

Space Stations (9)
Design Concepts and Engineering Solutions (1)

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MODULAR SYSTEM FOR AFFORDABLE SPACE SETTLEMENTS

Abstract

Many designs have been proposed in the nearly fifty years since Gerard O'Neill proposed the space settlement as a new concept for space development. Due to their huge dimensions and consequent long construction times measurable in decades even with more advanced technology, lack of technology to utilize local space resources for their construction, distance from our planet, huge costs of realization and without a practical and profitable business activity model they are mostly unaffordable and non-buildable remaining exercises of theoretical space development designs. To overcome such limitations we are proposing a modular system for their assembly that would reduce construction costs and times of many orders of magnitude, be operative and affordable with a profitable business purpose. Such system consists in the assembly in LEO orbit, being more accessible of an initial ring shaped, to obtain 1G gravity conditions by rotation at appropriate speed, multifunctional second generation space station, based in perimetral inflatable modules joined together by a modular construction system of spokes rings and hub components based on minimum launches from Earth. Such system with a few modules would be immediately operational with several potential activities, like a space based launching platform, Earth-Moon transportation system and others. The first ring, of a diameter of 120 mt, can be completed in coordination with its business growth while, when completed a second ring, more distant from the hub, can be built utilizing resources from deflected asteroids, avoiding the expensive dependence from our planet. Also this second ring, of a diameter of 160 mt, could grow with small 20x40 mt modules, attached together, built from asteroid material along its business growth till the settlement will be fully operational. The two ring settlement would have all functions and be relatively independent from our planet and able to perform all necessary and future space services and activities, including, the construction of other new settlements for third parties interested in space development.