8.1 Glossary

Definitions of key terms used throughout the Sphere Space Station Earth ONE & Beyond project documentation.

A

- **AI (Artificial Intelligence)**: Computer systems capable of performing tasks that normally require human intelligence, such as perception, decision-making, or language understanding.
- **Airlock**: A sealed chamber that allows movement between pressurized and unpressurized environments without compromising either atmosphere.
- **Attitude Control**: The process of controlling the orientation of a spacecraft or station in three-dimensional space.

B

- **Biosphere**: A closed ecological system designed to support life by recycling air, water, and nutrients.
- **Boosters**: Rocket engines or stages that provide the thrust necessary to reach orbital velocity or transfer between orbits.

C

- **Command Module**: The primary control section of a spacecraft or station where crew monitor and direct operations.
- **Cislunar Space**: The region of space between Earth and the Moon.
- **Cycler**: A spacecraft that travels on a regular trajectory between celestial bodies, enabling repeated transport without major propulsion expenditures.

D

- **Docking Port**: A mechanical interface that allows two spacecraft or modules to connect securely.
- **Delta-v**: A measure of the change in velocity required to perform a maneuver in spaceflight.

E

- **ECLS (Environmental Control and Life Support)**: Systems that maintain breathable air, safe pressure, and other life-sustaining conditions.
- **EVA (Extravehicular Activity)**: Operations performed by astronauts outside a spacecraft or space station.

F

- **Fuel Cell**: A device that generates electrical power through a chemical reaction, commonly between hydrogen and oxygen.
- **Flux Shielding**: Protective material or magnetic fields used to reduce radiation exposure.

G

- **Gimbal**: A pivoted support that allows rotation of a component, such as a thruster or sensor, about one or more axes.
- **GTO (Geostationary Transfer Orbit)**: An elliptical orbit used to transfer spacecraft from low Earth orbit to geostationary orbit.

H

- **Habitat Module**: A pressurized module providing living and working space for crew members.
- **Heat Shield**: A layer of material that protects a spacecraft from extreme temperatures during atmospheric entry or high-speed operations.

I

- **Inclination**: The tilt of an orbit's plane relative to the equator of the body it orbits.
- **International Democratic Solar Alliance (IDSA)**: Proposed governing coalition ensuring transparent, peaceful, and cooperative use of space infrastructure.

J

- **Jet Propulsion**: Thrust produced by expelling mass at high velocity, typically through rocket engines.
- **Jettison**: To deliberately discard equipment or material from a spacecraft.

K

- **Karman Line**: The internationally recognized boundary between Earth's atmosphere and outer space, set at 100 kilometers altitude.
- **Kill Switch**: A manual or automated mechanism to immediately disable an AI system or critical subsystem for safety reasons.

L

- **LEO (Low Earth Orbit)**: An orbit around Earth with an altitude between roughly 160 and 2,000 kilometers.
- **Launch Window**: The time period during which a launch must occur to reach a desired orbit or destination.

M

- **Microgravity**: A condition in which objects appear to be weightless because they are in free fall around Earth or another body.
- **Modular Architecture**: Design approach where spacecraft or station components are built as interchangeable units that can be added or replaced.

N

- **Nadir**: The direction pointing directly toward the center of the Earth from an orbiting spacecraft.

- **Nuclear Thermal Propulsion**: Propulsion method that uses a nuclear reactor to heat propellant, producing high-efficiency thrust.

O

- **O'Neill Cylinder**: A proposed type of rotating space habitat designed to provide artificial gravity through centripetal force.
- **Orbital Debris**: Nonfunctional human-made objects in orbit, such as defunct satellites or spent rocket stages.

P

- **Propellant**: Mass expelled by a propulsion system to generate thrust.
- **Pressurized Module**: A spacecraft section designed to maintain an internal atmosphere suitable for human occupancy.

Q

- **Quarantine Module**: A dedicated area where crew or materials are isolated to prevent contamination or illness.
- **Quick Disconnect**: A coupling that allows rapid connection or separation of fluid or gas lines.

R

- **Radiation Shielding**: Materials or structures designed to protect occupants and electronics from harmful space radiation.
- **RCS (Reaction Control System)**: Small thrusters used to control attitude or execute fine maneuvers.

S

- **Solar Array**: A collection of solar panels that converts sunlight into electrical power.
- **Space Debris Mitigation**: Strategies and technologies aimed at preventing the creation of new orbital debris and removing existing debris.

T

- **Telemetry**: The transmission of data from a spacecraft or station to ground control for monitoring and analysis.
- **Thermal Control System**: Equipment that regulates temperature within a spacecraft or station.

U

- **Uplink**: Communication link used to transmit commands or data from Earth to a spacecraft.
- **Uncrewed Vehicle**: A spacecraft or drone that operates without human occupants, often autonomously or via remote control.

V

- **Vacuum**: A region devoid of matter; in space, the near-perfect vacuum outside planetary atmospheres.
- **Vernier Thruster**: A small rocket engine used for precise adjustments to a spacecraft's velocity or attitude.

W

- **Waypoint**: A predefined coordinate used for navigation or mission planning.
- **Wet Workshop**: A method of converting a spent launch vehicle stage into a habitable volume after its propellant is expended.

X

- **X-band**: A segment of the microwave radio spectrum commonly used for deep-space communications and radar.
- **Xenon Propulsion**: An electric propulsion system that uses ionized xenon gas for efficient long-duration thrust.

Y

- **Yaw**: Rotation of a spacecraft around its vertical axis, affecting its left-right orientation.
- **Yeoman Services**: Routine maintenance and operational support tasks carried out by crew or automated systems.

Z

- **Zenith**: The direction directly away from the Earth, opposite nadir, as observed from an orbiting spacecraft.
- **Zonal Harmonics**: Variations in a planet's gravitational field due to its nonuniform shape or mass distribution, affecting orbital dynamics.