U.S. Naval War College Global 2014

Game Report

Navy Global War Game Series

Game Director: Professor Don Marrin
Lead Analyst: Professor Walter Berbrick

February 2015

February 2015

Based on the findings of the Global 2013 Project, the War Gaming Department, at the request of the Air-Sea Battle Office and Chief of Naval Operations, undertook a year-long effort to examine four emerging command and control attributes designed to improve our ability to execute cross-domain operations in future high-intensity anti-access, area-denial environments. This report was prepared by the War Gaming Department faculty and documents the findings of these efforts.

The War Gaming Department conducts high quality research, analysis, gaming, and education to support the Naval War College mission of preparing future maritime leaders and helping to shape key decisions on the future of the Navy. It strives to provide interested parties with intellectually honest analysis of complex problems using a wide range of research tools and analytical methodologies.

The War Gaming Department is located within the Center for Naval Warfare Studies at the U.S. Naval War College in Newport, Rhode Island. It was first established in 1887 by Lieutenant William McCarty-Little. The views expressed in this work are those of the War Gaming Department and do not represent the policy or position of the Department of the Navy, Department of the Defense, or the U.S. government. This work was cleared for public release; distribution is unlimited. Please direct any inquiries or comments on the substantive content of this document to the project director, Professor Don Marrin, at 401-841-2246 or don.marrin@usnwc.edu.

David A. Della Volpe
Chairman
War Gaming Department
U.S. Naval War College

INTENTIONALLY BLANK

Table of Contents

List of Figures

I. Introduction

OVERVIEW

At the direction of the Air Sea Battle (ASB) Office, and with the concurrence of the Chief of Naval Operations, Global '14 continued to focus on the Air-Sea Battle (ASB) Concept. While Global '12 looked at the war fighting implications associated with concept implementation, Global '13 and Global '14 examined the command and control (C2) of cross-domain operations (XDO) in future Anti-Access/Area-Denial (A2/AD) environments.[1] After evaluating the three possible C2 structures developed in Global '13 – a functional component commander based model, a "Domain Commander" based model, and a "Cross-Domain Commander" based model – a fourth "hybridized" system was proposed using the current functional component C2 structure incorporating specific features identified during Global '13. This hybrid C2 system was examined and refined during the February 2014 Global '14 C2 Workshop, resulting in the following 4 C2 attributes:

- A Combined Joint Force Information Component Commander (CJFICC)
- A Combined Joint Force Sustainment Component Commander (CJFSCC)
- Cross-Domain Operations Coordination Elements (XDOCEs)
- Combined Joint Task Units (CJTUs)

The results of the workshop were provided to a Joint Writing Team, which produced a draft Joint XDO C2 Concept of Operations (CONOPS). The Global '14 War Game examined the implications for C2 authorities and processes as a result of integrating the four new C2 attributes with today's C2 structure. The results of this effort were designed to inform the refinement of the draft CONOPS.

STATEMENT OF THE SPONSOR'S PROBLEM

Current service or component-centric C2 structures at the operational level of war may be inadequate to effectively execute XDO as envisioned by the ASB concept. While the ASB concept outlines the need to command and control cross-domain operations which are joint, networked, and integrated, no organizational structure is proposed; only the requirement that any suitable structure must be capable of tight, real-time coordination.

---

[1] The Global '12 Project Report is classified SECRET//NOFORN. Organizations desiring to obtain a copy should contact the game director (Prof Don Marrin) via SIPRNET e-mail at don.marrin@nwc.navy.smil.mil.
The Global '13 Project Report is UNCLAS and can be obtained from the U.S. Naval War College Internet web site at https://www.usnwc.edu/getattachment/Research---Gaming/War-Gaming/Documents/Publications/Game-Reports/Global-13-Game-Report.pdf.aspx.

The ability to conduct XDO in a communications degraded or denied environment requires commanders to exercise authority and direction over assigned and attached forces in real time while critical information, systems and services are reduced or prevented. To attain the level of speed and coordination required to outpace the adversary, a commander must be able to direct and control actions in the air, sea, land, space and cyberspace without having to work through parallel chains of command. Joint and allied consensus at Global '13 was that an evolutionary (not revolutionary) approach will be the most effective in addressing the challenge of C2 in an A2/AD environment. The assumption is that XDO will be enhanced by the four C2 attributes contained in the draft XDO C2 CONOPS.

First, the current Joint Task Force (JTF) structure is focused on coordination and unity of command at the operational level of war. Tactical unity of effort between forces relies predominately on tactical control (TACON) or short-term support arrangements between forces. Commanders detecting and reacting to changes at the tactical level must submit requests up through their service/functional channels when changes must be made which fall outside the narrow authorities they have been provided via TACON or support relationships. While this process has been streamlined by technology and decades of experience, it is heavily reliant upon assured communications. In a degraded or denied communications environment, commanders at the tactical level will need to coordinate XDO in order to seize and maintain the initiative while maintaining unity of command and effort. The integration of air, land and maritime C2 organizations requires - at a minimum - common procedures, interoperable communication systems, and shared education, training and experience. Two of the proposed C2 attributes address this issue: the XDOCE and the CJTU.

