

BRITE-Austria/TUG Sat1: Launch Opportunities

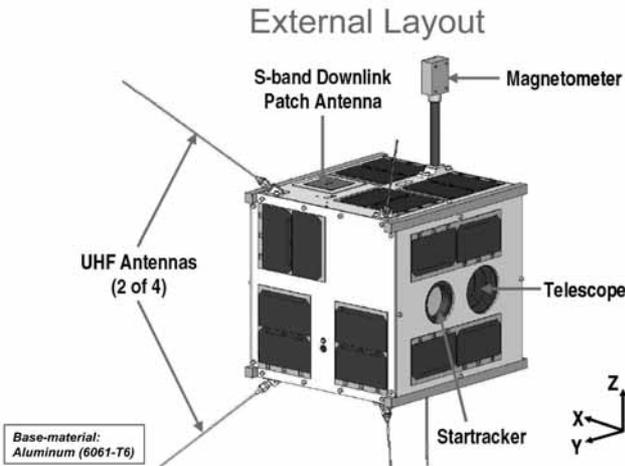
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Abstract

This proceeding paper was generated using a Power-Point presentation from the workshop.

Presentation Slides



BRITE-Austria - Baseline Orbits

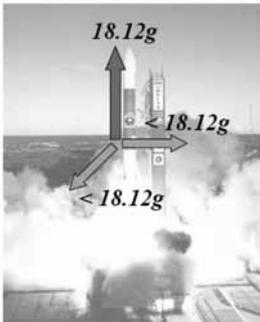
BRITE is designed for any low earth orbit in view of the ground stations to maximize launch flexibility. Typically, the following orbits are used for analysis:

- Dawn-Dusk Sun-Synchronous (minimum eclipse): hot case for thermal analysis
- Noon-Midnight Sun-Synchronous (maximum eclipse): cold case for thermal analysis, worst power conditions
- 900 km altitude orbit for link budgets
- 550 km altitude orbit for atmospheric drag and Doppler

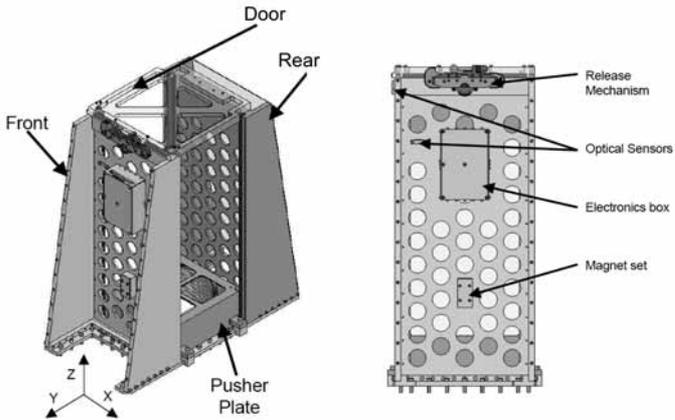
The launch (and consequently the orbit) of BRITE is unknown at this time. The spacecraft will be launched as a secondary or tertiary payload, hopefully in late 2008.

Boundary Conditions

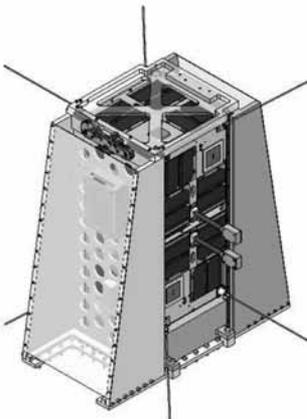
Loads & Accelerations



Nanosatellite Separation System (XPOD Duo)

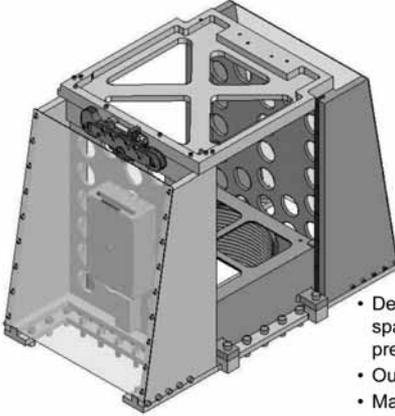


Nanosatellite Separation System (XPOD Duo)



