MALAYSIA SISWASAT COMPETITION 2008

COMPETITION CRITERIA & GUIDELINES DOCUMENT

Organized by:

NATIONAL SPACE AGENCY

With support from:

MINISTRY OF SCIENCE, TECHNOLOGY & INNOVATION

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Form

1. Introduction

SiswaSat is a nano-scale satellite model that fits into a 325ml standard soda can which able to perform various scientific experiments such as attitude control, image capturing and GPS measurement. All basic subsystems of a satellite (communication, power, command & data handling, etc) are been designed to fulfill the mission statement that has been determined earlier on.

This competition is designed to provide undergraduate students with the opportunity to experience a hands-on space program at an affordable cost. The competition involves writing a mission proposal, generating design documentation, presentation and launching the SiswaSat to an altitude of 200m using a tethered helium balloon.

The most important aspect of this competition is that each team will learn many important lessons that could be applied throughout their professional career. By developing this project, learning what works and what does not, and also learning to work as a team, each participant will develop an understanding of the processes essential in the development and success of any project.

2. Minimal Mission Requirements

Each team is required to design their SiswaSat according to the minimal mission requirements that are listed below. This is important to make sure each team designs to a standard SiswaSat specification. However, it is not limiting the innovative requirements as team can add features to obtain bonus points.

Each team is required to design their SiswaSat based on the criteria listed below. Failed to follow the minimal mission requirement, will subject to the disqualification from the competition.

i. All structure and components must be integrated and fit inside a standard 325ml soda can with diameter of 6.6 cm and height of 11.0 cm.

ii. SiswaSat mass, including parachute must not exceed 350 grams.

iii. No protrusions from the surfaces of the SiswaSat prior to the deployment except for antenna & parachute with hooks.

iv. Telemetry and payload data from the sensors on-board must be transmit to ground terminal during descent time. Mandatory sensor to be include on the design is accelerometer.

v. Telemetry data indicating the SiswaSat altitude during descending shall be transmit in 5 seconds interval or faster.

vi. The power subsystem of the SiswaSat must be able to support the operation of SiswaSat for at least 20 minutes.

vii. Develop a ground terminal receiving software for the SiswaSat that have a user-friendly interface.

3. Competition Rules & Requirements

This section will describe the rules and requirements for the competition. Each team shall follow all rules and requirements that has been set by the competition board.

3.1 Participation Requirement & Team Makeup

The competition is open to all higher institutions at Malaysia which are include university, college and polytechnic. Each university can only sent one (1) team to the competition.

Team members shall consist of maximum 6 undergraduate students from various disciplines. The team leader should be selected from final year student and he should undertake project management roles as well as engineering development tasks. The proposition was made as an effort to encourage sustainability of SiswaSat activities at those participating universities in the sense that roles left by graduating members shall be handed over to the most senior members remained, and new year 1 student(s) be recruited into the team.

3.2 Faculty Adviser

All teams entering the SiswaSat competition are required to have a faculty adviser. The faculty adviser shall oversee and be responsible for the conduct of the team at all times during the competition and is strongly encouraged to accompany the team to the competition.

3.3 Registration

Each team is required to read and understand the competition criteria & guidelines document before entering the competition. Registration form can be download at SiswaSat website. The completed registration form must be submitted to the competition secretariat before/on 21st July 2008.

Confirmation of registration will be sent on the contact email-id provided during registration, as the registrations take place.

3.4 Documentations & Presentations

This section will described the required documents need to be prepared by each team.

3.4.1 Proposal of Mission

Each registered team shall prepare a proposal document that indicating the mission, objective and other related aspects for the evaluation by the competition board. Please refer to the Appendix A for the guideline of the proposal. All proposals must be submitted and received by

competition secretariat by 1st August 2008 to be eligible to enter the competition.

The submitted proposal will be evaluated by the panels and the eligible teams will be announce on the SiswaSat official website and inform by the letter within 3 days after the evaluation.

3.4.2 Preliminary Design Review (PDR)

The eligible teams need to submit Preliminary Design Review document one (1) month after the proposal evaluation. Following this, each team is required to make a presentation to the competition board. The document should be as specific and complete as possible. Each team will be allocated 20 minutes to present their PDR. The PDR document (hardcopy and softcopy) shall be submitted to the secretariat three (3) days prior to the presentation.

