**OPS-SAT: the flying laboratory**

Consumer electronics have gone through a revolution over the last 30 years with computers becoming ever faster, smaller and better. But when it comes to million- or even billion-euro satellites, their onboard hardware and software have not seen this revolution due to the risk of testing new technology in flight. As spacecraft managers dare to fly only tried-and-tested hard and software in the harsh conditions of space, innovation on the operational side of satellites is a very slow-moving process. Now ESA will launch OPS-SAT, a small, low-cost, test satellite specifically designed for operational experimentation in space. This flying laboratory includes one of the most powerful computers in space today and it will be used by experimenters to test innovative software and new mission operations techniques. Proving technology for future missions and paving the way for satellites to further evolve with minimum risk, OPS-SAT will be launched together with CHEOPS from Kourou in December 2019.

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| 10:00:00 | ESA leader |
| 10:00:10 | Title: **OPS-SAT: The Flying laboratory** |
| * INT. GV’s OPS-SAT in laboratory, Technical University of Graz - Germany – 2019 – ESA (2shots) * INT. CHEOPS satellite in Cleanroom – unknown date – ESA (2shots) * INT. GV’s OPS-SAT in laboratory, Technical University of Graz - Germany – 2019 – ESA * INT. Detailed view of OPS-SAT CPU on flatsat, ESOC Darmstadt - Germany – nov 2019 – ESA * INT. GV’s OPS-SAT in laboratory, Technical University of Graz - Germany – 2019 – ESA * INT. GV’s SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA (2 shots) | **Sometimes the greatest things come in the smallest of packages. This is certainly true for ESA’s new OPS-SAT, a small CubeSat, which will be launched together with CHEOPS in December 2019. This little satellite is only 30cm high but contains a powerful experimental computer many times more powerful than on any current ESA spacecraft. It is the world’s first mission dedicated to testing satellite control technology in orbit and will boost the competitive edge of European space technology companies.** |
| 10:00:45:24   * INT. David Evans in SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA | **David Evans – OPS-SAT Mission Manager, ESA**  ESA is flying this mission because it is very difficult to experiment on an operational satellite. A big mission can cost a billion euros. And when you have that sort of money you don’t take risks. But in order to experiment you must take risks, you must do something new, you must decide what the results are going to be. What is going to be a success or a failure, which means failure has to be an option when you do an experiment. An operations failure is not an option.  And therefore we need a mission that allows us, has been designed specifically for us to do these operations in space. And this is why OPS-SAT was born and this is what it is for. |
| 10:01:25:04   * INT. GV’s OPS-SAT in laboratory, Technical University of Graz - Germany – 2019 – ESA (2shots) * INT. Detailed view of OPS-SAT CAMERA on flatsat, ESOC Darmstadt - Germany – nov 2019 – ESA * INT. GV’s OPS-SAT in laboratory, Technical University of Graz - Germany – 2019 – ESA (6shots) * Aerial. ESOC, Darmstadt – Germany – unknown date – ESA (2shots) * INT. GV’s SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA (6 shots) | **OPS-SAT is an innovative testbed designed with powerful but lower-cost, off-the-shelf electronics. It can be used for experimenting with a wide range of new technologies such as data compression, onboard applications and autonomy. The satellite is specially designed to be ‘recovered’ and safely rebooted should an experiment fail.**  **This flying laboratory and will be controlled from a new, small-footprint lab at ESA’s ESOC mission control center in Darmstadt, Germany. Here engineers, students and European space industry can come and test their new mission control software and concepts in space. By taking control of a satellite in orbit, their experiments can go far beyond the limits of what is possible on the ground. OPS-SAT offers a chance to accelerate the innovation in satellite operations technology.** |
| 10:02:20:15   * INT. Tom Mladenov in SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA | **Tom Mladenov – Young Graduate Trainee, ESA**  So, basically, OPS-SAT is really boosting the innovation cycle. So what OPS-SAT is allowing to do, it really allows you to develop an application on ground, verify it on ground and test it in space in a matter of weeks. And this is really where the innovation cycle is substantially boosted. |
| 10:02:36:22   * INT. OPS-SAT Experimenter's Day, ESOC Darmstadt – Germany – June 2019 (3shots) * INT. GV’s OPS-SAT in laboratory, Technical University of Graz - Germany – 2019 – ESA (2shots) * INT. SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA (2 shots) * STILL. Artist impression OPS-SAT in orbit – unknown date -ESA | **Even before its flight, OPS-SAT has become a success, with over 100 companies and institutions from 17 European countries having registered experimental proposals to fly on the tiny mission. This demonstrates that OPS-SAT answers a demand from spacecraft operators and European industry for a way to prove innovation and experimentation. With OPS-SAT, ESA once again looks to the future and dares to go where none have gone before -- working to improve satellite technology.** |
| 10:03:18:11 | **B-roll** |
| INT. David Evans in SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA | **David Evans – OPS-SAT Mission Manager, ESA - English**   * Why ESA is flying OPS-SAT * What will be tested on OPS-SAT * OPS-SAT hardware * OPS-SAT CPU * Why a satellite needs to be tested in space * OPS-SAT experiments * What makes OPS-SAT unique |
| 10:10:03:18   * INT. Tom Mladenov in SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA | **Tom Mladenov – Young Graduate Trainee, ESA – English**   * Who can experiment on OPS-SAT * Why it is hard to innovate in satellite operations * What makes OPS-SAT unique |
| 10:11:28:20   * INT. Tom Mladenov in SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA | **Tom Mladenov – Young Graduate Trainee, ESA – Dutch**   * Who can experiment on OPS-SAT * Importance of OPS-SAT experiments * What makes OPS-SAT unique |
| 10:12:37:06   * INT. Vasundhara Shiradhonkar in SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA | **Vasundhara Shiradhonkar - Experiment Engineer, Terma GmbH for ESA – English**   * What is OPS-SAT and its Purpose * OPS-SAT Hardware * Risks of experimenting without OPS-SAT |
| 10:14:12:08   * INT. Melanie Flentge in SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA | **Melanie Flentge – Ground Operations Engineer in Deep Space & External Services Section, ESA – English**   * What is SMILE * What is SMILE used for * Who can use SMILE * Benefits of using SMILE |
| 10:15:53:03   * INT. Melanie Flentge in SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA | **Melanie Flentge – Ground Operations Engineer in Deep Space & External Services Section, ESA – German**   * What is SMILE * Why was SMILE developed * Who can use SMILE |
| 10:17:35:04   * INT. SMILE laboratory, ESOC Darmstadt - Germany – nov 2019 – ESA (2 shots) | **GV’s ESOC SMILE Laboratory** |
| 10:21:04:08 | **END** |