



# SPACE EXPLORATION

## Where Do We Go Next?

By

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“We had an expansive run in the '60s and '70s. You might have thought, as I did then, that our species would be on Mars before the century was over. But instead, we've pulled inward. Robots aside, we've backed off from the planets and the stars. I keep asking myself Is it a failure of nerve or a sign of maturity?” Carl Sagan via *Pale Blue Dot*

What happened? So many in the US cheered for the space programs of NASA as we launched so many space-craft both manned and unmanned into the depths of space towards our nearest satellite the moon. Ever since the return of Apollo 17 we haven't had a manned mission go further than low-earth orbit (leo). I'm more inclined to agree with the late Dr. Sagan that it *is* a failure of nerve on our part, but I think there's even more than that; more like a lacking of public interest. Fortunately a new space race has been under way since the late 1980s, and I'm delighted to say this race isn't predicated on fears of nuclear paranoia.

It's 2017 and NASA's Jet Propulsion Labs (JPL) is no longer the only household name on the block in aerospace. Agencies like SpaceX, Blue Originis, Virgin Galactic, Lockheed, and a handful of other entities are stepping up to the plate to contribute to mankind's quest to usher life beyond Earth into the stars. The question now is where

do we set up shop next; and several questions dealing with our basic Pavlovian needs such as shelter, food (and cultivation), and all the necessities for keeping one's environment comfortable enough to live and work and play.

My own suggestion would be to setup a 3-prong campaign that would advance in incremental phases wherein the beginning is a space colony followed by a lunar colony followed by a Martian settlement. The first phase would start with the construction of a politically independent space colony further out than the ISS geocentrically orbits, which is a paltry few hundred miles overhead. A space-born colony makes more sense, as opposed to aiming for another rock, for the sheer immensity of "room" that's available; it's space... plenty of room! The biggest hurdle to overcome is the gravitational difference; not everyone's physiology is suitable to work much less live comfortably in a 0-g environment. Several space station concepts have been introduced through science fiction culture throughout the 20th and 21st centuries that deal with creating the illusion of gravity through a Huygenian principle called centrifugal force (not a real force so much as the consequence of inertial force) including but not limited to habitation wheels, the Stanford Torus, and an O'Neill Cylinder; if you've seen *Mission to Mars*, *Elysium*, or *The Martian* then you have seen the "wheel" or Torus ring in action. These concepts solve the gravity problem, but they also all rely on the one principle; what happens *when* something goes wrong with that system? Let's take Murphy's Law to heart on this. I am not familiar with any pragmatic solutions to the problem of gravitational failure, but if you've ever seen the 2016 film *Passengers* losing gravity isn't anything of a picnic occasion.

So let's put aside the problems of gravity for now. There are still numerous benefits of starting with a space colony and the 0-g environment; think of the drydock that was featured in 2016's *Star Trek Beyond* at Yorktown station. In short, the need to put a space capsule on a rocket and blast it into orbit becomes nullified, and the resources can be put to better use! Another benefit would be that, with all the room available on a large enough space station, mass-production industrial and agricultural endeavors could be undertaken; presently, the ISS has a plant growth system called Veggie that has been running since 2014, and it will soon be joined by a supplemental program called the Advanced Plant Habitat. Imagine a space station that had a dedicated greenhouse for the thousands of species of plant life we have down here!

My own desire would be to take the same agricultural experiment and start cultivating and farming industrial hemp, which has been shown to replace most current mediums for construction and insulation materials; then use the hemp to construct as much of the new space colony as can be accommodated. I mentioned earlier that the colony ought to be politically independent, which would help with cultivation of hemp and many other crops that some nations have prohibited from use or cultivation. There's actually such a space station currently underway that is vying for political sovereignty and recognition from the United Nations, but right now it's

only in the logistical stage. *Asgardia*, as it has come to be called, was conceived of by Russian scientist Igor Ashurbeyli. Igor's own desire is to have a colony with no less than 150 million inhabitants from around the world.