Please refer to Appendix B for the PDR outline guide. The purpose of the PDR is for the competition board to make sure that each team understands the requirements.

During PDR session, final elimination will be performed and the eligible team will be notified through email and letter within 2 days after the presentation.

3.4.3 Critical Design Review (CDR)

Each team will be given one (1) month after the PDR presentation & evaluation to complete their CDR document. CDR documents (hardcopy and softcopy) shall be submitted to the competition secretariat three (3) days before presentation to the competition board. Each team will be allocated 20 minutes for presentation. Please refer to Appendix C for the CDR outline guide.

3.4.4 Flight Readiness Review (FRR)

Each team shall prepare the Flight Readiness Review document and submit one (1) week prior to the presentation. The document shall be the final

document that include the details of every subsystem. Please refer to the Appendix D for the document outline guide.

Each team is required to present the final SiswaSat system design and configuration that include the testing and result one (1) day before the launching. This will determine either the SiswaSat is ready for the flight or not. Each team will be allocated 20 minutes for the presentation.

Content of the presentation shall include below items:

i. Mission and objective
ii. Summary of design
iii. Testing method and result(s)
iv. Concept of operations
v. Financial report
vi. Summary

3.4.5 Post-flight Review

Post-flight review presentation will take place after launch. Each team needs to prepare a presentation to the competition board. They need to present the summary of their design, flight results (telemetry & payload data) and analysis of their mission. Each team will be allocated 20 minutes for the presentation.

Each team is advised prepare posters, flyers and brochures to be distributed to the public during the launch day.

The presentation will contain the items listed below. Most of the materials can be prepared before the competition. However, result data (telemetry & payload) and analysis of the mission have to be added after the competition.

i. Mission and objective(s)
ii. Data analysis (telemetry & payload data)
iii. Success/Failure analysis
iv. Comparison to initial mission

v. Lessons learned
vi. Summary

3.5 SiswaSat Frequency

SiswaSat shall used the allocated frequency for communication purpose; which is 434MHz (amateur frequency).

3.6 Financial Budget

The total cost of the SiswaSat shall be not more than RM 5,000.00 that exclude the ground support peripherals. Each team is been advised to design a SiswaSat within the allocated budget. The financial report shall be present during the Flight Readiness Review for evaluation.

4. Field Operations

This section describes the activities on the launching day.

4.1 Launcher

Each SiswaSat will be launched using a tethered helium balloon to the altitude of 150m. The technical team will help each team to integrate their SiswaSat inside the deployer that is attached to the bottom of the balloon.

4.2 Flight Schedule & Preparation

Each team will be given about 10 minutes to complete necessary preparation before the launch. Upon registration each team will be given a flight queue number and schedule. There will also be a briefing session.

4.3 Delay

The teams are not allowed to delay the launch. The secretariat will inform any delay of launch due to weather condition, launcher problem or any other technical anomalies with approval from competition board.

4.4 Ground Segment

Each team shall determine/design their own ground segment peripherals such as antenna and other related terminal software.

5. Evaluation Criteria

The aspects of evaluation are divided into six (6) categories; which are:

Aspect of evaluation	Points
Minimal Mission Requirements	Mandatory
Preliminary Design Review	5
Critical Design Review	15
Post-flight Review	30
Engineering	45
Management	5
TOTAL POINTS	**100**

Each team shall follow all the minimal mission requirements and successfully achieve the determined mission in order to win the competition. **The decisions are at the complete discretion of the panels, and all decisions are final.**

6. Awards & Prizes

Below are the awards and prizes to be won.

First Prize	- RM 5,000.00
Second Prize	- RM 3,000.00
Third Prize	- RM 2,000.00
Best SiswaSat Design	– RM 1,000.00
Best SiswaSat Mission	- RM 500.00
Best Team	- RM 500.00

7. Preliminary Event Schedule

Below is the preliminary event schedule for the reference. The updated event information can be found on the official SiswaSat website at http://www.angkasa.gov.my/siswasat/home.php

Event	Date/Duration
Registration	1-21 July '08 (3 week)
Proposal of mission submission	1 August '08
Announcement of the selected proposal (preliminary elimination)	6 August '08
Preliminary Design Review document submission	6 Sept '08
Preliminary Design Review presentation	9 Sept '08
Critical Design Review document submission	9 Oct '08
Critical Design Review presentation	13 Oct '08
SiswaSat development and testing	Oct – Dis '08 (3 months)
Flight Readiness Review document submission	12 Dis '08
Flight Readiness Review presentation	19 Dis '08
SiswaSat launching preparation	19 Dis '08
Launching	20 Dis '08
Post-flight presentation	21 Dis '08

