

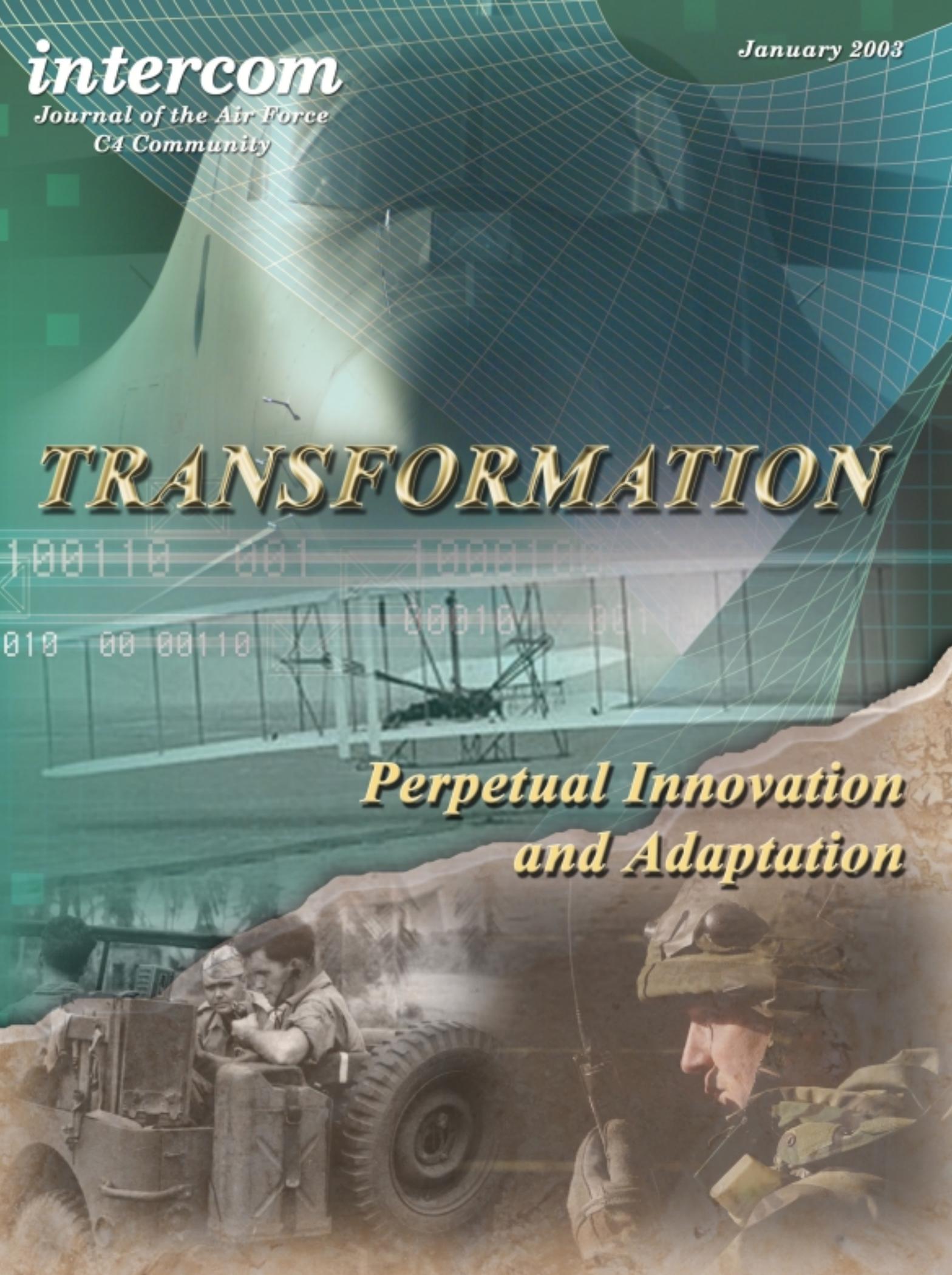
intercom

*Journal of the Air Force
C4 Community*

January 2003

TRANSFORMATION

*Perpetual Innovation
and Adaptation*



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"An extensive set of rules governs the sharing of this information, a

Senior leaders discuss transformation

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Maj. Gen. Dale W. Meyerrose - Director of Command Control Systems, J6, Headquarters North American Aerospace Defense Command, and director, Architectures and Integration, J6, Headquarters U.S. Northern Command

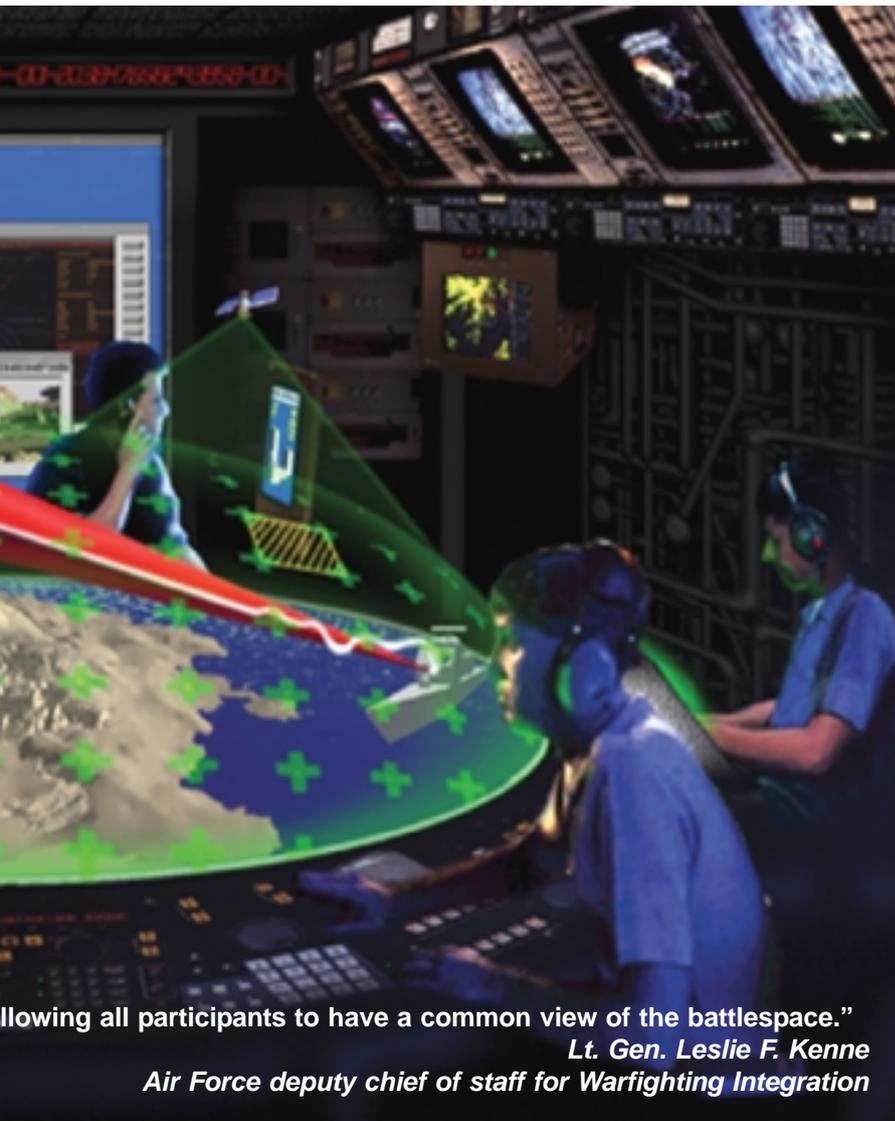
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allowing all participants to have a common view of the battlespace.”
Lt. Gen. Leslie F. Kenne
Air Force deputy chief of staff for Warfighting Integration

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On the cover



Cover by Janet Moreiko-Gagen
 This month's cover focuses on the Air Force's transformation efforts.



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Moving power to the edge

... driving force behind DOD transformation

By **John P. Stenbit**

Assistant Secretary of Defense for Command, Control, Communications, and Intelligence and DOD Chief Information Officer

The Department of Defense is committed to transformation, a transformation that requires us to adopt – and adapt to – Information Age technologies. The success of our efforts at transformation is related directly to our ability to bring information to bear in our war-fighting and other national security missions, as well as in the business processes through which we support operations and acquire military capabilities. The entry fee to the Information Age is a ubiquitous, secure, robust, trusted, protected, and routinely used wide-bandwidth network populated with the information and information services our forces need.



John P. Stenbit

It also requires DOD to change its organizational processes and behaviors to move **power to the edge**. In other words, we must replace top-down operations with distributed operations – and use information technology to empower whomever is in need of a solution, regardless of where that individual is. Whoever confronts a problem is “on the edge” – whether a leader of a special forces unit thousands of miles from the Pentagon, or the secretary of defense working in his office. Anyone “on the edge” with a problem to solve must be able to pull *needed* information from a network populated with *that* information – not with what somebody thought might be needed. In Network Centric Warfare, a key to moving power to the edge is making sure all individuals and organizations have timely access to the information they need, along with the ability to participate in collaborative processes.

A recent report to Congress stated that network centric warfare is the embodiment of an Information Age transformation of DOD – that it will involve a new way of thinking about how we accomplish our missions, how we organize and interrelate, and how we acquire and field the systems that support us. (NCW Report to Congress – Executive Summary) **Power to the Edge** is the principle that should guide us in rethinking our policies, organizations and processes.

Network centric warfare is predicated upon the ability to create and share a high level of awareness and leveraging this shared awareness to rapidly self-synchronize effects. Shared awareness will allow us to concentrate the available information and assets on the challenge at hand – multiplying our combat effectiveness. However, shared awareness alone will not guarantee success.

Success further requires that we think about information differently – that we move from a set of monopoly suppliers of information, where I tell you what I think you need, to an information marketplace where everyone pulls down what they need, when they need it. That is the only way our forces will have the variety of views and perspectives necessary to make sense of the complex situations they face. The “marketplace” perspective gives us a couple of advantages. We ensure our information collection and analysis quickly respond to changing circumstances. We retain all the basic data and, when more is known, we can test alternative theories and revise our courses of action.

Similarly, we need to move rapidly from our push-oriented, top-down dissemination process to where information can be pulled from the network wherever and whenever it is needed. We can have widely varying needs and views of the same piece of data.

Our approach to interoperability needs to change as well. The rate of advancing technology requires us to move from an approach based on standard applications to one based on data standards. The key is to give users of information the

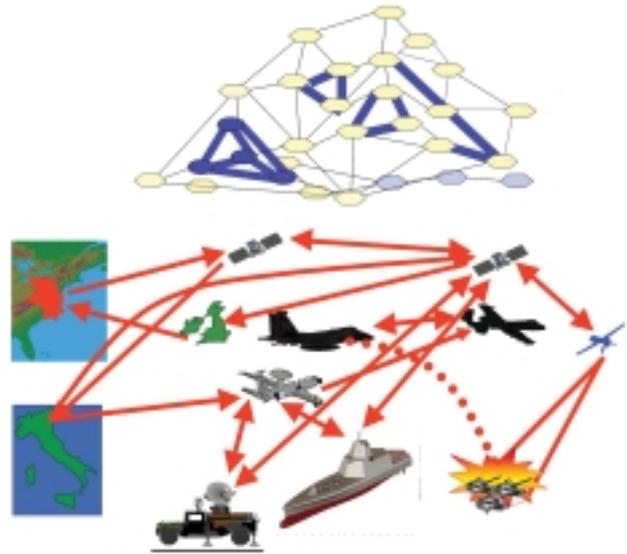
Net-Centric Operations

A Fundamental Shift

Platform-Centric



Net-Centric



Traditional stovepipe approach vs. fused information available on the Net

opportunity to use applications that make sense to their activity while maintaining the ability to exchange information. Finally, we need to pay a great deal more attention to supporting peer-to-peer relationships.

These initiatives will empower “the edge” where information and decisions come together to shape and respond to a dynamic battlespace. In the past, our command and control system has been about how we exercise control. Command is evolving from a centralized planning process where someone in a headquarters tries to think through the possible variables that may arise – into a system where alternatives are generated and responded to appropriately at the edge. Control will move from a set of externally imposed constraints and decisions to a property that is emergent.

In network centric warfare, the single greatest contributor to combat power is the network. We will generate much more power individually and collectively when we are connected to the Net, where we are each empowered to pull the information we need – instead of hoping someone sends it to us. The marginal value of independent platforms pales in comparison to the value they contribute if they are Net ready, contributing their information and pulling what they need. The value of the current collection of disparate platforms pales in comparison to the value generated when they are robustly networked. The Net is needed to move **power to the edge**. Moving **power to the edge** is the driving force behind network centric warfare and the transformation of DOD.



Tightening the kill chain: broadening information access

“Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.”

Air Marshall Giulio Douhet, 1928

By Lt. Gen. Leslie F. Kenne
*Air Force Deputy Chief of Staff for
Warfighting Integration
Washington*



“Our purpose is to assure information dominance and achieve battlespace effects.”

*Lt. Gen.
Leslie F. Kenne*

The secretary and Air Force chief of staff have designated two organizations to spearhead a transformational change to an information-centric Air Force. The Air Force chief information officer and the deputy chief of staff for Warfighting Integration are teamed to enhance combat support systems, business-systems capabilities, and warfighting capabilities. Our purpose is to assure information dominance and achieve battlespace effects. Within this transformational partnership, one of the DCS’s most important goals is to make rapid progress toward Gen. John Jumper’s vision of seamless, integrated C4ISR. As the chief has pointed out, the Air Force seeks to exploit America’s current technological advantage through an emphasis on innovation and integration. The Air Force intends to set the form of future warfare by addressing directly how to better achieve the joint force commander’s desired effect. We will do this by shortening the cycle time of the “kill chain” (i.e., find, fix, track, target, engage and assess).

Let’s talk about what we need to do to actualize the vision of “tightening the seams in the kill chain.” The mission of AF/XI is aimed squarely at this task:

Close the seams in the “kill chain” between find, fix, track, target, engage and assess by integration of manned, unmanned and space systems

Our mission statement serves to focus our ef-

forts on operational effects. Although our role is to provide an improved C4ISR domain that supports all aspects of the Air Force mission, we wanted to make sure we didn’t lose track of the most critical measure of Air Force success – how well the USAF employs air and space power to achieve effects desired by the joint force air component commander or combined force air component commander throughout the battlespace.

The “kill chain” – the find, fix, track, target, engage, assess construct – is not just aimed at physically attacking targets. The same process applies to airlift for humanitarian relief operations, re-supply or rescue. Some targets you feed, some you save, some you destroy, but they are always targets. Knowing rapidly and precisely where the target is and the status and location of friendly forces becomes crucial to the JFACC/CFACC. It follows that tightening the kill chain is inextricably tied to maintaining accurate information and delivering it responsively.

Command and Control of Information

If closing the seams allows us to transform how we employ forces, the question is how do we best

tighten the sequence. The way ahead involves both a change in the way we handle information, as well as the technical changes necessary to enable that change. In other words, the solution is not simply technical, but also concept of operations driven. Tightening the kill chain requires applying the fundamental tenets of Air Force C2 doctrine, as well as embracing a change in the way we view information. We need to embrace the notion that control of information is not command and control of forces. However, they have a relationship: Control of information supports the command and control of forces.

Air Force C2 doctrine holds to a basic tenet, based on combat experience, that control of air and space forces should be centralized in a person with air and space expertise to assure best effects within the battlespace. However, the actual execution of missions should be decentralized to responsible and capable lower-level commanders. This delegation of execution authority allows for effective span of control and for the lower unit-level fighters to use their initiative, situational responsiveness and flexibility. These tenets, to which we have hewed consistently since 1942, remain valid today.

We have the opportunity to further facilitate this doctrine by dealing separately with the distribution of information to support the command and control of forces. By treating information as a commodity available to all, we can increase the velocity of decision-making, thereby tightening the kill chain. We can do this without jeopardizing the command and control of forces. Putting our bottom line up front, separating the control of information from command and control of forces:

- * Supports the joint force commander
- * Allows broad access by all echelons of command simultaneously, vice sequentially along the lines of command – sharing information freely
- * Provides information rapidly that is accurate and trusted – velocity and accuracy.

To further illustrate why this distinction is important, let's explore how we have approached this problem in the past, and how we need to approach it in the future.

Technological Advances & Information Flow

Historically, technology limited the flow of information. Battlefield information delivery was limited to the speed of horses and the commander's ability to assess the situation. Information had to flow from the front lines (the sensor) to the commander for decisions and then back to the forces. Only the commander had the total situational

awareness necessary to control forces to order reinforcements or troop movements, so other than the immediate tactical situation, little decentralization of execution was possible. Execution was centralized because only one commander had situational awareness to control forces, to order reinforcements or troop movements. As a result of the limited information flow, there was no time for reinforcements to gain situational awareness before entering the fight. Troops had to rely on the commander's ability to place them in the right spot at the right time, hoping the enemy had not made any other moves that would counter their own.

Today, technology allows us the potential to keep all elements of the force informed of the situation, allowing accelerated responses to changing situations. We do this better than anyone, but we can do it even better and be even more effective.

Air Defense Model – Information and C2

We have a template in our air defense forces for effective "control of information" separate from the command and control of forces.

Due to the speed of air defense engagements and the necessity to coordinate to prevent wasted engagements and fratricide, the air defense forces have evolved both the mechanisms and procedures to address distribution of information and command and control of forces separately. While we can debate the effectiveness of particular solutions, the principles underlying the structure bear review.

A series of tactical data links (TADIL A, B and J) have evolved which permit air defense elements to share the information gathered by each separately. An extensive set of rules governs the sharing of this information, allowing all participants to have a common view of the battlespace. These rules on information sharing are separate from the rules of engagement and command lines that may be established. The joint interface control officer, whose job it is to ensure the picture is as accurate as possible, manages the information sharing. A key part of this process was getting agreement among all the participants on the data elements that needed to be exchanged. A separate set of procedures called rules of engagement are developed by the combatant commander and the CFACC, and these ROE govern assignment of mission responsibilities for carrying out tasks. These separate rules enable air defense commanders from the CFACC on down to focus on decision-making

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and not on information management. This distinction between control of information and command and control of forces needs to be carried over into other operations.

Surface Targets and Command Flow

At present, information on sensitive, or ROE-bounded, emerging ground targets has tended to follow the command flow from sensors to commander's decision then to a verbal/digital "9-line," either to the JSTARS platform then to the shooter or direct to the shooter. Like our historical example, this information flow has in some measure been driven by technical limitations in our ability to send information automatically among the elements of the system engaging ground targets. This means that time is taken after the decision is made to send not only the command, but also the target information to the strike elements. With technology, we make this flow faster, but it will require both material and non-material changes in the way we do business.

Imagine how much we could compress the kill chain if we could push accurate information to all elements involved in the strike, even while the commanders are deciding what action should be taken. Everyone has the information just waiting on the shoot command from the decision-maker. Much like our air defense example, we need to separate management and distribution of information from the command and control of forces. Further, we need to do this so that the information is rapid, accurate, trusted and managed to support the commander.

For this to happen, we need to take the same rigorous steps the air defense community took. We need to establish a process for information management. It needs to focus on agreement on the data elements that must be exchanged. Moreover, we must have a person responsible for maintaining the quality of this information, much as the JICO does for the air picture. Compared to where

we were when we undertook the air defense problem decades ago, technology can help the process. New information exchange techniques like eXtensible Markup Language (XML) may allow us to access data without major overhaul of existing databases. However, the underpinning data management CONOPS needs to mature. Conclusions coming out of our recent Joint Expeditionary Force Experiment indicate the CONOPS for data management should include an information manager in each cell, with an overall information manager working directly with the air operations center director. This overall information manager should be someone with an operations background who knows how to aggregate data and present it in usable fashion to the CFACC and AOC floor.

Separation of Control of Information from C2 of Forces

Why highlight the need for dealing with control of information separately from command and control of forces? There are two reasons.

First, this separation of control of information from command and control of forces would allow the CFACC and combatant commander to focus on the

art of command, leaving the science of control to the supporting staffs. Specifically, we want to have the CFACC focused on countering an adversary's reaction, refining his own strategy, focusing his forces, crafting the apportionment recommendation for the next day... week... month of the war, vice worrying about weather in a tanker orbit or committing Blue 3 on a target. The CFACC should be given information tailored to predictive effects of today's battle damage assessment on the evolving air operations, for example. The CFACC can then check that expected effects are consistent with the combatant commander's strategic objectives and make necessary corrections to the commander's intent and the air tasking order.

