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CAPTURING AND DEORBITING ENVISAT WITH AN AIRBUS SPACETUG. RESULTS FROM THE
ESA E.DEORBIT CONSOLIDATION PHASE STUDY.

Abstract

Airbus has been developing a mission and chaser concept for capturing and deorbiting the defunct Envisat satellite with different partners in the frame of ESA studies (e.Deorbit Phases A and B1). In the last e.Deorbit study called 'Consolidation Phase' which aims at implementing findings from the intermediate SRR, Airbus along with their partners CBK, MDA, SENER and GMV was pursuing the mission and chaser definition, but then based on the Airbus Spacetug vehicle for GEO servicing. The assumption for this analysis was a Spacetug vehicle adapted for the specific e.Deorbit mission rather than generic electrical Spacetug for orbit transfer or GEO servicing missions. As the same Eurostar Neo bus platform would be used in both cases, the potential for the reuse of the e.Deorbit Spacetug solution for further servicing missions would be therefore very high. Starting from mission analyses, an e.Deorbit Spacetug baseline configuration was defined, bringing various options depending on the mission scenarios. As with the Airbus Spacetug vehicle, this e.Deorbit Spacetug vehicle aims at being launched with a medium or heavy launcher. The first considered scenario is the one inherited from e.Deorbit Phase B1 study, i.e. based on motion synchronization with Envisat, capture and stabilization via robotic arm and fixation using clamping mechanism, before deorbiting with controlled re-entry. The Airbus Spacetug preliminary design is based on the Eurostar Neo platform from Airbus and made of: -A 2.5kW electrical power system based on two solar arrays and battery -A chemical propulsion system with associated bi-propellant tanks -A set of sensors dedicated to AOCS/GNC such as STR and Gyroscopes -Robotic arm system, gripper and clamping mechanism for servicing -On-Board Computer (Leon3 based) and avionics bus reused from Eurostar Neo The preliminary assessment of the synergies between the e.Deorbit and GEO Spacetug systems already shows very good opportunities for a mutual fertilization of both systems. A great opportunity pointing out here is the high flexibility of the Spacetug platform to adapt to different mission configurations.