NASA GRC Small Spacecraft Capabilities

- NASA GRC is seeking opportunities to develop and test small spacecraft, while fostering commercial partnerships to help satisfy NASA exploration and science mission requirements.

- GRC maintains an array of test/vacuum facilities (VF) along with production and assembly capabilities
  - VF-3 (pulsed plasma thruster testbed), VF-8 (low power EP testbed), VF-11 (ion propulsion testbed)
    - Conducive for small spacecraft testing/development

- Recent and noteworthy IV&V/development activities
  - Enpulsion
  - Busek electrospray & Busek BHT-600 thruster
  - Alameda
  - Upcoming Announcement of Collaboration Opportunity (ACO) with Phase Four LLC.
Small Spacecraft Electric Propulsion (SSEP)

- The NASA Glenn Research Center (GRC) has expertise in SSEP.
- NASA's SSEP project is developing technologies critical to expanding spacecraft capabilities and enabling ambitious new missions into deep space. (e.g., High Thrust – SSEP Hall thruster; H71M)

Benefits of Electric Propulsion (EP)

- Utilizes propellant to produce thrust (specific impulse) 1 to 2 orders of magnitude more effectively than chemical/thermal propulsion, thus enabling:
  - Reduction in the amount of propellant required for a specific mission, thus decreasing mass of the overall spacecraft
  - Increase in the payload mass for a specific mission
  - Increase overall mission velocity capability (ΔV)

- The low-thrust and highly tailorable in-space trajectories enabled by EP offers additional benefits:
  - Broadens launch windows and provides more flexibility in mission planning
  - Multiple rendezvous with small planetary bodies
  - Better control of arrival conditions
  - Reduce number of mission critical events
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