



Space: One important thing that might retain bipartisan focus

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These days, despite the hyper-partisan atmosphere in Washington, there still seem to be two issues that both Democrats and Republicans can agree on. One is the pervasive threat posed by the People's Republic of China. The other is the overarching importance of space.

When Vice President Kamala Harris chaired the Biden administration's first National Space Policy Council meeting last month, her comments — along with the simultaneously released U.S. Space Priorities Framework — largely echoed the space policy launched by the Trump administration. That was not necessarily a given, since a continuation of policy is never a guarantee during presidential transitions. But the Biden administration's acknowledgement is great news for the rekindling of America's space program and strategy.

The emphasis is logical. Although news about space is all too often dominated by headlines of the latest Russian anti-satellite test or milestone in China's space program, the domain is already ubiquitous — and essential — for daily life. We rely on space for our financial transactions, daily navigation, weather notifications, TV services, and telecommunications. Today, the global space economy is estimated at \$450 billion annually — a figure that has doubled over the previous decade. This, however, is just the beginning. The economic value of space is poised to soar, entering the trillions annually over the course of the next two decades.

What is driving this economic expansion? The short answer is reusable rockets. While some have been critical of the so-called “billionaire space race,” companies like SpaceX have made the domain more accessible by drastically reducing the costs associated with bringing items into space (an 85 percent reduction over the last 20 years). Critics may not want to admit it, but the visionaries who are pursuing dreams of humans becoming a multiplanetary species are indeed pushing civilization forward — and helping to solve some of our most pressing problems in the process.

Climate change is one. As countries scramble to find ways to reduce dependency on carbon fuels, space holds out promise in the form of an unlimited power source: the Sun. Unlike Earth-based solar panels on houses and buildings, which have limited access to sunlight due to cloud cover and nighttime, space-based solar power (SSP) relies on satellites with large solar arrays that can collect sunlight 24/7 and beam that energy to Earth in the form of microwaves that are then converted to electricity. The U.S. military already has a number of SSP projects underway at facilities like the Naval Research Laboratory and Air Force Research Laboratory, but the real game changer will be if SSP can be scaled up for civilian and commercial use.

To do so, however, will require construction of incredibly large satellites — an expensive and cumbersome endeavor, at least on Earth. Thanks to gravity, getting such payloads into low Earth orbit burns up large quantities of propellant, making space launches a costly endeavor. But, here too, space can help. If SSP satellites can be assembled in space (from materials gathered from the Moon or asteroids), the construction process would be far more efficient, and considerably cheaper. Moreover, although it sounds a bit like science fiction, space, asteroid and Lunar mining could provide a new and virtually limitless supply of the coveted rare Earth elements that are essential components in modern communication and weapon systems — not to mention generating trillions of dollars of precious metals, and materials to create space fuel.

The private sector push for power, mining, and in-space fabrication will also foster advancement in artificial intelligence and robotics. Improvements in these fields will reduce the cost for on-orbit servicing in space — meaning that satellites currently in orbit can stay functional for longer periods of time as satellites dedicated to repair and refueling are developed (a process that is already underway).

Space-based innovations benefiting the public are hardly a new phenomenon. Over the years, NASA has produced numerous spinoffs in the course of its primary mission of space exploration. Neither has the success of the International Space Station (ISS) and the potential for experimentation in near zero gravity gone unnoticed. As the ISS prepares to sunset in 2030, several U.S. companies have already made plans to build follow-on space stations. The benefits of microgravity on the new stations will help the medical field 3D print human organs and allow pharmaceutical firms to create new drugs. Developing medicine in space, in turn, will translate into opportunities for astronauts to go on longer space missions, and so on.

Meanwhile, space tourism has arrived. Jeff Bezos' Blue Origin and Richard Branson's Virgin Galactic have done a good deal more than simply send celebrities into space. They have demonstrated that space missions are no longer limited to highly trained astronauts. As the private sector continues to innovate, longer-term human presence in space will invariably necessitate support services, including communication satellites and space-based internet. All of these developments will contribute to a burgeoning space economy of unbounded potential.

The U.S. thus finds itself at a critical juncture.

With the proper vision and investment, America has the potential to become a leader in the space economy. But doing so will require serious investments from industry, and a mandate from policymakers to harness this renewed interest in space, irrespective of what party happens to be in power in Washington. That we are now heading in such a direction is good news indeed.

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