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# ADAPTABLE INTELLIGENT SPACECRAFT MODULES FOR VARIOUS VEHICLE AND HABITAT ARCHITECTURES

**Abstract**

Future space missions will have two very distinctive features: duration of the mission and increasing distances from Earth. These two characteristics are related to a number of risk factors that may jeopardize the mission. Providing a habitable and comfortable interior environment rather than just a "livable" one is essential to secure missions' success. An Adaptable Intelligent Spacecraft Module is proposed as an answer to existing lack of habitability within space modules. This approach allows to increase crew's quality of living while avoiding additional volume and mass launch requirements.

This paper presents the next step in the Intelligent Spacecraft Module (ISM) research, exploring feasibility requirements and initiation of a methodological approach to material specifications. It explores the potential and necessary adjustments required for the ISM to be fitted within different architectures of vehicles and habitats. Since the ISM is conceptualized as an "add-on" to any kind of manned space environments, it must have an ability to fit within a variety of volumes and to be adaptable to different levels of gravitational forces. Four main scenarios are examined regarding human factors and performances, as well as load and stresses of the module itself on the overall structure of the vehicle or habitat. These scenarios are for LEO, HEO, very low gravity and low/medium gravity conditions.

The paper will propose major design changes and adjustments to be made on the ISM and will be presented as an adaptability study for similar proposals.