Research and Analysis in Astrodynamics

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Benefit to Outer Planet Exploration

- Voyager, Galileo, Cassini-Huygens, JEO, and JGO all have benefited from new astrodynamics techniques.
- However, funding for this research has been largely limited to the development and operations phases of flagship missions.
- New ideas are waiting for funding. Some examples:
  - Multi-moon orbiters at Jupiter and Saturn
  - N-body techniques for efficient orbit capture
  - Better techniques for combining gravity-assists with electric propulsion
  - Faster trajectories to the far outer solar system (e.g. for Neptune orbiters, KBO missions)
- It would be better to have these techniques understood prior to the formulation of new missions.

Research and Analysis Funding

- Astrodynamics research and analysis funding could fit in the planetary science part of ROSES
  - Currently there is no dependable source of funding for university astrodynamics research.
  - NASA funding would have a dramatic positive impact and would help to ensure the continuation of university research programs.
- Such funding would benefit all planetary* missions, especially in their formulation stage.
- New astrodynamics techniques would expand the feasible mission set for missions of all sizes
  (From flagship to microsat secondary payload missions)
- Inclusion in ROSES would focus research into areas that would most benefit planetary missions.

(*) Astrophysics and Earth missions would also benefit from similar astrodynamics research and analysis funding. However, my focus today is on Appendix C of ROSES.