War Fighting in Cyberspace

Evolving Force Presentation and Command and Control

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The Department of Defense (DOD) is endeavoring to define war fighting in the global cyberspace domain.[1] Creation of US Cyber Command (USCYBERCOM), a subunified functional combatant command (FCC) under US Strategic Command (USSTRATCOM), is a huge step in integrating and coordinating the defense, protection, and operation of DOD networks; however, this step does not mean that USCYBERCOM will perform or manage all cyberspace functions. In fact the vast majority of cyberspace functions conducted by the services and combatant commands (COCOM), although vital for maintaining access to the domain in support of their operations, are not of an *active* war-fighting nature. We apply the concepts of war fighting, offense, and active defense to the domain of cyberspace and propose several recommendations to aid USCYBERCOM as it works with the services and geographic combatant commands (GCC) to fight in cyberspace. That global, regional, and service commanders will have to share command and control (C2) of cyberspace war-fighting capabilities and forces raises several interesting questions about how USCYBERCOM can most effectively work with the GCCs. Specifically, what is the ideal force presentation method, and which C2 model should the DOD use for war-fighting capabilities in cyberspace? Are there lessons learned from similar global-to-regional support challenges that we might apply to cyberspace C2? We offer US Special Operations Command (USSOCOM) as a model for cyberspace force presentation and C2; however, this model is a long-term goal that is not immediately achievable. In the interim, USCYBERCOM can adapt lessons learned from space and air-mobility force presentation and C2 to develop a building-block approach to evolve cyber force presentation and C2 from its current nascent state to a more mature USSOCOM-like state.

Although other models exist, we examine how space, air mobility, and special operations force presentation and C2 models can inform the way USCYBERCOM could interact with the other COCOMs—particularly the GCCs. We also discuss the complex interdependencies, specialized capabilities, and doctrinal approaches FCCs use as they provide capabilities to GCCs. To begin, we briefly address the inadequacy of current doctrine for war fighting in cyberspace. Then we examine how space and air mobility doctrine can serve as useful, although only partly adequate, models for presenting forces and performing C2. Finally, we provide a building-block methodology to take us from current capabilities to a fully developed USSOCOM-like cyberspace model.

Why the Existing Information Operations Model Is Insufficient

Current Air Force and joint doctrine governing war fighting in cyberspace is scarce. According to Air Force Doctrine Document (AFDD) 3-12, *Cyberspace Operations*, "Although cyberspace operations are integral to all combatant commands, Services, and agency boundaries, as of the date of publication of this AFDD, there is no overarching joint doctrine for planning or operations in cyberspace."[2] A new joint doctrine cyberspace publication is being formally staffed, but published joint doctrine comes no closer to addressing war fighting in cyberspace than a discussion of computer network operations as a subset of information operations (IO).[3] Computer network operations and IO are clearly related, but their purposes differ. Gen Keith B. Alexander, commander of USCYBERCOM, wrote, "Although it is understood that land, maritime, air, and space warfare will be employed to deter (for example, influence) an adversary, no one believes that warfare within these domains is uniquely 'information operations.'"[4]

Both AFDD 3-12 and General Alexander recognize that war fighting in cyberspace is more than a subset of IO; however, at this time Joint Publication (JP) 3-13, *Information Operations*, provides the only joint framework that addresses C2 for cyberspace war fighting. Joint doctrine contains no guidance for cyber force presentation. IO doctrine defines computer network operations, comprised of computer network attack (CNA), computer network defense (CND), and computer network exploitation.[5] For the purpose of this article, we define cyber war-fighting actions as CNA plus a subset of CND called CND-response actions (CND-RA).[6] According to JP 3-13, CNA activities are now integrated at the theater level in the J-39 IO cell.[7] JP 6-0, *Joint Communications System*, notes that CND is integrated within the J-6.[8] This arrangement is problematic because it splits related war-fighting functions between different staff elements and essentially minimizes the importance of a war-fighting domain by burying it within the Joint Staff.

Joint doctrine must separate the shared responsibility for maintaining access to the cyberspace domain, which should be a J-6 (communications) function, from the concept of war fighting in cyberspace, which should be a J-3 (operations) function.[9] General Alexander noted, "Where the principal effect of IO is to influence an adversary *not* to take an action, the principal effect of cyber warfare is to deny the enemy freedom of action in cyberspace" (emphasis in original).[10] To engage in cyber warfare as General Alexander envisions it, responsibility for CNA and CND-RA must expand beyond the Joint Staff and be treated the same as warfare in other domains.

Defining Force Presentation

Force presentation for cyber war fighting is the manner in which USCYBERCOM and the services make CNA and CND-RA capabilities available to the GCCs. JP 1, *Doctrine for the Armed Forces of the United States*, summarizes the roles and responsibilities of the services and COCOMS:

> The Services and United States Special Operations Command (in areas unique to special operations) have responsibilities to organize, train, equip, and sustain forces. . . .

> The Commanders, US Central Command, US European Command, US Pacific Command, US Southern Command, and US Northern Command. . . . (1) deter attacks against the United States, its territories, possessions and bases, and employ appropriate force should deterrence fail; (2) carry out assigned missions and tasks and plan for and execute military operations, as directed, in support of strategic guidance.[11]

As the DOD components tasked to fight wars, COCOMs define requirements, and the services then organize, train, equip, and sustain forces to meet them. Currently USSOCOM is unique in that it is a COCOM with service-like responsibilities.

The force presentation and C2 models for space, air mobility, and special operations form steps along a continuum of options that USCYBERCOM can use when providing war-fighting forces and capabilities to the GCCs. The first step, space force presentation, is based on an independent action model that USSTRATCOM uses to control space force presentation and support the GCCs. The second step, air mobility force presentation, is based on an interdependent action model by which US Transportation Command (USTRANSCOM) works with the GCCs to move forces and supplies throughout the world. Finally, special operations forces (SOF) force presentation is based on an organic force presentation model.

Step One: A Space Model— Independent Action

Today, as the DOD develops cyber war-fighting capabilities, we do not have enough cyber war fighters available to distribute them in a decentralized manner among the GCCs. Using an independent action model would enable USCYBERCOM to support the maximum number of GCC requirements because USCYBERCOM could dynamically shift its limited resources to maximize GCC support. USSTRATCOM has done this for decades with space force presentation. Applying space doctrinal concepts can help USCYBERCOM take immediate measures to improve cyber force presentation to the GCCs.

Gen Kevin P. Chilton, former commander of USSTRATCOM, clearly connected space to cyberspace: "Let's move into the line of operation that we call cyberspace. Is that a support line for us? You bet. Just like space. Is it global in nature? You bet. Just like space. Do we operate in it every day? You bet. Just like space. In fact what we're tasked to do is to operate, defend, prepare to attack, and on order attack through this domain."[12]

USSTRATCOM's actions in space occur independently of any actions taken in the theater. That command does not rely upon the GCC to carry out some task before it can complete its own tasks in space. How-ever, the space relationship is inherently a dependent one from the perspective of the GCC. For this reason, GCCs must explicitly state all space support requirements to USSTRATCOM; to do otherwise would potentially disrupt or negatively affect GCC war-fighting operations that depend upon space support.

The space force presentation and C2 template centralize all GCC communications through a specified channel within USSTRATCOM called the joint functional component command space (JFCC Space). That channel communicates with all GCCs and maintains situational awareness of how space operations integrate with all GCC activities. In order to communicate effectively, JFCC Space uses the joint space operations center (modeled after an air and space operations center [AOC] construct) to command and control military space operations effectively.

USSTRATCOM has delegated day-to-day communication activities to JFCC Space. Likewise, JP 3-14, *Space Operations*, notes that "[GCC commanders] may designate a space coordinating authority (SCA) and delegate appropriate authorities for planning, integrating, and coordinating space operations within the operational area."[13] In many regards, the SCA serves as the COCOM's focal point for all space support operations. An SCA can work with JFCC Space for all types of space support issues. The concept of the SCA serves as a cross-domain model for communicating between USSTRATCOM and the GCC. The SCA gathers the requirements from all service and functional components and, on behalf of the GCC, speaks with one voice to USSTRATCOM via JFCC Space.

Achieving USCYBERCOM Independent Action: Cyber Coordinating Authority. To increase the visibility of cyber war-fighting activities, each GCC should adopt the SCA concept for cyber force presentation, in effect creating a cyber coordinating authority (CCA). This action is viable today because it requires limited resources. The greatest challenge to creating a CCA

position within each GCC lies in determining its proper placement. Space doctrine regarding SCA placement defers this decision to each GCC.[14] USCYBERCOM could follow the space doctrinal template of deferring the decision to each GCC, or it could recommend a CCA placement location in order to best integrate USCYBERCOM activities within the GCC scheme of maneuver.

Furthermore, if a CCA were created, USCYBERCOM could continue to complete many of its existing war-fighting functions in a centralized manner. As with space operations, the relationship would remain independent from the FCC perspective and dependent from the GCC perspective. Within the GCC, the services maintain and operate their own networks. USCYBERCOM would direct all CNA and CND-RA activities on behalf of the GCC.

