IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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THE LESSON LEARNED OF FACING THEOS-2A BATTERY THERMAL HANDLING ISSUE DURING SATELLITE DEVELOPMENT PHASE

Abstract

GISTDA and Airbus have been collaborating under the THEOS-2 program with respect to very high-resolution satellite development as known as THEOS-2 and capacity building through high-resolution satellite development with SSTL support as a sub-contractor of Airbus as known as THEOS-2A. The capacity building is aimed to build Thai engineers to be able to develop their own satellite locally in the future and Thai suppliers for preparation of next mission. Regarding the Thai engineers, they have been through all process of satellite development since design until operation since schedule launch within 2023 alongside SSTL expert in United Kingdom more than two years. Even though the most sub-system is picked up from SSTL's heritage, some parts are required to newly develop and then the location and material are definitely changed. In this regard, thermal handling is to re-analysis.

In general, to maintain satellite operation life cycle the satellite should be designed under well-understood space environment especially critical part such a battery. Very cold and hot extremely are taken into account including their own generating high temperature from each sub-system and neighbor. For the THEOS-2A, the analysis has been done during design and selected method to handle battery temperature already. The battery was delivered later than scheduled, and all modules have been manufactured and assembled on the satellite. Once the battery is delivered, the battery heater sizing is only half of the original design size. The thermal control system design needs to re-consider. So that, this paper presents the appropriate solution through the hands-on experience including the result of analysis based on thermal control methods such as dry contact, change the mounting point, isolating mount and MLI on battery along with consideration of physical limitation.

Finally, there all worked through environmental verification test successfully which that be confident the THEOS-2A will perform as high-resolution product and lifetime product warranty for 3 years.