

14TH IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)Novel Concepts and Technologies to Enable Future Building Blocks in Space Exploration and
Development (3)

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ARTIFICIAL GRAVITY CONCEPTUAL ORBITING STATION DESIGN

Abstract

One of the key challenges of long term human presence for exploration and research in low earth orbit is the microgravity environment. This environment is a key enabler for research on today's International

Space Station, but is also a major factor contributing to negative effects on the human body and mind. In order to expand the capabilities of a future orbiting station the element of artificial gravity will need to be added.

During the summer of 2016 a team of space professionals looked into the design challenges of a large orbiting facility in low earth orbit. This design challenge was part of the Space Studies Program 2016 of the International Space University, hosted at the Technion Israel Institute of Technology in Haifa. This orbiting facility should not only support microgravity and other space-based research, but also be a place to live, work and visit for much larger numbers of people than current space stations.

The Artificial Gravity Conceptual Vehicle Design includes key engineering and design considerations for a crewed low earth orbit space station, which uses rotation to provide artificial gravity. It will have a center section which will provide a microgravity environment for research and manufacturing, and will also serve as the docking location for the station. This vehicle will be a grand complex. It is designed to be orbited in the 2035 to 2040 timeframe, and it will make living and working in space commonplace. The station will be very large and provide an environment compatible with work and tourism. It is expected that up to 200 people may reside on the complex at any one time. Workers and their families will live on board. A hotel to house tourists will be part of the complex. There will be schools, stores, green areas with ponds or streams, a cinema, restaurants etc.