

Ground based observation of mission target asteroids

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The mission target asteroids are the asteroid actually investigated by a spacecraft or the body which may serve as a candidate in the future mission here. Ground based observation of the mission target asteroid has two big meanings. The 1st is using for decision of missions scenario by getting to know the physical property of the asteroid beforehand, and raising mission feasibility. The 2nd is being able to perform verification of the result of ground based observation after the mission, throughout which we can obtain the true picture of the target body. The mission required information of the target body is an orbit, a taxonomic type, a size, shape, a rotation period, a pole orientation, surface reflectance, surface temperature, volume, density, mass, surface gravity, surface speed, etc. On the other hand, it is to be desired that we lessen use fuel of a space craft to approach the mission target asteroid as much as possible. This is because the weight of fuel is saved, and caring many science instruments. The mission target body chosen from such a viewpoint is small and faint for the ground based observation in generally.

The MUSES-C mission, which will be launch in this May, is the asteroid sample return mission, and its target is a near-earth asteroid (25143) 1998SF36. The size of this asteroid is about only 300m. This asteroid brightened during the end of 2000 and middle of 2001, and various observations including the one using the Subaru Telescope was carried out. 1998SF36 was approached to the earth within only 0.04 AU at the end of March, 2001, and brightened less than 14 magnitudes.

At present, we are planning to a Post-MUSES-C mission. There are various taxonomic types of asteroids and it is thought that each has the material information of solar system in early stage. In the post-MUSES-C mission the space craft will send to two or more asteroids of the taxonomic type which was not investigated by MUSES-C mission. It is very important to determine the taxonomic type of the asteroids which are reachable by a space craft using the large telescope like the Subaru Telescope.

In the presentation, we reports the obtained result for 1998SF36 by ground based observations, and observability of mission candidate asteroids in near future.