PRESS RELEASE

The new Hungarian satellite is in orbit - SMOG-1 is working

SMOG-1, the small satellite of Budapest University of Technology and Economics, was successfully launched on the 22nd of March, 2021, at 7:07:12 local time and was put into orbit on the 23rd of March, 2021. A Soyuz-2.1a launch vehicle with a Fregat final stage was launched from Baikonur spaceport (Kazakhstan), which carried South-Korean CAS-500-1 satellite as a primary payload and 37 other spacecrafts. **SMOG-1** and 5 other smallsats were deployed automatically from the 32kg Italian UNISAT-7 and were put into a 550 km orbit early afternoon on the 24th of March. The first contact with the fourth Hungarian satellite was made by several radio amateurs in Hungary and the remote controlled primary ground control station of the developers between 0:46 and 0:56 on the 25th of March. The callsign of SMOG-1 is HA5BME, every subsystem is working properly, the onboard temperature is 31 °C, the battery is 90 % charged.

The new Hungarian satellite, the 1-PocketQube (5x5x5cm) size **SMOG-1** was entirely designed, developed and realized by a team of students under the supervision of university lecturers of the Budapest University of Technology and Economics (BME). The whole project was part of the academic programme and was funded by several sponsors. The development was integrated at the Department of Broadband Infocommunications and Electromagnetic Theory of the Faculty of Electrical Engineering and Informatics, in cooperation with the Faculty of Mechanical Engineering and external experts as well. The project and the launch costs were funded by the National Media and Infocommunications Authority, the Faculty of Electrical Engineering and Informatics, and the Ministry of Foreign Affairs and Trade.

The primary ground station at BME University is responsible for controlling the satellite and receiving its signals. In addition to the secondary ground station located in Érd, many radio amateurs are tracking the PocketQube and sending the received data to the developers worldwide. Receiving the signals of the satellite is possible for everybody, the description and further details can be found at the project homepage.

Beside the basic subsystems required for satellite operation, the primary mission of SMOG-1 is the **measurement of electromagnetic pollution (i.e. electrosmog) generated by human activity** in space around the Earth. As a secondary mission, a **total ionising dose measurement** system is on board, which measures and studies the effect of particles coming from the Sun on electronics in space. SMOG-1 has an additional, tertiary mission, a special **magnetically lossy material** which was placed underneath the solar panels and serves as a

brake. It is expected to shorten the more-than-18-year lifespan of the orbit, therefore minimizing the amount of time which is spent as space trash, after completing its active mission.

The development of the 1PQ size SMOG satellites started in 2013 at the BME. Since then, the project has enhanced numerous results in research and education. Two flight models were created and one of them got an earlier launch opportunity on the 6th of December, 2019. This unit was named **SMOG-P**, P standing for precursor, and it served as a preliminary test of the current mission. It became the first functional 1PQ size satellite in the world. After it successfully accomplished its mission, SMOG-P deorbited on the 28th of September, 2020 as an active spacecraft. With the measurement data it gathered, the team created the world's first public electrosmog map. With the successful start of this mission, the developer team of SMOG and ATL-1 satellites has the most number of operational PocketQubes to date.

The Budapest University of Technology and Economics has activities related to space research and -technology for decades. The next milestone of this activity was the creation and the launch of SMOG-1. Mentored by the Faculty of Electrical Engineering and Informatics, with the cooperation of the Faculties of Civil-, Mechanical-, Transportation- and Vehicle Engineering together with the Faculty of Natural Sciences, our University have developed and established the first Space engineering MSc programme in Hungary. Starting in February 2022, the programme is open for applicants having a bachelor or a master's degree in engineering or natural sciences. After completing the 4-semester programme, degree holders will be competent in engineering, development, manufacturing and operating tasks related to space technologies and space research. Space engineers will have relevant knowledge on the construction, creation an operation processes of spacecraft and of the service instruments and facilities.

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Sound recording of the signals of **SMOG-1**: https://youtu.be/J7nU7Y6W3tE

More info about **SMOG** satellites: https://gnd.bme.hu/smog1, https://gnd.bme.hu.

Photos, full and cut video recordings of the launch are available at the social media of Roscosmos and GK Launch.
https://twitter.com/gk_launch?lang=hu, https://152.66.80.46/smog1/soyuz2_smog1.

Resources (with citation only): http://152.66.80.46/smog1