



Development of Hybrid Product Breakdown Structure for NASA Ground Systems

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INTRODUCTION

- The Product Breakdown Structure is traditionally a method of identification of the products of a project in a tree structure.
- It is a tool used to assess, plan, document, and display the equipment requirements for a project.
- It is part of a product based planning technique, and attempts to break down all components of a project in as much detail as possible, so that nothing is overlooked.

Development of Hybrid Product Breakdown Structure for NASA Ground Systems

PRODUCT BREAKDOWN STRUCTURE (PBS)

- The PBS for ground systems at the Kennedy Space Center is being developed to encompass the traditional requirements including the alignment of facility, systems, and components to the organizational hierarchy.
- This paper will document, demonstrate, and identify key aspects of the life cycle of a Hybrid Product Breakdown Structure (PBS) developed for KSC Ground Operations.

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- The PBS is defined differently depending on the application or the organization developing the PBS.

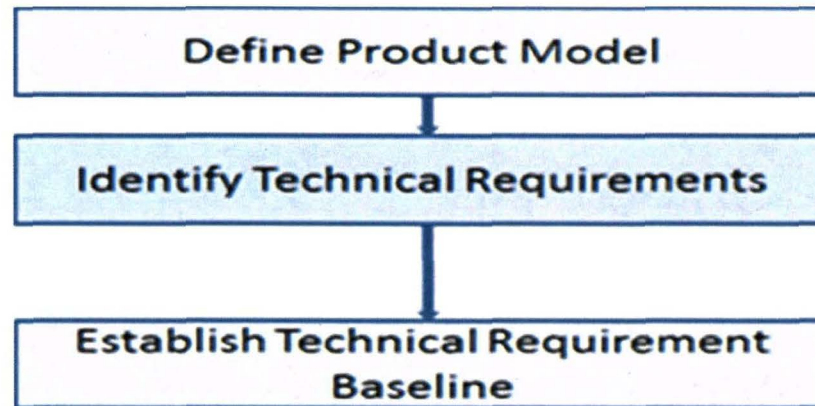


Figure 1. Developmental Decomposition

- The PBS becomes the single source for identification of hardware, software and the information products. As a result is a top-down High level matrix of the products and organizations necessary to baseline the project.

Development of Hybrid Product Breakdown Structure for NASA Ground Systems

HOW PBS RELATES TO PROJECT MANAGEMENT

- The PBS is used to identify the project deliverables at a summary level. It provides the hardware, software, and information listing for the completion of the project.

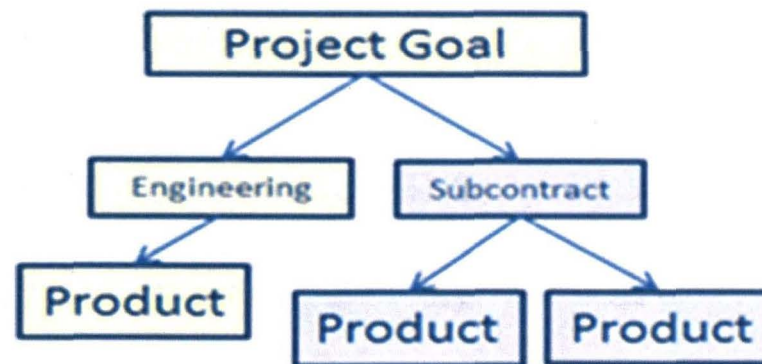
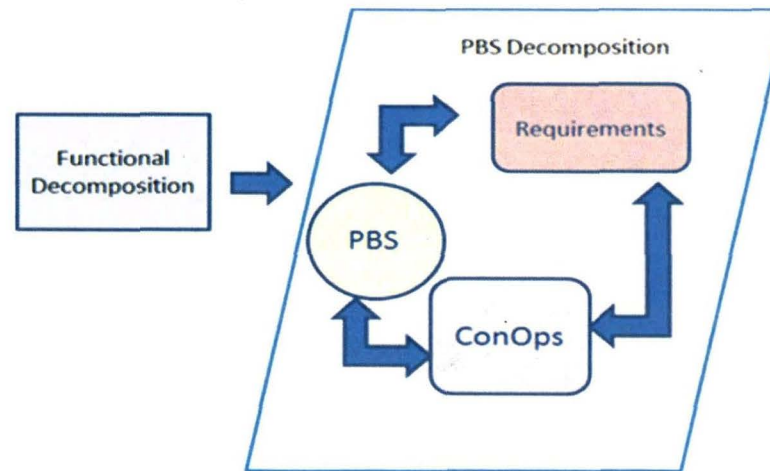


Figure 1: PBS as developed by Project Management

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HOW PBS RELATES TO SYSTEM ENGINEERING

- The PBS relationship to system engineering can be identified to three basic functional goals.
 - Translate top level requirements to functions
 - Identify functional interfaces into ConOps
 - Allocate functions in to the PBS



Development of Hybrid Product Breakdown Structure for NASA Ground Systems

THE MERGER BETWEEN PE AND SE USE OF THE PBS

- The merger of the two views of a PBS can be made to determine in a complex system first by, identification of various groups to provide deliverables, and second, to identify how operations relate to the individual systems. The intersection of PBSPM and PBSSE becomes the engineering group responsible.

