AU/ACSC/179/1999-04

AIR COMMAND AND STAFF COLLEGE

AIR UNIVERSITY

DYNAMIC RE-TASKING:

THE JFACC AND THE AIRBORNE STRIKE PACKAGE

by

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A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

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April 1999

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Preface

This paper on Dynamic Re-tasking is aimed at the role information technology has on the future of the air war. It is to examine the relationship between the JFACC and the warfighter in a strike package. It is meant to stimulate thought on the infusion of real time intelligence to the Joint Air Operations Center (JAOC) and its implication on the centralized to decentralized execution continuum.

I would like to thank my faculty advisor, Lt Col Raul Meza, for his support and comments leading to the completion of this paper. His guidance is much appreciated by a fighter pilot whose ambition lies in the clouds.

Thanks also go to Dr Michael Grumelli for his attentive ear. Both in his office and in long walks down the hall on the way to meetings. I could not ask for a better sounding board.

Thanks go to my wife, Karen, and my four daughters, Maia, Katie, Lisa, and Diane, for your sacrifice of time. Special thanks goes to my daughter Maia, whose perseverance at homework made me attempt to be a role model.

Abstract

The explosion of information technology has enabled real-time intelligence to become an invaluable tool to the Joint Force Air Component Commander (JFACC). This capability has led to an increased drive to allow the JFACC tighter control over airborne assets, adding flexibility to the JFACC's response options, but, in effect, "centralizing" execution. What is the implication of this centralization on the decision making process involving airborne missions? What is the appropriate level of control for the processing of real time intelligence in future air operations? Does the responsibility lie within the Joint Air Operations Center (JAOC)? The primary purpose of this paper is not to answer these questions, rather it is to pose them and other issues as items to consider for operations and identify areas for future research. In doing so it examines the JAOC structure, the relationship of information to the Master Air Attack Plan and methods of distributing that information to the warfighter through the Air Tasking Order and alternately through Dynamic Re-tasking. It briefly discusses the cognitive decision making process, examines real time intelligence integration, and the possible results of exploitation of that process. Finally, the paper concludes with a discussion of Dynamic Re-tasking and a discourse on Centralized vs. Decentralized Execution.

Chapter 1

Introduction

The capability of technology to alter organizational relationships may be invaluable or dysfunctional based on the effect it has on the organism.

—General Charles A Horner, Comments on EFX 98

The explosion of information technology on the battlefield has led to tremendous strides in the ability to process and disseminate information on a large scale. Real-time intelligence has become an invaluable tool to the Joint Force Air Component Commander (JFACC) and his ability to quickly make decisions. Airborne command and control platforms with continuous links to both the JFACC and the strike package have the ability to pass this information directly to the warfighter. Internal Data Modem (IDM) capable aircraft bring the ability to pass thousands of bits of information securely through the airwaves. These capabilities have led to an increased drive to allow the JFACC tighter control over airborne assets after "wheels in the well," adding greater flexibility to the JFACC's response options.

Statement of the Research Question

Real time intelligence integration in future air campaigns is inevitable. What is the implication of this enhancement for the decision making process involving airborne missions? How can this information be used to tailor the air battle? What is the

appropriate level of control for the processing of real time intelligence in future air operations? Does the responsibility lie within the Joint Air Operations Center (JAOC)? The primary purpose of this paper is not to answer these questions, rather it is to pose them and other issues as items to consider for operations and identify areas for future research.

Background and Significance

There have been great strides recently, in information technology, which has allowed the processing of near-real time and real time intelligence in the JAOC of tomorrow. Recent exercises and experiments have dedicated time and defense dollars to analyzing the significance of information innovation. War games designed to test air commanders' flexibility to change have increasingly relied on simulated real time inputs into the decision process. [1]

Increased flexibility, however, does not come without the ability to stretch. How much is too much? What information is important to focus on real-time and how can it be incorporated into decisions that must be made within seconds of its arrival? Since the volume of information available may be too large to process, a certain amount of the decision tree would most likely be automated.[2] How vulnerable will this automation be to a smart enemy who knows what indicators to change in order to shape our actions? Once the decision is made, what information must be passed to the airborne assets and what are the options of execution? Finally, how much increase in centralized control can occur before it becomes detrimental to decentralized execution?

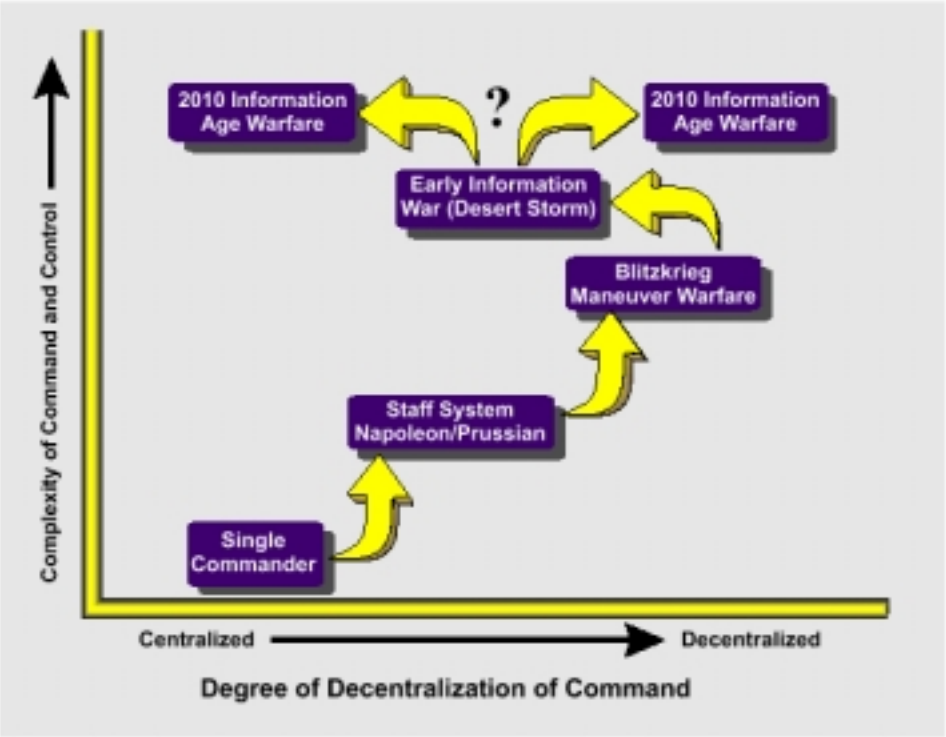

Figure 1 Command and Control (source Concept of Future Joint Operations)

Figure 1 from the Concept of Future Joint Operations, illustrates the predicament facing the JFACC. It shows the degree of control exercised historically and the impact information technology may have on the face of future battlefields. Information may allow for more informed and empowered troops or it may turn back time to a more centralized command system. This paper's main aim is to address this predicament and look at what level of control is appropriate for effective execution of the air phase of a theater campaign.

Limitations of the Study

This study only addresses the impact of information technology advancements on the airborne strike package. In doing so it paints a picture of the current JAOC structure, the JFACC's decision making process, and the possible impact of future technology

integration in the command and control process. It is not intended to be a complete portrayal of the JFACC and JAOC roles in the air phase of a theater campaign, rather it is to provide a cursory view of the targeting process and the impact of change on that process. Additionally, due to the desire to discuss command and control process rather than specific platform capabilities, all discussion will be kept at the unclassified level. Platform specifics will not be discussed.

