

AIRMY WARFIGHTER PANEL

SPACE CONTRIBUTIONS TO THE WARFIGHTER

The following edited text was taken from the warfighter panel chaired by U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's Deputy Commanding General, BG Kurt S. Story, at the 11th Annual SPACECOMM Defending America Symposium. Other members of the panel included: MAJ Ty Hensley, Support Company Commander, 10th Special Forces Group (Airborne); 1Lt Patricia S. Rodriguez, Deputy Flight Commander for Plans and Resources Flight in the 60th Communications Squadron; SFC Douglas A. Wilderman, GSC Signal Detachment Sergeant, 10th Special Forces Group (Airborne); and CPT Jeffrey Fish, Detachment S6 for the 10th Special Forces Group (Airborne).

Space Mission Areas

Fig. 1

- Space Force Application
- Space Control
- Space Support
- Space Force Enhancement
 - Intelligence, Surveillance and Reconnaissance
 - Environmental Monitoring
 - Satellite Communications
 - Space-based Positioning, Navigation and Timing
 - Missile Warning

BG KURT S. STORY:

Today I have the honor to chair a panel of Army and Air Force warfighters, some of who have recently returned from Iraq. SFC Wilderman returned from Iraq on Monday of this week, so he's still got mud on his boots. They're going to share some of their experiences with us this morning in regards to how Space enabled them to be able to carry their fight to the enemy. They are going to talk about how friendly force tracking, satellite communications and ISR (intelligence, surveillance and reconnaissance) enabled them in real missions and they'll provide you some very clear examples.

I think most of you are familiar with Joint Pub 3-14. Joint Pub 3-14 was recently signed on the Jan. 6, 2009, and these are the mission areas (Figure 1) that you see reflected in the new version, the JP 3-14. No major changes in these mission areas. Today though, we are going to focus in on Space force enhancement mission area and how those Space force enhancement functions enabled these Soldiers to be successful on the battlefield.

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Fig. 2 Fulda Gap Defense – 1990



Fig. 3
Iraq – 2008 Current Space Enabled Battle Space

The importance of Space operations increasing is due to its enabling capabilities and the recognition of these enabling capabilities. Space operations multiply force strength, combat power, and allow freedom of movement across the battlefield. So, as I've said, Space force enhancement is a significant force multiplier.

When it comes to enabling dominant land power, if you “see first, understand first, act first and finish decisively,” you’ll understand what Space is allowing us to do in terms of dominating land warfare. For the foreseeable future, our Soldiers are going to engage in full-spectrum operations. Space will allow our Soldiers to dominate full-spectrum operations. Not survive, but dominate full spectrum operations.

I’d like to give you a quick example in regards to battlespace and how Space enables the domination of that battlespace. On a map of Germany from the Cold War era (Figure 2), you’ll see a red line that is the interzonal border between what was West and East Germany. The red portion was the frontage that was covered by the 11th Armored Cavalry Regiment. It was a 368 km front. Now this was a symmetrical battlefield, linear, and it had contiguous battlespace. At that time, pilots in the 11th Armored Cavalry Regiment would fly their helicopters patrolling the border using line of sight communications, 1:150,000 scale maps, and they’d have to pop up to do position reports because there was no friendly force tracking.

The next map (Figure 3) shows you Iraq. And it shows you the orange and the yellow shaded portions are the battlespace occupied by the 3rd Armored Cavalry Regiment on separate deployments to Iraq. You can see that we’ve superimposed on this the 368 linear border from Germany, as well as in green, the state of New Jersey. This gives you an idea of how Space has enabled us to expand our battlespace. This is an asymmetrical threat on a non-linear battlefield.

At this time I’d like to turn it over to MAJ Hensley who is going to talk to you about the role of the special operations Soldier.

MAJ TY HENSLEY:

I appreciate the opportunity to come and speak to you all today. The remainder of the panel members here worked in the Combined Joint Special Operations Task Force in Iraq for the last seven to eight months. On my part, I’m going to talk about special operations, specifically Army special operations, to give you an idea of what our warfighters look like on the ground. I’ll give you a brief overview of the organization; go into a little detail on the Special Forces Soldier and then the heart of the Army Special Forces, the Operational Detachment Alpha, or “A team.” Then I’ll talk a little bit about Special Forces missions.

The Army Special Operations Command is a component of U.S. Special Operations Command out of Tampa, which is represented by the four different services of special operations. The second tier of blocks (Figure 4, page 28) shows some of the Army special operators, the 75th Rangers, the psychological operations group, and the third tier down below shows our civil affairs element and our special operations aviation. As a Special Forces Officer, I’m going to remain biased to on the third tier on the left side our U.S. Army Special Forces Command and or Green Berets.

I’d like to give you a quick look at what the average Special Forces Soldier looks like. He’s a little bit older, a little bit more mature than a normal Soldier. We ask him to be. He’s specially selected and trained. He’s culturally attuned and we ask them to be independent thinkers. They speak at least one foreign language and we ask them to go anywhere in the world to be able to operate and carry the flag for the United States.

