Structural Reliability for Nano Satellites

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Outline

• Introduction
• Engineering Design
• Manufacturing and Processing
• Specification
• Implementation
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Introduction

• Problems Faced-
  – Use of Commercially off the shelf equipment to meet performance requirements.
  
  – Lack of standard documents in procedural, technical, engineering and design fields.
  
  – Use of non standardized design, development and specification procedures.
• **Motivation**
  – Improve collaboration between different research groups/nanosatellite development teams.
  – Provide effective knowledge transfer.
  – Increase reliability and effectiveness of satellite.

• **Solution Overview**
  – Developing and implementing technical standards for nanosatellite which are accessible by everyone.
  – Development should be taken on basis of standards which are
    • Organized
    • Industry accepted
    • Accurate and available for use
Engineering Design

• Non standardized material and design process data leads to resource wastage in
  – Information gathering
  – Procurement and quality check
  – Design data acquisition

• Use of MIL-HDBK-5J for material fundamentals

• Use of MIL-HDBK-17-3F for composite usage
Manufacturing and Processing

• Nanosatellite developers tend to use variety of untested manufacturing and processes resulting in
  – High level in-depth and expensive testing to ensure quality.
  – Industrial expert assistance is unavailable.

• Use of MIL-STD documents for establishing standards in manufacturing process and practices.

• Use of MIL-PRF documents to define functional requirements.
Specification

• Non standardized specification methodology leads to-
  – Incompatibility of various components
  – Reduced Industry-developer interaction
  – Reduced knowledge transfer, co-ordination and readability

• Use of MIL-SPEC documents is helpful in following regard-
  – Jointly agreed terminology and designations
  – Revision and revision designation
  – Acceptance and certification requirements
Implementation

Source
- Selecting the appropriate domain of document
- Collection and acquisition of the necessary documents

Utility
- Guidance
- General reference

Objectives
- Material selection
- Process
- Systems
- Procurement
- Interfacing

Purpose
- Performance
- Specification
- Detail
Conclusion

• Implementation of common reliability criteria will make the nanosatellite development more streamlined

• Standardization will have direct impact on:
  – Industry interaction
  – Problem solving and debugging
  – Speed and cost of Nanosatellite development
Thank You

Special Thanks-

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