

# The Triumph of BRITE-Constellation, yet Impending End

In absolute terms, the problem is small (5000 euros per month for two years), but without this relatively modest sum, the first ever CubeSat-class astronomical research satellites are facing a premature end after investments in the construction and operation totaling well over 6 million euros. Since 2013, this fleet of five identical satellites, called BRiGht Target Explorer (BRITE) [Constellation](#), has been providing forefront astronomical photometric data to the international research community. But operations are fundamentally at risk for budgetary reasons, and quick help is needed because, under UN space law, satellites that are not operated, e.g. because public funding has run out, must be irrevocably shut down, even if they are still functioning. New financing must therefore be put in place to prevent this disaster.

## 1. The research potential of BRITE-Constellation:

Stars are opaque – but their insides are important to understand. This is similar to material testing, especially when it concerns components that must not be disassembled or damaged. A proven method for this is vibration tests, which also works for stars. Stars vibrate (pulsate) naturally, and all that is required is to “listen” carefully to them. The listening is done photometrically, and the measurements of the tiny brightness changes require the use of satellites (e.g. [BRITE-Constellation](#)) to produce very long series of measurements with few interruptions, as well as to avoid perturbations caused by the Earth's atmosphere.

## 2. The threat to BRITE-Constellation:

After several extensions of the funding of BRITE-Constellation's research operations by the three international funding agencies, the final end came as a surprise to the organizers in April 2021 citing cuts in the global budget by Graz University of Technology, which had been responsible for the Constellation's operation since the beginning and whose expertise is therefore irreplaceable on any reasonable timescale while there is still life left in the satellites.

## 3. Facts about the history of BRITE- Constellation:

A concept for small satellites (CubeSats) in 2002 was finally realized in 2012 by the construction of "BRITE-Constellation", marking the first successful use of nanosatellites in astronomical research. Previously, such dwarf satellites were only used for testing technological components in space, student training and Earth-atmosphere studies, but with a sufficient three-axis stabilization not yet available. This problem was solved by the Canadian industry partner with the development of stabilizers based on miniaturized gyros and magnetic field sensors. This development has meanwhile triggered a veritable worldwide boom in dwarf satellites.

Collaborating astrophysicists in Austria, Canada and Poland achieved funding for one pair of CubeSats in each country for precision time-dependent photometry. That was the birth of BRITE-Constellation. Meanwhile, research results based on BRITE precision photometry have been published in 215 [publications](#) in international journals and at conferences in Europe, Canada and USA. One year after the measurements are acquired, the [data](#) are also made available to the worldwide scientific community.

#### **4. Saving BRITE-Constellation:**

Continued operation of BRITE-Constellation is now only possible through individual contributions from supporters. Our hopes for the future of BRITE-Constellation rest on two pillars: First, to explore the administrative, legal and budgetary aspects of crowdsponsoring. Second, we are approaching corporations directly for donations. Even relatively small contributions can give the mission a significant boost. As a bonus, we offer that this support will be highlighted in our PR articles, as well as appearing prominently on our website.

We ask for favourable consideration of our request. Your help will be crucial for the continuation of a very successful research programme in space with international visibility. We are grateful that you are concerned with this issue and would be very happy to answer any questions you may have.

We kindly ask you to transfer donations to the following account in Austria:

Recipient: Graz University of Technology  
Account No.: 51656101802  
Payment purpose: BRITE-Constellation  
IBAN: AT691200051656101802  
BIC: BKAUATWW

Bills can be issued on request.