Flying over East Asia, Expedition 38 crewmember on International Space Station took this night image of the Korean Peninsula (NASA)

Bringing Space Crisis Stability Down to Earth

By James P. Finch

Tensions in the South and East China seas have been elevated during the last year. Territorial disputes in these areas flare periodically, but historically the brinkmanship has largely been confined to encounters at sea, with maritime law enforcement vessels confronting fishing fleets as tra-ditional naval forces lurk just over the horizon. Given that the objects of these political disputes are islands, shoals, and the vast resources around and beneath them, it is only natural that the armed instruments of power brought to bear would operate in close proximity to the territory in question.

China's unilateral expansion of its air defense identification zone (ADIZ) appears to have introduced a new and dangerous element into the situation. While such zones are not new, the uni-lateral extension of one country's ADIZ to overlap with another country's ADIZ, with no prior consultation and over polit-ically disputed territory, necessarily breeds suspicion and rancor. Moreover, the du-plication sets the stage for misperception and miscalculation, with each party re-fusing to recognize the legitimacy of the declared defense interests of the other.

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Although much is being written about the ADIZ, the expansion of the political dispute from the seas to the skies portends an additional evolution of a future political crisis—a jump to the heavens. Just as analysts are closely scrutinizing the repercussions of the competing ADIZs on strategic and crisis stability between the claimants, we would be wise to begin thinking about the implications for strategic stability if future crisis escalations involve the space domain. It is far easier to dispassionately consider implications of such a jump before it occurs, when analysis can occur free of the politically charged suspicions that follow the horizontal escalation of a crisis into a new domain.

A discussion about the political import of space cannot occur as if space were somehow abstracted from the terrestrial political situation or, in the case of nuclear-armed powers, abstracted from nuclear or strategic stability. Just as the expansion of the ADIZ must be considered within the context of the political dispute over the territory beneath it, so too must space power be understood in the context of the political objectives here on Earth that gave rise to the crisis. Important, too, is the overall stability of the strategic situation, and our understanding of such stability must not somehow be artificially separated from what is happening or could happen in the heavens. Understanding how space fits into strategic stability, and how actions in space can affect, or even drive, crisis dynamics, is imperative to reduce the risk of miscalculation.

Giving Meaning to Strategic Stability

Over the past 5 to 10 years, it has become common to focus on "strategic stability" as the new modus vivendi between great powers. Before exploring the synergies of space and strategic stability, it is important to settle on a workable definition of *strategic stability*. In many ways, for those not schooled in nuclear strategy, this term has come to replace "mutually assured destruction" in defining the relationship between potentially adversarial nuclear powers. Precise definitions of strategic stability

vary, and the U.S. Army War College highlighted this point in a recent volume of essays that explore various aspects of competing interpretations.[1] Understanding the concept of strategic stability is an excellent foundation, yet by its focus on nuclear weapons it largely overlooks the critical role of the space domain.

The focus on nuclear weapons at the expense of space power in strategic stability literature is understandable. For the four-plus decades of the Cold War, nuclear weapons were the coin of the strategic realm. As both sides fielded space systems during this period, the safety of satellites was maintained by their close linkage to nuclear force structures. In peacetime, space systems provided reassurance that the other party was not massing forces in threatening ways, while also providing technical insights that helped to verify arms control regimes. During crisis and wartime, space systems were designed to provide early warning of missile launches and to enable national leadership to execute nuclear warfighting plans. Space systems could also be called on to conduct battle damage assessment to confirm that nuclear weapons had detonated as planned and to order further attacks as needed. Given these roles and the connection to nuclear warfighting, decisionmakers in Washington (and perhaps Moscow) presumed that an attack on space assets would prefigure a nuclear confrontation. Thus, the problem of space deterrence, or crisis stability in space independent of nuclear stability, was uninteresting at best. Times have changed, and those concerned with understanding contemporary strategic stability would be well served to consider the synergistic effects of space warfare and crisis dynamics.

In one of the most insightful chapters of the Army War College volume, author Elbridge Colby states that "strategic stability should be understood to mean a situation in which no party has an incentive to use nuclear weapons save for vindication of its vital interests in extreme situations."[2] He goes on to assert that in "a stable situation, then, major war would only come about because one party truly

sought it, not because of miscalculation."[3] Colby's insightful description not only applies to nuclear conflicts, but also can help advance our understanding of how space systems fit into broader notions of strategic stability, crisis stability, and arms race stability.

Importance of Space to Stability

Space is vital to the national security of the United States. As noted in the U.S. National Space Policy, space-based capabilities enable the Armed Forces to see with clarity, communicate with certainty, navigate with accuracy, and operate with assurance.[4] Maintaining the benefits afforded by space is also essential to economic growth and prosperity, both in the United States and around the world.

