



Taksha Institute (TI)

TRS123: Seminar on Launch Vehicle Systems Design and Engineering



A 2-DAY, 12-HOUR COURSE

*Sponsored by the Institute for Atmospheric Optics and Remote Sensing (IFAORS),
a division of Taksha Institute (TI)*

Location/Date: TBA



INSTRUCTOR: DONALD EDBERG, PH.D. – Professor, IFAORS, Taksha Institute; Professor of Aerospace Engineering, California State Polytechnic University, Pomona; and former Boeing Technical Fellow, Boeing Information, Space, and Defense Systems, Huntington Beach, CA.

With more than 24 years of experience in the aerospace industry and teaching, Dr. Edberg has worked on launch vehicle and on-orbit space environments, aerodynamic testing of launch vehicles at high angles of attack, experimental modal and dynamic analysis, launch vehicle load mitigation, reduction of on-orbit mechanical vibrations, and microgravity isolation systems, as well as the development of an electric-powered, back-packable UAV now in service as the FQM-151 Pointer. He holds 10 U.S. patents in aerospace and related fields, and was the inventor of and chief engineer for the patented McDonnell Douglas STABLE (Suppression of Transient Acceleration by Levitation Evaluation) vibration isolation system. Dr. Edberg is an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA) and an active UAV pilot. He is currently the Director of Cal Poly Pomona's Spacecraft and Launch Vehicle Lab and Uninhabited Aerospace Vehicle Lab.

DESCRIPTION: This seminar presents an overview of the engineering design factors that affect the operation of launch vehicles. It begins with a historical review of manned and unmanned launch vehicles, followed by current designs and future concepts. All the design drivers, such as launch windows, required acceleration performance (including gravity and atmospheric losses), ascent trajectories, and orbit/escape injections are covered. Ascent dynamics and orbital mechanics are presented as they relate to launch vehicle performance in a manner that provides an easy understanding of underlying principles. Considerable time is spent defining the systems engineering aspects of launch vehicle design, including rocket propulsion, structures and tanks, staging, guidance and control, payload integration, and the various launch vehicle subsystems and components. Design considerations such as launch optimization, thermal effects, range safety, and operational aspects, are detailed. Practical aspects of launch vehicles, such as fabrication and testing, are also discussed. The seminar concludes with several examples of, and the lessons learned from, launch vehicle failures. **(A detailed outline is provided at www.taksha.org/event/TRS123.)**

MATERIALS: The oral presentation is supplemented with complete printed class notes. Participants are also supplied with a DVD containing an extensive set of design data along with the videos illustrating different concepts that are shown in class. A trajectory optimization code along with a sample vehicle optimization input file is also provided.

WHO SHOULD ATTEND? This seminar is ideal both for an engineer with a particular specialty or any specialist who needs to obtain a solid background in the "big picture" of launch vehicle design and how these vehicles must work together with spacecraft payloads. Managers who want to understand the many aspects of launch vehicle design that affect their work, tasks, and scheduling will also benefit from this course.

A Certificate of Completion for 12 hours will be awarded to all those who complete the seminar.

COURSE FEE: Registration Fee: TBA (Early Registration Fee: TBA). Group discounts are also available.

Register online and see detailed course outline at: www.taksha.org

DISCLAIMER: Attendance at this event is for personal growth, and entails no promise of employment.

[Taksha Institute is a non-profit research & educational institution founded in 1976.]