Commercial Enabled Science

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Introduction: The rapid rise of new space companies and capabilities, exemplified by companies such as SpaceX, Made in Space, Nanoracks, Astrobotic, Moon Express and Blue Origin, provides a wide range of new capabilities and opportunities for advancing space science. The most obvious potential benefit is lower cost and more responsive options for launch of payloads to low-earth-orbit, geosynchronous transfer orbit, to the Moon and beyond. But there are a number of other options and opportunities as well. These include:

- On-orbit assembly and manufacturing for large space structures and complex spacecraft
- On-orbit repair and upgrades of space science missions
- Indefinite life upper stages and on-orbit refueling to enable deep-space missions not possible or affordable using standard single launch approaches
- Use of extraterrestrial resources, including spent stages and Earth orbital debris, to manufacture spacecraft components and systems, and propulsion fuel
- Establishment of multi-purpose, multi-use, long duration infrastructure for transportation, power, comm and navigation to significantly reduce the risks and costs of future missions.
- Purchase rides to the lunar or Mars surface on commercial landers

This paper will detail a variety of these new space companies and briefly describe their current capabilities and future plans. With this foundation, several potential new science missions will be discussed that could leverage these capabilities to pursue exciting and beneficial future science missions.