



Apr 25th, 1:00 PM - 4:00 PM

## Paper Session III-A - Next Generation Reusable Launch Systems Site Selection Trade Study: An Application of the Analytic Hierarchy Process

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### Scholarly Commons Citation

Huether, Jacob E.; Heileman, Mark D.; and Duffy, James B., "Paper Session III-A - Next Generation Reusable Launch Systems Site Selection Trade Study: An Application of the Analytic Hierarchy Process" (1996). *The Space Congress® Proceedings*. 11.

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# **Next Generation Reusable Launch Systems Site Selection Trade Study: An Application Of The Analytic Hierarchy Process**

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## **ABSTRACT**

This paper focuses on site selection trade studies associated with Next Generation Reusable Launch Vehicle concepts. During site selection trade studies the need to utilize a decision making tool enabling tradeoffs between competing objectives while minimizing intuitive bias was recognized. In order to meet established goals of the next generation reusable launch vehicle concepts, a comprehensive site selection trade study must be performed. Estimates for both non-recurring and recurring costs associated with each candidate site must be evaluated. The systems' operations concept, environmental constraints, logistics, range support, and weather are other important factors which must also be considered. Based on this, the Analytic Hierarchy Process (AHP) was implemented, allowing for systematic evaluation and measurement of each of the identified criteria in the site selection process.

AHP is a multi-criterion decision support methodology allowing study participants (engineers and program management) to deal consistently with comparisons between both tangible and intangible criteria. Using this tool, participants in the site selection process can integrate their collective judgment, experience and understanding concerning the relevant importance of identified criteria as they relate to one another. The resulting process is organized in a logical hierarchical structure which can be easily tested for sensitivities to changes in assumptions and judgments.