

**Testimony**  
for  
**The Commission on Moon, Mars  
and Beyond**

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by  
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# Outline

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- **About Princeton Synergetics, Inc.**
- **About Joel S. Greenberg**
- **Costs and Program Planning Considerations**
- **Potential Benefits**
- **Other Considerations**

## **About Princeton Synergetics, Inc.**

- **A policy research and consulting firm with a broad client base:**

**+ NASA**

**+ DOT/FAA**

**+ DOD**

**+ DOE**

**+ OTA**

**+ JPL**

**+ NRL**

**+ Battelle PNL**

**+ Lockheed**

**+ Loral**

**+ Canadian Spaceport**

**+ Showboat**

**+ Caesars Palace**

**+ Bally's Park Place**

# About Joel S. Greenberg

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- **Education:** BEE, MEE
- **Employment:** USAF, RCA Corp. Staff., Aerospace Dept Princeton Univ., ECON, PSI
- **Experience:** New Business Planning, Benefit/Cost Anal., Systems Analysis, Policy Analysis, Tech Program Planning/Evaluation, Tech Transfer/Commercialization
- **Membership:** AIAA Fellow & Member of Public Policy Committee, Member IAA and co-Chaired Comm. On Economics of Space Operations
- **Publications:** Economic Principles Applied to Space Industry Decisions [AIAA/2003], Investment Decisions: Influence of Risk and Other Factors [AMA/1982], over 300 publications.

# **Costs and Program Planning Considerations**

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- **Moon Mars Mission requires a long-term multi-phase RD&D program that continuously “buys” information and adjusts plans accordingly.**
- **Planning requires the explicit and quantitative consideration of uncertainty and risk.**
- **Program planning has 3 interrelated degrees of freedom: Performance, Cost, Schedule.**
- **Cost and Schedule, when given performance, are unknown and must be considered in terms of Probability of Success.**

## **Potential Benefits**

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- **Pride resulting from success [or frustration due to unavailability of funds for other uses].**
- **Job creation from additional expenditures [inflationary pressures?]**
- **Technology development and spinoffs.**

## **Other Considerations**

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- **Transportation! Transportation!  
Transportation! [low cost]**
- **Impact on Hubble Telescope and other programs.**
- **Withdrawal from ISS program and impact on partners. Who will have responsibility for return of ISS to Earth?**
- **Alternate uses of funds.**