Second, the air, land and maritime environments have functional component commands established by the JTF Commander and a link to the Joint Force Component Command for Space. The increased importance of the space and cyber domain, and the growth of forces that can operate in those domains, require a functional commander to execute operations on par with the traditional Land Component Commander (LCC), Air Component Commander (ACC), and Maritime Component Commander (MCC) and to push control of those operations from the JTF staff or higher headquarters down to the tactical warfighting level. In order to draw all the information resources from across the domains and employ them as envisioned in the Joint Electromagnetic Spectrum Operations Concept and the Navy's concept of Electromagnetic Maneuver Warfare, the idea of an Information Component Commander (ICC) has been proposed.

Third, the logistically intensive nature of projecting force against advanced adversary A2/AD capabilities requires the ability to sustain distributed and dissimilar forces operating in multiple contested locations throughout the joint operating area (JOA). This problem is compounded further when decision-making must occur in a time-constrained environment. Various factors complicate the JTF Commander's integration effort, such as competing demands for high-priority capabilities (e.g., intra-theater lift, air ports of debarkation (APODs)/sea ports of debarkation (SPODs), etc.) and the fact that joint force components have different function-oriented approaches, procedures, and perspectives. As a result, a Sustainment Component Commander (SCC) is envisioned to provide unity of effort for operational sustainment within the JOA in a contested communications environment.

STUDY PURPOSE AND OBJECTIVES

The purpose of the Global ’14 Project is to inform the development and refinement of a Joint XDO C2 CONOPS that describes how to command joint forces while executing cross-domain operations in future high-intensity A2/AD environments.

Game objectives were used to drive game design and play. The two primary objectives for Global ’14 were as follows:

- Identify any strengths and weaknesses of the four new C2 attributes (SCC, ICC, XDOCE, CJTU) using established criteria against a near-peer competitor in a high intensity A2/AD environment; and
- Identify improvements to the draft CONOPS and new Mission Essential Tasks (METs).

INTENTIONALLY BLANK

II. Research Methodology and Game Design

RESEARCH QUESTIONS

Based on the sponsor's interest in exploring XDO C2, and after extensive review of related literature, the following research questions were developed for this game:

1. Based on the six C2 criteria employed in this game, how, if at all, does the integration of the four new C2 attributes (SCC, ICC, XDOCE, and CJTU) strengthen or weaken the ability to C2 combined forces conducting XDO in a high-intensity A2/AD environment?
2. What new authorities, processes, responsibilities, and mission essential tasks are required of the four new C2 attributes in order to plan, direct, monitor, and assess XDO in a high-intensity A2/AD environment?
3. In what ways does the integration of the four new C2 attributes impact current command and control authorities, processes, and responsibilities at the task force (Tier 2), component (Tier 3), and the task unit (Tier 4) levels of command?

DEFINITION OF KEY TERMS

The four terms defined below provided the foundation for the research methodology and game design employed in this game:

> ***Anti-Access*** (A2): Those actions and capabilities, usually long-range, designed to prevent an opposing force from entering an operational area.
>
> ***Area-Denial*** (AD): Those actions and capabilities, usually shorter-range, designed not to keep an opposing force out, but to limit its freedom of action within the operational area.
>
> ***Cross-Domain Operations*** (XDO): The use of capabilities in one or multiple domains to reduce risk and gain or maintain access in another domain.
>
> ***Command and Control*** (C2): The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission.

Player review of the four attributes was guided by a common set of criteria which were derived from the Joint Operational Access Concept (JOAC) and Milan Vego's *Joint Operational Warfare Theory and Practice*, and subsequently refined and applied during the Global '13 Project. The resulting criteria consisted of the following:

Unity of Effort: The C2 construct ensures that all execution decisions and apportionment requests remain aligned with the operation's mission and commander's intent. The organizational structure fosters a sense of cohesion and unity of purpose from planning to directing to monitoring to assessing.

Flexibility: The C2 construct is broadly adaptable to a wide range of regions and tasks. The organization can expand or contract with changing circumstances without serious loss of effectiveness. It is able to respond to changes in mission and resources. Information is acquired and passed quickly and reliably to help build the situational awareness of subordinate, superior and adjacent commands. It exercises decentralized execution, delegates specific defined functions, and rapidly deploys forces to meet specific situations.

Simplicity: Chain of command is clear and straightforward. Responsibilities and authorities are clearly delineated with no overlap. Subordinate commands are responsible to no more than one superior at any given time. Processes and procedures are straightforward and foster clear direct communication.