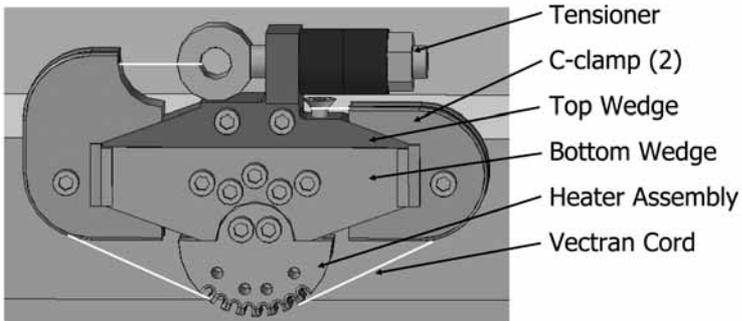
- Is designed to accommodate two 6 kg, 20 x 20 x 22 cm spacecrafts (antennas, booms etc. pre-deployed)
- Outer dimensions: ~ 24 x 49 x 55 cm
- Mass: + 12 kg

XPOD GNB Separation System

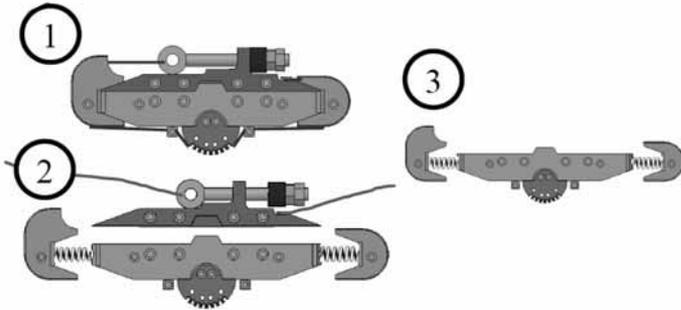


- Designed for 20 x 20 x 22 cm spacecraft (antennas, booms etc. pre-deployed)
- Outer dimensions: ~ 24 x 38 x 33 cm
- Mass: ~ 9 kg

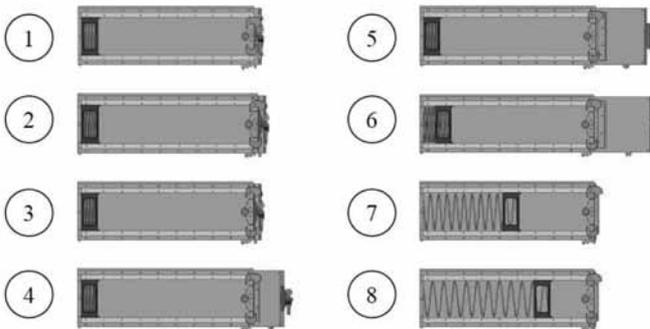
Release Mechanism



Mechanism Release Sequence

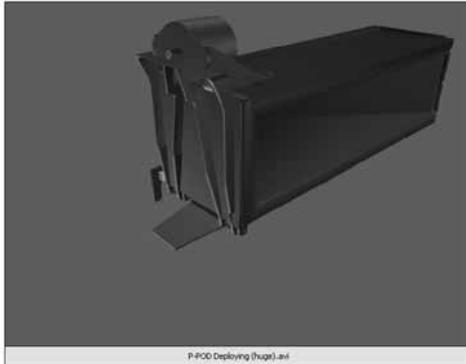


Release Sequence



Deployment Principle

(Quelle: The CubeSat Program / Cal Poly State University)



Launch Opportunities

Launcher:

- DNEPR
- ROKOT
- KOSMOS
- ARIANE V

Launch Sites:

- Plesetsk (Ru)
- Baikonur (Kas)
- Kourou (F)

Launch Costs:

- ca. € 10.000,- bis 20.000,- / kg



ROKOT (Khrunichev)

Launch Opportunities

- AGIIF, Vienna, April 23, 2007: Signing of a MOU between the Russian and the Austrian side (article 7 - providing support with launch of TUGSAT-1)
- In our first contacts, Roscosmos suggested a *Dnepr* launch.
- Kazakhstan, July 26, 2006: 18 Russian and foreign-made micro-satellites were destroyed when a civilian version of the heavy R-36M2 crashed shortly after liftoff, due to a first stage engine shutdown.
- On April 17 Russia has successfully launched a *Dnepr* carrier rocket. 16 foreign (Egyptian, Saudi satellites) and additional P-Pod and Cube-Sat micro-satellites were delivered and successfully deployed into 640 km sun-synchronous orbit (being the 8th commercial launch).
- Currently the reliability factor for the rocket (160 launches in SS-18 and Dnepr configuration) is 0,97