Space doctrine offers insight into cyber force presentation beyond the joint force headquarters level. USSTRATCOM directs its service components (in regard to space) to serve as space proponents within their service, especially the service components of GCCs:

> Common responsibilities of each of the Service components are: advocating for space requirements within their respective Services, providing a single point of contact for access to Service resources and capabilities, making recommendations to USSTRATCOM on appropriate employment of Service forces, providing assigned space forces to CDRUSSTRATCOM [commander, USSTRATCOM] and CCDRs [combatant commanders] as directed, assisting in planning in support of space operations and assigned tasking, and supporting CDRUSSTRATCOM and other CCDRs with space mission area expertise and advocacy of desired capabilities as requested.[15]

USSTRATCOM disperses the space expertise resident in its service components to the GCC service components to provide the GCCs "space mission area expertise and advocacy," as mentioned above. This approach enables USSTRATCOM to centralize C2 space capabilities while ensuring that the GCC components are aware of space capabilities. These space proponents help GCC components integrate space capabilities within their operations.

Achieving USCYBERCOM Independent Action: Service Component Responsibilities. The service components to USCYBERCOM should act as CNA and CND-RA proponents within each GCC. Those components should send liaisons to champion cyber war-fighting capabilities within the respective GCC service and functional components to maximize USCYBERCOM's contribution to GCC war-fighting activities. Space doctrine provides a template for integrating space within the service components, using the Army's space support elements, the Navy's space operations officers, the Marines' space cadre, and the Air Force's director for space forces.[16] Although USSTRATCOM has no special operations component, it does maintain a space support team construct to send space "proponents" to GCC special operations components.[17] USCYBERCOM's embedded cyber war-fighting proponents would advocate methods by which USCYBERCOM CNA/CND-RA actions could help fulfill GCC requirements, which would then filter back to USCYBERCOM via the GCC CCA.

Step Two: An Air Mobility Model—Interdependent Action

Creating a CCA and dispersing proponents throughout the GCC would lay a strong foundation to build a mature methodology for cyber force presentation. These initial measures to leverage lessons learned from space force presentation should continue to evolve into an interdependent communication model. Such an intermediate step is necessary to transition cyber war fighting from a primarily USCYBERCOM mission to a mission shared between USCYBERCOM and GCCs. The next building block, an interdependent model, would enable each GCC to develop a nascent organic cyber war-fighting capability and develop regional cyber war-fighting subject-matter experts.

Interdependent operations differ from independent operations in that both parties rely on each other for mission accomplishment. Interdependent operations are more complex than independent operations because they require coordination to avoid duplication of effort and to maximize utility. Cyber war-fighting actions occurring at near "network speed" will demand detailed planning and coordination because execution speed may render real-time communication impossible. Air mobility operations offer insight into mitigating the communication challenges of interdependent operations.

Because of limited air mobility resources, global air mobility operations must occur interdependently among the FCC, USTRANSCOM, and GCCs. The DOD simply does not have enough air mobility assets to give each GCC all of the airlift it requires. Therefore, all components must share ownership and collaborate. For this reason, air mobility force "ownership" can be segmented into three distinct classifications: those forces under the command of USTRANSCOM, those under the GCC (such as US Pacific Command), and each service's organic air mobility forces.[18]

USTRANSCOM maintains an air component, US Air Forces Transportation, which, in turn, maintains the 618th AOC. The latter, which communicates with GCC AOCs daily to enable global mobility operations, has responsibility for the majority of intertheater airlift, while the GCCs' AOCs have responsibility for the majority of each GCC's intratheater airlift.[19] The 618th AOC and the GCC AOCs thus work interdependently to ensure the success of the global air mobility enterprise.

Joint doctrine offers the concept of a facilitator to aid this process. JP 3-17, *Air Mobility Operations*, defines the director of mobility forces (DIRMOBFOR) as a "coordinating authority for air mobility with all commands and agencies, both internal and external to the JTF [joint task force], including the JAOC [joint air operations center], the 618th TACC [Tactical Air Control Center, now known as the 618th AOC], and the

JDDOC [joint deployment and distribution operations center] and/or the JMC [joint movement center]."[20] JP 3-17 describes the DIRMOBFOR as "normally a senior officer who is familiar with the AOR [area of responsibility] or JOA [joint operations area] and possesses an extensive background in air mobility operations. The DIRMOBFOR serves as the designated agent for all air mobility issues in the AOR or JOA, and for other duties as directed."[21] However, because the DIRMOBFOR represents the commander of Air Force forces rather than the joint force air component commander, the director must work with the AOC's commander and its air mobility division for intratheater airlift operations. Within the theater AOC, the air mobility division will "integrate and direct the execution of theater assigned or attached Service organic mobility forces operating in the AOR or JOA in support of JFC [joint force commander] objectives."[22] The 618th AOC works interdependently with the GCC's DIRMOBFOR and AOC to ensure that the war fighter receives support via transportation activities and thus obtains the proverbial beans, bullets, and people.

Achieving USCYBERCOM Interdependent Action: Director of Cyber Forces. The GCC's CCA should become the equivalent of the DIRMOBFOR for cyber war-fighting capabilities (i.e., a DIRCYBERFOR). The DIRCYBERFOR would continue to work with USCYBERCOM, as the CCA did, for external cyber war-fighting capabilities but would also work with the GCC's nascent organic cyber war fighters through theater organic C2 channels. In this second step, the GCCs would develop initial cyber war-fighting capability that will require C2 within the GCC itself—external to USCYBERCOM. Unlike the CCA, the DIRCYBERFOR has a doctrinal template in the placement of the DIRMOBFOR underneath the commander of Air Force forces. Although the processes required to integrate airlift clearly differ from those to integrate USCYBERCOM's nonkinetic fires activities, the concept of a DIRCYBERFOR has value.

Joint doctrine gives the following guidance to JFCs who stand up functional components: "Normally, the Service component CDR with the preponderance of forces to be tasked and the ability to C2 those forces will be designated as the functional component CDR; however, the JFC will always consider the mission, nature and duration of the operation, force capabilities, and the C2 capabilities in selecting a CDR."[23] CNA/CND-RA forces are in such a formative state that GCCs will have difficulty initially determining who to designate as the DIRCYBERFOR. Although not directly grounded in existing joint doctrine, it may be best if both the CCA and DIRCYBERFOR begin at the JFC level and then transition over time to create a cyber functional component at both the GCC and JFC levels in the future.

Achieving USCYBERCOM Interdependent Action: Cyber War-Fighting Element. The AOC's air mobility division process could serve as a model for a theater C2 structure for incipient cyber forces—a cyber war-fighting element (CWE). Whereas an air mobility division endeavors to direct and execute the JFC's organic airlift mission, the CWE would endeavor to direct and execute the JFC's cyber war-fighting mission. As JFCs seek to integrate cyber war-fighting capabilities within the theater scheme of maneuver, a small CWE could report to the DIRCYBERFOR within the JFC staff.

We should inject a word of caution at this point. Step one, the space model, entailed sending proponents forward to help the war fighter present requirements to USCYBERCOM through the SCA. Step two, the air mobility model, cannot subsequently remove these forces and use them as the foundation for standing up CWEs because each GCC component will still need cyber war-fighting proponents to push war-fighter requirements to the CWE and DIRCYBERFOR.

Achieving USCYBERCOM Interdependent Action: Cyber Operations Center. As forces become available to establish CWEs, USCYBERCOM should establish a cyber operations center modeled on the 618th AOC to interact with GCCs. The center would work with GCC CWEs and DIRCYBERFORs to prioritize, allocate, and utilize global cyber war-fighting capabilities.

Step Three: A USSOCOM Model— Organic Action

During congressional testimony, General Alexander observed that

> command and control in cyberspace is still more complicated [than in other domains]. Computer network operations can be regional and global at the same time, and can have effects approaching those of weapons of mass destruction. The devices that give us access to cyberspace exist in the physical world, and in conventional military terms we can say that they are always within the area of responsibility of some geographic combatant command—but they can create effects that take place far away in the area of responsibility of a second command, and they might be enabled to do so by unsuspecting users and their devices located in still a third command's region. Which commander is the mission lead in such a case and is military action appropriate? Which command is supported, and which is supporting? In cyberspace, questions like this must be answered at Internet speed and must take into account our responsibilities and obligations under international law and norms.[24]

The challenges that General Alexander described are daunting, but they are not unique—in fact, they are quite similar to the challenges we face when combating terrorism and conducting special operations in general. The DOD has carefully studied terrorism and determined that the best method to confront this global challenge is to direct USSOCOM to "synchronize planning of global operations against terrorist networks."[25] Because of the similar challenges faced by cyber war fighting and SOF, USCYBERCOM should eventually adopt USSOCOM's force presentation and C2 models.

USSOCOM has chosen to posture forces both globally from the continental United States and regionally (organically) within GCCs. Rather than supporting forces, organic forces are the doctrinal concept for

GCC wartime force presentation defined within JP 1, *Doctrine for the Armed Forces of the United States*.[26] Based upon that document, some type of organic cyber forces should also be the end-state goal for GCC force presentation and C2.