Now those Special Forces Soldiers make up the backbone of Army Special Forces, the “A team.” The “A team” is a twelve man element commanded by a Special Force Captain. A Senior Noncommissioned Officer is the team sergeant, and then the Special Forces team is made up of two each of the following specialists: weapons, engineer, medical and communications. These guys spend up to two years training at Fort Bragg to learn their trade to be able to go and serve on a Special Forces “A team.”

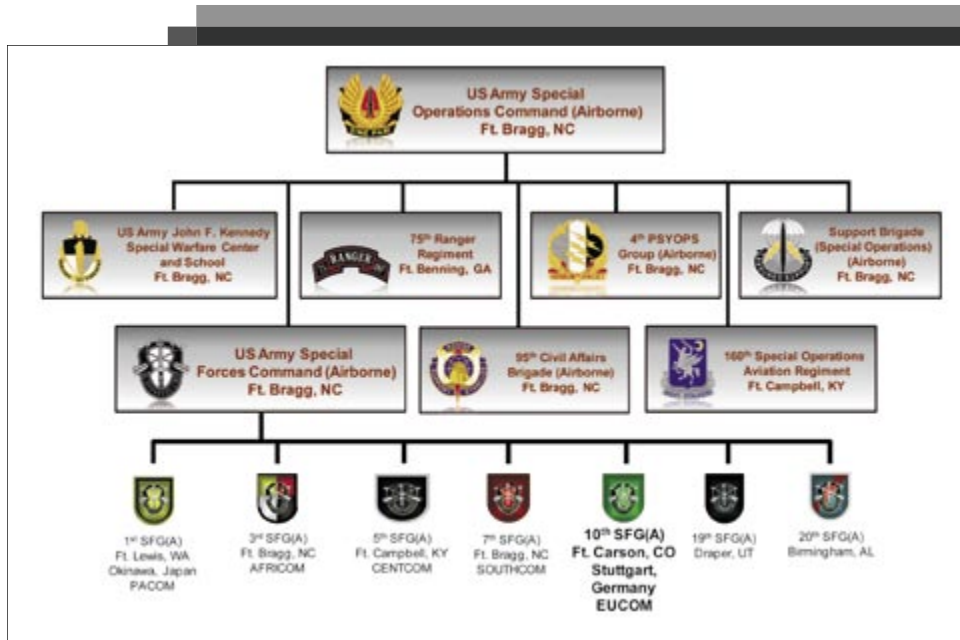


Fig. 4
Command Relationships

Once they get to that “A team,” that old crusty master sergeant goes ahead and whips them into shape so that they’re combat ready and turns them into a specialized and cohesive unit.

Now we can deploy this twelve man team anywhere in the world independently and they can be self sufficient. They have the medical guys, they have the communicators and they have the engineers to be able to build stuff, fix stuff and talk to people. It’s important to point out that this twelve man team may sometimes be the only twelve guys wearing the uniforms and carrying the flag for the United States in a particular country. Other times, we’ll move multiple formations or multiple Operational Detachment “A teams” into country, at which time they’re command and controlled by what General Story alluded to, a Special Operations Task Force. In Iraq and Afghanistan it is a combined Joint Special Operations Task Force. Special Operators from each of the four services and from multinational forces are represented within that task force. The remainder of the panel members are the folks that provide that echelon of command and control to make sure these twelve guys can do their job on the ground.

Some of the advanced skill we ask our Special Forces guys to learn and be able to execute from military freefall operations or jumping out of the plane. (Figure 5) We also ask them to be dive qualified so that they can work in littoral areas and maritime operations. And then I’ll put in a plug for our 10th Special Forces Group here in Fort Carson, in Colorado Springs, the premier element for cold weather and mountain training in U.S. Army Special Operations.

These are the five core missions of the Army Special Forces. Unconventional warfare is warfare by, with and through a host nation force. Then foreign internal defense is really what our predominant mission is these days in places like Iraq and Afghanistan. We’re working with foreign governments, national defense forces to protect their citizens from aggressors. Special Forces are often talked about as a force multiplier. One twelve man Operational Detachment “A team,” is suppose to be able

to go in and link up with, and operate with, a battalion or brigade sized element of host nation forces. Those are the kinds of things that we’re doing on the ground today.

As I alluded to before, and I’m near to closing here, several echelons of support are required to make sure our Special Forces guys can do these missions. In Iraq and Afghanistan that command and control is provided by the Combined Joint Special Operations Task Force. That task force provides the backbone, the logistical, the technological and communications support required for our guys to work on the ground.

I’ve been in Special Forces for ten years and in that ten years, I’ve noticed a dramatic improvement in the equipment and technology provided to the Special Forces Soldier, which greatly improves our battlefield awareness, our lethality and most important to me, our survivability on the battlefield. If you can imagine a twelve man team outside the wire, working in austere locations, it’s great to have, I’ll use your cliché, the “eye in the sky” or that communications reachback that can go anywhere in the world to make sure these guys are safe and can bring effects on the battlefield.

I’m going to go ahead and turn it over now to First Lieutenant Rodriguez. She is going to talk about some of those communications and critical SATCOM based systems that are so important to our Special Forces Soldiers on the ground. She worked at the Combined Joint Special Operations Task Force J-6 or communications shop during this most recent Iraq deployment for 10th Special Forces Group.

