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SUSTAINABLE PROCESS SOLUTION FOR MANAGEMENT OF SPACECRAFT HEALTH OPERATION DATABASE SYSTEM

Abstract

Telemetry and Telecommand Data Dictionary forms an integral part of Spacecraft Missions. The validity and integrity of the data dictionary are of utmost importance for carrying out successful Spacecraft Health Management operations. As many different stakeholders are involved in the preparation, maintenance, and usage of the data dictionary, change monitoring and propagation is a challenging task. For example, based on simulations and performance evaluations Data definitions may be fine-tuned. As performance evaluation is carried out in different test beds involving parallel activities, reflecting all updates in a central repository is essential to ensure that the correct version of the Data Dictionary is used in the Mission operations. Especially with the growing nature of missions and subsystem-specific requirements such as reusing a data dictionary of a subsystem from one spacecraft to another, consistency maintenance and ensuring that the valid one is in use is a huge challenge. Hence, Common DataBase Management System (CDB) has evolved to serve as an end to end solution for all the stakeholders to streamline the Spacecraft Data Dictionary Database management activities. CDB Process has thus evolved addressing the various aspects such as building a nomenclature, their assignments to bringing up data dictionary for mission, test, and in-orbit operations. It involves all the concerned stakeholders ranging from data owners to data users. As part of CDB, data dictionary unique identifiers serve as the central pool of definitions which can then be used to define any Spacecraft's Database later referred as The Satellite DataBase (SDB). Having common definitions across different stakeholders not only for a given Spacecraft but also across Spacecrafts will ease the information transfer across the different teams and enable the reuse and standardization of Telemetry Pages, validation schemes, test procedures, and operation plans across different categories of mission, making process sustainable across multi class of satellites. Spacecraft Data definitions for each subsystem in CDB are categorised into different Satellite classes and sub classes thereby forming a Tree structure. A newly defined Spacecraft automatically inherits the definitions from its parent classes. Thus, CDB facilitates centralised system enabling the porting of data dictionary for heritage systems across Spacecrafts as one of strong feature. CDB has established a sustainable process defining the roles and responsibilities of each of the stakeholders right from spacecraft configuration, data dictionary preparation, operation usage, and quality assurance verification and has been made operational for many of the ongoing ISRO missions.