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A Method to Establish a Trade-Space of System Requirements and Life Cycle Cost (Article)

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Abstract

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Systems engineering traditionally approaches the design of systems through determination of requirements for and implementation of a system. The system is conceived as something to enable achievement of an effect with the tacit assumption that the system to be designed must achieve technical performance, including availability characteristics, which enable delivery of the whole of the intended effect. This approach determines the technical requirements of the system to ensure achievement of the system purpose under assumptions about how the system, or fleet, would be deployed to provide the intended service. Usually, cost is addressed after requirements, either to find the cheapest method to achieve the requirements or as one dimension of a trade-space analysis. In this paper, we explore a different philosophy for finding the system requirements; starting with the required system level service provision, but agnostic about the technical quality needed. We investigate a trade-space including the life cycle cost (LCC) of service provision as a contribution to determining subsystem requirements. We model the life cycle, for many variations of technical composition, using a Monte Carlo method, and show that a trade-space of LCC and requirements is likely to produce a cheaper solution than starting with sub-system requirements. © 2007-2012 IEEE.

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- Costs
- system lifecycle management
- systems design
- systems requirements management
- systems technical assessment

Indexed keywords

Engineering controlled terms:

- Commerce
- Cost benefit analysis
- Life cycle
- Monte Carlo methods
- Requirements engineering
- Systems analysis

Engineering uncontrolled terms

- Life cycle costs (LCC)
- Service provisions
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
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