

## **Commercial LEO Destination (CLD) FAQs**

**There is a sense from this presentation that the future U.S. commercial LEO economy will evolve along a path where NASA will relegate the U.S. government role in LEO to a user – “one of many” – with access to less capability on commercial destinations than available on ISS today. The transition concept suggests that it is the intent of U.S. policy to eventually dissolve the partnerships that have been praised as a model for international cooperation and surrogate the U.S. government to a lesser role in LEO - one simply as a user of available U.S. commercial capabilities – essentially ceding to leadership governments of China and Russia who plan a continued presence in LEO. Is this an intended or unintended outcome of CLD strategy? The question seeks to get some clarity on NASA’s objective and notion of a transition in low Earth orbit.**

It is definitely not NASA’s intent to dissolve international partnership. We want to continue our international partner relationships, not only as we go beyond LEO to Artemis, but also to continue in LEO. What that looks like with transition to CLD remains to be seen, and we will be exploring that with our partners. We know they have their own interests in commercial activities in LEO. NASA intends to continue in our leadership role but still encourage direct business to business relationships in LEO needed to strengthen and build the LEO economy.

### **Will you set aside some opportunities for small business including SDVOSB (Service-Disabled Veteran-Owned Small Business)?**

Unlike contracts, Funded Space Act Agreements (FSAA) do not have small-business set-asides. However, under our FSAA policy, we do consider how small businesses can participate in a full and open competition.

### **How are you addressing the rise in cost of using astronaut's time on ISS?**

Astronaut crew time costs have not risen. NASA has recently removed the subsidy that was provided in the past for commercial activities. The cost is not just their salaries. There are crew transportation to orbit costs, cargo transportation costs for food, water, and other supplies, and other costs which are factored in to define the cost per hour. The new pricing policy for crew time applies to people using NASA astronauts. In the future, companies can charge whatever they want for their own astronauts’ time, and that cost will hopefully go down.

### **If NASA expects to see a robust commercial economy in LEO, why is the expectation of the cumulative capability less than ISS today?**

We expect to continue to utilize ISS for the bulk of what we need to do for Artemis. We have roadmaps of what we need to accomplish in LEO, and hope to accomplish most of that in next few years. After ISS end of life, our ongoing LEO requirements will be somewhat smaller. Our requirements are estimated in the [forecast white paper](#) we published and will continue to refine. Nominally, we have seven crew on board ISS with Soyuz and commercial crews. After ISS

retires, we estimate that we will need two NASA crew continuously on orbit. We will refine NASA and international partner needs over next several years. We estimate we will want to perform 200 investigations annually in commercial destinations. We conduct more than that on ISS today. Going forward, the markets will be driven by both NASA and other users' demand. If something to the size of ISS is required, we hope commercial industry can meet that need. Success will be dependent on how much budget NASA gets, but also what industry charges. NASA plans to spend many hundreds of millions of dollars annually for CLD services. We want to see a lot of capabilities. The key is the cost-effectiveness of the commercial destinations. What made commercial crew so successful is because those services are cost-effective. So for destinations, cost-effectiveness is key to success and the key to sufficient demand.

**How does the proposed schedule change if LEO commercialization is not funded as expected? Are you worried about a LEO destination gap after ISS end of life if commercial LEO destinations are not funded adequately or take longer to develop than expected?**

The proposed schedule is based on expected funding, but the use of funded Space Act Agreements (FSAA) allow flexibility. We intend to include extension options if required. The budget will be part of the decision process leading into awards in FY22 and the number of awardees. The risk in a gap with ISS is a real risk that we are carrying and have addressed to NASA HQ. The overall development strategy recommends an overlap with ISS and commercial destinations to provide risk mitigation and orderly transition of services. Discussions on ISS extension is another potential risk mitigation.

That risk is one of the reasons we went to a FSAA. The \$300-400 million you see is dependent on President's budget request. We're hopeful it will be funded. We can accommodate lower budgets and will refine as we realize budgets going forward. We can adjust to budget realities. If we were not to get the budget, the plan will have additional risk. That's why we have so many swim lanes – to maximize the opportunity for success. ISS is healthy but at some point will retire. The plan is to do that once we have these capabilities in place.

