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INNOVATION TO FLIGHT PORTAL

Abstract

The space mission engineering process is moving from a system supported by separated documents and computer applications to shared, networked software environments. New approaches such as model-based systems engineering (MBSE) rely on a single-source of truth, and coordinated inputs and outputs to that system. The central store of data has utility to a variety of analyses, reports, information searches, presentations, and more. As a result, there are multiple types of user, each with different motivations and goals. In this situation, it is important to consider a user-centered design approach to simplify the user interface, and to create efficient, intuitive workflows.

As part of the Launch MBSE project at NASA's Jet Propulsion Laboratory, the systems engineering team has incorporated user-centered design into the development process to continually improve the user-facing interfaces to the information contained in the model. The Launch portal is a web-based system that assists mission planners in manifesting launches, finding ride share opportunities, aggregating launch vehicle data, and flying innovations. This portal is meant to communicate, educate, and bridge the divide between innovation/technology and launch/project system engineering communities by providing users with the latest and most up-to-date in performance and manifest information.

The portal uses a Model Based Engineering Environment (MBEE) architecture that provides a complete open source tool set in the Engineering Modeling System (EMS). The framework features a backend model-management tool and a front-end web-based interface allowing engineers to access and connect to repository data. Open MBEE combines the design metrics of Systems Modelling Language (SysML) with the graphical documentation created using EMS.

The systems engineering team has taken a collaborative, embedded, design approach to facilitate communication across team members and to maintain a flexible software-development model. The user-centered design process includes conducting user research, generating personas, creating task flows, mock-ups, rapid prototyping, and continuous iteration on design and development with the help of user input at every step of the process.