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ASAP – A SENSOR SYSTEM FOR AUTONOMOUS EVENT DETECTION AND ON BOARD PLANNING

Abstract

Traditionally the operations planning is done on ground. User requirements are compiled, put into a priority list and telecommand lists are generated based on predefined procedures. All these planning activities are often done a few days before the commands are uplinked to the satellites, where they are executed at the intended point of time. This well established procedure has the drawback, that one can not react to transient events in the environment which may occur temporarily and might be of interest such as geysers on planets or moons, volcano eruption, fires or fireballs. Additionally the classical planning activities on ground require a significant amount of human resources, which results in high operations cost.

One possible way to reduce the disadvantages of classical operations approach is to shift the planning task to the satellite. In order to be able to detect interesting event as mentioned above, the system must be capable of continuously observing the environment of interest and look for predefined features in the sensor data. A second system must then reorganize the on board command list to adapt to the new situation as soon as a interesting feature or event is detected.

Within the frame of the ASAP project it is planned to develop such a system containing a image sensor, a processor for the image data and a planning system. The system will be suitable to be operated in the environment of a nano satellite. The project is funded by the German Aerospace Center, DLR (FKZ 50RM1208). The paper will describe the system motivation, the first system concept.