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Strategies for Rapid Implementation of Interstellar Missions: Precursors and Beyond (4)

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THE EFFECTS OF THE TIMELINE EXPANSE OF CURRENT TECHNOLOGY VERSUS PROJECTED TECHNOLOGY ON THE ROAD MAP TO THE STARS

Abstract

Developing a realistic master plan for traveling to the stars needs to account for a network of intersecting elements and milestones including the perpetual advancements in space travel technology and scientific discoveries. Space travel depends on multidisciplinary fields of engineering, natural sciences, social sciences, and cognitive sciences. In addition, designing space missions are directly affected by the daily advancement in electronics and telecommunication technologies that are influenced by the fast development in IT hardware and software, 3D printing, IoT, AI and machine learning, and nanotechnology.

Such approach depends on assessing the requirements for functioning spacecraft, based not only on current science and technology, but also on futuristic advancements.

The comprehensive Road Map to the Stars integrates gradual space travel from lunar missions to interplanetary, and interstellar trips, with a timeline where all involved expeditions are evaluated based on their technology readiness. The sequence of designing, building, and testing stages are defined. While some missions have been accomplished, others are awaiting the appropriate science and technology developments to be realized. Afterall, all the multidisciplinary aspects involved in designing and building space travel elements are part of a dynamic matrix.

In the past few years, advancements related to space travel research and missions took place: Landing Perseverance on Mars; Launching Parker Solar Probe; China's Chang'e 5 lunar mission and sample return; SpaceX's crew mission; Such remarkable events and noticeable milestones are directly connected to the sequence of achievements which affect the deep space travel timeline. Interstellar travel field witnessed vital developments with the Breakthrough Starshot project to build a prototype for a micro light-propelled interstellar spacecraft and the accelerating discoveries of exoplanets. The progress of Breakthrough Starshot is part of measuring the schedule progress

The dynamic road map combines the factors of science and technology while accounting for future developments, in a gradual schedule from Earth's LEO to interstellar exploration over the upcoming 150 years. Its details work on: 1) Addressing deep space structural, environmental, and human needs, 2) Defining destinations and missions, 3) Completing a sequence of gradually advancing probes and missions within our solar system and beyond. 4) Outlining the type and number of successful missions required to advance to next milestone. 5) Assessing COVID effects on progress