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SPACE ARCHITECTURE – ADVANCED MATERIAL HABITAT STRUCTURES

Abstract

The International Space Station has been humanities Low Earth Orbit (LEO) laboratory and home for human space exploration for more than 20 years. A new chapter is currently being developed through commercial space efforts to design, engineer and build space stations that can support a future LEO ecosystem. Advanced composite material structures can pave the way for a new generation of space stations that are stronger, lighter, less expensive and offer a range of design possibilities. This study includes the development of graphene reinforced composites, advanced manufacturing and architectural design of a habitat architecture. The composite materials and methods developed can be used in station-type facilities as large pressure vessels and shielding structures for habitation. The results of the study are intended to provide a roadmap and process for implementation in the future design of space architecture. The study provides opportunities for practical applications to support future prototyping and testing.