FAR FUTURE (D4)
Human Exploration Beyond Mars/Interstellar Precursors Missions (1.-D4.3)

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AN UNMANNED MISSION AS A STEPPING STONE TO HUMAN VENTURE BEYOND MARS

Abstract

Looking ahead at 2100, it is not impossible to imagine humans sailing beyond Mars and perhaps even the solar system, exploring the vastness and beauty of the cosmos. However, for such futuristic manned-missions to have the slightest chance of success, there has to be precursor unmanned missions to provide crucial stepping stones.

Beyond the solar system, unlike Lunar and Mars missions, the course of a space craft cannot be controlled from the earth using current communication technologies. Hence it would necessary for a space-craft to decide its own course and make its own decision whenever need arises. The space-craft should be able to learn from its past experience (much similar to our human brain and also mission learning), so that it will be will able to foresee similar dangers in the future. It should also be able to make wise decisions and plan its course so that fruitful results are transmitted back to the earth (once it is able to establish communication with the earth again). Most importantly, the spacecraft will have to continuously replenish its energy supplies to survive through its entire journey.

A possible solution for such a space craft would be to:

• Use locally available sources of energy (like radiation from surrounding bodies) to replenish itself continuously

• Plan its course by using the bodies in its vicinity as reference points.

• Use the various parameters like radiation, gravitational fields etc to categorize various objects it encounters and to identify its reference

• Change its set of reference points at various stages.

• Store all data about its journey (right from the beginning), so that it will enable the space-craft to get accustomed to the environment and train itself to not only avoid dangers and decide its future course but also return back safely to the earth (especially in case of manned missions).

The lessons learned during such an unmanned mission would greatly help in planning future manned missions and in identifying possible locations for establishing human colonies, particularly planets that are best suited for Terra-forming.

The concepts underlying the design of such a space-craft system and its navigation, as a precursor to manned missions beyond Mars, would be discussed in the paper.