Appendix A : Proposal Of Mission Guideline

Malaysia SiswaSat Competition 2008

PROPOSAL OF MISSION GUIDELINE

Please submit a 5 to 10 page proposal of your SiswaSat proposal for our reviewers. The purpose of the proposal is to show the competition board that each team understands the requirements and is capable of implementing the required project tasks. This proposal should address, as explicitly as possible:

I. Title Page

Include title, date, team name/university, adviser name and contact information, and team leader and contact information.

II. Executive Summary / Abstract

Provide an overview of your proposed project, briefly addressing all competition phases (design, build, testing, operations) and describing how you will meet the project requirements.

III. Project Technical Description

Describe the proposed technical approaches to comply with each of the requirements specified. Legibility, clarity, and completeness of the technical approach are primary factors in evaluation of the proposals. Each team shall clearly describe their mission definition and objectives. The preliminary design of the SiswaSat hardware must be described, as well as the sensors and/or instrumentation to be used. A system block diagram showing major system components and interfaces should also be included. The flight operations approach must be addressed, including ground station operations, flight sequence operations, tracking and data collection operations, data analysis operations, and recovery scenario. Present a proposed performance baseline (measurement accuracy) that is consistent with the performance, scope, cost, and schedule baselines for the project.

IV. Project Management / Personnel

Describe how your project team will be organized and managed. Describe duties and responsibilities for team leader. Briefly describe the qualifications of faculty adviser and experience level of team members.

V. Laboratory Facilities

Briefly describe your laboratory capabilities and identify work that will need to be performed elsewhere.

VI. Schedule & Cost Estimates

Provide a preliminary schedule identifying major subtasks and project milestones. Provide a preliminary cost estimate identifying material costs, student/faculty labor hours and any external costs.

IMPORTANT NOTE

Send your printed copy of proposal together with the registration form to Pusat Angkasa Negara office (Attention to: Secretariat of SiswaSat Competition) **AND** electronic copy of proposal to siswasatcompetition@angkasa.gov.my, by Friday, 1 August 2008. Acknowledgment of receipt of proposals is sent by fax/email to the point of contact listed on the proposal within 1-3 working days of the closing date. Late proposal will not be entertained.

Selected proposals will be notified by Wednesday, 6 August 2008 through letter and will be announced on the SiswaSat official website.

EVALUATION CRITERIA

The principal elements considered in evaluating a proposal are its technical and programmatic relevance to SiswaSat competition, and the intrinsic scientific or engineering merit.

Appendix B :
Preliminary Design Review (PDR) Outline

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PRELIMINARY DESIGN REVIEW (PDR) OUTLINE

Each team needs to prepare the Preliminary Design Review (PDR) document to be submitted to the competition board. The PDR material must be submitted three (3) days prior to the presentation that will be informed later.

The purpose of the PDR to the team is to:

- present an understanding of the competition requirements
- present a preliminary design that discusses how the competition requirements will be met and verified
- present a reasonable understanding of schedule and cost
- provide an opportunity to receive feedback on the SiswaSat design and development

PDR Outline

The following outline for the PDR is to be used by each team. Following this outline is important to ensure fair and equal scoring by the judges of each presentation by providing standard expectations as to what is presented by each team.

The outline also provides the team with a list of the information that is expected to be presented. Wherever possible, simple diagrams and drawings should be used to convey concepts and design details.

I. Introduction

The introduction section shall include

- Team roster and roles – identify the team members including academic year, roles of each team member, and faculty adviser to the team.
- Presentation outline – provide an overview of the presentation.

