

"The Next Space Age"

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Editor's Note: The General references a video shown prior to his speech, called "Around the Command" also shown at the 2008 Fall Commander's Conference

Thank you, Elliot, for the kind introduction. What a great opening ceremony you held last evening -- a real celebration of achievement.

I can't tell you how proud I am to be with you this morning representing 40,000 men and women of Air Force Space Command. You saw a number of Airmen in the video a couple of minutes ago. Those Airmen you saw were doing a number of important things for the United States of America -- securing, operating, and maintaining our combat-ready ICBM force, and their dedication, along with the rest of the nuclear enterprise that forms the basis of the Nation's deterrent. That's an important mission for us and, as I tell our people every day, perfection is the standard.

We also saw Airmen in that video who conduct satellite, space launch and other space operations. This command wields capabilities that enable our Joint commanders to know more about their adversaries, to see the battlefield more clearly, and to strike more quickly and precisely than ever before. Space capabilities provide intelligence that would otherwise be lost, warning that would otherwise be undetected, and communications that would otherwise be impossible.

Space is no longer just the high ground, it is an integral part of the Joint fight. Today, space capabilities are embedded in a complex of systems that serve forces and commanders at every level and that span the spectrum of diplomatic, informational, military, and economic activities. And they do this from peace through crisis and war. Today, in Air Force Space Command, we are clearly active participants in the Joint fight that we are waging in overseas contingency operations. The capabilities we present have shaped the American way of warfare.

You also saw other Airmen in the video operate in cyberspace, with all the opportunities and challenges that suggests, and who will soon pick up lead command responsibility for United States Air Force cyberspace activities.

We're really excited about what is happening at Air Force Space Command. I think most of you know that we made some decisions in this Air Force that have directly impacted the command. For example, we are moving the ICBM force out of Air Force Space Command and into a command that we are standing up called Air Force Global Strike Command. We are also moving lead command responsibilities for cyberspace into Air Force Space Command and standing up an operational command for cyberspace within Air Force Space Command.

These are exciting times for sure. We're taking decisive steps to position resources and people to meet the challenges that America will encounter in the vital domains of space and cyberspace.

I'm reminded that Newsman David Brinkley once remarked that he was worried that we may be approaching the point where we have more people willing to make speeches than we have people willing to listen to them. I hope that's not the case this morning. In fact, a few minutes before I came in here, (...) someone said, "Gee, I hope the speaker is good this morning," and I said, "I hope so, too!" So we'll see.

I need to thank the Space Foundation once again for bringing us together here in Colorado Springs to discuss the important issues we have in the National Space Enterprise. I'm a little intimidated to follow the panel we just had, because I will talk about the theme of the conference as well - that's "The Next Space Age." I think since it is the 25th anniversary of the Space Foundation, it is important and fitting that have that conversation.

No question about it, our world has changed drastically thanks to the accomplishments of the first space age. Some people say we are already in the third space age. I'm not going to do that. Let's just call all that went before today the first space age. Let's take the theme of this conference from today forward into the next one. That's easy enough for a guy like me to understand. I think we will see equally drastic changes with the accomplishments of the next space age. As we saw with the award recipients last evening, space has always been a place of inspired technological advancement and human searching. It is also a place of serious national security activity. Given the suit I wear that's

what I am going to talk about today and I will confine my remarks to some issues with national security in the next space age.

The United States Air Force has played a very key role throughout the first space age. Just to name a few examples, Space launch vehicles that formed the basis of the later Mercury flights and all the Gemini flights came off of the drawing board of Gen. Bennie (Bernard A.) Schriever's team in the Western Development Division - today's Space and Missile Systems Center in Los Angeles, Calif. Commercial satellite communications advanced in a great many ways due to the work done on military satellite communications also at SMC. And, of course, no one questions the value of GPS to the entire world. I would offer that GPS has even become its own word - it's no longer an acronym. When you get that kind of positioning, as my corporate friends would tell me, you've got something. That's the U.S. Air Force that's doing that. I like to remind people of that. I think our accomplishments are down farther on the list than they should be.

