

# Design of Low Cost Space Missions

## Course Summary:

This is a 4-day class provides real cost data on a variety of missions, systems, and subsystems.

Each student will be provided with a copy of Reducing Space Mission Cost for his or her own professional reference library.

*Reducing Space Mission Cost is the first complete treatment of the technology, process, and problems in the most critical area of modern spaceflight. The demand to reduce cost is unrelenting. This pioneering book addresses all aspects of this problem, including:*

- *Technology and processes for reducing cost*
- *Cost reduction in mission engineering, spacecraft design, manufacture, launch, and operations*
- *Implementation methods and problems*
- *The price of reducing cost*
- *10 detailed case studies of what works in practice*

## Instructor:

Edward L. Keith is a multi-discipline Launch Vehicle System Engineer, specializing in the integration of launch vehicle technology, design, and business strategies. He is currently conducting business case strategic analysis, risk reduction and modeling for the Boeing Space Launch Initiative Reusable Launch Vehicle team. For the past five years, Ed has supported the technical and business case efforts at Boeing to advance the state-of-the-art for reusable launch vehicles. Mr. Keith has designed complete rocket engines, rocket vehicles, small propulsion systems, and composite propellant tank systems, especially designed for low cost, as a propulsion and launch vehicle engineer. His travels have taken him to Russia, China, Australia and many other launch operation centers throughout the world. Mr. Keith has worked as a Systems Engineer for Rockwell International, on the Brilliant Eyes Satellite Program and on the Space Shuttle Advanced Solid Rocket Motor project. Mr. Keith served for five years with Aerojet in Australia, evaluating all space mission operations that originated in the Eastern Hemisphere. Mr. Keith also served for five years on Launch Operations at Vandenberg AFB, California. Mr. Keith has written 18 papers on various aspects of Low Cost Space Transportation over the last decade.

## Course Outline:

Introductions

The role of low-cost space missions in economic hard times

The Soyuz Capsule Integration Case Study

Space Transportation as a cost driver

Incentives to succeed or fail

Process changes to reduce cost

Integrating a Multi-Discipline Team

Modeling to understand consequences of decisions

Technology to reduce costs

Technology and the Solid State Revolution

Technology and Mass Properties

Technology and Cost relationships

Reducing mission cost for;

The spacecraft,

The payload,

The ground segment

Space Transportation from launch to orbit

Mission Operations

Avoiding or minimizing cost overruns

Realistic Requirements

Better Trade Studies

Cost and Schedule Tracking

Risk Management

From cartoons to probabilities

## What You Will Learn:

- i. The role of low-cost space mission in economic hard times
- ii. Process changes to reduce cost
- iii. Technology to reduce cost
- iv. Reducing mission cost for spacecraft, payload, ground segment and operations, and launch
- v. Avoiding or minimizing cost overruns
- vi. Cost modeling
- vii. Reliability
- viii. Case study experiences
- ix. Implementation strategies and problems X- Methods for reducing launch cost