

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
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CHASE – COMMERCIAL HUMAN SPACEFLIGHT EXPEDITIONS

Abstract

In the 2021 Fall term, the ASTE Studio focused creative efforts on how commercial human spaceflight in the United States could catalyze space activity around the globe and steer the future of human spaceflight. With an eye on NASA's Gateway and Artemis projects, the CHASE project cast the net wide, to seek out synergies and collaborations sans policy limitations. By starting to explore the future of governmental and commercial activities in low Earth orbit, on the International Space Station, and evolving outward to encompass cislunar space and our Moon, the USC CHASE project imagined and created potential concepts that we feel are worthy of further investigation. Topics explored included Commercially focused Utilization of the International Space Station, Uses of a Human-tended Geostationary Space Station, Evolution and Uses of an Advanced Cislunar Communications Infrastructure, Importance of Establishing a sturdy Earth-Moon Logistics Channel to support 21st century cislunar traffic and a permanent human lunar surface presence. A scientific exploration mission for the Artemis III crew to retrieve solar activity records to help build a much more complete solar behavior model over geologic time that can inform Climate Change on Earth and also explore the interior of a lunar lava tube, a concept for a Robot scout assistant rover for lunar surface crew in EVA, and Crew safety and rescue Infrastructure establishment before commencing Artemis missions that can also be used in case anomalies arise are proposed as well as the evolution of nuclear power systems for lunar applications. Commerce is the lifeblood of modern civilization. Several American space companies are sprouting that continue to broaden human spaceflight capability and expand CHASE allied engineering capacity needed to grow and mature this fully homegrown space industry ecology. Powered by the plummeting costs of components and methods like advanced additive manufacturing, a wide stable of launchers and private spacecraft are entering the space activity domain once considered the monopoly of governments. Synopses of visions created in the CHASE concept studio are presented. Welcome to USC ASTE527 2021 CHASE Graduate Space Concept Synthesis Studio dear colleagues, where architectural and engineering minds work together to imagine the "what can be" of human spaceflight.