So, looking at the next space age is important to us in the Air Force, not only because space is important to national security, but because we know we will once again play a key -- albeit a different role as we develop the next space age.

At this point, I was going to haul out my crystal ball, and I was going to tell you precisely what the next space age will be like. Unfortunately, my aide left the crystal ball back at the office. It's not my fault, of course. But even if we'd brought the crystal ball, I don't think it could tell us all the things that we're going to need to know as we get after the issues of the next space age. So, that's probably better anyway.

No one can define with certainty what the next space age will look like; instead, let's take a few minutes to do this the old fashioned way. Let's look at this the way we planners like to do it and look at the trends, and then we audit that against where I think we're going to go in the future. So let's take a look at global space and cyberspace trends.

We have come a long way from the middle of the 20th century, when the space race began between the Soviet Union and the U.S. We can all be thankful we've come a long way from that point in time. The Cold War ended, and again, thankfully, it ended peacefully, which was the objective all along. Many of you will remember that was a time when the requirement that formed the basis of the space race was "win the space race at any cost," and we invested a large amount of the national treasure to do just that.

We weren't quite sure where we were headed, but we had a group of visionaries who recognized the scientific, technical and, yes, the national security potential that was to be gained from space. We knew that it was the high ground, and we knew we had to establish our presence. We recognized the national security challenges we faced in the Cold War. We confronted a large, superpower with nuclear arms. They threatened our national survival. There were important areas and activities that we needed to observe without hindrance. There was a very high likelihood that a surprise attack could occur. The enemy was deployed over global distances and threatened us in many places. Of course our number-one task was strategic deterrence.

As a result we invested in communications systems, weather platforms, surveillance and reconnaissance platforms, and we developed GPS - all space-based solutions for the problems of the day. As time passed and the Cold War ended, we demonstrated how those same capabilities could be used to revolutionize tactical operations. We saw the beginnings of that in Desert Storm, and we see that opportunity to use tactical operations throughout the operations we are conducting in contingencies around the world today. Now, in the 21st century, it is no longer two nations trying to one-up each other for national pride or strategic advantage. That doesn't form the backdrop for the next space age.

As I said, I don't have a crystal ball, but I see a future national security environment that is far more uncertain, far more complex and far more changing than ever before. Last November, Joint Forces Command published an intriguing document called "The Joint Operating Environment." That document gives a perspective on future trends, shocks, contexts and implications for us as we look to the future - kind of like the discussion of the last panel. It clearly states that no one can predict the future, but it lays out some considerations for us as we try to go to the future.

Much of what we have known of crisis and conflict over the ages will be the same - (Carl) von Clausewitz would recognize it in some cases. But much will be different. Let me quote this document for a moment because I think this is important: "The next quarter-century will challenge U.S. Joint forces with threats and opportunities ranging from regular and irregular wars in remote lands to relief and reconstruction in crisis zones, to sustained engagement in the global commons."

That last part in particular caught my eye when that document came to Air Force Space Command a couple of months ago. Because the global commons certainly includes space and cyberspace and maybe in the future will be dominated by space and cyberspace. It goes on to say the causes of conflict will vary, enemy capabilities will range from precision-guided, long-range (inaudible) weapons to suicide vests, the threat of mass destruction will expand and, significantly, that "it is impossible to predict precisely how challenges will emerge and what form they might take."

We already see challenges in space, and we see them equally in cyberspace. Space is a place of intense growth, with nations, consortia and private companies joining the ranks of space-faring and space-capable nations. Space capabilities are becoming more accessible to people all over the world. We see an increase in the demand for space capabilities.

As the technologies for space have advanced, we have also seen a rapid increase in the accessibility of those services and in the accessibility to cyberspace. Of course, cyberspace is where all the operations that support our daily lives reside.

