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REAL OPTIONS VALUATION FOR SPACE STARTUPS: A FRAMEWORK ALIGNING FINANCIAL  
VALUE WITH SYSTEMS ENGINEERING MILESTONES**Abstract**

Valuing space startups is complex due to long timelines, technological and business uncertainties, and dynamic cash flow scenarios. Conventional venture capital valuation methods fail to account for critical systems engineering milestones. This paper proposes a tailored valuation framework for space startups, integrating real options valuation (ROV) with systems engineering concept integration, such as Technology Readiness Level and Design Review Processes. By quantifying probabilities of business scenarios, risks, uncertainties, and technology value, the framework enables venture investors to reasonably assess present and future space startup value, reflecting the dynamic nature of space technology.

The paper details the framework's derivation, assumptions, and parameter sources, with case studies demonstrating its effectiveness and limitations compared to conventional approaches. The goal is to bridge financial theory and space engineering, enabling informed investment decisions of venture investors and ultimately promoting space venture investments to generalist investors.