

## **Optimizing Technology Investments: A Broad Mission Model Approach**

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A long-standing problem in NASA is how to allocate scarce technology development resources across advanced technologies in order to best support a large set of future potential missions. Within NASA, two (orthogonal) paradigms have received attention in recent years: the real-options approach and the broad mission model approach. This paper focuses on the latter. Two broad mission models are developed for Mars Science Laboratory (MSL)-type missions—a large mobile rover/laboratory versus a fixed laboratory with a small “fetch” rover. Two technologies that are critical to the amount of science returned make up the technology portfolio. Within each mission model, the technology program manager (TPM) maximizes the science return by allocating a technology development budget and controlling reserves across the two technologies. The TPM must ultimately choose between a higher science return and a higher probability of development success for the technology portfolio. The paper concludes with prospects for implementing the broad mission model approach.