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DOING FORENSIC ON DTUSAT-2 USING THE BEACON COUNTER

Abstract

DTUsat-2 was launched into a Polar LEO on a Dnepr rocket out of Yasny on 19th June 2014. After the first few days of beacon recording and precise orbit determination it became apparent that all was not nominal. One notable thing was the relatively low beacon count number. The beacon count reflects how many times the communication system has generated and transmitted a beacon. When nominal the number will reach 32767 in about 22.5 days before rolling over. Not only did we observe a low beacon count number but most surprisingly the counter seemed the restart right before AOS when the satellite rises from the south. That observation is in direct conflict with our model for DTUsat-2 attitude. The electrical power subsystem became the primary suspect in the search for a cause for the frequent resets. However a fault in the power subsystem could not explain why the resets would occur just before AOS were the satellite should have maximum power. A thorough investigation using modelling and beacon count mapping has been conducted in order to understand why the satellite does not operate nominally and why the beacon counter maps out contradictive to our initial understandings.