U.S. and allied forces rely on satellites to operate far from established terrestrial communications networks. Satellite communications provide the backbone to ensure that analysts and warfighters receive real-time access to intelligence, surveillance, and reconnaissance data streams provided by remotely piloted aircraft, which themselves are operated by pilots via satellite. The global positioning system provides forces critical position, navigation, and timing information, allowing the joint force to better understand the contours of the battlespace, target with precision, and synchronize effects. Space-based assets provide for global and theater missile warning, and assets operated by the Department of Defense and National Oceanic and Atmospheric Administration provide accurate, timely weather information. All of these capabilities are critical to the joint force in projecting power far from the homeland.

For an adversary seeking to disrupt or deny the ability of the United States to project power, space capabilities may provide an appealing target, especially early in a crisis or conflict. As such, space as a domain is inextricably linked to crisis stability. First, space capabilities are critical enablers for the joint force, and some have viewed these capabilities as an Achilles' heel for that force. Because a first strike against key space forces could undercut the ability of the rest of the

joint force to meet its operational and tactical objectives, it may be a tempting option. Second, many space capabilities can be degraded through electronic means, enabling the use of weapons systems such as jammers that an adversary might perceive as less escalatory. Just as China has found the use of civil "maritime law enforcement" ships to be less provocative than People's Liberation Army naval forces in maritime standoffs, so too an adversary may believe that jamming a spacecraft is less provocative than other means of purposeful interference. Finally, it is often said that "satellites have no mothers." Adversaries may therefore believe that they can attack such targets without fear of engendering strong public outcries that must be satisfied through some form of retaliation.

But focusing exclusively on the U.S. use of space systems misses a significant change in the larger environment—a change that will only become more pronounced in the coming decades. The United States is not alone in its growing reliance on space for political, economic, and military purposes. The unique attributes of the space domain—global coverage, persistence, access to denied areas—are attributes that are valuable to all societies and militaries irrespective of their political ideologies.

China is the best example of this trend, as that country's space program both mirrors and directly contributes to its overall modernization, military and otherwise. China has contributed to new challenges for traditional and emerging actors in space, such as through competition for commercial contracts to launch satellites and through China's antisatellite test in 2007 that created thousands of pieces of space debris. Yet it should be recognized that China also shares a common interest in the safety, stability, and security of the domain. President Barack Obama and then-President Hu Jintao agreed during one of their first meetings that "the two countries have common interests in promoting the peaceful use of outer space and agreed to take steps to enhance security in outer space."[5]

China, like the rest of the world, continues to derive significant economic

Standard Missile–3 Block IB guided missile launched from USS *John Paul Jones* during Missile Defense Agency and U.S. Navy test over Pacific Ocean (Missile Defense Agency/Leah Garton)

benefit from space capabilities. And, like the United States, China has discovered the military benefits enabled by space. A critical feature of China's so-called antiaccess/area-denial strategy is the ability to engage an adversary's force at a distance. This is best accomplished by relying on the ultimate high ground of space. Space provides an ideal location to identify and target forces, to communicate with and guide weapons systems, and to assess damage after the strike.

For the past decade, the strategic community has thought of dependence on space systems and the accompanying vulnerability as a "U.S. problem." While this was accurate a decade ago, this problem increasingly confronts any modern state seeking to project power regardless of its political motivation. The implication of this development is profound, with wide-ranging potential effects for strategic stability. If both sides depend on space systems to ensure that military forces can

achieve political objectives (or deny the political objectives of an adversary), then the overall stability of the space domain will become a central component of the overall stability of a crisis.

Decisionmakers in a crisis must weigh the implications of accepting the status quo or seeking to alter it through the application of some element of power. In such a circumstance, a decisionmaker will evaluate the relative balance of forces at different levels of conflict and may be deterred by the likelihood of failure or the risks of unacceptable retaliation. If, however, it appears that an early strike can improve the odds of success or neutralize an adversary's ability to counter-escalate—for example, by denying critical space capabilities—the adversary's conclusion may be different and deterrence may fail. An effective deterrence strategy must balance across domains and elements of national power. The alternative is to risk that vulnerability in one narrow area, such as space, could collapse the threshold for deterrence failure more broadly.[6]

Simply put, strategic stability must be sought in space, and space stability must help maintain the overarching stability and deterrence posture here on Earth. Strategic and space stabilities are inextricably linked, and they are linked not only for the United States, but also increasingly for China and other countries that rely on space systems to achieve military and political objectives. For this reason, we must give serious attention to how to achieve and maintain crisis stability in space.

