Life-Cycle Cost Analysis Task Summary

M. McKenzie
Telecommunications Science and Engineering Division

The DSN life-cycle cost (LCC) analysis methodology has been completed. This article summarizes the LCC analysis methodology goals and objectives, the issues covered by the methodology, and its expected use and long-range implications.

I. Introduction

Development and implementation of the DSN life-cycle cost (LCC) analysis methodology has been completed. Policy, standards, guidelines, and procedures for performing LCC analysis are stated in Ref. 1, while background information and general guidance are supplied by the TDA document noted in Ref. 2.

The following is a summary of methodology goals and objectives, topics covered in the above documents, and expected use and implications of the methodology.

II. Methodology Goals and Objectives

Motivation for an LCC analysis methodology arose from the following conditions:

(1) The level of requirements levied on the DSN, relative to the budget, was greater than in the past.

(2) The probable cost of systems over their full lifetimes was often not available at the time of major planning decisions.

(3) NASA Office of Space Tracking and Data Systems needed stronger and stronger justification of budget items to obtain concurrence within NASA and the rest of the government.

(4) The cost of some items such as energy were increasing at a rate greater than the general inflation rate, and there was no mechanism by which to consider these relationships during the design phase.

(5) A technique, called LCC analysis, was developed by industry and the government that was capable of deriving the estimated cost of systems over their full lifetimes.

Thus, development of a DSN LCC analysis methodology was proposed. The goals of implementing and supporting the methodology were to minimize total future costs of existing and proposed DSN systems while still supplying required services, and to factor life-cycle cost predictions into decisions regarding the services provided.

The attending objectives were therefore as follows:

(1) To supply the methodology and motivation by which planning and design decisions:

(a) become sensitive to estimated life-cycle costs.

(b) consider cost relationships between components of a system.

(2) To provide a quantitative life-cycle cost analysis tool to help managers and engineers in planning and design decisions.

(3) To improve budgeting capabilities for the DSN as a whole.

III. Subjects Addressed

To meet the above goals and objectives, the two aforementioned documents (Refs. 1 and 2) were produced. Major topics covered in the documents are listed below:

(1) Definition of "life-cycle cost" and other terms.

(2) Criteria prescribing when an LCC analysis must be performed.

(3) Conditions under which an LCC calculation would be useful, though it is not required.

(4) Activities, roles, and responsibilities.

(5) Information needed before the analysis begins.

(6) Planning the LCC analysis.

(7) Gathering cost estimates.

(8) Calculation of the estimated life-cycle cost.

(9) Interpretation of the LCC.

(10) Reporting results.

(11) Examples.

IV. Use and Implications

The two LCC documents, together with the training package available from TDA Engineering, enables managers and engineers to perform and use LCC analysis. Consideration is also being given to follow-on tasks that might further enhance the effectiveness of LCC analysis within the DSN. Among these tasks are the following:

(1) Evaluation of the methodology in practice.

(2) Augmentation of existing cost data bases.

(3) Compilation of existing cost models and cost estimation techniques.

(4) Additional cost model development.

There are long-range implications of using life-cycle cost analysis to support planning in the DSN. Performance of cost trade-offs will become standard. The objective of minimum life-cycle cost will impact capabilities, specifications, and designs selected, and thus, the overall cost effectiveness of the DSN will continue to improve. Lastly, formal information exchange and feedback between implementing and operating organizations, as well as between levels of implementation, will increase.

References

1. *Life-Cycle* ***Cost Analysis,*** TDA Standard Practice 810-23. Jet Propulsion Laboratory, Pasadena, Calif., Sept. 15, 1980 (JPL internal document).

2. *DSN Life-Cycle* ***Cost Analysis Handbook,*** TDA Document 890-l 19. Jet Propulsion Laboratory, Pasadena, Calif., Oct. 1, 1980 (JPL internal document).