1 Lt PATRICIA RODRIGUEZ:

When people think of communications, the most common assets that come to mind are telephones, internet and radios. My primary mission back at home station is to make sure communications are up so that the planes are in the air. Once the planes take off, we refocus on other missions.

My first deployment was to an Army unit. I had to change gears from providing support to the air, to the ground troops. I

Fig. 5 Advanced Training

- Special Forces Advanced Urban Combat (SFAUC)
- SF Advanced Reconnaissance Target Analysis and Exploitation Techniques Course (SFARTAETC)
- Special Operations Target Interdiction Course (SOTIC)
- Military Free Fall (MFF)
- Combat Diver Qualification Course (CDQC)
- Cold Weather Training (CWT)
- Special Operations Mountaineering Course



served as the future plans officer while I was deployed. I had to plan network infrastructure to new facilities. I also had to plan the implementation of SATCOM systems across the theater. When a new SATCOM system or an upgrade to an existing one came down from higher headquarters, I had to make sure we had all the required equipment and I would get with our technicians to make sure to test the equipment. We wanted to make sure the systems actually worked and would be utilized by our team guys. To make sure the team guys can use the SATCOM systems, we also sent our technical experts to show them the capabilities the systems can provide.

Two of the projects I was responsible for were intelligence, surveillance and reconnaissance feeds through Global Broadcasting System and our Blue Force Tracker (Force XXI Battle Command Brigade and Below). We'd received live feeds from unmanned aerial vehicles. These vehicles would fly up in the air and take live video footage from the battlefield. The video feed would then shoot up through the Global Broadcasting System satellite link, and then send the signal back down to our operations center. This live video streaming provides the commander "eyes on target" and live battle updates. This also provides the commander real time situational awareness.

FBCB2 is our Blue Force Tracker which shows all the friendly forces in the battlefield. It ranges anything from planes to vehicles. The FBCB2 equipment sends the information via satellite back to the United States to be translated, and then sends the information back down to the ground forces with real time friendly positions. This decreases the friendly on friendly contact and also allows our team guys to get assistance if needed.

I realized when I was deployed how close the Space and communication careers fields are to each other. It's funny since I wanted to avoid the Space career field like the plague when career selections came down. I also realized that delivering communications to the team guys is much more than just giving them connectivity. We have to know how the communications are being delivered, if they can be utilized, and take into account all

echelons, especially the team guys on the ground.

Internet and radios are important, but Global Broadcasting System and FBCB2 are our lifelines. They enable the amount of missions we can conduct, and without the SATCOM capabilities, our team guys would be dead in the water.

SFC Douglas Wilderman:

As they told you, in the last three days, I arrived back; I'm still a little jet lag so excuse me if I start to waiver here. I just arrived back from Iraq where we served as part of the combined Joint Special Operations Task Force, Arabian Peninsula. My detachments mission there is to support the entire theater special operations with all communications, intelligence, surveillance and reconnaissance, FBCB2, Blue Force Tracker, soft deployable node mediums, command posts of the future and a whole lot of other acronyms.

When I was asked to come here, I really didn't know what to say at first. So I thought I would just tell a little story about some things that have happened. We always joke that we fought this war in the beginning on three SATCOM nets, which we did, but it was soon after that, we began to see American ingenuity at its very best: intelligence, surveillance, reconnaissance birds started to dot the skies. Blue Force Tracker, FBCB2 appeared in every vehicle. And this equipment was allowing us to do our jobs faster and better. We quickly realized the extreme importance of being able to have virtual eyes along with the real eyes on the battlefield, which we had relied on for so very long in special operations.

In late 2004, our unit received its first global broadcast system which was the platform that we received the intelligence, surveillance and reconnaissance on. It was kind of handed to us in a box. We really didn't know what to do with it, and a couple of my super smart kids put it together and made it work, which again comes back to the American ingenuity. This was the beginning of the actualization that these systems, although they were powerful by themselves could be used together to

