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ASSESSMENT OF THE ORION-SLS INTERFACE MANAGEMENT PROCESS IN ACHIEVING THE EIA 731.1 SYSTEMS ENGINEERING CAPABILITY MODEL GENERIC PRACTICES LEVEL 3 CRITERIA

Abstract

NASA is developing the next generation manned spacecraft and launch vehicle for exploration beyond earth orbit including returning to the Moon and making the transit to Mars. Managing the technical integration of major hardware elements of a space transportation system is critical for overcoming both the technical and programmatic challenges in taking a complex technical system from concept to space operations. An established method of accomplishing this is formal interface management during systems development.

In this paper we will set forth an argument that the interface management process implemented by NASA between the Orion spacecraft and the Space Launch System (SLS) vehicle has achieved the Level 3 tier of the EIA 731.1 System Engineering Capability Model (SECM) for Generic Practices. EIA 731.1, Systems Engineering Capability Model, is an Industry standard for measuring the maturity of systems engineering processes being executed within technical organizations. It employs a set of specific practices for each systems engineering (SE) process, including Interface Coordination. It also includes a family of generic practices that apply across the delineated SE processes. The generic practices define organizational behaviors associated with process control and continuous improvement. The practices are associated with capability maturity levels ranging from Level 1, basically no control, to Level 5, typically associated with world class process implementations. The target for our implementation of Interface Management is Level 3, which has 4 particular success criteria.

We will describe the relevant Orion and SLS systems and associated organizations and define the EIA SECM Generic Practices along with the four Level 3 success criteria. We will provide evidence for our compliance with each success criteria. This will include a discussion of: 1) NASA Systems Engineering Interface management standard processes and best practices, 2) The tailoring of those processes for implementation on the Orion to SLS interface, including people, product and process aspects, 3) what we have changed over time to improve our tailored process, and, 4) our plans to take the lessons learned and drive change to our institutional processes and best practices. Finally, we will compare this evidence against the criteria to form the rationale for the declared SECM maturity level.

This paper on Orion to SLS interface management provides selected further details following from Smith, M., et al., discussion of "A Technical Integration Approach for NASA's Deep Space Human Exploration Programs," Paper IAC-14-B3.1, 65th International Astronautical Congress, Toronto, Canada, dated 23 July 2012.