Like special operations, war fighting in cyberspace is both global and regional in nature. The SOF community has addressed the dual global and regional nature of terrorism and developed a C2 architecture and force presentation model that provide USCYBERCOM unique and relevant insights. All SOF forces stationed in the continental United States fall under the command authority of USSOCOM, while those assigned to a GCC fall under authority of the GCC commander. As an FCC, USSOCOM provides additional forces on a temporary basis to GCCs for operational employment, with the GCC normally exercising operational control over them.[27] The GCC exercises C2 of all assigned and attached special forces through a theater special operations command (TSOC), which provides unity of command and serves as "the primary theater SOF organization capable of performing broad continuous missions uniquely suited to SOF capabilities" and "the primary mechanism by which a geographic combatant commander exercises C2 over SOF."[28] The TSOC commander has three principal roles: JFC of SOF in-theater, theater special operations adviser, and joint force special operations component commander.[29] This "triple hatting" makes the position unique within the GCCs. Only this commander is dual hatted as a JFC; GCC service components are dual hatted as component commanders because the service components, unlike SOF, are inherently not joint.

Achieving USCYBERCOM Organic Action: Theater Cyber Operations Command. USCYBERCOM should adopt a USSOCOM force-provider mind-set for each GCC's organic cyber war-fighting component. Each theater would establish a theater cyber operations command (TCYOC) to provide the same type of advocacy and C2 provided by the TSOC for SOF. The TCYOC commander would serve as JFC for all assigned and attached cyber operations personnel, as theater cyber operations adviser, and as joint force cyber operations component commander. Implementing this concept would clearly elevate cyberspace to an appropriate level of importance.

Achieving USCYBERCOM Organic Action: Joint Cyber Attack Component. Organic CNA capabilities from multiple services should be combined under a joint cyber attack component. Joint doctrine provides guidance on how the TCYOC should present forces to the GCC: "Functional component commands are appropriate when forces from two or more Military Departments must operate within the same mission area or geographic domain or there is a need to accomplish a distinct aspect of the assigned mission."[30] If multiple services provide cyber attack and defensive response capabilities within the TCYOC, it would be appropriate to create functional components for each. For example, JP 3-05, *Doctrine for Joint Special Operations*, discusses how a joint special operations air component is often created within a joint special operations task force when multiple services have organic air assets.[31] This component creates a layer of oversight with air expertise above the various SOF aviation elements so that the limited resource can be employed in the most efficient manner.

In the future, a TCYOC probably would have organic service components. The SOF template illustrates a scenario in which multiple services could provide overlapping capabilities. Although many SOF aspects are uniquely connected to a service component, capabilities such as air mobility and airborne fires reside in two service components. Lessons learned from theater operations led to the doctrinal concept of a theater joint special operations air component.

If service CNA/CND-RA capabilities evolved into specialized functions, a study of SOF doctrine would indicate that cyber service components should be adequate. However, overlapping of some aspects of

service-provided CNA/CND-RA capabilities may warrant an additional C2 layer.

Achieving USCYBERCOM Organic Action: Liaison Elements. The GCC cyber war-fighting component must send liaison elements to other functional components. Each GCC maintains a special operations component that must liaise with the other GCC (or subordinate joint task force) components. According to JP 3-05, "To fully integrate SO [special operations] and conventional operations, SOF must maintain effective liaison with all components of the joint force to ensure that unity of effort is maintained and risk of fratricide is minimized."[32] Special operations doctrine addresses specific areas where SOF must send liaison elements:

> SOF commanders have available specific elements that facilitate C2, coordination, and liaison. They include . . . the special operations liaison element . . . to provide liaison to the joint force air component commander . . . or appropriate Service component air C2 facility; and SOF liaison officers (LNOs) placed in a variety of locations as necessary to coordinate, synchronize, and deconflict SO within the operational area. . . . All of these elements significantly improve the flow of information, facilitate concurrent planning, and enhance overall mission accomplishment of the joint force.[33]

The TSOC integrates personnel within the AOC to coordinate, deconflict, and integrate SOF air, surface, and subsurface operations.[34] Special operations doctrine recognizes that communication between organic components within the GCC requires conscious effort and resource allocation.

Achieving USCYBERCOM Organic Action: Cyber War-Fighting Liaison Elements. USCYBERCOM should consider creating cyber war-fighting liaison elements when pursuing TCYOCs. JP 3-05 discusses how the special operations liaison element integrates within the JAOC.[35] Members of the former integrate into processes throughout the AOC. Similarly, the cyber war-fighting liaison elements could integrate cyber war-fighting capabilities within the various

JAOC divisions. For example, should the TCYOC plan a significant CNA/CND-RA action, the liaison elements could ensure proper integration and deconfliction of the activity within JAOC processes.

Achieving USCYBERCOM Organic Action: "Service-Like" Responsibilities. USCYBERCOM should be given appropriate "service-like" responsibilities for cyber-specific requirements modeled after those of USSOCOM. The methodology for SOF force presentation addresses force presentation from both the COCOM and service perspectives. USSOCOM has service-like responsibilities in that it organizes, trains, and equips SOF.[36] This includes maintaining its own major force program to procure specialized equipment. For example, the US Air Force will procure a C-130 Hercules and deliver it to Air Force Special Operations Command, which then "upgrades" the C-130 into a special operations AC-130U Spooky gunship. One benefit of this arrangement is that SOF-specific requirements (regardless of the service involved) will receive an appropriate amount of advocacy and not be overshadowed by competing service-level requirements. Analogously, USCYBERCOM should be the DOD's primary FCC to organize, train, and equip CNA and CND-RA forces.

Aside from USSOCOM, it is the role of the services to equip and educate their members. The services tend to develop and acquire capabilities in accordance with their own priorities, which may not necessarily favor decisions optimized for cyberspace operations. Furthermore, cyberspace is inherently a joint (or even interagency) operating area, yet the services may pursue different technical solutions to realize similar capabilities, such as CNA software. Gaps may also arise in research, development, and acquisition. With service-like responsibilities, USCYBERCOM could provide cyberspace-specific advocacy for systems acquisition, research, and development.

Achieving USCYBERCOM Organic Action: Joint Cyberspace Operations University. To train or, in this case, educate its members, USCYBERCOM should develop a

Joint Cyberspace Operations University modeled after Joint Special Operations University. USSOCOM maintains the latter to provide continuing education for worldwide SOF. The university focuses on educating senior and intermediate special operations leaders and selected non-special-operations decision makers (both military and civilian) in joint special operations.[37] Joint Cyberspace Operations University could play an important role in developing future cyberspace leaders. It could partner with service schools in the same way Joint Special Operations University partners with these schools, including the US Air Force's Special Operations School.[38] In addition, USCYBERCOM could leverage a number of existing cyber training and education programs, including the Air Force's Undergraduate Cyber Training School, the Air Force Institute of Technology, and the Naval Postgraduate School.[39] It may even be possible to implement Joint Cyber Operations University in a decentralized manner. New schools that specifically address war fighting in cyberspace, such as a Cyber School of Advanced Air and Space Studies and a Cyber Weapons Instructor Course within the USAF Weapons School could also meet specific USCYBERCOM requirements.[40]

Conclusion

USCYBERCOM can begin implementation today of a building-block approach to normalize force presentation for cyber war fighting and C2. Each step would build upon actions taken in the preceding one. The first step, taking lessons learned from space, would require little additional manpower. Initially, USCYBERCOM would advocate that the GCCs adopt cyber coordinating authority for cyber force presentation. Simultaneously, USCYBERCOM would direct its service components to send cyber warfighting proponents to respective GCC service and functional components to better integrate USCYBERCOM's contribution to GCC war-fighting activities.

The second step in the building-block approach would involve transitioning from a space to an air mobility model. The CCA from the previous step would evolve into a DIRCYBERFOR for cyber war-fighting activities. As forces become available, GCCs would establish cyber war-fighting elements, and USCYBERCOM would stand up a cyber operations center to interact with GCCs.

Within the air mobility model, USCYBERCOM cyber war-fighting proponents would remain embedded within the GCC, as they were under the space model. However, within the USSOCOM model, these USCYBERCOM proponents would evolve into liaisons from the GCC cyber war-fighting component to the other GCC components. With this building block, the individuals would remain, but their C2 chain would change from USCYBERCOM to the GCC.

In the third step (the USSOCOM model), the relationship between the theater JFC staff and USCYBERCOM C2 center would evolve to one of an FCC responsible for global cyber war-fighting operations and a GCC cyber war-fighting component responsible for regional cyber war-fighting activities. The USCYBERCOM C2 center would also maintain responsibility for synchronizing regional actions between GCCs. This synchronization responsibility would require close coordination between the GCC cyber components and the USCYBERCOM C2 center.

USSOCOM has utilized its "service-like" responsibilities to advance special operations war-fighting capabilities. Adapting USSOCOM's service-like attributes could aid USCYBERCOM in much the same manner. The importance of education in developing a cyber war-fighting force cannot be overstated, and Joint Special Operations University offers a model that USCYBERCOM can adapt.

Although the DOD still grapples with the very concept of war fighting in cyberspace and remains unclear about what actions would constitute acts of war, it must still address the question of how to present cyber forces and exercise C2 of them. Cyber-

space is definitely a contested domain, but is it a unique one? Although some aspects of cyberspace are undoubtedly unique, we argue that in the area of force presentation and C2, cyberspace is analogous to other war-fighting domains; hence, we can apply lessons from space and air operations to cyberspace. We therefore recommend that USCYBERCOM adopt our doctrinally based blueprint for presenting and exercising C2 of cyber war-fighting forces. ✪

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Notes

1. Joint doctrine defines *cyberspace* as a global domain. See Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (as amended through 30 September 2010), http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf.

