

## **Space Debris Mitigation requirements and CleanSat programme (ESA/ESTEC)**

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The Clean Space, is a technology cross-cutting initiative which started in 2012 with the aim of guaranteeing the future of space activities by protecting the environment, both on Earth and in space. Clean Space encompasses technology developments along 4 branches:

- Eco-Design to evaluate the environmental impact and monitor legislation risk;
- Green Technologies to replace hazardous substances and mitigate environmental impact;
- Technologies for compliance with Space Debris Mitigation (SDM) requirements;
- Technologies for Active Debris Removal.

In the last years several countries and institutions around the world have made SDM requirements applicable for all space missions. SDM requirements for ESA projects came into force with ESA/ADMIN/IPOL(2008)2, recently superseded by ESA/ADMIN/IPOL(2014)2.

Considering the SDM impact on several sub-systems, the systematic compliance requires an evolution of the LEO platforms. LEO is becoming more and more a commercial arena, where having recurrent platforms and respective supply chains results in important competitive advantages.

ESA's CleanSat programme, is being prepared by the Clean Space Office and encompasses the evolution of the LEO platform for compliance with SDM through a coordinated effort at European level. It aims create an efficient framework for the fast implementation of innovative technologies in upcoming EOP missions. The development of building blocks in a coordinated European approach, may lead to the creation of shared supply chains, lowering development and recurrent costs.

CleanSat primary focus is on the development of building-blocks ensuring compliance with the SDM requirements. Other technologies in areas such as obsolescence risk mitigation, performance improvement and future operations will nevertheless be considered within in CleanSat programme. This paper will focus on the impact of the SDM requirements on RF payloads, addressing potential areas of interest for technology developments in the Clean Space domain through the CleanSat framework.