OPS-SAT Concept Summary

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What is OPS-SAT?

3U cubesat launched by ESA on 18\textsuperscript{th} Dec 2019
First nanosatellite to be directly owned by ESA and controlled by ESA/ESOC
The result of 7 years of development supported by GSTP and ESOC internal investment
A satellite within a satellite. Control can be swapped between the two and they monitor each other – providing the in-bult robustness.
Conceived to break the “has not flown, will not fly” cycle - by allowing real experimentation on critical control functions during flight
Fully equipped with
1) a full set of sensors and actuators including a camera, GPS, star tracker and reaction wheels
2) High speed X band and S band communication
3) Laser receiver
4) Software defined radio receiver
5) A 800 MHz processor with a reconfigurable FPGA at its heart
What does ESA get out of OPS-SAT?

OPS-SAT looks like an advanced ESA spacecraft to the ground. The uplink rate is four times higher than any ESA spacecraft; it employs never before flown communication protocols and implements new ESA patents. So by using many new technologies to control the mission every day we are preparing for the future.

At the centre of OPS-SAT is a high performance control processor. This allows “normal” software (Linux, JAVA, Python..) to control the entire satellite: rotate, take pictures, classify them, compress them, send them to the ground etc. Together with our experimenters, we are exploring how all that processing power and open source software can be exploited in space.

The processor integrates with a powerful FPGA that allows us to reconfigure its firmware in space. Reconfigurable on-board software caused a revolution in space and this will be just as significant. It is an incredibly powerful technology allowing many algorithms to run in parallel at nanosecond speeds. Together with our experimenters we are learning how to master this powerful technology safely in flight.
What does ESA offer on OPS-SAT?

OPS-SAT is unique flying platform that European Industry and Institutions can use to rapidly test their software and firmware experiments in space at no cost* and no bureaucracy.

Experimenters can

• execute repeated “develop, fly, improve” cycles without having to worry about risk
• reconfigure the ground and satellite in ways that up to now have been impossible...
• get their data only a few minutes after it is received at ESOC, command and control their experiment in real-time over the internet..
• join the OPS-SAT community, where experiments and experimenters synergise...

156 experiments are already registered from big primes to start-ups but there are still slots available and we are always open to good ideas!

* ESA has committed to cover the operations cost of OPS-SAT (800K/year) at no cost until Nov 2021. After this date the operations cost will have to be shared between Member States with running experiments or the spacecraft will be switched off.