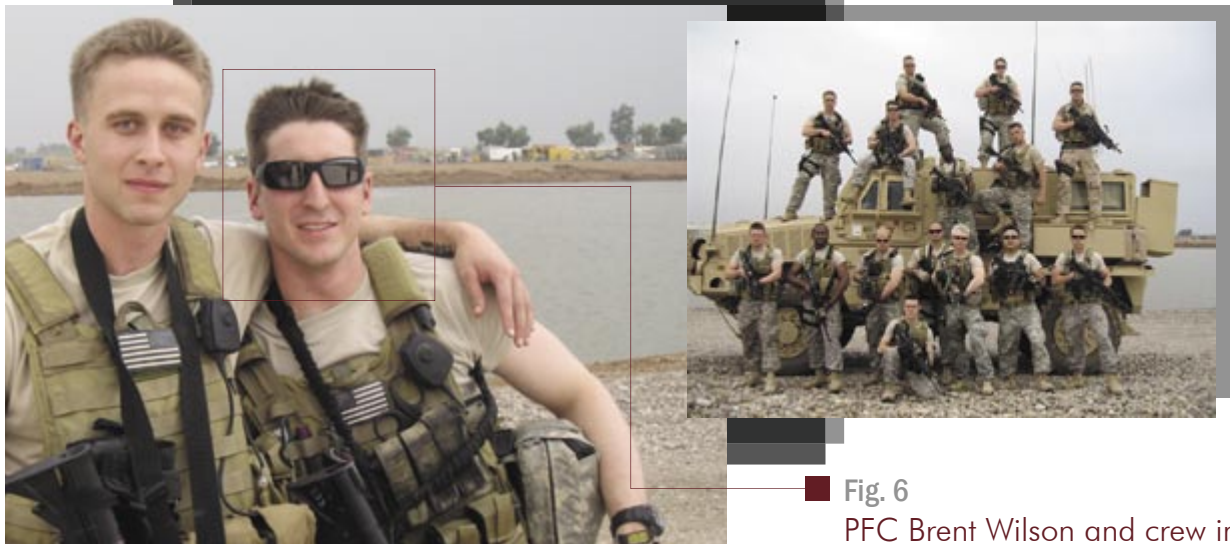


Fig. 6
PFC Brent Wilson and crew in Iraq.

deliver a crushing, deadly, surgical, precise blow to the enemy, while at the same time putting less lives in danger and decreasing collateral damage. Over the past three years, these systems have highly evolved from being two completely separate systems into a synergistic relationship that when used completely, potentially enables commanders the ability to virtually be everywhere on the battlefield at any given moment.

Intelligence and targeting could be done in days, not in weeks. Some trigger targets could be eliminated almost on demand through the use of internet relay MIRC (Military Intelligence Reserve Command) chat, flash messaging, FBCB2, and the ability to monitor intelligence, surveillance and reconnaissance, we could alert ground forces of “squirters” and other dangerous situations. We could give joint tactical controllers and tactical controllers the ability to call for close air support and emergency close air support by using precision GPS information that was provided by Blue Force Tracker, the One System Remote Video Terminal and the Medidata. Each day we use these key elements to build the mission data for the concepts of operations to build the overall picture of the battlefield, which includes the combination of radio, intelligence, surveillance and reconnaissance, One System Remote Video Terminal, Blue Force Tracker and FBCB2.

Now I'd like to talk about what I really came here to talk about. All this stuff which we use every day, in great detail, the multitude of it, it really talks about the story that I'm going to tell you now. And you'll have to excuse me, but I get a little choked up every time I tell it.

The story begins with a young Private First Class Wilson (Figure 6). Just like any other father, as it is being the platoon sergeant, I look at him as my son, and everything that he does makes me proud. Well there was a particular day that I was the proudest that I could be. It's like watching your son throw a touchdown for the first time, or see him drive off in the car with his brand new license in his pocket, and the two dollars burning a hole that he's going to spend on his girlfriend.

Private Brent Wilson came to me from Arizona. He just got

here right before the deployment, and he was pretty wet behind the proverbial ears as most people would say, having never been in combat and only seeing movies. I took Brent into our family and his sergeants and I began to tell him the stories and mentor him, and train him, and lead him down the road to combat. But there is no way to really prepare your son to see the things that you see, or do the things that you do. He would put his life in danger. That was a fact. Others would put their lives in his hands. That was a fact. We had no idea what was to come.

It was Aug. 10, of this past year. I was sitting in my station just outside of the operations cell where we monitor the radios FBCB2 and intelligence, surveillance and reconnaissance. I was listening to the normal day of radio chatter as there were seven or eight teams outside the wire conducting operations at any given moment, when I heard PFC Wilson call out “troops in contact.” This is a term that we coined at the beginning of the war that we all knew was going to send shivers up our spine, cause we knew it was our brothers out there, our sisters out there who needed us.

He was alone in the operations cell and I ran in to help him. To my surprise he didn't need my help. He went straight into action. It's like watching your son for the first time do something that you had shown him once upon a time and never thought that he had listened. He took the entire situation into his hands.

There was a unit outside the wire just outside of base that was being engaged by the enemy. PFC Wilson had seen it on the intelligence, surveillance and reconnaissance feed that we were monitoring. He quickly jumped on the radio noticing that there was a fault, understanding what that fault was, he jumped on the radio and began to relay information to the team that was isolated from its headquarters. He used the FBCB2 to quickly find the grid location of the unit that was being engaged. They were taking small arms fire and mortar fire. One of the trucks had been destroyed and the communications equipment in it was destroyed also. Brent knew that he had to get a message to them to tell them to come up on a different net or they were probably going to perish. They had no way to contact a Quick

Fig. 7 Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance

<p>ISR</p> <ul style="list-style-type: none"> • GBS • OSRVT • ROVER III • ROVER 	<p>SATCOM</p> <ul style="list-style-type: none"> • PHOENIX • DCET • SDN • SDN-M • BGAN • PRC-117 • PSC-5D • PRC-152 • INMARSAT • IRIDIUM 	<p>C2</p> <ul style="list-style-type: none"> • GBS • CPOF • FBCB2 • C2PC • MIRC chat • PSC-5 • SOTM
<p>NAVIGATION/ TIMING</p> <ul style="list-style-type: none"> • PLGR • DAGR 		



Reactionary Force, or anyone to come and help them. PFC Wilson then scrambled to the FBCB2, sent out a flash message, connected with the unit, and was able to direct and command the entire recovery of the unit that was being engaged.