2. Air Force Doctrine Document 3-12, *Cyberspace Operations*, 15 July 2010, 14, http://www.e-publishing.af.mil/shared/media/epubs/AFDD3-12.pdf.

3. JP 3-13, *Information Operations*, 13 February 2006, IV-5, http://www.dtic.mil/doctrine/new_pubs/jp3_13.pdf.

4. Lt Gen Keith B. Alexander, "Warfighting in Cyberspace," *Joint Force Quarterly* 46 (Third Quarter 2007): 60, https://digitalndulibrary.ndu.edu/cgi-bin/showfile.exe?CISOROOT = /ndupress&CISOPTR = 20001&CISOMODE = print.

5. JP 1-02, *Department of Defense Dictionary*, defines *computer network attack* as "actions taken through the use of computer networks to disrupt, deny, degrade, or destroy information resident in computers and computer networks, or the computers and networks themselves" (93); *computer network defense* as "actions taken to protect, monitor, analyze, detect, and respond to unauthorized activity within the Department of Defense information systems and computer networks" (93); and *computer network exploitation* as "enabling operations and intelligence collection capabilities conducted through the use of computer networks to gather data from target or adversary automated information systems or networks" (93).

6. CND-RAs are "deliberate, authorized defensive measures or activities that protect and defend DOD computer systems and networks under attack or targeted for attack by adversary computer systems/networks. RAs extend DOD's layered defense-in-depth capabilities and increase DOD's ability to withstand adversary attacks." Chairman of the Joint Chiefs of Staff Instruction 6510.01E, *Information Assurance (IA) and Computer Network Defense (CND)*, 12 August 2008, GL-7, http://www.dtic.mil/cjcs_directives/cdata/unlimit/6510_01.pdf.

7. JP 3-13, *Information Operations*, IV-5.

8. JP 6-0, *Joint Communications System*, 10 June 2010, III-1, http://www.dtic.mil/doctrine/new_pubs/jp6_0.pdf.

9. For a more in-depth discussion on the importance of separating war fighting in the domain from actions taken to maintain access to the domain, see Dr. Robert F. Mills, Maj M. Bodine Birdwell, and Maj Kevin R. Beeker, "Apples & Oranges: Operating and Defending the Global Information Grid," *IAnewsletter* 13, no. 2 (Spring 2010): 39–40, http://iac.dtic.mil/iatac/download/Vol13_No2.pdf.

10. Alexander, "Warfighting in Cyberspace," 60.

11. JP 1, *Doctrine for the Armed Forces of the United States*, 2 May 2007 (incorporating change 1, 23 March 2009), ii, III-12–13, http://www.dtic.mil/doctrine/new_pubs/jp1.pdf.

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Top

What's in a Name?

Beyond Rescue As We Know It

Maj Samuel Kwan, USAF*

Operational art is "the application of creative imagination . . . to design strategies, campaigns, and major operations and organize and employ military forces."[1] The visual arts epitomize creativity while challenging viewers to interpret an artist's message. In some instances, the artist's intent is quite clear, as in Paul Gauguin's painting *Where Do We Come From? What Are We? Where Are We Going?*, which contemplates humankind's existence and evolution in terms of birth, life, and death.[2] Examining other subjects in a similar manner may also prove worthwhile. By applying Gauguin's three questions to the Air Force's personnel recovery (PR) mission, we can design a road map for the future.

Throughout the evolution of Air Force rescue, one recurring theme—the redesignation of forces—has more or less coincided with changes in capabilities and increases or decreases in the scope of the mission. The latest and perhaps most substantial change to affect Air Force rescue in the last several decades is the June 2009 adoption of PR as one of the service's core functions.[3] By doing so, the Air Force elevated the importance of the mission by formally assuming ownership and committing to this capability on a par with air superiority, rapid global mobility, special operations, and other functions. As the only service to have PR as a core function, the Air Force is recognized as the Department of Defense's (DOD) expert in this mission. But this increased focus calls for another name change—one long overdue. Specifically, such a seemingly minor initiative as redesignating "rescue squadrons" as "personnel recovery squadrons" can become a catalyst that energizes further changes. More than just a new name and flight-suit patch, the concept of a PR squadron will define how the Air Force organizes, trains, and equips PR forces to operate in the joint environment while professionally developing those personnel to perform duties beyond the tactical level in order to lead the rescue mission into the future.

Where Do We Come From?

To find out where we come from, we must study our history. Inception of the modern rescue force occurred on 13 March 1946 with the establishment of the Air Rescue Service (ARS), led by Col Richard Kight, under Air Transport Command.[4] Colonel Kight (later a brigadier general) was responsible for coining the "Code of an Air Rescue Man," which ends with the well-known oath "These things [we] do that others may live."[5] Following the Korean War, the ARS reverted to a conventional peacetime civil search and rescue (SAR) mission.[6] According to one historian, "Most USAF leaders believed that the Korean experience had been an aberration in warfare, and they expected that few lessons were to be learned." This attitude led to cuts in ARS's budget and personnel, which resulted in the loss of rotary-wing doctrine and expertise.[7] When the need once again arose for combat search and rescue (CSAR) during the Vietnam War, the Air Force assembled forces and renamed the

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ARS the Aerospace Rescue and Recovery Service (ARRS) in January 1966. However, by then, those forces had to relearn many of the lessons of Korea, so the failed early years of the Vietnam conflict became known as the "dark age of SAR."[8] Nevertheless, Air Force rescue later gained fame in Vietnam for daring missions involving "Jolly Green Giant" helicopters that plucked downed Air Force and other services' aircrews out of the dense jungle. Airmen such as A1C William Pitsenbarger, a pararescueman and recipient of the Medal of Honor, gave their lives to save others. Thus, the latter portion of the Vietnam War became known as the "golden age" of rescue.[9]

Unfortunately, Air Force rescue atrophied again after Vietnam, and the subsequent 15 years saw a loss of combat rescue capability. In the 1980s, Twenty-Third Air Force owned the mission for a time, under United States Special Operations Command (USSOCOM), which later divested responsibility to Military Airlift Command, which then revived the original designation, Air Rescue Service.[10]

The beginning of Operation Desert Storm brought about the hasty reassembling of CSAR forces and operational command and control (C2) architecture. As Darrel Whitcomb observes, "In the summer of 1990, CSAR in toto was not in the best of shape," due largely to "force reductions, budget decisions, and reorganizations."[11] Additionally, the transfer of HC-130 and MH-53 aircraft and experienced personnel from the ARS to USSOCOM resulted in the tasking of Special Operations Command Central, rather than ARS, with the CSAR mission in Desert Storm. However, instead of the special operations component, the joint rescue coordination center—an entity that belonged to the conventional air component of Central Command Air Forces—was assigned the C2 responsibility. This divided architecture meant that Special Operations Command Central owned the primary recovery mission for all service components while Central Command Air Forces, which had no helicopters in-theater, exercised C2 for that

mission.[12] Such a problematic command relationship between components produced a significant lesson learned from the conflict.

Apart from those in Desert Storm, other recovery missions in the 1990s famously included the rescue of Capt Scott O'Grady by a Marine Corps tactical recovery of aircraft and personnel team and the recoveries, by Air Force special operations forces, of an F-117 and an F-16 pilot during Operation Allied Force. Meanwhile, conventional Air Force rescue units struggled to find their identity. On 1 February 1993, Air Mobility Command (the successor to Military Airlift Command) transferred the ARS to Air Combat Command, which in turn disbanded it and aligned some rescue units with their geographic major commands (e.g., US Air Forces in Europe and Pacific Air Forces).[13] At the same time, Air Force CSAR squadrons, known as "air rescue squadrons," became "rescue squadrons." Although Air Force Special Operations Command absorbed rescue units in 2003 and Air Combat Command reinherited the mission in 2006, no significant shift occurred in the organizing, training, or equipping of these units.

Prior to Operations Enduring Freedom and Iraqi Freedom, traditional Air Force CSAR forces sat alert in Turkey and Kuwait for Operations Northern and Southern Watch, respectively, waiting for the distress call that never came, much as they had during Desert Storm. Today, Air Force rescue forces are certainly engaged in combat and heroically going into harm's way to save lives, but the service's PR mission is currently stagnating from the combination of high operating tempo (OPTEMPO) and difficulty adapting to change.

What Are We?

