IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Interactive Presentations - IAF MATERIALS AND STRUCTURES SYMPOSIUM (IP)

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THE THERMALLY STABILIZED OPTICAL SYSTEM OF LAPAN'S IR CAMERA

Abstract

The hash condition as space environment provides the interesting challenge for lens designers. Extreme temperature changes in the environment either predictability or inversely would yield defocus problem which will eventually make the degradation of image quality. In addition, High value dn/dT of IR materials also makes those changes more problematic since the order tends to produce defocus in IR systems.

LAPAN's IR camera has been set to take image through wavelength of 3-4 m. In order to maintaining focus over large temperature changes in space environment, the thermally stabilized optical system of LAPAN's IR camera has been focused on athermalization of lens design. We have realized that the athermalization lens plays an important role in the designing of LAPAN's IR optical systems and becomes key factor to survive in space environment. The effective athermalization process has been achieved by using Zemax, a commercial optical design software, in order to optimize the thermal performance. To make more accurate, Thermal Desktop/Sinda Fluint software has been involved in during the simulation analysis supported by adjusting the housing of IR camera. From those, we would find variables causing the defocus problems, and then fix them. Slightly analysis of power distribution among lens elements and its materials has been also implicated to strengthen the analysis.

Diagram simulations show LAPAN's IR camera has good athermalization design. Its passive thermal stabilization system could control and maintain lens focus over large temperature changes in space. In other words, optical performance balance has been fulfilled.