Crisis Dynamics and Space

As potentially dangerous as the overlapping ADIZs are, they are far less destabilizing than actions in space could be during a crisis. All contestants in the "great game" unfolding in Asia have fairly similar appreciations of the implications that would follow engaging military or, worse, civilian aircraft transiting their ADIZ. These understandings have been built over 100 years of air travel and were underscored dramatically in the miscalculation associated with the Soviet downing of Korean Air Lines Flight 007 in 1983.

Such shared understandings are largely nonexistent in space. Not only do nations have less experience operating in the domain, but the criticality of space systems to broader operational objectives also may create a tempting target early in a crisis. Combined with the lack of potential human casualties from engagements in space, this lack of common understanding may create a growing risk of miscalculation in a terrestrial political crisis. If not explicitly addressed, this instability in space could even create a chasm that undermines the otherwise well-crafted tenets of strategic or nuclear stability.

While much has been written about how nuclear weapons contribute to, or detract from, crisis stability, space, in some ways, is more complex than nuclear stability. First, today a clear taboo exists against the use of nuclear weapons. Crossing that firebreak at any level has immediately recognizable and significant implications. Second, in the context of nuclear weapons, theorists can (at least arguably) discriminate among escalatory motives based on the *type of weapon*—strategic or tactical—and based on the *type of target*—counterforce or countervalue targeting. This was most famously sketched out in the form of an escalation ladder in Herman Kahn's 1965 book, *On Escalation*.[7]

This convenient heuristic method for understanding escalation based on the target and the weapon type is arguably more complex for space. This is a byproduct of the lack of mutual understanding on the implications of the weapon and the value of the target. These factors deserve detailed consideration because they describe the playing field on which a terrestrial crisis could spiral into space conflict. Efforts to manage crises, therefore, must account for these complexities.

To begin, there is no taboo against many types of counterspace systems. Starting a framework with weapon type, the threshold for use of temporary and reversible counterspace weapons appears much lower. There are documented instances of electronic jamming happening all over the world today, and the number of actors who possess counterspace weapons such as communications jammers

is much higher. Given the low cost and relative simplicity of some counterspace weapons, even nonstate actors have found utility in employing them. As former Deputy Secretary of Defense William Lynn noted, "Irregular warfare has come to space."[8] Consequently, this type of weapon—temporary and reversible—may appear at first glance to be less escalatory and less prone to miscalculation than kinetic weapons.

At the other end of the weapons spectrum are weapons that have permanent and irreversible effects. The extreme version of such a weapon would be a debris-generating kinetic kill device such as the kind that was tested by the United States and Soviet Union during the Cold War and by China in 2007. These weapons are particularly insidious because they generate large amounts of debris that indiscriminately threatens satellites and other space systems for decades into the future.

One additional dimension to the weapons spectrum that merits consideration in the context of crisis stability relates to the survivability of a weapon. It is commonly accepted that space is an offense-dominant domain, which is to say that holding space targets at risk is far easier and cheaper than defending them. This could lead to first-strike instability by creating pressure for early action at the conventional level here on Earth before counterspace attacks could undermine the capability for power projection. But the offense-dominant nature of the domain has implications for both peaceful satellites as well as space-based weapons. This could also create first-strike instability regarding space-based weapons since the advantage would go to the belligerents who use their space weapon first. In this way, space-based weapons may be uniquely destabilizing in ways that their more survivable, ground-based relatives are not.

Adding complexity to Kahn's heuristic, however, is the situational context surrounding the employment of counterspace systems. In the space context, strategists will have to consider weapon type, the nature of the target, and also the terrestrial context. Today's electronic jamming has primarily been witnessed

Views of zenith side of International Space Station over Lake Baikal in Russia, Mongolia, and China taken from *Atlantis*, Orbiter Vehicle 104, during STS-106 mission (NASA)

in the Middle East, where regimes have sought to deny freedom of information to their populations by jamming commercial communications satellites. The same weapon type—a satellite communications jammer—applied against a satellite carrying strategic nuclear command and control communications during a crisis could be perceived much differently. In such an instance, decisionmakers might conclude that the other side is attempting to deprive them of nuclear command and control as a prelude to escalation.

Similarly, the application of permanent, irreversible force against a commercial or third party satellite would have a much different effect on crisis dynamics than mere jamming. Physically

destroying or otherwise rendering inoperable such assets could raise a party's stake in the conflict, by threatening either its power projection capabilities globally or its assured ability to retaliate against a nuclear strike. Many militaries use commercial assets to communicate with deployed forces, and a "show of force" strike against a commercial satellite could inadvertently engage an adversary's vital interests.

