SPACE LIFE SCIENCES SYMPOSIUM (A1)
Human Physiology in Space (2)

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PROGRESS OF AGREE PROJECT: MULTILATERAL PROJECT ON THE EFFECTIVENESS OF ARTIFICIAL GRAVITY WITH EXERCISE

Abstract

AGREE is a acronyms for Artificial GRavity with Ergometric Exercise, and this project proposes the first in-flight testing of the effectiveness and acceptability of short radius artificial gravity (AG) as a countermeasure to human deconditioning on orbit. The concept is a very old one, although the implementation using a short radius centrifuge is relatively new. The ground based research supporting the in-flight AG validation we propose has been extensive, and includes research at ground centrifuges under the direction of the members of the investigator team in Nagoya/Nagakute, Houston/Galveston, Boston, Antwerp, Cologne and Toulouse. We propose to use the unique opportunity of testing astronauts on the ISS for this purpose. In order to appreciate the deconditioning problem which AG is designed to alleviate, we summarize a few of its more important aspects. At present, NASA will provide the place for installment, ESA will produce the facility, and JAXA will carry the facility to ISS by HTV (H-II transfer vehicle). In 2009, the project has begun with 12 members, 3 from Japan, 3 from United States, 2 from Germany, 1 from Netherland, 1 from France, and 1 from Belgium. The first International Working Group

meeting was held January 25-26, 2011, the second one at ESTEC in June 2011. In 2012, the Japanese group has promoted a ground-based short radius centrifuge to simulate the facility on the ISS. We propose to use the unique opportunity of testing astronauts on the ISS for this purpose. In order to appreciate the deconditioning problem which AG is designed to alleviate, we proposes pre- and postflight examination of astronauts and inflight examination during the centrifuge facility run. Overview of the AGREE project and experimental procedures will be discussed.