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AN OVERVIEW OF SELECTED JOINT PROCESSES, THE SUPPORTING ANALYSES, AND AN ARMY PERSPECTIVE OF ASSOCIATED ANALYTICAL PROBLEMS

BY

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An Overview of Selected Joint Processes, the Supporting Analyses, and an Army Perspective of Associated Analytical Problems

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ABSTRACT

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This paper provides a survey of selected joint processes and the supporting analyses. It begins with a background discussion of the current Joint organization, keying on areas requiring analytical support. This background sets the scene for why joint processes are important. The paper explains these selected processes, describes the types of analyses done to support these processes, and provides actual examples of these analyses. This paper discusses problems with the conduct of the analyses from the Army perspective and summarizes some lesson learned.

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AN OVERVIEW OF SELECTED JOINT PROCESSES, THE SUPPORTING ANALYSES, AND AN ARMY PERSPECTIVE OF ASSOCIATED ANALYTICAL PROBLEMS

> Our military must be ready to fight as a coherent joint force — fully interoperable and seamlessly integrated.[1]
>
> —1997 National Military Strategy

> A fully joint force requires joint operational concepts, doctrine, tactics, techniques, and procedures — as well as institutional, organizational, intellectual, and system interoperability — so that all US forces and systems operate coherently at the strategic, operational, or tactical levels.[2]
>
> —1997 National Military Strategy

PURPOSE

These two quotes from the 1997 National Military Strategy of the United States of America set the stage for understanding the importance of a joint force. A capable and successful joint force does not just happen. The Joint Staff and the Office of the Secretary of Defense (OSD) have put in place certain processes to assist in planning and preparing the joint force. Analytical studies are important supporting efforts conducted to provide the analytical underpinnings used to inform decision-makers responsible for these processes. While these analytical studies are integral in supporting joint processes, there are

some problems connected with their conduct. The purpose of this paper is to describe selected joint processes and provide a discussion of the different types of analyses conducted to support these joint processes. This paper will present some problems with the conduct of joint analyses from an Army perspective in an effort to show the complexity of addressing joint issues. Additionally, this paper provides a summary of lessons learned in the conduct of joint analyses.

SCOPE

Since the Joint Staff and OSD are very complex organizations with multiple processes in place to accomplish their joint roles and missions, the scope of this paper is limited to selected joint processes. The two Joint Requirements Overview Council (JROC) processes (requirements generation system and Joint Warfighting Capabilities Assessments (JWCA)), joint experimentation, and the Quadrennial Defense Review (QDR) are important examples of the processes that support the implementation of joint roles and missions. While all services and many Department of Defense (DoD) organizations support these joint processes and conduct analyses, the discussion of perceived problems with the conduct of analyses to support joint processes is from the Army perspective.

BACKGROUND

The current Joint Chiefs of Staff organization was established by the Goldwater-Nichols DoD Reorganization Act of 1 October 1986 with few modifications since then. This act designated the Chairman of the Joint Chiefs of Staff (CJCS) as the principal advisor to the President, the National Security Council, and the Secretary of Defense.[3] In this role, the Chairman's responsibilities include the preparation of military strategy, strategic plans, and strategic assessments. The Chairman must provide advice to the Secretary of Defense on the effect that critical force capability deficiencies and strengths will have on accomplishing national security objectives, implementing policy, and executing strategic plans.[4] The Joint Staff uses three main processes to support the Chairman's role as principal military advisor to the President. These processes are the requirements generation system and the JWCA, both overseen by the JROC, and joint experimentation.

The fourth selected process I will discuss is the QDR. The Military Force Structure Act, included as part of the National Defense Authorization Act for Fiscal Year 1997, requires a quadrennial defense review. The QDR is a collaborative product of OSD and the Joint Staff with support from the Military Services and the Commanders in Chief of the Combatant Commands. The QDR supports planning and preparing the joint force by

conducting a comprehensive review of the capabilities of all the services.[5]

JOINT REQUIREMENTS OVERSIGHT COUNCIL (JROC) PROCESSES

The JROC is the advisory council to the CJCS. The CJCS is the JROC chairman and recent chairmen have delegated the functions of the JROC chairman to the Vice Chairman of the Joint Chiefs of Staff (JCS). The JROC membership consists of a four-star representative from respective Services selected by the CJCS.[6] The JROC itself is often spoken of as a process but it is the oversight council responsible for the processes of the requirements generation system and the JWCA.

