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CAD MODELS IN PRODUCTION PLANNING FOR ARES V

Abstract

The paper will demonstrate the methodologies for establishing and utilizing Computer Aided Design models of a potential Ares V production facility, tooling and vehicle components and integrating them into manufacturing visualizations/simulations. These enabling technologies will allow Boeing and NASA to collaborate real time early in the design/development cycle of Ares V. This collaboration identifies cost effective and lean solutions that can be easily shared with Ares stakeholders (e.g., other NASA Centers and potential science users). Ares V production visualizations and analyses by their nature serve as early manufacturing improvement precursors to work with other Constellation elements to be built at the Michoud Assembly Facility like the Ares I Upper Stage, and the Altair Lander.

As with our Ares I USP contract, the key to this Boeing and Marshall Space Flight Center collaboration has been the use of advanced virtual manufacturing tools to understand the existing “Shuttle era” infrastructure and trade potential modifications to be able to support Ares V production. These approaches are then used to determine an optimal manufacturing configuration in terms of labor efficiency, safety and facility enhancements. These same models and tools can be used in an interactive simulation of Ares I and V flight to the Space Station or moon to educate the human space constituency (e.g., government, academia, media and the public) in order to increase national and international understanding of Constellation goals and benefits.

The paper will include realistic examples of the software tool usage and demonstrate its application in lean production of launch vehicles. The Ares V application of the software tools build on the significant maturation that has occurred during the Ares 1 program effort, incorporating various lessons learned in during the execution of that program.

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