Chapter Five

SHORTCOMINGS AND PROPOSED CHANGES

The *TO-BE* concept discussed in Chapter Four has an execution planning and control process designed around the needs of the AEF: operationally relevant, rapid, and responsive. As shown in Chapter Three, several aspects of the Air Force's current process prevent the *AS-IS* operational architecture from providing the most effective support possible to the AEF. Process improvements are thus core to the evolution of an execution planning and control system capable of ensuring support to the AEF. Several "enabling mechanisms," including doctrine and policy, organizational responsibilities, information systems, and training and education, must be modified.

In this chapter, we identify shortfalls in the current system. Some shortfalls became apparent from our *AS-IS/TO-BE* comparative analysis. Some were exposed in previous Air Force operations, and some have been evident in the difficulties of day-to-day activities.

For each shortcoming, we propose modifications targeted at implementing the *TO-BE* concept and demonstrate how these proposed changes will lead to an improved decisionmaking structure.

DOCTRINE AND POLICY

Our analysis revealed several shortfalls in Air Force CS doctrine and policy. The shortfalls and proposed solutions are summarized in Table 5.1.

Although doctrine clearly defines the extent of operational, tactical, and administrative control that operational organizations have over each other, no such definition exists for CS.[1] Because doctrine is minimal for CS, operational planning may not reflect CS realities,[2] delaying plan development, slowing the response to changing plans, and increasing the risk of running out of critical resources later in the campaign.

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[1]While AFDD-2 emphasizes operational C2, and Air Force Instruction (AFI) 13-1AOC, Vol. III, defines specific tasks associated with the AOC, parallel documentation does not exist for CSC2 and CS organizations.

[2]Lt Col Stephen Luxion, HQ CENTAF A-3/A-5, February 8, 2001; HQ CENTAF LGM, February 7, 2001; Mr. Van Hazel, 7th Air Force operations research analyst, December 10, 2001; Major Parker Northrup, 7th Air Force Air Operations Group, December 10, 2001, Major Steen, Pacific Air Forces (PACAF)/XPXX, December 17, 2001; Lt Col Levault, 13th Air Force/A-3/A-5, December 10, 2001.

Table 5.1

Doctrine and Policy Shortfalls and Proposed Solutions

Doctrine/Policy Shortfall	Proposed Solution
Objectives/functions not well defined in doctrine	Rewrite AFDD-2, AFDD-2-4, AFDD-2-8 to include basic objectives/functions of CS execution and planning and control and organizational alignment
Lack of AF-wide emphasis on C2 for CS	Increase emphasis on CSC2 role
CS organizational responsibilities for C2 not well defined in doctrine or policy	Develop and write policy for CS execution planning and control
Necessary C2 information flows not well documented for CS	Develop and write policy for CS execution planning and control

Table 5.1 shows that current Air Force doctrine and policy place little emphasis on CS input to operational planning and execution. Combat support feasibility assessments play a significant role in the *TO-BE* architecture, whereas AFDD-2 describes the joint-service operations planning and tasking cycle phases as "Plan, Execute, Assess."[3] There is no feasibility check between planning and execution, and thus the process does not consider Air Force status until after execution has begun.[4] If plans are not supportable, corrective actions become disruptive to combat execution as well as to future plans.

Because the CS execution planning and control concept is not well defined in doctrine, the objectives and functions of C2 for CS and assignment of responsibilities to organizations are not well defined in policy.

Air Force Instruction 13-1AOC, *Operational Procedures—Aerospace Operations Center,* provides guidance for the operation of the AOC and clearly denotes the functions involved in operations C2. It describes the purpose and primary responsibilities of the AOC, detailing the tasks necessary to accomplish them. It shows the command relationships between each division in the AOC, the information each division requires and generates, and the tools each uses to do its jobs. Similar guidance for CSC2 is largely contained in concepts of operations (CONOPs), which lack the directive authority of a doctrine or instruction document. MAJCOM and theaters develop operating instructions and CONOPs, but the documents often differ from one command to the next in approach and process.

AFDD-2-8 specifies four functions of a C2 system: planning, directing, coordination, and controlling, with little detail on the tasks necessary to accomplish these functions or which CS organizations will perform them. There is thus confusion regard-

[3]AFDD-2, p. 74.

[4]Hq Air Force Materiel Command (AFMC), February 21, 2001; Joint Staff J-4, Pentagon, February 23, 2001.

ing the responsibilities of CS organizations[5] and communication networks that are ad hoc.[6]

These problems can be eliminated with a series of changes to Air Force doctrine and policy. First, AFDD-2-8 should include CS details beyond the four basic functions of any command and control system. The following are proposed inputs to AFDD-2-8 describing planning, directing, coordinating, and controlling.

Planning. With the AEF's short timelines and pipelines, it is critical to be able to add CS information to initial planning, giving planners flexibility and confidence.

CS execution planning functions include monitoring theater and global CS resource levels and process performance, estimating resource needs for a dynamic and changing campaign, and assessing plan feasibility. Because capabilities and requirements are constantly changing, these activities must be performed continuously so accurate data are available for COA and operational planning.

Planning also includes assessment and ongoing monitoring of CS infrastructure (FOLs, FSLs, CONUS support locations, TDS, C2 nodes) configurations that support the operations plan. Benefits and drawbacks of various support options (use of FSLs, sources of supply, transportation providers, modes and nodes, host nation support) must be weighed in the context of timelines, operational capability, support risk, and cost. Having complete, up-to-date information on FOL capacities and operational capabilities [e.g., number and type of aircraft mission-design-series (MDS) and munitions] and their support (e.g., on-base repair capacity, fuel availability) allows more CS information to play in early planning stages (such as COA development).

CS execution planning should result in the production of a logistically feasible operations plan, a CS plan that dictates infrastructure configuration, a C2 organization structure, a TDS, and CS resource and process control metrics.