Definitions and Assumptions

For the purpose of this paper, ***Dynamic Re-tasking*** is the ability of the JFACC to effect changes in targeting and mission to an airborne strike package, or portions of that package, while in the execution phase. It involves command and control elements actually stopping the execution of airborne assets and redirecting those assets to other targets. It may also involve the coordination of other assets not associated with the airborne strike package in order to complete the mission. It is assumed the re-tasked assets have no prior knowledge of their newly assigned target (i.e. that it is not a preplanned alternate target). Information passed at the re-tasking is the first information the airborne asset has on their new target. Re-tasking is the result of some change in the enemy order of battle or the emergence of a higher priority target that requires, in the eyes of the JFACC, immediate response.

Additionally, this paper discusses the impact of information technology on the level of execution. As depicted in figure 1, the dilemma presented in the conduct of future operations is whether or not information technology will enable more decentralized execution, as in the era of blitzkrieg maneuver warfare, or, will command become even more centralized. This paper differentiates this increased level of centralized control as

the "centralization" of execution. ***Centralized execution*** occurs when control of operations, that in the past were left to the mind of the commander in the field, are now under direction of a centralized command structure, in this case the JAOC. In effect, the centralized command element maintains control of the execution phase, rather than delegating the authority to act to the field commander.

Preview of the Argument

The JFACC is charged by the Joint Force Commander (JFC) to prosecute the air portion of the theater campaign. In this respect the JFACC establishes the JAOC and his staff to build the Master Air Attack Plan. This plan is disseminated to geographically separate units via the Air Tasking Order (ATO).[3] The ATO process is long and involved. It incorporates a substantial analysis of intelligence information. Information technology integration is rapidly changing the ability for the JFACC to observe real time what is happening in the battlespace. Recent exercises have demonstrated this technology push may lead to a revolution in military affairs.[4] This revolution deals with the conflict between centralized and decentralized execution. Centralized execution and real time intelligence over a theater-sized battlespace requires a large amount of cognitive thought. The detail required for centralized execution may not be adequate to the time and demand placed on the JAOC for the prosecution of the Master Air Attack Plan (MAAP). Automation may not be the answer to the time and demand problem due to its susceptibility to exploitation. Details must be worked at the execution level.[5] Enhanced interoperability is required to enable Dynamic Re-Tasking. The JFACC must transmit the big picture to those in the battlespace. Dynamic Re-tasking can work only if those involved have near complete battlespace awareness.

Notes

[1] Maj Gen (Retired) John C Corder, "EFX-98 Good News Story,"*C2 Earlybird: Special Edition EFX 98 Lessons Learned,* Volume 1, Special Edition Issue 1, December 1998, 9.

[2] Lt Col Robert W. Cone, "Command and Control in Joint Vision 2010: Micro-Management of Decision Exploitation?" (Naval War College paper, 16 May 1998), 12-13.

[3] Joint Pub 3-56.1, *Command and Control for Joint Air Operations, 14 November 1994*, IV-6 – IV-12.

[4] James R. Fitzsimonds and Jan M. Van Tol, "Revolutions in Military Affairs", *Joint Force Quarterly*, Summer 1998, 90-97.

[5] Peter M Senge et al, *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization*, (New York: Doubleday, 1994), 530.

Chapter 2

JFACC and the JAOC[1]

This section outlines the command and control organization of the Joint Air Operations Center. It addresses the structure of the JAOC, outlines roles and responsibilities of JAOC members, lists the current targeting decision-making process, and speculates the impact of future information technology on that process.

Structure

The Joint Force Commander will normally designate a Joint Force Air Component Commander who will in turn set up a Joint Air Operations Center to fulfill all of the JFACC's responsibilities. JFACC organization may differ due to operational requirements but the basic layout remains the same. The organization depicted in Figure 2, from Joint Pub 3-56.1, outlines a notional organization of a Joint Air Operations Center.

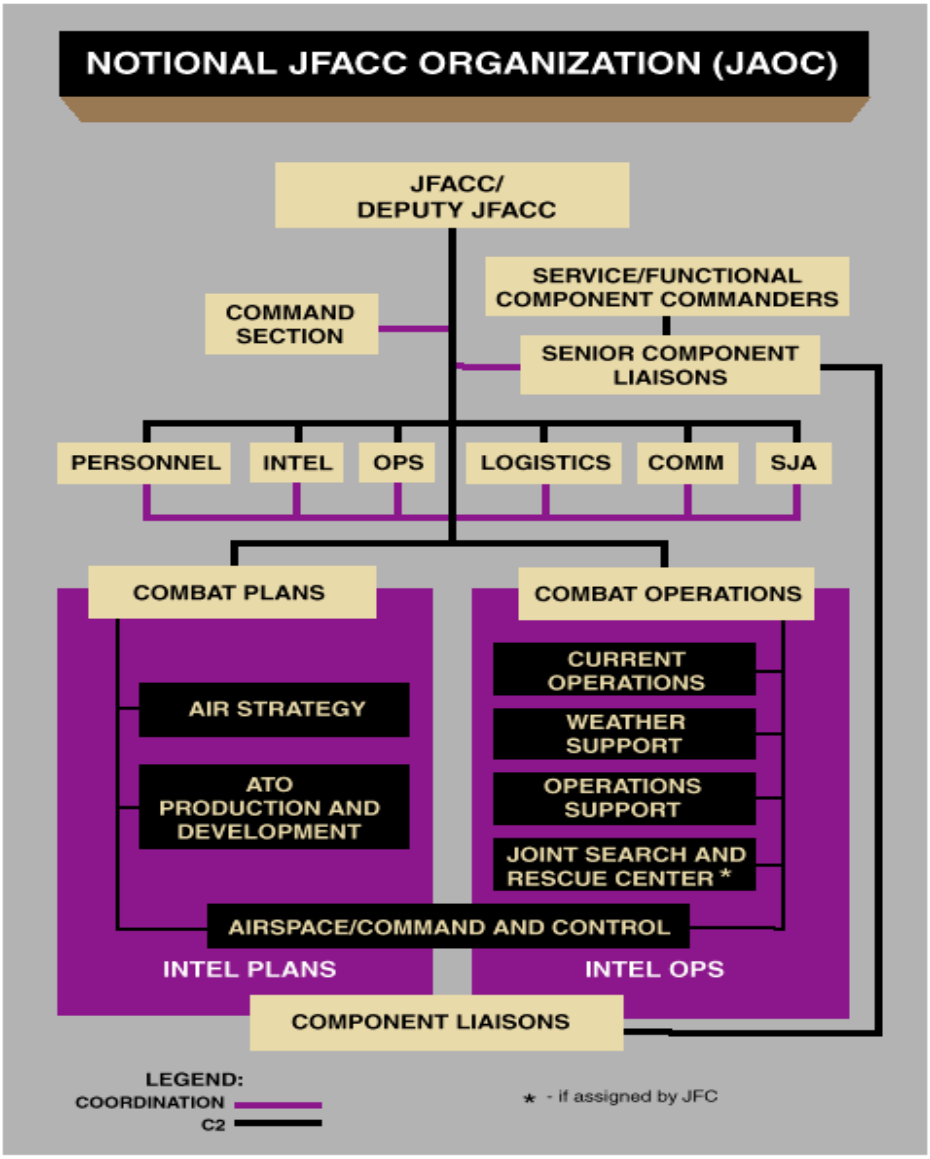

Figure 2. Notional JAOC Organization (source Joint Pub 3-56.1)

Major Components

What follows is a brief discussion of the major components of the JAOC structure.

