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FUTURE PROSPECTS OF SPACE TOURISM SUSTAINABILITY BASED ON CURRENT STATUS AND AVIATION TOURISM DEVELOPMENT HISTORY

Abstract

The purpose of this paper is to investigate the sustainability of space tourism based on its current development status and referring to the development history of aviation tourism. This study focuses on the following major points: (1) futuristic (suborbital and orbital space) travel vs. traditional (aviation) travel, (2) infrastructure in suborbital and orbital tourism vs. aviation tourism (3) market demand vs. supply availability, (4) technology maturity vs. risk assessment, and (5) development cost vs. ticket price (affordability). In suborbital space tourism, the Virgin Galactic completed six commercial spaceflights (Galactic-1 to -6) in seven months from June 2023 to January 2024. Also, the Blue Origin completed six commercial spaceflights (NS-16 and NS-18 to -22) in 13 months from July 2021 to August 2022. In the orbital space tourism, seven space passengers traveled eight times to ISS from 2001 to 2009 through the arrangements of Space Adventures, Russian Roscosmos and Energia. Then on 7 June 2019, NASA announced second time a plan to open the ISS to space tourism. From 16 September 2021 to 21 May 2023, three commercial spaceflight missions have been made: Inspiration4 mission, Axiom Mission 1 and Axiom Mission 2. NASA tries to create a tourist spaceflight market for sharing the developing cost of future commercial space stations. Referring to the aviation tourism development history, the current space tourism status is mostly like its status at late 1950s. The creation of jet aircraft and the airline deregulation in 1978 can be considered as the two major watersheds from “adventure” to “prosperity” to “popularization” of the commercial airline industry, passenger experience and aviation tourism. At the civil aviation ”adventure” stage in 1940s, flying was very expensive and discomforts. Only business and wealthy travelers, a tiny fraction of the traveling public, could afford to fly. It took 20 years (from late 1950s to late 1970s) for the aviation tourism to become maturity. The current stage of space tourism is “adventure”, might mean it needs 20 more years to enter “prosperity” stage and then “popularization” stage. There are many infrastructures still need be established such as: space tourism industry chain, legal and regulatory issues, criteria for passenger screening and training, insurance issue, space port, space traffic management and control, etc., etc. However, suppose we were standing at 1950s to outlook and prospect the civil aviation industry, the sustainability of space tourism could be expected based on the current development status.