



# Understanding Space



## Course Description

Understanding space delivers the 'big picture' of space missions from concept through to missions.

This is a 2-day course which starts by looking at why we use space, what types of missions are conducted and how we organise, manage and operate them.

We explore the space environment and look at a basic orbital mechanics to understand the opportunities and limitations imposed on missions by the fundamental laws of Physics. The most utilised orbits such as Geostationary, Sun-synchronous and other orbits, as well as interplanetary trajectories are explored. Getting into space and then manoeuvring, re-entry and launch windows are also covered.

We will cover space systems including remote sensing and other payloads, and how these drive the mission design. Finally, we will cover the key spacecraft subsystems including rockets and launch vehicles and key design trades for these sub systems.

Understanding Space is the ideal course for technical or non-technical professionals new to the space industry, those "cross-training" from other disciplines or anyone who needs a refresher on space fundamentals.

## Course Topics

### Space in Our Lives

- Space in Our Lives, How we use space
- Space Enterprise
- An Introduction to space systems engineering and mission management

### Orbits

- The Space Environment
- Getting into space
- Understanding orbits
- Orbit design, manoeuvres, ascent and reentry



### Mission and Systems

- Introduction to space systems engineering and mission management
- Payload and Spacecraft design
- Designing space missions

### Satellite Sub Systems and components

- Spacecraft sub systems
- Payloads
- AOCS
- Power
- Communications
- OBDH
- Propulsion
- Structure and Thermal

## Who Should Attend

Engineers, scientists, or managers either new to the space field or who want to broaden their understanding of the big picture of space systems and operations. There is technical and math content, and the material is intended for those with some element of technical background but would still be of interest and relevance to those of a non-technical background.

## Course Materials

Each participant will receive:

- Course handout

## Course Objectives

### Gain Core Space Knowledge

- Define and describe important astronautics terms and concepts

### Comprehend space mission Capabilities, Trade-offs and Limitations

- Explain how and why space is used to provide capabilities on Earth
- Understand the types of payloads that are utilised to deliver these capabilities

### Apply Space Concepts to real-world problems

- Understand basic orbit and system parameters that drive mission scope and cost

### Gain Understanding of Missions and Systems

- Introduces the audience to satellite and the subsystems.
- Examines payload and spacecraft design, and the design of space missions.

### Gain Awareness of Spacecraft Sub systems

- Explores the different subsystems and components that make up a satellite.
- Examines the various design considerations that go into their selection

