Perugia, Italy - 17/02/2025

The Erosion of Traditional Deterrence: Space as a Case Study in Military Transformation

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This paper will examine the evolving interplay between legacy military technologies and emerging innovations, arguing that the transformation of the battlefield has reached a critical tipping point at which traditional doctrines are no longer adequate, and will do so by using space as a case study. As Cold War-era systems—constructed on static deterrence models—confront cutting-edge dual-use innovations such as autonomous satellite constellations, and cyber-enabled space operations, the security environment in space is undergoing a profound reconfiguration. Drawing on empirical analyses of state practises and legal frameworks from authoritative sources including the Woomera Manual, the MILAMOS Project, and the Tallinn Manual on Cyber Operations, this study provides a comprehensive assessment of how these new technologies disrupt conventional military effectiveness and strategic stability.

The paper will first delineate the characteristics of legacy versus modern technologies, highlighting how historical systems have shaped deterrence through predictable and well-understood doctrines. In contrast, recent innovations introduce heightened unpredictability, diffuse the locus of control, and expand the pool of actors—encompassing non-state and commercial entities—thereby complicating attribution and response strategies. This analysis will expose critical vulnerabilities in current international legal regimes, which were originally devised for a markedly different technological era. The paper will propose a multi-pronged framework to bridge the gap between traditional and modern military capabilities, focusing on revising operational doctrines to incorporate real-time data analytics and adaptive response measures; and developing updated legal interpretations that reconcile existing treaty obligations with the realities of dual-use technologies.