Directing. CS directing activities include configuring and tailoring the CS network and establishing process performance parameters and resource thresholds.[7] Planning output drives infrastructure configuration direction—there must be an ongoing awareness of CS infrastructure and transportation capabilities to feed into operational planning and execution. For example, the speed and precision with which beddown sites can be assessed and prepared (configured) improve with the amount of information available beforehand. Awareness of the precise configuration for various options, in turn, gives planners more speed and flexibility in employment of forces in the face of changing objectives or constraints. The ability to reconfigure the

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[5]Col Huck Robinson, HQ ACC Battle Staff, February 6, 2001.

[6]Col Huck Robinson, HQ ACC Battle Staff, February 6, 2001; HQ AFMC, May 2, 2001.

[7]Heuristically determined thresholds can be established while more sophisticated expert rules or algorithms are being developed. For instance, Brigadier General Hennessey (AMC/LG) uses zero-balance stock positions coupled with forces supporting an engaged combatant commander as a rule to determine when lateral actions should be taken to resupply a unit "at war." Using this rule, he authorizes the AMC/Regional Supply Squadron (RSS) to reallocate stocks from units with stock to those with zero balances. The idea is to prevent mission degradation by focusing attention on the items that will cause the next mission degradation.

support infrastructure quickly enables operational changes, be they the result of anticipated or unanticipated changes in a scenario. Timely, accurate information and an agile CS system able to execute network configuration decisions would thus allow leaders to respond more quickly or simply to make more informed decisions.

Along similar lines, identifying and using appropriate sources (e.g., ships, supply depots, or host nation contractors) for different commodities (e.g., ammunition, fuel, or spares) and required services (construction, billeting, feeding) allow maximum employment of available Air Force and joint-service resources and the opportunity to balance intra- and intertheater requirements to support all AORs. As operational objectives change, requiring different logistics or installation support, the source can be changed. Also, as operational locations change, the source, as part of the overall CS network, can change to meet the demands more quickly.

Coordinating. Coordination ensures a common operating picture for CS personnel. It includes beddown site status, weapon system availability, sortie production capabilities, and the like. Coordination activities should be geared to providing information to higher headquarters, not necessarily to seek a decision but to create an advance awareness of issues should a higher-headquarters decision be needed at a later date. CS coordination tasks will affect theater distribution, force closure, supply deployment, and allocation of support forces. Each of these activities requires information gathered from a variety of processes and organizations and consolidated into a single decisionmaking framework that delivers decision-quality data to planners and commanders.

For example, to coordinate TDS movements, CS personnel must monitor all parts of the theater, as well as the activities of TRANSCOM, other U.S. military services, coalition partners, and host nations. Similarly, base-level planning is usually dependent on supplies provided by intratheater distribution. To develop supportable plans, operational and support planners must understand what the TDS will provide at any given time. Policy should specify the information to be collected and dictate how it should be gathered and disseminated to organizations for decisionmaking or to maintain situational awareness.

Controlling. During day-to-day and contingency operations, CS control tracks CS activities, resource inventories, and process performance worldwide, assessing root causes when performance deteriorates, deviates from what is expected, or otherwise falls out of control. Control modifies the CS infrastructure to return CS performance to the desired state. CS control should evaluate the feasibility of proposed modifications before they are implemented and then direct the appropriate organizations to implement the changes.

While doctrine must define and establish CS execution planning and control functions and objectives as described above, it should also prescribe which organizations perform these functions. AFDD-2 gives the organizational structure of the AFFOR and AOC, and AFDD-2-4 briefly describes the roles and deliverables of CS functions. Doctrine should further delineate the roles and responsibilities of directorates within the AFFOR, divisions of the AOC, and other support organizations (see the next section). It should include the reporting hierarchy and the communication network be-

tween groups. Once the "what" and "who" are delineated in doctrine, AFIs (instructions) should detail "how" the function will be executed by describing tasks performed by each organization, the information that each group should consider in its decisionmaking, and how frequently this information is updated.

As shown earlier, our CS *TO-BE* decisionmaking process incorporates C2 functions and objectives. Figure 3.1 differs in appearance only slightly from Figure 4.1, but the latter reflects a significant shift in Air Force priorities and resulting differences in planning and execution. Elevating the importance of CS execution planning and control in Air Force doctrine can engender enforceable rules for each organization, document information to be shared, and enable a much-improved planning process.

ORGANIZATION

In addition to doctrine and policy shortfalls, our analysis revealed several deficiencies in the Air Force's CS warfighting organizational structure. As summarized in Table 5.2, these deficiencies are rooted in the largely ad hoc approach that the Air Force uses to move from varying levels of contingency support in one AOR to differing levels of contingency support in another.

As we noted above, doctrine and policy do not clearly define and delineate the C2 roles and responsibilities of CS organizations, only that organizations shift to wartime roles and augment staff to manage the increased responsibility. The Air Force has supported one contingency after another for the past ten years—what changes is the AOR and the level of support.[8]

Current doctrine calls for the NAF to be the supported warfighting organization and be supplemented. In the last three conflicts, however, the Air Force has instead augmented the MAJCOM to provide AFFOR Rear responsibilities.[9] The augmentation staff was designated at the last minute, creating several challenges. First, the augmenters lacked familiarity with theater-specific plans, limiting their effectiveness in carrying out responsibilities that rely on in-depth knowledge of threat, host nation, and theater issues. Second, staff augmenters were not always familiar with command-unique policies and procedures (many of which are undocumented and have evolved from personal relationships between staff members and intratheater agencies), and they lacked training on locally developed decision support tools that are prevalent in the absence of standardized information systems. Finally, augmenters may lack experience with the core staff they are joining and hence may not contact the most knowledgeable person when seeking help. The impact of these types of uninformed or ad hoc communication networks can be significant. Without

[8]We acknowledge BGen Art Morrill (PACAF/LG) for this point.