II. SiswaSat Overview (Mission & Objective)

The SiswaSat overview section is to provide an overview of systems level attributes of the SiswaSat design and development. The overview section shall include:

- Mission overview – the primary and secondary(if have) mission must be stated clearly together with the objective of the developed SiswaSat. The problem statement or literature study should be explain.
- Requirements overview – the requirements overview section shall identify all design, development, and performance requirements; whether levied by the SiswaSat competition or internally. Requirements shall be explicitly defined so as to demonstrate an understanding of requirements. Identification of requirements flow down for each requirement to major subsystems shall be included.
- Design overview – the design overview section shall provide a high-level overview of the SiswaSat (and ground system) design and operation. The overview should include a high-level functional block diagram of the SiswaSat system. This diagram shall illustrate the major components of each subsystem, as well as, interconnections between each subsystem. Details of the design and operations should be addressed in appropriate subsystem sections of the presentation.

III. Payload Subsystem

The payload subsystem shall present the results of trade studies and analysis of the given and additional sensor(s). How each sensor will be utilized shall be include. Trade studies or analysis of the selected sensor should be explain.

IV. On-board Data Handling Subsystem

On-board data handling subsystem shall present the preliminary design of the SiswaSat software that operates on hardware located in the SiswaSat (hence, flight software). It shall include

- Design considerations and requirements – a list of the design considerations and/or requirements driving the development of the SiswaSat flight software shall be presented.
- Flight software – shall include a description of the software being implemented, programming language(s), development environment(s), data rates and processor loading(s). A high-level block diagram of

the flight software should be presented. Results of trade studies or analyses leading to the preliminary design should be presented.

- Processor – results of trade studies and analysis (include the pro and cons of the component (if any)) for the given processor shall be presented. A summary of data rates and expected processor loading should be included.

V. Electrical & Power Subsystem

The electrical & power subsystem shall present the preliminary design of the SiswaSat electrical & power system. The electrical & power subsystem shall include:

- Design considerations and requirements – a list of the design considerations and/or requirements driving the development of the SiswaSat electrical subsystem shall be presented.
- Electrical system block diagram – a high-level description and diagram(s) of the electrical system shall be provided. These diagrams shall define major components of the electrical system with identification of component connections. Diagrams should be accompanied by a list of components selected.
- Power system design – describe preliminary design of the power system. Results of trade studies or analyses of the preliminary design for the power system shall be presented.
- Power budget – a preliminary power budget shall be provided. The power budget shall list the power consumption/provided to/by each subsystem and/or component and margin allocations.

VI. Communication Subsystem

The communication subsystem – shall provide at a minimum, the communications methodology, gross definition of data to be transmitted/received, (including bandwidth requirements), and best estimate of frequency selection. It shall also provide the type of the antenna that will be used to support the mission.

VII. Mechanical & Structural Subsystem

The mechanical & structural subsystem section shall present the preliminary design of the SiswaSat structure, materials, mass, and recovery system (parachute). The mechanical overview shall present

- Design considerations and requirements – design considerations and/or requirements driving the mechanical/structural design of the SiswaSat should be presented.
- Results of preliminary design & analysis - at a high level, explain the various designs considered for the mechanical subsystem. Explain the advantages and disadvantages of those designs supporting each design consideration with preliminary analysis, where appropriate.
- Mechanical & structural layout – the preliminary design of technical & structural system layout of the SiswaSat shall be presented. This should include drawings of the structure and component layout, and a list of materials and component selections.
- Preliminary mass budget – allocation of masses to the various subsystems and/or components in a tabular form.
- Recovery system (parachute) – an overview of the recovery system is presented. The results of trade studies and/or analyses that lead to the preliminary design of the recovery system should be presented.

VIII. Integration and Test

The integration and test section discusses the system level integration and testing of the SiswaSat. This section shall include discussions of:

- Design considerations and requirements – a list of the design considerations and/or requirements driving the development of the SiswaSat integration and test shall be presented.
- Systems integration and testing – a description of the methods, facilities, and testing to be utilized to integrate the various subsystems and test the integrated SiswaSat shall be presented.

IX. Ground System

The ground system shall present the preliminary design of the ground system. This includes any ground hardware and software utilized during operations of the SiswaSat. The ground system section shall include:

- Design considerations and requirements – a list of the design considerations and/or requirements driving the development of the SiswaSat ground system integration and test shall be presented.
- Ground system architecture – an overview of the ground system including hardware and software selection. A diagram and list of the major ground system components shall be presented and results of analyses and/or trade studies leading to the selection of the hardware.
- Ground software – a summary of ground system software and results of analyses and/or trade studies leading to the selection of the ground software should be presented. For developed software, the programming language(s) and development environment(s) shall be discussed. Ground system software should include any software necessary for data analysis.