Requirements Generation System

The JROC charter states that the JROC mission is to:

- assist the Chairman in identifying and assessing the priority of joint military requirements (including existing systems and equipment) and acquisition programs to meet the National Military Strategy;

- assist the Chairman in considering alternatives to any acquisition program that has been identified to meet military requirements by examining cost, schedule, and performance criteria of the program and identified alternatives; and

- review and approve the military need for all potential major defense acquisition programs and validate performance

objectives and thresholds in the acquisition program baseline for all such programs prior to any milestone consideration.[7] The requirements generation system is the process by which the JROC carries out its responsibilities described above.

As part of the requirements generation system, the JROC:

- oversees the mission need determination and reviews results of concept exploration and definition studies and provides appropriate recommendations on alternatives and cost-performance trade-offs;

- directs the review and designation of all Mission Need Statements (MNS) and resulting operational requirements for joint potential;

- assists in ensuring alternatives to any major defense acquisition programs have been adequately addressed; and

- charters and tasks groups to address operational concept definitions, joint potential, and joint requirements issues.[8]

Basically, this means the JROC performs mission needs review, validates and prioritizes requirements, and makes recommendations on the best placement of scarce resources. The JROC is designed to provide a senior military perspective on what the Nation requires for national defense, and in particular, to judge whether major weapons, weapons systems and other military capabilities are required.[9]

The requirements generation system consists of four phases: definition, documentation, validation, and approval. In the definition phase, an organization defines, describes, and justifies a mission need to satisfy a deficiency or exploit a technological opportunity. Organizations identify mission needs based on continuing mission assessments of current or projected capabilities in the context of changing military threats and national defense policy. If decision-makers determine that the only feasible solution is a materiel solution, then an acquisition program may be considered.[10]

The formal preparation and initial review of required documents in support of defined mission need are developed in the documentation phase. Organizations document the new need in a MNS. Once the acquisition program is approved, the operational requirements for the concept(s) selected progressively evolve from broad operational capability needs described in the MNS to the system-specific performance requirements described in the Operational Requirements Document (ORD).[11]

The validation phase is the formal review process of the requirements documents by an operational authority other than the user. The validation is to review and confirm the identified need and operational requirement. The JROC is the

validation authority for very high cost programs or those of special interest.[12]

The approval is a formal sanction that the validation process is complete and the identified need of operational capabilities described in the documentation is valid.[13] At appropriate points in these phases, analytical studies are conducted to inform decision-makers.

Analysis supporting the Requirements Generation System

Analysis is used throughout the requirements generation process. Analysis is used in the very early stages to develop and assess warfighting concepts. It is woven into experiments, simulations, technology demonstrations, and science and technology research used to establish the basis for the warfighting capability. The analysis is used to determine the most effective, timely, and least costly means to achieve the warfighting capability. Using the results of the analysis, decision-makers determine if a doctrinal, training, leadership, organizational, or materiel alternative should be chosen for further development.[14]

The JROC requirements generation system emphasis is on those requirements that need materiel solutions. They focus on joint requirements and joint solutions. Analysis supports the life-cycle of the materiel acquisition process and its decision milestones. For example, during the concept exploration phase

(Phase 0 of the materiel acquisition cycle), analysis focuses on comparisons of alternative materiel concepts and their cost implications. During the program definition and risk reduction phase (phase I), the analysis focuses on requirements trade-offs and cost performance trade-offs. Later in the life-cycle, analysis is used to determine production quantities and the test and evaluation of the materiel system.[15]

One of the main types of analysis supporting the requirements generation system is the Analysis of Alternatives (AOA). A Cost and Operational Effectiveness Analysis (COEA) was the former name of the AOA and was recently redefined and replaced by the AOA. The AOA is "the evaluation of the estimated costs and operational effectiveness of alternative materiel systems to meet a mission need. The AOA assists decision makers in selecting the most cost-effective material alternative to satisfy a mission need."[16]

The Joint Surveillance Target Attack Radar System (JSTARS) COEA is a good representative example of the type of analysis conducted to support the JROC oversight of the requirements generation system. The Army and the Air Force conducted the JSTARS COEA to support a milestone III decision (approval for production). It was completed in May 1996 prior to the move to the AOA as the redefined type of supporting analysis.

Nonetheless, it is illustrative of the types of issues addressed.

