
Trade (2 or more)	Show at least two types of batteries	2	Trade (2 or more)	Show at least two types of batteries	2		4	2	4
Selection (with criteria)		2	Selection (with criteria)		2		4	2	4
Payload Power Budget	All power consumption should be in watt hours (Wh) only	2	Payload Power Budget	All power consumption should be in watt hours (Wh) only	2		4	2	4

Flight Software Design

Item	Description	Score	Item	Description	Score	Comment	Max	Score	Max
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		4	2	4
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		4	2	4
Simulation Mode Software	Description on the simulation mode implementation	2	Simulation Mode Software	Description on the simulation mode implementation	2		4	2	4
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		4	2	4

Ground Control System Design

Item	Description	Score	Item	Description	Score	Comment	Max	Score	Max
GCS Overview	A simple context diagram showing major components	2	GCS Overview	A simple context diagram showing major components	2		4	2	4
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		4	2	4

GCS Antenna Trade & Selection

Item	Description	Score	Item	Description	Score	Comment	Max	Score	Max
Trade (show at least 2)	Should include antenna patterns	2	Trade (show at least 2)	Should include antenna patterns	2		4	2	4
Discuss Antenna Mounting Design	Handheld or table top	2	Discuss Antenna Mounting Design	Handheld or table top	2		4	2	4
Selection	Indicate selected design and reasons for selection.	2	Selection	Indicate selected design and reasons for selection.	2		4	2	4
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		4	2	4

CanSat Integration and Test

Item	Description	Score	Item	Description	Score	Comment	Max	Score	Max
CanSat I&T Overview		2	CanSat I&T Overview		2		4	2	4
Subsystem Level Test Plans	Description of the test plan(s) and how implemented	1	Subsystem Level Test Plans	Description of the test plan(s) and how implemented	1	How do you verify sensor accuracy?	2	2	4
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		4	2	4
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		4	2	4
Simulation Test Plans	Description of the test plan(s) and how implemented	2	Simulation Test Plans	Description of the test plan(s) and how implemented	2		4	2	4

Mission Operations and Analysis

Item	Description	Score	Item	Description	Score	Comment	Max	Score	Max
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		4	2	4
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		4	2	4
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		4	2	4

Requirements Compliance

Item	Description	Score	Item	Description	Score	Comment	Max	Score	Max
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		4	2	4
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		4	2	4

Management

Item	Description	Score	Item	Description	Score	Comment	Max	Score	Max
CanSat Budget - Hardware	All component with prices should be listed in a table	1	CanSat Budget - Hardware	All component with prices should be listed in a table	1	Incomplete	2	2	4
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		4	2	4

Program Schedule

Item	Description	Score	Item	Description	Score	Comment	Max	Score	Max
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		4	2	4

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	4	2	4
Major Development Activies with Assignments Shown	Development activities should include team or team members assigned to each task	2		Major Development Activies with Assignments Shown	Development activities should include team or team members assigned to each task	2	4	2	4
Conclusions		2		Conclusions		2	4	2	4
Quality				**Quality**					
Quality of Powerpoint Presentation	Average is 7.	3		Quality of Powerpoint Presentation	Average is 7.	3	6	2	20
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	4	2	4
							330	226	468