

OPS-SAT LEOP and Commissioning: Running a Nanosatellite Project in a Space Agency Context

Georges Labrèche^{a*}, David Evans^b, Tom Mladenov^b, Dominik Marszk^b, Vasundhara Shiradhonkar^c,
Vladimir Zelenevskiy^d

^a *Tanagra Space OÜ / European Space Agency (ESA)*, georges@tanagraspace.com

^b *European Space Operations Centre (ESOC), European Space Agency (ESA)*, firstname.lastname@esa.int

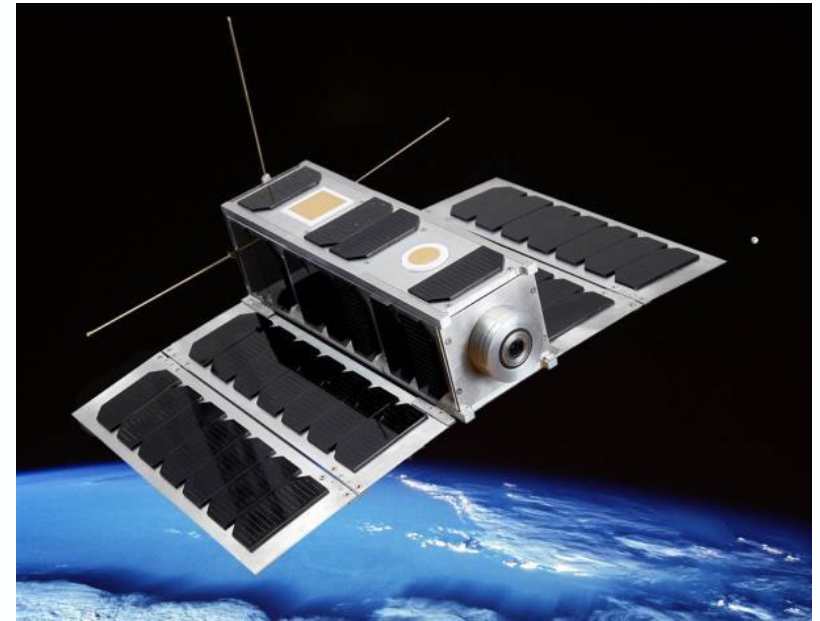
^c *Terma GmbH*, vash@terma.com

^d *Telespazio Germany GmbH*, vladimir.zelenevskiy@telespazio.de

* Corresponding Author

Background – OPS-SAT

- 3U CubeSat launched by the European Space Agency (ESA).
- Conceived to break the “has not flown, will not fly” cycle.
- Full set of sensors and actuators including a camera, GPS, star tracker, and reaction wheels.
- High speed X-band and S-band communication.
- Laser receiver.
- Software defined radio receiver.
- Dual-core 800 MHz CPU clock & 1 GB DDR3 RAM.
- FPGA.

