Process Development and Configuration Management for Aerospace Projects

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Abstract

The advancement of computational technology and the use of embedded software have made the systems more complex and highly integrated this due to the large number of functionalities delivered and their applications in the most diverse areas, which includes: control aerospace vehicles such as satellites, rockets, aircraft, telemetry and remote control, etc. On the other hand, this complexity demands a robust development process, in which it is essential to version the work products and, especially, to control the changes in these products. In this way, investing and maintaining efficient configuration management should contribute to a successful and less error prone project, both in the phases of the development cycle and throughout the manufacturing process. Therefore, considering this context, I will present some steps to maintain an effective control of the configuration of a complex project, based on a method applied in the aerospace industry, which establishes key activities for the control of artifact baselines, requirements management, maintaining the product structure and delivering software releases and hardware versions. We will also deal with the concepts of configuration identification, configuration item, baseline, change management, document workflow and configuration control board, in addition to presenting some tools that will facilitate the implementation of efficient configuration management focused on complex aerospace systems. Biography: Danilo Graca has a master's degree in space management and technology from the Brazilian National Space Research Institute, has more than 8 years of experience in the aerospace industry, working with process management for the development of aerospace systems. Currently, he works with projects and processes at IACIT Soluções Tecnológicas S / A, a Brazilian company with technological expertise in development of products and systems applied to the Defense and Public Security, Air and Maritime Traffic, Control and Navigation (CNS / ATM), Meteorology and Telemetry. Its headquarters strategically located in São José dos Campos city - major center of aerospace of Brazil.

Keywords

Configuration Management, Aerospace, Requirements management, Systems Engineering

Back Ground

Digital technologies are radically transforming project delivery, breaking the mould of 1960s approaches to enable more rapid and agile forms of organizing [1,2]. Up-front project planning, using multiple layers of work breakdown structures, was established in the 1950s and 1960s to manage small numbers of large complex projects. New digitallyenabled approaches are emerging in industries that are dynamic and less predictable. In these, data analytics and visualization using large digital data-sets, along with rapid, informal interaction and exchanges of information, provide the basis for more responsive, flexible and real-time decisionmaking in project delivery. Yet, in complex engineering projects, this increasing use of large digital data-sets, or 'big data' as this is often termed, also requires new forms of control. Configuration management is a process of maintaining system integrity while handling changes to both the data-set and real world engineering system it describes. It is a systems engineering technique that has been used since the mid twentieth century, but has renewed relevance for managing change in large digital data-sets. In this paper we compare leading practices of managing change in Airbus, CERN and Crossrail. Table 1 gives a brief overview of these organizations, all of which engage in in digitally-enabled projects.

The contribution of this paper is to explain: first, why configuration management has become more, rather than less, important in complex engineering in an era of 'big data'; and second, how approaches to configuration management are shaped by these industrial contexts of civil engineering, nuclear research and aerospace.