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THE BLUE ABYSS COMMERCIAL ASTRONAUT TRAINING CENTRE: ENABLING SPACE FLIGHT PARTICIPANTS TO FLY SAFELY

Abstract

The number of humans having flown in space will increase dramatically and exponentially in the coming years when first commercial suborbital flights, orbital flights, and human missions to the Moon and Mars will become a reality. This new step in space exploration will only be possible if adequate and professional training is provided, a contention supported by a recent study of suborbital spaceflight preparedness [1]. In this study involving a simulated suborbital flight, half of participants could not safely complete an emergency procedure whilst another fraction was convinced to have performed it correctly while having actually failed. The findings suggest that currently the majority of future space flight participants may have insufficient knowledge of operational procedures and that task performance in stressful conditions may be suboptimal for many, putting their lives at risk in emergencies. It is therefore of the utmost importance to adequately train and prepare future commercial space flight participants. The fully integrated approach to training proposed by Blue Abyss, a UK-based company, with potential expansion to the Middle-East, USA, Australasia, and Japan, offers such a training programme, utilising a facility built around four main axes: (1) A versatile multi-use dive pool with several platforms from 3m to 20m, an Astrolab module located at a depth of 12m, and a 50m deep shaft; (2) a centrifuge to train future astronauts and to refine the study of hypergravity physiological effects; (3) a parabolic flight capability to offer zero, reduced and hyper gravity for space preparation training and human physiology research; and (4) an education and outreach centre to promote STEM learning in the general public and in particular the young. The capability to train mentally and physically at various gravity levels, including 0g and partial g, will be epitomized by the use of the underwater facility and during parabolic flights. The Astrolab pressurised, underwater module will accommodate crews for short and long duration missions to train at '0g', at 'Moon-g' or at 'Mars-g' with special buoyancy equipment. Aircraft parabolic flights with dedicated mock-ups will offer further capabilities for orbital and 'off world' familiarisation and training. Meticulous preparation using multiple parabolas will enable space mission procedures and protocols to be carefully and successfully practised so that commercial spaceflight participants can fully enjoy their time in space.

[1] Stratton et al. (2018). Insight and task performance in simulated suborbital spaceflight: implications for informed consent. Aerospace Medicine and Human Performance. 89:3 p255.