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LEO SATELLITE TELEMETRY PACKET OPTIMIZATION PLATFORM FOR IMPROVING SPACE
DOWNLINK EFFICIENCY**Abstract**

Satellites in mission orbit collect their health data, or SOH, from their units and transmit telemetry, or TM, to the ground segment, or G/S. At this time, satellites allocate and transmit data that shall be located by byte position in a specific data unit of a virtual channel, or VCDU, defined in the CCSDS standard. This VCDU provides a place, or byte position, where data is to be transmitted from the satellite to the G/S, except for the header. Then, we may wonder who allocates the VCDU byte position that will transmit various data such as the units' SOH. Currently, it is the DB manager, or DBM, that manages TC/TM for satellite control as a database, or DB. There are usually one or two DBMs in a project, and one of them should always be on standby considering the possibility of a vacancy due to an unexpected situation. The DBMs begin works about six months before the first electrical test. When the test begins, the workload reaches its peak and then gradually decreases until the initial operation after launch. As mentioned earlier, the VCDU byte position to transmit the data is assigned by the DBM, but various assignment conditions should be collected from the unit managers who actually use the data. The ideal way is to collect the assignment conditions including the TC/TM DB before test and operation, but it is not as easy as it sounds. When electrical test begins, the quiet unit managers start raising their hands one by one. The DBM repeats DB updates for various reasons, from simple mistakes such as errors/defects to large and small changes in the design. The unit manager is simply asking to change one TC/TM, but from the DBMs' viewpoint, these gather and the task snowballs. The allocation of byte position within the VCDUs to which data is to be transmitted can also adversely affect data to which byte position has already been assigned within the VCDUs if the preparation for such requests is neglected in advance. This cannot only increase the number of DBM's tasks exponentially, but also affect the overall development schedule, such as several days of test delays. In this paper, we propose a platform that can allocate the byte position within a few seconds within the VCDUs with generalization of the conditions requested by unit managers for data reception.