The information summarized here and in the following paragraphs in this section is from JSTARS COEA Final Report dated May 1996. The report was classified Secret but all information extracted is unclassified.

The JSTARS COEA provided the analytical basis for the decisions regarding the production quantities of E-8C aircraft and Ground Station Modules (GSMs) and supported product improvement decisions. The Air Force was responsible for developing the airborne segment of the system (the E-8C aircraft) and the Army was responsible for developing and fielding the GSMs.[17]

To address the question of production quantities, the analysis focused on the following:

- differences in effectiveness between continuous and limited operations to support two nearly simultaneous major theaters of war,

- an investigation of the role of JSTARS in locating, tracking and supporting attacks on tactical ballistic defense and their launch sites,

- an investigation of the role of JSTARS in peacekeeping and peacemaking actions (operations other than war), and

- an investigation of the role of JSTARS in supporting Navy and Marine operations.[18]

For the conduct of the study, the Army and the Air Force developed appropriate scenarios as the framework for the analysis. The team developed alternatives based on JROC guidance. The study team used sensitivity analysis to examine variation in the numbers and distributions of the GSMs within the Army. Additional sensitivity analysis was used to examine preplanned program improvement (P3I) candidates to the baseline.[19] Sensitivity analysis was also used to examine the system effectiveness when conducting the missions for Navy and Marine support, tactical ballistic missile defense support, and operations other than war. The study team worked closely with the Navy, Marines, and functional experts to scope their particular study issues.[20]

A comprehensive review of system performance test data and operational concept demonstration information provided the baseline for an extensive modeling and simulation program. The study team used engineering, mission, corps, and campaign level models to aid in this analysis. They used measures of effectiveness (MOEs) to assess performance of the system at the different levels. Qualitative analyses were performed to examine system effectiveness when addressing the additional

missions of Navy and Marine support, tactical ballistic missile defense support, and operations other than war.[21]

A summary of the findings stated that incorporating near-real-time JSTARS information into the corps information gathering, targeting, and attack processes produced a significantly more effective force. The amount of the increase in specific MOEs was dependent on factors such as terrain, Red and Blue force structures, and Red and Blue battle postures.[22] The analysis provided observations that the intensity of combat operations and operational goals were achieved sooner when JSTARS was employed. Deep strikes by Army and Air Force assets were more effective which resulted in fewer direct fire conflicts and greater survivability of Blue forces. This performance increase was significant and was recommended to be included as a factor in the overall decision making process.[23]

Analysis of JSTARS in support of Navy and Marine operations and operations other than war indicated potential benefits for each mission. Excursions examining Marine Force use of JSTARS information showed an increase in effectiveness similar to that experienced by Army corps forces. Examination of operations other than war scenarios provided an indication of the information that can be provided to increase the situational awareness of diplomatic and military forces supporting these efforts.[24] Analysis of the Ground Station Module (GSM) P3I

options revealed that corps equipped with sufficient numbers of Common Ground Stations (CGS) are even more effective than those with baseline GSMs. The increase in information available to the corps commanded resulted in increased capabilities.[25] The analysis provided life cycle costs for the E-8C, CSM, and CGS P3I decisions.

Results of the JSTARS COEA were made available to the JROC to support and inform their decision-making. The results also supported the Army Systems Acquisition Review Council and the Defense Acquisition Board. While the results of the analysis significantly impacted the decision-makers' understanding of the effectiveness of JSTARS, dollars drove the final decisions on quantities.[26]

Joint Warfighting Capabilities Assessment

The JWCA is the other main process used by the JROC to support the CJCS's role as principal military advisor to the President. The JROC uses the JWCA process to examine key relationships and interactions among joint warfighting capabilities in order to identify opportunities to improve warfighting effectiveness.[27] The JWCA process allows for the exploration of new alternatives through more extensive, open, and candid assessments of joint military warfighting capabilities.[28]

JWCAs are conducted by teams of warfighting and functional area experts from the Joint Staff, unified commands, Services, OSD, Defense agencies, and others as required. The assessments consist of the teams' appraisals of various aspects of joint warfighting within their respective areas.[29] The JWCA process is intended to look at major military capabilities, detect capability voids, eliminate redundancies, and recommend methods to correct the deficiencies.[30]

