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Interface management for complex products *

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Abstract

In this paper, an interface management framework is proposed to improve the information sharing during new product development. The paper shows how structured interface control documents (ICD) can be made and integrated into PDM software. To create structured ICDs, interfaces are modeled using object oriented technology. Once interfaces are modeled as objects, they can be integrated into PDM software. The interface objects should be defined based on standard interface attributes so that they can be formalized. A standard interface object model helps to reduce incompatible design decisions between the groups and to eventually lessen new product development time.

Key words: interface management, interface control document, systems engineering, multidisciplinary product

1 Introduction

Interface management has been defined as "*the management of communication, coordination and responsibility across a common boundary between two organizations, phases, or physical entities which are interdependent*" [1]. Interface management plays an important role in development of complex products. This becomes particularly important when a product is composed of subsystems from different engineering disciplines. For example, a flight simulator has mechanical, hydraulic, hardware, software and electrical subsystems. For such a product, it is necessary to clearly define subsystem boundaries and the interfaces between them to ensure proper functionality of the final product. In multidisciplinary products, managing the interfaces between subsystems, particularly, the non-physical ones (e.g., between hardware and software) is very challenging. Some of the benefits of interface management for complex products are the quality improvement of the physical connection, and the conflict reduction among project participants [2]. Ideally, given that the interfaces are properly defined, it should be possible to develop subsystems independently. The best way to integrate the subsystems of a complex product is through interface management [3].

Before managing interfaces, they must be identified first. Interface identification begins by recognizing system boundaries. The clearer the system boundaries are, the easier it is to define and manage interfaces. Once the interfaces are identified, their specifications are documented in what is called an interface control document (ICD). ICDs should provide easy identification of interfaces and the connecting components. However, they differ substantially from one company to another. This is because there are no standard definitions for intersystem interfaces. Moreover, ICDs are just pure documents, so they don't provide any data connectivity among the corresponding subsystems. This makes managing the design changes very difficult, and hampers new product development (NPD) projects. A good interface management system provides better information sharing

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