

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Behaviour, Performance and Psychosocial Issues in Space (1)

Author: Mr. Miquel Bosch Bruguera
Institute of Space Systems, University of Stuttgart, Germany

Prof. Reinhold Ewald
Institute of Space Systems, University of Stuttgart, Germany

Dr. Nathalie Pattyn

University of Brussels, Belgium

Mrs. Emilie Dessy

Royal Military Academy, Belgium

Mr. Andreas Fink

University of Stuttgart, Germany

Dr. Valerie Schröder

Institute of Space Systems, University of Stuttgart, Germany

Dr. Floris P. van den Berg

ESA - European Space Agency, France

Dr. Nadja Albertsen

ESA - European Space Agency, Denmark

Dr. Carole Dangoisse

ESA - European Space Agency, United Kingdom

Dr. Carmen Possnig

ESA - European Space Agency, Austria

Dr. Greig Lawson

British Antarctic Survey, United Kingdom

ASSESSMENT OF THE EFFECTS OF ISOLATION, CONFINEMENT AND HYPOXIA ON
SPACEFLIGHT PILOTING PERFORMANCE FOR FUTURE SPACE MISSIONS – THE SIMSKILL
EXPERIMENT IN ANTARCTICA

Abstract

Interplanetary human missions to Mars and beyond will suppose a very demanding physical and psychological environment for future astronauts. Isolation, confinement, hypoxia or hypercapnia in a reduced pressure atmosphere, darkness and other factors are expected to endanger a mission's success, directly influencing human performance. In order to study the effects of such environmental conditions on human beings, the SIMSKILL Experiment aims to investigate how spacecraft piloting performance decays over time by deploying a Soyuz flight simulator on the Antarctic research stations Halley VI and Concordia, which feature similar living conditions as those of a space mission, leading to muscular atrophy, loss of cognitive capacities, and reduction of psychomotor skills. This paper offers an up-to-date analysis on the recorded data from the scientific campaigns in Antarctica, compared to those of the control group subjects in Stuttgart. An overall total of 57 subjects and more than one thousand approach and docking flights to the ISS performed in the simulator have been analyzed using mathematical models. The results obtained from this analysis show how the influence of isolation, confinement and hypoxia in Antarctica is crucial to understand how differences in performance appear between subjects. A thorough assessment of

the individual and collective trends is presented, by showing how background factors such as age, gender, health. are essential parameters to understand a pilot's skill evolution.