The JFACC Staff provides the JFACC with representation from the various components of the joint force. This representation will be in the form of experts in each of the weapon systems available to the JFACC. Their expertise is used by the JFACC to

plan and execute all of the JFACC's responsibilities assigned by the JFC. Two areas are common to all JAOCs, Combat Plans and Combat Operations

Combat Plans has the responsibility of planning all future combat operations. It contains experts in air strategy and ATO production and development. Combat Plans drafts joint operations plans to support the Joint Force Commander's campaign or objectives and produces the daily ATO that is disseminated to all forces at the JFACC's disposal.

Combat Operations is charged with the daily execution of the joint ATO. It contains elements of technical war fighting expertise in the form of mission experts who know the workings of the forces made available by components of the joint force. Also located in Combat Operations are elements representing Weather, the Joint Search and Rescue Center, and other operational support elements. Combat Operations closely follows the daily operation of joint air assets and makes adjustments in targeting and schedules as required. This is accomplished through the airspace command and control structure of the JFACC.

Integral to both Combat Plans and Combat Operations is Intelligence. Intelligence personnel assist both planners and current operations through a thorough understanding of the battlespace. Intelligence monitors enemy activity and provides assistance in targeting, weapon and platform selection, battle damage assessment, and status of priority targets.

Personnel

Joint Force Component Commander. The role of Joint Force Component Commander is normally assigned by the JFC to the component commander who has the

preponderance of air assets and the ability to plan task and control joint air operation in the JFC's area of responsibility. The JFACC may change during the course of the campaign based on deploying forces or the changes in the campaign situation (i.e. transiting from a sea-based phase to a land phase). The JFACC is assigned operational control (OPCON) and tactical control (TACON) over military forces made available for tasking. Mission receipt from the JFC is commensurate with authority to conduct operations in accordance with the JFC's intent.

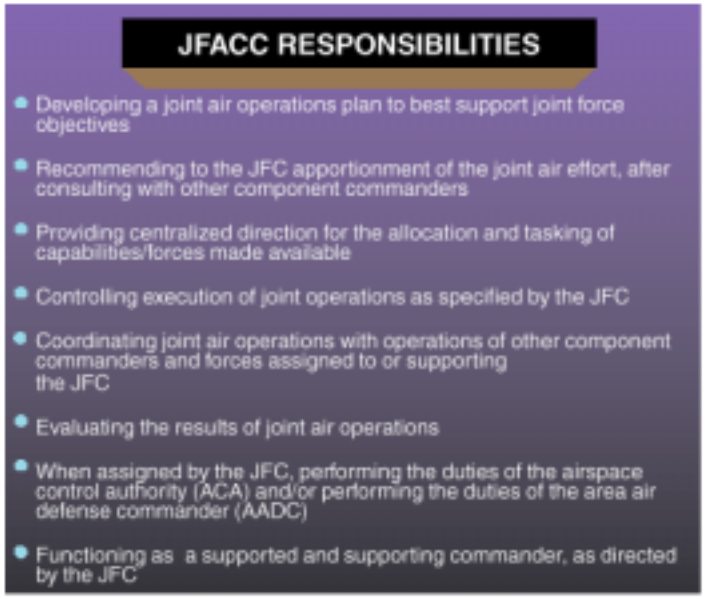

Figure 3. JFACC Responsibilities (source Joint Pub 3-56.1)

Figure 3, from Joint Pub 3-56.1, lists the responsibilities that are normally associated with the designation of the JFACC. Important responsibilities of note to this paper are those of providing centralized direction for the allocation and tasking of capabilities of available forces, controlling execution of joint air operations, and coordinating joint air operations with operations of other component commanders and forces assigned to or supporting the JFACC. If circumstances require the JFACC to change the planned joint

air operations during the execution of the mission, the JFACC will notify the affected commanders and the JFC as appropriate.

Component Liaisons. Senior Component Liaisons represent their component commander and work with the JFACC and staff. They act as conduits for direct coordination between the JFACC and the component commanders. They have the authority to act as their component commander on time-sensitive and critical issues, and represent the component perspective and considerations for planning and executing joint air operations.

Coordination Elements. Coordination Elements are liaison elements normally supplied by the components to work within the JAOC providing competent planning and tasking expertise and coordinating. These elements aid in the integration and coordination of their respective component participation in joint air operations. The number of coordination elements will normally differ depending on the size and complexity of the operation. They typically consist of the Battlefield Coordination Element, the Special Operations Liaison Element, the Space Liaison Element, the Naval and Amphibious Liaison Element, the Air Mobility Element, the Strategic Liaison Team, and the Air Force Liaison Element. There are no set numbers for the composition of each element.

Functional Area and Mission Experts. Functional Area and Mission Experts may be part of the elements listed above or they may be separate entities. They provide the necessary expertise to support, planning, and execution functions appropriate to the employment scenario. They also provide the expertise to plan and employ forces made

available by the components. They work at all levels of command and in all areas of the JAOC.

Current Decision Making Process

Figure 4, from Joint Pub 3-56.1, illustrates how the JFACC develops the Master Air Attack Plan from the concepts presented in the Joint Force Mission from the JFC.

Figure 4. Concept of Joint Air Operations (source Joint Pub 3-56.1)

The JFACC's Master Attack Plan and supporting orders flow directly from the Joint Force mission statement from the JFC. It incorporates an accurate estimate of the air situation that flows from the JFC's strategic appreciation and objectives, includes the component objectives, and develops a congruent air operations plan. The joint air operations plan documents the JFACC's plan for integrating and coordinating joint air operations, and is part of a five-phase process.

The first phase of the planning process is operational environment research. In this phase information is gained about friendly and adversary capabilities and intentions,

doctrine, and the environment in which operations will take place. This phase is primarily the intelligence preparation of the battle and the gaining of knowledge of the operational environment. During this phase, intelligence data is gathered and analyzed. Additionally logistic information and command relationships are gathered and developed.

The second phase of the planning process deals with objective determination. This is where clear and quantifiable objectives are laid out congruent with JFC guidance.

The third phase is strategy identification, the product of which is a defined joint strategy statement. The joint air strategy states how the JFACC plans to exploit joint air capabilities to support the JFC's objectives. This joint air operations plan is how the JFACC communicates this strategy to the joint air forces under his operational and tactical control.

Phase four is the identification of Centers of Gravity. During this phase all intelligence information is carefully examined and analyzed to identify centers of gravity to focus the air portion of the campaign against.

The final phase is the development of the Joint Air Operations Plan. This plan integrates the efforts of joint air forces to accomplish the JFC's objectives. It identifies a priority for targets and objectives. It accounts for current and potential adversary offensive and defensive threats. It lays out timing for joint air operations to phase in capabilities as needed. It conducts target analysis to identify specific targets for reattack.

Target analysis and the art of targeting is key to the understanding of the Dynamic Re-tasking problem. As stated in 3-56.1, "Targeting is the process of selecting targets and matching the appropriate response to them." It occurs at all levels of command. It is complicated by "the requirement to deconflict duplicative targeting by different forces or

different echelons within the same force and to synchronize the attack of those targets with other components of the joint force."[2]

Targeting currently is a six stage cyclical process. The first stage begins with an evaluation of the commander's objectives and guidance. From this evaluation, target sets are identified, a weaponeering assessment is accomplished, as well as force application. Following this, execution planning is accomplished, forces execute the plan and finally a combat assessment is accomplished which then factors into the commander's guidance for the next round. The JFACC accomplishes this targeting cycle currently through the process of the air tasking cycle in the development of the ATO.