Resiliency: The positive ability of the C2 system or a specific organization to adapt and overcome setbacks and fill important positions quickly and satisfactorily. This robustness is also a function of the number of command layers, degree of centralization vs. decentralization, and reliability of supporting C4ISR systems under degraded, denied or hostile communications environments.

Operational Integration: A C2 system capable of directing and coordinating high tempo, distributed, synchronized operations characterized by the use of mission command-type orders, and decentralized planning and execution at the lowest possible levels across the force, regardless of service, nationality or physical distances, concentrating their efforts seamlessly.

Cross-Domain Synergy: A C2 system capable of leveraging capabilities in different domains such that each enhances the strengths and compensates for the vulnerabilities of the others in order to establish superiority in some combination of domains that will provide the freedom of action required by the mission. A high degree of situational awareness and battle-space sense-making is a necessary enabler.

ANALYTIC METHODOLOGY

As an applied research and evaluation project, the game design for Global '14 focused on generating new knowledge related to the strengths and weaknesses of the four C2 attributes, as well as any changes related to C2 authorities, processes, roles and responsibilities and organizational composition of the these attributes and today's C2 structures. Consistent with Cherry Holmes (1992) and Morgan (2007)[2], this approach is interested in identifying the 'what' and 'how' of potential solutions to real world problems (Patton, 1990), understanding different expert opinions (Creswell, 2009), and using different forms of data collection and analysis to corroborate results (Merriam, 2009).

[2] Notes on Pragmatism and Scientific Realism; Cleo H. Cherryholmes from *Educational Researcher*, Vol. 21, No. 6 (Aug. - Sep., 1992), pp. 13-17; and Morgan, D. L. (2007). Paradigms lost and pragmatism regained. Methodological implications of combining qualitative and quantitative methods. Journal of Mixed Methods Research, 1, 48 – 76.

A qualitative methods design was used to answer the three central research questions. This study used triangulation through two or more different data collection and analysis methods to integrate and confirm findings (Leedy & Ormrod, 2010). This approach commonly employs distinct quantitative and qualitative methods as a means to compensate for the weakness of one method with the strength of another. Much of the strength of this approach comes from being able to draw the same or similar conclusions using different datasets and methods (Creswell, 2009).

Two forms of data analysis were used to describe the qualitative and quantitative data collected in the study. Qualitative data collected from game tool forms and chat, cell out briefs, Web-IQ threaded discussion, ethnographic notes and open-ended survey responses relied on content analysis and grounded theory to discern underlying patterns and themes in the data. Selective, in-vivo and serendipitous coding with ATLAS.ti software was used with these data. Using the co-occurrence function within the software allowed the game analysts to determine the correlation between terms and generate game themes and insights. Descriptive analysis of quantitative data was used to describe the nominal and ordinal measures derived from individual player questionnaires, ground truth data and player product forms. Statistical analyses of these questions were conducted using the Analysis ToolPak functions in Microsoft Excel 2010. Qualitative and quantitative data were analyzed concurrently and then integrated in the interpretation of the overall results.

GAME DESIGN

Global ’14 was a 1 ½-sided, open intelligence C2 game and used an action-reaction format, similar to a game of timed chess, with each side acting and reacting in an alternating, sequential fashion. Whereas Global ’12 focused on the interaction of combat forces, Global ’14 was designed to address COMMAND – the legal authority exercised over attached and assigned forces, and CONTROL – the ability to direct the actions of those forces. The Global ’14 analytic agenda and research objective had nothing to do with the outcome of tactical engagements; rather it concentrated on the process by which the orders that directed tactical engagements were drafted, prioritized, resourced, coordinated, communicated and assessed.

A synthetic region known as “Bartland“ was created specifically to support Global ’14. The region was NOT modeled after any particular real-world geography; rather it contained features conducive to the investigation of A2/AD challenges (e.g., time, space, and force). The region contained five countries – Red, Brown, Green, Gray and Purple – representing a spectrum of military capability and industrial development, and NOT any real-world countries. Australia, Canada, Great Britain, Japan and the US were collectively referred to as the Blue Coalition, or simply Blue. Red was the region’s hostile military peer to Blue; Green was the most industrially advanced and closely supported Blue, while Brown, Gray and Purple reflected varying lesser degrees of development and support.

