

# Design of Low-Cost Space Missions

1-Day, 2-Day and 5-Day Short Courses

Targeting the Most Critical Problem for Today's Space Missions

**Taught by Dr. James Wertz**

*Dr. James Wertz, creator of the original SMAD course and initiator of much of the current interest in Responsive Space, takes you step-by-step through the complete process of creating dramatically lower cost space missions.*

**COURSE DESCRIPTION** — The original and most comprehensive space mission analysis and design (SMAD) course has been taught by Dr. James Wertz for more than 10 years to professional engineers worldwide. In addition, as an adjunct professor at USC, Dr. Wertz teaches “Design of Low-Cost Space Missions” to address the specific issues associated with the most fundamental problem facing space exploration—the need to dramatically drive down space mission cost. This unique, televised course draws an audience from industry, DoD, and NASA centers throughout the US.

This course is now being offered as a stand-alone 5-day course, an abbreviated 2-day short course, and a 1-day summary. Each course intended as a supplement or follow-on to the traditional SMAD course, rather than a substitute for it. They assume that most of the participants are familiar with the SMAD material or are working in astronautics and go from there to specific methods for reducing cost. Although most of the experience base comes from SmallSat missions, techniques applicable to large, expensive missions will also be addressed. Among the topics not covered in any other course:

- Is cost reduction real?
- Applications and mission utility for low cost missions
- System techniques for reducing cost
- Cost reduction in all mission areas — mission engineering, spacecraft, payload, ground segment, operations, and launcher selection
- Applications and limitations of cubesats and nanosats
- Responsive Space
- Cost and Schedule overruns — why they occur and how to avoid or minimize them

- Creating a proactive program to reduce mission cost
- What works and what doesn't work in practice
- Counterproductive approaches to reducing cost
- Impact of cost reduction on reliability
- The Price of Low Cost
- Applying low cost techniques to inherently complex, high cost missions

The course is substantially more interactive than the traditional SMAD course, with a significant portion of the course time spent addressing issues or questions raised by the participants.

**INSTRUCTOR** — Dr. James Wertz is the President of Microcosm, a space technology company specializing for more than 25 years in reducing space mission cost. He is the author of many professional papers and seminars on virtually all aspects of mission cost reduction, based in large part on methods and techniques implemented at Microcosm. He is an adjunct professor of Astronautics at USC, a member of the International Academy of Astronautics, and a Fellow of both the AIAA and the British Interplanetary Society.

**COURSE MATERIAL** — Each student will receive a copy of *Reducing Space Mission Cost*, a complete set of the presentation viewgraphs, several of the most relevant professional papers in space system cost reduction, and an extensive bibliography on Reducing Space Mission Cost.



For more information please contact the Course Administrator, Julie Jackson.

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## **Participant Comments**

*Excellent overview of how to produce cheaper space programs.*

*Knowledgeable, engaging and entertaining; I couldn't ask for more.*

*What is great with the course is that it is challenging our mindset with the design of spacecraft.*

*Very energetic presenter with lots of experience, examples, and very appropriate.*

*I really enjoyed this course; it was very informative and offered a different perspective on the subject of cost management.*

*Very thorough treatment of the subject.*

*Presenter is very knowledgeable, enthusiastic and respectful.*

*Outstanding presentation. Many compelling examples.*

*The presentation is complete and clear. It is a valuable asset, to keep and read in the future as a reference. Note: presentation equals the notes so my comments are applicable to both.*

*The interaction of the classroom is very important.*

*I like the depth and breadth of experience; all the options have been considered.*

*Very thorough treatment.*

*What's good about the course? — Wealth of knowledge from Dr. Wertz, dynamic, relaxed.*

*Thank you for sharing all the information with us. This motivates me very much and helps enjoy even more what I am doing.*

*Thanks for teaching this course. It gave me an opportunity to have a lot of knowledge and experience related to me, and as a young engineer, I can't think of anything I would rather have. It was very interesting to learn about cost reduction methods, and I will endeavor to apply them to my career.*

*I enjoyed the class participation aspect of the course. I believe Dr. Wertz's relation of experience was very valuable.*

*Honestly, I can't think of a way to make the course better, more useful, or more interesting. I thought it was great just the way it way!*

*I've enjoyed the class — particularly, I felt that it provided me useful paradigms/philosophies for not just the "space business," but also for the management of many other different non-space organizations (like a squadron for instance). I look forward to applying what I have learned.*