While the JROC's requirements generation system specifically addressed service and joint materiel requirements, the JWCA process considers all aspects of joint warfighting capabilities. The JWCA process divides general concepts of warfighting into component parts or areas. The current areas are: intelligence, surveillance, and reconnaissance; combating terrorism; information operations; joint readiness; strategic mobility and sustainability; regional engagement; command and control; land and littoral warfare; reform initiative; sea, air and space superiority; and strike.[31]

Teams for each warfighting area analyze the warfighting requirements. These requirements are compared to fielded and planned programs intended to address the requirements. Redundant capabilities, requirement excesses, and capability shortfalls are identified. The assessment results are briefed to the Commanders in Chief (CINCs) and amended if necessary,

vetted through the JROC, and are used to assist the CJCS in the development of the Chairman's Program Recommendations (CPR) and the Chairman's Program Assessment (CPA).[32]

Analysis supporting the JWCA Process

An example of analysis to support the JWCA process is from the Reform Initiative (RI) JWCA. The purpose of the RI JWCA is to develop and assess Joint positions on Defense Reform Initiatives Directives (DRIDs) and Management Reform Memoranda (MRMs).[33] The RI JWCA Team is currently conducting the Defense Finance and Accounting Service (DFAS) Reform Assessment. The overall purpose of this assessment is to keep pressure on OSD to reduce infrastructure in order to fund modernization.[34]

The DFAS Assessment is about 85-90% complete as of this writing. It will analyze the ways to reform DFAS and the deliverable will be a report that evaluates the positives and negatives of courses of action for DFAS reform.[35]

The study team consisted of representatives who are generally considered as experts in the area of Defense Reform from each of the services, the joint staff, DFAS, and other interested organizations.

The hypothesis is that "DFAS services are expensive in relation to comparable commercial services and corporate benchmarks." To test the hypothesis, the study team will determine whether large commercial firms outsource finance and

accounting services. If so, how? If not, why? The study team will determine viable alternatives and courses of action (COAs) for reform and conduct its analysis against specific metrics.[36] Some of the identified metrics include the following. Is DFAS responsive to customer requests? Is DFAS accurate, meaning do the products and results consistently fall within acceptable parameters? Is DFAS easy to access to provide inputs or receive required information? Is DFAS reliable? What are the costs to implement and sustain reforms in DFAS? Is there value added from the reformed process?[37]

The metrics listed above are very subjective and were developed by the study team since empirical data was unavailable. For example, an objective metric would be a comparison between the cost of DFAS and a civilian accounting firm to issue a check. DFAS was unable to provide data on its costs to issue checks or other similar cost comparisons so more subjective metrics were developed.[38]

The DFAS Reform Assessment has identified five courses of action. The first is the status quo. This is really a "throw-away" COA since DFAS is currently undergoing some planned reforms and plans to complete the reforms regardless of the outcome of this study. Second, is the DFAS organization at the end of its ongoing reforms. The third COA is to create a public-private partnership (or consortia) between DFAS and

commercial vendors for selected activities and functions. Fourth is for DFAS to become a government corporation (GC). This would allow it more freedom to reform itself, compete for other government agency business, and realize those benefits that accompany GC status. Fifth, DFAS becomes a private organization using an Employee Stock Ownership Plan (ESOP) allowing it the flexibility to improve effectiveness and reduce costs.[39]

The results of the DFAS Reform Assessment are important to the JWCA process. It will identify voids and redundancies in the current process and make recommendations for efficiencies. While neither final nor approved, emerging recommendations may include the following. First, recommend the establishment of the senior level military and civilian Board of Directors to have oversight of the DFAS capital budget. Second, recommend the services standardize and improve their feeder systems for DFAS reporting. Third, create transparency in pricing so the services have a better understanding of what they are paying DFAS to do for them. Due to political considerations, the study team will not recommend a specific COA, rather they will present positives and negatives for each one.[40]

While the RI JWCA team and the DFAS Reform Assessment may not appear to be the typical capability one thinks of when one considers warfighting, it has a direct impact. The assessments

consider areas that affect the soldier, his or her pay, and effort to reduce infrastructure costs that can then be returned to modernization.