The point of the story is that due to the fact that PFC Wilson had possibly listened to someone at some time, he was able to use all the assets that he had at his fingertips to develop a plan in a quick moment, and his actions led to the capture of four enemy combatants, and saved the lives of twelve of his brothers who were being engaged that day. This is the real story. The real story is that PFC Wilson was able to utilize these assets that three to five years ago only generals and colonels had access to. As a result, no flags will be folded, no mothers will grieve these sons, and this is the reason why we are here today ... all of us. We're here to make sure that we move forward, that we continue the efforts to better the equipment and to deliver it to the warfighter on the ground, the smallest element available, the PFC Wilsons, the privates on the ground. I'd like to close by borrowing a little phrase, a piece from Theodore Roosevelt when he said, "the credit belongs to the man in the arena. His face marred with dust and blood, for he's the doer of deeds."

Thank you for your support. Thank you from the battlefield. With this I'd like to give it over to Captain Fish.

CPT JEFFREY FISH:

I'd like to talk a little bit today about the Space enabled Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance, which the Special Forces use. I'll then go into a little bit of future applications and then we'll wrap up with some challenges.

Here (Figure 7) is an alphabet soup of systems. I'm not going to talk about all of them, just the three that are highlighted. Special Operations Forces operate in a geographically distributed environment almost exclusively dictating a dependency on SATCOM. For example, in Iraq we operate from northern Mosul all the way down to southern Basra, across five multinational divisions. Talk about a nonlinear battlefield. Line-of-site com-

munications have limited applicability for most of our operations. We do use them, however it is fairly limited, even from an operational detachment to a company.

In our deployed configuration, we do integrate assets from the Navy and both the Naval Special Warfare Task Group, the SEALs, as well as some SEEBIES, with the Air Force, with the Combined Joint Special Operations Air Component, and our Tactical Command Posts and Joint Tactical Ground Stations. One of the reasons I put up this slide of alphabet soup is actually to give you a broad overview of each of the systems we have down at the lowest operational level. At our team level, two people have the opportunity or have the responsibility for installing, operating and maintaining most of these systems. Unprecedented and quite a challenge for not only somebody who goes out on missions and kicks down doors, but also has the responsibility to enable those communications for that operational detachment.

It was mentioned both by Lieutenant Rodriguez and Sergeant First Class Wilderman the importance of the Global Broadcast System as a combat multiplier to folks on the battlefield. It has a very important role in synchronizing operations by developing a common operational picture, meaning each level of command has the same real time, eyes on a visual picture. In fact, we are just now finishing up installation of our Global Broadcast System or the ability to view every intelligence, surveillance and reconnaissance platform down at the company level. Company commanders can see the exact same thing as the Multinational Corps – Iraq commander can. That enables a company commander an incredible amount of power to command and control his forces that have never been seen before.

Further, using our One System Remote Video Terminals, and our Rover 3s, the team approaching their target and getting ready to do their mission can see exactly what's happening on the ground before they get there. That makes Special Forces an even more dangerous force. With fifty plus teams, operating in Iraq currently, each commander has that hard, fast requirement to be able to command and control his own elements because

Fig. 8
Space Support to Future
Combat System (FCS)

Communications

- Transformational Communications Satellite (TSAT)
- Mobile User Objective System (MUOS)
- Advanced EHF (AEHF)
- Wideband Global Satellite (WGS)

Position, Navigation, and Timing

- Global Positioning System, Block III (GPS-III)

Environmental Monitoring

- National Polar-Orbiting Operational Environmental Satellite System (NPOESS)

Intelligence, Surveillance and Reconnaissance

- Space Radar (SR)
- Distributed Common Ground Station – Army (DCGS-A)
- National Systems

Theater Missile Warning

- Space-Based Infrared System (SBIRS)

the battalion could be quite busy watching quite a few intelligence, surveillance and reconnaissance feeds. It gets worse the higher up you go, so it's quite, quite important to have it there.

The next thing I'd like to talk about is one of our newest systems that we have fielded over the last couple years. The Broadband Global Access Network, or BGAN, is an INMARSAT based system utilizing the Thrane and Thrane antenna with a Hughes modem and of course we encrypt it. The BGAN and 117 are tied to our growing bandwidth requirements or the informational needs of the operational detachment level.

Back to the BGAN, we use them with a wide variety of applications. First and foremost we started using them in our Jump Tactical Operations Centers. Whenever a commander would go forward and have to set up another operations center, we would send them out with one of our BGANs so we'd have connectivity and some communications broadband in austere locations. We then started to actually distribute them down into the lowest common level, down to the operational detachments. This was necessitated by use doing split-based operations, where instead of it being a full twelve man team on one location, they might split their forces and go to two different locations and that hard requirement for Secret Internet Protocol Router, or SIPR access is required. It can also be used as a primary platform for SIPR at a team house or for a team location. And, the latest and greatest thing that we're actually using BGANs for is SIPR at the quick halt.