The second reason is to identify those efforts concerning the flow of information that have the most leverage to realize the vision laid out by the CSAF for tightening the kill chain. What can be leveraged in the control of information (the sci-

“ By treating information as a commodity available to all, we can increase the velocity of decision-making, thereby tightening the kill chain. ”

Lt. Gen. Leslie F. Kenne
Air Force deputy chief of staff for
Warfighting Integration

ence)? What do we design into our systems to permit control of information to tighten the kill chain? The answer is we have to address with zeal some “inglorious stuff”: architectures, standards, data management, and machine-to-machine interfaces.

C4ISR Architecture

Given the complexity of the challenge, we must address these changes in the context of an overall C4ISR architecture. Architectures provide a framework for developers to consider. They are not static, but offer a point of departure. They must be available in repositories for reference by industry and other developers. The architectures also help us set some high-level standards, which facilitate innovation and the exchange of information. Architectural standards need to be flexible enough to allow connections to be made, but not so restrictive as to preclude adaptation. Industry must be active participants in development of these standards. Balance is needed between proprietary intellectual property and allowing all to innovate by adopting shared standards. The Air Force will be demanding some level of openness. Proprietary stovepipes are fast becoming unacceptable. This architecture cannot be service-specific. It must account for the reality of the joint, interagency and multinational environment within which our forces operate. Adopting an architectural approach will enhance the DOD’s ability to rapidly incorporate innovative ideas and improve the assurance that when your newest black box turns on, it really is interoperable and provides the knowledge that it promised.

The CFACC needs answers to a couple of basic questions. What’s going on? Did we achieve the desired effect? In addressing those questions, the CFACC wants to get right to decision-quality information. Implicit in these is the need to understand relationships and information flow – how to do it with velocity and accuracy. We again must pay attention to data. Information needs to be entered by the individual at the lowest level possible to ensure accuracy. For example, the crew chief needs to enter the operational status of his or her jet, and that status ought to carry throughout the system. We need to make the exchange of

information free of human intervention as much as possible, allowing both velocity and accuracy – realizing there are assessment points in the information flow where human intervention is desired. We need to ensure broad access to information (velocity). Data within databases must be easily accessed. To facilitate the exchange of information, we need to renew our focus on data management – a CONOPS for data management, agreement on the data standards, and a dedicated effort to ensure the accuracy of information presented. Again, we need knowledge (information) managers to ensure the right information–aggregated/displayed in the most useful manner–is reported up to the CFACC.

ensure the accuracy of information presented. Again, we need knowledge (information) managers to ensure the right information–aggregated/displayed in the most useful manner–is reported up to the CFACC.

Conclusion

Creating the right effect in the battlespace to meet the commander’s intent is

our key metric. To achieve that, we want to provide the right information at the right time to the warfighter. The way to address that is to work both CONOPS and systems to improve the velocity and accuracy of information.

From a CONOPS perspective, we need to separate the control of information from the command and control of forces. We need to assign people to manage that information and ensure its accuracy. We need to enter information at the lowest responsible level, and then carry that information throughout the system.

From a system perspective, we must deal with the “inglorious stuff” of architectures, standards and data management. This will lead to an understanding and implementation of control of information that:

- * Supports the joint force commander
- * Allows broad access by all echelons of command simultaneously, instead of sequentially along the lines of command
- * Results in cultural change to share information freely
- * Provides information rapidly that is accurate and trusted: velocity and accuracy

If we do these things, we will have progressed far toward achieving the information dominance essential to win the engagement, the war, and most importantly, the thanks of our soldiers, sailors, airmen and Marines.

“ Tightening the kill chain requires both applying the fundamental tenets of Air Force C2 doctrine, as well as embracing a change in the way we view information. ”

Lt. Gen. Leslie F. Kenne

AF XI, CIO spearhead transformation to information-centric force

Lt. Gen. Leslie F. Kenne, Air Force deputy chief of staff for Warfighting Integration, responded to intercom questions regarding XI's role in the transformation to an information-centric Air Force.

intercom: Transformation of forces within DOD includes more than technology; it is tied to exploring new concepts of operation and developing capabilities. What is AF/XI's role in Air Force transformation?

General Kenne: The secretary and the chief designated two organizations to spearhead our transformation to an information-centric Air Force. The DCS for Warfighting Integration and the Air Force chief information officer are partnered in this effort. We have set out to establish processes and standards to accelerate horizontal integration and ensure funding priorities match our integrated information vision.

One of our aims in Warfighting Integration is support for the combatant commander, getting all the horses pulling together for the warfighter – to transform the speed and fidelity of target-quality data to shooters and decision-quality information to joint force commanders.

intercom: What are your key challenges?

General Kenne: With this sight picture comes the challenge: achieving horizontal integration across the broad canvas of C4ISR manned and unmanned air and space systems. Tightening the find, fix, track, target, engage, and assess “kill chain.” A key challenge is the overarching requirement for interoperability among joint and combined forces to permit rapid and precise operations and achieve the commander's desired effects.

intercom: From your perspective, how effectively is the new AF/XI structure meeting the C4ISR needs of the warfighter?

General Kenne: Our people have hit the

ground running. Our greatest contribution to date is the streamlining of the force-wide integration structure. We are focusing efforts on machine-to-machine integration, knowledge management, and standardization. We are engaged in the Chief's Capabilities Review and Risk Assessment process to capture and assist operational forces in defining and mapping capabilities and the shortfalls. We are advocating network centric collaborative targeting, recommended solution sets derived through Maj. Gen. Dan Leaf's Kill Chain Enhancement Task Force, and other initiatives emphasizing the connectivity between information producers and the shooter.

intercom: What new technologies have you seen emerge to benefit warfighters during the war on terrorism?

General Kenne: During Operation Enduring Freedom, the greatest technological impacts have been evolutionary – realized through the innovative application of existing technologies. Cases in point: the Predator/Hellfire initiative, streaming video to AC-130s, NORAD contingency suite, smart tanker capability – Roll-On-Beyond-Line-of-Sight-Enhancement, and tactical air control party modernization. Also there is increased emphasis on the cryptographic modernization program, especially in secure voice and bulk encryption areas. Joint Tactical Radio System is an emerging technology of software-defined radios that will provide interoperability between joint and coalition forces and a new IP-based wideband network waveform to meet the network-centric warfare requirements of Joint Vision 2020.

intercom: Based on your experiences in the operational community, what impact do you see Operation Enduring Freedom having on future warfare in general, and on C4ISR in particular?

General Kenne: Today's battlefield is increasingly complex. We are continuing to break down traditional tribal stovepipes and integrate communications systems to achieve seamless connectivity throughout our Air Force. An example is linking the Predator with an AC-130 Gunship in pursuing mobile targets in Afghanistan. C4ISR proved



the linchpin. All operations relied on it. OEF further reaffirmed the continued development of penetrating, persistent, multi-dimensional and multi-spectral ISR and the infrastructure to manage and execute these capabilities. The end goal is to synchronize these activities with the joint warfighting community for an effects-based synergy.

intercom: Do recent events emphasize the importance of delivering critical information to front-line warfighters?

General Kenne: Yes, we have long understood the importance of delivering decision-quality information. Current events bring new urgency to this task. The axiom – knowledge is power – prevails. In maintaining situational awareness for the warfighter, events on the battlefield highlight the need to manage information more effectively. Greater fusion of data bases, establishment of information standards, and better understanding of information requirements of the operator are all essential.

To facilitate the exchange of information, we need to renew the focus on information management, on the SIPRNET portal, and use of technologies like XML [eXtensible Markup Language] to help more efficiently manage our information. Maybe more important than technology though is the need to have an underpinning data management concept of operations so we can efficiently use the information we have available.

intercom: If you had unlimited funds, what capabilities would you want to buy for warfighters?

General Kenne: Unconstrained funding is not necessarily the answer to our problems. By using empirical tools to assess and analyze the effects we wish to achieve and identifying those capabilities necessary to achieve them, we can develop the underlying architectures that will ultimately lead to fielded capabilities that will truly benefit the warfighter. Couple this with a more streamlined acquisition process that fields capability faster, and you start to see transformational results. We all must look beyond individual systems and black boxes to integrated capability for the warfighter, and drive solutions that enhance jointness and interoperability.

intercom: What future do you see for the Air Force's young comm and info warriors?

General Kenne: A bright future filled with promise for each of them ... as warriors.

The most important fact that our folks need to understand is that their mission is warfighting,

clear and simple, either through the direct application of technology to the mission at hand or through the continued development of systems, which includes the operational concepts used to maximize the weapons effectiveness. It is critical that young officers, airmen and civilians take every opportunity to understand the missions of the Air Force and to help lead us to integrated systems ... bringing their talents and ideas to bear on the equipment, tactics, processes and procedures ... to make our missions happen effectively and efficiently. Risk and reward trade-offs must be considered every step of the way – if we can reduce risk and increase payoffs by achieving information dominance, all our troops will come home earlier.

intercom: Any other comments?

General Kenne: Transformation is not just all about technology; it is about relationships and transforming the way we think. In Warfighting Integration we must think about effects and the warfighting capabilities needed to achieve them. We must think about how systems come together to produce a greater good – a greater capability for the warfighter.

Our people must be committed to doing things in new and different ways. A focus on programs, or on platforms, is no longer acceptable. We are changing so that the first thing we talk about is the concept of operations – how we fight and the capabilities integral to the concept. Not only are we concerned about ourselves, but how we fight with the other services ... how we join the fight with the other services ... and, as importantly, with coalition partners. We are going to drive interoperability and connectivity into everything we do. It will be integral to every effect we seek to achieve; to every CONOPS, to every architecture, and every capability we build to achieve these effects.

When America's Air Force gets this information dominance right ... and we're going to get it right ... we'll give our joint force commanders an essential capability to meet crises ... a capability that will deter our adversaries, but when necessary, allow us to win quickly ... saving our national treasure with minimum loss of life.



AF/IL provides Air Force's daily comm needs

Lt. Gen. Michael E. Zettler, Air Force deputy chief of staff for Installations and Logistics, was interviewed in November by Len Barry, intercom executive editor, regarding IL's new role in helping to transform Air Force communications capabilities to better meet the needs of warfighters.

intercom: The Secretary of the Air Force defines transformation as a philosophy – an approach to developing capabilities and exploring new concepts of operation. Is that status quo in IL, or is this a different way of doing business?

General Zettler: It's surely **not** status quo in IL, and I want to be very **emphatic** about that. I think the IL community is getting appropriate recognition for leading many areas in a transformational effort. As you know, IL has a wide portfolio of areas of responsibility, and as we move through and address each area, we're making some dramatic changes. First we've consolidated the officer career field for supply, transportation and logistics plans. That's transformational, because in the past those three disciplines have worked separately as a stovepipe – yet, they're so intricately linked, and they have to work together, that they ought to be one at the officer level – so we've done that. That's one. We're being innovative with our family housing – we're trying to lead the way to a balanced approach to privatization of family housing. It won't be at every location, but at many locations we'll have privatized family housing, which expedites the timeframe in which we make quality housing available to our people. In the comm area, as we come together under the XI and IL construct, there's transformation right there. It's taking the great work that the comm world has done to leverage modern technology and saying, "Now how do we make it more normalized within our Air Force?"... that's the IL piece in many cases. We've had reviews of our unit type codes for deployment, and we've restructured those, and we have more restructuring to do. We have some studies going on that allow us to look at how we use our Guard and Reserve teammates to complement the active duty better. We are looking at what equipment they have, and why we have to draw upon them some of the time to meet our deployed needs. That's

the essence of what I want to tell you. It's not status quo. It's constant, evolutionary – in some cases, it's maybe even revolutionary – across the entire IL community.

intercom: How do you view the role of IL and ILC (directorate of Communications Operations) in providing C4 support to the warfighter, and how has this role evolved since ILC was established in April 2002?

General Zettler: The first thing that you really have to emphasize is that the complete "comm-info team" has done a wonderful job for the United States Air Force in how they've provided comm support to the warfighter and the peacetime Air Force. There is a new role that we have with XI building the technology for how we go forward. They will look at the ways to integrate all of the comm systems into our various platforms, and how to provide real-time info to the executors of taskings as well as the command and control authorities – that's what they have to do to leverage technology. The IL team has to make that work. We have to be the organization that provides for the day-to-day operation of the comm systems that are being fielded, or have already been fielded. We're the folks that make the systems work after they're in the Air Force. We have to do that. We have to be prepared to deploy, we have to think every day in an expeditionary mindset, we have to be trained to go, we have to understand what our equipment strengths and limitations are, what kinds of UTCs have to be put in place, and we have to be able to go anywhere in the world. ILC is the team that's going to do that. Your readers are the team that makes the delivered technology work.

intercom: How has establishment of ILC affected the overall mission focus of IL?

General Zettler: The mission focus of IL has been to support day-to-day operations – that's what logistics is all about. It's the civil engineering piece, the services piece, the logistics piece, the maintenance piece. The question is, "How do we provide those things on a day-to-day basis to sustain our forces, and what's our role in the long term to do that? How do we put that planning process in place, program the resources, budget the resources, and make it work?" We're the guys and gals who

are responsible to train, organize and equip our forces on a daily basis. So we pull all of that together. When you enter the ILC team into the equation, that's one more key link to the base structure that allows us to operate in an integrated fashion.



And the way we do unit type codes, training for our people, equipping of our people, ought to be done in a very similar fashion – accounting for some differences, but using a similar process for all the people in civil engineering, services, communications, maintenance, supply, transportation and plans. So from the standpoint of what is the best way to go about this, it's bringing in a natural fit within the IL team to better integrate the total Agile Combat Support into a consistent planning and processes effort. It doesn't change the way IL operates – it makes IL stronger because it's an integrated organization.

intercom: What advantages and benefits do you believe the warfighter has gained to date as a result of the Air Force C4 restructuring?

General Zettler: The first thing I want to emphasize is, "Nobody said anything was broken." What the Air Force needed was to strengthen integration of our communications resources and technologies with warfighting platforms. There had to be a way to work so that from the sensor, to the command and control authority, to the shooter, there was real-time information, and every possible node had the same information at the same time, while minimizing the man-machine interface – and that's a huge undertaking. It's General Kenne's piece of real estate. She has to make it automatic, real-time, facilitate the technology to make it happen. The IL team's role is to operate the systems that make the process work, to understand what technology is coming to it, to assure people are trained, and to be able to deploy anywhere in the world on short notice to support operations.

intercom: How effective do you feel the various elements of the new C4 structure – including XI, IL and XO – have been in working together to provide seamless support to Air Force customers?

General Zettler: We've been involved in this process since April, and my first impression is that it's gone much smoother than anyone expected. I think that's a real credit to Mr. (Michael) Aimone (deputy director, Logistics Readiness, AF/ILG), Mr. (David) Tillotson (director, C4ISR Architecture and Assessment, AF/XIW), and others who basically led the effort. But without a doubt, considering the enormity of this task, nobody expected that we'd get it perfect. In fact, we've uniformly said we'll surely make some mistakes here, but we're prepared to step back and correct them. Keeping in mind that the first point was nothing was broken, the second point is that after seven months, the effort has probably earned a good, solid "B" to a "B-plus". So where do we need more work? We've already had our first review, to say, "What's working, what's not working?" We came out of that with, "We need to work on the XO piece a little more." There are some areas where the DCS Air and Space Operations needs to be closely working on a frequent basis. We weren't sure who should be responsible for some of these. So that was a seam that we created that we have to resolve. Our next review will look at other areas where we need to fix some minor issues. There are probably some challenges in how we do our resourcing, who gets what money, and when. There are probably some questions in training and management of the officer career fields. But, I think that by the time this article is well read, we'll have things pretty much as they need to be. While we never said we'd get it perfect, I believe overall we've done a very creditable job of splitting out the key elements, getting them in the right places, and then pulling them together to work as a team.

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intercom: How close do you think the Air Force is to achieving true integration of Air Force C4 resources?

General Zettler: We're not close, when you say "true integration" – that's why we stood up XI. What we have to do is work toward the end of achieving true integration. True integration's going to take time – not months, but years – and it's going to require a continuing commitment of resources. But what's important is that we now have a team that's dedicated to making it happen, and it's rapidly mapping out the way ahead.

intercom: What's the "way ahead" for IL and ILC in supporting C4 needs of the warfighter?

General Zettler: The way ahead is to assure and insist that we have well trained people in the field, that they understand their equipment and their mission, that we have them properly aligned in the correct unit type code structures, that they're allocated to the air expeditionary force concepts, or "buckets", and that they're ready to go.

intercom: In your view, should the Air Force manage its IT resources differently from the other services?

General Zettler: That's a great question. I don't want to be critical of any other service because, while I have some knowledge of how they do it, I think that when you talk about managing our IT resources, and you put it in the context of being rapidly deployable worldwide, huge bandwidth requirements, we're not that far off. If our current organizational construct is different than the other services – and I believe it is – the answer is yes, we probably ought to be somewhat different. We should be trained, organized and equipped to meet the needs of the Air Force, and the joint

warfighter. And I don't ever want to lose sight of the fact that we're responsible in many cases for providing the support for the joint picture – and we have to be very closely aligned with what the combatant commanders need.

intercom: Is there anything else you'd like *intercom* readers to know?

General Zettler: *intercom* readers are an important part of the United States Air Force. They're combat power enablers. They're the men and women – whether active duty, civilian, Guard or Reserve – who make it possible for us to be an expeditionary Air Force. They allow us to put forces

far forward, and minimize the support posture at every location, because we're able to do reachback. They're the men and women who permit us to be flexible, and allow airpower to reach its true potential, because through our IT solution sets, we can be flexible. What the IL community owes to all those people serving in the field is: First, that we fight vigorously for the right amount of resources for them to do the job, that we identify the proper policies and,

“ We should be trained, organized and equipped to meet the needs of the Air Force and the joint warfighter. And I don't ever want to lose sight of the fact that we're responsible in many cases for providing the support for the joint picture – and we have to be very closely aligned with what the combatant commanders need. ”

Lt. Gen. Michael E. Zettler
Air Force deputy chief of staff
for Installations and Logistics

where applicable, procedures to do the job. Second, we insist that they be well trained so they can exploit all the technology we make available to them. Third, I'm extraordinarily pleased with Brig. Gen. Bernie Skoch, the head of ILC today. He's a marvelous leader, he knows when to make policy and when to leave it to the field's initiative, and he's extraordinarily technically competent – three traits that are vital in that position. Fourth, I'm delighted to have the communications-information technology team as part of IL. I'm committed 100 percent to assuring they get the support they need, and to allowing this new organizational construct to make our Air Force not only better than in the past, but the best it can possibly be now and in the future.

USNORTHCOM enhances situational awareness

Maj. Gen. Dale W. Meyerrose, director of Command Control Systems, J6, North American Aerospace Defense Command, and Director, Architectures and Integration, J6, U.S. Northern Command, Peterson AFB, Colo., responded to intercom questions regarding USNORTHCOM's goals, objectives and priorities.

intercom: What is USNORTHCOM's mission?

General Meyerrose: The Unified Command Plan 2002 established U.S. Northern Command as a regional combatant command. USNORTHCOM's relationships, within our established area of responsibility, are comparable to USEUCOM's relationships with the countries of Europe. In USNORTHCOM we have few permanently assigned forces:

- * JFHQ-HLS (Homeland Security) supports Military Assistance to Civil Authorities, Land and Maritime Defense, in Norfolk, Va.

- * JTF-CS (Civil Support) supports primarily the CBRNE arena, at Fort Monroe in Hampton, Va.

- * JTF-6 supports drug law enforcement agencies, at Fort Bliss in El Paso, Texas.

We also have service component commanders from the Army, Navy, Air Force and Marines that are dual-hatted to Joint Forces Command as well, in addition to the U.S. Coast Guard. Each component commander reports to our commander, Gen. Ed Eberhart – but not their forces. That's not a concern for us. Gen. Tommy Franks, from U.S. Central Command, does not own any air superiority capabilities, but when he needs this capability, he knows how to get it. The same is true for us.

