

SPACE SYSTEMS SYMPOSIUM (D1)  
Space Systems Engineering - Methods, Processes and Tools (2) (4B)

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ENABLING PRODUCT DEVELOPMENT METHOD

**Abstract**

This work addresses the development of a class of enabling products, known as Ground Support Equipment (GSE), necessary to support a space product during its integration and testing activities (AIT). We start this quest, by asking a fundamental question: Is it possible to develop enabling products without the Concurrent Engineering (CE) approach or with CE as an optional approach? System engineering standards and literature provide abundant material for the development of end products and address the development of enabling products by applying the recursiveness of the systems engineering process to the enabling products. Is it enough and effective? One consequence of that approach leads to difficulty in capturing the full set of requirements that describe the enabling products during the implementation analysis of the end products, as enabling product has not allocated any end product requirement, but instead, the enabling product has to support the end product during its life cycle processes. This relation indicates that design solution of the enabling product is coupled to the design solution of the end product and to its associated life cycle processes. A kind of relation that is different from the hierarchical system-product relation, assumed in the system engineering process as system decomposition. To overcome this difficulty, this work proposes an integrated development model, which correlates the development of the enabling product to the associated end product and the life cycle process. To exemplify it, the model is applied to a development analysis of one EGSE element. The conclusion is that concurrent development approach of end product, its life cycle process and associated enabling products, is not an optional approach of system engineering processes, but instead it is mandatory approach to derive an complete and effective solution to any element of the system.