Enhancement Software Package for Collision Risk Mitigation in KARI

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Currently, KARI (Korea Aerospace Research Institute) is operating five satellites (4 LEO, 1 GEO) and six more satellites will be launched in the near future. To secure these space assets, KARI has been performing conjunction risk management activities and continues to developing the analysis and support tools. Conjunction risk management activities such as monitoring, fine assessment, data exchange with JSpOC and collision avoidance maneuver should be continued or always prepared 24/7 and the system response time (from conjunction identification to mitigation measure execution) for specific conjunction event is top priority in real satellite operation.

CA-FAST (Conjunction Assessment – Flow Automation Support Tool) was developed in 2016 to support KARI's conjunction risk management activities. It can process the conjunction event monitoring, fine assessment, geometry analysis, avoidance maneuver planning, report generation, external interface (JSpOC) and statistics. It was designed with automation concept to minimize response time for risk events and operator effort. Over 40,000 CDM (Conjunction Data Message) of KARI constellation were processed automatically for every years and CA-FAST can also handle TLE and precise orbit data with regard to KARI satellites.

In this paper, KARI's conjunction assessment process, major function of CA-FAST and some lessons learned points during conjunction risk management activities were introduced. Especially, collision avoidance maneuver strategy for KARI constellation and maneuver planning function of CA-FAST were represented.