The next thing I'd like to talk about is actually something we're getting ready to receive soon in March. It's a PRC 117 Gulf. As I was coming in and perusing around today, it's actually featured out here in one of the booths, and we're actually very excited to get this for our growing bandwidth requirements. It's a multi-band, multi-mission radio, operating from 30 megahertz to two gigahertz. It has interoperability with most of our radio communication systems that we have in the soft inventory. One of the key features that we love about it is it's a lot lighter than what it's replacing which is always important when you're putting

a radio in a rucksack. It has some pretty decent power output so you don't have to carry an amp, and it has fairly significant data rates and some very interesting waveform propagations. So, we're looking forward to integrating that in March and integrating that with our current SATCOM-based systems.

One of the future applications of Space-based systems is biometrics. It's coming and it is right around the corner. In order to effectively accomplish this task, or to do biometrics on the objective, three things are actually going to be required. First is going to be broadband SIPR on the move. When I talk about broadband SIPR on the move, it's very, very important to transmit large files, when we're actually talking about sending up finger prints, retinal scans or sending information forward, that broadband SIPR on the move or at the objective has to be accomplished.

Next thing is high bandwidth SIPR connectivity to the Operational Detachment "A team" – something beyond our current capabilities. It is very important so we can synch near-real time data, and have those transmissions get back to the database to be searched.

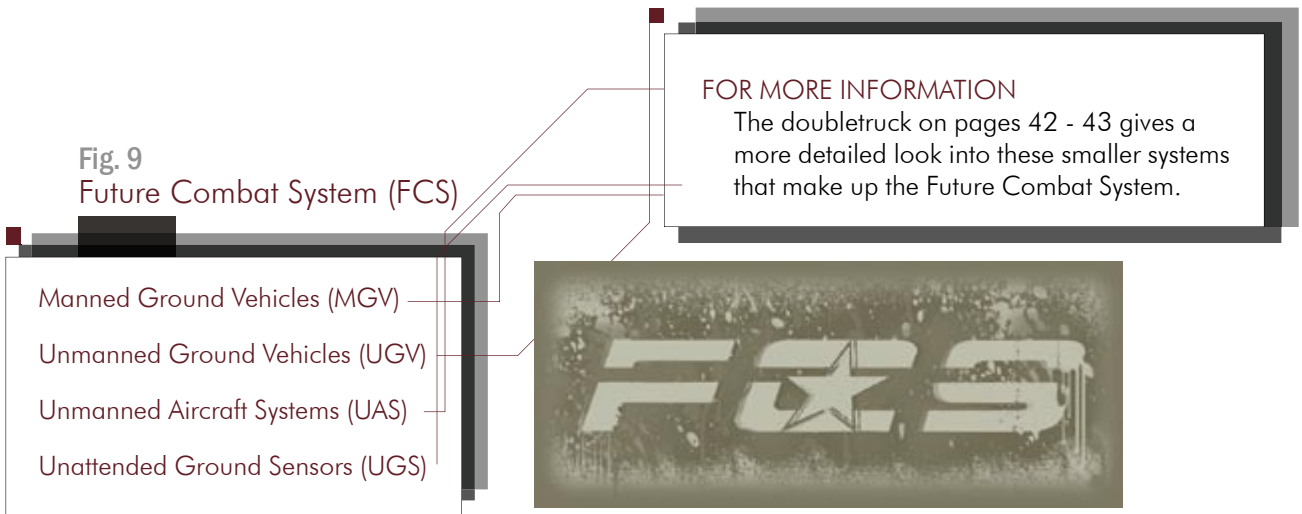
The third and final thing I'll talk about with biometrics is a logical network topology or a low latency network. If we're taking multiple satellite hops to get back to the database over a commercial, an INMARSAT and a MILSAT system, we actually have problems with timing out.

I'd like briefly address the challenges we face and constraints for some of our SATCOM systems. Most of this is fairly common knowledge for most people in the room.

First is Electronic Warfare – not only friendly, but foreign. We face an intelligent, resourceful enemy who quickly adapt to our tactics, techniques and procedures. It is a threat out there. We face it daily, and we also have our own protective measures where we inflict some of our own damages.

Next challenge is urban terrain. It is very difficult to do SATCOM when you're operating in an urban environment with large buildings blocking your line of site to the satellite bird.

Fig. 9
Future Combat System (FCS)



The last challenge I'd like to mention is low visibility operations. It is very difficult to do SATCOM on the move when you're trying to put an X-wing on the top of a local national car. It has a tendency to stick out just a little bit. Also it is very difficult to blend in with the local populace when you have a 2.4 meter commercial dish sticking off the side of your building. It kind of screams U.S.

So, those are the challenges we face. I'd like to finish this by saying often the most powerful weapon our teams have is that SATCOM radio in the rucksack, that tactical satellite terminal at their team house, that intelligence, surveillance and reconnaissance flying overhead providing them with security.

