

Updates on the Development of the Image Acquisition and Scheduler Portal for the Asian Microsatellite Consortium (AMC) from the Philippines' STAMINA4Space Program

*Mark Edwin Tupas¹, Alvin Retamar², Gay Jane Perez¹, Joel Joseph Jr Marciano², Romer Kristi Aranas¹, Benjamin Joseph Jiao¹

1. University of the Philippines - Diliman, 2. Department of Science and Technology - Advanced Science and Technology Institute

The Asian Microsatellite Consortium (AMC) is a platform for forging meaningful scientific collaborations among Asian nations in space technology through the development and operation of small satellites for scientific earth observation. The Department of Science and Technology and its attached agencies –the Advanced Science and Technology Institute (DOST-ASTI) and the Philippine Council for Industry, Energy and Emerging Technology Research & Development (PCIEERD), together with the University of the Philippines (UP) participates in and contributes to the AMC through scientific research and development programs such as the PHL-Microsat and its successor, the Space Technology & Applications Mastery, Innovation and Advancement (STAMINA4Space). Through PHL-Microsat and STAMINA4Space, UP and DOST support the interaction and exchange of Filipino researchers with partners and enables access to the country' s existing space assets, namely the microsatellites, DIWATA-1 and DIWATA-2, and ground receiving stations.

DIWATA-1 is a 50 kg. microsatellite that was deployed from the Japanese Kibo module in the International Space Station (ISS) on April 2016. In orbit for almost three (3) years and nearing the end of its orbital lifetime, DIWATA-1 has acquired more than 21,000 images of the Philippines and a total of over 36,000 including other parts of the world to support both scientific research and operational objectives. DIWATA-2, another 50 kg. microsatellite, on the other hand, was launched on October 29, 2018 by the JAXA HII-A rocket mission no. 40 to a Sun Synchronous Orbit (SSO) at approximately 600km. The optical cameras onboard DIWATA-2 consists of the HPT and the SMI with LCTF that were carried over end refined from the DIWATA-1 mission and Enhanced Resolution Camera (ERC) at 52.9m resolution to enhance imaging capability. With an expected orbital life of five (5) years, DIWATA-2 is expected to contribute to the AMC through target tasking and the reception, processing and distribution of relevant data.

In this regard, the STAMINA4Space program, through the Ground Receiving, Archiving, Science Product Development and Distribution (GRASPED) component, is currently undertaking the development of the satellite tasking and image acquisition scheduler software, which is expected to be part of a portal that will be accessed by the AMC members. The image acquisition scheduler works like a booking system by allowing AMC members and stakeholders to lodge image acquisition requests. The platform has been designed to follow a service oriented architecture in order to maintain a single source of information and to have flexibility in presentation. The core component of the distribution platform is the WebAPI , which handles geospatial queries through polygons or points. The user facing component of the platform is the web frontend, which consumes data from the WebAPI. It is based on Javascript and LeafletJS, a Javascript framework for interactive maps. Upon lodging of the image acquisition request, the system then identifies available satellites and ground segments for tasking and the member providers are subsequently notified and given the option to accept the tasks. According to the principles of cooperation under the AMC, acceptance and undertaking of the tasks by members is on a best-effort basis with certain requests

gaining priority over others, e.g. in case of emergencies or natural disasters. The cycle ends with the delivery and acceptance of data. More than a resource for facilitating the sharing of both space and ground assets, the AMC portal is expected to contribute towards achieving sustainability of the consortium and of the space technology activities in the region. This presentation provides an update from the GRASPED project component of the Philippines STAMINA4Space program on the development of the scheduler along with related progress of DIWATA-1 and DIWATA-2 microsatellites.

Keywords: Asian Microsatellite Consortium, DIWATA-1, DIWATA-2, Image Acquisition Tasking