Paper ID: 65084
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IAF SPACE SYSTEMS SYMPOSIUM (D1)
Interactive Presentations - IAF SPACE SYSTEMS SYMPOSIUM (IP)

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A CASE STUDY OF QUANTITATIVE PERSON-HOUR EVALUATION OF SE PROCESS BY USING MODELLED SE PROCESS OF A SATELLITE SYSTEM

Abstract

Satellites are utilized in a wide range of fields, such as scientific research, remote sensing, communication, and defense. Unlike ground-based systems, a satellite system has certain special features in terms of system design, usage environment, and life cycle. Therefore, it is difficult for engineers to pass on the system design documents and experiences of the satellite to the next generation. Engineers often design, develop, and validate satellite systems according to their individual competence. In general, if the experience and competence of the engineer are insufficient, design defects can occur in the later stages of development. In the past, satellites have been affected by problems such as unexpected resource inputs and in-orbit failures, which have reduced quality, cost, and delivery (QCD). We consider that the gap between the highest standards for satellite design such as ISO and Systems Engineering standards and the actual standards met by the engineers is the significant factor that causes the QCD to deteriorate. To address this issue, we aim to develop a systems-engineering method that can serve as a guideline for satellite development. In this paper, as one of the ways to establish the systems engineering methodology for satellite systems, we propose a method to estimate total person-hour from a modelled SE process of a satellite system and to quantitatively evaluate the backtracking impact evaluation when there is remaining work for each engineering phase using the person-hour. Specifically, the SE process of the satellite system is modeled as an ideal process without backtracking, and it is established as a method applicable to the evaluation of actual project by comparing and evaluating results of the actual project. This method enables actual engineers to easily verify the amount of work in the subsequent SE process. In this paper, we also indicate the results of evaluating the validity of this model using the results of several actual projects.