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Additive Manufacturing and High-Performance Computing: a Disruptive Latent Technology

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This presentation will discuss the relationship between recent advances in Additive Manufacturing (AM) technology, High-Performance Computing (HPC) simulation and design capabilities, and related advances in Uncertainty Quantification (UQ), and then examines their impacts upon national and international security. The presentation surveys how AM accelerates the fabrication process, while HPC combined with UQ provides a fast track for the engineering design cycle. The combination of AM and HPC/UQ almost eliminates the engineering design and prototype iterative cycle, thereby dramatically reducing cost of production and time-to-market. These methods thereby present significant benefits for US national interests, both civilian and military, in an age of austerity. Finally, considering cyber security issues and the advent of the "cloud," these disruptive, currently latent technologies may well enable proliferation and so challenge both nuclear and non-nuclear aspects of international security.