

The Satellite System for the VSOP-2 mission

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VSOP-2 is a next generation space VLBI project following the VSOP project. Over all mission view of the mission is presented by Hirabayashi (2006) in this meeting. We present the design of the satellite system for the VSOP-2 mission.

New functions of the satellite relative to the VSOP-2 mission is as follows. 1) Observing frequency till 43 GHz. 2) Dual polarization cooled receivers for 22 and 43 GHz, for getting higher sensitivity and the polarization observation. 3) High data rate sampling and data transfer (1 Gbps) for the sensitivity of the continuum sources. 4) High speed maneuver and high accuracy navigation system for the phase-referencing observation. The satellite is designed to be launched M-V rocket in JAXA. Its mass and total power are estimated to be 910 kg and 1.8 kW, respectively. Nominal orbit is elliptical with 25,000 apogee height and 1,000 km perigee height, with 7.5 hour period.

We use the deployable modular type antenna for the 9-m main dish of the VSOP-2 satellite. The deployment mechanism is same as that of the ETS-VIII mission in JAXA. The main dish is consist of 7 modules, and each module is newly developed to get higher surface accuracy than that of ETS-VIII, and tested.

The cooled HEMT receiver is designed with using the on-board starling cycle cooler, which have already developed for Suzaku (X-ray astronomy mission) and Akari (Astro-F: Infrared astronomy mission). We finished the concept design of the receivers.

High date rate processing and data transfer system is also another challenge of the system. We plan to use 37-38 GHz for wide band downlink and 40 GHz for uplink. The condition of the link budget is more severe than that of HALCA (VSOP). The simulation for the rapid switching using 2 control moment gyros and 4 reaction wheels give good results that we can switch 2 sources with 3 degree separation, within 1 minutes. GPS is plan to use for the high accuracy navigation with the level of 3 cm. Some simulation works have already carried out.

Other subsystems are basically follow the way of HALCA system, and we also finished the conceptual system design. We present the current status of the design and development of the VSOP-2 satellite.