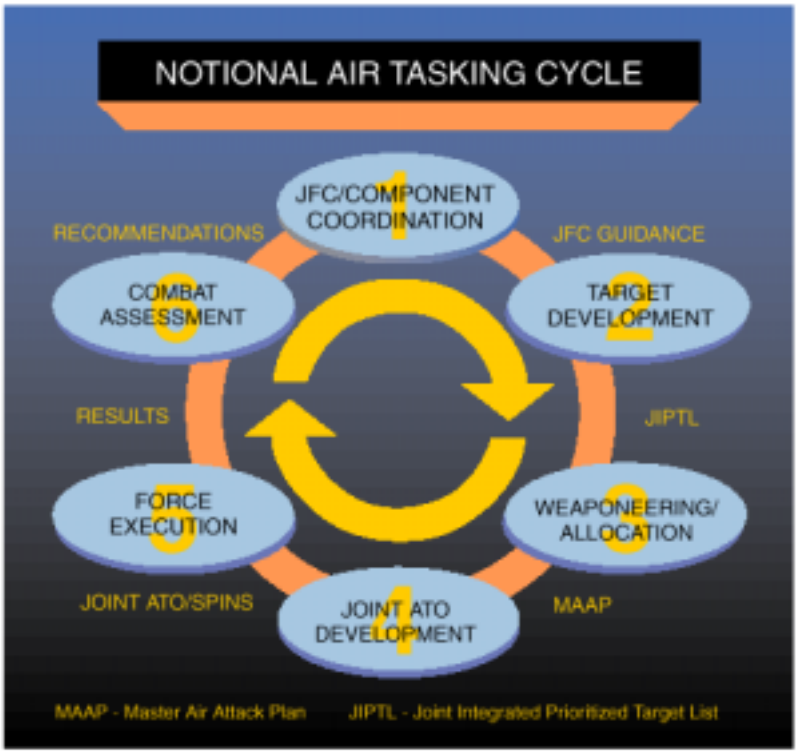

Figure 5 Air Tasking Cycle (source Joint Pub 3-56.1)

The joint air tasking cycle is analytical and systematic in its approach to the development of the air tasking order. It is heavily reliant on up to date intelligence information and the analysis of that information to ascertain its effect on the JFC concept

of operations. There are usually three ATOs in the works at any one time, one in execution, one in production, and one in planning

Essentials

The development of a coherent air attack plan is heavily dependent on the quality of information gathered and the analysis of that information. During the target development phase, the JAOC combat plans section identifies, prioritizes, and selects specific targets that meet the JFC objectives and guidance. Targets are selected from the joint target list (JTL), component requests, intelligence recommendations, and electronic warfare input. As a product of a process, the JTL is normally constructed by the unified command and begins before the deployment or the onset of hostilities. Its early stages begin during the development of the OPLAN or CONPLAN that will govern operations. Inputs from the Joint Staff and other government agencies are incorporated into the list, and maintenance of the list is conducted by the JFC staff based on inputs from the JFC and information from the Defense Intelligence Agency (DIA) and the theater joint intelligence centers (JICs). The product of the target development phase is a list of approved targets that are included in the ATO and assigned to combat forces through the weaponeering and ATO development phases.

During the weaponeering and allocation phase, targeting personnel take the joint integrated priority target list (JIPTL) developed from the targeting phase and detail recommended aimpoints, numbers and types of aircraft and weapons, weapon fuzing, target identification and description, target attack objectives, target area threats and probability of destruction for each target. The final list is included in the MAAP, which forms the basis for the joint ATO. During this same phase, the JFACC staff determines

the total number of sorties required by aircraft and weapon type available for each operation. From this determination, air support requests and allocation requests are made. These include the total number of joint air sorties to be flown and the request for any additional air support beyond the capability of the air component.

After the MAAP is approved, the Combat Plans section continues the production of the joint ATO, special instructions (SPINS), and the airspace control order (ACO). Components may submit change requests to targets and assets during the final stage of ATO development.

Once the joint ATO is approved and distributed the JFACC directs the execution. Components execute the ATO as tasked or request changes through the JAOC. The JAOC is responsive to changes required due to results from in-flight reports and initial battle damage assessments and may redirect capabilities or forces before launch or once airborne. During execution the JAOC is charged with coordinating and deconflicting changes with the appropriate control agencies or components. Ground or airborne mission control commanders may be delegated the authority from the JFACC to redirect sorties to higher priority targets if necessary.

The final phase of the cycle is the combat assessment phase. It is during this phase that the JAOC evaluates the results of the executed ATO's missions and determines if they had the desired effect. It is the phase during which the JFACC takes the day's results and weighs them with future enemy courses of action and capability to recommend future targeting. Combat assessment marks the end of the targeting process, but as figure 5 indicates, it also represents inputs for the beginning of the next air tasking cycle.

Level of Control

Of primary emphasis is the level of control for the execution phase listed above. As noted, the JFACC is charged with controlling the execution of joint air operation to include making timely adjustments to targeting and tasking. During normal operations the JFACC delegates TACON for risk assessment purposes to the commanders in the battle space. Changes from the JFACC typically are limited to pre-planned changes or options to the plan that have been pre-briefed and coordinated. Changes based on intelligence indicators are limited to variation of target location, or defensive response to enemy actions. Seldom are complete target sets changed or the efforts of a coordinated attack redesigned while airborne. Some target sets require extensive planning and coordination to attack and require more time than a simple redirection. Risk assessment is trained in airborne mission commanders through formal weapons school courses and other mission commander training, such as PACACES in the Pacific Air Forces, and the Tactical Leadership Program (TLP) in Europe. What level of TACON should the JFACC exercise over airborne missions and who should be responsible for its execution? The preface of Joint Pub 3-56.1 places the onus on the commander in stating "this doctrine will be followed except when, *in the judgement of the commander*, exceptional circumstances dictate otherwise." (Emphasis added)

Timeline

Figure 6, from Joint Pub 3-56.1, outlines a typical ATO timeline. As indicated, a notional joint ATO takes 48 hours to produce and execute. Intelligence inputs to the plan are made throughout the process, however as the plan approaches completion, it is less resilient to change. Once approved and fielded the plan proceeds to the component

forces for tactical execution. Specific tactics and risk assessments involved with the attack are planned at this level.