BG STORY

Man, what a group of great Americans. I have a few more issues I want to cover and I see the questions are piling up, so I'm going to keep the final wrap up brief, cause questions are probably why a lot of you came here. We talked a little bit about the Cold War, the battlespace in the Cold War. We've had these great Americans talk about the current fight and the future fight, and I want to spend a minute here just to talk about the future fight.

(Figure 8) These are the systems that are going to able the Army's future combat system. It is a system of systems that the Army is migrating toward and transforming toward with its brigade combat teams. It's a system as you can see which relies very, very heavily on Space assets. I'm quite sure that many of you in the audience are involved in some phase of the acquisition, development or technologies involved in the systems you see there.

(Figure 9) Here are some elements that make up the Future Combat System. There are the manned ground vehicles on a common chaises platform, and the unmanned ground vehicle, and then the unmanned aircraft systems and unaccounted ground sensors. The first Future Combat System Brigade Combat Team will be fielded in 2011, and a lot of these technologies will migrate to Brigade Combat Teams that are not Future Combat System Teams.

FOR MORE INFORMATION
 The doubletruck on pages 42 - 43 gives a more detailed look into these smaller systems that make up the Future Combat System.



Some of the items in yellow have already been fielded. If you see the Class I unmanned aerial vehicle ... that has already been fielded by two separate units. One of them was the 25th Infantry Division and one of them is a National Guard unit. Those are already being employed in combat. You might have seen pictures of them. They actually hover around and it is a very great system, as well as the unmanned ground sensors you see are being used.

The line-of-sight cannon has been tested and demonstrated and is highly successful. So all those systems (Figure 9), those technologies, they are going to enable this. You can also see the Army's portion of the global information grid and that's LANDWARNET and the layers that comprise LANDWARNET. Many of you are involved in those layers, and the standardization and the transport, etc.

I don't think that it takes a rocket scientist to realize that as our reliance on Space grows, our adversaries understand more and more how we're wed to Space and how it enables us. So they're going to do their very best to try to deny us Space, so really to be successful in the future, we're going to have to migrate toward a multi-domain solution. In order to provide the intelligence, surveillance and reconnaissance, the friendly force tracking and to fill gaps, this multi-domain solution is going to allow the U.S. warriors to dominate terrain and be successful in future battles.

As you look at this chart here (Figure 10, page 34), many of you who are out there in the defense industry can see that there is a lot of opportunity there. There's a lot of opportunity to do the things that you heard these great Americans talks about to get that technology down to the lowest level. It's no good for the intelligence, surveillance and reconnaissance, for the SATCOMs to reside at the general officer level, to be on big screens in the Pentagon. It's got to be down to the warfighter. When you heard that example of PFC Wilson using all those technologies having them at his fingerprints, it really speaks volumes for what the defense industry has done and how the warfighters are using that.

Space

GEO

Geosynchronous Earth Orbit
• 37,160 km

MEO

Medium Earth Orbit
• 21,000 km

LEO

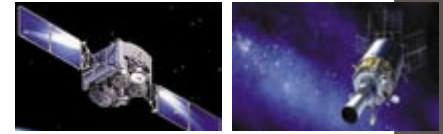
Low Earth Orbit
• 100 – 1000 km

Capabilities

- ISR Intelligence, Surveillance, and Reconnaissance
- Satellite Communications
- Early Warning
- GPS
- Tracking

New Opportunities

- TAC SAT



High Altitude

325 K ft. – 100 km



60 K ft. – 20 km

Capabilities

- Communications Extension & Expansion
- High Altitude
- Persistence
- Wide Area Surveillance
- Tactical Persistent Surveillance
- ISR Intelligence, Surveillance, and Reconnaissance
- Early Warning



Now I'm going to take a quick look at these questions and we'll get to answering some of them for you. Okay, I'll start with the first question here.

What capability in Research and Development holds the most promise in your opinion?

BG STORY: I think we have to put more energy into the protection of our Space assets. Not only do we have to work on that multi-domain solution, to provide layers and to fill gaps, but we have to be able to better prepare our Space assets. For many years, we have believed that we have freedom of access to Space and that nobody has the capability to deny us that. That is not true. Space is a contested domain, so I believe we've got to do a better job of protecting our assets.

I also think on the research, development and acquisition side, I know there's been a lot of work done, but near-Space and high altitude platform show a lot of promise. That's in between obviously air breathers and satellites. There are still some technology hurdles I think in terms of the configuration and the skin on these high altitude platforms but I believe that they are going to be a tool that the geographic combatant commander will be able to use to fill in his most important gaps and his urgent needs. He'll be able to tailor and configure the platforms to basically do friendly force tracking, communications, communications relay, limited intelligence, surveillance and reconnaissance, etc.

If PFC Wilson could choose which systems of C4ISR were most important due to the limited funding, which would he choose?

