Systems engineering is a methodical multidisciplinary approach to design, build, and operate complex systems. Launch vehicles are considered by many extremely complex systems that have greatly impacted where the systems engineering industry is today. Launch vehicles are used to transport payloads from the ground to a location in space. Satellites launched by launch vehicles can range from commercial communications to national security payloads. Satellite costs can range from a few million dollars to billions of dollars. Prior research suggests that lack of systems engineering rigor as one of the leading contributors to launch vehicle failures. A launch vehicle failure could have economic, societal, scientific, and national security impacts. This is why it is critical to understand the factors that affect systems engineering rigor in U.S. launch vehicle organizations.

The current research examined organizational factors that influence systems engineering rigor in launch vehicle organizations. This study examined the effects of the factors of systems engineering culture and systems engineering support on systems engineering rigor. Particularly, the effects of top management support, organizational commitment, systems engineering support, and value of systems engineering were examined. This research study also analyzed the mediating role of systems engineering support between top management support and systems engineering rigor, as well as between organizational commitment and systems engineering rigor. A quantitative approach was used for this. Data for the study was collected via survey instrument. A total of 203 people in various systems engineering roles in launch vehicle organizations throughout the United States voluntarily participated. Each latent construct of the study was validated using confirmatory factor analysis (CFA). Structural equation modeling (SEM) was used to examine the relationships between the variables of the study. The IBM SPSS AMOS 25 software was used to analyze the CFA and SEM.

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Approved for distribution by Waldemar Karwowski, Committee Chair, on October 2, 2019.

The public is welcome to attend.