

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Astrobiology and Exploration (5)

Author: Mr. Lolan Naicker
Cranfield University, United Kingdom, lolan.naicker@physics.org

V.V. Grama
Cranfield University, United Kingdom, v.v.grama@cranfield.ac.uk
Ms. Clara M. Juanes-Vallejo
Cranfield University, United Kingdom, c.juanesvallejo@cranfield.ac.uk
Mr. Ioannis Katramados
Cranfield University, United Kingdom, i.katramados@gmail.com
Ms. Carla Rato
Cranfield University, Portugal, carla.cristina.rato@gmail.com
Mr. Catherine Rix
Cranfield University, United Kingdom, daisychain97@googlemail.com
Mr. Edwin Sanchez
United Kingdom, edwinsanchez@gmail.com
Prof. David Cullen
Cranfield University, United Kingdom, d.cullen@cranfield.ac.uk

CASS-E : CRANFIELD ASTROBIOLOGICAL STRATOSPHERIC SAMPLING EXPERIMENT

Abstract

CASS-E is a life detection experiment that is part of the BEXUS program. It aims to be capable of detecting stratospheric microorganisms. The experiment essentially consists of a pump which draws air from the stratosphere through a 0.2 m collection filter which will retain any microbes present in the processed air.

Due to the expected low concentration of microbes in the stratosphere compared to the known levels of ground level contamination, in order to be confident that microbes detected are truly stratospheric, instrumentation must be rigorously cleaned and sterilized.

In order to ensure the cleanliness of instrument hardware a Planetary Protection and Contamination Control (PP&CC) approach based on those used for space missions will be adopted, including the use of space qualified cleaning and sterilization techniques, the implementation of bio-barrier technology to prevent recontamination of the instrument after sterilization and the use of standard microbiological techniques to monitor cleanliness and contamination throughout Assembly Integration and Verification (AIV).

In addition to this we intend to deliberately contaminate different areas of the hardware with differently coloured fluorescent beads to allow us to track paths of contamination during AIV, flight and recovery.

Examination of the filters post-flight will show whether contamination has occurred from any of the areas contaminated with fluorescent beads and the use of stains will allow the detection of any microbes that may have been collected.

It is hoped that the results of the CASS-E experiment will provide the basis for a larger stratospheric balloon mission, including improved understanding of good instrument design for ease of cleanliness and decontamination, an improved estimate for the number concentration of microbes in the stratosphere, validated PP&CC protocols and information about pathways of contamination from the fluorescent beads.

The REXUS / BEXUS programme (www.rexusbexus.net) is realised under a bilateral agency agreement between the German Aerospace Center (DLR) and the Swedish National Space Board (SNSB). The Swedish share of the payload has been made available to students from other European countries through a collaboration with the European Space Agency (ESA).

EuroLaunch, a collaboration between the Esrange Space Center of the Swedish Space Corporation (SSC) and the Mobile Rocket Base (MORABA) of DLR, is responsible for the campaign management and operations of the launch vehicles. Experts from ESA, SSC and DLR provide technical support to the student teams throughout the project.

REXUS and BEXUS are launched from Esrange Space Center in northern Sweden.