

Abstract

Enabling and Enhancing Space Mission Success and Reduction of Risk Through the Application of an Integrated Data Architecture

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The engineering phases of design, development, test, and evaluation (DDT&E) and subsequent planning, preparation, and operation (Ops) of space vehicles in a complex and distributed environment requires massive and continuous flows of information across the enterprise and across temporal stages of the vehicle lifecycle. The resulting capabilities at each subsequent stage depend in part on the capture, preparation, storage, and subsequent provision of information from prior stages.

The United States National Aeronautics and Space Administration (NASA) is currently designing a fleet of new vehicles that will replace the Space Shuttle and expand space operations and exploration capabilities. This includes the 2 stage human rated lift vehicle Ares 1 and its associated crew vehicle the Orion, and a service module; the heavy lift cargo vehicle, Ares 5, and an associated cargo stage known as the Earth Departure Stage; and a Lunar Lander vehicle that contains a descent stage, and ascent stage, and a habitation module. A variety of concurrent assorted ground operations infrastructure including software and facilities are also being developed, assorted technology and assembly designs and development for equipment such as EVA suits, life support systems, command and control technologies are also in the pipeline. The development is occurring in a distributed manner, with project deliverables being contributed by a large and diverse assortment of vendors and most space faring nations.

Critical information about all of the components, software, and procedures must be shared during the DDT&E phases and then made readily available to the mission operations staff for access during the planning, preparation, and operations phases, and also need to be readily available for system to system interactions. The Constellation Data Systems Project (CxDS) is identifying the needs, and designing and deploying systems and processes to support these needs.

This paper details the steps and processes that NASA is applying within the Constellation Program to manage this data and information, and to insure that the correct information is available, correctly annotated, and can be provisioned digitally to enhance response times, and support engineering analysis and anomaly resolution.