[9]Feinberg et al. (2002) document that the USAFE/LG staff served as AFFOR A-4 for AWOS. MGen Donald Wetekam (ACC/LG) in an interview on December 21, 2001, indicated that he served as AFFOR A-4 Rear for Operation Enduring Freedom, while BGen Pat Buras (ACC/CE) served as the AFFOR/A-7 Rear.

Table 5.2

Organizational Shortfalls and Proposed Solutions

Organizational Shortfall	Proposed Solution
Transitional roles and responsibilities are unclear	Establish standing CS organizations with clear C2 responsibilities
Peacetime organizations have difficulty shifting to support one AOR from another	Develop procedures for centralized management of CS support resources and capabilities
Roles of joint-service/combatant commander are unclear	
Warfighting organizations are minimally staffed and rely on poorly trained augmentees	
Commodities are managed by different organizations	

knowledge of established points of contact, augmenters may attempt to solve problems on their own, resulting in delays or errors. They may seek assistance from personnel outside the area of expertise who may not have the most current or accurate information. Command-level functions operating with outdated information then may become reactive, preventing staff from the monitoring, assessing, and reconfiguring that can better position CS resources and reduce uncertainty. Informal communication is also problematic in the context of sourcing materiel for a deployment or operation. When support materiel is not available from the group initially tasked, the planners contact anyone they can find for the needed supplies. By the time the operation ends, it is almost impossible to remember who has provided what or to compensate the supplies' original owners. This complicates redeployment plans and often results in the Air Force leaving supplies in the theater.

Another problem with the lack of standardized responsibilities is that organizations with the same name may play completely different roles, depending on the theater. For example, Air Combat Command (ACC), U.S. Air Forces Europe (USAFE), and Pacific Air Forces (PACAF) Contingency Response Groups (CRGs) and RSSs have different responsibilities thus different standards and measures for their performance.[10] It is therefore impossible to plan a common set of CRG tasks or use a common set of metrics to measure the performance of all RSSs. Similarly, it is impossible to develop a single training curriculum for all CRG or RSS operators, and personnel movement and employment between theaters has become increasingly complicated.

Operations Noble Anvil and Enduring Freedom highlighted the challenges of operating without an established CS organizational structure for C2.[11] During ONA, the CS warfighting responsibilities shifted from the 16th Air Force staff to the USAFE staff.

[10]Interviews at ACC RSS, February 6, 2001; PACAF RSS, March 8, 2001; and U.S. Air Forces in Europe (USAFE) RSS, April 4, 2001; ACC CRG, February 27, 2002.

[11]See Feinberg et al. (2002). MGen Donald Wetekam in an interview on December 21, 2001, indicated that he served as AFFOR/A-4 Rear for Operation Enduring Freedom.

To execute their responsibilities, the USAFE/LG staff was organized into cells to monitor and control CS activities. These control cells, operating in the absence of an established communication network, were in constant pursuit of timely and accurate data to support their C2 decisions. Each of the cells used some degree of manual data gathering and analysis. Additionally, they resorted to ad hoc reporting from the units. Their data gathering and analysis resulted in varying degrees of success with respect to data accuracy and timeliness. Similar cells for Civil Engineering and Services operated with the same issues.

During Operation Enduring Freedom, ACC made arrangements with CENTAF A-4 at the beginning of the engagement to act as the CENTAF A-4 Rear. Current doctrine calls for the NAF to be augmented and have a Rear function at the NAF site. In this case, ACC was in a better position and had greater resources to devote to the CENTAF A-4 Rear function. ACC co-located civil engineering (CE), logistics, and services to become the single focal point for CS actions. The A-4/7 Rear group was established as an around-the-clock operation with a colonel A-4/7 Combat Support director always on duty. The A-4/7 Rear reached back to ACC/LG Logistics Readiness Center (LRC) and ACC/CE Contingency Response Cell (CRC) for needed staffing. Again, this is not codified but could be a model for future operations. The MAJCOM could serve as the AFFOR Rear forces, consistent with initiatives at the MAJCOMs. PACAF has established a staffing package to support an Air Logistics Operations Center (ALOC) to provide staffing to support the Pacific Operations Support Center (POSC). The POSC is an AFFOR Rear-like organization, with co-located and grouped CS organizational functions. Maintenance, supply, fuels, and transportation are grouped to focus logistics support and reach back to the PACAF/LG LRC for depth. Similarly, CE, services, security, and base communications are grouped to provide installation support, with depth from functional staff cells. The ALOC would provide permanent staffing for an LRC-like organization.[12] Similar initiatives are taking place in USAFE, which has a theater aerospace support center that is organized in an AFFOR structure and has been charged to handle AFFOR functions.[13]

The permanent establishment of a cadre of support personnel for continuous contingency planning and execution could ease some of the augmentation issues. There would be fewer sites to augment and some of the NAF staffing could potentially be used to provide sources for the new organizations. Alternatively, the role of contingency planning could be a primary NAF task, with the NAF planners relocating to ACC, USAFE, and PACAF in contingencies. Further study and possibly additional manpower are needed.

The fact that different commodities fall under the responsibility of different organizations complicates CS resource assessment. Although commodities have different characteristics that may dictate that they be handled and managed in distinct ways, they need to be viewed from the perspective of how, in concert, they affect weapon system combat capability. Data are recorded in separate information systems, poli-

[12]BGen Pat Burns, February 26, 2002.

[13]USAFE Theater Air Support Center (UTASC) mission update brief, Col Forsythe, February 20, 2002.

cies and procedures vary for each of these organizations, and decisions are made on an individual commodity basis rather than from a comprehensive support perspective. This "stove-piping" of decisions affecting resource prioritization can lead to an imbalance between desired and actual capability and may not accurately reflect sortie production capability.