JOINT EXPERIMENTATION

Joint experimentation is the third of the three selected processes overseen directly by the Joint Staff. Effective 1 October 1998, the CINC United States Atlantic Command (CINCUSACOM) became the Defense Department's Executive Agent for Joint Experimentation. Joint experimentation is conducted to explore, demonstrate, and evaluate joint warfighting concepts.[41] The outcome of joint experimentation is a new warfighting concept that may require changes to doctrine, organizations, training (and education), materiel, leadership, and people (DOTMLP) to meet future challenges across the full range of military operations.[42] Joint experimentation is a process that asks questions, dissects problems, and experiments with ideas and hardware to learn and shape the future of joint operations.[43]

The joint experimentation process consists of several phases. The first is program development which consists of concept development and campaign planning. The concept development process assimilates strategic guidance to develop the concepts for experimentation. The Joint Experimentation

Campaign Plan lays out a multi-year process of experimentation designed to assess the operational utility of concepts.[44]

The second phase is Experimentation Plan Development and Execution. This phase consists of experiment plan development, experiment design, experiment preparation, conduct of the experiment, and assessment. An Experimentation Plan is written for each concept selected for experimentation. The plan identifies the experiment events and provides the information required to schedule, design, prepare, and conduct the experiments. Experiment design and preparation sets the objectives and examines the experiments, demonstrations, and exercises being conducted by the CINCs, Services and Agencies to determine the extent to which they can be leveraged to address these objectives. During this phase, MOEs and measures of performance (MOP), data collection plans, analysis plans and the modeling and simulation plans for the experiment are developed.[45]

The experiment is then conducted. Data is generated, collected, and prepared for assessment. During the assessment, the data collected during the experiment is analyzed according to the analysis plan. An initial after action report is generated to report the values determined for the MOP/MOE and provide a quick look at the findings and conclusions. The final report is based on more extensive analysis of the data and provides the final conclusions and recommendations.[46]

The final phase is integration. The purpose of the integration phase is to look at the results of all the experiments pertaining to a given concept, as well and information available from other experiments or analytical efforts, and draw conclusions about the utility and value-added or the concept. These conclusions become recommendations for changes to DOTMLP required to implement the concept.[47]

Analysis Supporting Joint Experimentation

In this author's opinion, it is difficult to describe the division between experimentation and analysis. When conducting an experiment and when conducting an analytical study, one goes through similar steps. For the purposes of this section, the discussion of analysis encompasses the total experimentation process.

USACOM has established a joint experimentation function and is in the process of developing the implementation plan and assembling the resources. They have not conducted a joint experiment yet but have developed extensive plans for their conduct.

A proposed example of the experimentation/analysis process is battlespace awareness. The Joint Staff has identified battlespace awareness as one of the 21st Century Challenges. USACOM, in coordination with teams from the Joint Staff, CINCS, and Services, has developed a postulate to consider what works

best to support a Joint Task Force (JTF) commander in the area of battlespace awareness.[48] For battlespace awareness, the postulate states:

"**IF** we can provide the Joint Force Commander with Battlespace awareness (defined as):

- Disposition of Intent of Hostile Forces
- Total asset awareness of Friendly Forces
- Visibility of Weather Considerations
- Decision Support Systems to support processing and understanding information;

Then we can provide the Battle Commander the Battlespace Awareness to:

- Improve the art, science and speed of decision making
- Better protect our own forces
- Better support decisive operations
- Synchronize lethal and non-lethal effects
- Maneuver to strategic and operational centers of gravity rapidly and simultaneously to achieve desired effects."[49]

Battlespace awareness was then divided into 14 related desired operational concepts (DOCs) such as counter-intelligence, human intelligence, collection management, visualization, weather, and terrain. Each of these areas is then addressed in assessment events. These assessment events are integrated joint command and control and battlespace

awareness experiments.[50] USACOM will take advantage of individual service assessment events and their own sponsored events to address the DOCs and the Joint Staff J-2 has the responsibility for coordinating the integration of the results. The notional timeline for USACOM sponsored events that will address battlespace awareness and other planned explorations calls for a Joint-Information Superiority Experiment, a JTF Headquarters Experiment, an experiment to address QDR issues, a JTF Headquarters Command Post Exercise, and many others.[51]

QUADRENNIAL DEFENSE REVIEW

The 1997 QDR was a comprehensive examination of our country's defense needs from 1997 to 2015 by the Joint Staff and OSD. It looked at potential threats, strategy, force structure, readiness, posture, military modernization programs, and defense infrastructure. The QDR was intended to provide a blueprint for a strategy-based, balanced, and affordable defense program.[52] The QDR is a required recurring comprehensive review of the capabilities of all the services.