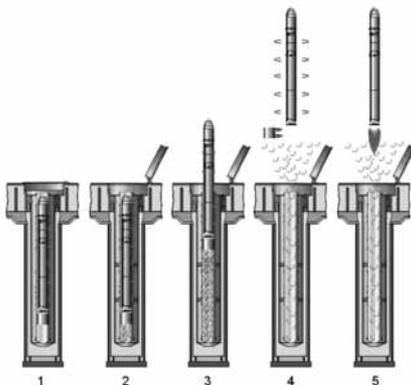
Russian rocket fails (July 26, 2006)

Kazakhstan: The Dnepr's wreckage was discovered 150 km's from the space center, due to a first stage engine shutdown. Russia has agreed to pay more than \$1 mio. in compensation for the July crash.

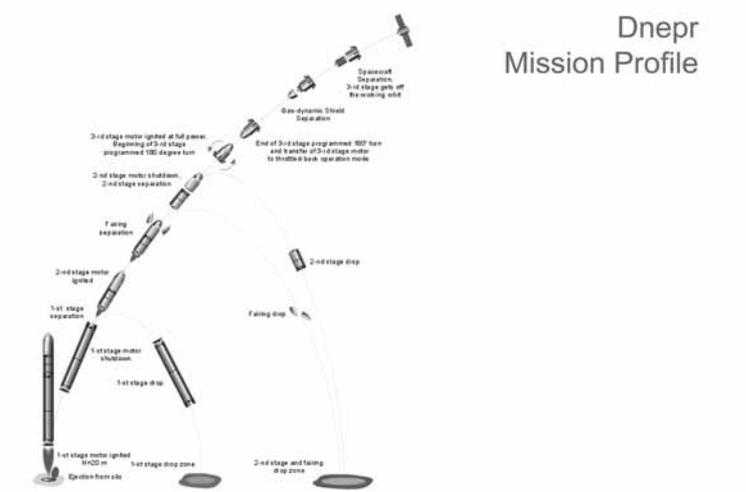




Dnepr – Liftoff Diagram

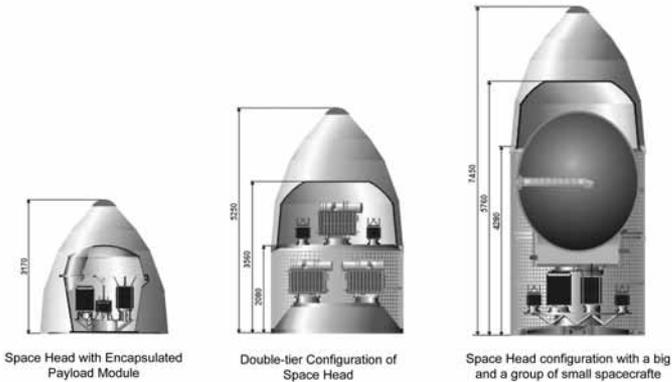


Steam eject from the launch silo using standard launch sequence.



Dnepr Application for Space Missions

Dnepr Cluster Launch Capability for Small and Microsatellites



DNEPR – Integration



Quelle:
Kosmotras

Dnepr - Launch Preparation



Quelle:
Kosmotras

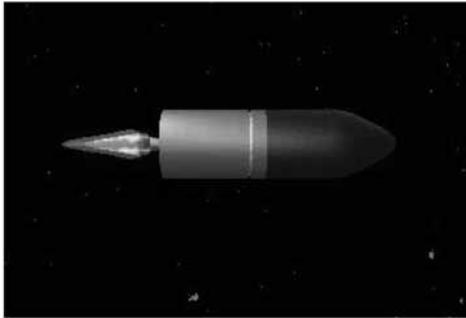
DNEPR - Launch Preparation



Earth Transportation Facility: Launcher in horizontal position



DNEPR - Deployment Simulation



(Quelle: The CubeSat Program / Cal Poly State University)

Informations

www.tugsat.at oder www.tugsat.com

www.iks.tugraz.at

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