Computers and access to the Internet are everywhere, in homes, businesses, schools. We see the growth in space in ways we did not imagine at the beginning of the space age, and we'll see the growth in cyberspace in ways we do not imagine as we sit here today looking forward. The benefits of these capabilities are enormous to the entire human race, and we welcome the improvements in our lives that space and cyberspace have delivered. But, as I say around my command sometimes, the old Chinese saying, "May you live in interesting times" does not apply to us. We're not paid to live in interesting times - we're paid to deal with interesting times. The Nation asks us to do that. But, there are two sides to this discussion. While farmers incorporate GPS for "precision farming," to increase their crop production, we have seen others trying to jam GPS.

Communications systems enable people around the world to do business in ways once thought impossible, but we have seen commercial communications satellites jammed. And, as many in the audience cannot live without a Blackberry™ and a cell phone. I'm probably one of those people, and my wife is really one of those people. It's amazing when you buy a person a Blackberry™ in self defense what happens. We have seen terrorists plan attacks using commercial (satellite) imagery, communicate during these attacks on their satellite phones, navigate with commercial GPS receivers, and get intelligence updates via the local news on their personal handheld devices.

We must face the reality of the global trends in space and cyberspace.

The amount of on-orbit objects is growing. More satellites are on orbit today. Every time a satellite is launched, rocket bodies, explosive bolts and various pieces of debris are intentionally left behind adding to the catalog and contributing to the problem we have. We are starting the next space age at a very, very different point than we started the first one.

Cyberspace is a dense, urban environment. People are shopping, going to school, to work - they are traveling and conducting banking business. Everything you can do walking down a street in downtown Colorado Springs, you can do in cyberspace. We need to be mindful of the problems, the challenges and the opportunities that portends for us. Because cyberspace is not only a dense urban environment, it's also a contested environment. Access is simple, a laptop and a wireless connection gives you access and entry to the entire world. Every day, someone tries to exploit our weaknesses in cyberspace. If they can do it, the asymmetric advantages to be gained in this domain are great. Therefore, a potential adversary will not ignore that.

In cyberspace we see criminals, vandals, and spies, and determined nation-states conducting nation-state business. So we can, and do expect to be challenged in both space and cyberspace. We see the global trends as an increase in users, an increase in capabilities, and an increase in challenges. So with that as a backdrop for the next space age, what do we do? How do we shape this? How do we account for the next space age? And what does it look like?

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I'm not a futurist - thank heaven for that. I wouldn't be very good at it. But I will tell you that we're very attentive to those who are, and with these trends we see emerging, we can begin to see that the backdrop will be dynamic and uncertain. Flexibility and agility will be required. We have to started to come to grips with what I have begun to call the "spherical battlespace."

I uttered those words out in front of my staff and got the "stunned mullet" look...they said, "Yes, Sir." and I left. (laughter) So what does that mean? I'm not sure yet. I'm starting to think that we are looking into the future of space and cyberspace in the spherical battlespace. For our purposes today, let's confine ourselves to the area beginning at the geostationary distances from the Earth and extending down. For far too long we've looked at our conception of future battlespace as standing on the ground looking up. That might be the wrong way to look. So, bear with me for a minute, and maybe I'll stop getting that "stunned look" from all of you. (laughter)

This battlespace includes cyberspace and has different boundaries. It's about boundaries between Kepler and Bernoulli. It's about legal boundaries. It's about moral boundaries. It's about other boundaries that act on those domains and in that battlespace that we will have to contend with. In this spherical battlespace, orbital mechanics and electromagnetic laws rule, straight-line thinking no longer works, objects are always in motion, never at rest. Never at rest. Information is plentiful and actors can be anonymous.

This is a physical environment acted on by physical forces and environmental disturbances. The speeds are incredible. The closing speeds in the collision between the Iridium 33 and the Cosmos satellite approached 11,000 meters per second. A 30-06 round (a .30 caliber rifle round) goes downrange in about 1,000 meters per second. In my book, in a non-technical sense, that's pretty fast. Time and distance, therefore in this battlespace have completely different meanings.