The operators, logisticians, and installations support personnel that we interviewed stated that the means by which CS information is made available to planners and operators is inadequately defined and inefficient.[14] Logistics and installation support personnel repeatedly expressed frustration over ever-increasing informal requests for information and tasks, attempts to bypass recognized channels, and uncertainty about whether the information they had was consistent with that in other CS-related offices. In addition, they pointed out that it is often unclear where and when logistics and installation support information, such as situation reports, should be transmitted. For example, during OEF, it was not uncommon in critical early weeks for deployed units to initiate reporting with their parent MAJCOM, leaving CENTAF Forward and/or ACC, as CENTAF Rear, out of the loop. As discussed earlier, these problems have a deleterious effect on overall system and operational efficiency.

An important step toward resolving these problems is to establish a C2 node template for CS, such as that shown in Table 5.3, with clearly defined responsibilities for each node. Appendix C details the information flows into these nodes, processes that take place within the nodes, and products that leave each node for other nodes.

The node template is a key element of the *TO-BE* operational architecture. The template will promote clearly delineated roles and responsibilities, process activities, and information flows assigned to each node. As contingencies evolve or dissolve within geographic theaters of operation, specific organizations will be designated to fulfill the responsibilities of one of the nodes. The template allows for variations in organizational assignments by theater, and may serve as a guide to configuring the C2 infrastructure, while retaining standardization of responsibilities. Along with the template, having standing C2 nodes could enable continuous CS execution planning and control for ongoing contingency and peacetime operations worldwide.

The need for standing CS organizations for C2 derives from the AEF environment. To respond to threats, AEF CS resources may need to be reallocated from one theater to another. Currently, some resources [such as theater-based munitions and war reserve materiel (WRM), intratheater distribution assets, and physical installations and operational infrastructure] are confined to individual theaters and are managed by theater-based organizations. This arrangement may remain effective, but the ability to relocate and reallocate to other AORs needs to be streamlined.[15] Other CS commodities are currently managed by units, but with the advent of CIRFs, some [e.g., LANTIRN pods, electronic warfare (EW) pods, engines] may need to be managed from a global perspective—moving limited assets quickly from one theater CIRF to

[14] Col Ed Groeninger, PACAF 502/CC, March 8, 2001; Lt Col Stephen Luxion, Hq CENTAF A-3/A-5, February 8, 2001; BGen Pat Burns, PACAF/CE and ACC/CE, February 26, 2002.

[15] See Feinberg et al. (2002).

another. Other examples of scarce resources that may need to be managed centrally include specialized equipment, spare parts, fuel, CONUS-based munitions, aerospace ground equipment (AGE), fuel mobility support equipment (FMSE), and consumables, as well as maintenance and intertheater distribution assets.

CS resource assessment and allocation management could be assigned to permanent organizational nodes dedicated to consumable and reparable resource moni-

Table 5.3

Air Force C2 Node Template for Combat Support

Hq Air Force
Global Integration Center (GIC)[a]
AFFOR
Air Operations Center CS element
AFFOR A-4 staff (and AFFOR A-7 staff if used)
Operations Support Center (OSC)[b] (theater/region)
Deployed Units
Wing Operations Center (WOC)
Combat Support Center (CSC)
Supporting Commands (force providers)
LRC or CSC
CRC
Deploying Units
WOC
Deployment Control Center (DCC)
Commodity Inventory Control Points (ICPs)
Munitions ICP
Construction materiel ICP
Specialized/heavy equipment ICP
Spares ICP
POL ICP
Bare base equipment ICP
Class II ICP (clothing, chemical gear, etc.)
Rations ICP
Medical materiel ICP
Personnel ICP
Vehicle ICP
Sources of Supply (depots, commercial suppliers, etc.)
Command Centers

[a]The GIC could be a virtual organization rather than a single physical organization. For example, a branch of the virtual GIC could be an analysis cell for combat fighter aircraft that is co-located with the ACC RSS for data access convenience. Similarly, another analysis cell for airlift and refueling aircraft could be co-located with the AMC RSS. Space and adequate computer links would be necessary for data access. The CSC, which oversees integration, could be another element.

[b]The theater/regional OSC would have AFFOR Rear responsibilities in support of multiple COMAFFORs within a single combatant command theater or across multiple theaters.

toring, prioritization, and reconfiguration. Additionally, having a standing integration function for CS resource management will facilitate the incorporation of relevant data into capability assessments and raise the visibility of these assessments in the eyes of the operational community. Table 5.4 reflects the roles and responsibilities of the organizational nodes in the template and addresses the roles of parallel nodes in Joint organizations. Appendix C contains more detail on the nodes and their responsibilities as well as more detail on the information needed, processing, and information produced and sent to other nodes.

To coordinate resource-level management, the Air Force could put a CS theater presence in the Operations Support Center. The OSC will act as regional hub for monitoring, prioritizing, and allocating theater-level CS resources, and be responsible for mission support,[16] base infrastructure support, and establishing movement requirements within the theater. The OSC will be the theater integrator for commodities managed by Inventory Control Points (discussed below). To be effective, the OSC must have complete visibility of theater resources and the authority to reconfigure them. It will receive commodity-specific information from ICPs and make integrated capability assessments (both sortie production and base) and report those assessments to the CS personnel supporting JAOP/MAAP/ATO production in the AOC. In this role, the OSC will make allocation decisions in the face of competing demands for resources. Finally, it must work closely with the joint-service forces community to ensure that resources are allocated in accordance with global priorities. Impact analyses will justify demands for critical resources in competition with other theaters. The OSC could incorporate mission, base infrastructure, and movement capability assessments into operational plans. It would support the deployed AFFOR A-4 staff during a contingency, minimizing the number of personnel required to deploy forward. It would also alleviate problems associated with an undermanned NAF staff currently trying to perform the functions listed above as well as their roles under the unified command structure.