The QDR was structured into three organizational levels. At Level 1, seven panels conducted reviews of strategy, force structure, readiness, modernization, infrastructure, human resources, and information operations and intelligence. At Level 2, an Integration Group organized the panel results into a

coherent set of integrated options consistent with the defense strategy. At Level 3, a Senior Steering Group, co-chaired by the Deputy Secretary of Defense and the Vice Chairman of the JCS, provided oversight of the entire process and made recommendations to the Secretary of Defense. The Secretary of Defense reviewed the recommendations in consultation with the Chairman and other members of the JCS. The process consisted of five phases: start-up and guidance, strategy and fiscal context, analysis, integration, and decision. Work in each phase built directly upon the work of the previous phases.[53]

Analysis supporting the QDR

Many different analyses were done to support the QDR. For example, in the force assessment area, an Overseas Presence Analysis was conducted to look at the overseas presence objectives and posture in all regions, including the mix of permanently stationed forces, rotational forces, temporary forces, and prepositioned equipment. This analysis formed the basis for the development of the options considered for the appropriate levels of presence in key regions.[54] Another example was the Major Theater of War Analysis. This analysis examined the sufficiency of our forces to fight and win, in concert with regional allies, two overlapping major theaters of wars in Southwest Asia and on the Korean peninsula in 2006. This analysis varied key conditions such as the enemy use of chemical

and biological weapons, warning time, U.S. force size, and the degree to which U.S. forces were engaged in peacetime operations at the outbreak of the first major theater of war.[55]

The Deep Attack Weapons Mix Study (DAWMS) was a major study supporting the QDR process. The purpose was to identify the most cost-effective mix of joint deep attack systems and it looked at three times frames, 1998, 2006, and 2014.[56] DAWMS looked at the ammunition constraints that adversely impact combat tempo and sustainment of early deploying forces in order to understand the most effective use of early arriving combat assets. As part of the conduct of DAWMS, the study team developed a methodology for modeling ammunition flow to and within a theater of war. The methodology was then used to determine what munitions constraints, if any, exist early-on in any theater of operations where warning time and build-up may be minimal.[57]

The analysis conducted by the DAWMS study team informed the QDR decision makers that the current munitions programs, with modest adjustments, will provide the capability to defeat potential aggressors in the years ahead. They determined that the next generation of munitions will give our forces superior precision engagement capability against projected threats. Additionally, they determined that the fielding of unitary and cluster bombs that can be delivered accurately from altitudes

above the effective range of enemy anti-aircraft artillery and manportable surface-to-air missiles, stand-off weapons that avoid dense concentrations of air defenses, and highly effective precision munitions will increase the survivability and lethality of our forces in future conflicts called for in *Joint Vision 2010.*[58]

TYPICAL PROBLEMS ASSOCIATED WITH JOINT ANALYSES FROM THE ARMY PERSPECTIVE

Before discussing perceived problems with joint analysis, it is necessary to describe the four generally accepted descriptions of levels of joint analysis. The first level and the least "joint" analysis is a service study in a joint context. This is a single service examination of joint mission or service issues in a credible joint environment. The second level is a multi-service study. This study is usually chartered by mutual agreement with a single service lead to address common interests. The third level is a study with joint service participation. This type of study is usually chartered by OSD and consists of multiple work groups and committees. The fourth level and currently most "joint" is a Joint Staff sponsored study with Joint Staff oversight of the joint study team.[59] The analysis done to support the new joint experimentation process may soon be defined as the next and new "most" joint type of

analysis. It will be more joint than the fourth level described because the joint study team will have a permanent joint analysis organization to support the conduct of the study.

Training and Doctrine (TRADOC) Analysis Center (TRAC), a major Army analytical organization has identified three primary problems associated with joint analyses. The three problem areas are organization, data, and process.[60]

The organizational problem is caused by the nature of the joint study team. First, each team has to report back to its decision-maker during the conduct of the study. This results in too many perceived customers who layer the decision gates. Second, the effort itself, because of the multiple areas of interest from each service, may become too "robust". It then becomes difficult to coordinate the efforts of the entire study. Third, fragmented teams work in a pipeline mentality rather than viewing the end state goals.[61]

An example of an organizational problem illustrates the concern of the nature of the joint study team. In the Theater Missile Defense (TMD) Cost and Operational Effectiveness Analysis, there were 13 sub-working groups answering related issues but they were missing a strong focal point for coordinating results in a cohesive product. They were working in a pipeline mentality and not taking advantage of the integration possibilities to further the end state.