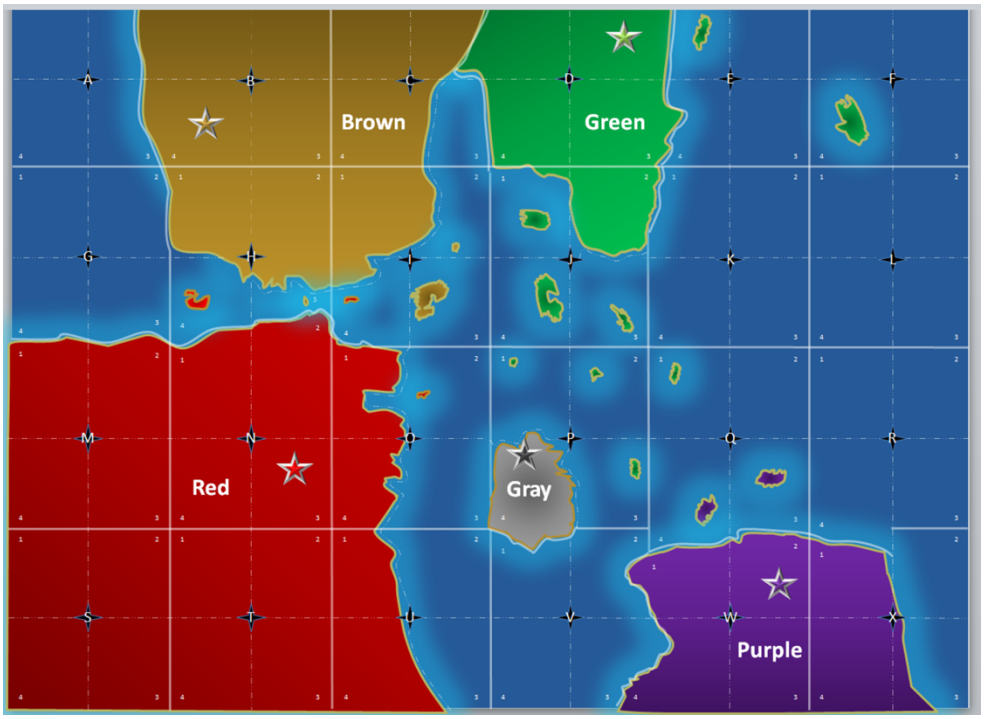

Figure 1: Bartland

Global ’14 had multiple layers of command, from the Tier 2 Task Force Commander to the Tier 3 Component Commanders to the Tier 4 Task Unit Commanders. Task orders, drafted by Tier 3 based on Tier 2 direction, were transmitted to Tier 4 commanders, interpreted and executed. The results of those combat interactions were determined in real time by umpires using a rigid, rules-based adjudication model and witnessed by the task unit commanders, who then sent post-turn reports back up their chain of command. For Tier 2 and 3, Bartland was represented by a computer display showing force disposition (though potentially time-late). For Tier 4, the players were gathered around a large 30' x 36' elevated game map with foam core OOB ‘pucks.’ This game map represented ground truth.

The C2 System for Global ’14 consisted of two “layers.” A Process Layer, consisting of activities and pathways to create turn products, interwoven with a Command Layer, composed of command nodes and the associated authorities and relationships. The specific command nodes and associated processes were determined using the results of Global ’13 and the draft XDO C2 CONOPS. Global ’14 gave players the opportunity to experiment with different levels of command delegation. For the purpose of game play, command authorities were defined as follows:

> ***OPCON***: Under OPCON authority, a commander can direct the movement of assigned or attached forces and assign missions for a period of time at a given place. The commander is responsible for sustaining the unit and may reorganize subordinate forces.
>
> ***TACON***: Under TACON authority, the commander is limited to executing the assigned mission at the assigned time and place with the forces provided.
>
> ***TACON Plus***: Under TACON Plus (TACON+), the commander may change the assigned mission, time and place for assigned or temporarily attached forces, based on the situation and his understanding of commander’s intent.

Cell Structure and Participants

Global ’14 used a multi-cell configuration for the Blue team. Each cell represented a headquarters staff at either the Task Force Commander (Tier 2) level, one of five Component Commanders (Tier 3, or an aggregation of Task Unit Commanders at the Tier 4 level. With the exception of Tier 4-to-Tier 4 commands, cells did not interact face-to-face; instead they relied on a communications and data network which was susceptible to enemy intrusion and interference.

Blue team membership was drawn from across the DoD enterprise. A USN O-8 led the Blue cell which consisted of approximately 60 joint US, British, Canadian, Australian and Japanese players.

The Red team was manned by the War Game Department’s (WGD) Office of Naval Intelligence Detachment (ONI-Det). As Global ’14 was a 1 ½ sided game, the Red team worked in concert with White/Control team, using a combination of free play, pre-scripted events and dynamic injects to ensure game play adequately addressed the various research questions.

The White cell consisted of primarily WGD personnel as assisted by external participants to represent Tier 1 commands as necessary (geographic combatant commander, TRANSCOM, CYBERCOM, STRATCOM and National Command Authority).

See Section III. (Demographics) and Annex A: (Player Manning by Cell) for specific cell membership information.