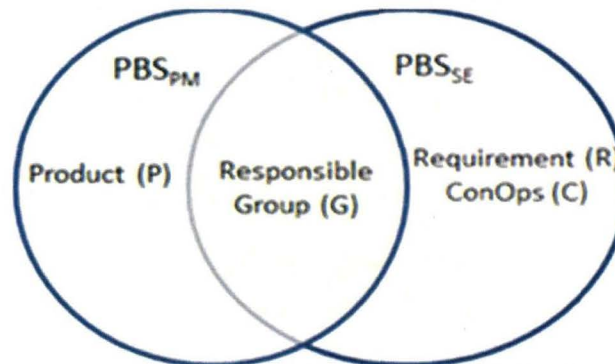


Figure 4. Intersection of PBS_{PM} and PBS_{SE}

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GSDO APPROACH TO PBS

- GSDO as a system engineering centered project has requirements to follow based on the customer (ESD). GSDO then establishes ConOps for the operation of the program based on the requirements.

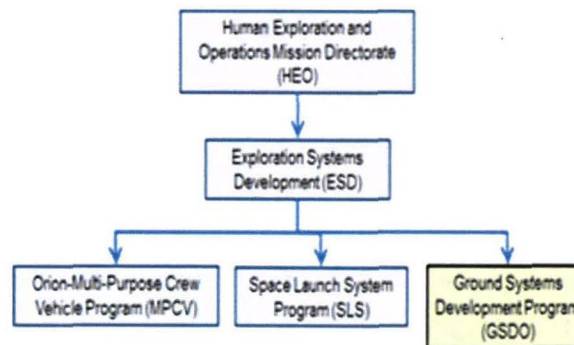


Figure 5. NASA Human Exploration Organization

- The individual subsystems utilized in the development of the GSDO PBS are identified in the Master Subsystem List (MSL).

Development of Hybrid Product Breakdown Structure for NASA Ground Systems

GSDO PBS Structure

- The IPT represents the level 2 part of the program with the EIT responsible physical locations or facilities.
- The systems/subsystems contained within the respective location or facility is managed by the program through the EIT.

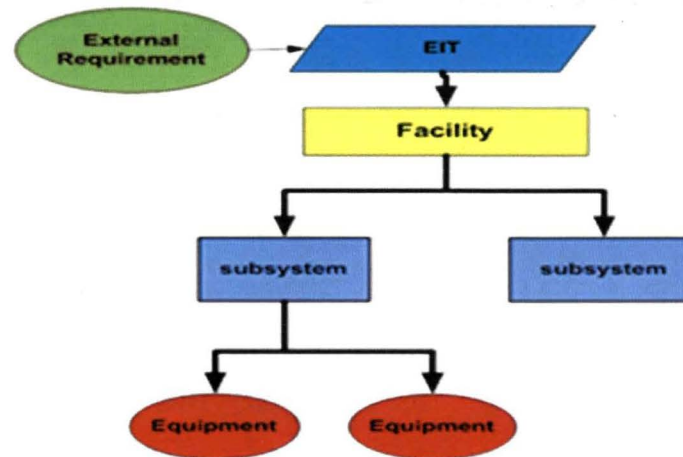
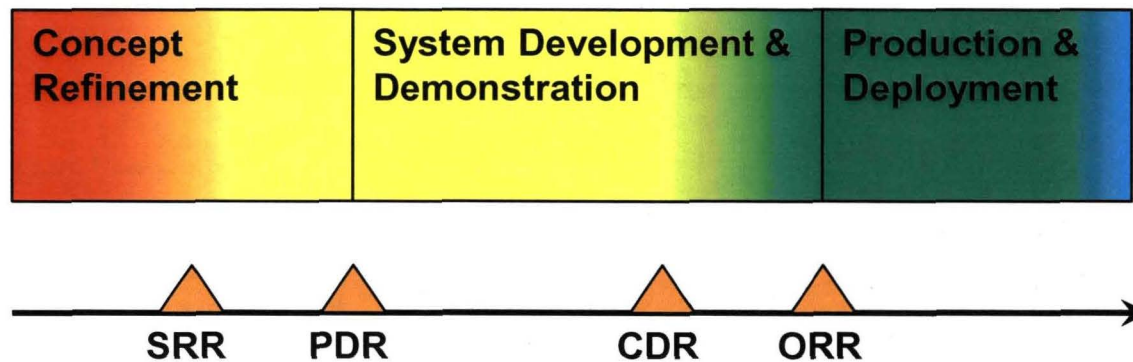


Figure 7. GSDO PBS Structure

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- SRR the PBS hierarchical structure is defined
- PDR the System & Equipment identified at Location
- CDR Baseline the Architecture
- ORR Adjust to As-Built Configuration/Support

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GSDO PBS SUMMARY AND CONCLUSION

- Communicates what is needed to build the Architecture
- Linkage between Program, Design, & Logistics
- Identifies Capability & Support requirements
- Provides a single source to locate subsystem documentation for a specific Architecture
- Provides a means for Operations to identify Architecture needs when multiple missions are competing for the same support.



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