LRS observation in the lunar polar regions

Takao Kobayashi[1]; Takayuki Ono[2]

[1] JST; [2] Department of Astronomy and Geophysics, Tohoku Univ.

Since SELENE is operated in a polar orbit, the number of observation in the polar regions will be very large.Consequently, the mean spacing of LRS observation point above the poles will be less than 1/10 of the wave length of the LRS pulse. This special condition allows a unique observation possible in the polar region, which could not be conducted in other lower latitude region. That is two Dimensional Synthetic Aperture Radar (2D-SAR) observation.2D-SAR has some special advantages to other nominal operation mode observations: (1) it considerablly improves signal to clutter ratio thanks to that a large number of pulses are processed in 2D-SAR,

(2) the target location is determined 3 dimensionally with the spatical resolution of 10^2m, (3) appropriate estimation of dielectric constant of subsurface material enables to visualize subsurface structure 3 dimensionally, (4) geometrical property of the target may be estimated by applying the method of polarimetric radar.

However, before getting the fruite of rich information by 2D-SAR, some problems must be solved. (1) the tolerated position error of observation point is less than 10m, (2) a super computer is required for the 2D-SAR data processing. The second problem is not a difficult one. As to (1), we have been confirmed, by simulation study, that the error can be reduced to 10^2m. A new algorithm is studied to improve the error for another order of magnitude.