Game Play

Global ’14 used an action-reaction style of play. Blue and Red submitted their moves in an alternating fashion, with each turn cycle taking approximately four hours to complete. A nominal four-hour turn cycle consisted of the following:

0+00	Integrated Task Order (ITO) submitted from Tier 3 to Tier 4.[3]
0+00 – 1+00	Adjudication of submitted ITO; forces moved by Tier 4 per ITO.
1+00 – 2+00	Adjudicated continued; offensive action from ITO resolved with defensive actions from opponent. Outcomes reported to Tier 3 by Tier 4.
2+00	ITO submitted from opposing side.
2+00 – 3+00	Adjudication of submitted ITO; forces moved by Tier 4 per ITO.
3+00 – 4+00	Adjudication continued; offensive action from ITO resolved with defensive actions from opponent. Outcomes reported to Tier 3 by Tier 4.
4+00	Cycle repeats.

Play did not stop during adjudication. While Tier 4 were carrying out orders and combat outcomes were being determined, Tier 2 and 3 continued to assess previous moves, update target lists, adjust apportionment, allocate and coordinate forces and draft tasking orders for the next turn.

[3] The Integrated Task Order (ITO) was a game product used to communicate a Tier 3 commander’s orders to their Tier 4 CJTU and TU commanders.

In order to bring players unfamiliar with the game mechanics 'up to speed' (also known as 'leveling up'), initial moves were pre-built to allow players to first learn how to use the game tool to submit moves (without having to build the move, in this case Blue Turn 0), then modify and submit an existing move (Blue Turn 1), and finally create and submit their own move (Blue Turn 2 and beyond). Over the course of the week, this resulted in six complete turns.

Blue players were able to recommend changes to authorities or processes to the Blue Cell Lead at any time for possible adjustment of the C2 system in order to improve unity of effort, simplicity, flexibility, resiliency, operational integration, or cross domain synergy.

After each turn, individual cell leads completed an End of Turn survey; after the last turn of each day, all participants completed an End of Day survey. An End of Day Plenary was moderated by WGD personnel and provided a forum for Blue players to discuss topics of interest surfaced through game play, such as authorities, processes, roles and responsibilities, and force distribution.

The Final Plenary provided the TF Cell and each Tier 3 and Tier 4 game cell the opportunity to out-brief their observations regarding the four attributes and their effect on current C2 structures and processes, as well as evaluate and discuss the overall effectiveness of the four attributes with regard to the C2 criteria, assisted by analytic hierarchy process (AHP) software, a pair-wise comparison decision aid.

Game Tool

The Global '14 Game Tool consisted of two parts which essentially acted like a web-based email system with attachments. Move forms were completed and sent to other game cells via a network email system. Which forms a command could create and to whom they could send them was a function of the command's roles, responsibilities and authorities.

The primary means of coordination between command cells was chat. There were various chat rooms available, depending on player role and command assignment. Both email delivery and chat was impacted by network loading and communications degradation. Control was able to modify network speeds as a function of bandwidth, file size, offensive and defensives cyber network actions, jamming and satellite status. This had a direct impact on the players' ability to pass the information required to support game play.

A total of 14 different types of orders and forms were used over the course of play to nominate and prioritize targets, apportion effort, request support, allocate force, task subordinate units, coordinate fires, and report combat results. Additionally there were forms to request and promulgate changes to the C2 system in terms of delegated authorities, senior-subordinate relationships, attached forces, etc.[4]

[4] A listing and explanation of each of the game forms is provided as Annex B.

Adjudication

Turns alternated between Blue and Red, with one team with the initiative/attack and the other reacting/counter-attack. The roles then reversed. Units possessed varying amounts of combat power across seven warfare areas:

- Cyber Operations
- Counter-Space Operations
- Anti-Air Warfare
- Ballistic Missile Defense
- Naval Surface Warfare
- Undersea Warfare
- Strike Warfare (Included all combat against ground based targets)

Combat was primarily limited to units occupying the same map-square; certain long range weapons could be employed beyond the square occupied by the shooter, though required over-the-horizon targeting support. Simplified C2 networks and "kill chains" were developed, particularly for Red A2/AD weapons, allowing Blue to exercise disrupt-destroy-defeat options. Outcomes were ultimately determined by WGD umpires using a probability based aggregated fires model based on a set of pre-determined rules, and directly observed by the Tier 4 players.

Along with traditional kinetic warfare, both sides were able to conduct cyber operations - exploitation, offensive and defensive - as well as space operations involving targeting and communication satellites which were susceptible to various counter-space attacks.

Sustainment play tracked fuel, ammunition and supply status of each unit via a forces database and map displays. Supplies were stored in depots in numerous locations and moved via air and seaborne lift as well as ground transport. Engineering units were able to establish expeditionary airfields and forward arming and refueling points and repair damaged airfields and ports.

