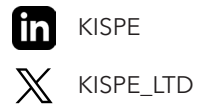




Space Mission Operations



Course Description

Space Mission Operations explores the challenge of designing and implementing sustainable mission support in a practical, cost-effective way.

This 3 or 4 day course takes a functional approach to provide an in-depth view of the entirety of space mission operations. This includes the concept of operations and all functions that are performed in support of a space mission. Interactive discussions focus on initial requirements definition, operations concept development, functional allocation among spacecraft, payload, ground system and operators. Constraints imposed by the space environment, orbital mechanics, communication architectures and other mission systems are also evaluated.

Participants gain extensive hands-on experience with a variety of mission operations modelling tools to understand physical constraints and appreciate the impact of programmatic trade-offs. Case studies of ongoing NASA, DoD and commercial missions are examined in detail.

Course Topics

Course Introduction and Overview

- Course Introduction
- Mission Operations Overview

Mission Operations Planning

- ConOps Development
- Operations Complexity



Tracking and Navigation

- Understanding and Using Orbits
- Predicting Orbits

Mission Data Receipt and Delivery

- Introduction to TT&C
- Ground Systems and Communication Architectures

Spacecraft Support and Analysis

- Environmental Effects and Spacecraft Design
- Contingency Planning and Anomalies

Flight Control and Training

- Activities, Roles and Responsibilities
- Organization and Training

Numerous case studies and exercises throughout the course

Who Should Attend

Systems engineers, payload principle investigators, subsystem engineers or project managers who are responsible for the detailed design and operation of space systems.

Course Materials

Each participant will receive:

- A complete electronic set of course notes with copies of the slides used in the presentation
- An e-copy of the Cost Effective Mission Operations (edited by Boden and Larson)

Course Objectives

At the end of this course you should be able to:

- Define and explain the critical activities of space mission operations
- Develop a mission concept of operations (ConOps) and be able to critically analyse one of these key documents
- Describe the elements that contribute to mission operations complexity and perform trade-off analyses to reduce that complexity
- Apply principles of orbital mechanics to plan and implement key operations activities
- Describe and analyse key elements of mission ground systems including communication link budgets
- Compare and contrast operations concepts for military, civil, scientific and human space missions
- Develop the planning, execution and support requirements for real-time space mission operations



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