Inventory Control Points could manage supply of resources to the MAJCOMs—essential for the distribution of critical resources such as munitions and spares. For example, spares should be managed along weapon system lines by an ICP run by Air Force Materiel Command (AFMC). The standing C2 node at AFMC would manage spares along the continuum of operations, with immediate access to both the data and analytical tools needed to assess capability and manage distribution of resources to MAJCOMs and theaters under direction from an integrating function. The spares ICP would monitor resource inventory levels, locations, and movement information,

[16]With today's communications and computer technology, it can be argued that analysis cells of the virtual GIC at ACC, AMC, and Space Command (SPACECOM) could assess and provide worldwide support for combat, strategic lift and tanker, and space-related weapon systems with Air Force–wide integration provided by the CSC. This would reduce OSC responsibilities to providing beddown support and transportation priorities among sites within the theater. Doctrine currently assigns the combatant commander support responsibility for forces over which he has operational control (OPCON). This was not followed during Operation Enduring Freedom when AMC retained support responsibilities for KC-10s and KC-135s, except those assigned to Thumrait and Al Dhafra air bases. Mission capable rates for units that were engaged in the theater but remained under AMC support control were higher than those that were supported by the combatant commander. This doctrine needs to be revisited. We have, however, assigned the assessment and control function to the theater OSCs in this report.

Table 5.4

Nodes and Responsibilities

C2 Node	Role/Responsibility
Joint Staff	
Logistics Readiness Center	Supply/demand arbitration across Combatant Commands
Combatant Command	
Combatant Command Logistics Readiness Center	Combatant Command logistics guidance and COA analysis
Joint Movement Center (JMC)	Combatant Command transportation supply/demand arbitration
Joint Petroleum Office (JPO)	Combatant Command POL supply/demand arbitration
Joint Facilities Utilization Board	Combatant Command facilities/real estate supply/demand arbitration
Joint Materiel Priorities & Allocation Board	Combatant Command materiel supply/demand arbitration
Joint Mortuary Affairs Board	Combatant Command mortuary affairs management
Theater Patient Movement Requirements Center	Combatant Command medical patient movement prioritization
Joint Civil/Military Engineering Board	Theater engineering supply/demand arbitration
JTF	
JTF J-4 & Logistics Readiness Center	JTF logistics guidance
JTF J-7 & Contingency Response Cell (if used)	Supply/demand arbitration within JTF among service components
	JTF installations support guidance
JFACC	
Joint Air Operations Center CS Representatives	JAOP/MAAP/ATO production support
JFACC staff logisticians	JFACC logistics guidance
JFACC installations support	JFACC installations support guidance
Air Force	
Combat Support Center	Monitor operations
	Represent Air Force CS interest to Joint Staff
Global Integration Center	Integrated weapon system assessments
	Critical resource supply/demand arbitration across AFFORs

Table 5.4—continued

C2 Node	Role/Responsibility
AFFOR	
Air Operations Center CS element	Air Campaign Plan/MAAP/ATO production support
AFFOR A-4 Staff and AFFOR A-7 Staff (if used)	Site surveys/beddown planning
OSC (theater/region) (can support multiple AFFORs)	Liaison with AOC CS element
	Mission/sortie capability assessments
	Beddown/infrastructure assessment
	Aerospace Expeditionary Task Force (ASETF) force structure support requirements
	Supply/demand arbitration within ASETF among AEFs/bases
	Theater distribution requirements planning
	Force closure analysis
	Liaison with Air Mobility Division in AOC
	Liaison with theater TRANSCOM node
Deployed Units	
Wing Operations Center	Disseminate unit tasking
	Report unit status
Combat Support Center	Monitor and report performance and inventory status
Supporting Commands (Force and Sustainment Providers)	
Logistics Readiness Center/CSC	Monitor unit deployments
Contingency Response Cell	Allocate resources to resolve deploying unit shortfalls
Deploying Units	
Wing Operations Center	Report unit status
	Disseminate unit tasking
Deployment Control Center	Plan and execute wing deployment
	Report status of deployment
Commodity Inventory Control Points (ICPs)	
Munitions ICP	Monitor resource levels
	Assess capability
	Allocate resources in accordance with theater and global priorities

Table 5.4—continued

C2 Node	Role/Responsibility
Construction materiel ICP	
Specialized/heavy equipment ICP	
Spare ICP[a]	
POL ICP	
Bare base equipment ICP	
Class III CP (clothing, chemical gear, etc.)	
Rations ICP	
Medical materiel ICP	
Personnel ICP	
Vehicle ICP	
Sources of Supply (Depots, Commercial Suppliers, etc.)	
Command Centers	Monitor production performance and report capacity

[a]Global resource allocation decisions for spare parts are coordinated with the Global Integration Center.

and use these data to assess contractor and depot capabilities to meet throughput requirements.

In addition to the commodity ICPs and the theater OSC, a Global Integration Center is needed, as briefly discussed above. It could be a virtual organization with analysis cells co-located with the ACC, AMC, and SPACECOM RSSs to assess weapon system capabilities, and should have responsibility for providing integrated weapon system assessments across commodities both in peacetime and wartime. An Air Force–level cell (possibly the Air Force CSC) could integrate assessments that support allocation decisions when multiple theaters are competing for the same resources and could serve as the Air Force voice to the Joint Staff in any arbitration across services. With the global nature of AEFs and worldwide commitments, other commodities should be considered for management in the same manner.

At both the OSCs and the GIC, individual resource prioritization will be guided by a common set of rules: given a required operational capability, the OSC will calculate the CS resources needed to meet it. Multiple ways to achieve the same goals will be considered in resource prioritization. Resources will then be assessed and allocated to meet the operational capability requirements set at higher levels [e.g., the National Defense Strategy and Joint Chiefs of Staff (JCS)]. These resources will thus be allocated according to the need for an overall level of operational capability rather than on an individual commodity basis.

Based on these assessments and allocations, the ICPs will direct purchases, repair operations, and distribution of components and spares, coordinate with combatant commanders and the joint-services community for intertheater airlift and direct the distribution of resources among theaters, and provide commodity support capabilities analysis and assessment to GICs. Theater OSCs will advise of infrastructure capabilities, needed resources to implement plans, and the consequences of not im-

proving capabilities. The theater joint-services command can then prioritize needs and advise the Joint Staff and others of theater capabilities and issues. Ongoing capability assessments generated by the GIC and OSCs will be incorporated into a theater's operational planning processes executed by CS liaisons in the AOC.