LIMITATIONS OF GAME DESIGN AND ANALYSIS

A major challenge for the War Gaming Department concerns development of a game that provides the robust insights into an issue or problem sought by the game's sponsor. Accordingly, managing stakeholder expectations about what the final game report will tell them with respect to broad-based implications is essential. Stakeholders often seek findings that will provide them with predictive conclusions for decision-making purposes. Gaming is predominately a descriptive process, not an experiment. Even if a game is repeated, it lacks sufficient controls to ensure validity. Sponsors should not attempt to draw inferences beyond what the specific players did in Global '14 in terms of generalizability (the ability to apply the findings observed for a small population to the broader world around us).

Global '14 play did not execute exactly as designed. During the game's development phase, the adjudication rules supporting Tier 4 play grew in complexity, and the game became very Tier 4 focused despite the higher interest in Tier 2 and 3 decisions. Consequently, many of the short-comings in execution tend to be related to Tier 4 and the CJTU attribute.

Design Limitations

CJTUs were not purpose built by the players at game start. To support the commencement of game play, the Control team provided the initial CJTU assignments and composition, ensuring that all of the Tier 3 component commands had at least 1 CJTU under their command. Unfortunately, this appeared to frustrate the players, since they didn't understand the rationale behind why particular CJTUs had been formed. That said, they tended to use them without significant modification from what was initially provided by the Control team, even though they had the capability to alter the composition of their assigned CJTUs and TUs.

Having all of the Tier 4 players together in one room provided them with perfect theater-wide situational awareness. This was a result of the one common game map, which was originally developed to accelerate adjudication and feedback for the Tier 3 players. As a result, Tier 3 was quick to delegate authority to Tier 4, due to their superior situational awareness (in terms of force disposition) and ability to coordinate face-to-face with their Tier 4 colleagues. Having each Tier 4 in a separate cell with only awareness of their local area was considered during design, but was rejected as it would likely have significantly slowed the tactical play and adjudication.

There were not enough Tier 4 players to effectively move all the OOB pieces. A single Tier 4 player could have control of traditional task units, as well as CJTUs with varying levels of delegated control (OPCON, TACON or TACON+). Despite color coding to distinguish differing levels of command authorities, it was difficult to enforce use limitations based on authority. Hence all Tier 4 players essentially exercised TACON+ over their forces, whether or not that was the actual delegated authority, making analytic evaluation of differences in authority difficult.

As time grew tight and communications degraded, move forms became increasingly incomplete. While less specific 'mission type orders' were anticipated under these circumstances, players began taking shortcuts and omitting data from reports, particularly at the Tier 4 level (reference Tier 4 manning comment above). As a result, data streams connected to the relationships between XDOCE, ICC, SCC and CJTU decisions were significantly diminished.

Analysis Limitations

It should be noted that both the quantitative and qualitative datasets analyzed in this game report lack generalizability due to the small sample sizes of participants—none of whom were randomly selected from a population known to be normally distributed. However, through triangulation and meta-analysis, researchers enhanced the reliability and validity of findings that should prove valuable to inform both the sponsor and players about XDO C2.

This game was designed to be highly inductive in order to garner broad-based insights relative to the research questions. Inductive games leverage qualitative data to identify themes based on player decisions during game play. The qualitative nature of data can result in subjective findings. To control for the subjectivity and complexity of the research area, a number of design and analysis measures were employed. The participants in this game represented an accessible and purposeful sample to provide information-rich data. In this report, the findings are limited to

the analysis of Global ’14 game data, supplemented by the collective wisdom of the Global Project Team, based on their 3 years examining the ASB concept.

Two threats to internal validity concern the quality of the data collected and the accuracy of the analytical techniques used to review these data. To ensure quality data collection, the post-game analysis team relied on player-created products, such as game tool products, individual survey responses, and final cell out-briefs. Insights extracted from these data sources were subsequently cross-checked, or triangulated, with other data sets including ethnographer notes to ensure accuracy and conclusiveness. The accuracy of the analytical techniques was enhanced by using multiple methods, tools, and researchers to review the same data. Methods included content analysis, grounded theory, and descriptive statistics. Multiple research teams reviewed the same data sets using different approaches. Themes and insights derived from multiple researchers and approaches reflect more validity than a single researcher using a single approach.

To explore the degree of external validity, one must consider whether the data collected can be generalized across the population of subjects. The demographics of the participants provide some measure to assess this attribute. The game was designed to stimulate critical thinking and analysis and sought players from different warfare areas, services and nations. Although the game had a diverse group of participants, it proves to be cost-prohibitive and too complex to have every perspective represented from all stakeholders across the joint community. Therefore, some gaps in perspectives can be assumed for any game, including Global ’14.

