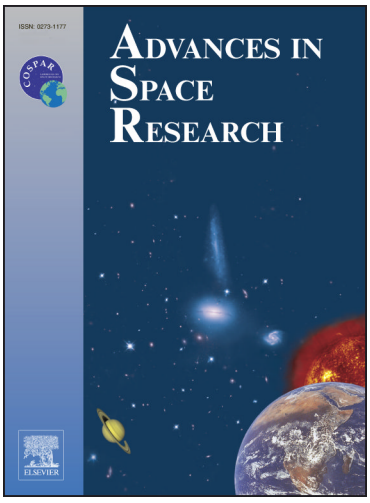

Didactic Satellite based on Android Platform for Space Operation Demonstration and Development

Omar Ben Bahri, Kamel Besbes

PII: S0273-1177(18)30008-5
DOI: https://doi.org/10.1016/j.asr.2017.12.040
Reference: JASR 13573

To appear in: *Advances in Space Research*

Received Date: 16 August 2017
Revised Date: 27 December 2017
Accepted Date: 30 December 2017

Please cite this article as: Ben Bahri, O., Besbes, K., Didactic Satellite based on Android Platform for Space Operation Demonstration and Development, *Advances in Space Research* (2018), doi: https://doi.org/10.1016/j.asr.2017.12.040

Didactic Satellite based on Android Platform for Space Operation Demonstration and Development

Omar Ben Bahri[1*] & Kamel Besbes[1,2]

[1]University of Monastir, Microelectronics and Instrumentation Lab, 19, Boulevard environment, 5019, Monastir, Tunisia. [2]Center for research on nanoelectronic & nanotechnology, technopark, Sousse, Tunisia.
omar.benbahri@fsm.rnu.tn,kamel.besbes@fsm.rnu.tn

ABSTRACT Space technology plays a pivotal role in society development. It offers new methods for telemetry, monitoring and control. However, this sector requires training, research and skills development but the lack of instruments, materials and budgets affects the ambiguity to understand satellite technology. The objective of this paper is to describe a demonstration prototype of a smart phone device for space operations study. Therefore, the first task was carried out to give a demonstration for spatial imagery and attitude determination missions through a wireless communication. The smart phone's Bluetooth was used to achieve this goal inclusive of a new method to enable real time transmission. In addition, an algorithm around a quaternion based Kalman filter was included in order to detect the reliability of the prototype's orientation. The second task was carried out to provide a demonstration for the attitude control mission using the smart phone's orientation sensor, including a new method for an autonomous guided mode. As a result, the acquisition platform showed real time measurement with good accuracy for orientation detection and image transmission. In addition, the prototype kept the balance during the demonstration based on the attitude control method.

Keywords

ADCS, Global Positioning System, Kalman filter, Satellite, Sensors, Smart phone.