

Advanced Space Technology Roadmap Architecture (ASTRA)

PI: Professor Olivier de Weck
Co-PI: Prof. Daniel Hastings

Solicitation: 80HQTR20NOA01-20ESI_B2: Early Stage Innovation (ESI20)
 Topic 5: Methodologies for Assessing Space Technology Investments

Research Goals:

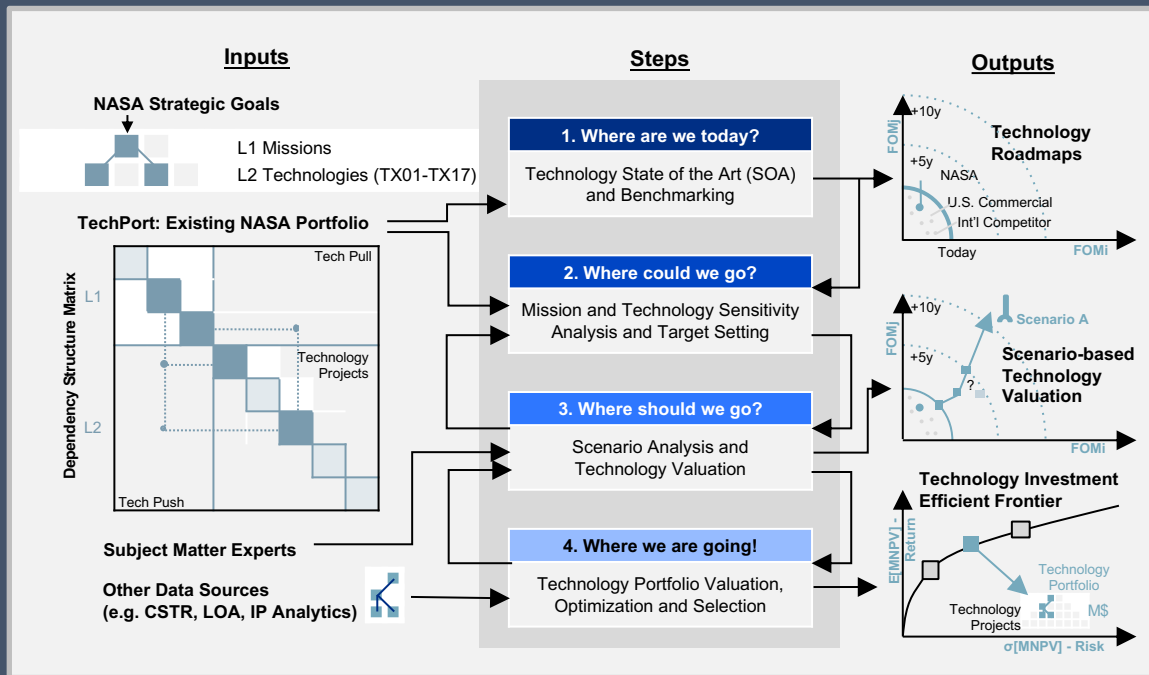
Team:

MIT | Aero Astro
 MIT | Space Exploration Initiative (Media Lab)

Space Technology workshops with:

NASA STMD, OCT
 NASA TechPort Team
 Industry (e.g Blue Origin)
 U.S. Agencies (e.g. USAF)

- Map out the NASA technology portfolio
- Quantify mission performance vs. technology FOMs
- Technology valuation and ranking w/ASTRA
- Portfolio construction thru TRL-risk-adapted Markowitz approach
- Demonstrate ASTRA on 5 cases and link to TechPort
- Disseminate using in-person workshops & online classes



1 Artemis 2 Mars Sample Return 3 WFIRST 4 Earth Observation 5 Cross-Cutting



Approach:

- Rigorous 4-step method
- Markowitz Portfolio Theory applied to technology
- Precursor method ATRA developed and validated in industry (>700 projects)
- Cloud-based implementation and TechPort integration

Case Studies:

Potential Impact:

- Powerful method to assist NASA with annual technology prioritization (STMD, OCT)
- Cleaner R&D portfolio with traceable budget decisions (~\$1B)
- Cadre of technology management savvy staff