INTENTIONALLY BLANK

III. Demographics

U.S. and international participants were sought based on their warfare experience and service affiliation. The subsequent demographic statistics were compiled from self-reported responses garnered from the online registration site and the individual player questionnaire administered at the beginning of the game. The 75 players who contributed demographic data consisted primarily of mid to senior-level military and civilian officials from the United States (56 players), Australia (6 players), United Kingdom (6 players), Japan (4 players), and Canada (3 players). International players were primarily distributed throughout the Tier 3 cells to ensure coalition perspectives were represented during cell deliberations. Each branch of service and functional area of expertise was adequately represented during the game; Navy (34), Air Force (21), Army (13), and Marine Corps (7). 37 players held the rank of O-5/GS-14, 17 held the rank of O-6/GS-15, 16 held the rank of O-4/GS-13, 3 held the rank of O-3/GS-12, 1 held the rank of O-7, and 1 player held the rank of O-8. Figures 2 and 3 depict the number of participants by branch of service and warfare specialty across player game cells.

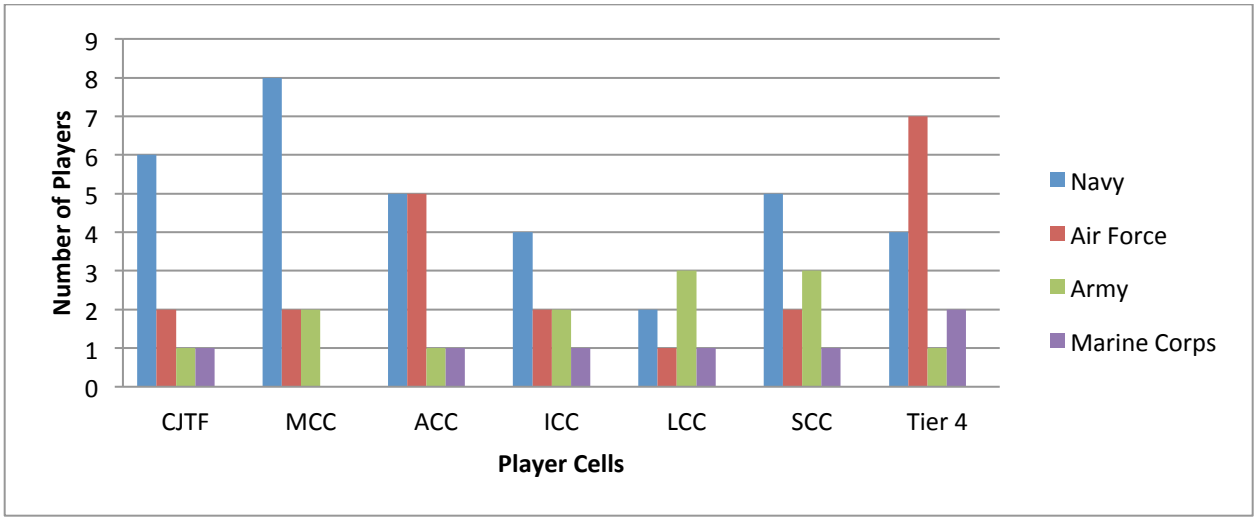

Figure 2: Branch of Service by Player Cell

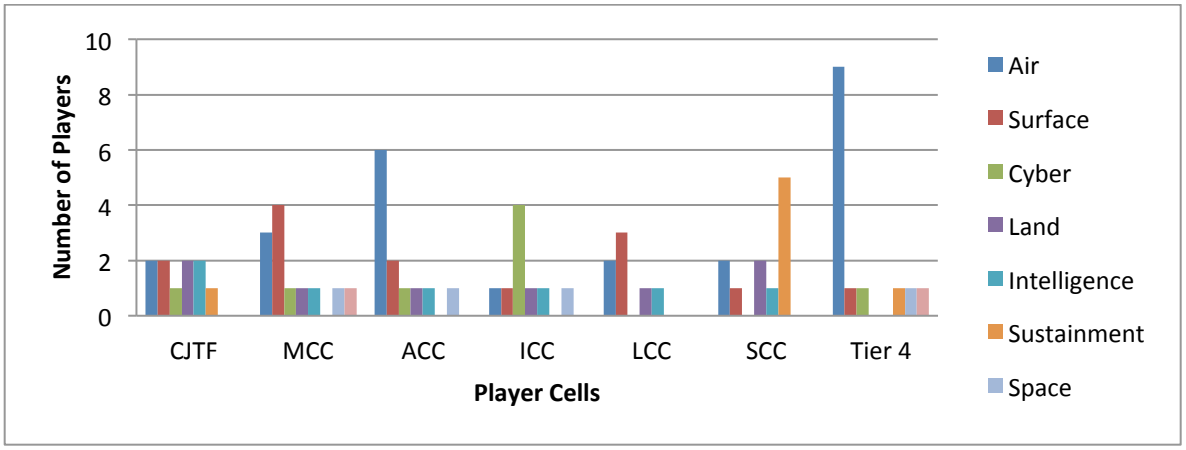

Figure 3: Warfare Specialty by Player Cell

IV. Findings and Recommendations

This section of the report addresses implications to the draft *Joint XDO C2 CONOPS* related to each of the four C2 attributes, and provides corresponding findings and recommendations. Player derived themes and phrases from game data (e.g., Web IQ Threaded Discussion, Final Cell Presentations, chat, products and forms, and ethnographic notes) were coded and analyzed to identify concepts relevant to informing the game's objectives. The analytic team used grounded theory and content analysis to identify patterns across data streams in order make general statements related to strengths and weaknesses, organizational composition, roles and responsibilities, authorities and processes, and mission essential tasks for each of the four C2 attributes. In this way, emergent themes were grounded both empirically (in the data) and conceptually to the wider analytic context of the CONOPS.

COMBINED JOINT FORCE INFORMATION COMPONENT COMMANDER (CJFICC)

Strengths And Weaknesses

> *"The main benefit for the CJFICC is putting many of those things that exist behind 'black doors' under a person that has the clearances and understanding to pull them together."*
>
> – Global '14 Player comment

Enhancing Unity of Effort and Operational Integration

Finding 1.1: Players at the Tier 2 and 3 levels generally viewed the CJFICC concept as enhancing unity of effort and operational integration by integrating and synchronizing cybernetic, electronic warfare, space and information operations (though information operations outside of cyber and EW were not examined as a limitation of game design).

Discussion: As the complexity and ability of cyber, space, EW and information operations to significantly impact the battle grows, the players indicated that there needs to be a specific commander who is responsible to provide that type of support to the traditional component commanders, and that the CJFICC is one potential way to address that need. Players stated that the operational-level view of peer component commander operations enabled the CJFICC to arrange and sequence support in alignment with CJTF objectives, and the broader view of the Information Environment "enabled integrated support to multiple domains towards common objectives."

