

PARAGRAPH V IN A NETWORK CENTRIC ENVIRONMENT AND ITS IMPACT ON OPERATIONS

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Saber 5: “SSC (Signal Support Cell), are you telling me the commander can’t run a VTC (video teleconference) right now with his battalion commanders?”

Saber 61: “No sir, I’m telling you that at this point if the commander has a VTC it will seriously impact ongoing operations.”

Saber 5: “Oh, you are telling me I can have whatever I want, just not all of it at the same time. When is the next good window and what are my options?”

The above dialogue is not meant to humble maneuver to the signal community, rather it points to the price of enabling distributed operations through a network enabled force. Bottom line is that a “Commander Centric/Network Enabled Force” implies building and maintaining/managing a network that supports it. This article deals with the impacts on staff mission analysis, through all phases of the operation with their branches and sequels, in the context of impacts on the other BOS (battlefield operating systems). The end product should be a Paragraph V or annex in the operations order or operations plan that provides a 70-percent solution before crossing the line of departure (LD). The 70 percent can then be updated with a running estimate that changes in accordance with the conditions. The target audience for this article is not the signal community, but the maneuver community to help account for the constraints and limitations on the battlefield and aid in planning that mitigates risk to maneuver forces.

What is the NCIE, and “So What”?

Much like understanding logistics, understanding C4 (command, control, communications, and computers) is not a favorite topic amongst most maneuver folks, but there once was a WWII leader whose remarks on logistics is very applicable. I’ll paraphrase: He said, “I don’t know what this logistics stuff is, but I want some more of it!” In a simpler time, Paragraph V could be boiled down to location of the commander, succession of command, and current CEOI (communications-electronics operating instructions) in effect. With the NCIE (network centric information

environment), the importance of Paragraph V and its impact on maneuver takes on a whole new importance, and is a critical enabling event on par with synchronizing fire support or maintaining LOCs (lines of communication) for sustainment.

The emphasis comes with the trades made on other elements of combat power such as information superiority (C2 capability) vs. heavy armor (tied to protection) and large stocks of class V (tied to fire power) in order to create a more responsive and agile force to meet the demand of the contemporary and future operating environments. Information technologies, combined with a higher density of sensors (includes manned and unmanned systems), allow for the “See First” capability (collectively displayed on a screen to

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the unit), facilitate the “Understand First” and “Act First” capabilities (by enabling us to better communicate and share information and send/receive orders), and finally to “Finish Decisively” (by maintaining information and assessing the effects we’ve employed). This means that a networked force can be assigned a larger battle space, with greater responsibilities and span of control. This is in effect what we are doing with the Stryker Brigade Combat Teams (SBCTs), networked modular BCTs and in the future, the Future Combat System Unit of Action (FCS UA).

The resourcing of these technologies implies that we will do more with less. Doing more with less requires greater emphasis on command and control capabilities to manage limited resources. Digital and analog C4 allows staffs to resource and synchronize assets in order to fulfill the commander’s intent and endstate. A large part of this is setting the conditions that account for uninterrupted information superiority throughout the operation. With the competing demands on bandwidth by a myriad of platforms, payloads and leaders, there is a requirement to manage the information (Information Management) to insure that the right information and people have priority when they need it (Information Assurance).

This is not a Future Force problem, but as more sensors and better C4 technologies are filtered into the battlefield at increasingly lower tactical levels, this problem becomes exponential and requires planners to examine BOS impacts and make tough decisions and recommendations about what to use



U.S. Army photo

A small unmanned (manpackable) robot like the one pictured is being used in Iraq and Afghanistan to detect mines and explosives.

where and when. It is a current problem that will be exacerbated with spinout technologies.

Consider how the impact spinout technologies are going to have on the battlefield. Spinout 1 in Fiscal Year 2007 is going to bring increased sensor and battle command capabilities. Intelligent munitions will be able to feed digital information back to the tactical levels. Unattended ground sensors (UGS) will allow for commanders to use economy of force and shape their battlespace better than before. Improvements in the battle command systems means new hardware and software that, like improvements in PC desktop applications, will require more RAM, better microchips and bigger files that relay more information at a single glance. We'll have visibility at lower levels (in many cases down to Soldier, platform, and payload), and be able to receive diagnostics as to their condition. Spinout 2 in 2010 provides upgrades in all the prior mentioned systems, plus unmanned systems (UMS) that will proliferate the battlefield at the lower tactical levels. Unmanned aerial systems (UAS) which currently offer fairly basic sensor payloads will be more technologically mature and offer more options to the platoon, company/troop, battalion/squadron and BCT. Each tactical echelon will have platforms and payloads

to meet its ISR (Intelligence, Surveillance & Reconnaissance) needs. While this is an incredible capability, it is also a draw on bandwidth across all the BOS. These technologies and their use have to be considered by the staff as they allocate resources and develop a concept of the operation.