Additionally, the lack of a decision-maker in the working groups delayed the progress until the respective services could obtain issue resolution. This layered the decision gates and delayed the process.[62]

The data problem reflects the differences in the joint team. The services use different data terminology. Additionally, there is no central data manager to ensure consistency of data provided by the services.[63] For example, in the TMD COEA lack of a central data manager prevented standardized calculations for certain key parameters such as probability of kill and probability of acquisition. Also the multiple avenues of submitting data for input into the models allowed all services to submit unvalidated data to the analytical sub-groups.[64]

The process problem is that centralized direction by the joint study team leader is lost in the decentralized execution. The process problem reflects the same issues as the organizational problem. The numerous reporting channels by the service members of the joint study team impacts on the results moving forward for presentation. There are lengthy coordination and communication requirements in the joint study process.[65] In the TMD COEA, the centralized coordinator was unable to pull the separate analysis efforts into a single cohesive product. Also the model versions determined by the central coordinator changed

often without proper dissemination of the current version to all services.[66]

There are several additional sub-areas of concern. In the analytical area, fragmented answers to issues provide partial pictures to solutions. Fragmented answers are the results of the analysis being parceled out to service team members. In the area of models and simulations, concerns arise because data in different models give different results, the service team members do not always understand the limitations and advantages of the models, and the model run matrix is not always geared to what is necessary versus what is desired. And finally, there is always a concern of political agendas, and "turf" and resource protection issues. Analytical results may be biased in the direction of the politically right answer.[67]

TRAC not only identified the typical problem areas above but also provided some lessons learned from their experiences in joint analysis. First, they recommended that the Flag Officer of each service participating on a joint study team sign a fully coordinated "Terms of Reference" document. This lends credibility to the requirements set forth in the agreement and lays the ground rules for everyone's role and participation. The terms of reference document would document and standardize the data inputs; methodologies for determining MOEs; performance characteristics; and tactics, techniques, and procedures.

Second, the centralized coordinator needs to expose the services to the model and data needs as early in the study as possible to facilitate standardization. Third, the study team must identify a central data manager for data consistency. The study team will benefit by shared terminology and standardized data calculations for key parameters.[68]

SUMMARY

My purpose in writing this paper was to show that planning and preparing for a capable and successful joint force is very complex. I have used the framework of describing selected joint processes and then used the analytical support of those processes to show the multiple aspects that decision makers must consider when making decisions for the future joint force. Furthermore, I then wanted to show that even though there are defined processes with analytical underpinnings, it is still not easy to address joint issues. Joint analysis is conducted on many levels with varying degrees of participation from the services.

The Army has been committed to supporting the joint processes in the past and is committed to improving its analytical products in support of those processes.

The Army is currently conducting workshops with the purpose of reviewing the way it conducts Army and joint AOA. The Army

understands that modernization studies (AOA) are high priority and high impact efforts and perceived weaknesses in AOA will undermine support for modernization programs and the entire requirements generation process.[69] The Army supports the JWCA and QDR processes when appropriate. And, the Army is a strong supporter of the joint experimentation process. The joint DOTMLP process is patterned around the Army's doctrine, training, leadership, organization, and soldier support (DTLOMS) framework. Army led the way in developing the experimentation construct and has already successfully conducted many experiments.

Finally, the Army wants to be an integral part of the USACOM joint experimentation process. The Army's TRADOC Battle Labs participate in meetings with USACOM and the other service battle labs to find ways to contribute to the process. TRAC is establishing an analytical support cell that will have duty station at USACOM on a permanent basis. TRAC is investing its own scare resources to organize and coordinate the effort of Army-wide reviews to ensure Army capabilities, doctrine, data on Army systems, and tactics, techniques, and procedures for joint experimentation are right.

In conclusion, I remind the reader of the quotes with which this paper began and reiterate that planning and preparing the joint force is hard but important work.

Our military must be ready to fight as a coherent joint force — fully interoperable and seamlessly integrated.

A fully joint force requires joint operational concepts, doctrine, tactics, techniques, and procedures — as well as institutional, organizational, intellectual, and system interoperability — so that all US forces and systems operate coherently at the strategic, operational, or tactical levels.

Word Count - 5,756

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