Mechatronics 3700 Death Star Tracker: Technical Manual

Team Dirac

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Abstract

This document describes how each of the modules (including both software and hardware) work, and how to use them.

Part I Technical Documentation

Introduction

1.1 Document Identification

This document describes the design and development of the "Yavin IV Orbital Tracking System". This is a proposed and prototyped design in response to the Rebel Alliance Commander Rye's request for a defence system to combat the imminent threat posed by The Empire, and their Death Star weapons platform. This system is to effectively, efficiently and easily track a space-based planetary annihilator, approximately the size of a small moon. This document and design brief is prepared by Dirac Defence Limited for assessment in MTRX3700, year 2014. The was approved by lieutenants Reid and Bell, and small scale testing initiated.

- 1.2 System Overview
- 1.3 Document Overview
- 1.4 Reference Documents
- 1.4.1 Acronyms and Abbreviations

System Description

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- 2.2 Operational Scenarios
- 2.3 System Requirements
- 2.4 Module Design
- 2.5 Module Requirements: Module X
- 2.5.1 Functional Requirements

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Processes

Outputs

Timing

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2.5.2 Non-Functional (Quality of Service) Requirements

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Interfaces

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- 2.6 Conceptual Design: Module X
- 2.6.1 Assumptions Made
- 2.6.2 Constraints on Module X Performance

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- 3.1 Classes of User
- 3.2 Interface Design: User Class Y
- 3.2.1 User Inputs and Outputs
- 3.2.2 Input Validation and Error Trapping

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- 4.1 Scope of X System Hardware
- 4.2 Hardware Design
- 4.2.1 Power Supply
- 4.2.2 Computer Design
- 4.2.3 Sensor Hardware
- 4.2.4 Actuator Hardware
- 4.2.5 Operator Input Hardware
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- 4.2.7 Hardware Quality Assurance
- 4.3 Hardware Validation
- 4.4 Hardware Calibration Procedures
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Software Design

- 5.1 Software Design Process
- 5.1.1 Software Development Environment
- 5.1.2 Software Implementation Stages and Test Plans
- 5.2 Software Quality Assurance
- 5.3 Software Design Description
- 5.3.1 Architecture
- 5.3.2 Software Interface
- **5.3.3** Software Components
- 5.4 Preconditions for Software
- 5.4.1 Preconditions for System Startup
- 5.4.2 Preconditions for System Shutdown

System Performance

- 6.1 Performance Testing
- 6.2 State of the System as Delivered
- 6.3 Future Improvements

Safety Implications

Conclusions

Part II Appendicies

Supporting Calculations

DOxygen Documentation

Code Listing