Network Centric Culture: Some Philosophical Differences

Although it is easier to consider a common operating picture (COP) as the graphic layers resident on a computer screen which portray friendly and enemy forces in a battle space organized by imagery and graphic control measures (GCMs), a COP is really a common understanding of the battlefield in both space and time. Commanders can share a COP over a radio conversation or a chat room, or even silently granted they share a common perspective about what they are seeing or hearing. People with common experiences tend to view things more similarly than people with uncommon experiences. Likewise, people who have known each other for a while have an intuitive knowledge of the actions and reactions the other person might have in certain circumstances. The Graphic User Interface (GUI) or the hardware and software providing the visual situational

awareness (SA) of blue and red icons is better thought of as a COP enabler.

The Network: Build It, Bring It, Borrow It, Beg It, or Steal It

Here, the assumptions are that the joint task force (JTF) commander will apportion bandwidth to subordinate units; and that at least some degree of network coverage will be in place using joint assets. The initial coverage might come from or a combination of: satellites, high altitude airships, joint aircraft with communications relay packages (CRP) payloads, naval surface platforms or subsurface platforms with CRP payloads employed above sea level, or other joint, interagency or multinational assets. As operational lines are extended to accommodate an inland campaign plan, the conditions that allow the information centric force to maintain information superiority must be established.

There are roughly five ways to do this, or any combination there of that best conforms to the conditions of METT-TC (mission, enemy, terrain, troops and time available, civilians). Building a network through range extension might involve:

- Space operations and the required coverage of satellites and near space platforms (NSPs);
- The establishment of a UAS restricted operating zone (ROZ) with a CRP over cleared airspace;
- Doing a terrain analysis for LOS communications then infiltrating manned and unmanned ground assets to extend your network; or
- It could be the emplacement of UGS or intelligent munitions system (IMS) by long range fires that by their presence thicken the network.

Building a network requires forward planning and the committal of limited resources. By default it could also limit future options by committing those resources to accommodate a chosen scheme of maneuver.

Bringing your own network means that every platform in your unit that is supporting your scheme of maneuver from your frontline trace to your rear trace is thickening your network. It can be thought of as a moving bubble. The problem with relying on this as a network solution is that

you lose your ability to shape the fight in front of you with ISR and fires. It also has the risk of breaking one bubble into smaller bubbles as LOS is interrupted during movement, or if platforms are lost to enemy actions.

Borrowing and begging are similar; they refer to either leveraging adjacent unit or joint assets that are in or transiting your AO or that can be requested for a duration from higher when not allocated to other units. Air Force aircraft that transit the AO and thicken the network might be an example in the future, but would require extensive knowledge of their air corridors and the area they would thicken before being relied on to mitigate network risk. There are also the consequences of METT-TC to consider. Begging it can be thought of as the higher echelon committing a reserve. If it were an asset that was OPCON to you, there might be no need to ask for it. This is probably a limited duration asset and as more of the joint force becomes “commander centric enabled by the network,” most echelons will probably place some type of network extending systems in reserve.

Stealing it may be an option in the future. There has been a good deal written about tapping into existing networks. Many nations have a signals intelligence capability in both their law enforcement and militaries. This would be a different take on that by using existing civil communications infrastructure to thicken and advance our own network. While this might be possible in the future, it would require solid knowledge of the target infrastructure for compatibility, as well as an understanding of the consequences. The consequences are much the same as any other type of targeting in examining the positive and negative effects vs. the key effects you’re trying to achieve in the current and future phases of the operation. An example might be the unintended shutting off of safety systems or hospital computers during Phase III major combat operations (MCO) that have a very negative civil military operations (MCO) impact on Phase IV stability and reconstruction operations (S&RO).

