

Technology Futures in Global Militaries: A Forecasting Method Using Abstraction Hierarchies

Authors : Mark Andrew

Abstract : Geopolitical tensions are at a thirty-year high, and the pace of technological innovation is driving asymmetry in force capabilities between nation states and between non-state actors. Technology futures are a vital component of defence capability growth, and investments in technology futures need to be informed by accurate and reliable forecasts of the options for 'systems of systems' innovation, development, and deployment. This paper describes a method for forecasting technology futures developed through an analysis of four key systems' development stages, namely: technology domain categorisation, scanning results examining novel systems' signals and signs, potential system-of systems' implications in warfare theatres, and political ramifications in terms of funding and development priorities. The method has been applied to several technology domains, including physical systems (e.g., nano weapons, loitering munitions, inflight charging, and hypersonic missiles), biological systems (e.g., molecular virus weaponry, genetic engineering, brain-computer interfaces, and trans-human augmentation), and information systems (e.g., sensor technologies supporting situation awareness, cyber-driven social attacks, and goal-specification challenges to proliferation and alliance testing). Although the current application of the method has been team-centred using paper-based rapid prototyping and iteration, the application of autonomous language models (such as GPT-3) is anticipated as a next-stage operating platform. The importance of forecasting accuracy and reliability is considered a vital element in guiding technology development to afford stronger contingencies as ideological changes are forecast to expand threats to ecology and earth systems, possibly eclipsing the traditional vulnerabilities of nation states. The early results from the method will be subjected to ground truthing using longitudinal investigation.

Keywords : forecasting, technology futures, uncertainty, complexity

Conference Title : ICMRPC 2023 : International Conference on Military Revolution and Political Change

Conference Location : Athens, Greece

Conference Dates : April 03-04, 2023