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Opinion: NASA's Deep Space Gateway Is In The Wrong Place

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President Donald Trump has spoken. The U.S. is going back to the Moon, and then on to Mars. Now the challenge is to figure out how to do it, so that this time it really happens. NASA has already outlined a path to capitalize on the growth in commercial space with its Deep Space Gateway concept to position a port in lunar orbit. That is the right idea, but for the architecture to be commercially viable, that way station should be positioned in geostationary orbit (GEO).

This is not the first time the U.S. has found itself in this situation. In the middle of the all-out, fully funded charge to the Moon in the 1960s, Wernher von Braun, Max Faget and John Houbolt were at an impasse, debating the architecture for the Apollo program. Instead of launching directly from the Earth to the Moon or assembling a landing vehicle in Earth orbit, the program paused, reconsidered and changed to a Lunar Orbit Rendezvous approach. After that, NASA marched onward to the eventual success of the Moon landings.

More recently, NASA has struggled with cycles of indecision dictated by smaller budgets. Since the days of Mercury, Gemini and Apollo, NASA's budget has plummeted to about 0.5% of GDP, one-tenth of what it took to land on the Moon. With that restriction, it is very hard, even if justified, to make any order-of-magnitude changes for an agency such as NASA.

However, the rise of commercial space has led to reusability and the development of commercial markets that might change the financial equation. SpaceX's Elon Musk, Blue Origin's Jeff Bezos, Virgin Galactic's Richard Branson, Bigelow Aerospace's Robert Bigelow—and other wealthy entrepreneurs—have the ability to put in place infrastructure that will allow NASA to go along for the ride.

With that in mind, NASA has the right kind of back-to-basics idea with its Deep Space Gateway concept. It just happens to be in the wrong place. We need a gateway at the edge of Earth's gravity well, that can take advantage of the new fiscal reality.

The gateway should be in geostationary orbit, rather than in lunar orbit or the L1 Lagrange point, because it would make future space exploration more affordable. In contrast to lunar orbit, GEO is a tried and tested location for commercial space.

The new gateway could be used as a base for new businesses, such as servicing GEO satellites, and also as a new destination for orbital space tourists, thereby ensuring that the entire journey to the edge of Earth's gravity well would not only be reusable but commercially subsidized.

At such a base, NASA could 3D-manufacture exploration craft, which would not need to be as massive and rugged as an equivalent craft launched from Earth, because it does not need to survive launch or reentry loads or thermal stresses.

In that location, unlike in lunar orbit, commercial businesses would underwrite the government facility and its communication and supply logistics. NASA could use its heavy-lift Space Launch System, if available, to put in place the initial station elements. But the regular supply route up and down from low Earth orbit (LEO) would depend on a fleet of tugs taking space tourists up and down to a space hotel. Imagine the views the tourists would get from GEO.

To support this joint governmental/commercial space exploration initiative, NASA would have to redirect its efforts to creation of a LEO tug-refueling capability and the design and installation of the governmental portion of the GEO gateway.

NASA astronauts at the GEO facility would not be there to conduct science, which can still be done at the International Space Station in LEO. They will need to be trained to support the spacecraft manufacturing facility and assist in the space hotel traffic control and docking of crews and cargo. The commercial contribution would be the fleet of LEO-to-GEO reusable tugs, and the Bigelow-type GEO space hotel.

This approach could provide reduced-cost, repeatable access to the Solar System, using the best and uniquely American way of combining commerce and government. Astronauts would have a new operating zone 100 times farther from Earth than where they have been for the last half century. A new commercial zone starts functioning in GEO, with a space hotel as the base point. We would open up the entire Solar System for exploration from this new outpost. Imagine, if you are NASA, and you have at your disposal a 3D-manufacturing facility at the edge of Earth's gravity well and easy access back and forth from Earth. What might you undertake? How might your role change?

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