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Development of
Satellite Operation Procedures Generator
with Automatic Error Checking Functions

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Major in System Design and Management

SUMMARY OF MASTER'S DISSERTATION

Student Identification Number	81534549	Name	Vu Duc Long
Title Development of Satellite Operation Procedures Generator with Automatic Error Checking Functions			
Abstract <p>The success of a space mission does not only depend on the designed satellite and the successful launch. It also depends on successful satellite operation to perform space mission, which is carried out by experts using the equipment and the processes of the mission data on the ground segment. The organization and design of the satellite operation, as well as the integration, the test, and the verification are important activities of the satellite development and launching. The satellite operators generate and use satellite operation procedures (SOP) to send satellite commands to the satellite for the execution of a space mission. A small operation error could lead to severe losses without the ability to recover. These errors usually occur as a result of human mistakes. To reduce the operation error, the system should minimize the influence of humans.</p> <p>For decades, several approaches have been introduced for the prevention and mitigation of operation errors. Some approaches have offered satisfactory manners for identifying and preventing elements that cause errors. However, these approaches still depend on the human factor.</p> <p>In this research, a satellite operation procedure (SOP) generator was created to support satellite operators in connecting the telemetry and the command database, in creating SOPs, and in properly and effectively using it. To solve the problem of satellite operators, this research proposes an approach of removing the mistakes of operators in SOP with the</p>			

automatic error checking functions. To design the SOP generator, several analysis have been done including stakeholder analysis, use case analysis, requirement analysis and then the actual SOP generator was designed to meet all requirements of the stakeholders. Evaluation of this approach is done by applying the approach to create and verify SOP for mission operation test of MicroDragon satellite developed by Vietnam National Satellite Center (VNSC) and by interviews with satellite engineers. The results say that SOP generator was designed properly to realize its functions and the design can totally solve the problem stated in the research. In conclusion, this research addresses and provides design of SOP generator with analysis ways and function design as well as verification and validation to solve satellite operator's problems.

Keywords (5 words)

Operation procedure, Flight procedure, MDG, MicroDragon Satellite, SOP Generator