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Author: Mr. Usukhbayar Erdenebat
National University of Mongolia, Mongolia, uskhu.e@gmail.com

Mr. Purevkhuu Batmunkh
National University of Mongolia, Mongolia, 17B1NUM2930@stud.num.edu.mn
Dr. Turtogtokh Tumenjargal
National University of Mongolia, Mongolia, turtogtokh@num.edu.mn
Dr. Erdenebaatar Dashdondog
National University of Mongolia, Mongolia, erdenebtr@gmail.com
Dr. Begzsuren Tumendemberel
National University of Mongolia, Mongolia, begzsuren@num.edu.mn
Mr. Odgerel Batochir
National University of Mongolia, Mongolia, 20B1NUM2767@stud.num.edu.mn
Mr. Narmandakh Nanjid
National University of Mongolia, Mongolia, 17N1NUM2082@stud.num.edu.mn

DEVELOPMENT STATUS OF IMAGING HOMELAND FROM SPACE MISSION FOR THE TEMUULEL 1U CUBESAT

Abstract

The TEMUULEL is Mongolia's first domestically developing CubeSat. This project has five missions which include imaging homeland from space, store and forward, determining the failure rate of a high voltage semiconductor device in orbit, reprogramming a standardized interface board in orbit, and sending citizens' wishes into space. This paper presents the current development status of the Imaging Homeland from Space mission (IHS). The IHS mission aims to capture the image of the earth in both wide and narrow angles. To achieve this mission, we are using commercial off-the-shelf (COTS) cameras such as Ardu cam and OpenMV. Using a microcontroller, STM32 will be able to perform simple image-processing to detect earth. When the earth is in view, it commands a low-angle camera that can take a high-resolution image of the earth. Processing higher resolution images require higher processing power which leads to all sorts of problems such as power and heating, wide-angle low-resolution (WALoR) will use only resolutions under 640x480. Furthermore, it will use a wide field of view lens to capture the earth's appearance. It contains a high-performance 32-bit STM32H7 microcontroller and OV7725 imaging sensor. The narrow-angle-high-resolution (NAHiR) cameras. It contains a simple 8-bit atmega328p microcontroller and OV5642 image sensor. Atmega328p will be able to take high-resolution images when receiving commands from a wide-angle camera. Each camera has oven flash memories to save captured images.