현황에 대해 논한다.

[IV-2-2] Construction of 3D Earth Optical Model for Earth Remote Sensing (Amon-Ra) Instrument at L1 Halo Orbit

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We present construction of 3D Earth optical Model for in-orbit performance prediction of L1 halo orbiting earth remote sensing instrument; the Albedo Monitor and Radiometer (Amon-Ra) using Integrated Ray Tracing (IRT) computational technique. The 3 components are defined in IRT; 1) Sun model, 2) Earth system model (Atmosphere, Land and Ocean), 3)Amon-Ra Instrument model. In this report, constructed sun model has Lambertian scattering hemisphere structure. The atmosphere is composed of 16 distributed structures and each optical model includes scatter model with both reflecting and transmitting direction respond to 5 deg. intervals of azimuth and zenith angles. Land structure model uses coastline and 5 kinds of vegetation distribution data structure, and its non-Lambertian scattering is defined with the semi-empirical "parametric kernel method" used for MODIS (NASA) missions. The ocean model includes sea ice cap with the sea ice area data from NOAA, and sea water optical model which is considering non-Lambertian sun-glint scattering. The IRT computation demonstrate that the designed Amon-Ra optical system satisfies the imaging and radiometric performance requirement. The technical details of the 3D Earth Model, IRT model construction and its computation results are presented together with future-works.

[IV-2-3] In-orbit performance prediction for Amon-Ra energy channel instrument

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In this report, we present in-orbit radiometric performance prediction for the Amon-Ra (Albedo Monitor and Radiometer) energy channel instrument. The Integrated Ray Tracing (IRT) computational technique uses the ray sets arriving at the Amon-Ra instrument aperture orbiting around the L1 halo orbit. Using this, the variation of flux arriving at the energy channel detector was obtained when the Amon-Ra instrument including the energy channel design observes the Sun and Earth alternately. The flux detectability was verified at the energy channel detector (LME-500-A, InfraTecTM). The detector time response and RMS signal voltage were then derived from the simulated flux variation results. The computation results demonstrate that the designed energy channel optical system satisfies the in-orbit detectability requirement. The technical details of energy channel instrument design, IRT model construction, radiative transfer simulation and output signal computation results are presented together with future development plan.

[IV-2-4] Giant Magellan Telescope Fast Steering Mirror Prototype의 반사경 Cell 초기설계 및 해석

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한국천문연구원은 Giant Magellan Telescope Fast Steering Mirror prototype을 개발 중이고, 반사경 제작과 tip-tilt 시스템 제작을 목표로 하고 있다. 반사경은 직경이 1.06m, 두께가 약 140mm, 질량이 약 100kg인 meniscus 타입인 비축 비구면 반사경이다. Tip-tilt 시스템은 바람에 의한 반사경의 진동과 망원경의 tracking jitter를 보정하기 위한 장치로써 tip-tilt 각도가 ±20″ 범위 내에서 약 30Hz로 작동하는 시스템이다. 반사경 cell은 반사경 뒷면에 조립되어 반사경 cell 내부에 주입되는 진공과 함께 반사경의 무게를 지지하고, tip-tilt 시스템을 작동시키는 액츄에이터가 장착되는 base structure 역할을 한다. 이 논문에서는 반사경 cell의 초기설계와 반사경 cell에 발생할 수 있는 하중조건에 따른 응력과 변위, 반사경 cell의 두께에 따른 고유진동수를 해석한 결과들에 대해 논한다.

■ Session : 기기 II
4월 29일(금) 13:00 - 14:00 제2발표장

[V-2-1] IGRINS : Collimating Mirror Mount Opto-mechanical Design

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