

SPACE SYSTEMS SYMPOSIUM (D1)
Training, Achievements, and Lessons Learned in Space Systems (5)

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SUMMARY OF DEVELOPMENT AND TESTING OF UNIFORM-1 MICROSATELLITE

Abstract

UNIFORM-1 is a first micro-satellite of UNIFORM project which aims to construct sustainable micro-satellite constellation system with various countries. Sponsor is the Ministry of Education, Culture, Sports and Technology (MEXT) of Japan. UNIFORM-1 is planned to be launched in June 2014 by H-IIA rocket as a secondary payload. Development and all testing have been completed as of March 2014. The satellite weighs 50kg and the size is 500mm cube, 3-axis controlled by four reaction wheels to point two cameras to the earth. They are to detect and localize forest fire as this satellite's mission. One camera is an uncooled microbolometer camera with 2D array sensor of 10um band and has GSD of 200m with swath 100km, and the other is a visible camera with 100m GSD and 100km swath. After integration of all components, the satellite has gone through electro-magnetic compatibility (EMC) test, vibration test, separation shock test, and thermal vacuum test, while all function of satellite is verified by following an operation sequence. In the meantime, attitude determination and control algorithm has been simulated with Model-in-the-Loop Simulation (MILS), Software-in-the-Loop Simulation (SILS) and Hardware-in-the-Loop Simulation (HILS). They are three steps of verifying attitude control software using MATLAB/Simulink and LabVIEW. Furthermore, UNIFORM-1 is compliant with JAXA's H-IIA piggyback safety standards while having deployable solar array paddles and lithium ion battery as electrical power subsystem. Summary of the development and testing of UNIFORM-1 is introduced in detail in this paper, as well as lessons learned from them.