SELENE UPI Gimbal system

Masayuki Kikuchi[1], Masato Nakamura[2], Makoto Taguchi[1], Shoichi Okano[3], Masaki Ejiri[1]

[1] NIPR, [2] Earth and Planetary Sci, Univ. Tokyo, [3] PPARC, Tohoku Univ.

The gimbals system of UPI (UPI-G) has 2 axes control in azimuthal (AZ) and elevation (EL) directions. A bipolar stepping motor (TAMAGAWA TS2617N1E2) drives each axis and one DSP chip (TI SMJ320HFP) can control these two motors. Two DSP chips are, however, are prepared for redundancy. The accuracy of pointing angle is 0.08 degree for AZ and EL because of the dynamic range of A/D converter for potentiometer (SMJ320HFP). In order to track the earth from the orbiter, we must know the direction of the earth. We upload a table every year for this calculation.

The gimbals system of UPI (UPI-G) has 2 axes control in azimuthal (AZ) and elevation (EL) directions. A bipolar stepping motor (TAMAGAWA TS2617N1E2) drives each axis and one DSP chip (TI SMJ320HFP) can control these two motors. Two DSP chips are, however, are prepared for redundancy. The accuracy of pointing angle is 0.08 degree for AZ and EL because of the dynamic range of A/D converter for potentiometer (SMJ320HFP). This DSP chip is not a mere microprocessor but it also has analog inputs from the sensors, digital output to the stepping motors, and watch dog timer (WDT) in one chip. This will enable us to save the electric parts and programming load.

In order to track the earth from the orbiter, we must know the direction of the earth. Orbiter bus system supplies information of attitude and position of the orbiter in the moon-centered coordinates. Thus to know direction of earth from the orbiter, we must know the distance and relative position between the center of the moon and the earth. We upload a table every year for this calculation.