



Air Force Association, Orlando: Space, Cyberspace, and National Security

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Introduction

Thank you, Joe, for that kind introduction. Also, I'd like to thank you, and the rest of your AFA team, for organizing yet another world-class event. I'm especially pleased with the extensive Reserve component, combatant command, and Joint involvement; and, I especially look forward to General Scaparrotti's remarks.

I greatly appreciate the opportunity to spend some time with this impressive group once again, and to share some thoughts on the Air Force's contributions to our national security. Today, I would like to discuss matters involving the ultimate high ground of space, and the still largely undiscovered possibilities in the emerging medium of cyberspace.

Virtually all aspects of military operations are affected in some way by the capabilities provided from these domains, and it's difficult to overstate their importance to the success of our armed forces. From precision navigation and timing, to global satellite communications, to space-based surveillance and missile warning, our space assets provide us with an unparalleled degree of accuracy, connectivity, and situational awareness. And, our exploitation of cyberspace and advanced information technologies enable us and the Joint team to properly command and control our forces, binding virtually all of our advanced capabilities together into precise, increasingly networked, and better synchronized operations.

U.S. Dependence on Space and Cyberspace

Certainly, our reliance on space and cyber power is well established. Because our Nation's diverse interests – diplomatically, financially, economically, and militarily – exist around the globe, we have an enduring need for robust space and cyber systems and the inherently globally-oriented capabilities that they afford. It would be fair to say that space and cyber power



affects the lives of virtually all Americans every day, keeping us connected, and shaping the ways in which we all view the world.

From an Air Force perspective, space and cyber power enable our ability to provide global mobility; global strike; intelligence, surveillance, and reconnaissance; communications; and many other critical capabilities on which the Joint team heavily relies for operational effectiveness. As such, it stands to reason that our substantial dependence on space and cyberspace creates vulnerabilities that are potentially exploitable by our adversaries – an outcome with profound strategic implications.

Therefore, our efforts to protect these interests in space and cyberspace must be as ambitious as our reliance on these domains. We must be able to deter and defend against attacks on our space and cyber capabilities, and “fight through” any degradation, disruption, or even denial of these vital capabilities.

Vulnerabilities and Deterrence

As we move to protect our interests in space and cyberspace, we must begin by evaluating our vulnerabilities. Threats to our space and cyber capabilities pose some of the most significant challenges to our national security. Those who pose these threats, therefore, must be deterred or, if necessary, compelled to stop. Unfortunately, Cold War methods of deterrence, which were founded on the ability to identify our adversaries and influence them with roughly similar capabilities, do not always apply today.

Instead, we today find ourselves in a more precarious situation – one where, at times, we are much more dependent on these domains than our adversaries, and one in which it may be very difficult to attribute threats, either to those who are deliberately taking action against us, or perhaps to natural causes from the extremely harsh environment in which our space systems operate.

Attributing threats in cyberspace is just as daunting, due to technological limitations in detecting and finding cyber intruders. It is also worth noting that what constitutes a challenge to our freedom of action in space and cyberspace



can range from simple tactical disruption with short-term military implications, to broader interference that affects the ways in which our Nation – not just our military – depends on these two domains. For example, attacks on commercial communications satellites can affect an entire universe of civilian uses, as well as the very significant proportion of military satellite communications that rely on commercial satellite systems.

Or, consider that a disruption to the Global Positioning System could affect not only precision navigation and timing for our Joint forces, but also our civilian banking and finance, commerce, and transportation sectors; or, that a hacker could access anything from medical records to financial statements, business proprietary to government sensitive, with malicious intent to disrupt efficient management of a vast multitude of networked global activity – both civilian and military. In short, the implications of attacks on our space and cyber capabilities are potentially more consequential than what would occur from a purely military perspective.

Because of this, we need to expand our definition of what constitutes a threat to our space and cyber capabilities. Paying attention to a particular asset allows us to assess immediate consequences to operational effectiveness. But, we must also consider broader forms of interference against any element of our space and cyber enterprise, to gain an appreciation for longer-term implications and our adversaries' broader strategic intent. These elements can include legal and regulatory regimes, international agreements, industrial base, or anything else that can affect, either directly or indirectly, our exploitation of space and cyberspace.

