

Space: New Threats, New Service, New Frontier

An Interview with Mir Sadat

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Conducted 1 August 2020

Dr. Mir Sadat has over 25 years of leadership experience in private industry, the Department of Defense, the intelligence community, and the National Security Council (NSC). At the NSC he was a policy director for interagency collaboration on defense and space policy issues helping to establish the US Space Force and US Space Command. Previously, as a naval officer with intelligence and space expertise, he served on orders as a space policy strategist for the chief of naval operations and as a space operations officer for US Fleet Cyber Command / US Tenth Fleet. Prior to government service, he spent 10 years working for prime defense corporations.

SSQ: How would you characterize the great power competition in space?

MS: The Cold War may be over, but since the early 2010s, a renewed era of great power competition has emerged across the world's land, air, sea, cyber, and space domains. This great power competition is about not only geostrategic positioning but ideological, political, economic, military, and technological dominance. Too often, we have leveraged only a few of our available tools (e.g., the military, diplomacy, or economics). However, the current competition requires the full employment of America's traditional and emerging instruments of national power (i.e., diplomacy, information, the military, economics, finance, intelligence, the law, and science and technology [S&T]). Our global competitors are energized by assessments that the US may be overwhelmed with domestic issues. They suggest that the US is a spent great power in decline. For the last 20 years, America has been laser-focused and resourced on countering terrorism, a real but not existential threat. The US has not resourced with maximum return on investment for great power competition, which does in fact impact our way of life. Worse yet, the US still operates in an Industrial Age mode of operation rather than in an Information or Digital Age. We must change the way we invest in and employ cutting-edge technologies or risk adverse effects to our operations in future conflicts. If we do not take significant measures, we will lose our scientific and technological competitive

advantage in less than a decade. If we lose that competitive advantage, we may be incapable of deterring other great powers or perhaps even regional hegemon. Inaction would also increase our margin of error in assessing our adversaries' intentions and capabilities, resulting in higher risk trade-offs. Given China's technological investment and our unchanged steady-state planned force structure and budget, such a miscalculation could potentially lead to conflict between two, three, or even more nuclear powers.

Nowhere else is this competition more nebulous and strategic than in space. The US, along with its allies and partners, have recognized space as a war-fighting domain primarily in response to Russian and Chinese counterspace capabilities, military operations, and declarative statements. The stakes are high because there is a race for dominance over cislunar access, operations, and resources.

Since our global competitors and adversaries are dangerously competent and capable of threatening our space equities, a recurring theme in US policy is "maintaining and advancing United States dominance and strategic leadership in space." That is why the bipartisan 2020 National Defense Authorization Act created the US Space Force (USSF), under the Department of the Air Force, to secure our national interests in an increasingly contested domain. The competition is as much about economics, and the other instruments of national power, as it is about military power. Through the US Space Command, the US Space Force will play an integral role in America's competition for leadership in space—whether military, commercial, or civil.

A decade ago, China laid out a 30-year cislunar economic and industrial plan committing vast resources and talent to achieve its "space dream" of becoming a leading global space power. The Chinese government has funded its commercial sector and advanced its customer base via the Belt and Road Initiative at a scale and price point that market-driven firms in the United States cannot match. In fact, China's Belt and Road Initiative Space Information Corridor and Digital Silk Road will supposedly generate \$10 trillion by 2050—dwarfing America's estimated space economy of \$1.5 trillion by 2040 (pre-COVID-19 estimation) from today's approximately \$385 billion.

There is now a gold rush in space because trillions of dollars of economic activity are moving into low Earth orbit and beyond. Our efforts should not focus on preventing China and Russia from participating in this arena if they are engaged in peaceful space activities that follow accepted rules, norms, and behavior. To compete with China, the US cannot

become China, so we must play to our strengths to retain our global competitive advantage.

US strength lies in its position as leader of the world in technological innovation, vibrancy of a true market economy, and, most importantly, democratic norms and values. China attempts to undermine America's traditional leadership role and create schisms between ally and partner spacefaring nations and the US. The US must provide allies and partners—and other nations that view the US as leader of the free and open world—with competitive military, civil, and commercial partnership frameworks. Our example and lead must be so profound that great powers and other nations would have no choice but to follow and replicate our success—although there is no guarantee.

SSQ: What is the significance of increased civilian space activities to national security?

