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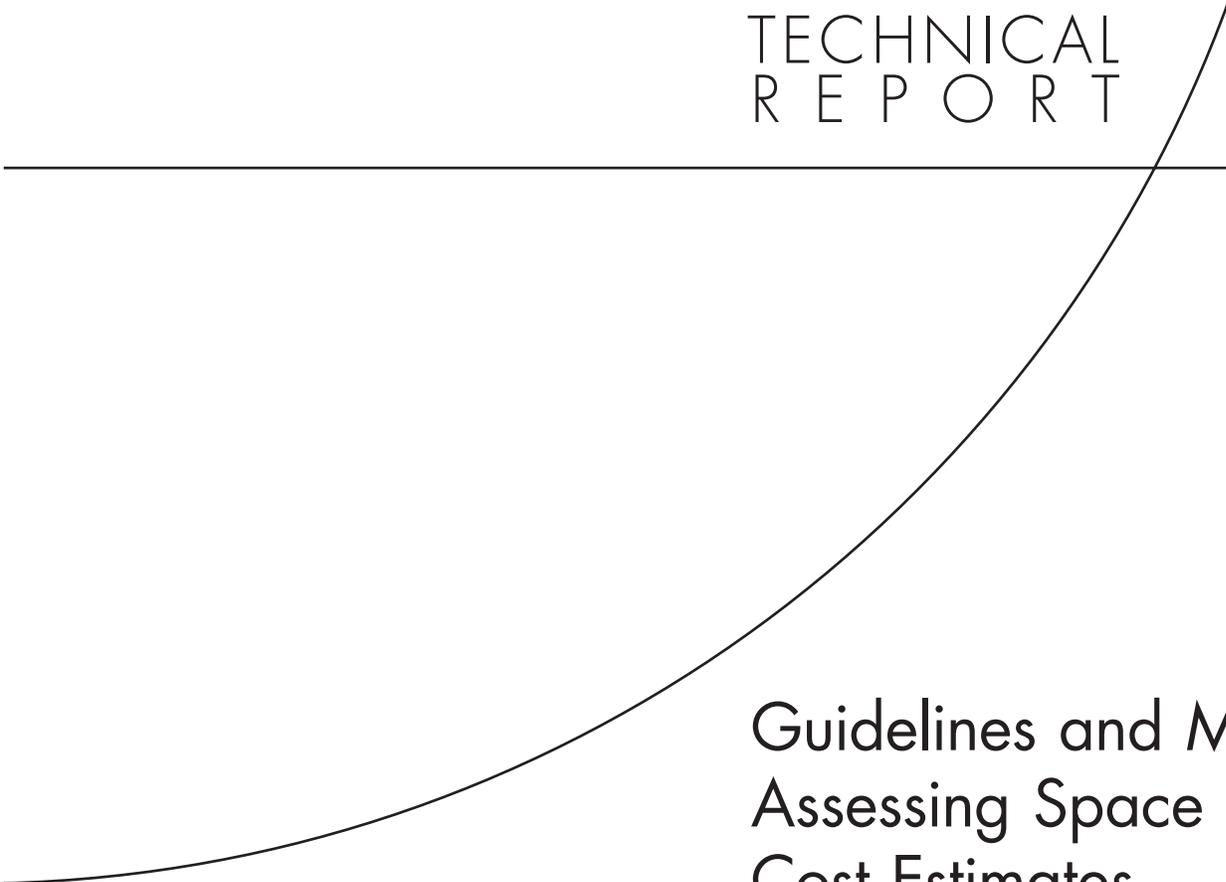
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TECHNICAL
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Guidelines and Metrics for Assessing Space System Cost Estimates

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Summary

This handbook is designed to help analysts assess cost estimates of space systems. It assumes that the reader understands common cost analysis methodologies but has limited experience with space systems. Its objective is to give the analyst tasked with reviewing an estimate information to help accomplish the following tasks:

- Plan the review.
- Identify the key programmatic, technical, and cost data needed, along with suggested sources.
- Highlight common issues to investigate.
- Provide typical cost ranges for components of relevant historical space programs.

This handbook also supplements the AFCAA's spacecraft training course by focusing on the cost analysis implications of the systems and processes covered in the course.¹ Intended to be a dynamic reference, evolving and expanding as useful material becomes available, it is organized as follows:

- Chapter One is a brief introduction to the importance of space systems for the U.S. Department of Defense (DoD) and the challenges of developing accurate estimates of their costs.
- Chapter Two provides an overview of space systems. It discusses various missions and their effects on system architecture, design, and cost. It then briefly describes the major components of typical DoD space systems, focusing on functions and common design approaches and their implications for cost. It highlights typical risk areas to give the analyst a sense of where cost and schedule problems have occurred in past programs.
- Chapter Three provides guidelines for planning and conducting a typical review, data requirements and likely sources, and common problem areas.

¹ *U.S. Air Force Cost Analysis Agency (AFCAA) Training Curriculum: Fundamentals of Design, Engineering, and Production for Spacecraft* (AFCAA, 2004) is part of the AFCAA's training curriculum and provides an introduction to space mission design, systems engineering, space vehicle subsystems, and launch and orbital operations. The course is offered periodically by AFCAA for government personnel and their supporting contractors.

- Chapter Four provides average costs and ranges for space vehicles, subsystems, and components to provide the analyst with a source of readily accessible crosschecks and to provide a resource for estimating the end points of risk distributions.
- Chapter Five describes common issues encountered in estimating the cost of space programs. These include small satellites, cost improvement in low-volume programs, use of commercial off-the-shelf (COTS) components for space applications, and the challenges of cost estimating under evolutionary acquisition.
- Chapter Six provides summary descriptions of some common cost models available to AFCAA for space programs.
- Chapter Seven presents recommendations for future additions to the handbook.
- Appendix A contains the portions of the standard Military Handbook 881B (MIL-HDBK-881B) work breakdown structure (WBS) relevant for space systems.
- Appendix B contains the Unmanned Space Vehicle Cost Model (USCM) Version 8 WBS dictionary, as the crosschecks follow its structure.
- Appendix C contains the portions of the standard MIL Handbook-881A WBS relevant for space systems. This replaces MIL-HDBK-881B for new programs.
- Appendix D contains the National Reconnaissance Office (NRO) WBS, which extends MIL-HDBK-881A to lower levels of detail.
- Appendix E is an extract of the Office of the Secretary of Defense (OSD) Cost Analysis Improvement Group (CAIG) criteria for DoD cost estimates.
- Appendix F provides a checklist for cost risk analysis.
- Appendix G contains guidance for changing the crosscheck prediction interval levels of significance.
- A bibliography provides sources of additional information on the topics covered.