Extending your network to enable your actions during all phases of the operations is as critical as the joint fire support plan, the CSS plan and the maneuver plan since it enables all of the BOS in a NCIE. To do any one of the above is probably a gamble or could not be resourced in the operating environments we face today and tomorrow. A mixture provides balance, mitigates risk and takes advantage of joint synergy. It will, however, require solid planning at all component and joint levels.

The C4 Estimate: “Can you Hear Me Now?”

Akin to an intelligence estimate, a modified combined obstacle overlay (MCOO), and a light and weather data chart, this tool would visually illustrate periods of peak network activity based on the operations estimate and mission complexity in order to forecast needs, identify constraints and limitations and resource network “thickening” assets from higher. It would also layout the best areas to extend the network for LOS communications, UAS CRP ROZs, and take into account known information about higher echelon, JIM (joint, interagency, multi-national), indigenous assets that would help to create and extend the network.

The fusion of these two key elements of the C4 estimate would be the product of staff analysis and provide the commander with

the facts and assumptions that will provide him options. The information could be tied to decision points that effect maneuver or enable detection, targeting, delivery and assessment of HPTs. It would enable the visualization of the battlefield that becomes the C4 input into COA analysis. The TTP for displaying this product is not as important as the information’s presentation in a manner that the rest of the staff and the commander can say, “Okay, I got it.”

Distributed Operations: Enabling Effective Battle Command in TACs and MCGs (Mobile Command Groups)

A great question was raised by our Signal folks about a force that has such high network requirements: Does the signal plan support the scheme of maneuver, or does the scheme of maneuver conform to the realities of where the best network coverage is? Heresy? Maybe, but it’s a fair question since we already consider simplicity in maintaining lines of communication for support very high on our list of influencing factors for a given course of action.

The truth probably lies somewhere in the manner where we already do business. The mission will come from the higher headquarters and the staff will begin to look at either a directed COA (course of action) from the commander, or receive some planning guidance regarding COA development. During COA development, several things will happen that will impact the maneuver plan. Examples are:

1) An ISR plan will be developed that will shape maneuver (with an information centric force we are going to have to avoid chance contacts and achieve dominant maneuver out of contact to a position of advantage);

2) METT-TC is going to have an impact; negotiable terrain for both initial and follow on forces such as major LOCs may have to be cleared to sustain the campaign; Time may be a factor to achieve the higher echelons key effects; Modularity will have an impact as not all units will have organic the BOS functions (troops) needed to achieve their purpose or effect; civilian infrastructure required for a speedy and successful Phase IV such as communications, banks, or energy may have to be secured en-route.

This will lead the staff to consider facts and assumptions, constraints and limitations, specified and implied tasks, a restated mission, and proposed CCIR that round out the mission analysis. Requests for Information (RFIs) that cover all the BOS, to include those about network quality should shape the final decision about a scheme of maneuver. Some will probably coincide given major ground LOCs in most countries that will support follow on forces happen to be where people and industry converge. Those people have to communicate and the proliferation of wireless communication is only going to increase. The real problems lie with determining who gets how much of the available bandwidth. We already have a doctrinal answer in decisive and shaping/main and supporting, but it is useful to look at other ways to consider bandwidth allocation.