MS: The “NewSpace” sector of private industry has been funded primarily by visionary billionaires with rockets and public R&D. Space entrepreneurs and industrialists are creating new technologies and adapting current innovative technologies for space application. Their efforts are fueled by the decreasing cost of space access and innovative advances in space-enabling technologies. This environment creates the opportunity for an expanded space industrial base beyond the big aerospace companies that have traditionally supported government space missions. These NewSpace entrants are a fast-growing segment of the US space industrial base.

During the last five years, 11 billion dollars of private capital have been invested in NewSpace. However, this model is unsustainable since the COVID-19 pandemic has negatively impacted the entire US space industry. Investments in space-based companies in the second quarter of 2020 were down 23 percent from the record highs hit in 2019, and investments fell 85 percent in the second quarter of 2020 from the first quarter. The US government may also experience near- to medium-term fiscal constraints. Public financing for research and development was already at a historic low even prior to COVID-19.

There is growing recognition by Congress, the White House, the DOD, and NASA that the only long-term path to economic and strategic leadership in space is to catalyze and enable the accelerated growth of a vibrant US space industry. To maintain our lead in space, we must foster a stronger public-private partnership, and our government must resume the sustainable and impactful past levels of support for basic research while also ensuring the empowerment of diverse representation in the space industry.

Without government support, the US would have been unable to maintain its innovation and technological lead over the rest of the world in previous key commercial industries.

Strengthening the US commercial space industry is important to civil space priorities. The civil sector led by NASA is also fundamental to America's national security, as exemplified in the recent NASA Artemis Accords regarding conduct on the Moon and the 6 April 2020 executive order on space resources. NASA is on an ambitious critical path for a return to the Moon by 2024 and the development of the capabilities and infrastructure for a sustained lunar presence as a staging area before the mission to Mars and beyond. While a lunar landing is important, more critical are the readiness and capability to permanently stay on the Moon and to develop the means to get to Mars. NASA and the DOD should provide more precise assessments as to when they expect human settlements on the Moon. Those timelines should become the goals and drive subsequent decisions. This anticipated increase in human visitation and eventual settlement continues both technological and exploration leadership with applications for our military. As such, these efforts bear directly on our national security.

SSQ: Recently, it was announced that the 2010 US National Space Policy is being updated. What changes are most needed?

MS: We need to normalize the space domain just like the other mentioned domains. To do so, we need to think about commerce, civil exploration, and conflict in space with some creativity. Policies need to be addressed within the context of space over the next five to 10 years. The rising economic benefits of space and its increasing importance to national security, along with advances in fundamental technologies, are all intervening factors. These factors will accelerate space activities and improve capabilities of not only traditional great powers such as China and Russia but also other spacefaring nations.

Therefore, our new National Space Policy should include or consider the following (not listed in order of importance):

- Declaring space a zone for economic ventures and civil exploration because emerging commercial ventures and the development of smallsats, cubesats, and satellite constellations are outpacing efforts to develop and implement policies and processes to address these activities;
- Establishing space sustainability, norms of behavior, and codes of conduct;

- Designating space as a critical infrastructure;
- Standardizing space cybersecurity and transmission security;
- Sharing responsibly across the spectrum band;
- Reviewing the overclassification of compartmented and special access programs to allow for greater participation of people with a need to know and not to keep everything black where it serves no deterrent value to foreign adversaries;
- Messaging strategically and publicly to allies, partners, and adversaries;
- Incorporating offensive operations in space in addition to existing defensive operations;
- Advancing solar- and nuclear-powered space propulsion as well as lunar power generation;
- Encouraging US persons to enter and graduate vocational and academic science, technology, engineering, and mathematics (STEM) programs;
- Promoting supply chain hygiene with front-of-the-line contract passes for supply chain illumination;
- Aligning counterintelligence and counterespionage in our laboratories and space industrial base, and also educating participants about potential threats;
- Increasing export-control information sharing across the government for expedient dual-use technological transfers and national security;
- Leveraging US economic offensive and defensive tools to increase American commercial space activities and support the growth of American space companies across the wide spectrum of the domestic space market and international ventures;
- Reforming government procurement and planning to send predictable signals to private space companies;
- Bolstering existing space equities exchanges, creating an eventual separate and unique space commodities exchange along with bond market utilization; and
- Increasing public financing for S&T and research and development (R&D) programs.

We must advance space policy to profoundly benefit life on Earth and for US permanent presence in cislunar and beyond.

