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PREPARATION AND TRAINING OF ASTRONAUTS AND GROUND FORCE AT BLUE ABYSS

Abstract

Blue Abyss (<https://blueabyss.uk/>) develops training facilities to prepare the future space and ground force needed to sustain the expansion of human activities in space. The three main Blue Abyss training facilities are: centrifuges for training at different gravity levels from 1g to 12g; aircraft parabolic flights for training at zero, partial and hypergravity levels from 0g to 3g; and deep diving pools with platforms from 3m down to 50m, with an Astrolab platform at 12m that will support short to long duration simulations of crews living and working in underwater pressurized modules at simulated 0g, Moon g and Mars g with specially adapted buoyancy equipment. These facilities provide a fully integrated approach to training with cognitive and physical components tested at various gravity levels. The human centrifuges provide high g exposure for launch and return training. Aircraft parabolic flights with dedicated mock-ups will offer a wide range of research, operation testing and training capabilities for orbital and 'off-world' familiarisation. Extravehicular Activities (EVA) will be simulated and rehearsed in the pool using the facilities on the Astrolab platform. Simulated 0g EVAs will be conducted to train for EVAs from orbital space stations in low Earth orbit and in the future, from the Moon Gateway station. Simulated partial g EVAs will be conducted to train for EVAs from extra-terrestrial planetary surface bases like the Moon and Mars. Meticulous preparation using these and other normally difficult-to-access facilities will enable space mission procedures and protocols to be carefully and safely practised. The forthcoming space and ground workforce needed to grow and operate the commercial space sector as it expands will be prepared and trained at Blue Abyss centres at various locations around the world. Presently, two centres are considered: the first in Cornwall, South-West of The United Kingdom, and the second in Cleveland, Ohio, USA. Discussions for both centres are advanced and the implementation phase for both centres is foreseen to take place in the 2023-24 timeframe. The paper will present the integrated training approach pursued by Blue Abyss and the status of the UK and USA centres.