X. Concept of Operations

The concept of operations section discusses operation of the SiswaSat in order to achieve the mission objectives. This section shall discuss:

- Concept of operations – an overview of the launch day sequence of events shall be presented. A mission time-line presented as a table or diagram is recommended.
- Data analysis – a discussion of how data analysis will be performed shall be presented. This should include a list of data to be analyzed and hardware and/or software requirements for data analysis.

XI. Project Management & Resources

The project management & resources section shall present:

- Preliminary estimates of component, manufacturing, and service costs. Costs shall be summarized for both the SiswaSat and ground segment.
- Schedule overview section shall present the SiswaSat development schedule. The schedule shall include a list of major milestones, estimates of completion dates, and required resources. For milestones completed by PDR, actual versus estimated schedule performance shall be presented. It is recommended that information be presented graphically (Gantt charts, etc.) or in a table.

XII. Summary

Appendix C :
Critical Design Review (CDR) Outline

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CRITICAL DESIGN REVIEW (CDR) OUTLINE

Each team needs to prepare the Critical Design Review (CDR) document to be submitted to the competition board. Teams shall submit CDR document three (3) days prior to the presentation in order to allow judges time to review the material and prepare questions, comments, and concerns. Documents shall be submitted in hardcopy and softcopy to the secretariat in Microsoft PowerPoint (PPT) or PDF format.

The purpose of the CDR to the team is to:

- present details of the SiswaSat design
- present requirement compliance
- present revised cost and schedule estimates
- provide an opportunity to receive feedback on the SiswaSat design and development

CDR Outline

I. Introduction

The introduction section shall include:

- Team roster and roles – identify the team members including academic year, roles of each team member, and faculty adviser to the team.
- Presentation outline – provide an overview of the presentation.

II. SiswaSat Design and Development

The SiswaSat design and development section shall include:

- SiswaSat requirements –shall identify all design, development, and performance requirements (whether levied by the SiswaSat competition or internally) and flow-down of requirements to the subsystems. A statement related to how the requirement has been verified shall also be included. For requirements that have not been verified by CDR, a statement as to when and how the requirement will be verified should be made.
- SiswaSat design –shall provide a high-level overview of the SiswaSat (and ground system) design and operation. The document should

include a high-level functional block diagram of the SiswaSat system. This diagram shall illustrate the major components of each subsystem, as well as, interconnections between each subsystem. Details of the design and operations should be addressed in appropriate subsystem sections of the presentation.

III. Payload Subsystem

The payload subsystem shall present the list of the selected sensor and how each sensor will be utilized. The integration of sensor into the on-board computer shall be included.

IV. On-board Data Handling Subsystem

This section shall present the final design of the SiswaSat programming that operates on hardware located in the SiswaSat. The document shall include:

- Design details and requirements – a list of the design considerations and/or requirements driving the development of the SiswaSat integration and test shall be presented.
- Summary of changes since PDR – a summary of changes made to the design since the PDR shall be presented. Pertinent information and analysis results related to changes should be discussed.
- Flight software details – the flight software shall include a description of the software being implemented, programming language(s), development environment(s), data rates and processor loading(s). A high-level block diagram of the flight software should be presented. Results of relevant analyses should also be presented.
- Flight software testing – shall describe how the flight software will be tested shall be presented. This description shall include methodologies and required equipment or facilities.
- Work to be completed – a summary of work remaining to be completed for the flight software subsystem shall be presented.

V. Electrical & Power Subsystem

The electrical & power subsystem shall present the final design of the SiswaSat electrical & power system. The document shall include:

- Design details and requirements – a list of the design details and/or requirements driving the development of the SiswaSat electrical subsystem shall be presented.
- Summary of changes since PDR – a summary of changes made to the design since the PDR shall be presented. Pertinent information and analysis results related to changes should be discussed.
- Electrical system block diagram – a high-level description and drawing(s) of the electrical system shall be provided. These diagrams shall define major components of the electrical system with identification of component connections. Diagrams should be accompanied by a list of components selected.
- Power system design – this section shall describe the final design of the power system. Included in this discussion should be a functional diagram of the power system with major components identified.
- Power budget – a final power budget shall be provided. The power budget shall list the power consumption/provided to/by each subsystem and/or component and margin allocations.
- Electrical & power subsystem testing – shall described how the electrical subsystem will be test shall be presented. This description shall include methodologies and required equipment or facilities. This should also include results of tests completed.
- Work to be completed – a summary of work remaining to be completed for the electrical & power subsystem shall be presented.

