

SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)

Space Technology and System Management Practices and Tools (4)

Author: Ms. Chiharu Sasagawa
IHI Corporation, Japan, c.sasagawa@gmail.comMr. Nejc Trost
University of Houston, United States, nejc@trost.si

SPACE VEHICLE CONFIGURATION DESIGN TOOL FOR INTERPLANETARY MISSIONS

Abstract

This paper presents a tool to calculate approximate configuration designs of modular space vehicles for interplanetary missions and to evaluate the modular vehicle design in its early stage. Modular spacecraft systems may reduce the development duration and the cost for near-earth orbit missions. The modular space vehicle design for interplanetary missions is more complicated than for near-earth orbit missions because of the trajectory calculations, the required larger propellant, and limited launch vehicle conditions. This tool provides a solution to reduce the complexity of the modular space vehicle design by calculating each approximate configuration. The tool calculates the number of modules, the propellant mass, the total mass and any other primary parameters of each vehicle with inputs of each module catalogue, the engine parameter and the mission parameters or the required delta-Vs. The algorithms and examples of the configuration design will be discussed.