This presents us a challenging problem set, and we do not have the luxury of simplifying the problem by focusing on one geographic part of the Earth at a time. The spherical battlespace is constantly changing as on-orbit objects transverse across a volume that is 6,000 times greater than the airspace of the Earth below it.

In the next space age, we must completely understand the domains of space and cyberspace. We're going to have to properly integrate the two - something that will fall on the shoulders of Air Force Space Command. We're going to have to be responsible to the needs of Combatant Commanders and other national users who may be engaged across the spectrum of conflict or in non-military contingencies, and maybe both at the same time, at any time. We must fully understand emerging Joint operational concepts as well as a dynamic operational environment that will be increasingly contested.

We will have to provide space, cyberspace and related capabilities that are integrated with other warfighting elements...and these capabilities must be protected. We must have better situational awareness of space and cyberspace. We will have to attract, develop and retain America's best talent.

We will have to have better engineering. Every launch vehicle and spacecraft that sheds its parts on purpose is contributing to the debris problem. And I'm going to make that your engineering problem. Because as we look to the next space age, we will not have the luxury to operate the way we have operated in the first space age.

We will need a miracle or two (or maybe more). For example, we're going to need better propulsion, better power, better plug-and-play technology. We're going to need better sensors that are smaller and lighter weight. We're going to need launch vehicles that we can assemble in a different way and get to orbit in a different way. We will need stronger partnerships in the next space age both within and outside of government and across governments.

We take on these ventures, knowing that our resources are constrained and our economy has been stressed -- two conditions that did not exist at the beginning of the last space age. The cost of new weapons programs has significantly increased while the share of the federal budget dedicated to defense spending may decrease. Sustaining and developing the future force will be challenged by fiscal realities that we must acknowledge and overcome.

The sky will not be unlimited in terms of our fiscal considerations as we enter the next space age.

The key to dealing with constrained resources lies in transforming our acquisition processes. With continued concerns over cost, schedule and performance, Air Force Space Command will require new approaches to rapidly produce the capabilities needed in the Information Age. As we say around our command, we must provide capabilities to the warfighter at the "speed of need." But, herein lies yet another challenge: our defense industrial base is facing serious issues.

A strong industrial base is critical to the vitality of defense, intelligence, civil, commercial and allied space and

cyberspace systems that support national security. Numerous studies indicate the space industrial base, in particular, is on a downward trend. That is not to say that they don't produce amazing products with incredible capabilities - they do. But there are issues in the industry we've got to be mindful of. There is a crisis in the workforce with estimates projecting a shortfall in experienced scientists and engineers who support space science and technology development. At the advent of the next space age, we must take all these challenges into account.

We have to engineer better, operate better and properly define and meet the requirements of the Joint warfighter. Those will continue to change at a rapid pace...they will not stop. We will continue to provide the Joint commanders with game-changing capabilities that they need. Our Nation depends on us to do that. We depend on you in industry and academia and from the other places that we draw the talent and wherewithal to go into the next space age. We have made a commitment to the Joint warfighter...and we will deliver. This is the essence of our vision. Every day, our professionals work tirelessly to ensure the combatant commanders can call upon a varied array of space capabilities. We will continue to effectively and efficiently deliver capabilities to meet those requirements, to support operations across the spectrum of conflict.

We recognize the challenges we face and are working to overcome and prosper in this demanding environment. And I am confident...confident in our Airmen, confident in our commanders, confident in our industry partners, confident in you, and confident in our ability to continue to provide the best space, missile and cyberspace capabilities our Nation requires. We're going to meet the challenge of protecting the American people, their livelihoods and interests with utmost precision at the moment of need.

It is a pleasure for me to be here with you. I cannot tell you how proud I am of Air Force Space Command. Every member of AFSPC shares the privilege of serving the nation and our Air Force. Our team provides the most capable and remarkable military space, missile and cyberspace force the world has ever known. Our challenge is to ensure that those who come after us will be able to say the same thing.

I thank each of you for your continued support of our young men and women in uniform.

Thank you again to the Space Foundation for inviting me to speak.