

# Introduction: Systems Engineering

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**T**HE success of aerospace programs is directly linked to the successful application of systems engineering (SE) invoked from program initiation through program closure. However, there are many program failures, cost overruns, and schedule slippage due to insufficient SE implementations, as reported in Government Accountability Office, U.S. Department of Defense, and NASA documents. The AIAA lacks a journal devoted to the advancement of aerospace SE (ASE). Many high-quality ASE papers are generated each year within AIAA but were not captured by AIAA journals.

During the time frame of July to August in 2007, the Systems Engineering Journal Initiative was proposed by the Systems Engineering Technical Committee (SETC). The proposal was presented to the AIAA Publication Committee in January 2008. The committee recommended a special SE section in the *Journal of Aircraft* (JOA) in March of the same year.

By following the recommendations, SE papers supporting aircraft design and operations were solicited via *Aerospace America*. Major topics of interest include, but are not limited to, SE applications, integrated disciplines and technology, future trends and predictions in SE, SE education and research, SE life-cycle processes, and systems effectiveness. Examples of these subject topics follow:

1) For the application of complexity and change, the question is, how does systems complexity affect the practice of SE in different application areas?

2) For future trends and predictions, the question is, do we see new areas of applied SE emerging?

3) For SE for systems of systems (SOS), the question is, how much is the deviation between SE applied to SOS vs SE for a single system?

4) For integrated disciplines and technology, the question are, how are the different disciplines, both technical, such as mechanical engineering, electrical engineering, software, etc., and nontechnical, such as supplier management, contract, quality, etc. integrated? Furthermore, a program or a project may need the support and

understanding of different technologies. Therefore, how are these different technologies integrated to support the success of a project?

5) For SE education and research, the questions are, has teaching SE been successful when measured both absolutely and relative to other disciplines in organizations and universities? What are the ongoing research programs within SE, and what have we learned from the past years?

6) For SE life-cycle processes and systems effectiveness, the question is, how is integrated logistics support/acquisition logistics integrated with SE?

The SETC has organized and chaired the SE sessions in the Aerospace Sciences Meeting and Space Conference each year. The author(s) of quality papers in the sessions were encouraged to submit to the special section of the JOA. Papers were also solicited through other technical committees and the SETC members in their working organizations.

It has been a pleasure and an honor to work with the editors of the JOA, the reviewers of SETC members, and other non-SETC members. We want to express sincere appreciation to the reviewers who have donated their precious time and expertise in performing valuable review for maintaining the best quality of papers. Needless to say, we also salute the authors who have contributed the best quality papers.

We hope you will enjoy reading the papers of this special section of the JOA. We are hoping to continue receiving high-quality SE papers for future JOA issues.

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