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RESEARCH ON SATELLITES THAT INTERFERE THE TRANSMISSION OF THE LAPAN-A3 SATELLITE X-BAND WITH AN ORBIT APPROACH

Abstract

The LAPAN-A3 satellite is a remote sensing satellite that uses an x-band to transmit the data from several payloads such as a multispectral camera and digital camera. The specification of the x-band transmission system on the LAPAN-A3 satellite is operating with 8,200 MHz frequency and 105 Mbps data rate. On average, the ground station in Rancabungur Bogor downloads data 2-4 times per day from the LAPAN-A3/IPB satellite. In operation, x-band transmission is not always smooth, several times the LAPAN-A3 satellite x-band transmission is interrupted by other satellites. This research will discuss the identification of satellites that interfere with the transmission of the LAPAN-A3 satellite x-band with an orbit approach. Satellites that have a potential frequency interfering with LAPAN-A3 at the range of 8000-8400 Mhz are studied. From ITU there are around 500 satellites that meet the criteria. From that satellites only around 200 satellites have orbit information that can be obtained from space-track.org. When interference happened, two parameters are calculated for all satellites mentioned. First, vector position dot product of LAPAN-A3 and the satellite. Second, the time fraction of the satellite is located above the horizon when LAPAN-A3 transmits the data. Higher values for both parameters mean a higher possibility the satellite interferes with LAPAN-A3 transmission. Using this method, there are eight satellites suspected to interfere with LAPAN-A3. This result can be used for LAPAN-A3 mission planning recommendation to avoid transmission schedule when the suspected satellites are above ground station horizon.