Paper ID: 48021
student

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Interactive Presentations - IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (IP)

Author: Mr. ADITYA VEDANTHU
R.V.College of Engineering, India

CONSTRUCTION OF BASIC HUMAN HABITATS ON PLANETARY/LUNAR PLACES WITHOUT DIRECT HUMAN INVOLVEMENT

Abstract

Space exploration and colonizing is the dream of the human race.To achieve the dream, we will have to build lunar colonies to live on the moon and then be able to use them as a base to explore deeper into space.

Building habitats on any lunar surfaces is an issue that needs to be addressed effectively and efficiently.The idea of transporting pre-fabricated dwelling blocks and assembling them on the surface of the moon,is difficult due to associated costs and other challenges.Even if we are able to transport pre-fabricated blocks,we still need to assemble them on the surface of the planet.Such surface-based shelters will expose us to 'asteroids impacts',cosmic/solar radiation,intense cold,space vacuum, in addition to other problems.The abstract proposes to overcome the constraints listed above.

Instead of transporting building materials to space,a viable option would involve the use of in-situ materials available in/on the moon itself.This is of paramount importance,since it overcomes a key obstacle of transporting materials.Secondly,constructing underground habitats will help us succeed in dealing with the issues related to asteroids impacts, radiation and other problems.The scope of the abstract is limited to building underground chambers/enclosed spaces on the moon.

The strategy relies on the use of 'a swarm of small-to-medium sized robots' to dig,excavate and build underground chambers.The construction would be completed over a period of time,thereby making them available for space crews to upgrade and use after completion.This approach will rely purely on robots,existing robotic technologies,software systems,artificial intelligence plus other relevant systems to achieve the goal with no human intervention on-site.Human involvement will be from ground control stations based on earth.Existing technologies are available to plan,implement and execute the proposed strategy.Some of the technologies are in a nascent stage but have made significant progress.

Research and technology development/integration can be carried out to support the abstract.These will cover areas such as power sources, robotic automation [pre-programmed instructions to perform simple digging/excavation],robotic communication interfaces,on-site maintenance,spare-parts for use in cases of robot breakdown,chamber specifications,lunar geology,communication systems,just to name a few.

Such planned underground chambers/habitats can be constructed over time by the robots, with no human involvement and minimal risk.Thus, space crews can travel from earth after the construction of the habitat and build airlock chambers.A chamber with breathable air would be a good start for further activities on the planet/lunar surface.