8.4.Appendix A: Abstract – Sphere Space Station Earth ONE and Beyond

Date: 2025-08-08

The *Sphere Space Station Earth ONE & Beyond* project presents a comprehensive vision for a sustainable, modular, and expandable orbital habitat designed to serve as a cornerstone for humanity's long-term presence in space.
At its core, the Earth ONE station is a 127-meter-diameter rotating sphere with sixteen coaxial cylindrical decks, each offering distinct artificial gravity levels, and a total capacity of approximately 700 inhabitants. The design integrates advanced closed-loop life support systems, high-efficiency nuclear and solar hybrid energy supply, robust thermal and radiation shielding, and modular docking infrastructure for spacecraft and robotic vehicles.

The documentation outlines technical specifications, material selection (including high-performance SiC-based composites), operational infrastructure, governance structures, economic feasibility, environmental sustainability goals, and phased expansion strategies toward lunar, asteroid belt, and deep-space stations.
A dedicated consortium model, public engagement strategy, and alignment with international space governance frameworks ensure transparency, cooperation, and equitable access to technology and benefits.

Beyond Earth ONE, the *Beyond* program foresees the deployment of autonomous stations, interplanetary cyclers, exploration crafts, and unmanned freight transporters to establish a connected network throughout the Solar System. This initiative aims not only to advance space science and industry but also to serve as a scalable blueprint for future off-world habitats and to inspire sustainable innovation on Earth.