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GAMIFICATION STRATEGIES TO OPTIMIZE HUMAN SPACEFLIGHT TRAINING PROCESSES FOR SPACE TOURISTS USING IMMERSIVE TECHNOLOGIES

Abstract

In recent years, Virtual Reality (VR) applications have become widespread in the gaming industry thanks to the progressively lower costs and technological development of VR headsets. As results of this breakthrough, the usability of these devices has reached unprecedented levels supporting their diffusion for a large user base. Companies such as SpaceX, Axiom Space, Blue Origin, Virgin Galactic after having spent years developing their launch vehicles and ground infrastructure they will need to assess the training procedures to integrate space tourists with no background in space operations into the crew, offering high safety standards and a robust technical preparation. VR applications can guarantee a high level of immersivity needed to prepare the next generation of Space Tourists for the experience without disrupting their lives with long and intensive training sessions in dedicated facilities. This paper aims to define the characteristics of VR tools specifically designed to provide training activities for space tourists, the order of operations and the gamification process used for the different activities. Such applications will make heavy use of biometric and biofeedback data to improve the training process, enabling a highly personalized experience. Aerospace companies can collect the data to track the advancements of the training and recommend optimized tasks to improve the readiness level. The reference market is intended for a large sector of commercial spaceflight operations: sub-orbital, orbital, and partial gravity. The flexibility offered by contemporary VR devices allows high interactivity with the simulated environment, and the paper addresses the use of both current and near-future technologies, implementing the lesson learned from the gaming, medical and industrial field. In conclusion, the authors provide a proposed development and implementation timeline as a proof of feasibility for the aerospace industry, classifying the advantages of such a strategy against traditional spaceflight training processes.