USNORTHCOM's mission is similar to that of other regional combatant commands in that we will defend, deter and defeat military threats to our nation, territories and citizens. The command will also work closely with the other seven countries in our area of responsibility by strengthening alliances and building security cooperation. There is, however, a significant additional mission for USNORTHCOM in that we provide military support to civil authorities as directed by the secretary of defense or the president. In this capacity,

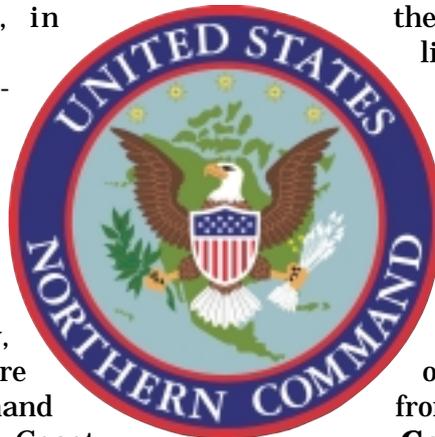
we will always be supporting another lead federal agency or state governor, whether responding to natural disasters or helping law enforcement agencies.

Many USNORTHCOM responsibilities in the area of military assistance to civil agencies are not new work for the Department of Defense as the military has been performing these functions for all of our over-226-year national history. The difference with USNORTHCOM's standup is that for the first time since George Washington commanded the Continental Forces, we have a single military commander accountable for the defense and support of the homeland in all domains, which include cyber, as well as land, sea and air. Of course, we recognize this concept of unity of command as being a time-honored military approach for ensuring effectiveness, efficiency and mission accomplishment. We had been debating the merits of standing up a command like USNORTHCOM for the past 10 years. It's unfortunate that it took the tragic events of Sept. 11, 2001, to be the forcing function to bring it about.

intercom: With USNORTHCOM being so new – beginning operations in October – how do you view the challenges and opportunities of building a command from the ground up?

General Meyerrose: As I mentioned, many of the military missions that USNORTHCOM will oversee aren't new. So, our commander directed that we would initially not break any processes or ongoing missions that were already working. On any given day, we have 500-700 military personnel deployed within the United States in support of non-DOD organizations. So, continuity of operations was our first task. Second, he charged us to make sure that existing processes and missions in need of immediate improvement received the attention and emphasis required to ensure operational success. And third, General Eberhart laid out the vision for us to create the unity of command environment required to declare final operational capability sometime next year.

Without a doubt, my biggest challenge in help-



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ing the command grow into its full operations capability is working our operational, system and technical information exchange needs with our new partners—not only within DOD and the federal government, but also with state, non-government organizations, industry, combatant commanders, and others that aren't even aware that they need to connect to us. We must become more efficient and effective in the ways we source and share data, mine information from existing and emerging organizations, generate information, and make information available for analysis, converting it to knowledge, and creating options for decision-makers.

One of the biggest obstacles to our required information exchange stems from the inherent differences among the National Security Classification System, public law governing privacy within the civil sector, and the access restrictions placed on information use by “owning” organizations. Most of us in DOD are very familiar with our current National Security Classification System that is divided into well-defined categories; i.e., confidential, secret, and top secret. As we all know, the underlying culture of this classification system is built on a “need to know” basis that prohibits us from making classified information available to uncleared people.

By the same token, the law enforcement community gathers, analyzes, protects and distributes information under different rules, dominated by the “need to prosecute.” That means that law enforcement agencies aren't apt to share information that would possibly undermine “rules of evidence” as applied in our courts of law. Similarly, the medical community generates and uses information based on “right to privacy” and “need to protect public health” cultures. In contrast, USNORTHCOM needs to create an information exchange environment on a “need to share” basis. In other words, we must create a trusted information exchange environment that promotes needed sharing at the data, information, collaboration and decision-making levels while not undermining intelligence, law enforcement, medical and other data and information generating organizations.

We don't have the total solution yet, but we do

know that the information exchange environment must be trusted, inclusive and maintained by all participants. Creating and maintaining this trusted information exchange environment will not be easy or painless. And, obviously our initiatives will require close coordination through the new assistant secretary of defense for Homeland Security as well as the new Department for Homeland Security.

intercom: What do you see as C4's role in supporting USNORTHCOM's top goals, objectives and priorities?

General Meyerrose: First, I'd like to make a point about the “C4” label. In candor, the stereotypical translation of “C4” in most minds only centers on the last two components—communications and computers. Personally, I believe the acronym “C4” and the associated “baggage” with its accepted usage is too limiting and marginalizes the contributions of our top-notch people to the mission. By the same token, the historical label of “systems” emphasizes only the technical side of our efforts. So, you won't see “C4” or the word “systems” in my duty title. That's not to say we won't continue to supervise these functions within NORTHCOM, but that's not our focus. The command broadened our J6 purview and responsibilities to encompass architectures and integration endeavors that figure how to deliver mission effects for the entire unified command and our partners.

The change in scope of J6 responsibilities mirrors that which Air Force senior leadership is doing with the Air Staff's deputy chief of staff for Warfighting Integration. I believe it's imperative to get out from under the “C4,” “system,” and “technical” stereotypes of the past in order to remain relevant to warfighters and commanders. Our ultimate goal is to transform the traditional roles from narrowly focused responsibilities as systems specialists to become operationally focused enterprise and information architects and operators who directly enable and conduct command and control functions for military operations.

Having said that, it's easy to identify my top goals, objectives and priorities—they are identical to those of this command and commander. As the J6, I have a role in every single command priority. And, for those most closely linked with the information exchange challenge that I previously described, we are flight lead for the team.

intercom: One of USNORTHCOM's responsibilities is to coordinate military support to public law enforcement and civil authorities, especially in case of a military or terrorist attack on the nation.



How do you anticipate J6 will help meet this responsibility?

General Meyerrose: It's important to remember that direction for working in this domain comes from the secretary of defense. As such, it is unlikely that we'll have much play in the strategic or policy arenas. Most of our activity will be between the operational and tactical levels of execution. We will constantly work the situational awareness challenge with our partners on a broad cross-section of potential situations. Using the athletic analogy, we'll be continually dressed on the bench ready to go into the game as needed. If the challenge is strictly a military one, it will likely be a response of last resort, USNORTHCOM will be in charge, and the consequences will be dire. For all other scenarios we will support another agency.

The initial J6 activity will have two thrusts. The first is to ensure that our military command and control are always ready so that any necessary military response will have the precision, lethality and decisiveness that the American people and the world have come to expect from our military. The second thrust is to continually anticipate whom we need to partner with in any given situation and ensure the trusted information exchange environment exists in order to get the job done.

intercom: What is USNORTHCOM's role in cyber intelligence, and helping to prevent cyber attacks?

General Meyerrose: USNORTHCOM's cyber role is no different than any other regional combatant commander. We are working in concert with U.S. Strategic Command at Offutt AFB, Neb., who has the global information operations mission, to prevent, preempt, deter, and counter cyber attacks against the infrastructure in our area of responsibility.

intercom: What other key C4 programs are you pursuing?

General Meyerrose: We play key roles in a wide range of programs, most created prior to USNORTHCOM's creation. We inherited an Advanced Concept and Technical Demonstration from Joint Forces Command aimed at improving command and control processes for homeland security missions. We play a pivotal role with NORAD and USSTRATCOM in the Combatant Command Information Command and Control System concept being funded by the Air Force's Integrated System Command and Control contract vehicle.

We are teaming with the Joint Staff on a proposal called Protect America which seeks to integrate intelligence with other information into a portal environment with the intent of creating the initial information exchange construct across the federal government down to the state and local levels. While we don't yet have approval to proceed, we're gaining tremendous insight into the challenges that lie ahead.

As you might expect, we're also involved in a myriad of joint projects and programs with other combatant commanders, DISA, DARPA, and the National Guard Bureau, just to name a few of our partners. We are focused on integrating our efforts with the standard, joint collaborative and Global Information Grid endeavors.

intercom: One of the Defense Department's priorities is to transform its way of doing business by achieving close integration of C4ISR assets. How well is this working within USNORTHCOM, and in relation to other DOD components?

General Meyerrose: It's too early to determine the effects or the return on investment from our transformational initiatives. Being a new command, we have been afforded the opportunity to

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AF/XO offers perspectives on C4 transformation

Maj. Gen. Randall M. "Mark" Schmidt, Air Force assistant to the deputy chief of staff for Air and Space Operations, responded to intercom questions regarding XO's role in helping to transform Air Force communications capabilities to better meet integration issues.

intercom: How effectively are the Air Force transformation and the new C4ISR structure – with responsibilities shared between AF/XI, and elements of AF/XO and AF/IL – meeting the C4ISR needs of the warfighter?

General Schmidt: The new C4ISR structure has proven to provide great benefit to solving some long-standing integration issues. The XO and XI staffs are working closely to ensure we provide warfighters the best capability in minimal time. As a team, our staffs have worked hard to ensure the Air Force chief of staff's vision of making the AOC weapon system a reality. During Operation Enduring Freedom, we responded immediately to warfighters' needs. For example, we improved direct support of our tactical air control party personnel. We not only defined requirements, but also reached the final phase of fielding equipment to modernize capabilities these young warriors are using to execute operations. Our TACPs are at the tip of the spear, and we're working together to reduce response time required to meet their needs.

intercom: How is XO contributing to C4ISR support?

General Schmidt: The U.S. Air Force is the world leader in C4ISR support. To ensure our forces remain responsive to warfighter needs, AF/XO is leading the CSAF's Space and C4ISR Capability Review and Risk Assessment. The CRRA effort will assess our ability to leverage existing and planned space and C4ISR capabilities to meet demands of an uncertain and challenging future. CRRA recommendations will help senior Air Force leaders shape future transformation efforts.

intercom: How important is information operations?

General Schmidt: Successful information operations is extremely important not only to the Air Force, but to all military services and the nation. Successful United States and coalition operations depend on our ability to gain, exploit, at-



“ Today, the Air Force recognizes that information and information systems serve equally as a force multiplier, a target and a weapon. ”

Maj. Gen. Randall M. "Mark" Schmidt

tack and defend information and information systems. Today, dependence on information and information systems – and our need to protect them from a full range of threats, from computer hacking by criminals, vandals, and terrorists, to overt attacks by other nations – has brought focus and compelling relevance to emerging IO concepts. The threats confronting U.S. IO capabilities are no longer defined solely by geographical or political boundaries. Just as the United States plans to employ IO against its adversaries, if necessary, we should expect our adversaries to have and apply similar capabilities. The global war on terrorism has placed heavy emphasis on the importance of IO. From the national-strategic to the tactical levels, IO, synchronized with other military and non-military activities, will continue to play an important role. IO's importance to the warfighter will only increase as time passes.

intercom: How do you rate the Air Force in that area?

General Schmidt: Five years ago, there was no formal Air Force doctrine for information operations, no organizational concept for long-term IO support to the warfighter, and limited development of information warfare tools. Today, the Air Force recognizes that information and information systems serve equally as a force multiplier, a target and a weapon. Consequently, IO has become an integral part of air and space operations, executing 365 days a year and 24 hours a day. The IO mindset is essential in formulating Air Force policy, doctrine and concepts of operation that drive development of offensive and defensive capabilities. It also defines how the Air Force presents its

capabilities to the warfighter.

Accordingly, the Air Force has taken major steps to align IO capabilities under a numbered air force. To best support requirements of the combined forces air component commander and joint force air component commander, the Air Force has consolidated elements of information in warfare, or IiW, and information warfare, or IW, under an IO NAF. The ability to gain and exploit adversary information, or IiW, has been accomplished through integration of existing intelligence, surveillance and reconnaissance assets within the NAF. Defend and attack capabilities have also been integrated into the NAF through alignment of capabilities resident in the Air Force Information Warfare Center, the Air Force Computer Emergency Response Team, and information warfare flights. These entities make it possible to target an adversary's information and information systems as part of an integrated planning process.

The Air Force continues to develop and integrate the full spectrum of IO activities to maintain information superiority at all times, whether in peace, crisis, war or reconstitution. We recognize that future battles may be fought and won, or even deterred before they begin, through application of information operations. IO is as critical as dominating the air, land, sea and space environments. It's an indispensable and synergistic component of air and space power.

intercom: What's the significance of regarding the AOC as a weapon system?

General Schmidt: In a number of ways, the Air Force has been transforming since the end of the Cold War. As we look ahead, we'll continue to develop new technologies, while improving on current assets. First, air and space operations must complement each other. The goal is one team working to precisely locate, identify and destroy the target, if required. So we must become more proficient at the operational level of war. To accomplish this, the Air Force created a new "weapon system" – the air and space operations center. The primary job of the AOC, comprised of highly-trained and qualified men and women, will be to put actionable, decision-quality information in front of the commander. The weapon system construct institutionalizes the formal training required of these "new" warriors, thus giving the staff the experience needed to successfully direct operations on future battlefields.

The AOC evolved from a group of stand-alone systems, each providing a specific capability, but

often lacking interoperability with other command and control systems and nodes. When General (John P.) Jumper (Air Force chief of staff) declared the AOC a weapon system, he envisioned AOC capability, manpower, training, funding and advocacy issues being addressed from a single program management perspective. The AOC would later establish its own funding profile, and compete against other weapon systems on its own merit. The AOC System Program Office was established as the focal point for integrating new systems and managing configuration of this complex weapon system. A program element was established to centralize AOC funding oversight and to provide the secretary of defense and secretary of the Air Force clear insight into prioritized requirements for future technology upgrades. Senior leaders have also identified a need to standardize AOC processes with clearly defined training. The Command and Control Warrior School is revising AOC training curriculum to align with other weapon systems. Future AOC warriors will be certified in a specific position within the AOC, and maintain currency through prescribed continuation training requirements.

intercom: How has the AOC evolved since 1994 in Vicenza?

General Schmidt: Many of the theoretical difficulties of command and control were revealed during Operation Desert Storm. Huge sortie counts and unrefined planning systems made it nearly impossible for commanders to react to targets of opportunity. Today, time-critical targeting is the centerpiece of AOC execution against emerging threats. Lines between "strategic" and "tactical" operations and forces have also blurred, resulting in the need for joint force air component commanders to be skilled in translating JFC guidance and apportionment decisions to effectively command and control a highly complex air and space power plan to support the theater campaign plan.

In recent years, we've focused a lot of attention on integrating operations and intelligence functions, in terms of both people and systems. We're working hard to eliminate stovepipes and make the next generation of automated systems truly interoperable. Our pursuit of machine-to-machine interfaces is driven strongly by the requirement to eliminate seams in the kill chain, reducing the time needed to find, fix, track, target, engage and

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assess operational concepts, organizational constructs and business processes through a transformational lens. As a result, we're developing and validating operational concepts that quickly enable us to adapt our organization from a staff construct to an operational one commensurate with events across the full spectrum of potential conflict. From a functional perspective, these transformational initiatives translate into tightly integrated operations among traditionally stovepiped areas, namely intelligence, operations and command and control. Our goal is to deliver synchronized operations to reduce decision time and enhance situational awareness based on integrated architectures derived from concepts of operations.

intercom: What do you see as

your way ahead within USNORTHCOM?

General Meyerrose: I am excited about the future. I find the challenge exhilarating and the opportunities beyond anything that I could have imagined only a short time ago. The expanded role of the J6 integrating a broad range of command capabilities brings with it bigger responsibilities, but more relevancy from the command's perspective. We must champion efforts to continually enhance situational awareness capabilities and provide a trusted environment for decision-making and collaboration with our homeland security and homeland defense partners. We will depend on smart integrating technologies to automate information exchange, correlate information, and disseminate knowledge on a "need to share" basis. We can only do this through agile architectures that are repeatable, scalable and

sustainable.

intercom: Is there anything else you'd like *intercom* readers to know?

General Meyerrose: I preside over many re-enlistment and promotion ceremonies where I administer the oath of office. Since 9/11/01, a portion of this oath has taken a new and greater meaning, namely: "...support and defend the Constitution of the U.S. against all enemies foreign and domestic...." While these words were first put in the commissioned officer oath of office in 1868, their impact is more relevant than ever. For those of us assigned to USNORTHCOM, we think about these words daily and work diligently to live up to our country's expectations. The task is not easy, but USNORTHCOM J6 has a great professional team from all of the services and the U.S. Coast Guard, and we're ready for the challenge.

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assess our effects from minutes to seconds.

Over time, our AOCs have moved toward reach-back concepts for imagery exploitation and analysis, helping to reduce the forward footprint in-theater. However, as the pace of technological advances continues to accelerate, we're struggling to manage the manpower, training and technical support required to incorporate new systems and capabilities into our worldwide AOCs.

Since air and space power is inherently joint, we've worked to develop common message sets and interoperability standards, including joint interoperability tactical command and control systems, and tactical air forces integrated information systems. We've also leveraged joint efforts such as ground and amphibious military operations, which was the foundation for the Marine Tactical Air Operations Center. As information

technology continues to improve, we're working to accelerate infusion of IT into the C2 business. Since the AOC is such a cross-cutter, we've worked many different efforts to set up management structures to bring the combat air forces together on this issue.

Operation Desert Storm truly marked a turning point in our approach to operational-level C2, and helped steer us toward significant technological, operational and doctrinal concepts that we embrace today.

Ultimately, we must manage our C2 capability like any other combat capability we bring to the fight – as a weapon system. Declaration of the AOC as a weapon system is a significant milestone, but we still have a long way to go.

Achieving full operational capability of our new Middle East CAOC just prior to OEF set the bar for others to follow, but we continue to work on refining our organization, systems, people and processes to optimize C2 of air and space forces.

Information operations key to AF future success

By Brig. Gen. William T. Lord
Director of Comm and Info Systems
with **Capt. Anthony S. Gamboa** and
Capt. Eric P. Oliver
HQ Air Combat Command
Langley AFB, Va.

These are exciting times to be in the Air Force. The rapidly developing field of information operations is paving the way for the Air Force to change an adversary's course of action without being restricted to traditional force-on-force confrontations. New doors are opening quickly, and we must be prepared to rush through them into the brave new world. Old paradigms may fall by the wayside much the way they did after Billy Mitchell sank the Ostfriesland. The vision for IO is a fully integrated mission area, exploiting asymmetric strengths to generate tactical, operational and strategic effects across the spectrum of conflict from peace to war and back to peace. The questions we now confront are: Is the vision worth pursuing, are we ready for it, and, if so, how do we develop IO to match the expectations?



Brig. Gen.
William T. Lord

Historical perspective

For as long as humans have engaged in conflict, the desired effect has always been the same: to change the opposing leadership's thinking and, therefore, his actions, with minimal cost to allies.

Diplomacy has traditionally been the first tool for influencing an opponent and has met with varying degrees of success. Nation-states usually focus on diplomacy as the first course of action because it holds promise for minimizing the cost of confrontation.

If diplomacy fails, war is sometimes adopted as "the continuation of policy by other means," as Clausewitz postulated. Traditionally, we have had to fight our way through terrain and fielded forces at great expense in time, material, and carnage before we could directly influence adversary leadership. The development of air and space forces has provided an ability to overcome the tyranny of distance to a great degree, but still at the expense

of time and loss of life. The tremendous price difference between diplomacy and war has served as a deterrent to war for centuries.

However, in the 21st century information age, development of information forces has decreased this price, making it possible to overcome the tyranny of distance at the speed of light with non-kinetic capabilities that do not rely solely on physical destruction or visible disruption. Warfighters can now directly target an opponent's thinking and loosen his grip on power. As technology has facilitated the capability, military thought has turned toward the goal of rapidly and decisively using information or its interruption as a weapon against those targets.

Unfortunately, history demonstrates it is not always possible to influence an adversary with anything less than physical force and violence. The ultimate measure of merit for every tool, tactic, technique, and procedure used in conflict is: How well does it support the goal of changing an adversary's course of action? Confronting fielded forces in a 20th century-style, attrition-based conflict does hold potential for changing an adversary's mind, but it is a very costly methodology requiring a large force structure.

As the information age matures, we are discovering, and in some cases rediscovering, new ways to generate all of the effects, both lethal and non-lethal, needed to impose our will on an adversary. We are beginning to mass effects rather than mass forces to attain our objectives. Control and exploitation of information—IO—holds the key to massing decisive effects across the spectrum of conflict.

Information operations and the Air Force

Stated broadly, IO can be described as the struggle to control and exploit the information environment much as air operations can be described as the struggle to control and exploit the air environment. This is not to say IO's impact is limited to the information environment. Just as operations in the air can have tangible effects in the land or maritime environments, operations in the information environment can impact the full spectrum of operating environments as well. IO is not just "cyber war" or computer-network centric warfare. Full spectrum IO includes a blend of tools, targets and techniques that are both old and new.