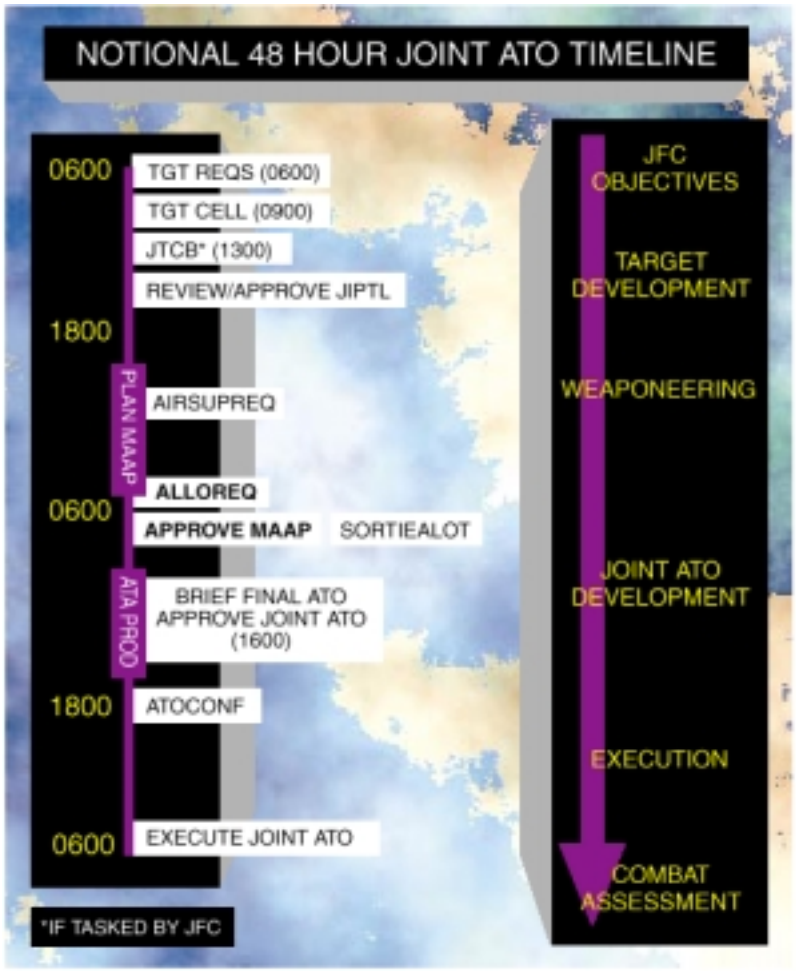

Figure 6 Notional 48 Hour Joint ATO Timeline (source Joint Pub 3-56.1)

Technology Integration

Future innovative technology integration in the JAOC has been highlighted in recent exercises such as Expeditionary Force Experiment (EFX) and Joint Suppression of Enemy Air Defenses (JSEAD).[3] Both exercises integrated new information system technology in the command and control function. Displays and computer systems

indicating real time intelligence were available to the JFACC giving a "big picture" view of the battlespace.

Documents such as Joint Vision 2010 (JV2010) and Air Force Basic Doctrine (AFDD-1) depicts technological innovation and information superiority as the enablers of Dominant Maneuver, Precision Engagement, Focused Logistics and Full Dimensional Protection leading to Full Spectrum Dominance. AFDD-1 paints a new picture of conflict and touts the speed, range, and flexibility of air power as having the capability to bring a decisive halt to a potential adversary's aggression. Information operations provide the JFACC this flexibility through real time intelligence in the JAOC.

Information Systems

Information Systems currently available to the JAOC come in many forms. Links to national assets through the DIA can provide a big picture of events in the theater. Intelligence Surveillance and Reconnaissance (ISR) aspects of platforms such as Rivet Joint, Joint Surveillance Target Attack Radar Systems (J-STARS), space based systems, and Unmanned Aerial Vehicles (UAV) among others provide feeds into the system as well. In the past, this information was fed to the Intelligence section of the JAOC from a variety of systems such as the Joint Service Imagery Processing System (JSIPS), Sentinel Byte, Combat Information System (CIS), Constant Source, Multi-mission Advanced Tactical Terminal (MATT), Intra-theater Imagery Transmission System (IITS), and the Joint Tactical Information Distribution System (JTIDS).[4] It is clearly evident, a multitude of systems exist for the dissemination of information. This information is filtered into the ATO cycle during the development of the MAAP discussed previously.

Real Time Command and Control Assets

Command and Control is exercised by the JFACC through multiple sources. The initial form of command and control is in the development of the ATO where the JFACC's master plan is disseminated to the forces. After the ATO leaves the JAOC the JFACC can still control its execution through landlines and other communications with the operations centers of geographically separate units. As the mission is in progress, however, the JFACC has to work through other assets to control operations real time. Control and Reporting Centers (CRC) are ground-based tactical control hubs and have communicative capability with airborne missions depending on the phase of the operation. Airborne assets for control include E-3B Airborne Warning and Control System (AWACS), J-STARS, and occasionally EC-130E Airborne Battlefield Command and Control Center (ABCCC). These assets communicate with the airborne strike package either by voice, or, in some instances, data link through Internal Data Modem (IDM) capable aircraft.

Notes

[1] Joint Pub 3-56.1, All information regarding JFACC responsibilities and JAOC organization are with reference to Chapters II, III, and IV.

[2] Joint Pub 3-56.1, IV-1.

[3] "Modeling and Simulation After Action Report,"*C2 Earlybird: Special Edition EFX 98 Lessons Learned,* Volume 1, Special Edition Issue 1, December 1998, 6-8.

Gregory Hadynski and Richard Simard, "Point Paper on Joint Suppression of Enemy Air Defenses (JSEAD)," July 1998, n.p,; on-line, Internet, 3 February 1999, available from http://www.rl.af.mil/div/IFE/IFEC/pointPapers/PPsimardJSEAD.html.

[4] Maj James P. Marshall, *Near Real Time Intelligence on the Tactical Battlefield: The Requirement for a Combat Information System*, Research Report No. AU-ARI-92-6, Maxwell Air Force Base, Alabama, Air University Press, January 1994, 11-26.

Chapter 3

Real Time Decision Making

While fighting is a physical act, its direction is a mental process.

—B. H. Liddell Hart, *Strategy*

The ATO, once published, is the order tasking the component forces to accomplish elements of the MAAP.[1] Changes must be made to that plan based on analysis of information that has changed since its inception.

The Decision Making Process

John Boyd conceptualized the decision making process as a nodal loop consisting of four phases (Figure 7). The premise is that commanders observe, orient, decide, and act. At this point commanders return to the beginning of the cycle and begin the process again.[2] Boyd calls this process the OODA Loop and likens it to a turning fighter engagement. The idea is that if one can turn inside their adversary they can defeat them. He postulates that the commander who can make observations, determine their meaning, decide among courses of action, and then act on those courses of action quicker than their adversary, will gain the upper hand.

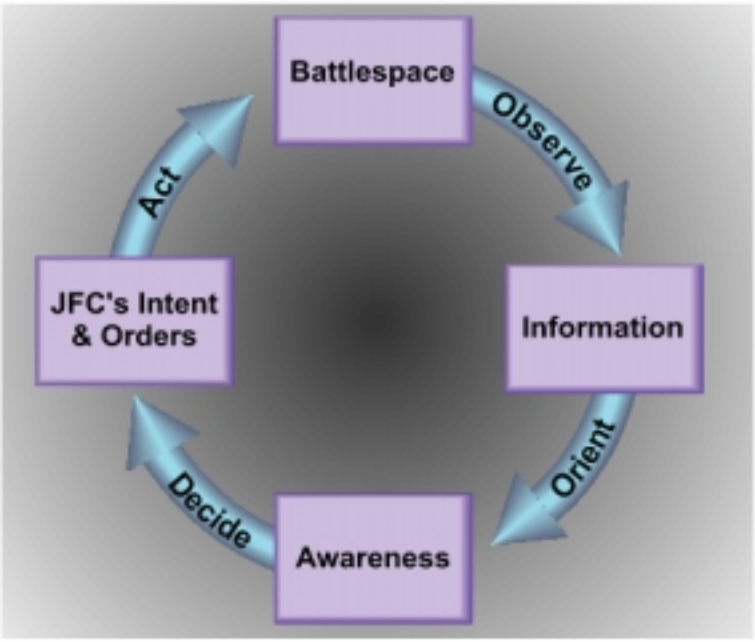

Figure 7 Boyd's OODA Loop (source Joint Pub 6-0)

This is accomplished in the JAOC through the processing of information to the ATO cycle, and in real time control of the current day's ATO. Joint Pub 6-0, Doctrine for Command, Control, Communications, and Computer (C4) Systems Support to Joint Operations, portraits a cognitive hierarchy for information flow. Data received must first be collected and transported from intelligence sources. This is the phase during which initial filtering occurs. Following this it is processed, which refines the data into information. It is then fused, filtered, and further manipulated with other information in a cognitive process that results in knowledge. Finally, an evaluation of this knowledge based on experience is accomplished, which leads to understanding. This understanding can then be acted upon to effect change to the battle plan.[3] The aim of technology integration in C4I systems is to accelerate the transformation from data to understanding, thereby making the commander's OODA Loop as small as possible.

