Unmanned Solar Powered Airship Concept Evaluation

Preliminary Design Report

<subsystem name>

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Acronyms

EPS Electrical Power System

ITPU Imaging and Tracking Payload Unit

MCC Motor Control and Communication

MSE Mechanical Structure and Envelope

USPACE Un-manned Solar Powered Airship Concept Evaluation

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1 Basic LaTex Commands

This section provides some basic useful LaTex commands. For further reference, search on Google where you will find plenty of useful LaTex blogs.

1.1 Figures

This is a figure example:

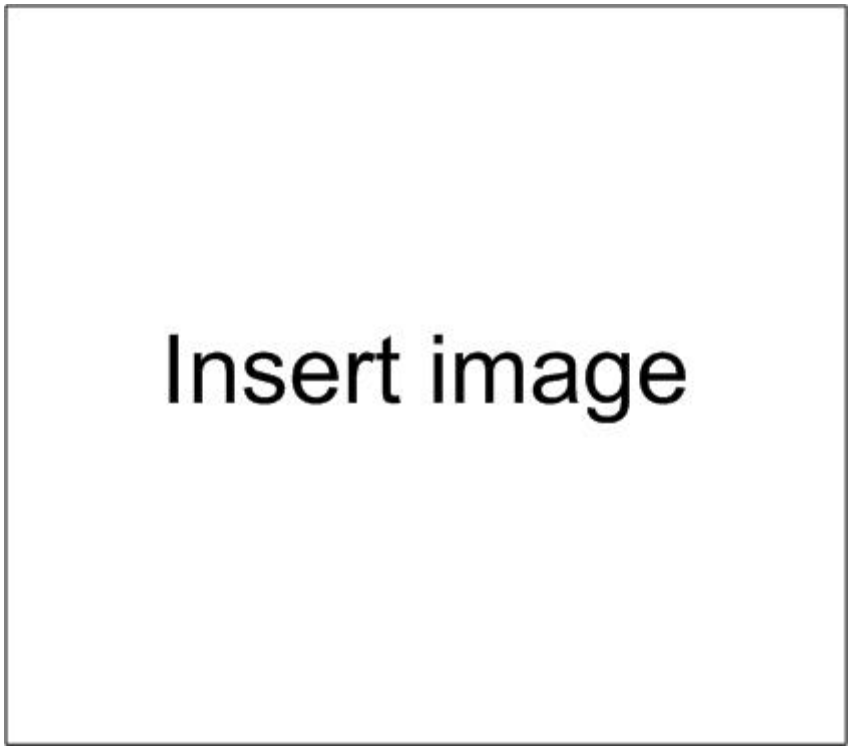

Figure 1 – *This is a figure caption*

You can also place figures side-by-side. An easy way is to use a "minipage" environment:

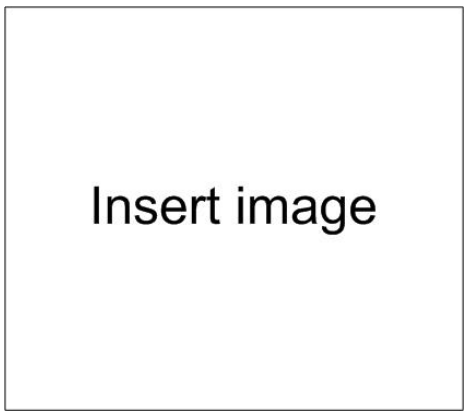

Figure 2 – *This is a figure caption*

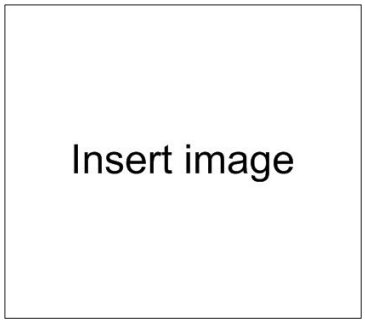

Figure 3 – *This is a figure caption*

1.2 Tables

This is an example of a table:

Table 1 – *This is a table caption*

Header 1	**Header 2**	**Header 3**
Some text Some more text	Some text Some more text	Some text Some more text

You can also do a table with multi-line cells:

Table 2 – *This is a table caption*

Header 1	**Header 2**	**Header 3**
Some long text that does not fit in a single-line table cell	Some text	Some text
Some more text	Another very long text that does not fit in a single-line table cell	Some more text

1.3 Equations

You can do simple in-line equations by using the "$" symbols around the equation: $2+2=4$. Remember always to use a the math- or equation environment when using signs like $+$, $=$, x^2, f_2 etc.