**Is continuous astronaut presence on each individual CLD required for its full lifetime, or would it be acceptable to propose CONOPS (Concept of Operations) where certain CLDs are partially robotically / telerobotically operated for a duration of their lifetimes, and crewed at others? Provided the minimum of two astronauts would be met across the total LEO ecosystem and multiple CLDs in multiple orbits, would this be acceptable?**

The forthcoming draft announcement will address this. We are guided by the COTS (Commercial Orbital Transportation Services) model that had discrete capabilities. Intent is to have our needs covered by a portfolio of CLDs. We are open to a strategy that each doesn't need to cover every capability. One might be human-tended focusing on microgravity applications. One might be more human centered with continuous crew. We are also interested in how one might evolve a CLD to cover additional capabilities in the future.

### **Is the intent of CLD to only consider crewed LEO destination?**

The forthcoming announcement will lay out a number of capabilities that can be proposed. There will be a minimum set with some options. There are key capabilities NASA is looking for post-ISS. Continuously crewed LEO destinations are not the only capabilities being requested but this is a critical need. In the end, NASA can purchase services from multiple destinations to meet all needs or one destination that meets all needs. The more capabilities that are available, the more attractive the proposal may be.

### **How does NASA plan to continue supporting demand generation activities under the Commercial LEO Development program? Will a separate budget amount be dedicated in addition to the projected \$75-100 million per year for destination development?**

Demand stimulation is a different budget line and is not associated with the CLD budget. Each swim lane discussed in the strategy chart has its own budget. We're working with ISS and ISSNL to determine what that level should be but we recognize it is important to keep supporting demand stimulation activities as part of the overall strategy.

### **Based on commercial missions announced to date, it would appear most non-NASA demand is for relatively short duration missions (days-weeks). What does NASA anticipate THEIR demand being for long duration missions vs. shorter sorties beyond ISS?**

Based on inputs we are getting from industry partners, non-NASA demand is not just short duration. We are getting quite a bit of interest in longer missions from private sector. Continuous US presence for up to two crewmembers is a key capability NASA has identified for future services. As we learn from Phase 1, NASA will continue to refine our strategy leading into Phase 2.

With respect to what NASA wants in Phase II, that will be finalized at a later date. We don't want just a NASA solution, it has to fit the entire business case for providers. Right now we think our requirements are for two NASA crew on-orbit continuously. How that gets chopped up into increments, we will let private sector develop and propose to NASA. We don't want to dictate one solution for everyone. We want providers to find needs of other customers. Two or three years ago we did studies with industry to inform us of demand. We found variability as to the size of different market. Some said millions, some said billions. Some said NASA demand made up 20% of their projected business, and some said 90%. That variability presents risk, so we want to reduce that variability. We are trying to allow industry to be innovative and maintain big trade space.

There is a [forecast](#) NASA has prepared that we will be refining further to provide and update in FY22.

### **What is the expectation relative to CASIS, or a LEO national lab in general, continuing beyond ISS?**

In the [forecast](#) to quantify NASA's future demand, one item we list is an ongoing national lab. We may call it the LEO National Lab. It will be used for other government agencies, for continuing to incubate new research applications, for industry, and for academia. It is very important and we intend to continue it as one of the uses for CLDs.

**Can you provide some information on FSAA Proposal Content since the NAlI 1050 handbook has little info on FSAA's?**

There is nothing we can say at this time. That will be forthcoming in the draft announcement. There are some sources you can reference while you're waiting such as the [COTS](#) and [CCDev](#) announcements for funded SAA competition, although CLD may be different.

**What is the target share of development costs that will be borne by the government and commercial partners under these funded Space Act Agreements?**

There is no target cost. We hope to have private sector skin in the game. We think that's reasonable. Given that we will not take ownership and private sector will retain intellectual property, NASA rights will be minimal. We hope to see robust cost share from private industry, let competitive forces incentivize that as well, but no target at this time.

**Will these new destinations be relegated to ISS orbit or other orbits?**

The forthcoming draft announcement will address this but we are not planning at this time to constrain orbit proposals.