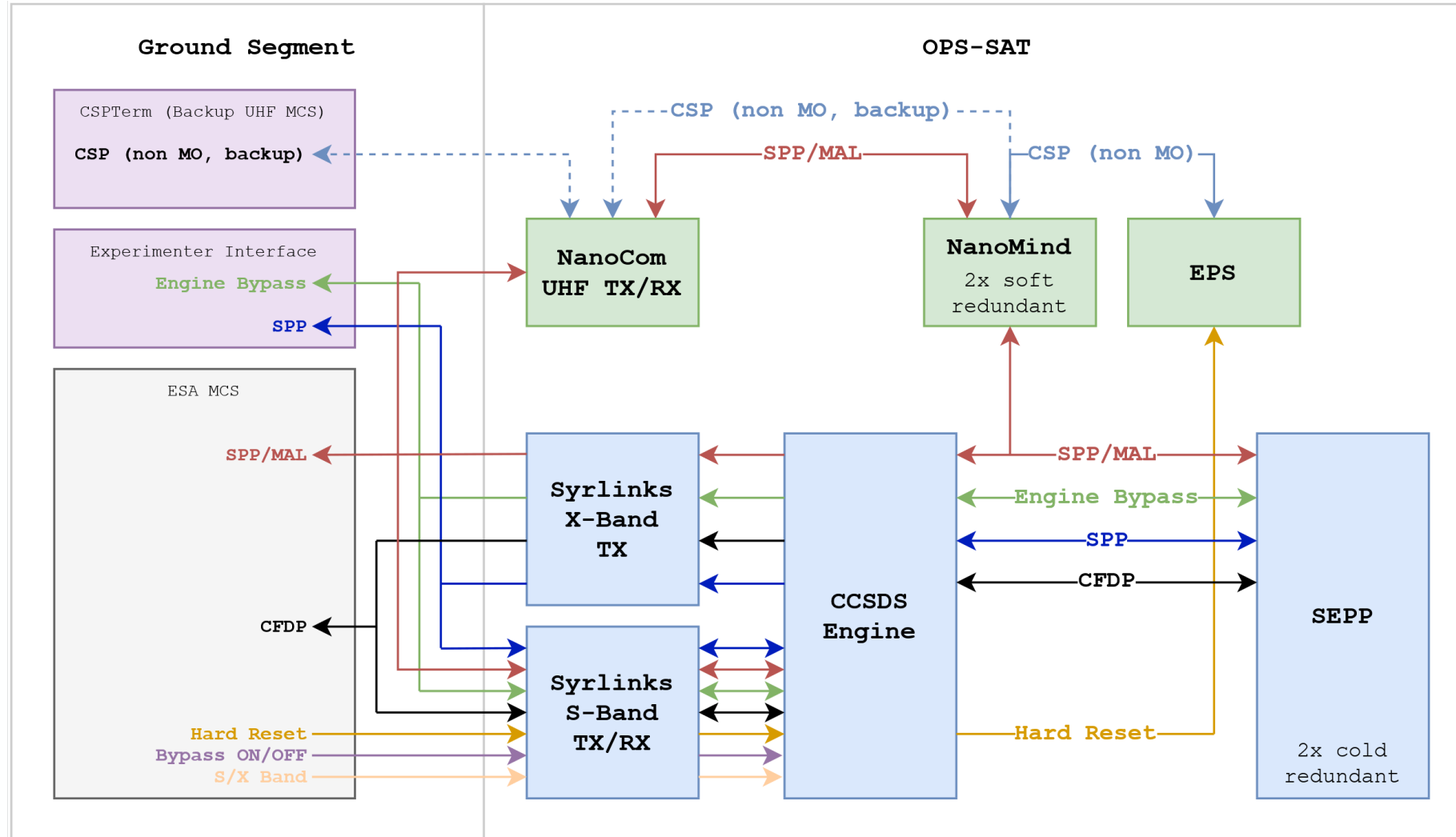


- A new paradigm to on-board software by introducing “**apps**” in space.
- Apps run on an Ångström distribution of Linux on top of the **Satellite Experimental Processing Platform (SEPP)**.
- An app can be easily developed, debugged, tested, deployed, and updated at any time without causing any major problem to the spacecraft.

