

Alliance for Space Development Commercial LEO Stations FAQ

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Should the life of the International Space Station (ISS) should be extended beyond 2024?

The Alliance for Space Development (ASD) does not have a position on the life of the ISS, meaning that the ASD does not advocate for or against ISS life extensions. The ASD is instead focused on enabling commercial LEO stations to emerge as soon as possible, and how NASA and the United States Government can act as a positive force for that.

Has the United States taken a position on the value of commercial space stations?

The 2017 NASA transition Act (P.L. 115-10), stated "It is the sense of Congress that an orderly transition for the United States flight activities in low-Earth orbit from the current regime, that relies heavily on NASA sponsorship, to a regime where NASA is one of many customers of a low-Earth orbit commercial human space flight enterprise may be necessary."

Can the ISS become the first commercial space station i.e. can it be privatized?

One common proposal is to attempt to turn the ISS into the first commercial space station, either through full privatization of the station, or some sort of much more aggressive public/private partnership. While the Alliance for Space Development is not opposed to considering possible options for a more commercial ISS, we are skeptical that there are major changes that can be made to the ISS ownership and operations structure that would make it much more commercially oriented.

Selling the International Space Station to a private entity is likely to prove impractical due to the InterGovernmental Agreement that details ownership and operations of the ISS. The United States does not wholly own the ISS. Our ISS partners (Russian, ESA, Japan, Canada) would need to agree to any transfer. In fact, NASA officials are on record stating that "The IGA is likely to outlast the space station itself." This results in substantial difficulties to formally transferring title.

The alternative method would be some sort of partial privatization, with a commercial entity running/controlling part or all of the ISS. The difficulty with that is that in developing the station, NASA made a number of decisions that make this very unlikely. For example, a commercial space station would be designed to take advantage of marketplace developments. However, the ISS contractor base is established, and arguably unlikely to be able to change. Additionally, because commercial operations were not wholly anticipated, it was not designed for commercial operation, which means its operational costs are high, and likely to remain high.

What is the "killer app" for commercial space stations?"

Although exciting products like ZBLAN fiber optics made in space are under development, it will take a lot more than one or two successful products manufactured in micro-gravity to ensure the success of a commercial LEO station. Instead the full range of commercial possibilities need to be pursued aggressively and in parallel, but currently the ISS only addresses a narrow range of potential commercial applications.

A broader list of potential applications on commercial stations includes:

- Very low gravity environment research and industrial production (there is a conflict between activities that require very low gravity and activities the result in significant vibration that drives the need for multiple commercial LEO platforms to meet customer needs)
- Satellite construction (which would generate vibrations that would disrupt ISS experiments)
- Activities requiring large crews, such as hands-on scientific research
- Activities requiring isolation from other activities
- Large scale variable gravity facilities
- Growing organs for transplant
- TV/Movie production on a full range of commercial projects, not just documentaries for NASA
- Advertising
- Tourist and honeymoon hotels
- Dance performances
- Musical performances

- Sporting events, and especially those that might be inappropriate for a government facility, for example zero-gravity gymnastics and soccer games

Why aren't these opportunities being pursued on the ISS?

Some are to a limited degree and others NASA would like to pursue but has not received appropriate funding. However, for many of the applications listed above, neither NASA nor the U.S. government is likely to allow them to be conducted on the ISS. Would NASA allow a horror movie to be filmed on the ISS? In some cases, the ISS lacks the size or the facilities to support the application. For others, NASA is unlikely to allow the sorts of activities described due a wide variety of violations of NASA policies or simply a fear that the activity would reflect poorly on NASA. Other activities are inhibited by concerns about the ownership of intellectual property developed on the ISS.

There are other more fundamental inhibiting factors. A single space station can never simultaneously provide both a very high level of microgravity and accommodate activities that create vibrations. The full range of commercial activities require at a minimum two commercial stations, or perhaps one commercial station with many "Free-flyers." Currently the crew size of the ISS is a fundamental limiting factor in ISS utilization. The advent of Commercial Crew will allow one more US crewmember, doubling the astronaut time available for scientific and commercial endeavors. However, the full-time work of two astronauts cannot sustain any really significant commercial enterprise. Finally, the cost and timeliness of access to the ISS falls far short of the levels needed to support significant commercial enterprises.

Isn't there a report that proves commercial LEO stations are not viable?

In March 2017 the Science & Technology Policy Institute published "Market Analysis of a Privately Owned and Operated Space Station." The major problem with this report is that it assumes there are no government users of commercial LEO stations. Under such conditions, and using the conservative assumptions of the report, the case for a purely LEO station does not close for most scenarios. However, such an approach makes little sense. Revenue estimates for private LEO stations need to start with a baseline revenue from NASA and ISS National Laboratory activities that will move from the ISS to the commercial stations.

Additionally, although this report is relatively recent, rapid progress on many fronts call into question the assumptions of the report. For example, the report uses a cost per commercial Falcon 9 launch of \$62M, but SpaceX is already offering F9 launches for about \$50M when a "flight proven" first stage is used. It is reasonable to expect that by 2025 (seven years from now), further declines in price to orbit will have been obtained.

Will NASA be willing to rely on commercial LEO Stations yet to be launched to provide services that are key to U.S. needs in space?

Government policy needs to nurture commercial stations until they are in orbit and operational, and ready to take on key work from the ISS. Only when all key work both from NASA and the ISS National Laboratory has been transferred to commercial LEO stations should the ISS be decommissioned. With a properly managed transition, NASA will incur minimal risk.