VI. Communication Subsystem

Communication subsystem shall present:

- Final design of the communications system onboard the SiswaSat. The transmit/receive frequencies, bandwidth and data rate requirements shall be provided.
- Communication subsystem testing – shall described how the communication subsystem will be test shall be presented. This description shall include methodologies and required equipment or facilities. This should also include results of tests completed.

- Work to be completed – a summary of work remaining to be completed for the communication subsystem shall be presented.

VII. Mechanical & Structural Subsystem

The mechanical & structural subsystem section shall present the final design of the SiswaSat structure, materials, mass, and recovery system. This section shall present:

- Design details and requirements – design details and/or requirements driving the mechanical & structural design of the SiswaSat should be presented.
- Summary of changes since PDR – a summary of changes made to the design since the PDR shall be presented. Pertinent information and analysis results related to changes should be discussed.
- Mechanical layout – the mechanical layout of the SiswaSat shall be presented. This should include drawings of the structure and component layout and a list of materials and component selections shall be included.
- Mass budget – the mass budget shall include allocation of masses to the various subsystems and/or components in a tabular form.
- Mechanical & structural subsystem testing – an overview mechanical & structural subsystem testing shall be presented. This should include an overview of the test methodologies, equipment, and facilities, as well as, presentation of the results of completed tests.
- Recovery system and testing – an overview of the recovery system is presented. The results of trade studies and/or analyses that lead to the preliminary design of the recovery system should be presented. A summary of the planned testing methodologies and required facilities and equipment should be included.
- Work to be completed – a summary of work remaining to be completed for the mechanical & structural subsystem shall be presented.

VIII. Integration and Test

The integration and test section shall describe the system level integration and testing of the SiswaSat. This section shall include of:

- Design details and requirements – a list of the design considerations and/or requirements driving the development of the SiswaSat flight software shall be presented.
- Summary of changes since PDR – a summary of changes made to the integration and test since the PDR shall be presented. Pertinent information and analysis results related to changes should be discussed.
- Systems integration and testing – a description of the methods, facilities, and testing to be utilized to integrate the various subsystems and test the integrated SiswaSat shall be presented.
- Work to be completed – a summary of work remaining to be completed for the integration and test shall be presented.

IX. Ground System

The ground system shall present the final design of the ground system. This includes any ground hardware and software utilized during operations of the SiswaSat. The section shall include:

- Design details and requirements – a list of the design considerations and/or requirements driving the development of the SiswaSat ground system integration and test shall be presented.
- Summary of changes since PDR – a summary of changes made to the integration and test since the PDR shall be presented. Pertinent information and analysis results related to changes should be discussed.
- Ground system architecture – shall describe the ground system including hardware and software selection. A diagram and list of the major ground system components shall be presented.
- Ground hardware selection – a summary of the ground hardware components and results of analyses and/or trade studies leading to the selection of the hardware.
- Ground software – a summary of ground system should be presented. For developed software, the programming language(s) and development environment(s) shall be discussed. Ground system software should include any software necessary for data analysis.

- Ground system testing – shall describe of how the ground system hardware and software will be tested shall be presented. This description shall include methodologies and required equipment or facilities.
- Work to be completed – a summary of work remaining to be completed for the ground system subsystem shall be presented.

X. Concept of Operations

The concept of operations section shall describe the operation of the SiswaSat in order to achieve the mission objectives. This section shall include:

- Design details and requirements – a list of the design considerations and/or requirements driving the development of the SiswaSat mission operations shall be presented.
- Summary of changes since PDR – a summary of changes made to the integration and test since the PDR shall be presented. Pertinent information and analysis results related to changes should be discussed.
- Concept of operations – description of the launch day sequence of events shall be presented. A mission time-line presented as a table or diagram is recommended.
- Launch site roles and responsibilities – a revised list of launch day roles and responsibilities shall be presented.
- Contingency operations – a discussion of contingency preparedness shall be presented. This shall include a revised list contingency to be prepared for and how each will be addressed at the launch site.
- Data analysis – a discussion of how data analysis will be performed shall be presented. This should include a list of data to be analyzed and hardware and/or software requirements for data analysis.
- Work to be completed – a summary of work remaining to be completed for the mission operations shall be presented.

