

A decorative graphic on the left side of the page, consisting of a network of blue lines and circles. The lines are of varying thicknesses and connect to circles of different sizes, creating a circuit-like or neural network pattern that extends from the top to the bottom of the page.

SPACE ENGINEERING 3
Assignment 1
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THESIS PROPOSAL

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**STUDENT PLAGIARISM: COURSE WORK - POLICY AND PROCEDURE
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1. INTRODUCTION

The Van Allen belts are two regions of

- what the problem is
- what have other ppl done
- why is it difficult

The environment inside the van allen belts have been investigated by NASA's Radiation Belt Storm Probes twin satellites. One of the primary mission objectives is to develop empirical and physical models predicting radiation belt space weather effects.

2. LIT REVIEW

2.1 What

What are you trying to achieve?

- active shielding of the satellite from
 - solar rad (deep space mission)
 - galactic rad (deep space mission)
- van allen belts for Earth missions - solar events

2.2 Why

Why is it important?

- currently all satellite constructions that will be exposed to the radiation must be radiation hardened costing ?? or only have a short mission lifetime and the entire satellite is considered disposable.
- passive shielding requires extra mass

2.3 Difficult

What is this difficult to accomplish?

- need to build for the space environment
- must be reliable as once it is launched it cannot be fixed
- still needs to allow EM to pass for communication and for solar power (especially Earth orbit missions)

2.4 What have others done?

2.5 Method of Attack

Phases: - identify the design constraints required of a spacecraft. Dimensions, power requirements, mass, communication ability

- design different magnetic field configurations with an without the plasma element of the shield that is within design constraints with guidance of past projects and theoretical ideas
- Simulate the design configurations in COMSOL and check that for the power/magnetic field it will block the plasma/radiation and the electric and magnetic fields
- Choose the best configuration based on the simulations and build a prototype
- test the prototype in a vacuum chamber and monitor the plasma
- Future: - create a feedback control system in MATLAB to interface with COMSOL for incident

plasma fluctuations such as what occurs during solar storms to only use the power required to shield from the plasma

3. RESOURCE PLAN

4. RISK MANAGEMENT

High voltage devices will be used to generate the magnetic field,