

Promoting Space Sustainability

[31/05/2021]

Implementation of the Guidelines for the Long-term Sustainability (LTS) of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space

Operational Case Studies

I. Short description of the outer space activity [1000-word max.]

Slovakia is well aware of the importance of ensuring the sustainable execution of space activities over a long-term period. As a member of the Committee on the Peaceful Uses of Outer Space since 2001 and being the treaty party to four of the five United Nations Treaties on outer space, Slovakia uses this opportunity to reiterate its commitment to perform its space activities in a responsible and sustainable manner.

Slovakia considers itself as an emerging spacefaring country, with a long-term tradition in space scientific and technical research, that is currently developing its space ecosystem and space industrial base. The “Act on Regulation of Outer Space activities in the Slovak Republic” is under preparation.

The activity we would like to describe is related to the launch of the second Slovak nanosatellite “GRBAlpha” that was launched into orbit on 22nd March 2021 onboard of a launcher Sojuz-2.1 of a company GK Launch Services from the Baikonur Cosmodrome. “GRB”Alpha that stands for (Gamma Ray Burst) detection and it is an international project of scientific and technical cooperation between Slovakia, the Czech Republic, Hungary and Japan. This project scored second in the International Astronautical Federation and GK Launch Services Competition in 2019 for a Free Launch of 1U CubeSat on the first commercial mission of GK Launch Services. The cooperation on this project involved both public and private stakeholders from across the scientific community, university students and private companies.

The main objective of the project is to support amateur radio activities and perform scientific experiments to verify the new possibilities of monitoring gravitation waves with the detection of Gamma-Ray Bursts in Earth’s orbit. The GRBAlpha nanosatellite contains a transmitter working on 2 frequency bands. It should transmit a regular beacon with a call sign in Morse code and a basic telemetry in digital format. It should also offer a retranslation function that would enable amateur radio stations to communicate with one another outside the direct radio signal. GRBAlpha is the pilot

project to prove the functionality of the proposed experiment and in the future potentially create a fleet of such detectors on various orbits. It is expected that the described scientific and technical activity would detect a place where the gravitation wave is created in the cosmos, which would be a significant contribution to global astrophysics.

Although it is an international project, GRBAlpha is registered as the Slovak satellite as it is operated under the auspices of Faculty of Aeronautics of the Technical University of Košice. Apart from this faculty, two Slovak companies, Spacemanic and Needronix and a civic association the Slovak Organisation for Space Activities and the Slovak University of Technology in Bratislava participated in the preparation and construction of GRBAlpha project. International partners of GRBAlpha are: Konkoly Observatory, Budapest – Hungary and Hiroshima University and Nagoya University – Japan, Czech Aerospace Research Centre, Prague and Department of Theoretical Physics and Astrophysics, Faculty of Science, Masaryk University – the Czech Republic.

II. Connection with the LTS Guidelines [500-word max.]

GRBAlpha is registered as second Slovak national space object and enrolled into Slovak register of space objects that was created in relation with the launch of the first Slovak nanosatellite skCUBE in 2017. GRBAlpha project also pointed the need to prepare and adopt a “national space law” that is currently under preparation. GRBAlpha project is in this sense connected to the LTS Guideline A1. “Adopt, revise and amend, as necessary, national regulatory frameworks for outer space activities”. While preparing and drafting national space regulation framework in Slovakia, several elements are taken into consideration in line the LTS Guideline A.2, though.

Notification of UNOOSA on launched object into outer space was executed in accordance with the LTS Guideline B.1 “Provide updated contact information and share information on space objects and orbital events”. During the preparations and design phase of the satellite the constructors acted in accordance with the LTS Guideline B.8 “Design and operation of space objects regardless of their physical and operational characteristics”.

This activity enhanced international cooperation and also helped promoting and supporting space relevant capacity-building among university students and raised awareness of space activities on media and gained public interest in line with the LTS guidelines C.3 and C.4.

Last, but not least contribution of the GRBAlpha activity was promotion and support of research leading into development of ways to support sustainable exploration and use of outer space – that is the goal of LTS Guideline D.1.

III. Lessons learned [500-word max.]

During the preparatory activities relative to the construction and validation tests of the satellite and in pre-launched phases the team of constructors experienced several difficulties related to the effects of the inability to travel freely abroad that was caused by the COVID-19 counter measures imposed internationally. Lesson learns from the lockdowns were that international cooperation is eased with the free movement of persons and it is essential to have critical infrastructure available on national level, but on the other hand, the teams learned new ways how to solve arising challenges and adapted theirs processes to current circumstances what made them more flexible.

This activity helped to boost international scientific and technical cooperation both in the region and also with Japan and strengthened cross-sectorial collaboration between academia, industrial actors and enthusiasts and university students involved in the project preparation. At the same time, it increased cross ministerial cooperation on national level regarding the pre-launch permits, registration and launch enabling issues. Besides, the launch of the second Slovak nanosatellite raised awareness of the space activities among the public and increased interest in space especially in young STEM students from the Technical University of Košice and Slovak Technical University in Bratislava (among others).