

## Doubts about a New Space Race

Written by Taylor Marvin

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TAYLOR MARVIN, OCT 9 2012

Will the growing rivalry between China and the United States include a future space race between the two powers?

Recently Daryl Morini, writing in *The Diplomat*, suggested that a new space race was on the way; I doubted this conclusion on the logic that the current US-China rivalry has little in common with the US-USSR contest of the Cold War, a clear synergy between through-space weapons development and exploratory space technology no longer exists, and there is no clear and feasible target for a new exploratory space race. Last month Morini authored a detailed rebuttal to my piece arguing that not only is a new space race possible, it is likely.

At its heart the debate over whether a space race between China and the US lurks just over the horizon hinges on the definition of “space race” itself. In common usage, the archetypical space race is the rivalry between the US and USSR that reached its height between the Soviet Union’s 1957 milestone launch of Sputnik, the first artificial satellite, and the 1969 Apollo 11 moon landing. In addition to the the two nations’ dramatic manned space flights that captured the world’s attention, both superpowers invested considerably efforts into unmanned exploration. While the intensity of US-Soviet competition in space dropped off after the successful American moon landings – which coincided with Nixon-era détente between the rival superpowers – the American Space Shuttle and its rival Soviet *Buran* spaceplane, and Soviet *Mir* space station continued the rivalry through the collapse of the Soviet Union.

Today there is no question that the US and China are increasingly fractious rivals, and that the two countries’ relationship is likely to grow more unstable in the future. China’s booming economy has allowed it to modernize its conventional military forces, and its innovative investment in anti-access/area-denial strategies threaten to turn the Western Pacific into a no-go zone for US military forces. This military rivalry between the two countries extends to space, as well. Both countries are racing to field military assets capable of degrading each other’s satellite networks in the event of a conflict, and both have demonstrated their anti-satellite weapons (ASAT) as a way of signaling their ability to inflict high costs on the other in the event of war.

ASAT capabilities are an important part of each country’s strategic outlook. For the US, the ability to destroy Chinese reconnaissance satellites is an important way to degrade the effectiveness of the “system of systems” China would rely on to target US carrier strike groups with anti-ship ballistic missiles in wartime. To China, ASAT capability is an asymmetrical strategy for exploiting the US military’s reliance on free access to space. China’s 2007 destruction of a defunct weather satellite with an ASAT missile launched from a mobile ground-based launcher was a clear warning to the United States that its extensive satellite communications and surveillance networks would not be invulnerable during a conflict. Given the US military’s dependence on these networks, which is much greater than potential near-peer foes China and Russia’s own reliance on military satellites, China’s ability to exploit this US vulnerability could be a powerful deterrence against US entry into an Asian crisis. America’s rapid response – the 2008 shoot down of a failing US reconnaissance satellite by a US Navy guided-missile cruiser, ostensibly for safety reasons – demonstrated that the US could match China’s newly demonstrated ASAT capabilities.

This demonstration was notable. Aside from a 1985 successful test of an air-launched ASAT missile the US has traditionally declined to field anti-satellite weapons for fear of provoking an ASAT arms race that would potentially degrade satellite-dependent US forces more than their adversaries – “throwing stones from a glass house” is never a wise strategy. The destruction of US NRO satellite USA-193 and introduction of the X-37B spaceplane signals that the US either no longer fears an ASAT race, or sees it as inevitable.

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Questioning whether the US and China will engage in a space race rests on what we define a space race to be. Again, there is no question that the US and China engaged in an “ASAT race”; the struggle to gain the ability to deny space to the adversary while preserving your own satellite assets. But in common usage the term means something much more along the lines of the US-Soviet rivalry: national competition through expensive civilian prestige projects.

To adopt Andrew Erickson’s phrasing, both the Soviet Union and US possessed the capability to fight *through* space in the form of ICBMs that left the atmosphere on the way to their targets, yet no one discusses the ICBM race as a direct part of the famous Cold War space race. To be sure, advances in military rocket design initially motivated by the desire to build more capable ICBMs were dual use technologies that made the space race possible. But in common understanding exploratory, not military, programs constituted the space race; because the space race was motivated by superpower prestige, it is what the global audience understood the space race to be that matters.

For a new space race to occur the US-China military rivalry in space must escalate to a general rivalry in prestige exploratory programs. This escalation is not trivial. Morini asks if there are “practical ways to limit or prevent” competition in space. Of course, able diplomacy can avert an unwanted space race, but a natural barrier exists between a military ASAT race and a general prestige-driven space race. A military race is driven by the desire for a strategic advantage over a potential military opponent, while a general exploratory race on the Cold War-model the desire to demonstrate the superiority of a governing system, impress international audiences, make alliances attractive for unaligned states. These two variants of “space race” are fundamentally different beasts.