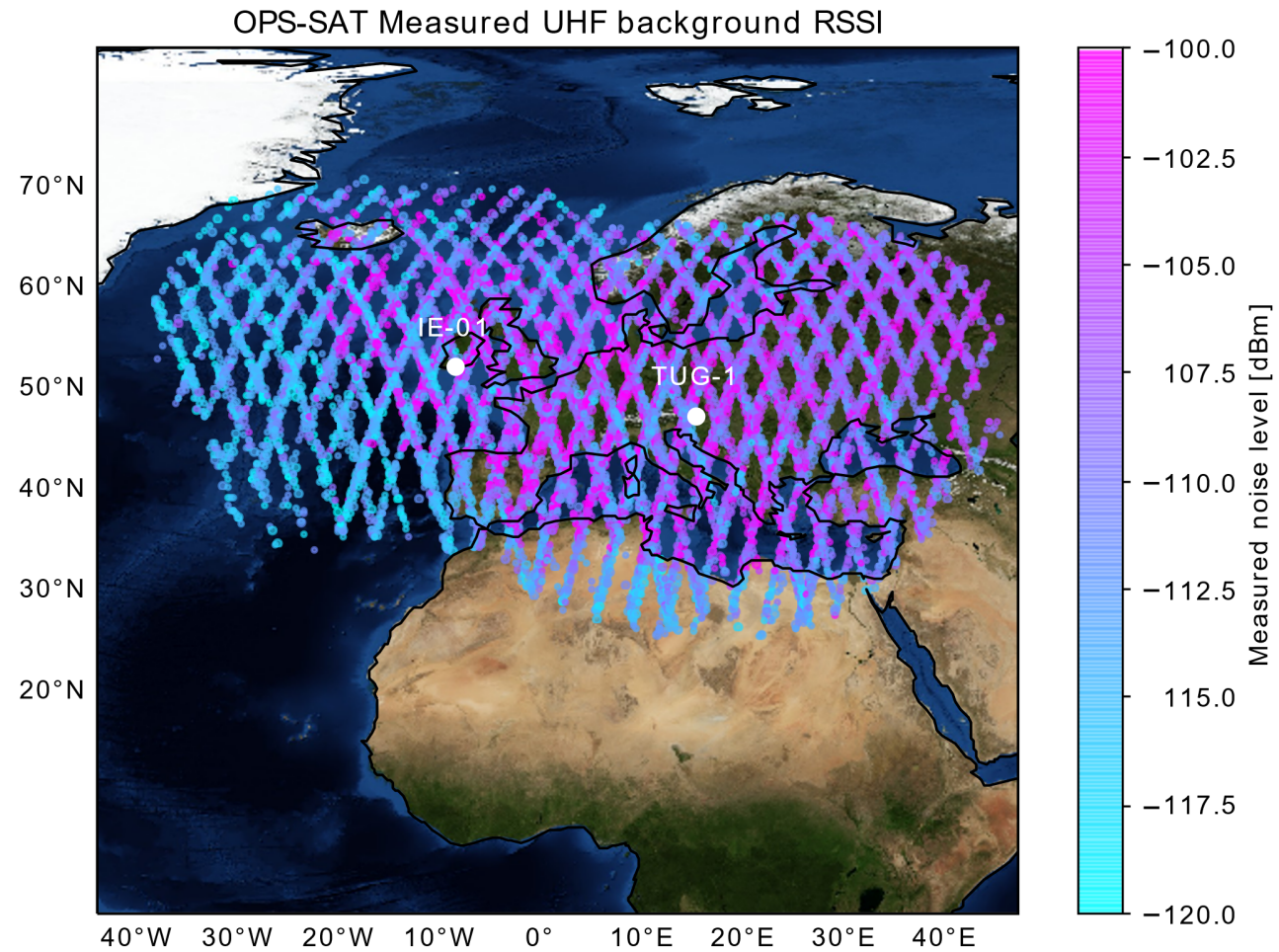
➤ Apply to fly your experiment: [https://](https://opssat1.esoc.esa.int/)