SSQ: What are your thoughts on the recently released Defense Space Strategy?

MS: The release of the *2020 Defense Space Strategy* (DSS) is an excellent step forward. The DSS claims to be a strategy for the next 10 years. Within that context, my main concern is how it implicitly perpetuates the notion that space is a domain in which conflict would not occur first. For example, stating that a primary DOD effort is to enable the US to be “capable of winning wars that extend into space” negates the DSS threat section, which affirms that space is a separate warfare domain in which conflict could potentially occur first.

The DSS call for space superiority is reminiscent of space as a sanctuary. Being superior in space vice supreme or dominant does not sufficiently empower us to fully compete with Russia and China. The DSS could have elaborated on the DOD or USSF role in maintaining freedom of space commerce and civil exploration.

The DSS mentions integration of military space power into defense operations. The DSS could have expanded space power beyond only the military and called for the need of a national-level plan emphasizing a whole-of-government space power. Foreign adversaries and US global competitors have integrated their military and national security space entities across their respective governments and even their industry. Now, they are building global partnerships. I would have used the term “integrate” vice “cooperate” in outlining the DSS’s fourth line of effort referencing the DOD’s relationship to other US government departments and agencies, industry, and US allies and partners.

This DSS is optimal if nothing changes over the next 10 years, and some may think that 10 years is a long time away. However, 2030 will come quickly; much can happen in this span. China sent its first astronaut into orbit in 2003 and by 2018 conducted more space-oriented operations than any other country. Now, it has already declared its intentions for the next 30 years, which will pass in the blink of an eye.

Whether the DSS or another strategy, it should clearly inform our allies and adversaries of our ambitions and intentions. The argument that ambiguity creates flexibility is nonsense when we generalize and make things so nebulous in our policies and strategies that even our closest friends are left baffled. If we do not convey that story explicitly, we are bound to repeat the mistakes of the past and potentially head into conflict.

We should also not classify our general national vision, policies, and overall strategies. We should classify only space operations; tactics, techniques, and procedures; and some of the related S&T/R&D aspects. We

must also bring everyone on the blue team into the same conversation by allowing them into special access programs. How can we prepare for a defense or offense when policy makers, decision-makers, operators, and analysts cannot talk freely to each other?

SSQ: What areas or space capability does the US need to be most focused on now?

MS: Space is more than a war-fighting domain. With each passing second of Planck time, space more and more facilitates our modern way of life: it provides instantaneous global imagery, assures telecommunications, captures humanity's imagination for civil space exploration, and is a burgeoning zone for commercial ventures and investors. American commercial and civil space priorities in space are fundamental to US national security interests. Protecting those activities starting at 100 km from Earth and ranging into deep space fall under the US Space Command's area of operations (AO).

The US needs more than to look down from space to assure support to terrestrial activities. As such, US Space Command must exercise command of its AO by updating the unified command plan for expanded presence to cislunar and to map that operational environment. US Space Command will draw its personnel primarily from the Space Force, which will need to recruit, train, develop doctrine for, and equip that future force and evolving mission.

That future force and evolving mission must have more than just a terrestrial focus. The Space Force may evolve to ensure freedom of US space commerce and civil exploration just as the US Navy stands watch to ensure that the US can freely navigate the world's oceans for sea commerce and exploration. America must have space domain supremacy to ensure unfettered access to, and the freedom to operate in, space. The 2017 *National Security Strategy* (NSS) considers such space access to be a "vital interest," that is, something for which nations have fought over.

To execute this strategy, the US needs to move from the strategic defensive and start planning for the strategic offensive in space. We need to evolve the thinking from defense only to also offense because, in space, first-move advantages have more strategic implications than in the other domains. To align with the 2017 NSS, we should not settle for dominating an adversary at only a specific time and place but strive for domain supremacy, targeting an aggressor whenever we consider "freedom of operation" a vital national interest. For example, the US Navy would never settle

for just a superior naval force. It aspires to sea supremacy and domination of adversaries at any time and location.

