SPACE OPERATIONS SYMPOSIUM (B6)
Interactive Presentations (IP)

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ONBOARD MISSION SCHEDULING FOR THE CAMERA SUBSYSTEM OF UOKSAT-3

Abstract

This research explorers the possibility of on-board scheduling for cubesats. The schedule is to be generated for the near future (up to ONE week) and it has to be determined based on the current status and statistics of the cubesat. Also it has to be instantly updated if any changes were introduced at the cubesat (failures, requests from ground operators, etc.).

Based on that, the camera mission of UOKSat-3 is designed and tested. The mission is to take pictures of ground locations specified by the ground operations team. The ground operations team usually request one or two pictures per day, while the cubesat is capable of taking 8-10 pictures per day. To fill this gap and increase the utilization of this cubesat, the cubesat is preset to take pictures of Sudan as much as possible. Also the repetition frequency of images is to be almost equal to all locations. In addition to that, the cubesat is to take pictures of ground areas that are more likely to have changes, example the big cities and the river sides in flood seasons.

The processing unit was selected to be a raspberry Pi computer connected to a Pi camera and a GPS receiver. The processing unit is also responsible of communicating with the cubesat onboard computer, and the communication subsystem. The mission subsystem does not request attitude control changes specifically to achieve the scheduled tasks, unless the task is requested by the ground operators.

This paper discusses the design of the mission subsystem so that it can achieve this, including the selection of components (camera, processor, etc.), development of the subsystem, and its interface with the other subsystems.