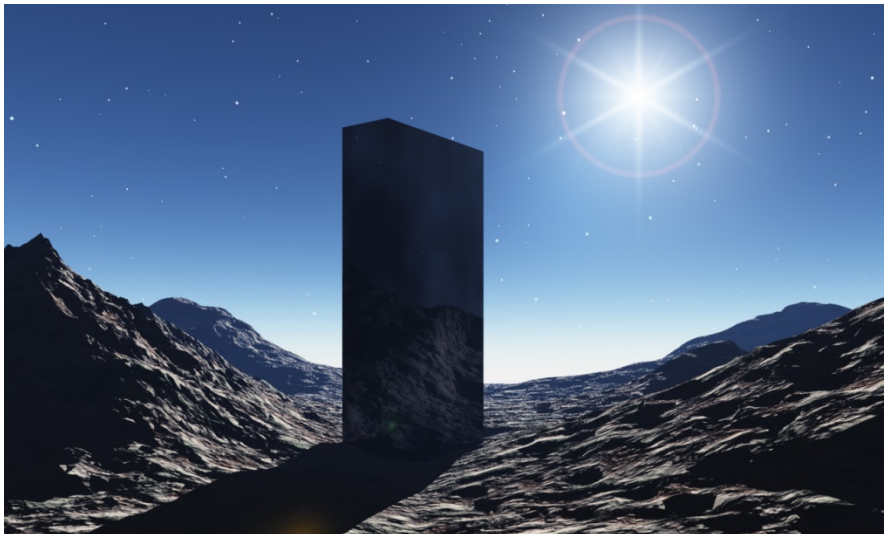
# Systems Architecture, Optimization, and Decision Making for Small Satellite Fleets in Distributed Planetary Science Missions

Monolithic Architectures

VS

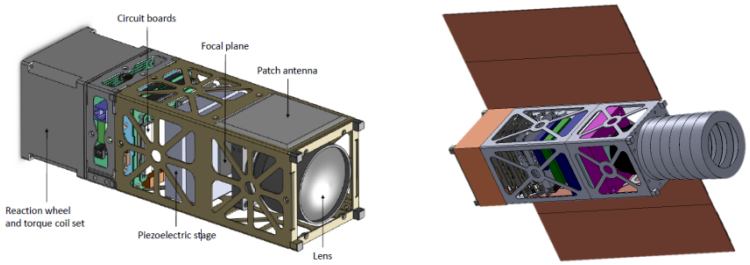
Fractionated Architectures



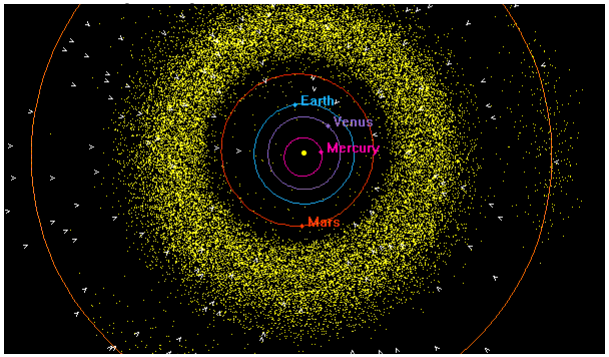
Comparing traditional methods of systems architecture to new methods, including Epoch-Era Analysis, to show how fractionated architectures are actually better despite previous design studies showing they aren't.

## Proposed Case Studies

- ExoplanetSat Fleet
  - Fleet of 3μ cubesats that will individually and continuously observe Sun-like stars to find Earth-like planets near us.

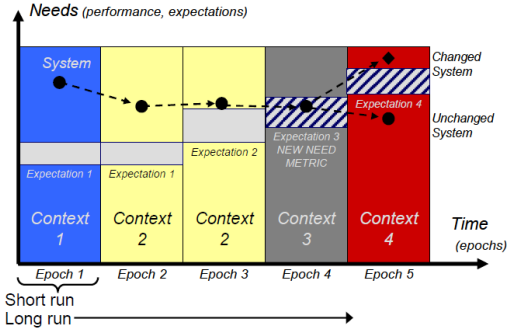



- Asteroid Exploration
  - Want to match the exterior spectra and radar data to the interior structure and mineral




## New Tools and Metrics

- Epoch-Era Analysis
  - Considers changes in expectations across an entire mission lifecycle to better quantify utility and value derived from an entire program.




- Super-Additive Science Value
  - Multiple measurements work synergistically to deliver more