SPACEGUARD ACTIVITY IN JAPAN: PAST AND FUTURE IN BISEI SPACEGUARD CENTER.

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Introduction: The term "spaceguard" means the activity to discover and study Near Earth Objects (NEOs), which have the potential to collide with the Earth. In Japan, the spaceguard activity has been enhanced since a non-profit organization, Japan Spaceguard Association (JSGA), was established in 1996. After long discussions on our request for making a special astronomical observatory optimized for the observations of NEOs, the Japanese government agreed to construct such a kind of observatory. Bisei Spaceguard Center was constructed in 1999 for the purpose of NEOs and space debris observations. It started to observe asteroids since the beginning of 2000. In this paper, we shortly review our activities in these 12 years and show our future prospect.

Bisei Spaceguard Center: Bisei Spaceguard Center (MPC code 300) was built in 1999 in Bisei town, Okayama prefecture in Japan. The facility was constructed by the Japan Space Forum. The operation is funded by the Japan Aerospace Exploration Agency (formerly the National Space Development Agency of Japan). The observations and research work are carried out by JSGA. Our asteroid observing project in BSGC is called the "BATTeRS" (Bisei Asteroid Tracking Telescopes for Rapid Survey).

From the beginning of 2000, 25 cm and 50 cm telescopes were firstly used for searching and follow-up observations of NEOs and other asteroids. After the installation of the 1 m telescope in 2001, the 50 cm and the 1 m telescopes have been mainly used. The unique features of these two telescopes are their large field of view (2-3 degrees) and the tracking capability for high-speed moving objects [1].

Results of Observations: During this 12 years, we have discovered more than 1000 provisionally designated "unnumbered" asteroids, including 270 newly numbered asteroids (at February 8, 2012). We have also discovered two Apollo-type Near Earth Asteroids, (20826) 2000 UV13 and 2007 YZ, and one new comet C/2001 W2, which is named as "BATTeRS".

Recently, the apparent magnitude for newly discovered asteroids go to fainter and fainter due to large and deep systematic surveys as Pan-STARRS. Therefore, we are now focusing on confirmatory follow-up observations of NEOs, in particular, newly discovered NEO candidates presented on the NEO Confirmation Page (NEOCP) maintained by the Minor Planet Center. Early follow-up astrometric observations of about 400 objects listed on the NEOCP were carried out since 2010.

In addition to these discoveries and astrometric follow-up observations, we think that the research activity is also important. From our light curve observations, it was found first that the rotational period of (25143) Itokawa, the target of HAYABUSA mission, is about 12 hours. We also carried out the light curve observations of (162173) 1999 JU3, the target of HAYABUSA-2 [2,3,4], and Comet-Asteroid Transition Object 107P/Wilson-Harrington [5], which is one of the candidate to be explored by the Japanese advanced sample return mission after HAYABUSA-2.

Outreach Activity: We consider that public outreach activity of the spaceguard is very important, and have conducted many events. They are public lectures/talks, Science Café (Café Scientifique), experience meetings about asteroid observations, and so on. These events have been held in various cities in Japan including Okayama prefecture.

Now and Future Plans: It is considered that research activities related to the spaceguard are important as well as astrometric discovery/confirmatory observations. We held a spaceguard meeting every year in Japan, and also published of the research bulletin "Spaceguard Research". In addition, we conducted a spaceguard research organization in order to promote our research activities. Further observational research programs in Bisei Spaceguard Center will be advanced, sometimes in cooperation with other agencies.

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