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Lessons Learned in Space Systems: Achievements, Challenges, Best Practices, Standards. (5)

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UNAWARENESS OF THE SYSTEM LEVEL VIEW IN THE MAGNETIC DESIGN

Abstract

A spaceborne radar system was developed and there were separated industries involved in the development. One was responsible for the transmitter, one was responsible for the quasi-optical mirror assembly, and the other was responsible for the system integration. Those industries were of different countries (Europe, North America, and Japan) and were developing without enough communication and the system level view about magnetic design although it's important to the satellite attitude control design. In the preliminary phase, there was a communication about the use of the soft magnetic material for the mirror assembly and was allowed up to a certain amount considering the total mass of the material and geomagnetic field in-orbit. On the other hand, the transmitter needed to use the hard magnets inside and therefore self-compensation was included in the design. After those communication in the preliminary phase, system level consideration was not continued and the subsystem design reviews were held separately. Then the integrated radar system design became two strong magnets those were geometrically assembled to be compensated but with distances and the soft magnetic materials in between but their combined effect was not taken into consideration. This magnetic design was pointed out at later phase when the manufacturing and test phase were on-going and eventually the magnetic moment measurement became necessary. Finally, it was tested and the design was accepted, however, it was not easy to perform the test at the later phase and estimate the magnetic moment of the radar system mainly due to the lack of preparation with respect to the verification planning and expertise. This presentation will introduce the problems of organizational structure for the development, the problems for the technical issues and how we resolved, and things we learned from the experience.