

IAF SPACE OPERATIONS SYMPOSIUM (B6)
New Space Operations Concepts and Advanced Systems (2)

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OPERATIONALISING VERY LOW EARTH ORBIT TO BOLSTER INTELLIGENCE,
SURVEILLANCE, AND RECONNAISSANCE CAPABILITIES FOR DEFENCE APPLICATIONS**Abstract**

Our paper will consider how Very Low Earth Orbit (VLEO) can be utilised for defence purposes, and how the positioning of military small satellite assets in the region can provide substantial operational benefits across different payloads and applications, with a particular focus on enabling and/or enhancing intelligence, surveillance, and reconnaissance (ISR) capabilities. It will also consider how such activities could enable the provision of broad spectrum support across air, land, sea, and space operations. We will also explain how operating in VLEO has the potential to both preserve existing strategic advantages in space, as well as enhance conventional warfighting capabilities across tactical, operational, and strategic planning levels.

In brief, we will examine:

1. The operational and economic benefits from operating in VLEO;
2. How these benefits can be operationalised for defence purposes across a range of potential applications in order to preserve and enhance strategic capabilities; and
3. The legal and environmental considerations of increased defence activity in VLEO, in light of current trends relating to the militarisation of the Near-Earth Environment as a whole.

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. In a defence context, the most immediately relevant applications would be for ISR, with a particular focus on operations involving Command, Control, Communications, Computers, and Intelligence (C4I) and/or Surveillance, Target Acquisition, and Reconnaissance (STAR) elements.

Our paper will therefore consider how VLEO can be operationalised to provide timely and accurate battlefield support without necessitating assets or human operators being placed in harm's way. Such support, key to the success of any modern military operation, can function as both force-enablers and force-multipliers, and maximise lethality whilst minimising risks to friendly forces, civilian non-combatants, and critical infrastructure. Most critically, our paper will discuss how greater ISR accuracy can reduce non-combatant casualties by improving the

efficacy of target acquisition. Finally, we will also consider the legal and environmental policy considerations of a greater defence presence in VLEO, and the potential impacts to both the global space law ecosystem as well as space itself.