Changes to the MAAP occur as a result of this understanding. The process however, currently exceeds the capability to drastically change while in the execution phase. Complex command and control structures, geographically separated units, differing communication systems capabilities, and differences in component doctrine, tactics and jargon, all hinder change. Coordination requirements for current operations are such that changes to a plan are either manifested in preplanned alternate targeting or in mission cancellation.

Future Technology Integration

Great strides are planned for future integration of technology as an enabler for the JFACC to exercise command and control real time in a Dynamic Re-tasking of airborne assets. The creation of a global C4 infrastructure will dramatically increase the data available to the JAOC. The push for standardization and interoperability among joint force systems and doctrine as well as multinational systems will provide the JFACC the communicative means to effect change.[4] Having the data available and a means of communication however do not complete the picture. The data must be transformed into understanding before it can be used to effect execution.

Automated Information Management

During EFX-98, the JAOC employed the Theater Battle Management and Control System (TBMCS) to host all intelligence and operation information. Through TBMCS the staff of the JAOC was connected to the virtual battlespace and received real time changes to the tactical situation. Processing over 2,500 intelligence messages per day and producing an average of 2,106 mission updates per day, the Situation Awareness and

Assessment (SAA), as well as the Time Critical Targeting (TCT) modules of the TBMCS allowed the JAOC staff to monitor and access missions real time.[5]

The Future JAOC

EFX 98 experimented with new and untested command and control devices, processes and organizations. Using the TBMCS as mentioned above, the JFACC was presented a virtual world in which to operate. Split headquarters, Forward and Rear JAOCs, were set up and connected through the TBMCS using a worldwide info-sphere. In theory this would allow the JFACC to have less of a forward presence footprint and enable greater connectivity to national information assets.[6] Presented with the big picture real time, the JFACC can make decisions based on real time intelligence processing. The size of the Forward JAOC need be only that required to maintain connectivity to the fielded forces. This concept allows for a reduction in size of advanced headquarters with concomitant benefits in reduced airlift requirements, fewer personnel exposed to enemy fire, and more centralized staffs.[7] Presumably, increased communicative conductivity with fielded forces combined with understanding of real time intelligence information will allow the JFACC of the future to tailor the air battle to the evolving tactical environment. Changes no longer will dictate cancellation of missions in the daily ATO; they may instead be redirected, more effectively shaping the air portion of the campaign to combat enemy courses of action.

Notes

[1] Joint Pub 3-56.1, xii.

[2] Maj Arden B. Dahl, *Command Dysfunction: Minding the Cognitive War,* Maxwell Air Force Base, Alabama, May 1998, 23-25.

Notes

[3] Joint Pub 6-0, *Doctrine for Command, Control, Communications, and Computer (C4) Systems Support to Joint Operations*, 30 May 1995, I-3, I-4.

[4] John H Tilelli, Jr., "Ulchi-Focus Lens '97: Putting JV 2010 into Practice," *Joint Force Quarterly*, Autumn/Winter 1997-98, 76-80.

[5] "Modeling and Simulation After Action Report," 6.

[6] Gen (Retired) Charles A Horner, "Comments on Expeditionary Force Experiment 98,"*C2 Earlybird: Special Edition EFX 98 Lessons Learned,* Volume 1, Special Edition Issue 1, December 1998, 2

[7] Horner, 2.

Chapter 4

Exploitation of the Process

> *"I make the enemy see my strengths as weaknesses and my weaknesses as strengths while I cause his strengths to become weaknesses and discover where he is not strong . . . I conceal my tracks so that none can discern them; I keep silence so that none can hear me."*
>
> — Sun Tzu
> The Art of War, c. 500 BC

Sun Tzu's principles in the Art of War are as appropriate today as they were 2,500 years ago. Deception across the gamut of military operations from strategic to tactical has been the bane of many commanders in the past. Confidence in knowing the adversary, their next move, and redirection of forces to counter that move is the crux of great captaincy. Lack of knowledge can be overcome by planning for what one does not know. Changing a plan based on false information, however, can be fatal. The intent of this chapter is not to discredit real-time intelligence; rather, it is to point to the fact that not all intelligence is what it first appears to be and that occasionally, a more thorough examination (i.e. time consuming analysis) must be accomplished to discern true meaning.[1]

History of Intelligence Indicator Manipulation

Fortitude South[2]

The Allied landing on the beaches of Normandy in 1944 was greatly aided by a masterfully planned set of intelligence manipulation code named Fortitude South. The Germans concluded early in 1944 that the Allies would invade the continent; however, when and where this invasion was to occur was not known. The most probable location for a landing was speculated to be at Pas de Calais due to its short distance from points of embarkation to debarkation and the threat a breakthrough in that region would do to the German war effort. With this predisposition of thought the stage was set for Fortitude South.

The basis of Fortitude South was the concept that the Allies had amassed enough resources to conduct a diversionary landing in addition to a main assault along the coast. The overall plan used element of camouflage, signal discipline, restricted zoning and other security schemes to conceal the real invasion force. Information was fed to German intelligence through double agents that bolstered the Pas de Calais idea in intelligence circles. Six supporting operations contributed to intelligence indications supporting a Pas de Calais invasion. Quicksilver I was a fictional plan for a cross channel assault at Pas de Calais by the First United States Army Group (FUSAG). Quicksilver II was a radio deception that simulated army group traffic for the fictional FUSAG. Quicksilver III was the visual demonstration of landing craft along the eastern coast of England. Quicksilver IV was actual bombing of Pas de Calais fortifications. Quicksilver V was bombing operations aimed at communications networks behind Pas de Calais beaches. Quicksilver VI was an elaborate light scheme operation that simulated numerous port and assembly

facilities on England's eastern and southwest coast while concealing operations at the actual sites. The Allies knowledge of German High Command's thinking, due to the breaking of the Enigma code, allowed the Allies to adjust their deception to obtain the desired results. This deception was so strong that, even after the Normandy invasion, German command thought Normandy was a diversion for a main invasion still to come six weeks later at Pas de Calais.

The Gulf War[3]

During the Gulf War deception was a major item emphasized to conceal the intentions of the coalition forces. The deception involved convincing the Iraqi forces the main push of the coalition invasion was going to come from an amphibious assault on the coast of Kuwait. The positioning of Marine and Naval units in the Gulf led to this deception. Marine landing exercises along the Gulf and in Oman helped sell this deception as did timing and placement of air attacks. The lack of aerial attack on some targets in the west added additional indication that the attack would come from the east. In effect these actions fixed Iraqi forces in the east allowing the well know left hook, that cut off the Iraqi route of retreat, to occur with little resistance.

Impact on Critical Decision Making

These are but two examples of deception in action to shape the response of the enemy. In Fortitude South, the Allies were aware the Germans were focusing on communication interception, human intelligence, and visual cue (equivalent of today's Electro-optical reconnaissance). The German command saw what their predisposition also told them they wanted to believe, that is, a massing of force for an assault at Pas de

Calais. How much of a parallel is this to what a potential adversary may do? For instance, if a potential adversary understood a deep routed fear of weapons of mass destruction, they could preposition dummy launchers and electronic signal generators that would demand attention and the possible redirection of force. This force may be redirected from real targets that would survive to inflict damage of their own. If an adversary can fix the actions of an opponent, they make their opponent predictable. A predictable opponent can be defeated.