Simply put, the weapon, target, and context all contribute to the perceived intent and effects of a counterspace attack. Unlike in other domains, tremendous ambiguity exists regarding the use of counterspace weapons. This means that all of these variables would be open to interpretation in crises, and it should

be remembered that an inherent characteristic of crises is a short timeframe for decisionmaking. When time is short and the potential cost of inaction is significant, or even catastrophic, decisionmakers tend to lean toward worst-case interpretations of an adversary's actions. This is a clear recipe for inadvertent miscalculation.

Bringing Space Down to Earth

The Cold War adversaries had many years to develop mutual understandings about the nature and role of nuclear weapons, and these understandings contributed to strategic stability. These understandings were born out of real-world crises, such as the Berlin crises, Korean War, and Cuban missile crisis.

Single modified tactical Standard Missile–3 launches from U.S. Navy Aegis cruiser USS *Lake Erie* (U.S. Navy)

They also emerged from dialogues, such as formal summits and long-running arms control negotiations. The former are certainly much more dangerous than the latter, and no one wants to see the space equivalent of a Cuban missile crisis.

There are signs of progress. The United Nations Group of Government Experts recently recommended bilateral and multilateral transparency and confidence-building measures. In addition, the European Union is leading open-ended consultations to develop an "International Code of Conduct for Outer Space Activities." While these measures will help promote the responsible use of space, they do not squarely address the current lack of mutual understanding regarding how space attacks will be perceived in the midst of a crisis. This is of particular concern for the United States and China, which, as previously noted, increasingly rely on space systems to execute their political and military strategies.

At the government-to-government (so-called Track 1) level, there is not currently a productive venue for the United States and China to develop a mutual understanding of how space plays into crisis stability. While space security has been incorporated into existing diplomatic and defense dialogues, these steps in the right direction have been slow and tentative, and there is much work to be done.

Recently, some engagements led by think tanks (known as Track 1.5 dialogues due to mixed delegations of government and academics) have begun to explore the issue, and it is clear that both sides harbor a lot of mistrust and misperception. The United States continues to raise questions about China's military modernization and its potential coercion of regional neighbors over contested territory. China continues to question the implications of expanding U.S. missile defenses and, to a lesser extent, the U.S. rebalance to the Asia-Pacific region.

Suspicions about space activities fit within this broader geopolitical mistrust. The United States continues to express concern about Chinese space activities and China's lack of transparency when it comes to unique space launch profiles or robotics experiments. China, for its part, expresses concerns about U.S. activities, such as the reusable experimental test platform known as the X-37B. These misperceptions are hard to resolve, both because of the inherent dual-use nature of space systems and the difficulty in creating transparency for a regime so far removed from terra firma. Resolving such suspicions and building trust take

time and require a common understanding of the nature of the space domain and space systems.

Returning to the formulation of Colby, recall that "in a stable situation . . . major war would only come about because one party truly sought it, not because of miscalculation." Miscalculation is best avoided when each side understands the implications of its actions and understands how the other side will interpret and react to those actions. This situation does not exist in today's environment regarding space systems and space weapons. We lack a common understanding of how space will contribute to, or come to define, potential crises between the United States and China. As both countries seek to define a "new type of great power relationship," it would be wise to consider how new technologies and operational concepts are best managed during crises. Given both sides' growing reliance on space systems to achieve their future military and political aims, a lack of understanding comes with great peril. We should strive to build a common framework now, using dialogues during peacetime, before provocative actions in space during a crisis imperil stability here on Earth. **JFQ**

Notes

[1] Elbridge A. Colby and Michael S. Gerson, eds., *Strategic Stability: Contending Interpretations* (Carlisle Barracks, PA: U.S. Army War College Press, February 2013).

[2] Elbridge A. Colby, "Defining Strategic Stability: Reconciling Stability and Deterrence," in *Strategic Stability*, 55.

[3] Ibid., 57. Emphasized in original.

[4] National Space Policy of the United States of America, June 28, 2010, available at <www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf>.

[5] U.S.-China Joint Statement, November 17, 2009, available at <www.whitehouse.gov/the-press-office/us-china-joint-statement>.

[6] James P. Finch and Shawn Steene, "Finding Space in Deterrence: Toward a General Framework for 'Space Deterrence,'" *Strategic Studies Quarterly* (Winter 2011), 10–17.

[7] Herman Kahn, *On Escalation: Metaphors and Scenarios* (New York: Praeger, 1965).

[8] William Lynn, "A Military Strategy for the New Space Environment," *The Washington Quarterly* 34, no. 3 (Summer 2011), 11.