In the 1990s, the DOD adopted the term *personnel recovery*, defined as "the sum of military, diplomatic, and civil efforts to prepare for and execute the recovery and reintegration of isolated personnel."[14] The Joint Personnel Recovery Agency was es-

tablished within US Joint Forces Command in 1999 as the DOD's office of primary responsibility for PR.[15] Although CSAR is only a subset of PR, most people are more familiar with the former, the means by which "the Air Force accomplishes the PR recovery task. It is the Air Force's preferred mechanism for personnel recovery in uncertain or hostile environments and denied areas."[16]

The term *search* in CSAR is an antiquated misnomer that brings to mind aircraft flying in hostile airspace "searching" for a downed Airman or other isolated personnel. In reality, the "locate" task of PR now usually happens at the operational, not tactical, level. The air and space operations center, joint PR center, or component PR coordination cell utilizes the gamut of intelligence, surveillance, and reconnaissance assets; satellites in the Global Positioning System; and survival radios, such as the Combat Survivor Evader Locator, to take the "search" out of search and rescue before recovery forces ever launch.[17] Understanding the operational-level capabilities and responsibilities of PR C2 is essential for professional development, which will create future PR leaders who practice operational art. However, among the Air Force "PR triad" of HH-60, HC-130, and Guardian Angel weapon systems, only the Guardian Angel community is broadly educated on all phases of the PR mission, from reporting through reintegration of recovered personnel.[18]

The Air Force trains our PR triad to be tactical experts in recovery—no small feat since newly assigned personnel can take up to two years to progress from initial skills training to fully mission qualified status. The Air Force needs to realize a return on its training investment by deploying and employing our PR forces in combat, but PR units have become victims of their own success. Without a doubt, Air Force PR represents the most highly trained and proficient tactical rescue force in the world. Our PR forces are invaluable to the joint team because no other service possesses the same capability.[19] Recovery of personnel by Airmen is as old as military aviation itself, but

the wars in Afghanistan and Iraq have shown that the old paradigm of CSAR's saving a fighter pilot from enemy territory amounts to only a fraction of what PR forces are tasked to do. The vast majority of isolated personnel are ground-component members—US and coalition—needing extraction from the fight. The Air Force performs this mission immensely well. HH-60 crews and Guardian Angels in particular have saved thousands of lives by flying in bad weather, at night, and under hostile fire to evacuate and provide immediate medical care to wounded soldiers and civilians. In 2009 alone, Air Force crews were credited with a combined 768 saves and 3,594 assists in Enduring Freedom and Iraqi Freedom.[20]

This persistent need for Air Force combat capability in Afghanistan, Iraq, and elsewhere has resulted in a low-supply, high-demand PR force that spends an average of one day deployed for every day spent at home station, a ratio known as a "1:1 dwell." Even though this high OPTEMPO gives PR personnel extensive tactical experience, it deprives them of the chance to acquire additional PR skills and greater operational experience—or to pursue other career-development opportunities. As the 1980s and 1990s generation of senior leaders retires from active service, combat veterans of Afghanistan and Iraq will require more than tactical skills to lead and prepare Air Force and joint PR forces in future operations. They should also have background in PR C2 and should serve in DOD, joint, or combatant command staffs to gain operational background and strategic acumen.

Among the officer corps, are we merely individual combat rescue officers or HC-130 and HH-60 pilots? Or should we instead be known as PR officers? Currently, the Air Force specialty codes (AFSC) for an HC-130 pilot and navigator are 11R and 12R, respectively, which groups them with reconnaissance, surveillance, and electronic warfare aviators, while HH-60 pilots (AFSC 11H) are aligned with other helicopter pilots. Along with combat rescue officers, PR is the proper specialty of HC-130 and HH-60 offi-

cers, just as fighter or mobility crew members are categorized into those respective mission areas. PR officers should hold the AFSCs 11P, 12P, and 13P (replacing the 13D control-and-recovery designation currently held by combat rescue officers). These AFSCs would more accurately define and identify the PR specialty and its associated knowledge, placing more emphasis on the core function than on individual weapon systems. Similarly, the Air Force created a new 18X AFSC in October 2009 for operators of remotely piloted aircraft in order to recognize, capture, and develop the unique skills in that community.[21]

By adopting PR AFSCs, the Air Force would do a better job of capturing, developing, and retaining PR expertise. We would thereby increase the pool of officers available to fill positions on higher headquarters staffs or in deployed joint PR centers and PR coordination cells. PR officers working in joint operational and strategic environments would tell (and sell) the Air Force's PR story. By increasing the number of operational and staff positions in combatant commands worldwide, we also would enhance opportunities to educate partner nations on PR, thus building their capacities and helping them establish organic PR capabilities.

The 23rd Wing, parent unit of all of the Air Force's active duty PR forces, already engages in limited activities at the tactical level that "build partnerships," another of the service's 12 core functions.[22] PR Airmen recently advised Colombian forces on airdrops and infiltration/exfiltration operations.[23] These types of efforts in theater security cooperation, however, are constrained by the limited availability of Air Force PR experts, who are heavily tasked to support wartime commitments. We need to find a way to simultaneously decrease the OPTEMPO of our deployments but increase our role in theater security cooperation since experiences in building partner capacity undoubtedly contribute to preparing well-rounded Airmen to lead PR squadrons.

Without broadly developing our people as well as our operational and strategic

competency, Air Force PR, despite its unmatched capability and success in recovery operations, risks losing relevancy in the joint environment. In a meeting with the Defense Writers Group, held shortly before termination of the CSAR-X helicopter-replacement program, John Young—former undersecretary of defense for acquisition, technology, and logistics—opined, "I don't know that that [CSAR] community has to have its own set of assets for the occasional rescue mission. We have new things coming on line like V-22s and other things that can be pressed into service. When we do our rescue mission we're going to do a come-as-you-are operation anyway, unless all the CSAR assets are pre-positioned for that."[24] Apart from demonstrating a fundamental misunderstanding of the role of PR in today's fight and a disregard for the risks of ad hoc recovery by untrained or unprepared assets, the undersecretary's statement suggests that Air Force PR is narrowly focused and its capability easily duplicated. PR forces, like special operations forces, cannot be mass produced; however, Air Force PR does indeed have a narrow focus. In reality, the joint train has left the station, and Air Force PR needs to get on board. PR officers on staff have a duty to advocate the mission and educate our senior leaders on PR issues ranging from plans and operations to acquisition, requirements, strategy, policy, and doctrine.

Where Are We Going?

CSAR-X, the Air Force's planned rescue-helicopter replacement program, appeared to embody the future of combat rescue until the secretary of defense cancelled it, asking whether PR "can only be accomplished by yet another single-service solution."[25] Because current operations and the "long war" necessitate meeting the urgent equipment needs of war fighters, the Air Force has put a high priority on acquiring new recovery aircraft. Despite the CSAR-X cancellation, an HH-60 operational-loss-replacement plan

exists to compensate for 20-plus years of aircraft losses during combat and training. In addition, the Air Force has begun recapitalizing our legacy HC-130 fleet with the HC-130J model.[26] But we must still address the long-term definition of joint PR. New technology and iron on the ramp will mollify frustrations associated with aging equipment and increase our ability to survive and operate against increasingly capable enemy air defense threats. Nevertheless, new aircraft and associated tactics, techniques, and procedures will be far less useful without smart personnel who understand strategy and desired effects. DOD leadership has already recognized that we need to adapt. Meeting joint expectations requires widening the scope of the Air Force's traditional thinking with regard to rescue.

our core professional military education in PR, actively increasing the Air Force's PR participation in collateral missions and exercises, widely exchanging PR specialists among members of the joint community, and incorporating PR into the AirSea Battle operational concept.

Within the Joint Personnel Recovery Agency, the Personnel Recovery Education and Training Center exists "to educate DoD and selected other national and international Personnel Recovery professionals, both civilian and military, in the art and science of planning and executing joint Personnel Recovery operations."[27] The center's courses train and educate joint officers and enlisted members but primarily instruct combat rescue officers or a select few operational staffers, not only on the recovery

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New technology and iron on the ramp will mollify frustrations associated with aging equipment and increase our ability to survive and operate against increasingly capable enemy air defense threats. Nevertheless, new aircraft and associated tactics, techniques, and procedures will be far less useful without smart personnel who understand strategy and desired effects.

Senior leaders such as Mr. Young will continue to take the Air Force's CSAR competency for granted, and our tactical units will continue their 1:1 dwell ratio because other nations, services, or components are unable or unwilling to dedicate assets to recover their own personnel. For those reasons, we should consider several initiatives to train others while advancing our own PR forces. These initiatives include expanding

phase of PR but also on the other PR execution tasks of reporting, locating, supporting, and reintegrating. Courses offered include PR Plans and Operations as well as Reintegration Team Responsibilities.[28] Unfortunately, training slots for these valuable courses are extremely limited.

On 9 August 2010, Secretary of Defense Robert Gates announced his intent to eliminate Joint Forces Command. Naturally, we

must consider the cascading effects, including what will become of the Joint Personnel Recovery Agency. With or without that agency, the Personnel Recovery Education and Training Center could expand to become a "PR University" that would incorporate compulsory and optional classes as part of either mission qualification or career field upgrades.[29] Additionally, the center would be an ideal forum for classes on rescue history and case studies that would help build a foundation for new PR officers. PR University's cadre would include experienced PR officers and specialists from all the services.

An article entitled "A Rescue Force for the World: Adapting Airpower to the Realities of the Long War" coherently maps the future role of Air Force PR.[30] Specifically, it proposes that we extensively employ Air Force rescue assets for disaster response and theater security cooperation, in large part to engage other nations and win the hearts and minds of their citizenry. Along those same lines, PR squadrons, through greater participation in collateral missions and exercises, could broaden their Airmen, develop their future leaders, and increase credibility and relevancy in the joint and interagency arena. Counterdrug operations with the Department of Homeland Security, noncombatant evacuation exercises with the Marine Corps, and humanitarian relief with the US Agency for International Development represent just a few examples of activities for which Air Force PR experts are ideally suited to contribute. Exercise Angel Thunder, the "premier personnel recovery exercise in the world," held annually in the Arizona desert, serves as an excellent example to emulate and expand upon.[31] We should also incorporate PR scenarios into all Red Flag and Green Flag exercises since joint and coalition partners regularly attend them.

