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ABSTRACT

Translating Vision into Design: A Method for Conceptual Design Development

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One of the most challenging tasks for engineers is the definition of design solutions that will satisfy high-level strategic visions and objectives. Even more challenging is the need to demonstrate how a particular design solution supports the high-level vision. This paper describes a process and set of system engineering tools that have been used at the Johnson Space Center to analyze and decompose high-level objectives for future human missions into design requirements that can be used to develop alternative concepts for vehicles, habitats, and other systems. Analysis and design studies of alternative concepts and approaches are used to develop recommendations for strategic investments in research and technology that support the NASA Integrated Space Plan. In addition to a description of system engineering tools, this paper includes a discussion of collaborative design practices for human exploration mission architecture studies used at the Johnson Space Center.