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However, emerging technologies *are* increasing the speed, reach and lethality of all aspects of IO.

Doctrinally, the Air Force divided IO into two categories. The first is information warfare, which is IO conducted to defend the Air Force's own information and information systems or to attack an adversary's information and information systems. IW to attack or defend is also known as offensive or defensive counter information, OCI or DCI, respectively. The second category is information-in-warfare, a term that describes the broad range of information functions that provide commanders the means to gain and exploit information, and includes activities such as ISR, weather, precision navigation positioning, and public affairs. Current Air Force IO doctrine is illustrated in Figure 1.

We believe this view of IO can be improved by taking a wider view from different perspectives. IiW is not IO specific; it also provides critical support to the full range of operations in the air and space mediums. IO is best viewed as an integrated part of an air and space campaign designed to bend an adversary to our will. Figure 2 offers an alternative, fused view of IO designed to address some of the limitations in the current doctrinal picture, which shows what IO is, but doesn't show how the various parts of IO relate to each other.

The information operations road ahead

This fused view acknowledges the potential for synergy between IO and traditional air and space operations. Like interlocking rings, operations in all domains are mutually supporting. In this picture, a conventional air or space attack could be an IW defensive action. Conversely, an IW attack could be an air or space defensive action. Further, in this picture there are many other possible permutations where activities in the air, space and information arenas are mutually supportive. This model also recognizes that all the capabilities of IiW are foundational, enabling attack and defense in the information, air and space domains, and it clearly shows all operations rely heavily upon a secure, interoperable and reliable IO environment to produce information services.

Gen. Hal M. Hornburg, commander, Air Combat Command, envisions a time when IO could be decisive in conflict. To achieve that vision, we must begin to view IO as a strategic, operational and



Conceptual View of Information Operations
Figure 1

tactical capability that generates integrated effects supported by and in support of operations in the air and space domains.

The first step toward realizing this vision is to communicate the vision. Toward that end, ACC/SC has been tasked to develop the Air Force IO concept of operations and is rapidly moving out in that direction.

Although it is still early in the drafting process, it is clear the CONOPS will not advocate a continuation of the status quo. Instead, it is transformational, proposing many new ideas. Some of the ideas may be immediately executable, but others may take years to fully realize. Transformation only becomes possible when doctrine, policy, organization, training, material, leadership, personnel, and the relationships between them are considered in innovative ways. The emerging CONOPS will carefully consider these various pieces and shape each of them to realize ACC's vision.

One of the first changes of interest to communicators is the modification of the doctrinally accepted term "computer network operations." It is our intent to rename "computer network operations" as "network operations," by moving attention away from traditional Internet Protocol-based networks and encompassing all manner of networks to include radio nets, satellite links, tactical digital information links, telemetry, digital track files, and supervisory control and data acquisition systems, among others—the full scope of networks is included that provides the ISVs needed to prosecute operations in all domains.

Communicators will become operators of network-based, non-kinetic weapons. What exactly

with and trusts.

Execution authority for many non-kinetic attack capabilities must be delegated to lower levels. We should reexamine the standing rules of engagement to ensure we can rapidly respond to time-critical/time-sensitive targets in the information domain.

The funding strategy for IO must be overhauled. Until we put our money where our mouth is, IO will not become a robust mission area. Perhaps there needs to be a single focal point at the Air Staff level to ensure adequate vetting of IO-related program elements and funding requirements.

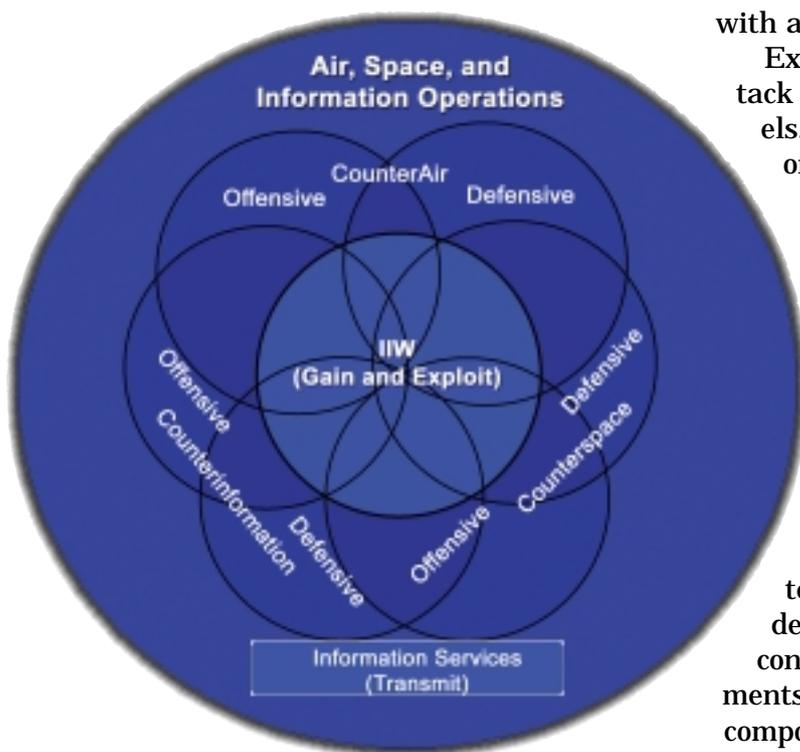
We must also ensure seamless plan integration with the joint and civil worlds and develop a model for force presentation. One concept being explored to address these requirements is a joint force air, space, and information component commander. Today, we have one boss for each of the currently recognized domains: maritime, land, and air and space; we need one boss orchestrating the strategic IO campaign to ensure synergy between the various services is maximized.

We need to resolve differences between joint and Air Force IO doctrine. The present Air Force model is much more expansive than the joint model, so we must establish a mutually agreed upon position before we can truly leverage our IO capabilities in a joint arena.

Command relationships need to be reviewed. In order to execute effectively in the information domain, a domain without meaningful boundaries, we must establish a clear combatant command authority and specify operational control of all the actors and material that comprise the domain.

As the new concept for information operations takes shape, it must seamlessly integrate with all the instruments of national security to provide for a stable, secure future. Let's take a look at what that future may hold.

We must invest the time and treasure now, so we will be prepared to conduct decisive operations in the information domain. We will be able to mass effects without massing force. We will be prepared to precisely attack adversaries at the speed of light, while simultaneously defending against similar attacks on our own pillars of national security. We will be able to achieve the overriding objective of any military force – support national political objectives. These are indeed exciting times.



Fused View of Information Operations
Figure 2

constitutes a non-kinetic weapon is a subject for future debate and exploration, but we must begin to address the issue. How we go about realizing the vision also remains to be determined, but there are several possibilities.

One possibility is to maintain the communications career fields “as is” and simply pull the operations piece into it. Another possibility is to develop a new career field, an information operator, which trains to be a warrior of the information domain. A third possibility is a hybrid: communications, intelligence, and operations career fields remain untouched, but they all feed personnel into the information operations career field after they have established several years of experience in their respective disciplines.

Regardless of how the IO force is developed, we will be driving it out into the open, out from behind “the Green Door” to experiment and exercise with it. If IO is to realize its potential, we must put IO into flag exercises and fully develop a non-kinetic weapons school modeled after Air Force weapons school.

There must be an integrated non-kinetic and kinetic Joint Munitions Effectiveness Manual, and senior leaders must have experience with it. A joint force air component commander is much more likely to use tools that he or she has experience

Acquisition chief discusses transformation

By **Chuck Paone**

*Electronic Systems Center Public Affairs
Hanscom AFB, Mass.*

“Command and control, and intelligence, surveillance and reconnaissance integration is perhaps the most significant of all (Department of Defense) transformation goals. It’s absolutely paramount,” said Dr. Marvin Sambur, assistant secretary of the Air Force for Acquisition, on a visit to Hanscom.

This is true not only for the Air Force, but for all the military services, the Air Force’s top acquisition official said.

According to Sambur, communication and creativity are key to transforming the defense acquisition process to achieve integration.

The status quo is unacceptable, he said, because the time it takes the acquisition cycle to go from concept development to initial operational capability is much too long.

“Air Force programs’ cycle times run about 10 years, and that’s only the average. Some programs take up to 25 years to get to the field,” he said.

One example is the F/A-22 Raptor, which was conceived in 1981 and will not achieve initial operational capability until 2005 or 2006, he said. He contrasted this to the automobile industry, which has cut its cycle times to just a couple of years.

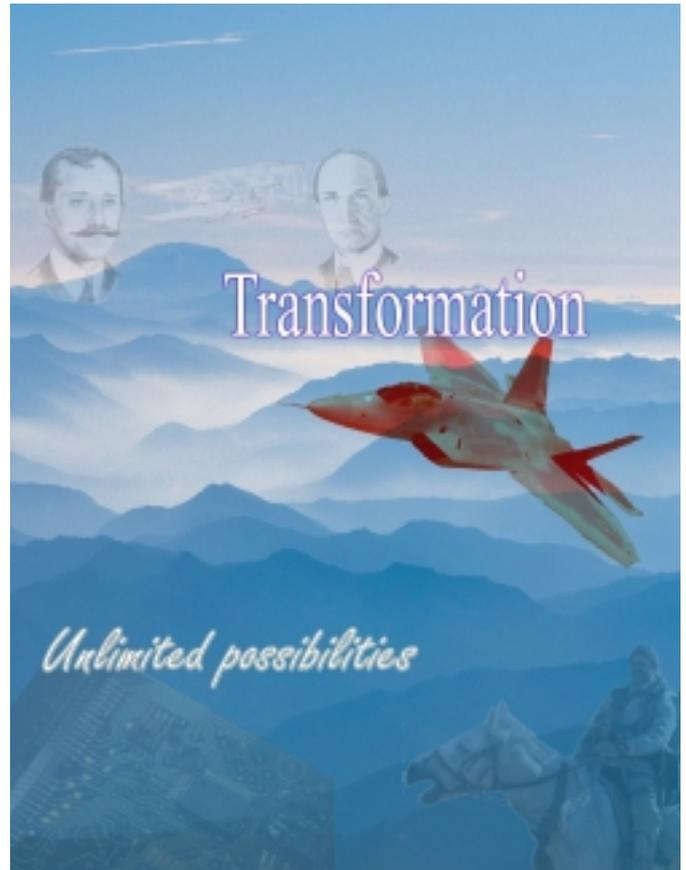
Besides the basic problem of not getting the capability to operators quickly enough, too many other problems are created when programs get stretched out, Sambur said. For one thing, it becomes very hard to keep up with technological changes.

“When it takes so long, it just can’t be state-of-the-art,” he said.

There are also political implications.

“When leadership changes several times during the process of fielding a system, the program gets opened up to increased scrutiny, and it gets threatened,” he said. This often creates problems for the program, delaying the process and causing budget overruns.

This negative cycle can then adversely impact other “healthy” programs, from which funds are often siphoned to cover the shortfalls, he said.



While program managers have many tools to help avoid or reduce these problems, one thing is essential in every case.

“Collaboration is the answer,” Sambur said, stressing that constant communication among all the parties involved is what ultimately makes the difference between successful and problem-plagued programs.

“Have you ever noticed how much faster we’re able to deliver things when we’re at war, how we’re able to deliver in months what might otherwise take us 10 years?” Sambur asked. “What do you think the difference is? It’s that everyone’s talking to one another all the time.”

Reducing burdensome regulations and affording managers greater autonomy are crucial to improving the acquisition process, Sambur said.

Leaders have to ensure creative program managers aren’t unnecessarily penalized for taking chances that ultimately don’t work, and to reward people for taking chances that pay off.

“You’ve got to let program managers manage,” he said. *(Courtesy AFPN)*

New strategy globalizes Air Force information

By Staff Sgt. C. Todd Lopez
Air Force Print News
Washington

The Air Force is changing the way it manages information, according to a recently released document by the service's chief information officer.

John Gilligan said the 2002 Air Force Information Strategy is designed to standardize the way the Air Force uses the increasing volume of information it generates in performance of its mission. "This is a document that helps galvanize the Air Force toward a consistent approach on how we want to use and manage information," Gilligan said.

"Another motivator for the information strategy is that information is becoming an increasingly important part of our ability to conduct our Air Force missions, warfighting in particular."

The overriding idea presented in the strategy is that the Air Force will create a single, global, integrated digital network available to all members who need information. The network would provide what information is necessary, where it is necessary and when it is necessary.

"To be able to effectively leverage information, all Air Force members need to have access," Gilligan said. "Not only will we have a ubiquitous network, but everyone will have access to it."

For warfighters, a global network will mean quicker access to targeting, weather and intelligence information.

One example is the linking of the equipment used to find bombing targets. In Afghanistan, special operations members on horseback used laser range find-

Master Sgt. Bart Decker, an AF combat controller from Hurlburt Field, Fla., rides horseback with the Northern Alliance in Afghanistan. Decker and fellow combat controllers provided air traffic control support during Operation Enduring Freedom.



"Combat inspires the need to invent things on the spot when you have to handle difficult circumstances you've never come across before," AF Chief of Staff Gen. John P. Jumper said during testimony to Congress this year. He cited special forces troops

riding horseback in Afghanistan using laser goggles to help relay target locations through laptops to a satellite as an example of how people handle difficult circumstances. Jumper credits the ingenuity of young troops as the greatest transformation element being used in the Air Force.

ers to pinpoint targets. They used the global positioning system to find their own coordinates and then manually calculated the coordinates of the target. That information was radioed to an operations center that relayed it to an aircraft.

With a global network, the various electronic systems used in that chain of information could be made to work together, Gilligan said.

"We had not thought to link the laser range finder to the GPS receiver to a data link capability," he said. "An example we can now demonstrate in the field is that the special operations person clicks on the laser range finder and then, within milliseconds, that information is in the cockpit. That is going to speed up the ability to prosecute time sensitive targets by many minutes."

The Air Force's global net-

work will benefit more than the warfighter, Gilligan said. Maintenance information for aircraft, or even video footage of complex repair techniques, will someday be available online. Maintainers will be able to access information with a handheld computer from anywhere in the world.

Additionally, because personnel, medical and financial information will be available globally and around-the-clock, Air Force members will be able to accomplish actions in those areas, regardless of their own location.

"In the future, when airmen want to perform personnel or finance actions, they will no longer go to the personnel flight or down to the finance office. They will do the majority of that online, 24 hours a day, with self-service capabilities," Gilligan said. "Physical location will no longer be a limit."

Officer career field development initiatives update

By Maj. Kelly A. Kirts

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Washington*

Have you ever wondered who is responsible for developing the future of the communications and information officer corps? If you're a comm and info officer, the answer is "you." All comm and info professionals are responsible for monitoring and molding the future of the comm and info community. However, the actual day-to-day responsibility for comm and info officer professional development resides with the Force Development branch in the Force and Information Management division, under the new directorate of Communications Operations, deputy chief of staff for Installations and Logistics, Headquarters Air Force. The Air Staff, working with representatives from all the major commands, the Air Force Personnel Center and the Air Force Communications Agency, plan, advocate and implement initiatives to improve and maintain the capabilities of the comm and info officer corps.

It has been more than four years since the last formal review of the 33S-training program. As information technology continues to advance, it has been increasingly difficult to keep our technical training current with the increased level of competition for budget dollars. Despite the challenges we face, it is obvious we must still strive for modernization in our training programs.

Lt. Col. Sheron Bellizan, chief, Force Development and Information Management division, said, "We have to be creative in how we deliver comm and info training. Our officers deserve the very best training that we can offer so they are equipped to provide comm and info capabilities across the full spectrum of operations. Modernization of our initial and advanced course curricula coupled with improved relevancy to field operations is part of the Air Staff's plan to improve 33S officer training." To facilitate this effort, several initiatives are under way, all working toward the final goal of ensuring the Air Force's comm and info officers are prepared to overcome any and all operational

challenges.

The Air Force Occupational Measurement Squadron briefed the preliminary findings of their 33SX Occupational Survey Report. This review started in 2000 by identifying and capturing the day-to-day tasks of comm and info officers at 15 representative bases. Then, 2,396 33S officers, approximately 48 percent of the comm and info officer community, completed a survey about the different aspects of those duties. The survey results captured a relevant snapshot of the jobs being performed in the Air Force today. We have started comparing the initial survey results with the Basic Communications and Information Officer Training and the Advanced Communications and Information Officer Training course curricula. The goal of this effort is to produce the first Career Field Education and Training Plan for the 33S officer career field. The CFETP will document the core competencies and tasks that comm and info officers need to perform in day-to-day operations. The CFETP will also identify how these tasks flow directly into formal career field training. The direct link between the CFETP and core training requirements make this document a key part of the formal education and training process review.

Another project under way supporting the career field training review is the Career Management Master Plan. This effort will integrate information generated from the OSR and the officer CFETP along with similar information from the enlisted and civilian career fields. This document will outline specific career field developmental and training information for our officer, enlisted and civilian force in one document. It will outline retention, education and training and career development initiatives for the comm and info total force. Most importantly, it will provide our vision and guidance in the development of our future total force. The CMMP will serve as the focal point for all comm and info professionals by consolidating the various professional development sources under one comm and info umbrella. We believe that any airman, officer or civilian will find relevant information about individual professional development in addition to information impacting the en-

tire comm and info community. The goal of this overarching document is to promote accessibility to relevant information as well as to foster an increased awareness and understanding of the total comm and info force by all comm and info professionals.

Once the core responsibilities for comm and info officers are captured, it will be time for us to review how our formal training prepares officers to meet those challenges. Specifically, the comm and info community is gearing up for a Utilization and Training Workshop. The U&TW will provide recommendations to senior leadership on course modifications to 33S training. The process of updating the BCOT and ACOT training programs starts with the U&TW and concludes when final course modifications are implemented. AF/ILC is working with the schoolhouse and the MAJCOM SCs in planning the next workshop in early 2003. This detailed course review is expected to produce a relevant and technically current course curriculum, and will identify opportunities for leveraging technology in the instruction process.

A prime example of technology insertion is the new BCOT Network Lab. The new lab integrates current equipment with additional state-of-the-art components increasing opportunities for students to receive applicable hands-on training. Additionally, the new lab will allow instructors to demonstrate realistic network configurations and provide exposure to the operational situations officers will experience in the field.

Another example of a new training initiative is the BCOT "Exportable" course for traditional Air National Guard and Air Force Reserve members. This distance learning course is designed to meet some of the challenges faced by Guard and Reserve members who are required to attend the 13-week in-resident course to achieve AFSC upgrade. The course officially is known as the traditional AFRES and ANG Communications and Information Sys-

tems Officer course and is comprised of three components.

1. Distance Learning — interactive, self study, computer-based training package
2. Network Operations Block (two-week in-resident)
3. Fixed and Deployable Communications Block (two-week in-resident)

Successful completion of all three parts equates to attending the 13-week in-resident course and satisfies the mandatory BCOT requirement. ANG and AFRES members will have four years to complete the three blocks in any order, and 24 months to complete the exportable block once enrolled. As of December 2002, all three components of the program are available and applicable members can enroll.

Lastly, we need to ensure that feedback mechanisms are in place to analyze initial and advanced training course deficiencies. To this end, we are working with AETC to develop surveys targeted at BCOT/ACOT graduates, and their supervisors. We believe this will provide feedback on how well those courses have



prepared them for their jobs.

Even with all these ongoing efforts, it is imperative that all 33S officers realize they play a significant role in the force development process. Identifying problem areas for improvement is the easy part. Finding, recommending and implementing the changes to solve those problems is the difficult part. All officers need to remember that the process of career management is everyone's responsibility. We must continue to make progress today to guarantee success tomorrow.

To find out more information on issues facing the comm and info community, please be sure to check out the 33S Communications and Information Officer Web page from your .mil access at <https://www.afca.scott.af.mil/33sx/> or contact the Force Development branch at DSN 425-1527 for more information.

Maintenance standardization and evaluation program becomes easier using MSEMS

By **Senior Master Sgt. Rodney Doyel**
*HQ Air Combat Command
Communications and Information Systems
Langley AFB, Va.*

Have you ever pondered the irony of why a program designed to evaluate standardization, has never itself been standardized? Over the years as units labored to meet the requirements of the Maintenance Standardization and Evaluation Program, a myriad database programs were locally created to manage this complex program. The result was less than effective. Untold hours were spent developing management tools rather than implementing MSEP, only to find that the knowledgeable person left for another assignment with hopes of never working in maintenance support again, and no one else knew how to keep the software running. Enter Maintenance Standardization and Evaluation Management System.