We need to evolve our thinking, and both our lexicon and actions must match that thinking. To accomplish this paradigm shift, we need to develop something similar to the infantry assault maxim of “move, shoot, and communicate.” In the context of space, moving entails a rapid launch capability to get to space no matter the weather, time, or other impediments. Just as in air operations, this precept would be a game changer because maneuver in, to, and from space is by far the most important element. Offensive action (shooting), if necessary, is next. Finally, communicating effectively is essential to taking advantage of move and shoot. You may not lose if you have a good defense, but to win you need to go on the offensive. And accomplishing any of these objectives requires a space doctrine that sets the strategic context for the Space Force and connects space power to commercial space interests and the cislunar operating environment.

SSQ: Do we have too many space-related agencies, such as the Missile Defense Agency (MDA), Space and Missile Systems Center (SMC), Space Development Agency (SDA), and National Reconnaissance Office (NRO)?

MS: The MDA and SMC have purview beyond the US Space Force because national missile defense and ICBMs were purposely not integrated into the Space Force. The technologies of ICBMs and space launch are operationally different. ICBMs are needed for nuclear deterrence and not necessarily war fighting in space or supporting combatant commands for a conventional conflict. Another argument against merging the ICBM mission into the Space Force is the incompatibility of an ICBM compliance culture with space innovation culture. More evidence is needed to convince opponents that the Space Force could successfully balance ICBM compliance while encouraging space innovation. Some have also argued that if ICBMs are integrated into the Space Force, its focus will always be grounded to the terrestrial theatre. When these concerns are addressed, then separate organizations would perhaps no longer be justified.

The SDA will eventually get incorporated into the Space Force by October 2022. It would be a great outcome if the SDA were first permitted to finalize acquisition of its proliferated low-Earth-orbit architecture. Then the SDA could serve as the ideal model for most or even all Space Force acquisition. The SDA should be afforded the opportunity to succeed before absorption into the Space Force, and if it fails, then absorption allows it to start over with many lessons learned.

As far as the NRO, it may make good sense at some point to incorporate it into the Space Force. Perhaps it would be logical in the form of a dual-hatted Space Force chief of intelligence, surveillance, and reconnaissance (ISR). The topic of NRO more than the other agencies will likely be litigated into the foreseeable future before we see any resolution.

SSQ: If you could design a space force, would it look different than today's arrangement? Any advice on this for the new USSF chief?

MS: General Jay Raymond, Space Force's inaugural chief of space operations, has done a fabulous job considering that he is dual-hatted as a service chief and a combatant commander (US Space Command). I am encouraged by his recent comment that it is important to solicit diverse insights and evaluate their feasibility because America's future in space is a US national interest. The US Space Force should always reflect American societal values, norms, and demography. Everyone wants to be part of a winning team; therefore, the USSF should give all its members something that they can champion.

The active duty component should focus on current operations, space domain awareness, war fighting, space supremacy, and building an international space alliance with nations that share our norms, values, and behavior. In addition to supporting the active duty component, the Reserve component should focus strategically on integrating commercial advances into the Space Force. The Space National Guard should focus on space defense of the homeland, broad-spectrum space integration for states, critical infrastructure, and defense operations from space.

The Space Force should be a cultural blend of all military and space organizations, even embracing some science fiction, to incorporate the best traditions, ranks, and symbols and to create newer ones unique to space. It is very important to consider the future mission of the Space Force between 2060 and 2070, which would resemble an oceanic force. Under no circumstances should the creators of the space culture consist only of, or be dominated by, current or prior Air Force personnel now that we also have Army and Navy personnel detailed to support the Space Force. The next step is to detail, assign, or transfer Army and Navy flag officers with space expertise to ensure diversity of thought and experience as well as to encourage and mentor transfers from their services. Otherwise, we risk creating an Air Force-lite organization that can be folded back as a separate branch of the USAF.

It is also important to match actions with words. It does not suffice to state only that the Space Force is a high-tech, future-looking service when

there are not going to be programmatic transfers from the Air Force or major investments to keep the service's technology and systems top notch. For example, the X-37B and similar programs need to transition now from the USAF to the USSF.

The Space Force would also not foster a healthy culture if its members are considered elite but others, like those in the intelligence community, play second fiddle to operations people. Every military service has its own separate intelligence center to look after its priorities, mission, and overall domain awareness. The Space Force should be no exception. Arguments against reorganizing space intelligence organizations within the Department of the Air Force should not be about major cost increases or damaging the USAF: it is simply a reassignment of personnel and resources.