This example placed over the ATO cycle process may result in recognition by the intelligence section that these are actually dummy sites and signals, or the combat plans section realizing the number of launchers targeted do not equal the preconception of enemy capability. Real time reaction in the form of Dynamic Re-tasking, however, may not pick out the discrepancies. The Dynamic Re-tasking environment differs from the ATO cycle by a factor of time. Entin and Serfatay describe "time pressure" as a component of overload, which is one of the attributes of stress. Additionally, secondary tasks increase stress in that they cut deeply into residual capacity, provide a sense of uncontrollability, and are intrusive and distracting to the performance of the primary task.[4] Wearing the hats of ACA and AADC, in addition to promulgating the air portion of the campaign, both current and days in advance, leaves little doubt the JFACC has many secondary tasks. Under stress, people experience a tremendous amount of cognitive constriction that disrupt the normal thought processes. Reaction to real time intelligence input has little room for error.

The idea that technological innovation will be able to render information with such clarity and accuracy that commanders will no longer have to deal with uncertainty in their

decisions fails to take this notion of intelligence indicator manipulation into account. Commander Valentine, in his paper on operational art, warns if operational decisions were based solely on the picture presented through automation, the risk is run of not making a decision at all but merely fashioning a product of mathematical analysis and logical conclusion based on perfect information.[5] That is, if that information was truly perfect.

Tactical Paralysis?

When presented with a large amount of data to process, the human mind must sort this data, decide what data is valuable from that which is not, transform that data to understanding as described in the previous chapter, devise courses of action, and then choose to act on one of those courses of action. Colonel Littlefield points out "the art of war has come a long way since the days of the Roman legions where commanders could see the entire battlefield with the naked eye."[6] In those days the commander could see nearly all from a vantagepoint on the high ground and act on it. Today, technology integration is allowing that "standing on a hill" aspect of great captaincy to return, however the valley has become the size of the entire theater and in some cases the world. Data from the many sources discussed in Chapter 2 act as the looking glass for the commander. This amount of information and a theater sized force structure allows the JFACC freedom to form many alternate courses of action. This, combined with the time pressure and secondary task stress noted above, may lead to a situation where the JFACC is presented with too many courses of action to choose from in the allotted time. Peter Senge indicates that an increased amount of information does not necessarily lead to better, more timely decisions. This would be exaggerated by automated information in

that it may result in leaders paying attention to highly visible but misleading data. In fact, increased information may overwhelm and paralyze decision-making.[7] This paralysis is defined in Douglas Coupland's book *Generation X: Tales for an Accelerated Culture* as "option paralysis."[8] Option paralysis occurs when one has so many options to consider in the selection of a course of action that none is selected before the allotted time expires. In the JAOC this same phenomenon could result in "tactical paralysis."

Notes

[1] Senge et al, 529.

[2] Dahl, 41.

[3] Joint Pub 3-58, *Joint Doctrine for Military Deception*, 31 May 1996, IV-2.

[4] Elliot E. Entin and Daniel Serfaty, "Information Gathering and Decision Making Under Stress," TR-454, (Alphatech, Inc., Burlington MA, January 1990), 10-11.

[5] Commander William D Valentine Jr., *Leveraging technology: Using the Practical Essence of Operational Art to Translate Information into Decisions*, (Naval War College, Newport, RI, 16 June 1995), 4.

[6] Col Thomas K Littlefield, *The Military Decision Process --- Overlooked by the Revolution in Military Affairs*, (United States Army War College, Carlisle Barracks, PA, 1 September 1998), 10.

[7] Senge et al, 529-530.

[8] Douglas Coupland, *Generation X: Tales for an Accelerated Culture*, (N.Y.: St. Martin's Press, 1991), 139.

Chapter 5

Where Can Dynamic Re-Tasking Work?

> *What the Warrior Needs: a fused, real time, true representation of the battlespace — an ability to order, respond and coordinate horizontally and vertically to the degree necessary to prosecute his mission in that battlespace.*
>
> —The C4I For the Warrior vision

Military leadership and great captaincy can overcome "tactical paralysis" if given the right opportunity. The complexity of planning, coordinating, and executing individual missions as described in chapter 2 must be taken into consideration. The role of the JFACC and the duties assigned to elements of the JAOC may make Dynamic Re-tasking unwieldy on a grand scale. Time critical accurate intelligence information that can be incorporated in the current execution of a mission, however, may have the effect of shrinking the OODA loop described in chapter 3. If the JFACC can indeed see the big picture, then technology may mean a revolution in military affairs is in the works.

Preconditions for Success

For Dynamic Re-tasking to have the dramatic effect it is intended to a certain degree of centralized execution must be exercised by the JFACC. Yet this centralized execution must be at the same time decentralized. Army Lieutenant Colonel Robert Cone in his paper *Command and Control in Joint Vision 2010: Micro-Management or Decision*

Exploitation?, likens war in the technology age to the game of chess. The commander can see the entire battlefield but, despite knowledge of opponent's pieces and location, must still exercise cognitive processing of their meaning and the opponent's intentions.[1] This analogy falls short, in that, unlike chess, the pieces in war have their own OODA loop that can contribute to the whole. They are not pawns or unthinking automatons. They are closer to the battle and see nuances the commander may not be able to see. The real battlespace is larger than 64 squares. Forces in that battlespace move and react with the level of detail that allow them to maximize their effect. When orchestrated in knowing concert they synergistically magnify their capability with others. Uninformed they are merely fodder, no more effective than the armies of World War I charging out of the trenches simply because they were told. For Dynamic Re-tasking to work, execution must be centralized yet remain decentralized.

Required Information

To effect this centralized / decentralized execution, the fielded forces must be as one with the JFACC. They must understand the concept of the required task, its implication, and how it fits into the order of battle. All coordination must occur for synergistic effects. For example if a strike package is re-tasked from their original targets to a different target set, they must know key elements of information. The enemy disposition of forces must be known for the new location. Threats to the strike package must be identified and reduced. This may require, alternate routes of flight, timing changes, or additional assets not organic to the strike package. If such is the case this information must be provided so forces do not go blindly into the face of an overwhelming threat without purpose. Abort criteria must be established. New target descriptions as well as

avenues of approach must be determined. Weaponeering changes in spacing and fuzing of munitions may need to occur. The more complex the strike package, threat, target set and coordination become, the less susceptible the mission is to Dynamic Re-tasking. The effects of re-tasking must not only be determined on the current strike package but also for subsequent packages that may have been depending on a previous mission obtaining certain results. The entire JAOC planning cell must be involved. One change may effect the entire plan.

Critical Requirements

Free information flow from the JFACC to the warfighter is a must to enable the fielded force the ability to execute. True interoperability between weapon platforms is a must for Dynamic Re-tasking to work. Platforms re-tasked must have connectivity to other platforms in the original strike package. Additionally they must have connectivity to the platforms in the re-tasked package for the case of split package re-tasking. Secure IDM capability is required to pass more information quickly to all affected. Common jargon and tactics are required for inter-service operations. Current target and threat information is a must. Pre-conceived attack plans may be beneficial as a generic play card to orchestrate the synergistic effect of different assets. These, however, must be guarded for compromise.

A flattened command and control structure is needed to provide greater connectivity to the JFACC.[2] Communication links and data links must be streamlined. Commonality of systems is a must. The JAOC may need to be restructured and expanded with systems providing for greater control of current operations. At the same time more connectivity

of the warfighter to the "big picture" in the JAOC is critical for decentralizing the central execution.

