

**Introduction:** The Korea Astronomy and Space Science Institute (KASI) has been providing a supplementary Consolidated Prediction Format (CPF) for STSAT-2C as one of ILRS prediction centers since April 7, 2014. The STSAT-2C is the first Korean satellite equipped with the laser retro-reflector array for satellite laser ranging (SLR). The abbreviation in CPF files is KAS. The main provider of CPFs for STSAT-2C is the Korea Advanced Institute of Science and Technology (KAIST, KAI). The KAI prediction center consistently provides CPFs for STSAT-2C. However, KAI CPFs based on two line element (TLE) have limits in ensuring accuracy. The only source for orbit determination (OD) for STSAT-2C is SLR observations, and therefore an attempt to make enhanced CPFs from SLR-based OD was accomplished and KASI started to operate KAS prediction center.

**Operation Status:** The operation of KAS prediction center has two stages: test period and regular period. The SLR trackings for STSAT-2C are very few, for example, in April 2014, the only 19 passes during 9 day were uploaded to EDC data center. Therefore, daily CPFs were generated by using OD and their prediction results during from 7 to 22 April, 2014. As a result, only SLR-based CPFs from OD with new SLR observations have meaningful accuracy. In regular period, from 28 April to now, 2014, only if new SLR trackings are added, OD and CPFs generation are tried. Finally, a total of 31 KAS CPFs for STSAT-2C were uploaded to CDDIS data center as of September 17, 2014.

**Prediction Procedure:** The process for CPFs generation for STSAT-2C has two steps. First is OD for STSAT-2C using NASA/GSFC GEODYN II software. Because the condition for OD for STSAT-2C is very poor, short/sparse measurements and inaccurate initial orbit information, the successful estimation is a lot of hard work. If the number of SLR normal points is small (under 6), the OD for STSAT-2C cannot be performed. The information of initial orbit can be obtained from KAI CPFs. Second is to generate CPFs from OD results. After OD, predicted orbits based on determined orbits can be transformed to geocentric true body fixed reference frame, which is a default frame of CPFs. Finally, generated SLR-based CPFs can be compared to KAI CPFs for consistency verification and uploaded to CDDIS data center. Figure 1 shows the flowchart of KAS CPFs for STSAT2C generation.

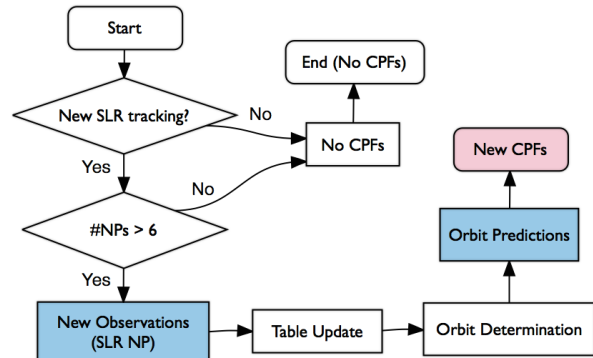


Figure 1. The flowchart of KAS CPFs Generation

**Conclusions and Future Works:** The KASI prediction centers (KAS) provides CPFs for STSAT-2C. If SLR tracking is accomplished, KAS CPFs for STSAT-2C can be generated. The unsolved issue is to confirmed the practical accuracy of KAS CPFs. Now, the only way to assess KAS CPFs accuracy is to track STSAT-2C using KAS CPFs, however it is not easy work because satisfying all condition such as CPFs, SLR NPs, day time and weather at the same time is very hard. We will prepare better strategy for quality assessment of KAS CPFs and continuously try to generate confirmed CPFs for more SLR tracking for STSAT-2C.

#### References:

- [1] Kim Y.-R., Park E., and Lim H.-Y. (2013) *18<sup>th</sup> International Workshop on Laser Ranging*.