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NANOSAT MO FRAMEWORK: DRILL DOWN YOUR NANOSATELLITE'S PLATFORM USING CCSDS MISSION OPERATIONS SERVICES

Abstract

The rising market of smartphones and tablets brought new ideas into software by providing simple and rapid development of software (or as they became to be known "Apps") using well defined libraries from Android and iOS. The NanoSat MO Framework (NMF) intends to change the current view on on-board software in a similar way by turning it into flexible "apps" that can be easily developed, debugged, tested, deployed and updated at any time. Furthermore, it will be possible to use the same "app" on different nanosatellite platforms. The CCSDS Mission Operations (MO) services are a set of standardized end-to-end services which are currently being defined by the Consultative Committee for Space Data Systems (CCSDS) and are intended to be used for mission operations of future space assets. The MO services are defined in a service-oriented architecture that allows them to be specified in an implementation and communication-agnostic manner. The NMF takes advantage of MO by defines a new set of Platform services to interact with the platform devices. The Platform services have been designed in a platform-independent manner and generic enough to allow them to support peripherals that share the same functionality but have different low-level interfaces, for example, two GPS units from different vendors. This is possible to achieve by having a different backend adapter for the two different units while keeping the same GPS service frontend. The app developer will then be abstracted from the low-level details of any specific platform. ESA's OPS-SAT mission will have a NMF implementation that will let experimenters to seamlessly develop their experiments in form of NMF apps by abstracting them from understanding the low-level implementation details of the satellite platform. A lightweight software simulator mimicking OPS-SAT's peripherals has been implemented and plugged into the Platform services in order to allow any developer to directly test their app in a playground environment. This will give some degree of confidence in the new app before packaging it and sending it to the spacecraft. The simulator is provided as part of the NMF SDK.