In this construct, distribution decisions consistent with operational priorities will be made at the lowest possible level. Elevation of the decision to a higher authority can be triggered by a number of factors, including constraints beyond the capacity of a lower echelon to solve and competition for resources extending beyond the decision authority of the lower level. Table 5.5 is an example of how these triggers might be established.

This organizational structure offers three improvements over the existing one. First, it enables prioritization and allocation based on operational capability assessments. Rather than simply giving the highest priority to all requests from a particular

Table 5.5

Resource Distribution Decision Triggers

Decision Level	Decision Authority	Decision Elevation Trigger	Elevation Level
		Ammunition Example	
Ammo ICP	Allocate munitions to an AFFOR in accordance with established priorities to meet planned requirements	Threshold breech driven by demand from multiple AFFORs *within single theater*	OSC
OSC	Allocate munitions within a single theater	Threshold breech driven by demand from multiple AFFORs *from different theaters*	GIC
GIC	Allocate munitions to AFFORs in different theaters	Resource competition resulting in capability degradation of one theater vs. another theater	SECDEF
		Spare Parts Example	
Shop	Allocate repair resources to meet planned requirements	Threshold breech crosses shop-allocated resources	Air Logistics Center (ALC) or Purchasing and Supply Chain Manager (PSCM)
PSCM	Buy/distribute/repair	Threshold breech by weapon system or commodity	Virtual Inventory Control Point or GIC
OSC (regional)	Allocate among competing requirements within a theater	Threshold breech driven by demand from multiple AFFORs *from different theaters*	GIC
GIC	Buy/distribute/repair priorities across weapon systems and commodities Resource competition among AFFORs across theaters	Resource competition resulting in capability degradation of one theater vs. another theater	SECDEF

location, the status of each location is synthesized from several global information control points. Capabilities are estimated in the context of theater and global priorities, and resources are allocated accordingly. Distribution of CS capabilities is more informed, resources can be moved before requests are made, and filling emergency requests is easier. The second distinction is that this structure considers the complete spectrum of CS resources. Each resource influences operational capability in some way, and hence must be prioritized and allocated in conjunction with the others. By centralizing CS capability assessments, capability becomes a commodity that can be managed like any other, with a single set of decisionmakers. Although this management is ultimately broken down into the movement of individual resources, the resources are not managed individually but rather in an integrated manner. The third strength is that by establishing nodes for designated tasks, the structure is a consistent framework for decisionmaking throughout all phases of operations. Because the standing nodes are devoted to the monitoring, prioritization, and reconfiguration of all CS resources, they are equally capable of addressing long-term weapon system development considerations, training, or crisis action planning and execution.

These responsibilities can be performed by organizations in different theaters, but the grouping of the tasks, the information required to complete them, and the products resulting from each task should not change from one theater to the next. Table 5.6 reflects a notional assignment of organizations to nodes in the template, creating a theater-specific view of the C2 architecture for CS functions. Assigning organizations to perform each task will better define the communication network and roles that each augmenter needs to train for. This will result in improved training programs and better-trained personnel in wartime positions. With better-trained staff, planning organizations will be better able to assess operational capability, monitor deployments, and respond to changes in an ongoing campaign.

TRAINING AND EDUCATION

To move toward the *TO-BE* decisionmaking process, the Air Force must make several changes in its training and education programs. Table 5.7 lists shortfalls in current training and changes required to enable the *TO-BE* concept.

As indicated earlier, the absence of a core process and well-documented C2 operational architecture baseline for CS contributes to the shortfall in training and education. For example, ineffective communication between operation and support planners can be attributed to the fact that CS personnel typically do not have experience in both logistics and installation support functions and are not effectively taught their role in the context of operational planning. As a result, they do not develop metrics appropriate for communicating with operators, the Joint community, or other members of the diverse support chain.

Similarly, because operators lack an understanding of how CS contributes to and enables operational capabilities, they often set strategies without sufficient CS input, which leads to the difficulties discussed earlier. Exercises often lack CS realism,

Table 5.6

C2 Nodes and Theater Organization Notional Alignments (CS Elements Only)

Combat Support C2 Node	Notional Alignment of Organizations by Theater		
	USAFE	CENTAF	PACAF
Joint Staff			
Logistics Readiness Center	Joint Staff LRC	Joint Staff LRC	Joint Staff LRC
JTF			
JTF J-4 and Logistics Readiness Center[a]	Appointed JTF J-4/LRC	Appointed JTF J-4/LRC	Appointed JTF J-4/LRC
JFACC			
Joint AOC CS representatives	Appointed JFACC	Appointed JFACC	Appointed JFACC
JFACC staff logisticians	32 Air Operations Group (AOG) logisticians	9AF logisticians	11AF/13AF logisticians 607 ASUS
Air Force			
Global Integration Center[b]	AF virtual GIC	AF virtual GIC	AF virtual GIC
AFFOR			
Air Operations Center (AOC) CS element	32 AOG logisticians	9AF logisticians	11AF/13AF logisticians 607 ASUS
AFFOR A-4 staff	16AF/3AF logisticians	9AF logisticians	11AF/13AF logisticians 607 ASUS
Operations Support Center (OSC) (theater/region) (can support multiple AFFORs)	USAFE Theater Aerospace Support Center (USAFE TASC)	CONUS OSC (ACC RSS expanded)	PACAF OSC (POSC)
Deployed units			
Wing Operations Center (WOC)	Deployed units' WOC	Deployed units' WOC	Deployed units' WOC
Combat Support Center	Deployed units' LG staff	Deployed units' LG staff	Deployed units' LG staff
Supporting Commands (Force Providers)			
Logistics Readiness Center/CSC	Force providing MAJCOM LG staff	Force providing MAJCOM LG staff	Force providing MAJCOM LG staff
Deploying Units			
Wing Operations Center (WOC)	Deploying units' WOC	Deploying units' WOC	Deploying units' WOC
Deployment Control Center (DCC)	Deploying units' LG staff	Deploying units' LG staff	Deploying units' LG staff
Commodity Inventory Control Points (ICPs)			
Munitions ICP	OO-ALC/WM USAFE TACP	OO-ALC/WM	OO-ALC/WM PACAF TACP
Spares ICP	AFMC/DLA	AFMC/DLA	AFMC/DLA