We must also consider a broader scope of adversaries. The list includes not only rival nation-states, but potentially also any number of non-state, sub-national, and even individual actors that can threaten the advantage that we currently enjoy from space- and cyber-borne capabilities. This reality reflects a broader feature of the 21st century international security environment – that potential adversaries are not mere unitary state actors. We therefore should not treat them as such.



The rub is how to deter potential adversaries in the event of competition in space, when few others appear to have as much dependency as we do. This is a very difficult issue through which we still must work, for until we see more parity in dependence, it would appear, on the surface, that we have limited leverage.

But, it is worth noting that, according to some studies, the breadth of space activities by our peers and near-peers – China and the European Union, for example – is similar to our own range of effort. Also, access to space appears to be increasingly widespread, therefore involving more actors who benefit from, and increasingly rely on, space. The proliferation of missile and rocket technology, miniaturization techniques for smaller payloads, and other technological advancements are enabling more governments, as well as commercial space providers, to provide launch and satellite services more affordably. This has the ultimate effect of lowering barriers to entry, and suggests that we must always be vigilant in discovering further challenges, to be sure, but also opportunities for deterrence options.

Other possible deterrence options derive from how our adversaries *value* space, even though they may not rely on it as much, or in the same way, as we do. For instance, space can still afford international prestige, much as it did in the 1960s and 70s. As recent efforts on long-range missile development by Iran and North Korea suggest, highly technological endeavors such as indigenous launch capabilities and advanced conventional weaponry are at least in part about garnering respect and stature as it is about the fledgling technological and capability achievements themselves. And, in addition to prestige, space and cyberspace also offer opportunities for economic and industrial growth, political leverage, and other enablers of national power and influence. Correspondingly, our efforts to stave off potential interference of our space assets gain other possible avenues of deterrence.

Current Air Force Efforts

To address these challenges, we must continue to focus attention on enhanced space situational awareness. Our ability to conduct this vital



mission not only helps us to characterize threats as either an intentional act by an adversary or the result of electromagnetic radiation, space debris, or any number of other hazards in outer space; they also help us to recognize anomalies in our own space constellations and evaluate options for such contingencies.

Our ability to track space objects – currently, over 20,000 of them – has operational implications not only for military and civil uses of space, but also for the enormously lucrative space system industry. Including sales of business communications, navigation through Global Positioning System handsets, remote sensing, and digital television and music for tens of millions of consumers, this segment of the industry topped 33 billion dollars of revenue in 2008 – neither a small nor completely mature undertaking at this point.

To enhance our space situational awareness, we must continue to nurture our resurgence in space intelligence analytical and collection capabilities. This process will take time, as decades of knowledge and experience are imparted from senior analysts to new ones, and new technical ways and means of collection are developed, managed, and implemented. This enhanced situational awareness not only will provide our Nation with the ability to evaluate our adversaries' space orders of battle and clarify our understanding of their intent, but also to detect, mitigate, and otherwise respond to threats to our space assets.

Increased space situational awareness capabilities will also bolster our space cooperation with key international partners and allies. Through the sharing of our surveillance data, for example, we provide mission assurance for our cooperative efforts with enduring international partners.

Also, to maintain our current ability to leverage space, we must continue to nurture and further develop our technological superiority. In all likelihood, any sort of “space competition” in the foreseeable future will entail some elements of protecting and preserving our own space-borne capabilities. This demands that we maintain the cutting edge in technology, both from a government perspective, as well as with our industrial base. For example, it is



well-known that our dependency on the Global Positioning System has also created certain vulnerabilities that our adversaries can exploit through jamming and other tactical denial techniques. While we remain unequivocally committed to proper stewardship and use of the world's unparalleled standard in precision navigation and timing, as well as advancing enhanced capabilities with new GPS Block II-F satellites and next-generation GPS-III concepts, we also recognize the need to be able to continue to operate effectively, through improvement to GPS and other methods, in a denied or degraded localized environment.