SFC WILDERMAN: Well that's kind of a loaded question because there are really two platforms out there that we really need, and they coincide. They work together. First, I'd talk about the Global Broadcasting System, because that's what really brings down the feed to the group, battalion, or company level. We currently don't have that asset readily available to the Operational Detachment "A team," the guy on the ground there who is actually making the hit on the targeting, but what we do

have is the One System Remote Video Terminal, which is the One Source Remote Video Terminal. This allows the operator on the ground to pull out this small suitcase or even in an MRAP, they're previously mounted. As long as the jamming not on, he can bring down any intelligence, surveillance and reconnaissance feed within a certain range, depending on the antenna and the platforms he's pulling down. Those two assets are primarily the two major assets that really bring it down to the ground, to the warfighter, to the one guy on the ground who's making that call, who's targeting that target and taking down the bad guys.

You said GBS and FBCB2 were your lifelines. What capabilities do they provide that other command and control systems didn't?

1Lt RODRIGUEZ: Just kind of going back to that it is more than just one particular system, it's actually all systems working together, but there are times where a radio, telephone or internet goes down, where with Global Broadcasting System and FBCB2 you can no kidding, see exactly where your guys are. You can see where other people are and you can direct them. It's not like if radios or telephones went out, you won't know where they are. You will always have the eyes on target at all times.

With a joint environment and operations, do you see or notice any pitfalls that are due to service cultures or service specific training?

MAJ HENSLEY: I had a chance to kind of think about the question and my answer is no. I think in the beginning of large scale operations, and I'll just use Iraq as an example, yes it is a bit more prevalent and it took us some time, we had to go through some growing pains. In this day and age now, when we have done these joint operations and even interagency operations, we're working together and it has become much more apparent that the Army, Navy, Air Force, special operations to conventional, everybody brings a different piece to the fight. We're doing a much better job of working together and using all the same technology to put our specific skill sets on the battlefield. So, I really

Air

20 K



Surface

Capabilities

- Early Warning
- ISR Intelligence, Surveillance, and Reconnaissance
- Tracking
- Integrated Fire Control



Fig. 10

Multi-Domain Interdependence

don't see that anymore in my limited experience with the joint operations that are going on, and it's a testament a) to fielding the system across the board, and b) commanders at the highest level, and then folks all the way down to PFC Wilson's level, understanding the capabilities of those systems and being able to bring to bear their capability with folks on the ground.

1Lt RODRIGUEZ: And also just from personal experience, like I said, this is my first deployment, and it was to an Army unit, so I kind of had to learn the different cultures. For Air Force, our mission is to get our planes up in the air. Well I had to quickly transition that to be concerned with the eyes on the ground. I actually also had the experience to work with Navy guys as well, and to be honest with you, I think the different perspectives kind of make you think outside the box so you're just not limited to the one capability. You learn to use every single thing to put it all together.

SFC Wilderman talked about systems merging into one. What is that process, how quickly is it done, and is there any improvements?

CPT FISH: I will say that there is always room for improvement, and of the systems that we have, if we are really talking about a system of systems merging into one. Each one of those brings a different capability to the warfighter at a different level of tactical operation. He already answered how we use our Global Broadcasting System and our One System Remote Video Terminals to bring down live video feed. We also use FBCB2, the Command Post of the Future, and Command and Control Personal Computers at various echelons to transmit or keep a common picture for Blue Force Tracking or Friendly Force Tracking. Then we also have reliance upon not only satellite-based TacSat, whether it be over a 152, a 117 or a PSC 5, and so really, it's a system of systems being integrated together for each one serving a different function. I'd just like to take a little bit of time to talk about ... we always do our communications pace planning. So much of what we do is mission dependent. If you're on the back of an all-terrain vehicle doing mobility training, it's going to be very different than if you're going down the highway in an MRAP.

Does each member of the team have independent communications with the rest of the team? If not do they need that?

SFC WILDERMAN: Yes they do. They have line-of-sight. Each team member has a 148 Multi-band Inter/Intra Team Radio. The problem is anything that is not line-of-sight is being jammed more or less, so being able to communicate to higher headquarters in a two-way line is not always available. We use what we call transmitting in the blind, which is a TTP that we've developed for reaching around jamming, and I know there's a lot of things in the works to try to evade that.

Yes, of course they need it. Generally speaking we use other platforms to mitigate those issues. Some units have them, which will allow them to drop down into a different type of bandwidth to be able to transmit these messages, so when they don't have the radio communications, they have the messaging. Hopefully in the future, we'll be able to evade all the jamming and all the other environmental issues. To say something else about what CPT Fish was just talking about. When we talk about the integration of all these systems, and what is the primary one stop. Well, to be honest with you, at this moment, and as it has always been, it is that human connection, that person who has the ability to think outside the box and take those individual systems and say "What can I use this for? What is it going to help me to develop a plan or an action to help these guys on the ground?" That I'm sure will stay the same for quite some time, although, if we can get more integration within the systems, that will always help the operator too.

BG STORY: That's a great point. Technology is great. We rely upon it heavily, but we also have to understand how to operate when our technology goes south on us, and it's the ingenuity of the American fighting force that allows us to do that and be successful. I'd like to thank the Rocky Mountain Chapter of AFCEA for inviting us here today. It's been a real pleasure speaking to you all. Thanks again for your attentiveness and have a great day.