

## 24th SYMPOSIUM ON SPACE ACTIVITY AND SOCIETY (E5)

New architectural, Strategic and Design Approaches to the Future of Human Space Flight (1)

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## DESIGNING MIXED GRAVITY EXERTION GAMES FOR HUMANS IN SPACE.

**Abstract**

The recent boom of private-space-related activities – from Space-X, Virgin Galactic to the X-Prize challenge and broad public appeal of successful musical transmissions from the NASA MARS rover Curiosity and utilisation of the International Space Station – is contributing to a significant shift in perception and openness to the notion of civilian-designed initiatives for wider human access to space. This paper examines opportunities for new design strategies at the intersection of human movement and the body to create accessible and creative interactions in simulation environments and Earth-based analogue training environments for future engagements in the space.

We focus on technology, physical exertion and play harnessed to approach two challenges: a) designing altered-gravity exertion games for Earth-based analogue and simulation environments – preparing the physiological, psychological, psycho-spatial and human-factors interactions or training; and b) designing altered-gravity exertion games for Space environments contributing playful-yet-useful interactions supporting wider-human health considerations in these environments. We present projects of the Exertion Games Lab to discuss how the designs consider prior knowledge of humans exposed to the space environment; the historical mapping of activities undertaken by humans in these spaces; and research of parallel activities in extreme space from saturation divers, to miners, acrobats to mountaineers then combined with the playful or gameful techno-engineering and human-computing interactions for current, and predicted interactions on Earth and in extreme future environments.

Why is this significant? History shows Space is a highly sophisticated and expensive field of inquiry and the margins for ad-hoc experimentation, pre-ordained moments of improvisation, play and intuitive, imaginative are challenging - unless of course, you are an astronaut or delegate already undertaking approve science or engineering and then such ingenuity is considered genius. Key priority research areas, codes of conduct, security and access to human and material resources, have been directed largely by politics, mission requirements, timelines and budget parameters, filtering down to effect the opportunities for artists, inventors, and designers to partner, collaborate, practice and connect with space professionals and their activities and resources, that is, until recently. This shift in opportunity, focus and possibility is explored to ask how projects like Gravity Well: Underwater Play, and iFall:iFloat:iFeel adopt an interdisciplinary design solution to this burgeoning frontier opportunity. Recommendations are made for future development of civilian-based exertion game interactions in extreme and altered-gravity environments from undersea – to the extremes of space.