PUCP – Instituto de Radioastronomía (INRAS)

INTISAT Design and Mission Overview

Critical Design Review (CDR) – Engineering Model

Departamento de Ingeniería – Pontificia Universidad Católica del Perú

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Nomenclature

OBC	On-Board Computer
EPS	Electrical Power System
TTC	Telemetry, Tracking and Command
CDR	Critical Design Review
PUCP	Pontificia Universidad Católica del Perú
INRAS	Instituto de Radioastronomía

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Chapter 1

Introduction

1.1 Mission Description

INTISAT is a 2U CubeSat-class technology demonstration mission led by the Pontifical Catholic University of Peru (PUCP) through the Instituto de Radioastronomía (INRAS). The mission aims to validate the integration of a compact image-based microscopy payload for Earth orbit operation, developed by students and researchers as part of PUCP's space education and technology development efforts.

INTISAT will demonstrate a fully integrated platform composed of an On-Board Computer (OBC), Electrical Power System (EPS), Telemetry, Tracking and Command (TTC) system, structural components, and a custom scientific payload. The system is enclosed within a 2U CubeSat mechanical envelope. The current implementation corresponds to an Engineering Model, serving as a foundation for future improvements and eventual flight qualification.

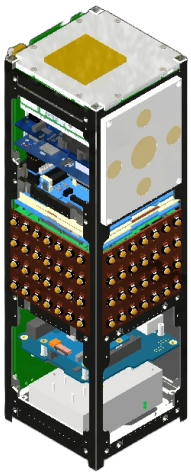

Figure 1.1: INTISAT 3D model view.

1.2 Mission Objectives

The primary objectives of INTISAT are:

- To validate the integration and operation of a miniaturized image sensor for microscopy in low Earth orbit (LEO).
- To demonstrate the functionality of student-developed subsystems working within a unified nanosatellite platform.
- To develop and verify a scalable and modular CubeSat architecture aligned with academic and educational standards.
- To serve as a hands-on training platform for students in satellite systems engineering, design, integration, and testing.

1.3 Project Members

INTISAT is an academic initiative driven by interdisciplinary teams at PUCP. The project structure includes:

- **INRAS – PUCP**: Mission coordination, systems engineering, TTC module development, and platform integration.
- **Faculty of Science and Engineering – PUCP**: Development of software, electronics, and mechanical subsystems.
- **External partners (future phase)**: Collaborators for testing, launch coordination, or mission operations.

1.4 Mission Patch

Figure 1.2: Official mission patch of INTISAT.

Chapter 2

Arquitectura del Sistema

2.1 Visión general del sistema

Descripción del satélite completo.

Chapter 3

OBC – Computadora de a Bordo

3.1 Diseño de hardware y software

Chapter 4

EPS – Sistema de Energía

4.1 Generación, almacenamiento y distribución

Chapter 5

ADCS – Control de Actitud

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TTC – Telecomunicaciones

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Carga Útil

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Gestión del Proyecto

12.1 Cronograma, WBS y riesgos

Appendix A

Referencias

- ECSS-E-ST-10C – Requisitos de ingeniería de sistemas espaciales
- NASA Systems Engineering Handbook

Appendix B

Anexos

B.1 Diagramas, tablas y presupuestos adicionales