

## A Blueprint for Responsible Launch of Small Satellites from a Debris Perspective

**Authors :** Jeroen Rotteveel, Zeger De Groot

**Abstract :** The small satellite community is more and more aware of the need to start operating responsibly and sustainably in order to secure the use of outer space in the long run. On the technical side, many debris mitigation techniques have been investigated and demonstrated on board small satellites, showing that technically, a lot of things can be done to curb the growth of space debris and operate more responsibly. However, in the absence of strict laws and constraints, one cannot help but wonder what the incentive is to incur significant costs (paying for debris mitigation systems and the launch mass of these systems) and to lose performance onboard resource limited small satellites (mass, volume, power)? Many small satellite developers are operating under tight budgets, either from their sponsors (in case of academic and research projects) or from their investors (in case of startups). As long as it is not mandatory to act more responsibly, we might need to consider the implementation of incentives to stimulate developers to accommodate deorbiting modules, etc. ISISPACE joined the NetZeroSpace initiative in 2021 with the aim to play its role in secure the use of low earth orbit for the next decades by facilitating more sustainable use of space. The company is in a good position as both a satellite builder, a rideshare launch provider, and a technology development company. ISISPACE operates under one of the stricter space laws in the world in terms of maximum orbital lifetime and has been active in various debris mitigation and debris removal in-orbit demonstration missions in the past 10 years. ISISPACE proposes to introduce together with launch partners and regulators an incentive scheme for CubeSat developers to baseline debris mitigation systems on board their CubeSats in such a way that it does not impose too many additional costs to the project. Much like incentives to switch to electric cars or install solar panels on your house, such an incentive can help to increase market uptake of behavior or solutions prior to legislation or bans of certain practices. This can be achieved by: Introducing an extended launch volume in CubeSat deployers to accommodate debris mitigation systems without compromising available payload space for the payload of the main mission Not charging the fee for the launch mass for the additional debris mitigation module Whenever possible, find ways to further co-fund the purchase price, or otherwise reduce the cost of flying debris mitigation modules onboard the CubeSats. The paper will outline the framework of such an incentive scheme and provides ISISPACE's way forward to make this happen in the near future.

**Keywords :** netZerospace, cubesats, debris mitigation, small satellite community

**Conference Title :** ICSD 2022 : International Conference on Space Debris

**Conference Location :** Amsterdam, Netherlands

**Conference Dates :** February 07-08, 2022