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NEAR EQUATORIAL ORBIT FOR REMOTE SENSING MISSION – THE WAY FORWARD

Abstract

Polar or near-polar orbiting satellite has been widely used for the purpose of remote sensing, surveillance and meteorology nowadays. However, tropical countries around the equatorial belt are among the area that has the least benefit from this kind of highly-inclined orbit due to infrequent passes over this region and heavy cloud cover. Facing such limitations has drive tropical countries to look for some other alternatives and launching an earth observation satellite into Near Equatorial Orbit (NeqO) is certainly one of the alternatives. Due to geographical location, it is believe tropical countries like Malaysia will benefit most from NeqO. Satellite placed in Near Equatorial Low Earh Orbit will be passes over Malaysia region 14 times per day and thus, giving great advantages in terms of imaging opportunity over Malaysia and communication time. Malaysia has become the first country to place remote sensing satellite into NeqO with the launch of RazakSATTM into 9 inclination orbit on 14 July 2009. This paper evaluates the accomplishment of RazakSATTM mission up to today after the launching. Main focus of the paper is concentrate in assessing effectiveness of the use of NeqO to improve imaging coverage over Malaysia region. Different aspects of the mission will be addressed in this paper, from launching, revisit capabilities, characteristics of RazakSATTM itself, cloud cover, image quality, target bi-directional reflectance distribution function (brdf), ground station operation and in-flight radiometric calibration. The frequent pass of RazakSATTM over Malaysia offers much more communication time which translates into the ease of satellite operation in terms of satellite health monitoring and the fewer requirements onboard space system by engaging more ground satellite operation. However, it is shown that the number of useful images is strongly restricted as compared to the imaging opportunity owing to image radiometric quality issue, nature of cloud over in tropical region and constraints of RazakSATTM system by itself. A few recommendations were made to improve the number of useful images.