

Suaineadh Satellite Project - Application Note for WLg-LINK-OEM-TTL

Introduction

The Suaineadh experiment is a collaboration between the University of Strathclyde, the University of Glasgow and the Royal Institute of Technology, Stockholm. The aim of the experiment is to deploy and stabilise a space web by means of the centrifugal forces acting on the spinning assembly which is ejected from the nosecone of the REXUS-12 sounding rocket. Controlled web deployment and stabilisation will be achieved by an active control method. Operational data will be accumulated visually, via cameras, and by on-board sensors in the form of inertial measurement units. This data is transmitted via an integrated communications architecture back to a data storage module on-board REXUS and recorded. A portion of the operational data is relayed to Erange ground station during flight whilst the remainder is recovered once the rocket has returned back to Earth. It is also planned to recover the experimental module by using a GPS beacon.

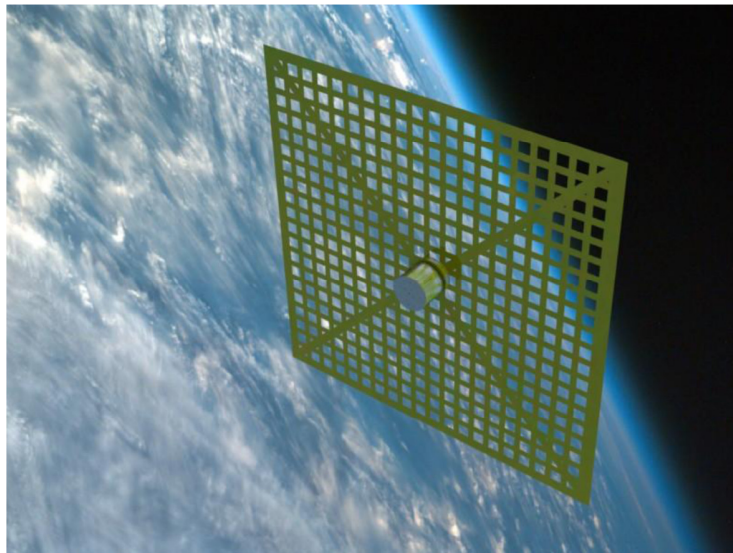


Figure 1. Central Hub with deployed web.

Wireless communication using the WLg-LINK-OEM-TTL

Part of the system is separated from the rocket to be able to deploy the web. Since that part, called CHAD (Central Hub And Daughters), will fall down to ground without any parachutes it might not survive the impact on earth. Thus there was a need to send sensor and image data wirelessly from CHAD back to the REXUS rocket. By using two WLg-LINK-OEM-TTL, each connected to a FPGA, the wireless link could be realized.

Because of the nature of this project the requirements on the chosen components and modules were very high. The most important aspects and requirements when choosing the wireless link was that the size should be as small as possible as well as the temperature range. The size limitation is due to the fact that the experiment itself has a very limited space inside of the rocket. The launch site is in northern

Sweden where the outside temperatures may be as low as -40°C. However since the module will be placed inside two layers of metal for a few minutes before launch the inside temperature is not likely to drop to those ranges. The WLg-LINK-OEM-TTL has a lowest temperature of operation of -20°C and it was deemed to be enough.

Another important aspect is the use of the frequencies between 5.470-5.725 GHz. Most of the frequencies at and below 2.4 GHz is occupied by the REXUS rocket and its communication systems. Therefore it was decided to use the higher frequencies and WLg-LINK-OEM-TTL suited the needs of this project perfectly.