opssat1.esoc.esa.int/

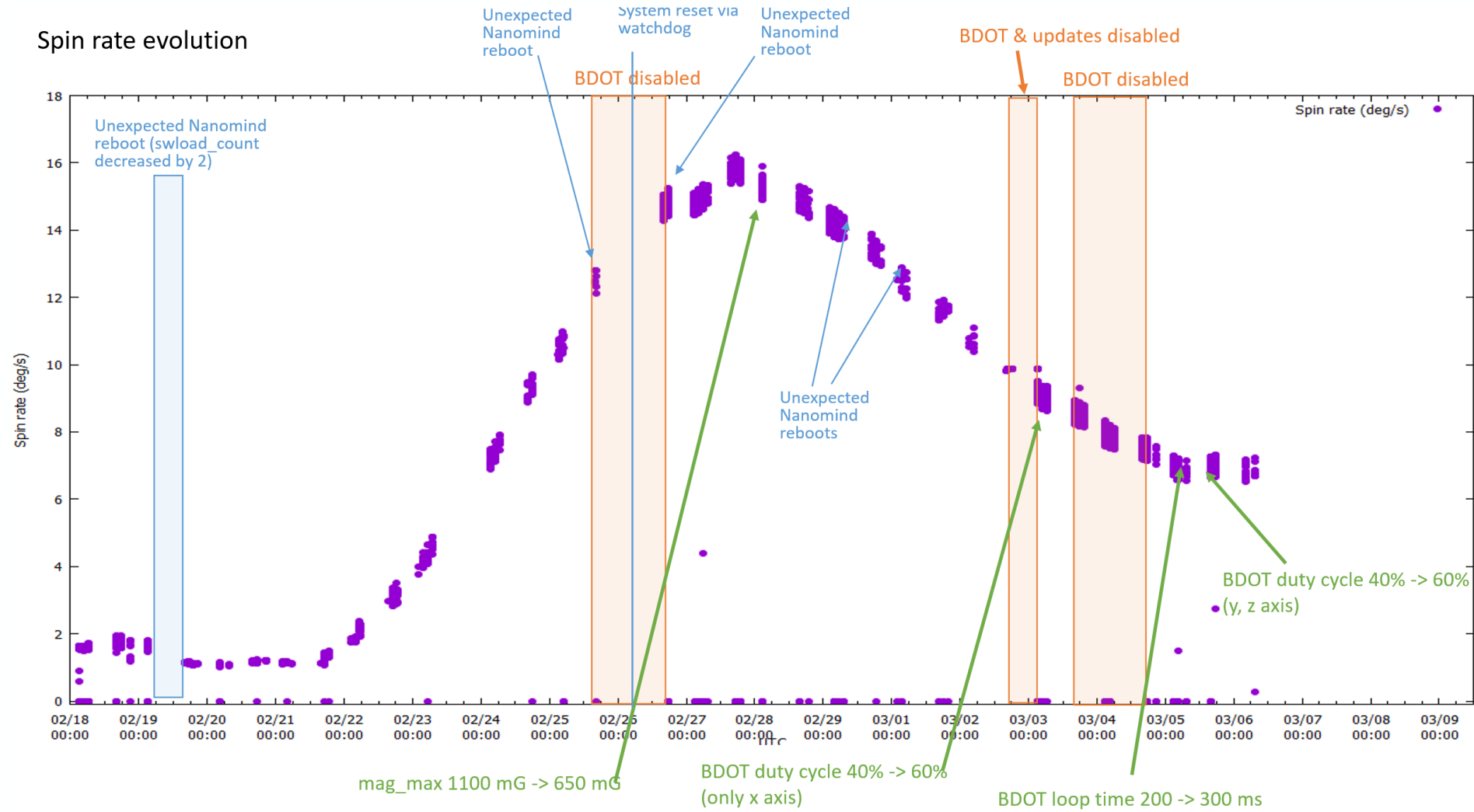
Interactions between Ground and Space Segment



Communication Challenges in LEOP



Unexpected spin-up of the satellite



- Use of Radio Amateur support and the SatNOGS network
- Mixing the bands
- Use of SEPP as an OBSW update tool
- Use of SEPP/FMS/SpaceShell as a commissioning tool

Great!

Apply to fly:

<https://opssat1.esoc.esa.int/>

Thank you and check out the research papers for more!



georges@tanagraspace.com
github.com/georgeslabreche
[linkedin.com/in/georgeslabreche](https://www.linkedin.com/in/georgeslabreche)

Georges Labrèche^{a*}, David Evans^b, Tom Mladenov^b, Dominik Marszk^b, Vasundhara Shiradhonkar^c,
Vladimir Zelenevskiy^d

^a *Tanagra Space OÜ / European Space Agency (ESA)*, georges@tanagraspace.com

^b *European Space Operations Centre (ESOC), European Space Agency (ESA)*, firstname.lastname@esa.int

^c *Terma GmbH*, vash@terma.com

^d *Telespazio Germany GmbH*, vladimir.zelenevskiy@telespazio.de

* Corresponding Author

