

15th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)Novel Concepts and Technologies to Enable Future Building Blocks in Space Exploration and
Development (3)

Author: Mr. Benjamin Koschnick
UNSW Australia, Australia, benjamin.koschnick94@gmail.com

Mr. Noor Huq
University of New South Wales, Australia, taofiquhuq193@gmail.com

Ms. Scarlett Li-Williams
UNSW Australia, Australia, scarlett.liwilliams@hotmail.com

Mr. Anuraj Talati
UNSW Australia, Australia, anurajtalati@gmail.com

Mr. Nathan Kristian
UNSW Australia, Australia, nathankris8@gmail.com

Ms. Jessica Tam
UNSW Australia, Australia, tamtinying@gmail.com

Mr. Rohan Murthy
Australia, rohanmurthy94@gmail.com

Ms. Yasmin Akhtar
University of New South Wales, Australia, yasminsakhtar@hotmail.com

Mr. Jing Li
Australia, jing_li1998@hotmail.com

Ms. Irina Kozlova
UNSW Australia, Australia, kozlovaira20@gmail.com

Ms. Anna Piskunova
UNSW Australia, Australia, vandalarina@gmail.com

Ms. Yasmin Zaman
UNSW Australia, Australia, yassie_syd@yahoo.com

Mr. Alexander Kowcz Rosinke
UNSW Australia, Australia, akrosinke@gmail.com

Dr. Elias Aboutanios
University of New South Wales, Australia, elias@ieee.org

GREENSAT: CUBESAT PLATFORM FOR BIOLOGICAL AND AGRICULTURAL EXPERIMENTS

Abstract

With the success of the International Space Station and the world's sights set on a manned mission to Mars, long-term spaceflight is becoming more routine. The recent boom in interest in asteroid mining promises to provide astronauts with materials and fuel for their journey. The lack of food production in space will eventually become a significant hurdle. To colonise space and remove astronauts' dependence on supplies from Earth, vast quantities of food will need to be produced in the space environment. This requires a great deal of understanding in how plants and other organisms react to the space environment.

However, in the present day, access to the space environment is limited due to the costs of spacecraft and launch.

GreenSat will provide a controlled environment aboard a CubeSat for biological and agricultural experiments in space. The satellite will provide a suitable environment in space for a biological system of microbes and plant life to grow and flourish using a minimalistic design. This paper aims to assess the feasibility of building a platform that can house any isolated biological system for experiments in space. Ethical and regulatory concerns, particularly related to preventing contamination of the space environment will be considered in addition to engineering.

This satellite will provide artificial gravity through rotation, protection from radiation, atmospheric control and either natural or artificial sunlight. Sensors will collect data from the payload which will then be sent to researchers on the ground for study.

GreenSat will be developed by BLUEsat, a student run space projects society at the University of New South Wales Australia. It will provide a simple, elegant testbed for understanding the process of growing food in the space environment. If successful, the knowledge gained can be applied to providing large-scale agriculture to support human colonisation in the far reaches of space. BLUEsat is accepting proposals for experiments to be conducted aboard GreenSat.