Headquarters ACC and the 82nd Computer Systems Squadron personnel teamed up to resolve these issues and developed MSEMS as a means to standardize MSEP management. The new program provides the feel of commercial software while taking advantage of Web-based technology, allowing worldwide accessibility.

Designed to automate the MSEP process, MSEMS provides a user-friendly, step-by-step report generation process. When the evaluator drafts a report, MSEMS offers the ability to electronically sign the report and begin an automatic routing process. Each successive party's corrective actions or comments are then added directly to the report, negating wasted time spent re-typing sent replies.

The MSEMS automatic e-mail notification function provides comprehensive report tracking throughout the entire routing sequence.

One of the more prominent features of MSEMS is the automation of evaluation scheduling. The new program calculates evaluation dates based on criteria established by setting up unit and personnel profiles. Technical evaluations on equipment are identified based on the sampling plan published in AFI 21-116 to keep workload down while providing valid statistical trending information and a continuous view of required inspections.

MSEMS offers a trend analysis capability to identify and correct negative trends. Evaluation data for a particular unit is stored for eight years, providing scalable, long-term inquiry capability.

MSEMS also uses the same powerful automation tools to manage the Not-Repairable-This-Station function. By incorporating an automated NRTS feature, designers increased MSEMS' effectiveness as a maintenance support standardized tool.

Although initially designed as an ACC program, the need for an effective MSEP management tool quickly expanded to other major commands. MSEMS has a promising future and is being evaluated for use as the standard to implement communications-electronics MSEP management across the Air Force.

Standardization has finally come to the Maintenance Standardization and Evaluation Program. Its name is MSEMS, and MSEP just got easier.

To request an MSEMS account, visit the ACC Web site <https://networks.acc.af.mil/scns/atcals/maintman.shtml>.

"You can't decide one day to work on some transformation," Maj. Gen. Daniel Leaf said. "It happens when the bright men and women of the Air Force question the assumptions that they operate under and look for new ways to achieve the desired effects. Thinking about better ways to do business is the fertile ground from which transformation can grow."



AMC leads Air Force e-mail consolidation

By Maj. Daniel Liggins
HQ Air Mobility Command/SCPP
Scott AFB, Ill.

Air Mobility Command is centrally consolidating information technology services to its network operations and security center, and base network control centers. Currently, each base has dozens of IT servers supporting various missions and functional areas. To use IT resources wisely, the Air Force secretary and chief of staff directed consolidation of all networks, servers and desktop services at each installation. According to the Air Force's chief information officer, the overall intent and continued vision of IT services consolidation is to improve the effectiveness of warfighting and business operations, while increasing efficiency of IT operations.

AMC served as the Air Force's lead command for e-mail consolidation, physically migrating more than 75,000 e-mail accounts in its NOSC at Scott AFB. The massive effort took nearly two years, and was completed in September. Implementation of the aggressive plan required overcoming some challenges.

While executing our cutting edge configuration, we expected to "break some glass," but the true measure of success was in how the command met those tests. We fine-tuned our deployment process to better stage the rollout of Windows 2000 and Active Directory before Exchange 2000. We maintained an excellent partnership with colleagues at Microsoft, EMC, IXOS, Dell, NetIQ and other vendors. With long-haul connectivity being critical, we worked with DISA's regional NOSC to highlight the criticality of dedicated circuits and speed restoration after outages. Finally, we found consolidation of servers can degrade performance until the system is completed and finetuned. Because of this, we are using performance-monitoring tools and are load balancing the remaining consolidated site servers to improve system performance. This is critical because the NOSC delivers more than 2 million e-mail messages each day.

AMC is also the lead command on Defense Message System consolidation. Our initial focus

was on the command's unclassified DMS services. By the time it was completed in September, we had reduced unclassified servers from 48 to 6. In 2003, the focus for DMS is on consolidating classified DMS servers.

The road ahead includes consolidation of public and private Web services; enterprise use of the software management system; consolidation of data and official records on file servers across the command; and consolidation of functional services. Functional automated information systems will be consolidated on a case-by-case basis.

How does this fit within the vision of improving the effectiveness of business operations and improving IT operational efficiency? AMC expects to reap several benefits, including a more robust and secure network architecture, returning

manpower to functional areas, providing a more elaborate backup capability across the command, and a centralized pool of IT professionals within the NOSC.

A key benefit of consolidation is to provide a more robust backup capability at base level.

The plan calls for continuity of operations at a site that will mirror select e-mail, critical data and official records. It will provide

immediate fail-over capability of critical data and services. That will enhance our ability to recover critical data in the event of a disaster at our primary site. The COOP site is still in the planning stages, with implementation scheduled for late FY '03.

The IT services consolidation initiative is also the driving force behind a more robust and secure network architecture. Although the number of probes by potential hackers has increased from 3,764 to more than 5,500 since consolidation, the number of successful incidents has decreased by 45 percent. This can be attributed to standardized technology and security processes. Before consolidation, the command was stricken with the debilitating "Loveletter," "Code Red," and "NIMDA" viruses that resulted in significant e-mail downtime across AMC. For e-mail in the consolidated environment, the NOSC now catches nearly



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USTRANSCOM creates ground-breaking intel tool

By Petty Officer 1st Class Gary Henry
Naval Information Bureau 1018
Kansas City, Mo.

SCOTT AFB, Ill. – A dangerous and volatile world may have just gotten a little more manageable, thanks to a new Web-based program created by U.S. Transportation Command's Joint Intelligence Center.

Transportation Intelligence Digital Environment allows the center's intelligence analysts to create comprehensive transportation intelligence products directly on the Internet. Using TIDE, analysts can get those products to decision-makers and planners much faster than most current methods allow, says Francine Billings, JICTRANS Chief of Systems Requirements.

Change is the only constant

TIDE, online since September, is a Web-based program. It gives analysts near unlimited ability to combine text, graphic, photo, video and audio files – including live feeds – into comprehensive reports, briefings and other Web-based intelligence products. The program automatically codes these files for the Internet. That means after a unit-level review, users can easily and quickly post their products, Billings said. Online, the information is instantly available to mission planners.

Because TIDE is database driven, the posted information automatically updates each time the databases TIDE connects to are updated. That, says Col. James Marchio, JICTRANS commanding officer, is a huge advantage in a world where change, often violent, is the only constant.

Bomb threats, anti-American demonstrations, mines in ports and surface-to-air missile launches are not everyday events, but they do happen, said Marchio, who has dealt with all of these situations during his 20 years in the intelligence community. TIDE's timely production of intelligence products will go further in helping missions avoid those unpleasant surprises.

"Many stand to benefit from faster, more efficient transportation intelligence," he said. "That includes sailors making overseas port calls and aircrews flying supplies to our troops in unstable areas of the world.

"It would also include the Afghani men, women and children who escaped starvation last winter thanks to the millions of Humanitarian Daily Rations USTRANSCOM air-dropped in-country."

Time is of the essence

Billings, who led the effort to develop TIDE, explained that the nation's intelligence community has long sought faster, more in-depth methods for delivering information to leaders.

"Recent events, including Sept. 11, have underscored the fact that time is of the essence in delivering information," she said. She contrasted the streamlined TIDE process to the cumbersome reporting methods of the '80s.

"You write a draft, send the manuscript up the chain for review, incorporate the changes, and then send the report to a graphics shop," she said. "From there it goes to the publisher, where it could be bottlenecked awhile, depending on its priority. Eventually the report is printed and distributed. The only problem," Billings pointed out, "is that three months may have elapsed since the conditions existed that you originally wrote about."

Although methods have improved since then, "before-TIDE" reporting methods still had bottlenecks and limitations. Analysts have had only a limited ability to incorporate other types of files into their text reports, and once completed, the reports still must be sent to another shop to be coded for the Web. TIDE remedies all that, she said.

They didn't wait

For Marchio, one of the most remarkable facets of TIDE is the way it was conceived and created.

"TIDE is a tribute to the ingenuity of our folks,"



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240 viruses per week, ultimately resulting in much less downtime across the command.

One of the advantages of consolidation is to give the NOSC a centralized pool of IT professionals who can provide more responsive, technically competent services to AMC customers. Another advantage is to allow manpower previously performing system administrator duties to be returned to the regular workforce. E-mail consolidation reduced the number of system administrators required for e-mail administration from 15 to 6. DMS administrators were reduced from 24 to 6. AEF issues are being addressed at the major command level and further guidance is coming soon.

AMC has made great strides in IT services consolidation. The command's leadership role in this Air Force-wide initiative, and strong partnerships with vendors, helped AMC receive recognition as the Microsoft's 2001 Technology Innovator of the Year. While some issues are still to be resolved, AMC is transforming the way the Air Force does business. Our goal is to ensure IT services meet or exceed the current level of support provided to personnel on the network, while dramatically improving IT operations. The command continues to echo the Air Force information vision: "Enabled mission capabilities through seamlessly integrated access to the right information anytime, anywhere."

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he said. "Ms. Billing's group saw a need and went out and filled it. They didn't wait for orders or money."

The group – civilian Andy Thompson, Capt. Les Coles, Staff Sgt. Ian Mitchell, Karl Gee and Tech. Sgt. Kevin Kirtley, along with Billings, began by outlining what they wanted in program capabilities. They also asked the JICTRANS transportation analysts what they wanted.

Then the group looked in-house to see what tools already existed. "We didn't want to reinvent the wheel," Billings said.

Finally, they spent about \$8,000 on new software – a pittance, Billings pointed out, when compared to the hundreds of thousands, and even millions of dollars often spent on program development.

Web-based modules

The result, TIDE, consists of several connected Web-based modules. TIDE's heart is a report generator known as report integrated process. It's in this module that analysts build their

products, integrating whatever files they need to paint the picture.

They can also call upon the Transportation Intelligence Network to create custom maps and charts showing port and airfield information. These "geospatial" images can be "layered," Billings explained. A click of the mouse can, for example, reveal on the map all airfields that accommodate C-17 Globemasters. Another click could show C-5 Galaxy-capable fields, then one more click shows the airfields that can accept both.

PACE2, the newest edition of the Port and Airfield Collaborative Environment, can be used with or independently of TIDE. It provides constantly updated data about port and airfield infrastructure worldwide.

A fourth module, Workflow Application in a Digital Environment, currently under development, tracks and coordinates production on line. That means TIDE managers can generate progress reports at a moment's notice, Billings said. WADE also notifies analysts by e-mail as due-dates for recurring reports

draw near as well as assign new tasks.

Rising TIDE

TIDE is used only by the analysts at JICTRANS, the part of Transportation Command's Intelligence directorate responsible for producing transportation intelligence output.

That could change, said Billings. Plans are in the works for analysts in the rest of the directorate to be introduced to TIDE by the new year. The groundbreaking nature of the program has also caught the attention of other DOD intelligence agencies. Tests with other Joint Intelligence Centers are being scheduled.

Though in use, TIDE is still in its infancy. Billings' crew is already at work on enhancements and additions.

Meanwhile, JICTRANS is collecting data on the young program, measuring its effectiveness and estimating its potential.

In day-to-day operations that include participating in the global war on terrorism, Marchio said, TIDE has already proved itself a valuable tool.

Net Decoy system test shows worth, thwarts intruders

By 2nd Lt. Glory Smith

*100th Air Refueling Wing Public Affairs
RAF Mildenhall, England*

The airmen of the 100th Communications Squadron here hosted the first-ever demonstration of the pioneering "Net Decoy" system, combining two defensive information systems that detect, track and potentially identify cyberspace intruders.

The Air Force Information Warfare Battlelab, Lackland Air Force Base, Texas, worked with members from the 100th CS and a team of Air Force computer experts from the 92nd Information Warfare Aggressor Squadron, also at Lackland, "to demonstrate the military value of creating virtual networks (false computer units) designed to decoy attacks and exploits," said Capt. Robert Anderson, project officer for the AFIWB initiative.

Staff Sgt. Michael Thompson, 100th CS, responsible for the evaluation of the Net Decoy demonstration, likens the function of the system to World War II, when Allied forces set up false tanks to fool enemy bombers and expose their movement.

Likewise, Net Decoy sets up false PCs that notify system administrators of the intruder's movement without his knowledge. "It not only detects the hacker, but it allows system monitors to observe his movement and potentially track him down," said Thompson.

The operators of Net Decoy expect Mildenhall to stay online with the system, after the team's departure. After the six-month evaluation period here, the Air Force may install the network intrusion system Air Force-wide, said Thompson.

The intrusion detection system makes information more secure, which is important because so many people use and depend on computers for basic Air Force operations, said Airman 1st Class Jack Jennings, 100th CS, who monitors movement in the wing-wide network.

"While physical security has always been a requirement, cybersecurity is becoming increasingly important," said Chief Master Sgt. Pam Derrow, 100th CS information systems flight superintendent. Information superiority, the ability to control and exploit information, remains one of the core competencies of the Air Force.



Photo by Airman 1st Class Meghan Geis

Master Sgt. Rodney Fuller, left, and Airman 1st Class Jack Jennings, 100th CS, monitor the network for internal and external intrusion using the Net Decoy computer security system.

Derrow said the communications people are responsible for protecting a "virtual" network perimeter, and this system brings brand new capabilities for information and data defense during this new age of cyberwar.

The Net Decoy system brings considerable training opportunities to the airmen through new technology and products, along with an increased sense of urgency in the security environment, said Capt. Charles Celnik, 100th CS information systems flight commander.

Net Decoy is "an additional layer of defense with in-depth architecture that gives the Air Force another tool against internal and external intruders in the cyber war," said Anderson, and it has potential for all DOD installations.

ACC transforms counter drug operations

By John Orsolino

HQ Air Combat Command
Communications and Information
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Langley AFB, Va.

In 1986 the President issued National Security Directive 221 which declared drug trafficking to be a threat to national security. HQ ACC/SC was involved from the beginning as the force provider for the tactical radars and communications equipment known as the ground based radar sites. The locations of ground based radar sites, both real estate and manpower, faced a dual threat from guerrilla and drug runners, adding increased risk to deployed men and women. As is always the case, other deployments elsewhere and the TDY days were taking their toll on specific over-tasked AFSCs. This period also saw the clock ticking toward Howard AFB's (Panama) reversion. With manpower being heavily tasked and the logistics support base's longevity drawing to a close, questions and frustrations increased.

At the same time, HQ ACC/SC was the systems manager for a network of contractor maintained sites throughout the Caribbean, Central and South America. The number of sites in this commercially-equipped and civilian-manned network was more than twice the number of military sites, yet the annual cost was considerably less.

As the load increased to provide hard-hit personnel tempo Air Force specialty codes to man the military sites, the concept of commercialization of the ground based radar sites began to grow. The counter drug section of HQ ACC/SC was soon tasked to convert these ground based radar sites to the commercial successes they managed in the Caribbean Basin Radar Network.

A commercialization plan was written, approved, and the 18-month process was accelerated to 12 months. Today all counter drug sites managed by HQ ACC/SC are commercialized and maintained by contractors via an ACC operations and maintenance contract funded by the office of the deputy assistant secretary of defense/Counter Narcotics. The system of ground sites is now called the Hemispheric Radar System, and all have small U.S. footprints (usually two full-time U.S. contrac-



A remnant of the past for the GBRs.

tors per site with the remainder of the manning being local workers). The on-site operators are participating nation Air Force officers.

The HRS is a network of radar sensors and satellite communications managed by HQ ACC/SCW that provide surveillance of the Caribbean, Central and South American air space for the war on drugs. Besides its primary mission, HRS provides a significant increase in flight safety in the cooperative airspace. The HRS is composed of nine radar sites, seven TPS-70 and two TPS-43 long-range radars. Each of these radar sites has a collocated satellite communications terminal. All sites have their own power generation system; and for those remote locations or for reasons of security, the sites provide living accommodations and messing facilities for the "live aboard" manning. There is a SATCOM terminal hub at Key West NAS, Fla., and SATCOM hubs at each of the military headquarters in Colombia, Venezuela, and Ecuador. Additionally, the HRS network includes radar data feeds from strategically-located participating nation-owned radars. Typically, these feeds (two in Colombia, one in Honduras and one in Ecuador) are made available to the HRS network by the PN at their military headquarters complex. The HRS customers include U.S. Southern Command, U.S. Southern Air Forces, the Joint Interagency Task Force-East, the Joint Southern Surveillance & Reconnaissance Operations Center, and the USMILGRPs in the participating nations. All this is provided while not impacting Air Force manning or "blue" funds.

Transforming combat comm: new mission for new era

By Capt. Tara Routsis

HQ Air Combat Command

Communications and Information Systems

Langley AFB, Va.

Operation Enduring Freedom identified significant issues related to how we bring communications to the fight. It showed us that the Air Force needs a more flexible deployable communications capability with a greater range of employment options to provide communications for the entire spectrum of conflict. Every deployment location does not necessarily require a complete Theater Deployable Communications suite designed to provide services for 1,200 users. We need lighter, leaner, and more malleable communications packages to support today's wide variety of missions. In addition, placing deployable initial communications capability within lead wings makes those units vulnerable to deployments to sites other than where their wing's operations squadrons deploy – if they even deploy. This reduces the wing's in-garrison communications capability and generates complex planning and scheduling problems. Blurring the lines between combat communications units and lead wing communications squadrons appeared to provide planners greater flexibility, but in reality generated complicated questions such as, who should we send where, and who will replace them. Often these questions added more fog to already difficult wartime planning operations.

Brig. Gen. William T. Lord, Director of Communications and Information Systems, Headquarters Air Combat Command, stood up a Combat Communications Transformation Planning Group, to address these problems. The planning group is comprised of members from the ACC staff, combat communications, and a lead wing. The team's mission was to develop a proposal for lighter, leaner and more flexible deployable communications units capable of getting to the fight quicker than our current capability. Realizing this transformation may include changing missions, unit type codes, and organizational structures, the group took a methodical approach to attacking these issues.

The team's first step was to look at deployable communication's past and present construct prior to charting the course for the future. Prior to TDC,

Air Force wings had wing initial communications packages that could provide minimal communications for a deployed commander, while combat communications units were tasked with setting up the deployed communications infrastructure to support a theater air base. There were five active duty combat communications groups, with approximately 1,200 troops each, tasked to deploy with tactical voice, AUTODIN messaging, and air traffic control Tri-Service Tactical communications equipment with 72-hour notice. For the communications package alone, we needed 15 C-130s (103 pallet positions) to transport the equipment and troops.

Today, both combat communications and lead wing communications units are equipped with TDC suites and tasked to deploy a base's initial communications infrastructure. There are two active duty combat communications groups and one squadron (U.S. Air Forces in Europe); each group has about 650 troops to support Air Expeditionary Force, Air Expeditionary Wing, and non-steady state taskings. While the response requirement is still 72 hours, we only need three C-130s (or 12 pallet positions) to provide voice and messaging services, now Defense Messaging System, and added data networking capabilities such as e-mail, Internet access, and file/print services. While new technology was the largest factor in reducing our airlift requirements, our communications suites are still designed to support 1,200 users. Given this history and the lessons from OEF, the group was prepared to develop a proposal for deployable communications' transformation.

The team recommended we develop a scalable initial deployable communications capability as well as an equally, if not more, important communications sustainment capability. This includes combat communications units having a series of tiered UTCs capable of providing the right amount of communications for the right mission, while lead wings focus on the deployable communications sustainment piece. This makes the combat communications' primary mission to provide tactical engineering, site surveys, information operations, and Command and Control Intelligence, Surveillance and Reconnaissance support. It includes a 24-hour scalable response with phased deploy-

ments using partial C-130s with 0, 4, 9, or 12 pallet positions as they are phased in to the fight. Combat communications units must be restructured to accomplish this transformation using the existing number of personnel with the same equipment. Ultimately, we will be able to provide all of the services of today, while expanding for special circuits and imagery.

Getting to the contingency as quickly as possible with the services necessary at any given time requires a phased deployment approach. These phases range from a 24-hour standby Advanced Echelon team to Expanded Buildup and Exit. Phase 1, or the ADVON, is a combat commu-

nications team on 24-hour standby, to be tasked prior to the fight, and able to fly military or commercial aircraft with a flyaway kit. They can activate the communications for the ADVON team's use (secure voice and data) in under one hour.