Assigning Priority of Bandwidth During an Event or Phase of the Operation

The increased number of sensors (manned and unmanned) and

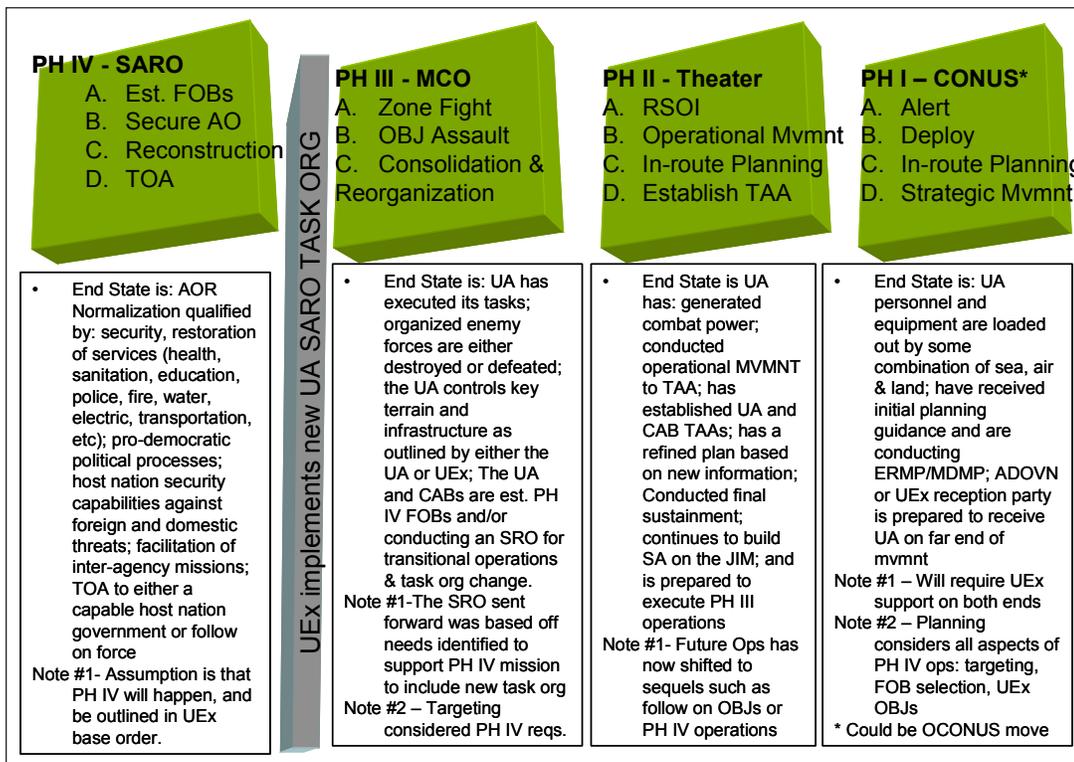


Figure 1 — Reverse Order Planning

the greater distribution of radios (with increased wave form capabilities that enhance the quality of communications — better graphics, imagery, live video, targeting chips, etc.) lead to increased use of a limited resource — bandwidth. Increasing the amount of bandwidth through allocation of satellites or other resources is possible. Compressing the file or transmission to a degree is also possible, but there are limitations to both of these solutions either because of cost or technological capabilities. This leads staffs to have to do the hard work on defining the best uses of bandwidth. Much like priority of fires or support or engineer effort, which also involve limited resources, bandwidth may need to be allocated to ensure the user who needs it most, has it when it is needed.

It could be prioritized by phase of the operation in Paragraph V or the annex, then subdivided by BOS platform, sensor, tactical echelon or subordinate unit. In Figure 1, the four phases of the operation are broken out in reverse order to facilitate general enroute mission planning and allocation of resources. This is also true of bandwidth. By looking at the phases, planners can come up with a general

network concept and generate RFIs to the higher headquarters about required resources or network shortfalls that may impact operational capability. A good example might be: the higher HQs has tasked your unit to conduct an operational maneuver (could be vertical, by road march, or by high speed vessel). What conditions are they going to set to establish the required network connectivity for both the JIM environment to give you the kind of reachback to higher echelon assets and forward to your own units as they deploy into your AO?

Each phase of the operation is going to have some special requirements that could call for more or less higher echelon resources. Resources could be platforms, payloads, or skill sets depending on what operational tasks come with that phase.

An example of priority of bandwidth (POB) might be: Initial POB might be to command and control so that as elements depart from the aerial port of embarkation (APOE) or seaport of embarkation (SPOE). The commanders and staffs can collaborate using the meat of the available network and bandwidth apportioned to them. Then, based on a defined event, POB would transition to ISR and fires to shape the fight

and set the condition for the maneuver force. When conditions have been met to cross the LD with maneuver units, priority might shift to maneuver supported by mobility. The lines between the BOS are not going to be black and white since we'll use ISR and fires throughout the operation, but it would help shape planning guidance that would alert all echelons as to their constraints and limitations. Example, if I know that command and control for planning has priority, then I won't put up as many UMS. Consequently, if ISR has POB, an option for units continuing to plan might be to set up a fiber optic (or other type of) hot loop in their TAA (total Army authorizations). As mentioned in the preceding

section, the other examples of prioritizing bandwidth are more similar to the manner we allocate fires or other types of support.

Putting the "Command" in Command & Signal

Enabling the commander to exercise the art and science of command over a networked force, that because of its capabilities has been assigned greater responsibilities and battlespace, requires:

- 1) The organic command and control capabilities to meet requirements;
- 2) A responsive network which can facilitate command elements maintaining situational awareness, keep subordinate elements synchronized, and enable the commander to recognize and take advantage of emerging opportunities;
- 3) Good staff work to examine the critical events within all phases of the operation and determine where the available command posts should be positioned to facilitate the commander's guidance and where those resources can reduce friction.