Furthermore, the service should create and cultivate a clear war-fighting structure that includes all to, from, in, and through space warfare elements, including terrestrial strike, planetary defense, and space supremacy. It should also craft a unique organizational structure that blends acquisition, engineering, operations, and support at the lowest possible level without favoring a specific career field. The Space Force should have its own maintenance, legal professionals, public affairs, legislative liaison, ISR, labs, recruitment, and other critical service functions.

Every military service also has a career designator of astronaut. Space Force, as the specific military service dedicated to space, does not—even though its first recruitment video says “maybe your purpose on this planet isn't on this planet” and the second features an astronaut. This discrepancy needs to be resolved by permitting other services' astronauts to transfer to Space Force as astronauts and allowing new military recruits to the astronaut career field in the Space Force. Doing so is just one other measure that would permit the Space Force not to be grounded.

These astronauts would also be the connective tissues to build stronger ties with NASA and the private sector because the Space Force will eventually grow to ensure access, operations, and safety of both commercial and civilian space. The earlier that Space Force leadership embraces and supports this momentum, the further ahead we will be in the space competition.

SSQ: Looking to the future, what is your sense of our strengths, weaknesses, opportunities, and threats in space 20 years from now?

MS: In 2019, US Air Force Space Command assessed that by 2060 space will be “a significant engine of national political, economic, and military power” and that the United States “must commit to having a military force structure that can defend this international space order and

defend American space interests, to include American space settlements and commerce.”

When we endeavored to put the first two humans on the Moon, we did not do it by cooperating only with the government and industry. We did so by integrating a whole-of-nation approach. The US must create and execute an integrated, comprehensive 2060 American Space Vision and Strategy that fuses national security, civil, and commercial space efforts using to the fullest extent possible all national instruments of power, as mentioned earlier. Integration must not be an end state but a means to assimilate and economize to scale our shared technologies, talents, investments, and innovative discoveries. The US should develop a guiding 2060 American Space Vision to catalyze whole-of-nation efforts and enable the United States to compete and win now and into the future. This vision should be developed to drive a host of actions specific to federal departments and agencies and to update other strategies and policies.

The United States can either prepare and posture to shape a future with American strategic leadership in space or resign itself to follower status—leaving leaders and citizens to ask themselves why we never made the necessary reforms. We can either seize the moment or waste this decade’s opportunities for US strategic leadership in space. We cannot achieve this vision by investing only in technology. We must invest in human capital to win in this great power competition.

America’s greatest assets are its people’s knowledge, innovation, and resolve. Without Americans and their innovative talents, no amount of resources or technological capabilities can ensure that the US will last as a great power or win in great power competition. We must empower Americans to attain the necessary twenty-first-century skill sets for the future economy.

There is no denying that we have a shortage of STEM vocational and educational graduates in the US. The space industrial base and government space organizations compete with each other and with other cutting-edge technology sectors for recruitment of talent. So government and industry need to work together to fix this labor and talent shortage—not just for the space industry but all STEM-dependent sectors.

Space currently provides value because it facilitates the creation, distribution, and selling of data. But in the future, space will become increasingly commercialized and industrialized, which will demand highly skilled human capital. NASA’s Artemis program will require an additional 10,000 STEM graduates over the next five years for civil needs alone, and this

does not account for what is needed to support the evolving US Space Force or the enlarged space industry.

Current STEM personnel numbers are insufficient unless we do something to meet the needs of expanded national space capabilities and the industrial base that provides those capabilities. The space industry will also require non-STEM personnel knowledgeable of the space enterprise in a variety of support occupational fields, such as financial engineering, economics, and law. We require a whole-of-government mobilization, especially in light of our STEM statistics as compared to our great power competitors, if we are intent on sourcing those talents.

STEM is a vital innovation multiplier. We must ensure our future generations are afforded access to quality education and training programs—especially in STEM and STEM-related fields. If our future generations don't have this background, then our nation will incur qualitative and quantitative loss in many arenas. We will not have properly trained and educated “women and men of the hour” making sound decisions about our civil, commercial, and national security priorities.

SSQ: Dr. Sadat, on behalf of Team SSQ and the entire SSQ audience, thank you for sharing your profound ideas on the future of the US Space Force.

MS: Thank you for taking an interest in discussing and debating critical space topics facing our nation and allies. I look forward to your readers' reactions and continuing our dialogue. Most importantly, thanks to Mike Guillot for extending an opportunity for me to share my perspective. He deserves our gratitude for his four decades of military and civilian service to our nation. **SSQ**

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