Phase 2, or the initial phase, brings in centralized services and includes 10 troops, ready to deploy within 24 hours, with pallets pre-packed/repacked every 30 days. They are tasked at the warning order with the assumption that no more than 50 to 100 troops will be on the base at this time.

Phase 3 builds on Phase 2, bringing in air traffic control and landing systems (equipment packages tailorable for the mission) building 400 additional users, and spreading communications to three additional locations on the base. Planners have now have time to determine the communications necessary for the mission. There are 17 combat communications troops in place to build the base infrastructure.

Finally, Phase 4 is the expanded buildup of the base. There are two UTC choices for this phase, which means we can bring in communications services for an additional 350 users and two additional locations per choice. At this point the lead wing is identified, and the combat communications groups and wing personnel begin working together to provide the services for the base. Combat communications troops are focused on activating communications, planning for expansion, and performing



Members of the 3rd Combat Comm Group and the 5th CCG study TDC Continuation Training Course material so they'll be able to provide the critical training needed for technicians in the field to complete their mission.

maintenance, while wings are best trained to support daily operations and sustainment. After buildup is complete, the combat communications group personnel begin to move out, reducing the combat communications presence. Finally, the exit team is called in to ensure planning for the phase-out.

With a transformation of the organizational structures, we will be able to meet the actual designed operational capability statement requirement.

We are now well beyond the Transformation Planning Group and are streamlining equipment, manpower, UTCs, and training and using technology to eliminate manpower-intensive, legacy equipment in the area of responsibility. We are also synergizing efforts with the Air Reserve component, combat air forces, mobility air forces, and air control and warning communications communities.

Combat communications transformation results in lighter, leaner, standardized, yet malleable combat communications capability skilled in "kick down the door" missions with quick response, combat-ready teams. It also factors in the important deployed communications sustainment requirement. As General Lord said, "This new concept of operations provides us the communications capability to apply the science of control, enabling combatant commanders to exercise the art of command."

Digital kill chain starts on board AWACS

By **Capt. Stephen King**
and **Tech. Sgt. Richard Shearer**
552nd Computer Systems Squadron
Tinker AFB, Okla.

Somewhere just above the 36th parallel over Northern Iraq, a United States F-15E unleashes its precision guided munitions and scores a direct hit on an Iraqi SA-3 anti-aircraft missile battery. A digital stream of events led up to this successful kill, and it all started with the E-3 Airborne Warning and Control System's on-board computer system, the Airborne Operational Computer Program.

The 2001 National Security Strategy advocates the full exploitation of U.S. intelligence advantages. As the Air Force begins its transformation towards total air dominance, full spectrum dominance, as outlined in Joint Vision 2020, is pivotal in the United States' ability to defeat any adver-

sary and control any situation across the range of military operations. It is the direct role of the AWACS to supply this control, providing a comprehensive, theater-wide surveillance picture to the war planners and fighters.

AOCP is the nerve system of AWACS, controlling all sensor, display, and communication functions. Developed by Boeing in the early 1970s, AOCP has continuously evolved to meet the challenges of ever-increasing advancements in aviation and communications technology. A group of highly specialized computer programmers and program managers assigned to the 552nd Computer Systems Group, based at Tinker AFB, Okla., maintain the AOCP.

Communications is the foundation of AOCP, the direct data links between AWACS and theater forces. Data links are the primary means by which the "Iron Triad" consisting of the E-3 AWACS, RJ-

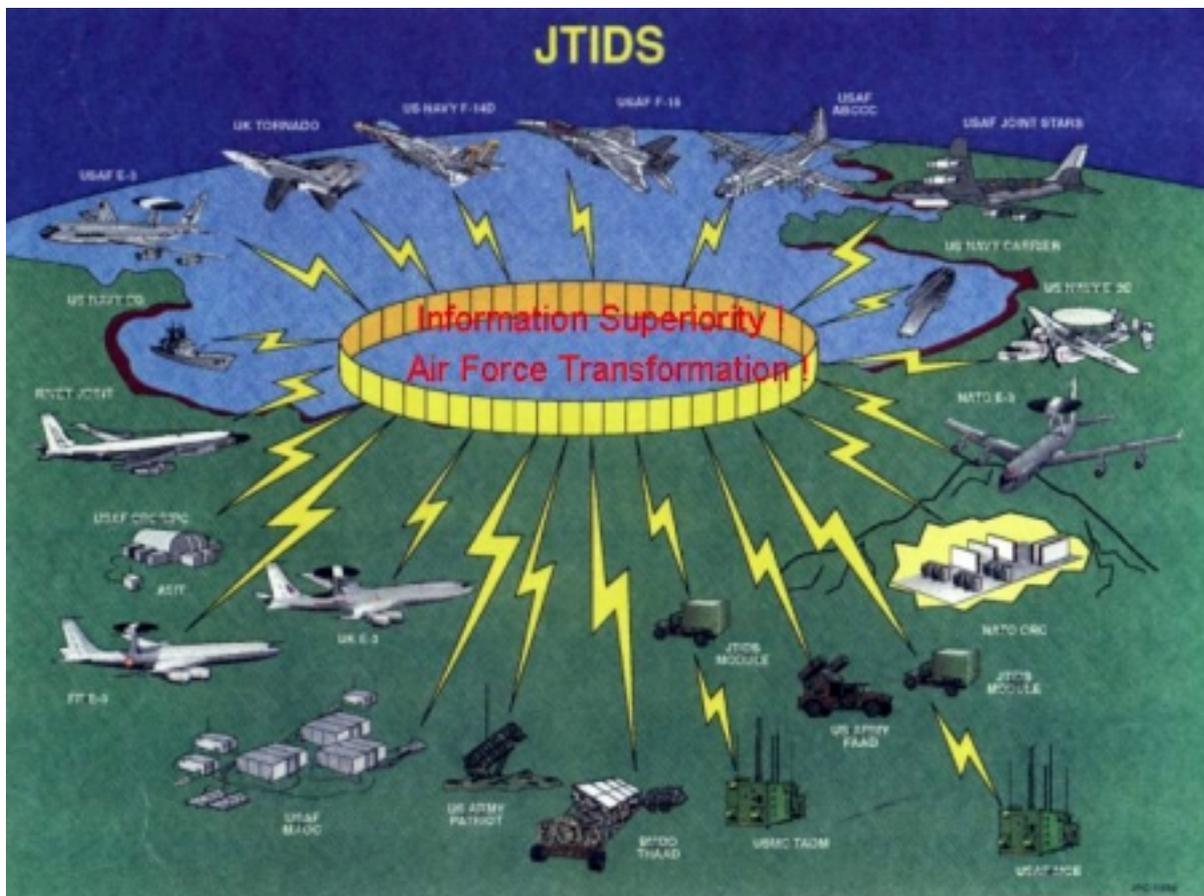


Figure 1

135 Rivet Joint, and the E-8 Joint Surveillance Target Attack Radar System join with other weapons systems throughout the DOD to form a common, integrated battlespace awareness and control environment. It is through these data links the AOC is able to 'digitize the kill chain', a transparent flow of information from the sensor to the shooter, providing the warfighter a seamless picture of the battlefield.

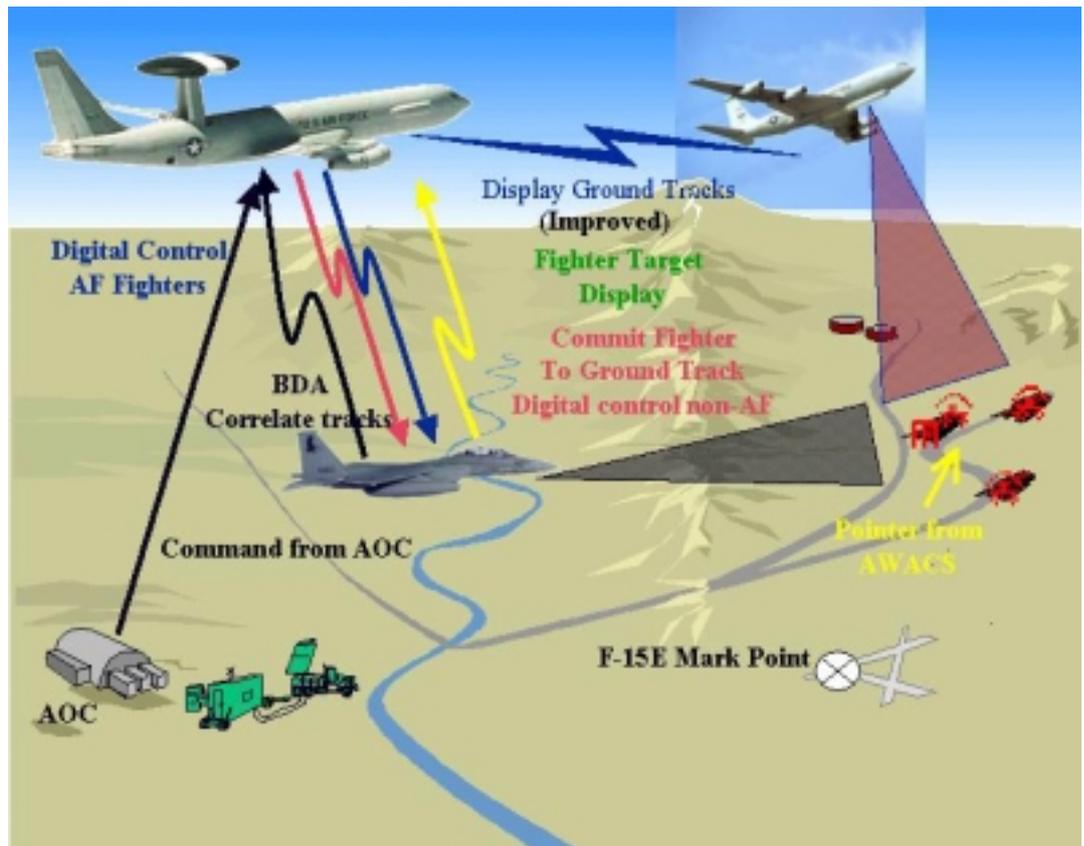
Simply put, digitizing the kill chain means delivering complete situational awareness for the weapons platform. AOC must support and participate in the Joint Tactical Information Distribution System Tactical Air Picture, providing operators and shooters the same information. A major leap forward was the development and use of TADIL-J or Link 16. Link 16 is a secure, high-capacity, jam-resistant, line-of-sight tactical data link. It essentially functions as a reliable over-the-air wide area network interconnecting the mission computing systems of various tactical platforms. Key performance characteristics include a 115 kilobytes per second capacity and substantial jam resistance by using fast frequency hopping and spread spectrum techniques.

An example of how AOC communications work, using Figure 1, is this Time Critical Target scenario:

1. FIND: JSTARS detects an enemy tank formation. The tracks and associated data are all transmitted. [Link 16]

2. FIX: AWACS receives the ground track data and displays the information to the operator. A reference point for the tank formation is transmitted to other platforms on the net. [Link 16]

3. TRACK: Using the reference point, other



Airborne Operational Computer Program

sensors look for the ground track to further refine it. JSTARS continues to track the formation, transmitting data for location and motion. All the participating units receive and display a ground point identifying the enemy. [Link 16]

4. TARGET: The Air Operations Center via a CRE, sends to AWACS the order to commit an asset against the targeted TEL. [Link 16]

5. ENGAGE: AWACS directs the mission by sending the appropriate asset, an F-15E, to attack the target. [Link 16]

6. ENGAGE/ASSESS: The F-15E attacks the target and assesses the damage, which is reported back to AWACS. [Link 16]

One of the major challenges facing AOC today is maintaining interoperability with the various warfighting platforms across the entire DOD. As the Air Force transforms itself, equipment throughout the DOD must be interoperable to exchange information without user intervention. In every endeavor, it is AOC's mission to meet the challenge of the Joint Battlefield Infosphere, providing the "right" information at the "right" time, disseminated and displayed in the "right" way, so the commander can do the "right" things at the "right" time in the "right" way.

C2 Center transforms C2 capabilities

By Col. Walter "Buster" Burns

Director, Command & Control

Transformation Center

AFC2ISRC

Langley AFB, Va.

The success of U.S. forces in Operations Noble Eagle and Enduring Freedom was based in part on work begun in August 2000 to transform command and control capabilities for air operations centers. The Command and Control Transformation Center, or C2 TC, is built around the success of that and other efforts of the Combined Air and Space Operations Center - Experimental. CAOC-X is being expanded in order to tighten C2 seams across functional areas at every level in the Air Force, and to transform battle management C2 capabilities in cooperation with other U.S. military services, joint organizations, national agencies and coalition partners.

Under the auspices of the Air Force Command and Control, and Intelligence, Surveillance and Reconnaissance Center, commanded by Maj. Gen. Robert F. Behler, the C2 TC leads a workforce of 88 personnel, not only from AFC2ISRC, but also Air Combat Command; Det. 2, Space Warfare Center; Air Force Research Laboratory; the 46th and 605th Test Squadrons; and the Air Force Operational Test and Evaluation Center. In addition, Electronic Systems Center, Hanscom AFB, Mass., has an operating location of 34 personnel. To ensure the right operational or technical expertise is brought to bear on C2 TC efforts, representatives from DOD, national organizations, and industry augment the core team. Langley AFB was chosen because of the proximity to both joint and national C2 communities.

The mission statement for the C2 TC is: "Operational experts, leading teams of users, developers and testers, to develop interoperable and horizontally integrated BMC2 concepts and technolo-

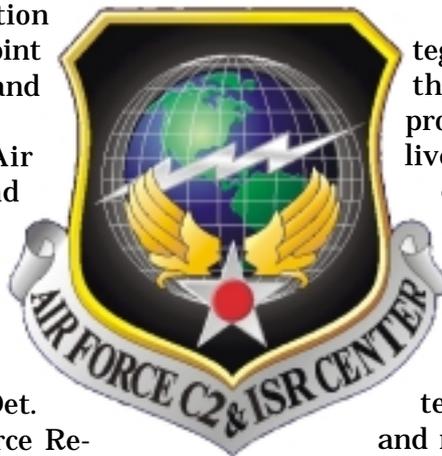
gies, to provide near-real-time executable decision-making information for command and control of the full spectrum of air and space power – service, joint and coalition."

C2 transformation includes development and integration of communications and computer capabilities, agile combat support capabilities, mobility and space capabilities, and tasking, processing, exploitation and dissemination capabilities. The C2 TC tightens the seams across several areas, to include labs, integration and development centers, and testing and acquisition communities. The C2 TC is applying the best practices from teams like the Mobility Systems Test Integration Center to integrate mobility capabilities into the tanker airlift control center and other Air Mobility Command C2 nodes.

The objective is to form a single integrated team and process that breaks through the "tribal" functional and program focus and concentrates on delivering affordable, interoperable C2 capability. The C2 TC is not solely responsible for all the facets of transformation such as concept exploration, development, testing, fielding, or policy, standards, or doctrine changes. The C2 TC core team will draw upon the expertise

and resources from other organizations to address transformation issues from their perspective. C2 TC will orchestrate C2 interoperability across the tribes, provide new concepts or prototypes, and participate in or review development and integration efforts of others to ensure they're synchronized with other Air Force efforts, as well as those of our joint, national and coalition partners.

A key element of transformational success is that operators will refine requirements throughout the lifecycle. For this reason, the C2 TC appointed operational experts to monitor capabilities through each phase of the lifecycle to ensure that developers meet requirements, and that as new requirements are identified, they are captured and



Initial C2 Transformation Path

- **Transform today's AOCs & DGS**
 - Focus is on the nodes
 - Processes are complementary but separate
- **Via AF Transformation Center (with JTF EX and JBC)**
 - Multi-discipline capability teams
 - Visual requirements
- **Into AT AOC/DGS for BMC2 and DJC2**
 - Integrated, interoperable information & infostructure for the JFACC and JFC



documented in appropriate program guidance. Emerging DOD acquisition guidance recognizes the need for operator involvement at all stages of the acquisition cycle to refine requirements along the way.

The C2 TC mission cuts across all Air Force missions and functional areas and focuses on C2 from the unit level to the joint level. The responsibilities of this organization bridge the gaps between the development and acquisition community, industry, operational air force, testers and maintainers. Many of the challenges of rapidly developing, testing and fielding systems will be met by having a dedicated team that follows a capability from concept exploration through every phase of the lifecycle, including fielding. Operators, developers and testers have a role at every phase of the lifecycle – the level and focus of effort and leadership responsibilities may change depending on phase or activity in a phase – but everyone on the team is involved from beginning to end.

There's much remaining to be done to transform Air Force C2 capabilities. The C2 TC will

assess gaps where no one is working to provide capability or integrate existing capabilities between C2 nodes or within cells in a node. The C2 TC will continuously experiment with new concepts and technologies to refine requirements and improve capabilities. The C2 TC will conduct “fly-off” events between competing capabilities to reduce duplication. However, competition between capabilities will be encouraged in the development phase to keep costs down.

The initial focus of the C2 TC is to develop Advanced Technology Air Operations Center/ Distributed Ground Station as the foundation for joint command and control regional command centers. The C2 TC teams with Defense Information Systems Agency, ESC, Air Force Communications Agency, and Joint Integration Test Facility to strive for common infrastructure, services and data. With standard architecture and selection of common components, C2 capabilities will be transformed to increase interoperability and affordability.

JSTARS makes future total force happen today

By Capt. Shelly Prescod
*116th Computer Systems
Squadron
Robins AFB, Ga.*

The 116th Computer Systems Squadron is a unique unit within the Air Force. They support the Air Force's only E-8C Joint Surveillance Target Attack System Radar aircraft and they are members of the DOD's first "blended wing" composed of both active duty and Air National Guard members, united in performing this unique Air Force mission. The consolidation of the Georgia ANG's 116th Bomber Wing and the 93rd Air Control Wing, into the blended ANG and active-duty 116th Air Control Wing Oct. 2, was designed to create flexibility in operating, maintaining and supporting the JSTARS E-8C.

"The activation of the 116th Air Control Wing is a tangible and real example of transformation. It's a wonderful example of how we can improve our capability without jeopardizing readiness or the warfighting effects we deliver to combatant commanders and our joint forces," said Dr. James G. Roche, Secretary of the Air Force.

JSTARS provides seamless connectivity between air and land component forces by relaying a real-time ground picture to air, ground, and some sea assets. JSTARS is a system of three complex systems: Radar, Operations and Control and Communications subsystems. The radar's antenna is a 24-foot long, side-looking, phased array that is electronically scanned in azimuth and mechanically scanned in elevation. The radar's signals are processed onboard the aircraft in multiple, programmable signal processors that continuously convert radar signals into target coordinates. The operations and control subsystem controls the radar and consists of a real-time, VAX-based distributed processing architecture, including individual DEC ALPHA-based digital processors at each of the 17 operator workstations. The communications sub-system uses both secure data links and voice communications to exchange information. There



The E-8C JSTARS is an airborne battle management and C2 platform that conducts ground surveillance to develop an understanding of the enemy situation and to support attack operations and targeting that contributes to the delay, disruption and destruction of enemy forces. These functions support the primary mission of JSTARS -- to provide dedicated support of ground and air theater commanders.

are UHF, VHF, HF, SINCGARS, and SATCOM radios aboard each aircraft.

The 116th CSS provides classified system and mission specific software that powers the radar on the E-8C. With so complex a system, the addition of traditional Guard, technician, and active Guard Reserve members bring additional talent, improved stability and continuity to CSS support for this system. The 116th CSS is just beginning to exploit this opportunity to create a synergistic effect from leveraging the individual strengths of the active and Guard by combining operations into a new organizational structure. As a rotating active duty force, with each permanent change of station move, valuable system knowledge walks out the door. The ANG members will offer continuity that will allow for system improvements and efficiencies for many years to come.

Blending both active duty and Georgia ANG members into one organization is not without its challenges: different personnel systems, administrative and legal issues, and differences in cultures to name a few. There are different categories of personnel in the ANG, each with different rules. Full-time military technicians wear an Air Force uniform during the week, fall under Title 32 and are a part of the accepted civil service with union representation, civilian time cards and perfor-

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Maintenance mindset – a cultural change

Chief Master Sgt. Gerald E. Boutelier
Superintendent, Information Systems Flight
52nd Communications Squadron
Spangdahlem AB, Germany

As technology continually evolves, we try to keep pace by matching the best people, the best equipment and structure to meet our customers' needs. Sometimes we succeed, but often we don't. Over the last few years, the Air Force communications community has had to evolve in matching technology to the demands of its customers. Although we pursue the latest technology, we don't always have the right skills and training to operate that technology. It's similar to asking a successful Formula-1 driver to fly an F-16; that person might have the training, skills and experience for a high-speed, quick-decision environment, but could that person fly a fighter as effectively as a trained pilot? In 2001, at Spangdahlem AB, Germany, we were faced with a similar dilemma.