Organization design and flexibility should come first. This includes having multiple tactical command posts and/or mobile command groups that can be quickly

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set up, made functional, and then displaced to a new location for the next critical event. The design needs to include a rear or main that maintains connectivity to the JIM, keeps the COP (this means bringing the mobile CPs up to date with events that can effect the operation by the best C4 assets available), and that operates out of contact with a staff that can consider branch and sequel options to the different phases of the operation in either sanctuary or at least out of likely contact. If a unit does not have that organic capability, it may need to request it from higher or resource it internally and compromise in other areas. The second comes from anticipating needs based on the concept of the operation, but also from balancing resources and realigning them as the plan is executed and new requirements arise.

The third is what comes out in the “command” portion of Paragraph V. Having the flexibility found in the former attributes will not maximize command and control if assets are employed where they do nothing more than filter or obstruct mission type orders and stifle subordinate unit initiative. It is not necessarily a “use them because you have them” type of asset. Each critical event should be war-gamed in some fashion to determine if the addition of a higher element enables the subordinate unit, or hinders it since it takes resources to position it forward and then maintain it, and potentially displace it to a new location. All of the above can affect the tempo of offensive operations.

Once a decision to commit a CP to an event is made, its command relationship with subordinate units must be framed in an order to ensure clarity for all effected parties. The context of the relationship can be geographical, by event, by task organization or by time. Whatever the command relationship or the context that frames it, the relationship should enable the achievement of a commander’s key effects and reduce the friction for subordinate units. For example, a CP might be tasked with the responsibility for operational movement or key tactical mission of a portion of the force. Within the same echelon, the responsibility might fall to the subordinated CP to handle all Phase IV SARO tasks while the primary CP conducts the operations of Phase III MCO. It might fall to the subordinated CP to handle all shaping operations such as Joint Fires, Psychological Operations (PSYOP), etc., while the primary CP focuses on decisive maneuver. The capability to provide flexible command and control is determined by the staff’s ability to estimate the mission’s conditions then forecast and allocate network resources and leadership to make it happen.

A good analogy to allocating and balancing resources amongst the various headquarters would be amphibious shipping during WWII. Look at the relationship between Admiral Bull Halsey and

Admiral Ray Spruance in alternating command of the same group of ships, but redesignating them as each man alternated command; then scope out to General MacArthur and Admiral Nimitz competing for resources within the same theater; then consider the operational resource requirements for amphibious shipping assets between the Pacific and European Theaters. Then consider the impacts at the strategic levels, the operational levels, and even the tactical levels in terms of making tough decisions about what to bring ashore and when based on what amphibious resources were actually available. While there are other historical and current analogies available, they illustrate the difficult choices to be made in determining the use of limited resources. The work involving allocating network assets to support command and control is going to require staff effort that is driven by achieving the commander’s intent at every echelon, but must be considered against the back drop of each higher echelon’s mission as well.

The Road Ahead

Recently, the results from a RAND study on the effectiveness of a networked force using the SBCT as a case study showed a significant reduction in casualties (from all types of actions) and an increase in effectiveness. The road ahead promises challenges as we build a military that can fulfill its obligations to the nation’s security strategy by being an implement of foreign policy that is: expeditionary in nature to get to the AOR before the enemy can gain an advantage; of campaign quality so that it can sustain itself through all phases of the operation; is JIM compliant so it can leverage joint, interagency and multi-national synergy; operationally flexible and responsive; and tactically agile. These are all hallmarks of a networked force that allows leadership to share a common operating picture and make good decisions faster than the enemy can react.

One of the biggest challenges will be developing the Soldiers and leaders who can employ the technology to its fullest extent and understand the value of the information they receive. The Office of Force Transformation has a very good Web site at <http://www.oft.osd.mil/> which discusses transformational issues and has significant unclassified information on the NCIE. When talking to many company and field grade leaders today they are often surprised to learn how soon they will be affected and to what scale the NCIE will effect them. These leaders should be our target audience for establishing a military culture that understands both the mass based constraints our Army has to live with, but also the technical requirements our Army is moving to. The increasing importance of Paragraph V is really just one more indication that all planners are going to have to be smarter on the C4 technologies, and their constraints and limitations.

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