Paper ID: 13114
oral

SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (D3)
Systems and Infrastructures to Implement Future Building Blocks in Space Exploration and Development (2)

Author: Mr. Bernard Krummenacher
U3P (Union pour la Promotion de la Propulsion Photonique), Switzerland, astro@silicon-peace.com

AN ORBITAL FACTORY FOR MODULAR SOLAR SAILS

Abstract

Deployment (unfolding or unrolling) of large monolithic solar sails in orbit is a difficult problem that may never totally get rid of the deployment system overhead mass, thus will reduce the propulsion efficiency of the sail. Using deploymentless modular solar sail tiles that will be assembled in orbit could be a solution to this problem. The tiles may be manufactured in factories on earth and sent into orbit ready to be assembled. They may also be manufactured in an orbital robotic factory using raw material sent with separate launchers than the one used to launch the factory. This paper describes such a factory and makes a rough cost analysis for a kilometer square modular solair sail. Due to its size constraints, the output rate of an orbital solar sail factory is drastically limited and therefore the assembly time of a kilometer square sail may take years to complete. A scenario is proposed to efficiently use the sail tiles as they come out of the factory until final full sail assembly. Similar orbital factories can be used for building the collectors of orbital solar power plants.