HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Commercial Human Spaceflight Programs (2)

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HELIUM: A COMMERCIAL EUROPEAN NEAR-SPACE BALLOON-BORNE LABORATORY

Abstract

Space technologies are on a continuous growth path and many new developments (related to flagship space programmes like Galileo or Copernicus, and a long tail of other space initiatives) need to be tested, demonstrated and validated before being accepted by the industry. Currently, these new developed technologies are tested on the ground, using climatic chambers that simulate one or a few space conditions. However it remains hard to simulate the integrated effect of all space conditions at a time and to understand the interactions between them and their effect.

Zero2infinity has developed and partially tested a novel system concept allowing a cost effective acces to near-space by means of high-altitude balloons. The concept is an environmentally friendly solution that uses helium to fill the balloons, without using any polluting elements as propellants like other space access technologies. Moreover it requires no large infrastructure to give scientists access to space-like conditions for research and equipment tests.

The HELIUM (High European Laboratory for Institutes, Universities and Markets) project was granted a phase 1 SME Instrument by the European Commission in 2015 and aims at offering European space companies, researchers and scientists a platform to access space-like conditions, with more flight opportunities and at lower costs to test, validate, demonstrate and calibrate technologies, equipment and new concepts to increase their TRL, boosting up the competitiveness, non-dependence and innovation of the European space sector.

Initially, the proposed platform will be designed to perform short duration flights (a few hours at altitude) for 2 passengers up to an altitude of 40km. The benefits of the proposed platform include: (i) bridging between ground testing (TRL ¡5) and IOV/IOD, (ii) long exposure times and less strict requirements compared to sounding rockets, (iii) low cost and increased flight opportunities compared to orbital access, (iv) crewed platform, offering astronaut-like capabilities for researchers and scientists.

This paper will present the results of the phase 1 study about the technical viability as well as the sustainability and profitability of the HELIUM solution.