

SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FAR FUTURE (D4)

Novel Concepts and Technologies (1)

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STRATOBASE: A SPACE LAUNCHING BASE IN THE STRATOSPHERE

Abstract

To lower space accessibility costs, by at least one order of magnitude, different approaches must be evaluated to achieve such a goal. The state of the art for launching payloads from the ground must be reinvented because it has already been demonstrated that it is an extremely inefficient process. For this reason, when we were developing the “Multibody Advanced Airship for Transport” (MAAT) project concept for the European Union FP7 project, a cruiser-feeder airship, entirely green, transportation system, we realized that it is possible to utilize such a system, conveniently revised, as a stratospheric platform for launching space payloads. The proposal consists of several modular hexagon shaped “lighter than air” (LTA) airships, with a 100 meter diameter, which will be launched unmanned individually. These airships will rendezvous and connect at “Very Low Earth Orbit” (VLEO), to form a much larger cruiser airship, which can remain permanently in the sky. Powered by PV cells, this cruiser airship will be permanently stationed in the stratosphere in a convenient location. Equipped with facilities to manufacture LOX from the atmosphere, it will receive incoming feeders, transporting rockets and payloads for space destinations. Powered as MAAT, by PV cells during the day, and hydrogen fuel cells by night, the entire system will be completely autonomous in the air. It will be equipped to allow the docking of the incoming feeders that, once fueled, all empty tanks, will leave the spaceport and allow launching of the rocket with its payload. After launching, the feeder can return to its land base safely. Such system may reduce an order of magnitude space accessibility costs, allowing larger vehicles to be sent on demanding missions that require heavy payloads. In this paper, we describe the concept and the preliminary design, systems, vehicles and procedures, to make the entire operation successful and achieve the expected goals.