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# ALL TIME LOW: LEGAL CONSIDERATIONS FOR UTILISING VERY LOW EARTH ORBIT IN SUSTAINABLE COMMERCIAL SATELLITE OPERATIONS

**Abstract**

The ongoing degradation of the orbital environment due to a build-up of space debris objects is set to worsen with the rapid increase in commercial satellite activity. In response, companies and other organisations are beginning to explore Very Low Earth Orbit (VLEO) as a new operational zone which would enable higher technical performance while still ensuring that their activities remain environmentally sustainable. This paper considers this trend as well as likely legal considerations that may follow, and provides suggestions for potential policy pitfalls endemic to the technical characteristics and related challenges of operating in VLEO.

In brief, we will examine:

1. the context necessitating the adoption of VLEO as an operational zone by reviewing the current space debris crisis, and the technological, economic, and legal challenges facing efforts to resolve it;
2. VLEO itself, the benefits it confers to satellite operations, the challenges it poses to commercial operators looking to venture there, and the growing cognisance by the space industry of the region's numerous advantages; and
3. the legal considerations implicated by a shift toward VLEO, and propose several solutions to mitigate any potential challenges posed by greater VLEO utilisation as a means of ensuring sustainability in the commercial satellite services sector, with a view toward minimising institutional resistance.

VLEO is the region between 100-500 kilometres in altitude. Operating within this region confers several benefits to all manner of satellite operations, and improves both the capabilities and efficacy of Remote Sensing and Telecommunications payloads. The benefits include drastically reduced payload power draw, improved signal-to-noise ratios, enhanced optical image resolutions, and lower communications latency.

This paper will consider the prospect of utilising VLEO to a greater degree in commercial satellite operations, with a view toward incentivising environmentally sustainable practices without compromising profit motives. The rapid growth of the space industry has created a real risk of irreversible degradation in the orbital environment. We need to develop new approaches toward encouraging sustainable practices, away from zero-sum assessments and toward solutions which are beneficial for both the space environment and the space industry it supports. In that light, a shift toward VLEO will constitute a fruitful first step in this direction.