To write a numbered equation on its own line, use the "equation" environment:

$$T(s) = \frac{G(s)H(s)}{1 + G(s)H(s)} \tag{1}$$

You can also do multi-line equation by using the "split" - environment:

$$\begin{aligned} 2x + 4y &= 6 \\ 4y &= 6 - 2x \\ y &= 1.5 - 0.5x \end{aligned} \tag{2}$$

1.4 Citations, References and Acronyms

This is a citation[1].

This is a citation referring to a specific page in the cited work[1, p. 28].

You can also do multiple citations[1, 2].

This is a cross-reference to a figure/section/table/equation etc. in the latex document: see Figure 1.

Use acronyms consistently to provide an easy-reading text: The Un-manned Solar Powered Airship Concept Evaluation (USPACE) project rocks!

2 Introduction

3 Functional and Technical Requirements

some text...

3.1 Functional Requirements

- A requirement
- Another requirement
- Etc...

3.2 Technical Requirements

- A requirement
- Another requirement
- Etc...

3.3 Expected Performance

- A performance
- Another performance
- Etc...

4 Preliminary Design

4.1 Preliminary Design Explanation

some text...

4.2 Software Structure

some text...

4.3 Trade-Off Analysis of Concepts

some text...

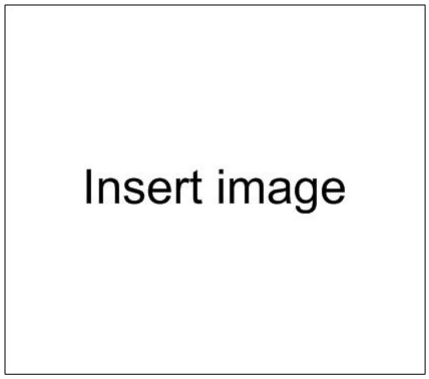

Figure 4 – *Design diagrams*

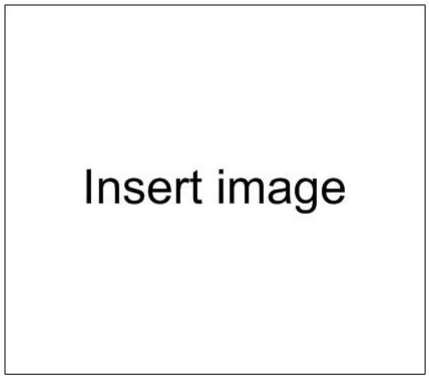

Figure 5 – *Software structure*

4.4 Argumentation for Chosen Concept(s)

some text...

4.5 Feasibility Study of Concept(s)

some text...

SA Regulator Concepts:	**MPPT**	**Shunt-Regulator**	**Zener-diode Regulation**	**Etc...**
Costs	Medium(some ICs required)	Medium(some ICs required)	Low(simple components)	...
Performance and efficiency	High($90-98\%$)	Medium($70-90\%$)	Low($50-70\%$)	...
Etc...	...	...	...	...

Table 3 – *Trade off analysis*

4.6 Telemetry and Telecommands

some text...

Telemetry	**Data rate/frequency**	**Data size**
Battery voltage	Every 30 sec	1 byte
Solar array temperature	Every 30 sec	1 byte
Solar array voltage	Every 20 msec(MPP tracking)	2 bytes(MPP tracking)
Etc...	...	...
Telecommands	**Parameters**	**Valid input range**
set-output-voltage	$< voltage > [1byte]$	$0; 255 (= 7...9V)$
Etc...	...	...

Table 4 – *Telemetry and telecommands*

4.7 External Interfaces

some text...

External interface	**Implementation**
Solar array mounting to rigid ballon structure	Screws and bolts
DC-DC regulators	Mounted on PCB which sists in system housing
Voltage/current sensor telemetry	Analog signals to Microcontroller
Etc...	...

Table 5 – *External interfaces*

5 Test and Verification of Design

5.1 Preliminary Verification of Design

some text...

5.2 Design Models and Verification Methods

some text...

6 Resources and Scheduling

6.1 Main Tasks

some text...

6.2 Parts List and Costs

some text...

6.3 Electronics Ground Support Equipment (EGSE)

some text...

6.4 Mechanical Ground Support Equipment (MGSE)

some text...

References

[1] In: ().

[2] In: ().

Appendices

A Some Appendix

some text...