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SUPPORTING CUBESAT OPERATIONS USING SMILE INFRASTRUCTURE AT ESA

Abstract

SMILE – Special Mission Infrastructure Lab Environment is a facility at the European Space Operations (ESOC) centre in Darmstadt, Germany involved in supporting small satellite missions across ESA member states. The SMILE lab provides an end-to-end solution to satellite developers for testing and validating their mission operations with the current ground architecture hosted in the SMILE lab. Teams can further use the facility for mission operations during launch, early operations and in emergency situations. Small satellite missions focus on low cost satellites and therefore have a stringent budget. The paper will describe how missions can use ground station services at ESA and efficiently reduce the risk of their mission during critical operations. Moreover, SMILE services are made available to teams remotely, where users can access their satellite data using a web interface. The paper will describe in detail how SMILE accommodates multiple users across the globe using the FAST API scheduling software. Currently SMILE consists of the following antennas: a 3.7 m dish which support S band uplink and downlink along with X band downlink, a UHF antenna for uplink and downlink in the amateur band, and a new antenna called Reindeer in Kiruna, Sweden which will support UHF uplink and downlink along with S-band Downlink. Teams can also benefit from using SMILE equipment remotely, experimenters can use SDRs, cortex, and other hardware and software ground interfaces for research and satellite validation purposes. In future, SMILE would like to continue providing support to the small satellite industry and collaborate with other small satellite ground station operators. This will allow small satellites more access to space by increasing their ground pass time. Having validated missions with SMILE ground stations can definitely improve the probability of success in the small satellite industry. SMILE is a small steps towards helping the space industry in that domain. The paper in IAC will allow teams understand the use of SMILE, by expanding on missions previously supported by SMILE and also propose an easy ground solution to the small satellite community.