Table 5.6—continued

Combat Support C2 Node	Notional Alignment of Organizations by Theater		
	USAFE	CENTAF	PACAF
POL ICP	DESC DESC—Europe	DESC DESC—Middle East	DESC DESC—Pacific
Rations ICP	DLA	DLA	DLA

NOTE: TACP = Theater Ammunition Control Point; DLA = Defense Logistics Agency; OO-ALC/WM = Ogden Air Logistics Center/Air-to-Surface Munitions Directorate; DESC = Defense Energy Support Center.

[a]The J-4, A-4, and LRC installation responsibilities can be split off into a J-7, A-7, and Contingency Response Cell. In this table, the J-4, A-4, and LRC has responsibility for both logistics and installations.

[b]GIC could have cells at AMC, ACC, AFMC, and Air Staff or some combination of them.

Table 5.7

Training Shortfalls and Solutions

Training Shortfall	Proposed Solution
Most operations and CS training focused on wing-level skills, not operational-level skills	Develop CS course curriculum for C2
Little training for CS personnel on operations C2, and for operations personnel on CSC2	Expand the role of CS in wargames/exercises
Little training on communicating and operating with the joint-services community	Take advantage of joint-services logistics wargames (e.g., FLOW) to evaluate new concepts
CS participation in exercises and wargames not accurately addressing the execution planning process	Incorporate C2 gates in CS officer and enlisted career development
Few training opportunities	Develop C2 job performance aids for CS

which carries over to real-world contingencies in which operational planners generally do not consider CS issues until well into the planning process. OEF experience bears this out—operational forces arriving well in advance of their combat support were mission-hampered and under severe beddown living conditions.

This lack of awareness of each other's roles and processes, and inability to communicate between operations, logistics, and installations support becomes particularly evident in COA development during crisis action planning. Combat support personnel describe their capabilities in terms of the amount of fuel, munitions, and spare parts available. Operations planners are more interested in assessments of logistics and installations support infrastructure that relate CS resources to aircraft basing and sortie production. With proper training and education, this information could be incorporated into strategy at a much earlier point, but CS planners do not know how nor do they have the tools to provide it.[17]

[17]Lt Col Stephen Luxion, Hq CENTAF A-3/A-5, February 8, 2001. Col Duane Jones, CENTAF Forward A-4/A-7, February 14, 2002.

During our site visits and interviews, we learned that many warfighting staff members are not adequately trained in their management roles. Most staff are assigned to regional CS roles from the wing-level and have little or no experience in the diversity of CS resource management at a regional level. Little formal training is available to develop such skills. In fact, few opportunities for C2 training exist, leaving both operations and CS personnel to learn their responsibilities through on-the-job training (OJT). OJT is problematic because manning for many command-level support functions at the NAFs is limited. Some OJT is necessary, but without supplemental information it can reinforce bad practices and bypass issues that are not raised on a day-to-day basis. Examples of skills that are not formally trained include managing the regional supply chain, non-unit sustainment/resupply resources, and theater-owned resources, as well as administering interactions between bases, MAJCOMs, headquarters, joint-services forces, and the operations community. That, coupled with the absence of detailed policy, leaves many warfighting staff members and augmenters with little help in understanding how to execute their responsibilities.

Training and education shortfalls can be remedied. Training can be improved through the development of a CS curriculum, which can be incorporated into existing and upcoming training courses. The JAC2C (Joint Aerospace C2 Course) at Hurlburt Air Force Base is the joint-services introductory course for basic AOC processes. This course can be expanded to include elements of operational-level CS planning and execution. For operations personnel, JAC2C is mandatory training for designated assignments. Combat support personnel should be encouraged and funded to attend these courses with the same priority. Additionally, the Chief of Staff Logistics Review (CLR) initiative to implement a logistics officer weapons school should include a link to the CS execution planning and control curriculum.

As a longer-term goal, the CS curriculum should be incorporated into new courses. In addition to JAC2C, courses should train on:

- CS doctrine, policy, and guidance
- AFFOR and AOC CS processes
- Weapon system and infrastructure capability assessments, to incorporate CS resource levels and other metrics into both theater and global capability measures
- New decision support tools, as they are developed and implemented.

Exercises and wargames should include more CS issues and be funded to educate both operators and CS planners on their respective roles and the role of CS resources in campaign planning.

Career-path planning for CS personnel might include assignment to warfighting command-level positions in supply, transportation, logistics plans, CE, services, etc., with the intent of creating senior CS personnel with the skills needed to fill AFFOR A-4 (and A-7, if used) and combatant command staff CS positions. The Developing Aerospace Leaders (DAL) initiative offers a good opportunity to establish the breadth

and depth of experience future CS leaders need.[18] Developing this path requires more closely identifying and monitoring the track for CS positions. Air Force leadership can identify which existing (and forthcoming) courses better prepare their CS students for C2 roles. Those CS officers with a strong C2 background can be groomed for leadership positions, and those with weaker backgrounds can be given supplemental training.

A basic element of the *TO-BE* concept is the feedback loop, which enables CS input to affect operations planning. For the feedback loop to be most effective, CS personnel must understand air campaign planning and aerospace force capabilities. For example, what issues factor into planning different phases of the air campaign? What factors drive weapon systems and preferred munitions selection? What other weapons can provide similar effects? The CS planner of tomorrow, working side-by-side with operations planners in an integrated planning process, must be able to answer these questions. Changes to training and education should equip CS personnel to translate logistics and installation support resources to operational capabilities.