According to joint doctrine, PR can and should involve air, land, or naval forces—whatever is necessary to fulfill the mission.[32] Exchange tours offer an ideal way to increase participants' knowledge of the capabilities of sister services and components as well as enhance joint integration. Air Force HH-60 crews, for example, would embed with Marines to exercise tactical recovery of aircraft and personnel or in Navy SAR units to gain proficiency in shipboard operations and C2, eventually returning to Air Force units to share their experiences. Obviously, this is not a new idea, but we should break down the old construct that exchange tours must be few and far between. Rather than special duties, these assignments should become a normal part of career progression. Increasing exchange opportunities would also allow our sister services to learn from the best—Air Force PR experts. Our service still possesses the preponderance of PR forces and expertise; consequently, the Air Force PR coordination cell is normally designated the joint PR center as well.[33] No other service has as many dedicated recovery assets, including aircraft; officer and enlisted aircrews; pararescuemen; and survival, evasion, resistance, and escape instructors. Our PR officers and specialists will serve as enablers who can train, educate, and increase the capacity of our sister services to fulfill the inherent doctrinal responsibility of recovering their own personnel, thereby reducing the OPTEMPO of stressed Air Force PR forces.

The AirSea Battle concept, initiated in September 2009 by the chief of staff of the Air Force and the chief of naval operations, offers a perfect forum for joint discussion of PR. Thus far, the concept has emphasized major combat operations in antiaccess environments.[34] Although this type of conflict seems to set up a "classic" downed-aviator CSAR scenario, regardless of the nature of the mission, the current AirSea Battle concept makes no mention of PR as a critical collaboration between air and naval forces. It would almost certainly become the Air Force's responsibility to recover naval aviators located beyond the range of Navy rescue forces, so we should not overlook this strategic opportunity to enhance Air Force–Navy integration. Further advancement of AirSea Battle should include discussion of

shared PR doctrine; training; C2; and tactics, techniques, and procedures.

Conclusion

We have never had a better opportunity to advance the future of joint PR. Specifically, we should leverage the increased focus on the mission, brought about by the designation of PR as an Air Force core function, by further expanding our role. Organizing, training, equipping, and committing to *personnel recovery*—not just the CSAR skill set—will define the future relevancy of Air Force PR forces. Along with expanding the role of AirSea Battle, the other initiatives will lead to a more capable joint PR community. Today, however, we find ourselves in a protracted high OPTEMPO that stretches our people and equipment to their limits. The better the Air Force performs our tactical recovery mission, the more likely it is that the DOD will continue to depend on us to provide that combat capability for all services and components. By maintaining the status quo, the Air Force risks creating only tactical experts without

the requisite operational know-how and strategic vision to lead PR in the current and future joint environment.

Remembering where we came from, we must build on the contributions, lessons learned (both good and bad), and legacy of Airmen who came before us. To take the next evolutionary step, we should redesignate Air Force rescue units as PR squadrons, led by PR officers whose professional development makes them experienced not only in tactical and operational warfare but also in strategic thinking. These PR squadrons should integrate exchange personnel from sister services and participate in a wide range of joint and interagency missions. Of course, by increasing our depth and taking on additional collateral missions, we risk becoming the proverbial jack-of-all-trades and master of none. Balancing tactical expertise and combat commitments with this expanded definition of Air Force PR will prove challenging, but by continually applying operational art and creative imagination to this dynamic mission, we will take it beyond rescue as we know it. ✪

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30. Lt Col Marc C. DiPaolo et al., "A Rescue Force for the World: Adapting Airpower to the Realities of the Long War," *Air and Space Power Journal* 21, no. 3 (Fall 2007): 78–87, http://www.airpower.au.af.mil /airchronicles/apj/apj07/fal07/fal07.pdf. This article is worth revisiting for a fuller discussion of the humanitarian relief and theater security initiatives proposed by those authors. My argument, though, aligns more closely with the broader scope of PR operations described in AFDD 2-1.6, *Personnel Recovery Operations*, versus CSAR. See specifically DiPaolo et al., "Rescue Force for the World," 86n9.

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Revelations in Haiti

The Side Effects of New Priorities for Remotely Piloted ISR Aircraft

Capt Jaylan Haley, USAF*

The RQ-4 Global Hawk, MQ-1 Predator, and other remotely piloted intelligence, surveillance, and reconnaissance (ISR) platforms typically perform combat missions to defeat improvised explosive devices or locate and neutralize enemy forces. However, the US response to the devastating earthquake near Port-au-Prince, Haiti, on 12 January 2010 challenges the paradigm that ISR simply counteracts threats.[1] In response to the Haiti disaster, the international community initiated a massive recovery and relief effort.[2] The United States alone deployed more than 22,000 military personnel, 30 ships, and 300 aircraft in support of Operation Unified Response.[3] The deployed aircraft included several manned and remotely piloted ISR platforms.

Unified Response was the first international deployment of remotely piloted ISR assets in support of a humanitarian operation although some of these assets assisted domestically after Hurricane Katrina.[4] The RQ-4 and MQ-1 provided time-critical imagery support and overwatch for military and civilian relief workers in Haiti. However, use of these military assets to support humanitarian operations complicates future decisions regarding their employment. A complication emerges when remotely piloted aircraft (RPA) tackle problems beyond their traditional roles of finding, fixing, tracking, and engaging targets. Specifically, such a new role gives policy makers, war fighters, and the public a different perspective of ISR. Providing humanitarian support via remotely piloted ISR platforms contests the established paradigm by creating debate about when and how to employ these assets. Unified Response reveals that the United States *can* respond to international humanitarian operations with ISR aircraft whenever decision makers choose to do so. Consequently, the operation demonstrates that the ISR community must be prepared to conduct these operations with the necessary manpower, support, and equipment.

The "When" Challenge

The calculus for determining when the United States should employ ISR RPAs is influenced by these aircraft's operational benefits of rapid deployability, long endurance, and lack of risk to personnel, which may persuade policy makers to use them to aid foreign states when disaster strikes. However, the prospect of using scarce ISR platforms for humanitarian operations creates a quandary for decision makers, who must determine priorities for supporting combat and noncombat operations, and for ISR operators, who must execute those priorities.

For example, the day the Haiti earthquake occurred, the Air Force had deployed an RQ-4 to support combat operations in Iraq and Afghanistan. Because

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Pres. Barack Obama ordered an aggressive response by the US government to the Haiti disaster, including the allocation of ISR assets to United States Southern Command (USSOUTHCOM) for humanitarian operations in that country, the RQ-4 priority for Unified Response temporarily exceeded that of US Central Command (USCENTCOM) for replacing its RQ-4 aircraft in support of fully engaged combat forces.[5] It is possible that future priorities may prove more ambiguous, complicating the division of ISR assets between combat and noncombat operations. Competing policy choices between humanitarian and combat operations do not constitute a new concept, but some decision makers do not consider situations like the one in Haiti a military priority at all. Regarding the response to Hurricane Katrina, a domestic disaster, a House of Representatives committee report observed that the military's sole responsibility involved fighting and winning America's wars.[6] Such thinking reflects an enduring debate concerning the use of weapons of war for operations other than war. However, the new expectation for a US response to international disasters now includes ISR, and any questions concerning its usefulness for humanitarian operations have been answered.

Employing remotely piloted ISR platforms during such operations yields multiple benefits for the United States, not only by enhancing national security but also by increasing US moral authority and strengthening international friendships by assisting people in need. Furthermore, policy makers demonstrate to the American people that their investment in weapon systems is useful for a wide range of missions, including humanitarian operations. Additionally, the military shares information with nongovernmental organizations (NGO), compensating for shortfalls in their capabilities. This symbiosis fosters closer relationships between the military and relief organizations with which the military often partners in a variety of situations.[7] If policy makers assign humanitarian operations a higher priority than combat operations in order to attain the benefits mentioned above, then ISR operators should expect an expanded role in future US responses to international disasters.

The "How" Challenges

Like the ISR operators in Unified Response, their counterparts in future situations that require ISR support must overcome several obstacles before they can successfully conduct an expanding mission set which encompasses humanitarian operations. First, these personnel must deal with an increased operations tempo that may strain finite data collection and exploitation capacity. The pool of analysts, as well as their specialized equipment, that dynamically collects and exploits ISR data as usable intelligence represents a critical but limited resource. Therefore, additional, concurrent, multitheater ISR sorties—along with varying mission types (i.e., a mixture of combat and humanitarian operations) that demand different analytical emphases—will likely strain these limited mission-management and exploitation resources. Second, as the Air Force continues to increase the pace of distributed ISR operations, personnel who perform missions will bear additional workloads and psychological stresses.[8] Third, ISR operators who disseminate unclassified intelligence must deal with the fact that standard declassification procedures for releasing large amounts of data within hours or even minutes of collection do not exist for aircraft like the RQ-4. Operation Unified Response reaffirmed the truism that the effectiveness of intelligence depends in part on its timeliness.

