

Innovative computer aided alignment technique for deep space optical system for earth albedo monitoring

Seong-Hui Kim¹, Hanshin Lee^{1,2}, Sug-Whan Kim¹, Mike Lockwood²,
Nigel Morris², Ian Tosh², Ho-Soon Yang³, and Yun-Woo Lee³

¹SOL, Dept. of Astronomy and Space Science, Yonsei University

²Rutherford Applton Laboratory, UK

³Korea Research Institute of Standards and Science

The AmonRa instrument is a multi-channel space optical system designed for earth albedo monitoring from the L1 halo orbit. We present the current progress in development of the AmonRa optical system. It starts with the visible channel optical system prescription that benefits from a wide field of view and conic optical surfaces for efficient part manufacturing. This is followed by the new concept of optical alignment technique using Zernike polynomial fitting to the wavefront error caused by the optical misalignment. This technique departs sharply from the conventional least square fitting algorithm using the inverse sensitivity table found in the popular optical analysis tools including CODE V. We report the simulated performance indicators of both algorithms when applied to the AmonRa optical system alignment as well as the computational details and its implications to other space optical instruments.