Finally, decision support tools and job performance aids should complement formal courses and exercises. Air Force Tactics, Techniques, and Procedure (AFTTP) publications should provide desktop guidance on the use of tools, delineate the roles and responsibilities of each organization, and provide insight into the decisionmaking process. Similarly, web-based process guides can assist wartime planners on their C2 responsibilities and their roles in execution planning.

Training is a critical aspect of the link between CS and operational planning. Educating both CS and operations personnel about their roles in the context of campaign planning will enable more effective communication and facilitate the integrated decisionmaking process in the *TO-BE* architecture.

INFORMATION SYSTEMS AND DECISION SUPPORT

Several aspects of both the *AS-IS* and the *TO-BE* CS planning processes would benefit from enhancement or development of information systems and decision support tools. Table 5.8 identifies several shortfalls in the current process that could be remedied with decision support tools and an improved infrastructure.

CS resource assessment, prioritization, and reconfiguration has been emphasized throughout our description of the *TO-BE* architecture and is illustrated in detail in Appendix C. Existing systems are unable, for several reasons, to support these capabilities,[19] primarily because of the lack of uniformity among systems. Because CS resources have been managed by "stove-pipes" and funded by commodity, with different organizations having commodity management responsibility, corresponding

[18] MGen Chuck Link (USAF, ret.), DAL Video, January 2002.

[19] Lt Col Stephen Luxion, Hq CENTAF A-3/A-5, February 8, 2001; Hq AFMC LGXX, February 21, 2001; Mr. Van Hazel, 7th Air Force operations research analyst, December 10, 2001; Major Parker Northrup, 7th Air Force Air Operations Group, December 10, 2001; Major Steen, PACAF/XPXX, December 17, 2001; Lt Col Levault, 13th AF/A3/5, December 13, 2001.

Table 5.8

Decision Support Shortfalls and Solutions

Tools/Systems Shortfall	Proposed Solution
Tools needed to:	Develop tools to provide required capabilities
Relate operational plans to CS requirements	Focus integration efforts on global implementation of a few selected tools
Convert CS resource levels to operational capabilities	Standardize tools and systems for consistent integration
Aggregate capability assessments to a theater or global scale	
Conduct capability assessment and aggregate them on a theater or global scale	
Conduct tradeoff analyses of operational, support, and strategy options	
Inability to access data on a timely basis	
Proliferation of tools and systems has resulted in marginal success in fielding capabilities	

information systems have been developed and implemented independently among the organizations. The result is a myriad of independent systems with little ability to share data or interface with other systems.[20] Thus, although these systems allow individual commodity data to be recorded and monitored, they do not facilitate the integration of the data for comprehensive CS resource monitoring and capability assessments. Furthermore, with such a proliferation of systems, data in each are updated only sporadically,[21] and update status and data reliability are often unknown to users.

Existing information systems also lack robustness. Reliable recording of time-sensitive and often classified data within a globally distributed mobile organization like the Air Force is inherently challenging.[22] For example, logistics planning factors, which govern the translation of operational plans to CS resource requirements, are updated only every few years.[23] Similarly, base/host nation infrastructure capacity is only updated on an as-needed or contingency-driven basis.[24] These factors result in CS plans that are not reliable. In addition, CS planners may not be aware of tools available to estimate CS requirements.[25]

[20]Hq CENTAF A-4 Supply, February 7, 2001.

[21]Interviews, Joint Staff J-4, Pentagon, February 23, 2001.

[22]Ed Kowzlowski et al., Hq AFMC, May 2, 2001.

[23]Walter Busby et al., Hq CENTAF A-4, February 8, 2001.

[24]Col Tom Ryburn et al., Hq CENTAF A-7, February 15, 2002.

[25]In the AWOS, USAFE CS planners were not aware of LOGSAFE, a tool to estimate resupply transportation requirements. See Feinberg et al. (2002). During the early months of OEF, AMC CS planners were unaware of ACC and PACAF GeoReach remote base imaging and mapping capability. Ryburn et al., February 15, 2002.

Systems are needed to constantly monitor CS capacity, resource inventory, and process performance levels, and tools are needed to convert operational plans and status to CS resource requirements and resource levels and then into operational capabilities. Tools are also needed to inform maintenance workload decisions by expressing infrastructure status in terms of operational capabilities and estimating resupply, beddown, and associated sustainment requirements. These tools will enable the Air Force to more accurately express their resupply and sustainment needs. Finally, tools are needed to aid beddown decisions. Some of these requirements can be supported by integrating and modifying existing systems, whereas others will require new system development.

A thorough evaluation should consider all decision support tools for a particular function, with implementation focused on a smaller set of tools worldwide. This will reduce the number of systems and training programs required for each planning function and permit an efficient transfer of information.

New tools should be built on a systems infrastructure that can rapidly transfer information to maintenance facilities, inventory control points, OSCs, and other key CS nodes, as well as the AOC and all relevant operational nodes. This infrastructure will maximize the productivity of new tools and allow them to interface with joint-service systems. Air Force actions can then be framed in the context of a joint-service campaign with information disseminated on a timely basis.

The effects of improved information systems and decision support tools will be felt throughout the *TO-BE* process. Properly integrating information from these tools will greatly reduce the chances of needing to revise a plan in midstream, allow a faster transition to war and better-informed decisions, and facilitate change when necessary.

Enhancement of information systems and decision support tools is a challenging and difficult task in any organization, but it is particularly challenging in the Air Force CS area because of the new C2 functions that need to be supported. The value of each additional capability will need to be considered as well as its cost. The Air Force may consider seeking external advice on how to best address this issue. The architecture presented here provides a view of the processes and functions that must be developed to better develop CS planning and execution responsibilities across the spectrum of operations. If adopted, this architecture can keep information system and decision support system development on target.