Future Efforts for National Security Space

Current realities continue to suggest the inevitability of contested space. To prepare, we are starting at the very top. Back in December, Secretary Donley ordered a top-down evaluation of our management of military space responsibilities. Since 2001, when the last significant restructuring took place, new legal and regulatory requirements, as well as new agencies and authorities, have affected the structure of roles and responsibilities in our stewardship of national security space. We will ensure that, from the Pentagon to our space wings and centers, the appropriate structures and relationships are present to address the various challenges that I have just discussed, as well as other issues.

Our overall approach for the future must be capabilities-based; that is, instead of an emphasis solely on protecting satellites, we should also focus on preserving – through appropriate redundancies – the force-enhancing capabilities that our space systems provide. For example, space-based ISR capabilities should at least in part be backed up by other systems. In some situations, our highly-capable, remotely-piloted systems might be able to provide some compensating capabilities. They might not be identical, but we need to think in cross-domain terms when seeking such resilience.

Also, while we continue to pursue our efforts on Operationally Responsive Space, to build reliable and responsive operational enablers, and focus them “on timely satisfaction of Joint Force Commanders’ needs,” true agile



responsiveness should emphasize effectiveness in meeting operational demands, irrespective of whether the solution is space-based or otherwise. And, because equipping our satellites with defensive capabilities requires tradeoffs with takeoff weight, fuel capacity, service life, and system utility, we should also take a capabilities-based approach to space defense. Protecting spacecraft certainly is a consideration, and in some cases may be the best approach, but we must first emphasize protecting capabilities. If a defensible posture can be achieved not only by hardening and improving maneuverability of large, complex satellites, but also by smaller, simpler satellites, then we might emphasize further development of some less exquisite augmentation systems. With flattening budgets and likely declining purchasing power, these sorts of tradeoffs, while difficult, must be considered.

Also, perhaps some solutions to satellite defensibility can be found in broader efforts to address root causes of potential rivalries in space, or in other efforts to deter broader conflict. Perhaps through bilateral or multilateral cooperation, we can end up creating disincentives to attacking our shared space capabilities. These partnerships can be political, financial, material, or all of the above. There are numerous options to be discovered with international engagement and partnerships in space.

Finally, in addition to technological superiority, there also must be significant investment in human capital. We benefit from over 46,000 Total Force Airmen, including contract employees, who are dedicated to space – from acquisition to operations to logistics – and who must continue to be strengthened through robust training and education, and equipped to tackle these challenges and others. While space and cyberspace certainly showcase our innovation and advanced technology, let us not forget that it is our Airmen, through their daily professional efforts, who make it all happen. The American people rightly expect unwavering devotion and excellence from them. It is our responsibility to ensure that our Airmen have the breadth of knowledge, tools, and cross-domain perspective that they will need to succeed.



Conclusion

I have outlined just a few thoughts today. There remain many others, and this continues to be a critical time for our Air Force. Our Nation and our Joint teammates rely on us to be at peak performance daily, in *all* aspects of our unique and enduring Service capabilities. I am greatly encouraged by the gains that we have made in making space capabilities more accessible to the warfighter. With more than 2,500 Air Force Space Command Airmen forward deployed around the globe in 2009 – 2,100 of whom are supporting operations in Afghanistan and Iraq and on the horn of Africa – we are providing crucial and timely capabilities from our communications, GPS, early warning, space surveillance, space and terrestrial weather, and ISR systems, directly to the theater.

It is appropriate that, for the ultimate high ground and for the virtual domain that is unconstrained by physical barriers, we take as broad and holistic a view as possible, to address the pressing issues that face us as a space-faring and cyber-dependent Nation. I look to you and other bright and talented professionals – in and out of government – to engage in robust debate as we move forward together in discovering the various ways and means to meet these challenges.

AFA and each of you are part of the proud history of our Nation's development of, and preeminence in, air and space power. Your celebration of that history will assure that we never forget over a century of challenges, including often contentious debates, as well as attempts with potential solutions that ultimately were discarded.

We must now focus – with equal vigor, boldness, and creativity – on the unfolding histories of our Nation's continuing leadership in space, and development of the virtually boundless opportunities in cyberspace. These are challenges that require government- and industry-wide partnerships, and Nation-wide emphasis, if we are to succeed.

I want to thank you again for the opportunity to address these important matters, and for your daily efforts in supporting the Air Force's continued ability to provide *Global Vigilance, Reach, and Power* for America. I wish you the very best. Thank you.