



How much should America spend to defend its satellites?

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Today, there is near-universal acknowledgement that America's critical satellite infrastructure is at risk and needs to be better protected. The realization appears to be part of the motivation for the recent establishment of the U.S. Space Command (USSPACECOM) and the creation of a U.S. Space Force — an endeavor which the Donald Trump administration estimates will cost \$2 billion over five years.

For fiscal year 2020, the Trump administration requested \$14.1 billion for national security space programs, out of a total defense budget request of \$750 billion. Most of that larger total will be spent on intelligence, or on services that support warfighting or defense of U.S. national security in every domain. Yet almost nothing is allocated for the defense of space commerce or the protection of critical satellite infrastructure — including the country's civil, commercial and military satellites.

That gap highlights a stark reality: Defense can be expensive.

Ideally, then, satellites should pay their own way. But how would we even know how much is reasonable to spend? Here, some back-of-the-envelope calculations can help.

The United States currently spends 3.2 percent of its Gross Domestic Product (GDP) on defense. Meanwhile, the global revenue for the space sector last year was \$414.75 billion, with America's share of the total estimated at \$170 billion. Therefore, if we allocated defense dollars proportionally, the U.S. should have a dedicated budget of \$5.4 billion for the protection of space commerce.

Of course, that likely understates things. The precision navigation and timing that is made possible by GPS itself annually generates between \$37 and \$75 billion in economic value. And according to some estimates, critical satellite infrastructure enables about \$5 trillion in downstream economic impact (including internet, financial and weather services to the U.S. economy). That, in turn, suggests that an appropriate budget for defense of space commerce might actually be closer to \$160 billion. Perhaps not coincidentally, such a figure is much closer to the budgets of the other military services (Army: \$182 billion, Navy: \$205.6 billion, and Air Force: \$165.6 billion).

But whether the budget for defense of space commerce should be \$5.4 billion or \$160 billion, one thing is abundantly clear: America is underinvesting in securing space commerce.

This seems all the more foolish, given the ballooning nature of the space economy. Based on various estimates, the size of the space economy will grow to nearly \$3 trillion over the next three decades. If the U.S. is able to hold on to its current share (41percent) of the total space budget, this will directly add \$1.23 trillion to our economy over the next thirty years, and enable a staggering \$37 trillion in downstream activity by the year 2050.

A Space Force that can secure that level of economic growth is nothing short of a strategic investment. It is also a wise one; America's Space Force will effectively pay for itself as it grows with industry, and is to be a substantial growth opportunity for the defense industry.

It is time that the United States began to think of securing space commerce the same way it considers commerce in other domains. This, however, will require the country's fledgling space industry to organize and make specific demands. Industry needs to demand that the Space Force have a defense of commerce mission. As the numbers make all too clear, maintaining the current, underfunded state of space commerce may be penny wise, but it is nothing short of pound foolish.

Peter Garretson is Senior Fellow in Defense Studies at the American Foreign Policy Council in Washington, DC. He previously served as director of the Air University's Space Horizons Task Force, America's think tank for space, and was deputy director of America's premier space strategy program, the Schriever Scholars.