Impact of Dynamic Re-tasking

The impact of Dynamic Re-tasking, if accomplished correctly, will enable the JFACC to tailor the air battle to the current situation. This will be done real time and allow the JFACC the opportunity to work inside the opponent's OODA loop. Combined with the ATO process, Dynamic Re-tasking can create an ability for the JFACC to effect change more rapidly by hitting critical nodes of the opponent at critical times, magnifying their effect. The interoperability described previously can provide the JFACC with a "thinking" chessboard. An interactive connected battlespace will allow separate operations to occur as one.

Missions Susceptible to Re-tasking

Current capabilities limit the number and type of missions susceptible to Dynamic Re-tasking. Communicative limitations already noted greatly reduce the effectiveness that can be achieved from re-tasking. Currently, re-tasking should only occur on a limited number of aircraft on relatively benign missions that do not involve great knowledge of the battlespace peculiarities. Low threat and minimal coordination is a must for re-tasking efforts today. Units re-tasked must be given targets that have the same munition requirement as their originally planned targets. If the JFACC knows ahead of time a particular mission will most likely be re-tasked and to what target or type of target, that information must be transmitted to the unit prior to its execution. Any coordination efforts that can be prebriefed as an option before execution should be. After

the mission is airborne, little coordination should occur of which the aircrew are not aware.

Should change occur as discussed that dramatically increases the connectivity of all warfighters in the battlespace, there is no limit to the type of missions that would be susceptible to Dynamic Re-tasking. The "thinking chessboard" could implement the JFACC's Master Air Attack Plan with full knowledge of the effect on other warfighters. Suppression of enemy air defenses could occur before the enemy had an opportunity to react. Weapons of mass destruction could be identified and targeted prior to their use on friendly troops. Land commanders could request changes that interdict enemy troop movements at critical times. Battle damage assessments could be made prior to the last aircraft across a target area and changes made ensuring priority targets are destroyed. Dynamic Re-tasking employed in this manner with full connectivity would act as a force multiplier, reducing the enemy's capability while reducing the number of friendly sorties required to complete the plan.

Notes

[1] Cone, 14-15.
[2] Littlefield, 20.

Chapter 6

Conclusions

> *As technology advances, the conduct of operations will continue to change. Each advance in information technology will help leaders form a more complete picture of the battlespace, generate faster, higher quality decisions, maneuver more rapidly in time and space and increase a unit's flexibility and agility. Nevertheless, this technology is only an enabling tool. Quality and well-trained leaders remain the true centerpiece to successfully planning and operating this increasingly digitized and automated information system of systems.*
>
> —FM 100-6, Information Operations.

Dynamic Re-tasking can be of benefit to the JFACC of the future. It will act as a force multiplier to enable more efficient and effective use of air power. Dynamic Re-tasking is a technological benefit of the information age that allows the use of information integration in the JAOC to be translated to operations in the field. General Horner points out, however,

> "The lure of fancy graphics must not outweigh the need to improve our means of killing people and destroying things with air power."[1]

The cognitive process involved in the ATO cycle through the incorporation of intelligence information in targeting is an involved process. The JFACC has a plethora of duties and concerns. The macro-view at times may not be the view from which to execute. If this view is not transmitted to the warfighter during the execution phase, they become nothing more than automatons, or pawns executing orders.

Figure 1 depicted the problem facing the JFACC pertaining to the integration of information technology. Perhaps the real next step is as depicted in figure 8. Greater connectivity is required across the spectrum of command and control to enable Dynamic Re-tasking. If this can occur there may be little need for changes to originate from the JAOC. Empowered, informed commanders in the battlespace may seize the opportunity when time is critical. Decentralized knowledge of the centralized big picture may prove to be the true benefit of information superiority.

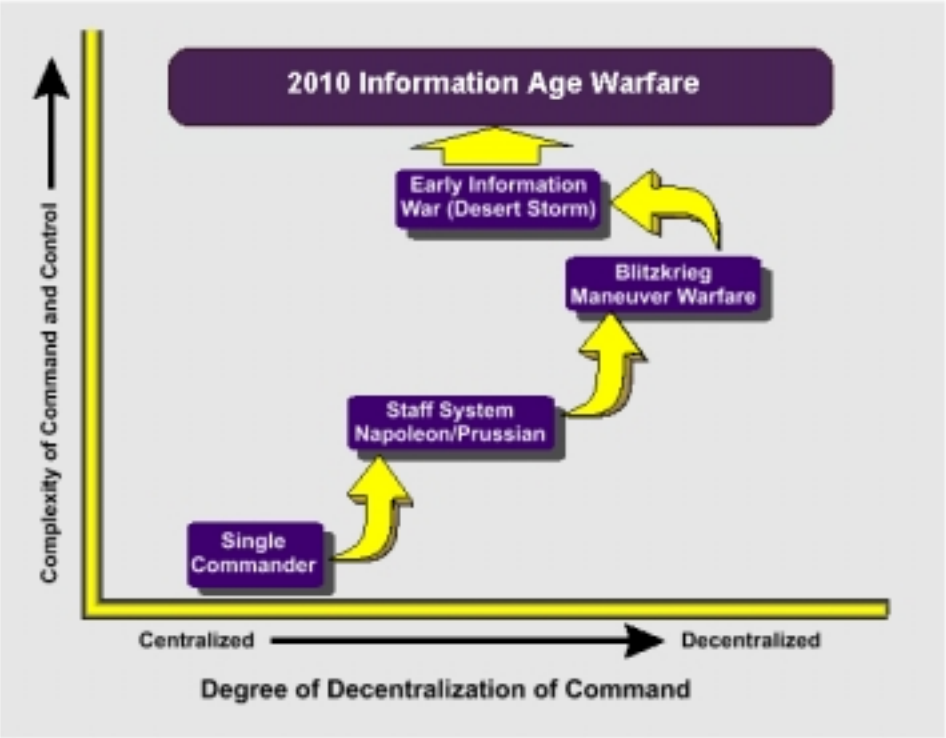

Figure 8 Decentralized / Centralization

Glossary

AADC	Area Air Defense Commander
ABCCC	Airborne Command Control and Communication
ACA	Airspace Control Authority
ACO	Airspace Control Order
ATO	Air Tasking Order
AWACS	Airborne Warning and Control System
C2	Command and Control
C4I	Command Control Communications Computers and Intelligence
CIS	Combat Information System
CONPLAN	Operation plan in concept format
CRC	Control and Reporting Center
DIA	Defense Intelligence Agency
EFX	Expeditionary Force Experiment
FUSAG	First United States Army Group
IDM	Internal Data Modem
IITS	Intra-theater Imagery Transfer System
JAOC	Joint Air Operations Center
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JIC	Joint Intelligence Center
JIPTL	Joint Integrated Priority Target List
JSEAD	Joint Suppression of Enemy Air Defenses
J-STARS	Joint Surveillance Target Attack Radar System
JTL	Joint Target List
JV 2010	Joint Vision 2010
MAAP	Master Air Attack Plan
MATT	Multi-mission Advanced Tactical Terminal
OODA Loop	Observe, Orient, Decide, Act cycle
OPCON	Operational Control

OPLAN	Operation Plan
SAA	Situation Awareness and Assessment
SPINS	Special Instructions
TACON	Tactical Control
TBMCS	Theater Battle Management and Control System
TCT	Time Critical Targeting
UAV	Unmanned Aerial Vehicle

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[1] Horner, 2