To address the first and second concerns, mentioned above, the Air Force needs to assign a sufficient number of ISR operations professionals to current and emerging scenarios, possibly including humanitarian operations. Moreover, the service should commission a study of ISR operators for the purpose of developing a baseline under-

standing of problems associated with conducting continuous distributed ISR missions. Perhaps future or concurrent studies could concentrate on other types of distributed missions, such as those conducted by space personnel—a community highly experienced in distributed operations.[9] The third issue justifies combatant commands' establishing uniform declassification standards to alleviate confusion in the event of another Haiti-type disaster that may call for prompt declassification of a substantial amount of intelligence. Additional or changing ISR priorities require a full-spectrum solution that considers not only hardware but also the software, processes, and human aspects of distributed ISR operations.

ISR personnel must contend with an upswing in operations tempo. By 2015 the Air Force expects to have at least 380 ISR aircraft, about 50 percent more than its current inventory of 250; this growth—primarily in remotely piloted platforms, combined with the possibility of more Haiti-like contingencies—will drive a need for more personnel to perform analytical, flight, and mission-management duties.[10] In a recent study, the Government Accountability Office identified mission-management and analytical capacities as critical ISR shortfalls, noting that "since 2002, [the Department of Defense] has rapidly increased its ability to collect ISR data in Iraq and Afghanistan; however, its capacity for processing, exploiting, and dissemination is limited and has not kept pace with the increase in collection platforms and combat air patrols."[11] Lt Gen David Deptula, retired, former Air Force A-2 (intelligence), best characterized the situation: "In the not-too-distance [*sic*] future, we'll be swimming in sensors and drowning in data."[12] RPAs create a need for more analysts since they fly longer sorties than manned aircraft and therefore collect much more data, which analysts must transform into intelligence. The ISR shortfalls identified by the Government Accountability Office are reflected in human terms by the number of ISR mission commanders and analysts available to collect and inter-

pret data from ISR platforms networked to the Air Force distributed common ground/surface system (DCGS).[13] Not only analysts but also pilots, sensor operators, and mission intelligence coordinators of the 12th and 99th Reconnaissance Squadrons and the 432nd Air Expeditionary Wing feel the effects of increased operations tempos during contingencies such as Unified Response.

The DCGS functions as the brain behind the ISR platforms that supply inputs to the overall system. The platforms, coordinated by ISR mission operations commanders, collect data for DCGS analysts located at worldwide nodes managed by the 480th ISR Wing. This unit managed intelligence exploitation, tasking, and collection for Unified Response while simultaneously supporting global combat requirements by requiring mission operations commanders and analysts to "surge" by working longer hours.[14] Even under normal conditions, analysts do not exploit all of the data collected by ISR platforms. USCENTCOM officials reportedly used "less than one-half of the electronic signals intercepts collected from the Predator."[15] Surge operations beyond the 12-hour days currently demanded by normal ISR operations are to be expected during ad hoc contingencies; however, more frequent humanitarian contingencies can severely strain our already limited analytical capacity. The Air Force's proposed 50 percent increase in ISR platforms over the next four years will place additional pressures on ISR mission management and exploitation.[16]

Because policy makers might have no knowledge of the vast amount of data collected by these additional platforms, they could underestimate the number of analysts needed to transform that information into useful intelligence. The increasing number of aircraft and accelerated usage brought about by humanitarian operations may unexpectedly confront the Air Force with the problem of "too much data and not enough intel."[17] Consequently, tactical and operational ISR commanders might find themselves in the precarious situation

of choosing between greater personnel workload and diminished mission availability.[18] Although the simple solution would call for more personnel, the use of discretion when deciding whether to become involved in contingency operations will continue to be the key factor in maintaining a proper balance of force structure. In the spring of 2010, the 480th ISR Wing began adding approximately 2,500 intelligence personnel, predicated on USCENTCOM's plan to increase its approximately 40 full-motion-video combat air patrols to 65.[19] However, this expansion does not take into account emerging priorities such as humanitarian operations.[20]

If the number of contingency operations (such as Unified Response) consistently exceeds projected USCENTCOM levels for the next several years, a faster operations tempo accompanied by surge operations for current DCGS personnel will become more likely. To alleviate the subsequent stress on mission-management and analytical capacities, the Air Force may have to add more ISR operators than the 2,500 currently planned. The Department of Defense has undertaken a study of ways to determine specific numbers of personnel necessary to meet the escalating demand for ISR analysis, but its date of publication remains uncertain.[21] Even though the military should certainly complete such evaluations in order to attain greater clarity regarding the actual manning dilemmas faced by the ISR community, other problems may exist as well.

ISR operators are subject to psychological stress occasioned by the changing requirements mentioned above. Many ISR operations take place from in-garrison locations throughout the United States every day and around the clock; indeed, the DCGS supports a variety of missions in all six geographic combatant commands. For the 13th Intelligence Squadron, Unified Response added to its many duties, albeit with a humanitarian rather than a combat focus. A sign outside the squadron's operations floor that reads "Welcome to the AOR [area of responsibility]" reflects the mentality of ISR operators, but sustainment of this "always in the fight" attitude for extended periods may have undesirable psychological repercussions.

The US Army commissions an annual report detailing stressful incidents that affect Soldiers' mental health. Studies assessing data from 2007 through 2009 identified multiple deployments as a major contributing factor to mental problems among Army personnel.[22] ISR operators, who are "always on," may possibly face *some* of the same concerns as individuals who deploy multiple times, but no data details the short- and long-term mental health issues associated with DCGS operations. Thus, commanders may someday confront a festering problem that could adversely affect their ISR operators.

Clearly, those commanders should invest in a study similar to the Army's to gauge the likelihood of mental health issues among persons who conduct combat operations from their home station. Such a study should address ISR operations, but commanders might consider expanding it to include other individuals, such as space and missile personnel who conduct distributed operations. It should also deal with ISR operators who spend several years conducting uninterrupted combat and noncombat missions. The findings might help identify potential mental health problems associated with DCGS operations—specifically, the attitudes and reactions of ISR operators to stressful situations in combat and noncombat environments. Regardless of the scope and scale of such a project, the Air Force should recognize mental health concerns as its operations increase in number and vary in scope.

Even without definitive data to document these matters, some commanders seek ways to assuage psychological stress. One initiative grants high-level security access to chaplains who support ISR operators in highly classified operating environments. Air Combat Command, which manages the pilot, sensor operator, and mission intelligence coordinator force, has taken similar

steps by granting clearances to mental health professionals, thereby expanding their access to assist operators in restricted duty areas. The side effects of including spiritual and mental health support personnel on or near operations floors remain unknown. Their presence could even inadvertently increase the pressure on task-saturated operators, who might view them as a distraction during time-critical moments. However, these initial steps will go a long way toward identifying and mitigating long-term stressors that affect people working in distributed operations, as have previous US Army research efforts in the forward operating environment.

Solving the personnel-related matters discussed above will not be enough to ensure that critical intelligence reaches the intended audience during humanitarian operations. Senior leaders must also address problems with the systems and processes that ISR operators rely upon to disseminate critical information. Declassifying sensitive information and identifying the associated delivery architecture during future humanitarian operations require planning to determine how best to deliver this information to operators who lack security clearances. Initially, security classification guidance and procedures for transmitting information to on-scene operators during Unified Response were convoluted.[23] For about the first week of operations, guidance changed repeatedly before it stabilized: virtually all electro-optical imagery was to be unclassified and transmitted through unclassified media.[24] Declassifying massive amounts of data and intelligence from remotely piloted ISR platforms so quickly was highly unorthodox, but personnel should expect it for future humanitarian operations. The situation in Haiti may have simplified the decision to declassify data and intelligence, yet guidance may differ considerably in case of humanitarian operations in more politically sensitive locations.

Releasing unclassified images may not prove feasible when the United States considers assisting states like China, Russia, or Syria. Despite their likely apprehension about the United States flying traditional "spy" aircraft over their territory, such countries might permit overflights of ISR aircraft in case of a severe disaster, but the United States might follow more restrictive rules for imagery declassification and architecture than it did in Haiti. The broader implication is that combatant commands must establish uniform declassification standards and processes that provide for the release of large amounts of intelligence within hours or minutes of collection. If a uniform declassification process is not feasible across combatant commands, then each command should establish criteria and procedures for releasing information according to its regional standards, possibly even detailing initial country-by-country declassification guidance that ISR operators can follow during disaster response. To prepare for future operations, we should clarify processes and enhance tools to deliver unclassified information to NGOs now.

Unclassified reporting standards for the DCGS may represent the most appropriate solution for future humanitarian operations since they would offer the architectural framework for delivering unclassified data. Although disseminating unclassified intelligence is not a traditional function of current ISR operators, members of the 13th Intelligence Squadron exploited ISR data during Unified Response and posted intelligence on classified and unclassified collaboration websites through the 480th ISR Wing.[25] On the unclassified network, many images appeared on USSOUTHCOM's website—the All Partners Access Network—for quick distribution of information to NGOs. However, because all combatant commands do not share this standard, decision makers should consider issuing blanket guidance for the unclassified distribution of intelligence in order to give ISR operators direction for filling requests from uncleared partners during disaster responses.

