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SPACE STARTUP FINANCING AND TECHNOLOGY MATURITY: TECHNOLOGY READINESS  
LEVELS (TRL) AS A TOOL FOR FINANCIAL INSTRUMENT SELECTION

**Abstract**

Venture capital has emerged as an essential financing instrument for the space sector, but not all space startups are a fit for venture capital. While there are numerous criteria that determine the best financing vehicles for a given startup, technology readiness is one of them. Technology Readiness Levels (TRL) is a framework for assessing technological maturity first developed by NASA and adapted for use in other contexts, including by the U.S. Department of Defense (DOD), U.S. Department of Energy (DOE), and European Space Agency (ESA), among others. Beyond assessing technological maturity, the TRL framework can also be used as a guide for startups to understand which financing options are best matched to their company's stage of development. However, the TRL framework was not designed as a financing guide, and thus many limitations exist for its use in this regard.

This paper explores the variety of financing options available to startups, how those options map to the TRL framework, and the limitations of those options. In addition, new and expanded frameworks are explored to identify methods for overcoming the limitations of the TRL framework for financing guidance. The goal of this work is to improve startup efficiency in identifying and securing financing, and financier efficiency in identifying which startups are well-matched to their investment thesis.