

In my opinion, a most relevant issue when regarding space exploration are space settlements and further space colonization.

Why build a space settlement? Reasons may vary, but in the end it all comes down to evolution, species perpetuation and knowledge of life surrounding us. After colonizing Earth and exploring our Solar System, targets will be set higher and higher and new boundaries will be looked forward.

Who will build and inhabit space settlements? Pioneers first. People like Louis Armstrong or "Buzz" Aldrin. Like the astronauts on the ISS. After the example is set, space colonies will be inhabited by all volunteers and candidates to pass the Space Inhabiting Exam.

When build a space settlement? A space settlement needs time. Time to be designed. Time for the pre-construction stage, for asteroid mining and for obtaining resources. Time for construction and inhabitation. Furthermore, space colonies need certain technology, so a first goal would be the development of nanotubes at a large scale and the creation of Artificial Intelligence.

Finally, after all these are decided and thoroughly taken into consideration, the development of life outside Earth may begin. The main areas when discussing a space settlement are Design, Technical Engineering, Construction, Life Design, Automation and Defense and Research, Business and Expansion.

The first issue that comes to one's mind when designing a space settlement is its orbital location. Although orbits like LEO, GEO or locations as one of the Earth's Lagrangian points sound feasible, in my opinion, placing a space settlement around the Sun is ideal. The Sun is the source of life throughout our Solar System, and in the case of an orbital settlement, it would offer 24/7 electrical power as well as the very-needed natural sunlight. Since it will orbit the Sun, this hypothetical space settlement will be, from now on, called Solaris.

The first chapter is the "kintesenta" of the space settlement, it is the introduction to the design philosophy, to Solaris' layout and the crucial parameters that represent it. Solaris' design comes from our Sun, the source of all life. Besides, a symmetric model has kept in order to endow Solaris with equilibrium and stability. Its layout makes the settlement spacious and organized, ideal for small communities and neighborhoods. The space settlement's parameters have been decided upon as realistic as possible considering the 10,000 people limit given by NASA.

The Technical Engineering chapter follows that Solaris is a safe, comfortable environment. In order to achieve this, volumes must be pressurized and oxygenized, sections must be rotated in order to generate gravity. After these are requirements are accomplished, food must be produced and recycled, water must be chemically generated, waste must be recycled, sunlight must be directed through all over the settlement and artificial weather created.

Moreover, radiation protection must be ensured, materials must be decided upon, and elevators must be fixed. All these are explained thoroughly in Episode Two-Technical Engineering.

Episode Three-Construction of Solaris fully describes the procedures through which materials for Solaris are obtained, Solaris' final orbit, the settlement's transfer and its construction sequence. The materials are mined from asteroids and from the Moon using robots and complex mining methods. The decision regarding Solaris' orbit is motivated, and the transfer procedure is described.

Finally, the space settlement's construction sequence is thoroughly discussed, as well as the adaptation and monitoring of the first solariens. In order for the solariens to adapt, homes and communities have been especially designed for Solaris. Schools, theatres, shops, all have been placed all through the residential tori. The transport on Solaris is made with magnetic levitation vehicles, which are very silent. Parks and playgrounds are all over Solaris, bringing the green life on Earth in space.

Episode Four, Life Design, details and thoroughly explains all elements of designing a comfortable life in space.

Episode Five, Automation and Defense describes all defense systems. Defense is a crucial part in space structures designs as it prevents danger. Preventing danger is much easier than having to cope with the disastrous results afterwards. Dangers are split up into three main sections depending on the seriousness of the damage to be inflicted. Automation will be applied after Artificial Intelligence is created, but, robots as they are now prove to be very helpful with Solaris' maintenance.

Episode Six, Research, Business and Expansion covers three very important areas in Solaris' purposes.

Research is covered here, space environment, the absence of gravity and the vacuum giving endless opportunities for scientific research. Business mainly explains the coverage of Solaris building costs by space resources as asteroids full of rich metal and by the creation of perfect crystals in microgravity. Expansion covers a possible future space project, and that is an asteroidal base. Three models are presented and described, along with their construction sequences and life support systems.

These being said, at least theoretically, the construction of a space settlement is possible, and achievable with proper funding and research. A way to fund such a project would be asteroid mining, already undergoing in multinational companies, with great progress having been made by Planetary Resources. Taking all these into consideration, one could say that the world is on its way to reaching a new boundary in space exploration!