Embarking on exploratory space programs for the advancement of national prestige is a risky, expensive business. Prestige-driven space efforts are not guaranteed to earn the support of domestic audiences, especially if they are unsuccessful. Inherent to this riskiness is a novelty requirement – achievements are more impressive to audiences if they’re new. Mercury was less impressive than Vostok, and the prospect of being second to the Moon was so unattractive that the Soviets never made the expensive attempt (at an admittedly dubious possibility of success).

The real barrier to unconstrained competition in space is the disheartening prospect of unconstrained costs. While ASAT kinetic kill missiles are certainly difficult to engineer, they are based on proven concepts. Novel space accomplishments are much more difficult. A permanent lunar base would require significant advances in *in situ* resource utilization, life support design, and likely a large reduction in launch costs. A crewed mission to Mars would be much more difficult, and would come with a significant risk of a catastrophic, long-running disaster. Even given the prisoner’s dilemma dynamic behind the choice to initiate a space or arms race, the US or China are only likely to bear the enormous opportunity costs of a prestige-driven space race unless they see no other choice. Given the multipolar world the twin superpowers are likely to inhabit this century, it is unlikely that either country will “jump the gap” from a limited ASAT military space race to a general exploratory one.

China hopes to put a man on the moon by 2020. Of course, there’s a solar system worth of distance between space goals stated and realized – a mid-1960s observer would likely be amazed that NASA did not press on with crewed missions to Mars after the Apollo landings – but Beijing has reason to believe that a successful crewed lunar landing would demonstrate to its domestic population the government’s competency. However, it is unclear how impressive this feat would be to foreign audiences; while the Soviets never launched a manned lunar mission, a Chinese crewed landing after 2020 would mean replicating an American achievement a half century later. More prestigious would be *surpassing* the American Apollo’s achievements, most likely by establishing a permanent moon base. Indeed, the Chinese space agency has hinted that a permanent moon base is the ultimate goal of the Chinese lunar program. In a recent piece for Foreign Policy, John Hickman suggests that the prospect of a PRC moon base is worth taking seriously, and competition over lunar real estate could “start a period of colonialism we haven’t seen since the 19th century.”

These concerns are overblown. Saying that Beijing has political reason to establish a moon base isn’t enough to make it assured – after all, the same prestige concerns gave the United States an incentive to go to Mars during the later years of the Cold War, but technological difficulties and budgetary concerns never made it possible. The fact is that crewed space exploration is difficult and expensive; of course not impossible, but requiring significant investment and effort at daunting opportunity costs. Hickman particularly underplays these hazards when he remarks that as

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hostile as the airless, radiation-heavy lunar surface is, “Alaska and Australia were no less distant and hostile when Russia and Britain claimed them back in the 18th and 19th centuries” – an enormous understatement.

Returning to the moon is often justified by the tantalizing prospect of exploiting valuable lunar resources, and could possibly spur a new space race motivated by cold economic concerns, not international rivalries. But it is difficult to construct a plausible near future where economic, not political, concerns are the dominant incentives favoring crewed space exploration. While mining the moon for Helium-3, a valuable isotope of Helium rare on Earth, to power fusion reactors is a staple of sci-fi pop culture, both  $3\text{He}$  fusion and the lunar infrastructure necessary for large-scale mining are unlikely to materialize in the near future, and  $3\text{He}$  is probably, in Rick Robinson’s entertaining term, “McGuffinite”: some magically convenient off-Earth commodity used to single-handedly justify space industrialization by enthusiasts. Mineral extraction from asteroids will probably be widespread this century but is likely to be the concern of private groups, not governments, and will certainly not be a national prestige project.

Space exploration is difficult. Prestigious crewed missions that push exploratory boundaries – the type incentivized by great power rivalries – are even more difficult. While the Cold War space race may have ushered in “the start of a new era in human history”, it was the outcome of a very particular set of political and economic circumstances. Moreover, the space race of the Cold War removed the low hanging fruit of space exploration; technological advancements have not changed that fact that a crewed mission to Mars – the ultimate prestige project of a new space race – is a greater challenge than the race to the moon, raising the threshold for action. China certainly aspires to grand exploratory crewed space missions. But as history has shown, the gulf between aspirations and reality is wide.

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