XI. Project Management & Resources

The section shall present:

- Summary of SiswaSat budget which should include estimates/actual costs of components, manufacturing, and services. Costs shall be summarized for both the SiswaSat and ground segment.
- SiswaSat development schedule include a list of all major milestones, estimates and actual completion dates, and required resources. It is recommended that information be presented graphically (Gantt charts, etc.) or in a table.

XII. Summary

Appendix D :
Flight Readiness Review (FRR) Outline

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FLIGHT READINESS REVIEW (FRR) OUTLINE

Each team needs to prepare the Flight Readiness Review (FRR) document to be submitted to the competition board one (1) week prior to the presentation. Competition board are looking for data that demonstrates proof that the SiswaSat will fly as predicted, lessons learned from test data and flights, and proof that the construction of SiswaSat will lead to mission success.

Please refer back to the comments given on the PDR and during the CDR review. It is advised that each team make necessary corrections. Please have all hardware with you to show to the competition board during your presentation.

The purpose of the FRR to the team is to:

- Demonstrate to the competition board that SiswaSat is ready to launch.
- Present final design of SiswaSat.
- Present final cost breakdown.
- Present closure of any actions from previous reviews.

FRR Outline

I. Mission and objective

The mission and objective section shall present the complete understanding of competition requirements and on how the selected mission will meet the competition requirements, mission statement and mission objective.

II. Summary of design

Each team shall summarize the design for all subsystems of SiswaSat, i.e. mechanical/structural, electrical, payload, on-board data handling and ground system. Be sure to highlight any design changes from PDR and CDR, and the rationale for the changes.

III. Testing method and result(s)

The testing method and results section shall describe the system level integration and testing of the SiswaSat. This section shall include of:

i. Systems integration and testing – a description of the methods, facilities, and testing to be utilized to integrate the various subsystems and test the integrated SiswaSat shall be presented.
ii. Summary of changes since CDR – a summary of changes made to the integration and test since the CDR shall be presented. Pertinent information and analysis results related to changes should be discussed.
iii. Test results – a detailed analysis of test result and lessons learned from the integration and testing.

IV. Concept of operations

The concept of operations section shall describe the operation of the SiswaSat in order to achieve the mission objectives. Each team shall defined and documented:

i. Detailed launch procedures, launch day sequence of events and a pre-release checklist
ii. A detailed tracking and recovery plan
iii. Radio frequencies to be used during launch day
iv. Detailed list of launch role and responsibilities
v. List of all possible failure modes, their failure mechanisms, and the actions taken to mitigate critical risks

V. Financial report

The financial report shall summarize the entire expenditure spend during the project, i.e. components, manufacturing and service costs, including both SiswaSat and ground segment.

VI. **Summary**

Form 1 : Registration Form

Malaysia SiswaSat Competition 2008

MALAYSIA SISWASAT COMPETITION 2008
REGISTRATION FORM

INSTRUCTION:

Please complete and fax to the secretariat **before 21st July 2008**. Confirmation of registration will be sent on the contact email-id provided during registration, as the registrations take place.
* Fax number : 03-31804044/31818503

PART I : TEAM INFORMATION	
Team Name	
No. of Team Members	
College/University Name	
City/State	

PART II : FACULTY ADVISOR INFORMATION				
#1	Name			
	Designation			
	Address			
	Email			
	Phone (Office)			
	(Mobile)		Fax No.	
#2	Name			
	Designation			
	Address			
	Email			
	Phone (Office)			
	(Mobile)		Fax No.	

PART III : TEAM LEADER INFORMATION			
Name			
Identity Card No.		Student ID	
Degree/Diploma		Year	
Email			
Phone (Mobile)			

PART IV : TEAM MEMBERS INFORMATION				
* Maximum team members is 6 include team leader.				
#1	Name			
	Identity Card No.		Student ID	
	Degree/Diploma		Year	
#2	Name			
	Identity Card No.		Student ID	
	Degree/Diploma		Year	
#3	Name			
	Identity Card No.		Student ID	
	Degree/Diploma		Year	
#4	Name			
	Identity Card No.		Student ID	
	Degree/Diploma		Year	
#5	Name			
	Identity Card No.		Student ID	
	Degree/Diploma		Year	