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Space Vehicles – Mechanical/Robotic/Thermal/Fluidic Systems (7)

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Abstract

This presentation addresses iBOSS (intelligent Building Blocks for On-Orbit Satellite Servicing and Assembly) as building blocks for non-nuclear subsystems in INPPS (International Nuclear Power and Propulsion System) flagship. iBOSS are ideal mechanical, thermal, fluidic and data standardized building blocks to be used in autonomous robotic in-space assembly operations (referred to CAESAR (Compliant Assistance and Exploration SpAce Robot (CAESAR))) of INPPS in high Earth orbit above 800 km. Additionally iBOSS will be used after non-human Mars return of INPPS, new replacements of INPPS subsystems equipped in iBOSS for extended INPPS mission to Europa plus usage in a later first human Mars-INPPS mission. iBOSS building blocks are foreseen to be used in the non-human INPPS version (with wide wing radiators) in the second half of 2020th for space qualification – also already to Mars / Europa - and later in the 2030th in an arrow wing radiators version of INPPS flagship for human and cargo transport to Mars. These INPPS flagship versions with iBOSS were studied in a concurrent engineering study of the European-Russian DEMOCRITOS project. The study was supported by NASA Glenn Research Center and JAXA Tokyo. The result of the study related to iBOSS is, that the flagship will be – in considerable high quantity of the non-nuclear subsystems – be equipped with iBOSS. For example, these subsystems are the deployable boom, the tanks of the electric thrusters, the payload basket, the power processing units and the electric thrusters as well as the auxiliary solar power ring. Insofar these subsystems contribute to advancements with respect to engineering, manufacturing, assembly, test verification, reliability and service to reach the ten years operation duration of the new advanced space system INPPS.