Because of mission and manning issues, we had highly skilled computer/communications (3C0X1) personnel performing nearly every function that could be performed: NT/UNIX system management, Exchange/DMS/AUTODIN mail services administration, information assurance and protection, and running the base's COMSEC program. They also had to contend with accountability of all base computer/communications assets. Additionally, they were still responsible for maintaining that base's complex network infrastructure of routers, switches and hubs. They were doing a great job in most of those functions, but were they fully trained to do each of those functions effectively?

One area we felt could be improved upon was maintaining the wing's network infrastructure. From a purely "maintenance mindset", 3C0X1s were not well versed in the proper installation and maintenance of network components. Tech school didn't give them much training in this area. Those doing network maintenance at the time obtained their knowledge through expensive vendor training or good old *trial and error*. Furthermore, while our 3C0X1s did a great job in keeping the network infrastructure operational using the "*duct tape and chicken-wire*" method, there was no real documentation on "*what was where*". When we had to know what or how many network components were in a particular building, we had to physically send

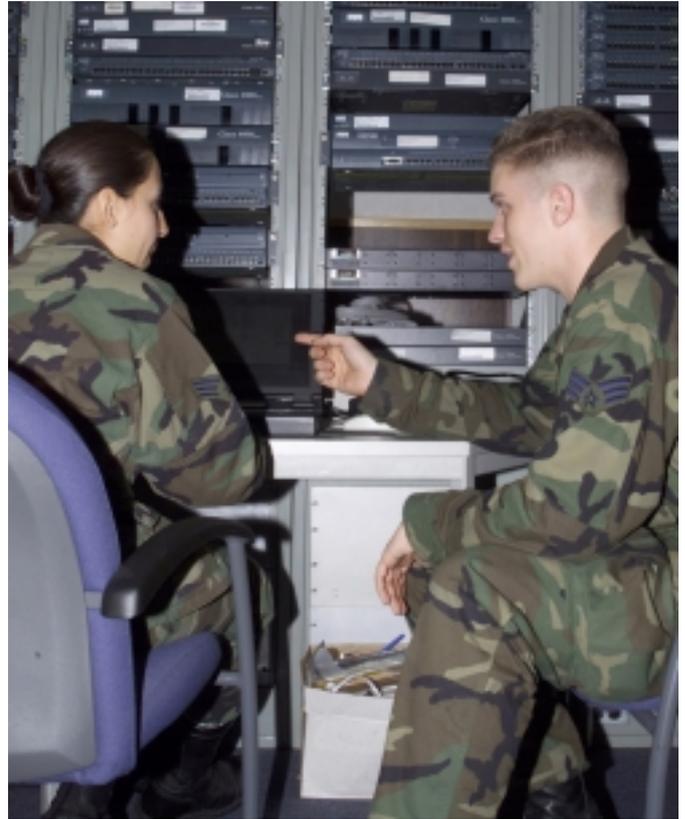


Photo by Staff Sgt. Timothy Cook

Senior Airmen Margarita Atchley and Eric Clawson work issues on network switching components. Both are now staff sergeants.

someone out to find out. To successfully manage and maintain Spangdahlem's communications infrastructure, we needed to find properly trained and skilled personnel for this daunting task. Was there anyone on Spangdahlem who had the basic skills and the maintenance mindset to do the job?

Yes! We had an abundance of both electronic computer and switching systems personnel (2E2X1) and communication-computer systems control personnel (3C2X1). However, both the 2E2X1s and 3C2X1s were assigned to the maintenance flight. At the time, the role for a typical 2E2X1 (and the old 2E3X1) was to maintain our base's secure communications infrastructure. But because the newer encryption devices did not require as much maintenance as the older devices, that typical 2E2X1 may have not been fully employed. Our 3C2X1s had a similar problem. Because contractors run Spangdahlem's technical control facility, most of our 3C2X1's were assigned

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MS-LITE transforms aircrew training

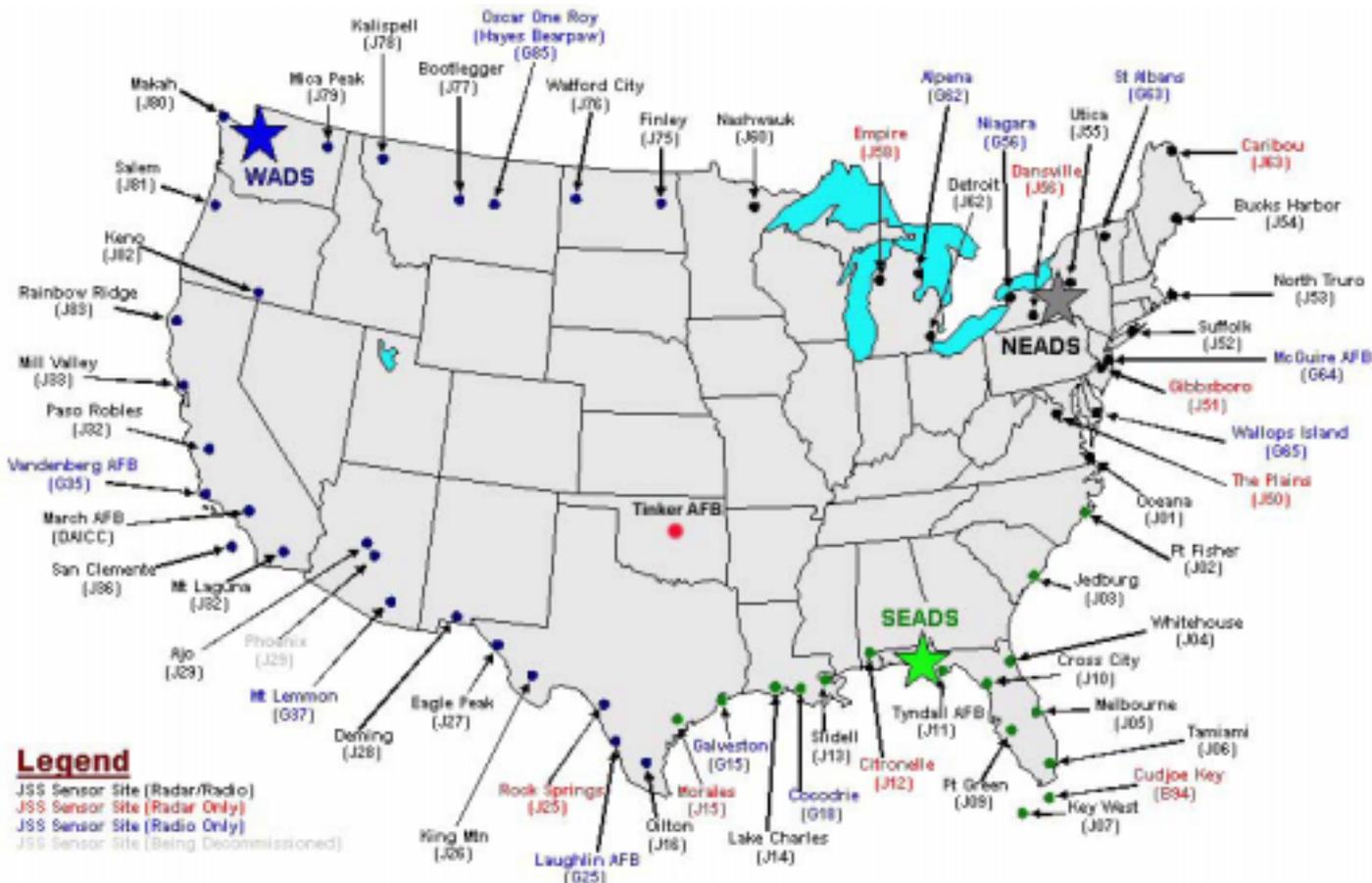
By Maj. Miguel Garcia
552nd Computer Systems Group
Offutt AFB, Neb.

Once upon a time, two generals sat down over a cup of coffee and devised a system to control live fighters from a ground station 3,000 miles away. Their blueprint was nothing more than a few lines on a napkin. This concept grew into a program called Mission Simulator Live Intercept Training Environment or MS-LITE, and it now allows AWACS weapon directors and controllers at Tinker AFB to control live fighters without leaving a simulator.

MS-LITE has an interesting history. In conjunction with 1st Air Force, Air Combat Command decided to contract a company called Air Defense Communication Service to provide communication and radar from the Southeast Air Defense Sector to Tinker AFB. ADCS used an Intellect voice com-

munication system to connect to Federal Aviation Agency radar. Once online, Air Combat Command extended the system and brought in voice and data from both the Western Air Defense Sector and the North Eastern Air Defense Sector. This allowed AWACS weapons directors full access to all coastal ranges around the country. Air Combat Command contracted another company, General Dynamics, to connect Tinker AFB to all three sectors since WADS and NEADS couldn't connect through Intellect panels. General Dynamics designed a system of connection between all sites and Tinker AFB, operating through the ACC-Enterprise Network providing all voice and radar. Since 1997, MS-LITE has allowed Air Defense Sector radios and radar to be funneled through ACC-E, the FAA, and Tinker AFB to provide vital communication and radar for live sorties.

See MS-LITE next page



MS-LITE

From previous page

It takes the combined efforts of 552nd Operations Support Squadron schedulers and controllers, 752nd Computer Systems Squadron technicians, General Dynamics technicians, and technicians from Tyndall AFB, Fla., to McChord AFB, Wash., to make this system operational. One of the technicians at Tinker AFB is Senior Airman Juan Guzman from the 752nd CSS, part of an unique group of individuals who are the final stage in the connection process of MS-LITE. He works hand in hand with this diverse group of technicians to troubleshoot radio problems, shout lines, and radar feeds.

Staff Sgt. Marc Sanders, noncommissioned officer in charge of the communications simulation shop, said, "It's a little like a Rube Goldberg cartoon—there are a lot of moving parts, many players, and a lot of potential for challenges." Second Lt. Daniel Whatley, officer in charge of the same workcenter added, "It sometimes feels like we're herding cats when it's mission time, and we are working with our local mission controllers, sector job control, contract maintainers, and Joint Surveillance Sector technicians to solve comm problems, but we take it seriously because the ops community needs this training to be effective in combat." Communications outages account for about 10 percent of mission cancellations. The 1st AF, ACC, and the AWACS team are working hard to eliminate these by formalizing JSS outage reporting and troubleshooting procedures, and partici-



MS-LITE allows the high demand, low density AWACS fleet to support unprecedented tasking levels by providing an efficient way to prepare crew members for worldwide contingencies.

pating in a CONUS-wide Air Defense Sector switch upgrade.

MS-LITE is fully operational and it continues to evolve and grow. Though sometimes taken for granted, it saves significant man-hours, jet fuel, and wear and tear on the high demand, low density E-3 fleet. Currently, the 552nd Air Control Wing conducts more than 20 successful missions per month. Since a typical E-3 flies about 10 sorties per month, most of them for training, MS-LITE is equivalent to more than two aircraft valued at nearly \$300,000 each. The long-term goal is to conduct up to 90 missions per month. To do that, the MS-LITE team will add radios and radar sites in the interior of the United States. For AWACS crew training, MS-LITE is the system of the future, and that future is now.

JSTARS

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mance appraisals. On unit training assembly weekends, they assume their military rank and military rules apply. The second category is active Guard Reserve. These individuals wear the uniform and though also Title 32, enjoy most of the same military benefits and are subject to the same requirements as active duty personnel. They are also required to attend UTAs. The final category is the traditional Guard member. Almost all of these have civilian jobs. They attend a UTA each month and perform 15 days of annual active duty training in Title 32 status each year. Fully understanding, appreciating and accommodating

the different rules involved with both active duty and ANG personnel systems is a work in progress. Training weekend-only traditional members, particularly cross-trainees, is another important challenge. Tailoring a six-month OJT program to meet the needs of traditional members is an ongoing effort, and the CSS is making strides.

Despite these initial challenges, the blended 116th CSS is thinking creatively and developing new techniques to mold its active and Guard members into an integrated and dynamic team. As members of the first total force wing, all 116th CSS Guard and active duty members are uniting to support the Air Force's only Joint STARS mission, embodying "One Team ...One Fight."

Cryptographic modernization crucial to combat success

By Master Sgt. Michael Jervis

Cryptographic Modernization Lead Command

Air Force Communications Agency

Scott AFB, Ill.

As the Air Force transforms from “time-sensitive” or “time-critical” targeting to an era of “instantaneous attack” – that is, the ability to find, fix, track, target, engage and assess any target or to create a desired effect, anywhere in the world, within hours or minutes – it must possess the tools to dynamically operate in a robust, secure, survivable networked environment to compress the kill chain and conduct effective predictive operations.

The Air Force is striving to modernize its C4ISR infrastructure from traditional “stovepipes” to a “network-centric” concept of command and control for air and space forces. These forces must be adapted to meet the full spectrum of worldwide engagement challenges. This includes modernization efforts to eliminate the seams fused by legacy cryptographic systems and equipment – hence the term “cryptographic modernization.”

Cryptographic modernization is the evolutionary transition from traditional stovepipe-centric cryptographic equipment to a network-centric product, allowing multiple weapon systems to use the same cryptographic device and rapid, electronic distribution of cryptographic key.

As we move into the 21st century, cryptographic modernization must satisfy Joint Vision 2020 objectives by transforming the current inventory of cryptographic equipment to support warfighter needs for high-capacity, secure, jam-resistant and interoperable communications and information technology systems that can transport information essential to conducting joint and combined operations.

To realize cryptographic modernization, products will integrate state-of-the-art technological advancements designed to provide seamless integration and enhanced secure interoperability, and to support algorithm and applications scalability and programmability, transparent key delivery directly to the end product, and configuration management for tracking and controlling/managing changes to end product hardware and software

configurations.

So, how did we get where we are today? In 1999, the Office of the Secretary of Defense directed the National Security Agency to evaluate the state of the DOD cryptographic inventory. Studies concluded that the effectiveness of current and projected DOD cryptographic inventory was declining at a significant rate for two primary reasons: equipment was reaching the end of its useful cryptographic life, and aging equipment technologies were creating logistics difficulties.

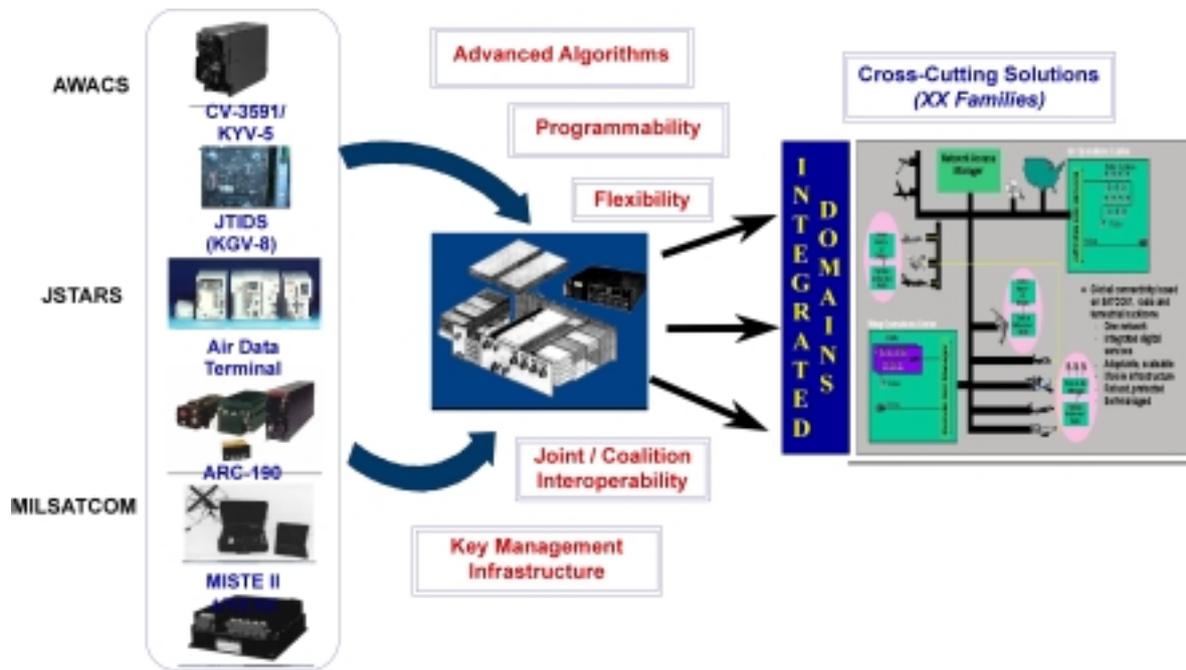
In September 2001, the Defense Resources Board tasked the NSA director to take the lead in working with other defense organizations to develop a programmatic roadmap for cryptographic modernization. A DOD-wide working group was established by the Military Communications-Electronics Board to develop the roadmap, which lays out strategy and initial budget estimates, addresses phase-out dates for existing cryptographic products and planned replacements, and identifies C4ISR-IT systems that cannot function if obsolete cryptographic systems are not replaced.

Shortly after NSA presented the roadmap to the deputy secretary of defense in February 2001, the ASD/C3I issued a memorandum directing the services to actively pursue cryptographic modernization.

Air Force Communications Agency was designated lead command and has been engaged in establishing overall strategy to address the challenges linked to cryptographic modernization. To support AFCA in accomplishing this monumental program, two principal supporting activities were established. First, the Air Force Command and Control, and Intelligence, Surveillance, and Reconnaissance Center, Langley AFB, Va., established an office to gather capabilities-based requirements from warfighter communities. Second, the Cryptologic Systems Group, Lackland AFB, Texas, established a program office to champion overall acquisition activities, providing centralized program management with decentralized execution at the weapon system program offices.

Cryptographic modernization has a direct op-

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Cryptographic modernization: a transformation enabler

CRYPTO

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erational impact on our Air Force weapon systems.

At stake, for example, are effective command and control of our forces, and separation of friendly and hostile forces during aerial combat.

As warfighters, we must support cryptographic modernization to achieve full-spectrum dominance and information superiority envisioned by Joint Vision 2020. Cryptographic modernization is a linchpin effort to assure fulfillment of the CSAF's vision for transforming to a capabilities-focused Expeditionary Air and Space Force.

MINDSET

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to our Air Expeditionary Communications Package. It seemed obvious these two AFSCs were perfect for our network infrastructure branch. How would we be able to use the talents of these personnel?

We had to sell our concept to the maintenance flight commander and superintendent as well as our commander. Even though we heard that some commands were doing this and that the Air Force was pushing to move 2E2X1s, 2E6X2s and 3C2X1 into something called the 3D information transport career field, it was still a tough sell. We had to work through the natural feelings of distrust and insecurity that both sides had. Some

3C0X1s felt they were going to lose control of the network and some 2E2X1s and 3C2X1s felt they might not really be as qualified for the job. We eventually convinced management it was the right thing to do and worked through the distrust and insecurity issues of the workers. We implemented our plan.

The result is our 3C0s have more time and personnel available to focus on core tasks, namely NT/Exchange administration, COMSEC, electronic messaging, information protection and information assurance. Tighter focus allows us to address long-standing issues in each of these areas. Network infrastructure stability increased as our 2E2X1s and 3C2X1s began planning, documenting and installing the device according to specifica-

tions. Problems once addressed only after the fact are now tackled before the first screw was turned or the first cable connected. We also had an additional benefit of exposing a "maintenance mindset" to the 3C0X1 world. This will pay big dividends when we adopt the Operationalizing and Professionalizing the Network program. It also lays the foundation for a credible 3C0X1 certification and accreditation program and possibly a Network Standard and Evaluation Program (similar to the Maintenance Standard and Evaluation Program the 2E2X1s have).

Spangdahlem is ready to meet the next technological evolution...knowing we have the best-trained and qualified personnel to accomplish the mission.

AIA uses portal technology to transform information access



Photo by William B. Belcher, 690th ISS

Capt. Darryl E. Mosley, AIA IO portal project manager, and Rosita Alaniz test a new service capability on the portal.

