

22nd IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (D3)

Interactive Presentations - 22nd IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (IP)

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ISLAND ZERO: A PRACTICAL GATEWAY TO LARGE-SCALE SPACE HABITATS

Abstract

In the early 1970s, Gerard O'Neill and others developed plans for large habitats to be constructed in free space that could house 10,000 people. This level of design was known as "IslandOne".

O'Neill deliberately restricted the design to the technology of the time, so that no-one could suggest that it was fantasy due to requiring materials that had not yet been invented.

As a result of advances in materials and technology over the next 40 years that could make this program more efficient, a project was run at the British Interplanetary Society to re-examine and update the original studies.

There are various such designs, and they all assumed the structure would rotate to produce 1g. An initial question for the project was whether they needed 1g. Why not 0.9g, 0.8g or lower? A reduced value would mean less stress on the structure, so less material would be required for its construction. It would also mean less stress on the inhabitants, and they would not have to carry out two hours of exercise every day, as on the ISS.

In addition, construction would not begin with IslandOne; a much smaller structure would need to be established first, which would act as living and working space for the personnel that would assemble the facilities for construction. Importantly, it would rotate to provide simulated gravity. The associated question is how much the gravity can be reduced before it becomes a problem rather than a benefit.

An initial version of such a unit could be used to carry out the medical research necessary in order to determine the g-level to be used in larger space habitats.

This small unit would demonstrate many features of a full settlement but on a much smaller scale, both in size and cost, as a way of showing the viability of some of the ideas behind space habitation. This structure was designated as "IslandZero".

Made up of multiple inflatable or expandable units, some modules could be positioned to provide 0.9g, 0.8g or 0.7g. This will allow medical research to be carried out at different levels - simultaneously - to determine the best g-level to be used.

Modules could also be used for commercial space activities and space tourism.

Inflatable units have already been launched, and others are undergoing testing by Sierra Space. This means that with approval this unit could be constructed now.