The Next Unified Response

Consider what might happen in the near future if we implemented the recommendations discussed above and then faced a hypothetical tsunami in Indonesia, comparable to the one that struck there in 2004. Suppose that the Indonesian government rejected a US offer of military forces to assist with initial recovery yet granted overflight permission for ISR aircraft. The United States could then provide assistance, largely unbeknownst to the local populace. The RQ-4 could immediately deploy from its forward station in Guam to supply nearly uninterrupted imagery coverage for humanitarian operations.[26] Additionally, tactical RPAs such as the Shadow and Raven could employ their sensors to investigate situations requiring further scrutiny of RQ-4 imagery. If these and other tactical RPAs—potentially numbering in the hundreds—linked into the DCGS, an unprecedented amount of data would stream to analysts around the world. Personnel could promptly send data garnered from these ISR platforms to our Indonesian partners and supporting NGOs via unclassified, or possibly classified, means.

In this scenario, the United States could show solidarity with its Indonesian partners, fostering a deeper friendship with an increasingly important international player—home of the world's largest Muslim population. We would expect surge operations to occur during execution of such a humanitarian mission. Nevertheless, the ISR mission would remain effective since (1) ISR personnel would not receive taskings beyond what resources allow, (2) we would have a better understanding of how increased operations affect their psycho-logical health, and (3) we would have issued clear guidance for ISR support to recovery and relief workers well in advance of the operation. These factors would culminate in a response even more effective than our efforts following the 2004 tsunami in Indonesia or the 2010 earthquake in Haiti. Moreover, the Indonesian situation is another example of using remotely piloted ISR platforms to secure US national interests in operations other than war.

Future humanitarian operations may temporarily take precedence over combat operations, and a variety of challenges will likely accompany this new reality. As they address concerns about limited data processing capacity, psychological effects associated with high operations tempo, and procedures for declassifying intelligence, decision makers and ISR operators should also recognize the benefits of humanitarian ISR operations. If Haiti is any indication of the United States' ability to respond quickly, efficiently, and effectively to international disasters, US policy makers have yet another tool with which to advance our national interests. Moreover, leveraging remotely piloted ISR weapons of war in a socially constructive manner will pay dividends well beyond the initial intent of the weapons' design. By means of this new paradigm, the DCGS and other portions of the ISR community have demonstrated their ability and willingness to transition from a purely combat focus. Because ISR operators will probably improve upon the lessons of Operation Unified Response, future humanitarian efforts will become even more effective. ✪

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Notes

1. "Intelligence assets monitor foreign states, volatile regions, and transnational issues to identify threats to US interests in time for senior military leaders to respond effectively." Joint Publication 2-0, *Joint Intelligence*, 22 June 2007, I-23–24, http://www.dtic.mil/doctrine/new_pubs/jp2_0.pdf.

2. "Magnitude 7.0—Haiti Region," US Geological Survey, 12 January 2010, accessed 5 February 2010, http://earthquake.usgs.gov/earthquakes/eqinthenews/2010/us2010rja6/#summary.

3. US Southern Command, "Narrative History of Operation Unified Response," 25 May 2010, http://www.southcom.mil/AppsSC/factFilesLarge.php?id=138.

4. The Air Force's ISR assets deployed in the aftermath of Hurricane Katrina, marking the first time they were "collectively called to domestic contingency service to provide imagery and full-motion video to military decision-makers and on-scene response providers." Maj Kevin L. Buddelmeyer, "Military First Response: Lessons Learned from Hurricane Katrina," research report (Maxwell AFB, AL: Air Command and Staff College, 2007), 3–4.

5. Jesse Lee, "Thoughts and Prayers for Haiti," White House Blog, 12 January 2010, http://www.whitehouse.gov/blog/2010/01/12/thoughts-and-prayers-haiti. USCENTCOM maintained its normal complement of ISR assets in-theater; however, the expected replacement RQ-4 was delayed due to operations in Haiti. Additionally, two RQ-1 orbits were dedicated to relief operations in Haiti. See Sharon Weinberg, "Military Drone Diverted from Mideast to Haiti," AOL News, 15 January 2010, http://www.aolnews.com/world/article/military-drone-diverted-from-mideast-to-haiti/19318294; and Judith Snyderman, "'Global Hawk' Photographs Damage to Help Relief Effort," American Forces Press Service, 15 January 2010, accessed 12 July 2010, http://www.defense.gov/news/newsarticle.aspx?id=57540.

6. "We cannot expect the Marines to swoop in with MREs [meals, ready to eat] every time a storm hits. We train soldiers to fight wars. You can't kill a storm." House, Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, *A Failure of Initiative: Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina* (Washington, DC: Government Printing Office, 2006), 15, http://www.gpoaccess.gov/serialset/creports/pdf/hr109-377/overview.pdf.

7. Col Floresita C. Quarto, "U.S. Military/NGO Interface: A Vital Link to Successful Humanitarian Intervention," US Army War College Strategy Research Project (Carlisle Barracks, PA: US Army War College, 18 March 2005), 4, http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA433681&Location=U2&doc=GetTRDoc.pdf.

8. Distributed ISR operations leverage mission management and analytical capabilities by physically separating the personnel who perform those duties from the ISR asset during mission execution. By their design, all RPAs and their ISR operators conduct distributed ISR operations.

9. See Col Keith W. Balts, "Satellites and Remotely Piloted Aircraft: Two Remotely Operated Ships Passing in the Fight," *Air and Space Power Journal* 24, no. 3 (Fall 2010): 35–41.

10. Robert M. Gates, *Quadrennial Defense Review Report* (Washington, DC: Department of Defense, February 2010), xvii, http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf; John A. Tirpak, "The RPA Boom," *Air Force Magazine* 93, no. 8 (August 2010): 36–42, http://www.airforce-magazine.com/MagazineArchive/Documents/2010/August%202010/0810RPA.pdf; and Christopher Drew, "Drones Are Weapons of Choice in Fighting Qaeda," *New York Times*, 16 March 2009, accessed 12 July 2010, http://www.nytimes.com/2009/03/17/business/17uav.html?_r=1&hp.

11. House, *"Intelligence, Surveillance and Reconnaissance: Overarching Guidance Is Needed to Advance Information Sharing," Statement of Davi M. D'Agostino, Director, Defense Capabilities and Management, Testimony before the Subcommittees on Air and Land Forces and Seapower and Expeditionary Forces, Committee on Armed Services, House of Representatives*, 111th Cong., 2nd sess., 17 March 2010, 5, http://www.gao.gov/new.items/d10500t.pdf.

12. Jim Hodges, "The Get-Well Intel Plan," *C4ISR Journal*, 1 January 2010, http://www.c4isrjournal.com/story.php?F=4411944.

13. "Air Force Distributed Common Ground System," fact sheet, *Air Force Link*, 31 August 2009, accessed 5 August 2010, http://www.af.mil/information/factsheets/factsheet.asp?id=15433.

14. TSgt Matthew McGovern, "ISR Wing Members Contribute to the Fight," *Air Force Link*, 18 March 2010, accessed 12 July 2010, http://www.af.mil/news/story.asp?id=123195175; and MSgt Dale Yates, "480th ISR Wing Airmen Aid Haiti Recovery," *Air Force Link*, 8 February 2010, accessed 12 July 2010, http://www.af.mil/news/story.asp?id=123189385.

15. House, *"Intelligence, Surveillance and Reconnaissance,"* 6.

16. Ibid.

17. An analyst uses data—the raw information garnered from ISR assets—to produce intelligence.

18. Although the operations in Haiti did not adversely affect the overall capacity of the DCGS, it does not have unlimited capability. Commanders, however, can augment capacity through extended work hours and work weeks for DCGS personnel—a process known as "surging."

19. *C4ISR Journal* 8, no. 9 (October 2009), accessed 12 July 2010, http://www.c4isrjournal.com /story.php?F = 4251691; and Barry Rosenberg, "Moving at the 'Speed of War' Is Air Force ISR Unit's Goal," *Defense Systems*, 5 April 2010, accessed 11 July 2010, http://www.defensesystems.com/Articles/2010 /04/06/Interview-Maj-Gen-Bradley-Heithold-ISR -Agency.aspx.

20. 2nd Lt Nicole White, "1st Global Hawk Lands in Guam," *GlobalSecurity.org*, 3 September 2010, accessed 15 September 2010, http://www.global security.org/intell/library/news/2010/intell-100903 -afns01.htm.

21. House, *"Intelligence, Surveillance and Reconnaissance,"* 7.

22. Judith A. Lyons, "Commentary on MHAT-IV: Struggling to Reduce the Psychological Impact of War," *Traumatology* 13, no. 4 (December 2007): 40–45; Jerry Harben, "Army Releases Mental Health Advisory Team V Report," *Army Medicine*, 6 March 2008, http://www.armymedicine.army.mil/news/releases /20080306mhatv.cfm; and Jerry Harben, "Mental Health Advisory Team VI," *Army Medicine*, 13 November 2009, http://www.armymedicine.army.mil /news/releases/20091113mhatvi.cfm.

23. In this context, classification means distinguishing between data too sensitive to release to the general public and data not sensitive enough to warrant withholding from the general public.

24. Although electro-optical images—similar to those produced by regular handheld cameras—were unclassified and released, other images (infrared and synthetic aperture radar) were not released.

25. Unclassified information was posted to USSOUTHCOM's NGO collaboration website—All Partners Access Network—a "community of communities" that combines the benefits of unstructured collaboration (wikis, blogs, forums) and structured collaboration (file sharing, calendars) with the personalization of social networking to facilitate unclassified sharing with multinational partners and NGOs, as well as among various US federal and state agencies.

26. White, "1st Global Hawk Lands in Guam."