LEADING EDGE

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Fail Fast, Learn Faster

Why the U.S. space industry is **the envy of the world**

IT IS HARD TO IMAGINE ELON MUSK'S antics lasting more than a day in the People's Republic of China, where a verbal infraction can get you a visit from the word police and a several-year prison sentence. The brash billionaire insults, ridicules and picks fights with everyone—including U.S. President Joe Biden, the man who effectively underwrites Musk's world-topping wealth by signing government spending bills containing NASA and U.S. Space Force budgets as well as electric car subsidies.

No matter your opinion of Musk, his ability to think differently—and sometimes irreverently—clearly powers his companies' innovation streak. The fact that the U.S. government and an iconoclastic innovator such as Musk work together also underpins the strength of the country's space industry.

America's high tolerance for failure, unorthodox ideas and unusual personalities allows it to run many different experiments at once, creating a rate of technological innovation that even China, with a population of 1.4 billion, cannot match.

SPACEX

With China dominating the battery, electric car and solar panel industries, it is easy to forget or dismiss America's strength in space. China has made very real strides in its space industry in recent years, including launching dozens of rockets, satellites, a space station and a robotic lunar lander. Its ability to marshal resources for projects of great national priority, such as hypersonic missiles, should not be forgotten.

But leaders in Beijing seem unable to match the sheer novelty in the U.S. space industry. The "Middle Kingdom" is pouring buckets of money into its space sector but is continually playing catchup, trying to copy American ideas a few years after they emerge.

By contrast, it is impossible to track all the innovation happening in the U.S. space sector. Serious ventures in fully reusable launch vehicles, broadband-beaming satellites, hyperspectral satellites, laser communication systems, space robots, space tugs, in-space manufacturing, microgravity research, space tourism, space pharmaceuticals, in-space refueling and nuclear propulsion, for example, have emerged in just the last few years.

Many of these emerging technologies are being developed as part of public-private partnerships. It should not be forgotten that is the kind of collaboration that helped develop SpaceX's partially reuseable Falcon 9 rocket. That medium-lift launch vehicle was lofted a staggering 96 times last year and has lowered the cost of reaching low Earth orbit to as little as $6,000 per kilogram. But before it was a proven technology, the Falcon 9 was funded by NASA. Later, the Aerospace Corp. provided technical consulting to improve the launch vehicle's reliability for national security payloads.

Washington deserves credit for being willing to back a bold, foreign-born entrepreneur's challenge to United Launch Alliance, which for a time had a state-sanctioned monopoly on military launch contracts. China, on the other hand, would be unlikely to disrupt the work of one of its state-owned enterprises.

To be sure, Musk took government support and ran with it—conjuring up ideas that a few years ago would have sounded like science fiction, including the fully reusable Starship-Super Heavy transport. SpaceX is developing that vehicle mostly with its own research and development funds, but the Defense Department, NASA and the U.S. commercial space sector stand to benefit enormously from the rocket's potentially lowered launch costs.

In China, a project as big—and promising—as SpaceX's Starship would likely be backed and controlled by the Chinese Communist Party. It is unlikely that the party, which is famously image-conscious, would be tolerant of a rocket of that size exploding again and again in full public view. But SpaceX's repeated launch failures of the Starship within the last year are not madness. They are rather a method of acquiring knowledge—or refining a product—through trial and error.

Unencumbered by internet censors and official party doctrine, SpaceX's philosophy of "fail fast, learn faster" has spread like wildfire across the U.S. space sector. While Musk may yet fall victim to his megalomaniacal expansion into new industries—brain chips, humanoid robotics, tunneling, artificial intelligence and social media, to name a few—if the U.S. holds fast to its values, there will be dozens of entrepreneurs to replace him and a whole new decade of innovation in space to come.