By William Marion

*Headquarters Air Intelligence Agency
Chief, Warfighter Integration branch
Lackland AFB, Texas*

Air Intelligence Agency had a challenge to overcome. As the organization responsible for conducting full spectrum information operations for the Air Force, AIA had to find a way to better manage the huge amount of its corporate information and get it to the people who needed it fast. Maj. Gen. Paul Lebras focused on this problem when he took command of AIA in stating that AIA needed to “manage existing information ... develop knowledge bases rather than databases, work push-pull architectures ... so that we make the output immediately relevant to the mission.” In the past, the answer was customized reports that usually require significant resources to tailor and coordinate at the appropriate technical level.

AIA needed to transform the way its information was accessed and portal technology fits the bill. It changes the old information access paradigm and provides the push-pull architecture AIA leadership is looking for. It lets a producer create a knowledge base and makes the information relevant through personalization, allowing users to customize the information to fit their requirements.

With the increased need for information sharing, particularly in support of the war on terror-

ism and its NSA, DIA and Air Force missions, AIA is working to improve the availability of its knowledge and information services.

“Our goal is to provide greater access to AIA’s IO products and services through a dynamic virtual ‘storefront,’” said Rosita Alaniz, IO portal content management and support lead. “Also, since the warfighter operates at the secret collateral level, we’re developing the portal on the Secret Internet Protocol Router Network to better support them and our traditional IO customers.”

With an Air Force enterprise portal already in development on the unclassified network, AIA sought to minimize cost and risk in its development approach and used the AFP as a baseline.

“Using standard NSA, DIA, AF products and enterprise licenses, we focused our efforts on identifying and fielding the core capabilities our users would need (content and workflow management, cross-platform application access, collaboration, integrated database access, and search and retrieval) and provided a framework based on those standards,” said Capt. Darryl Mosley, IO portal project manager. With the initial capability fielded in March 2002, two key successes have been the integration of the Defensive Counter-Information “Firewall” Report and the AF National Tactical Integration SIGINT Report. Both use the IO

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Air Force focuses on leadership development

By Michael J. Zimmerman

*Communications and Information Career
Program Position Management Administrator
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A new vision of total force leadership development for officer, enlisted and civilian personnel was unveiled by Air Force Chief of Staff Gen. John P. Jumper. The vision focuses on training, education and experience, and especially how individuals are assigned to gain that experience. The goal? Provide each of us the practical knowledge and skills required to be effective in today's expeditionary air and space force, and to better face the challenges of tomorrow. The Communications and Information Career Program is doing its part to meet this objective.

In terms of experience, CICP has a "basic" entry-level program called Palace Acquire, designed to recruit highly qualified college graduates and to serve as our major force renewal program for the IT community. At the intermediate level, CICP has a career broadening program that provides developmental experience for new skills in the communications and information functional arena; broadens existing functional skills; and enhances leadership perspectives. Now CICP is implementing Scope Champion, a new program aimed at furthering senior leadership development. It will provide current and future Air Force civilians more career development opportunities by managing a percentage of senior leadership positions as a cor-

porate functional area resource. Along with position management will come SES-level mentoring, rotation opportunities, intermediate and senior service school billets, and other career enhancing and broadening experiences.

The chief of staff's vision will begin with the officer corps, but planning is under way and details coming regarding the civilian and enlisted forces, and the Reserve components. As the chief said, "I know that a lot of you feel there are many reasons to be discouraged or dissatisfied with our current system – limited professional military education slots, limited advanced degree opportunities, or worse, square-filling master degree programs that do little to make you better at your job or get you close to your goals." Currently, CICP provides tuition assistance for undergraduate and graduate degrees. As for officers, however, PME in-residence slots are extremely limited for civilians. Most civilians take PME courses by correspondence.

CICP is working hard to provide more training opportunities to our registrants and we're hopeful the new vision will provide yet another avenue for more training and educational opportunities. There are changes coming, so stay in touch with CICP's Web site: <http://www.afpc.randolph.af.mil/cp/cicp>.

Another way to keep abreast of the latest information of importance to you is to subscribe to our list server. At our Web site, go to the "Index" section and click on "List Server Signup."

AIA

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portal's capabilities to provide better access to intelligence at the secret level, a key strategic goal of Lt. Gen. Leslie F. Kenne, HQ USAF/XI.

AIA's efforts, however, have not taken place in a vacuum.

"We've been actively engaged with several organizations regarding development of additional capabilities and future integration plans," said 1st Lt. Tobias Prettol, the IO portal technical development lead. In work-

ing with the Global Combat Support System – Air Force Special Projects Office, tasked with the seamless integration of all AF combat support systems, AIA's IO Portal is now on their integration schedule. Coordination with HQ ACC/IN and CENTAF will allow the creation of a vast collaboration environment on SIPRNET. When the AF Command and Control Intelligence Surveillance and Reconnaissance Center was designated as the lead for developing an Air Force Enterprise SIPRNet Portal, AIA

contributed key development experience and IO content, teaming with the AFC2ISRC to successfully demonstrate a pilot portal focusing on air operations center processes for the Air Force. With continued coordination and partnering among AF organizations, the end goal, a transformation of individual Air Force stand-alone systems into a single Web-centric framework with easily accessible federated data, is well within reach. The IO community and AIA are already off to a great start.

67th IWF integrates information operations

By Capt. Chip Regan

*67th Information Warfare Flight
Scott AFB, Ill.*

Information operations ... psychological operations ... computer network operations ... hacker groups ... information warfare ...

These terms are becoming “household” phrases in today’s Air Force, especially in light of the war on terror. Some of them have been around for a while, others are relatively new.

So what do they all mean, and more importantly, how are we integrating them into the warfighter’s mission? Lt. Gen. John Baker, Air Mobility Command’s vice commander, says it best, “Information operations is not a thing, it is an integrating strategy.” Here at AMC, we’re integrating IO by involving one of ACC’s 10 worldwide-dispersed Information Warfare Flights.

This particular information warfare “weapon system” is the 67th IWF, at Scott AFB, about 20 miles east of St Louis.

The 67th IWF supports AMC’s information operations mission requirements ... and does it most effectively. The 67th IWF secret of success is a combination of superb host-tenant relationship, exceptional IO expertise in the IWF, and seamless integration into AMC mission areas. Sound like a bunch of mumbo-jumbo? Here’s how it works:

The 67th IWF is comprised of 25 members in 11 different Air Force Specialty Codes, embedded in three separate, but closely related work centers: Tanker Airlift Control Center, which is AMC’s Air Operations Center, or the nerve center for nearly every AMC mission in the world. HQ AMC’s Intelligence directorate, which keeps the AMC commander abreast of world affairs from the “secret squirrel stuff” perspective. Lastly, the Network Operations and Security Center, responsible for AMC’s enterprise network. More specifically, the NOSC is busy defending the enterprise network against constant assault from hackers, terrorist organizations, and even nation-states, all of who would love to get inside and “see” what AMC is up to.

Technically, 67th IWF belongs to Air Combat Command. How does that work at an AMC base whose mission is so different from ACC? Surpris-

ingly well. Keep in mind the IWF is a tenant organization, working for a MAJCOM, in three separate directorates. A bureaucratic mess, one would think, huh? Yet, the 67th IWF is a very big success, and mostly due to forward-thinking from both AMC and 67th Information Operations Wing leadership. During a recent visit to Scott AFB, the 67th Information Operations Wing commander, Col. Roger Gaebel said, “...providing the TACC commander with predictive battlespace awareness, particularly in the area of force protection, information and information systems threat assessments, and threat working group injects concerning vulnerabilities to aircraft on the ramp and deployed personnel are the critical part of your mission.” His comment demonstrates the importance of the 67th IWF working as a team with AMC.

The seamless integration and exceptional host tenant relationship between 67th IWF and HQ AMC is really incumbent upon extremely capable individuals doing the IO mission “down in the trenches” at the IWF. The flight is working in two key areas: information warfare and information in warfare.

The IiW section of the 67th IWF performs IO assessments and analysis based upon all-source intelligence. IiW also provides tailored IO intelligence, analysis and products to organizations throughout AMC. All that without a single shred of “coordination delay” or bureaucratic overhead. These Intel/IO gurus also use the varied talents of imagery intelligence, signals intelligence, and human intelligence experts to develop a complete IO picture of the adversary. IiW provides key information pertaining to new computer threats from nation states and terrorist hacker groups directly to the Information Warfare branch within the NOSC. In addition, they work with IWF members sitting on the TACC and NOSC ops floors, headquarters intelligence personnel and with TACC sections such as the future ops cell planning key missions in AMC’s worldwide reach.

On the information warfare side of the house, the IWF provides one of the cornerstones to the successful integration of IW into AMC’s Tanker Airlift Control Center: OPSEC expertise, education and awareness. We produce weekly telecommunications fusion reports detailing critical, sen-

sitive and classified information disclosed over open phone lines and unencrypted e-mail communication. These particular reports are used as OPSEC feedback to senior leaders and critical TACC decision-makers who, in turn, use these reports to assess the effectiveness of their OPSEC measures, enhance operational risk management and serve as an education tool for their personnel. By providing specific incidents, they emphasize the need to protect all sensitive and critical information.

Shortly after the 9/11 terror attacks, we developed an OPSEC guide for the family raising awareness among family members about protecting information about current operations. Many times family members don't realize their calls discussing a spouse's deployment or upcoming TDY can be monitored by adversaries listening for key operational information.

Much of the information AMC transmits is in the form of e-mail, Web site information, or via command and control networks. Each one of these systems is a challenge to protect. This is where the computer network operations comes in to play, seamlessly embedded in the AMC NOSC.

The ACC IW planners working in the NOSC are *the* prime example of how to best integrate IO expertise into daily operations. The successes they have achieved working side-by-side with AMC NOSC network defenders are nothing short of amazing.

Remember, the 67th IWF is an ACC tenant on an AMC base, parsed out in separate work areas doing all sorts of different IO-related tasks. So how have they made it work so well? Teamwork, and not to be cliché, it really works that way. No inter-command rivalry, no "that's not our job" attitudes. Both sides work absolutely transparent with regard to organization. This is very significant considering what the IWF brings to the table—AIA and national intelligence resource reach-back. IW planners use this reach-back capability to provide NOSC personnel and AMC senior leaders a "network threat brief" specifically tailored for AMC networks comprised of vulnerability and virus threats by terror organizations and nation states. They're also involved in many other facets of network defense and IO as they face daily challenges to AMC's information operations...some of which are from our own sources.

A good example of this recently occurred. De-

ployed OPSEC monitoring personnel noted significant e-mail disclosures of sensitive AMC operational information were occurring in their theater of operations. Knowing the 67th IWF was working in TACC operations, they called their counterparts here at the 67th. This is where the "synergy" part comes in. Our OPSEC planners in the TACC researched the specifics of the leaks and set out to determine the source and fix them. Working with their IWF counterparts in the NOSC, they devised a plan in conjunction with NOSC network engineers to implement virtual private network solutions to secure the sensitive e-mails, and did so extremely successfully, bringing the disclosed e-mail numbers from about 2,000 e-mails per week down to zero.

The IWF/NOSC team also works with outside agencies, such as the 92nd Information Warfare Aggressor Squadron "red team" to find and fix critical network vulnerabilities. The 92nd IWAS members were able to penetrate and exploit various vulnerabilities to an AMC base's local area network. In essence they had complete control of the network. Once activities were discovered, 67th IWF personnel assisted the AMC NOSC in responding to the network incident. Countermeasures for combating the intrusion were also crafted to minimize the effects and restore network integrity. Furthermore, 67th IWF recommended various procedural and technical countermeasures to prevent an intruder from emulating the 92nd IWAS effort.

Col. Greg Touhill, commander of AMC's Communications Group, said this about IWF/NOSC integration and teamwork, "The 67th IWF is part of my NOSC team. We enjoy a very close partnership that operationalizes our networks and demonstrates improvements in support of the flying mission. Together we have found and fixed problems that ordinarily would have denied service to our colleagues in the field. We have established an Integrated Network Attack Warning and Attack Assessment capability for the command that allows my crews to rapidly identify and thwart threats to AMC operations. Having the 67th IWF as part of my team gives me the tools I need to build, fly and defend AMC's networks."

So there you have it...teamwork, critical mission operations, and information warfare all wrapped up in a clean package of experts. If there's a better example of warfighter integration, I'd like to see it. I think we could help make it better!

Interoperability key to information sharing

By **Dr. Bob Miller, Dr. Mary Ann Malloy
and Ed Masek**
AFC2ISRC
Langley AFB, Va.

The challenge of *interoperability* – the ability of systems to exchange services in ways that enable them to operate effectively together – has increased with the number of heterogeneous deployed automated systems. One of the most challenging aspects of this problem is that information sharing must take place despite disparate languages, cultures, command and management structures, and operational/business processes and procedures.

Formatted message interchange is a primary means for satisfying information exchange requirements and for supporting system interoperability. Examples of message standards include the United States Message Text Format program; the North Atlantic Treaty Organization Allied Data Publication-3 program; and the commercial Electronic Data Interchange standard. In defense contexts, MTFs govern a significant portion of all exchanged structured text information. They support the full spectrum of military operations, including intelligence, air, fire support, maritime, logistics and medical operations.

This article discusses how the Air Force is transforming and exploiting the tactical messaging standard management process through eXtended Markup Language technologies. This process will lay the foundation for a DOD information environment that will prove integral to achieving and maintaining information superiority. Through “plug and play” components and systems, automated agents, and human organizations, the process will integrate the functions, business rules, services and information required by the warfighter to make timely, effective decisions.

The messaging model that is the objective of the Air Force’s transformation efforts is based on the electronic business XML architecture. The ebXML initiative provides a Web-based model for message-based information sharing between cooperating partners. It is based on access to specifications for data definitions, message structures and business rules (i.e., processes) that can be man-

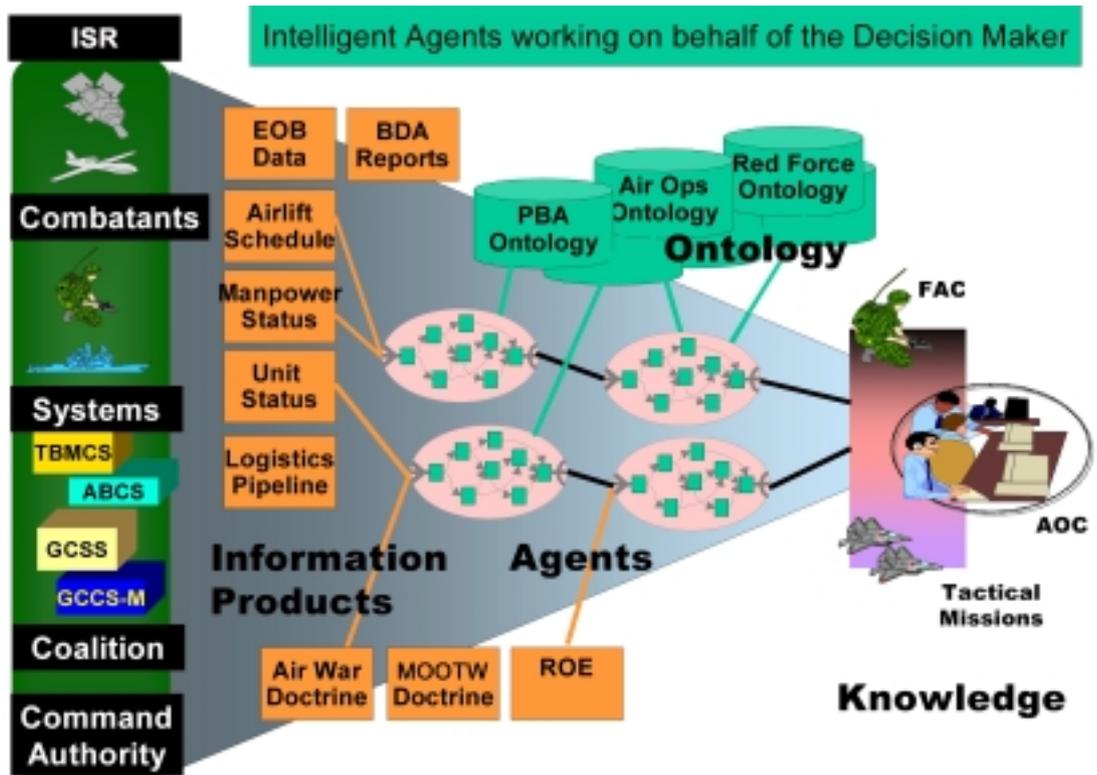
aged by appropriate standards bodies, made available through repositories, and executed by business partners. Business trading partners use *information exchange specifications* to construct interfaces to their information environment, and exploit the underlying communications transport to exchange XML messages.

Web-based services – which are loosely coupled and encapsulated software components that can be contracted using standard Internet protocols – also play an essential part in this plan for realizing the information environment needed by DOD. They can be described, published in a registry, discovered and invoked dynamically in a distributed computing environment. To make Web services work effectively, there must be some element of overall control or brokering. It also must be possible to chain Web services together to produce a desired result with workflow. These two core services – brokering and workflow – together enable an information environment to support information sharing and decision-making.

Web services and ebXML provide a Web-based context for the objective DOD information environment, including information sharing between national and coalition systems and operational facilities. Military information standards, such as MIL STD 6040, will provide the underlying data elements and type definitions that form the information exchange specification and populate the schemas. Tactical systems and facilities will use services and exchange information via agreed information packages called XML-MTFs, a Web-enabled variant of MIL STD 6040. Doctrinal and operational business rules captured from various sources also will be represented via XML technologies. Information packages (messages) constructed in this way in support of a given IER will adhere to the specification and so can be interpreted and used as intended, thus supporting interoperability. This future vision has been briefed and agreed in both joint and coalition forums.

Increasingly, coalition-oriented operations will be facilitated through “plug and play” information infrastructures, such as the one illustrated in the figure. Operational procedures will be captured in business-to-business processing models. Based on MTF configuration management, these models

will capture the evolving XML-MTF information exchanges. Systems will find and communicate with each other adaptively – Web services will enable systems to describe themselves and repositories will facilitate automating the information sharing among them. Such an environment will adapt dynamically to changes on the battlefield and in policy. XML-



Intelligent agents leverage information into knowledge

based security guards exploited by Web services will improve security in this coalition environment.

This collaborative framework, based on XML-MTF, will integrate disparate information producers and consumers. It will provide new and innovative ways to manage information processes. Through semantic linkage to operational procedures (business rules), massive amounts of information will be manipulated and exploited quickly and predictably to provide context sensitive information and knowledge for the warfighter. Intelligent agents and the ability to affect dynamic modifications in workflow will create a highly adaptable warfighting environment – one that is better able to provide common situational awareness and address the ever-changing conditions of the battlefield.

The incorporation of XML into interoperability solutions will maximize opportunities to use commercial off-the-shelf technology (e.g., for supporting distribution, processing, configuration management) and high-quality freeware. This improvement alone should represent a considerable cost benefit. When taken together with XML's pervasiveness, XML-MTF and similar conceptual approaches are gaining developer and user "buy-in" to Web-based solutions, increasing the value of these methods in next-generation C2 systems and

other information-centric systems currently using formatted message exchange for interoperability.

Various XML-based efforts have been initiated by the Air Force Command and Control, and Intelligence, Surveillance and Reconnaissance Center, at Langley AFB, with some products already in place. These initiatives will provide products and services needed to achieve a DOD information environment based on the ebXML and Web services paradigms, using XML technologies to evolve messaging. Parallel activities, also initiated by the Air Force, are under way in NATO.

As further applications of the XML-MTF concept are prototyped, validated and deployed into the MTF community, message processing will leapfrog into the next generation of smart-pull, information-on-demand technologies. Early results promise rapid, low-cost technological improvements to message-based interoperability. This means facilitating *forward migration* to emerging Web-based technologies and solutions in ways that still maintain *backward compatibility* with status quo business/operational processes for those who need them.

(Editor's Note: The full-text version of this article is available in intercom's online edition. The address is <https://public.afca.scott.af.mil/intercom.htm>)



"Transformation expands the way we, as airmen, think. It transcends just designing new systems. It is the integration of all our capabilities, old and new, that elevates our operational effectiveness to new heights."

*Gen. John P. Jumper
Air Force chief of staff*