> *"The CJFICC definitely enhances synchronization of limited cyber assets to support the warfighter ...timing and massing of forces against a very competent adversary. Clearly brings to bear cyber assets both within and outside the JOA"*
>
> – Global '14 Player comment

By design, the CJFICC concept integrates cyber, space and EW effects. Many players saw the synchronization value between CJFICC and other components to coordinate actions to optimize cyber, space and EW effects and improve utilization of low density/high demand capabilities.[5]

However, some players debated the degree to which the CJFICC contributed to operational integration, countering that the CJFICC added an additional unnecessary layer of complexity, since US Cyber Command (CYBERCOM) already provides support to the joint force. Furthermore, if CYBERCOM was to create a component commander, it could potentially resemble an upside-down pyramid, consisting of a large staff in charge of a relatively few number of actual forces. Some participants also stated that effects integration was ineffective during the game, with one player stating that "effects continued to be misaligned [between the components] throughout game play" and that this could have been alleviated if the CJFICC functions were devolved back to the other components.

Players concluded that national constraints and restraints for integrating multinational cyber forces into the CJFICC warrant further investigation. They highlighted the need to better understand the implications associated with providing TACON plus to allied forces operating in CJTU constructs. To address these issues, players concluded that integrating allies early in the planning process to plan offensive and defensive cyber operations is critically important to executing cross-domain operations. Moreover, players concluded that the CJFICC should expand bi-lateral and multilateral information sharing related to cyber plans, capabilities, and effects with allies and partners prior to conflict, as well as build the relationships and processes to protect partner communication networks.

Recommendation 1.1: Not applicable (No CONOPS modifications are required).

Cross-Domain Synergy through Shared Expertise and Understanding

Finding 1.2: Similar to the argument for operational integration, the CJFICC was seen as inherently cross-domain due to its domains of responsibility (cyber-domain, space domain), but confusion exists to what exactly is meant by 'cross-domain operations.'

Discussion: Though players generally thought that the CJFICC contributed significantly to cross- domain operations, they appeared to struggle to grasp what was and was not 'cross-domain,' even though definitions and examples as it pertained to the game were provided. Some favorable cross- domain comments were actually more applicable to joint - vice cross-domain - operations. Other players equated intel gain-loss deconfliction or synchronization as equivalent to cross-domain operations. Still others offered that an "information domain" was more appropriate than a cyber domain. One player provided an interesting take on the difficulty of cross-domain operations and why it may currently be the case, stating "...the game cannot drive us to cross-domain solutions because perhaps we do not have the toolsets yet to genuinely think that way."

[5] As mentioned earlier, not all aspects of Information Operations were exercised and therefore not integrated; for example, there was no deception plan, since the open information nature of game play made such activities irrelevant.

To fully leverage a cross-domain approach amongst the component commanders, better insight into CJFICC capabilities is required. Players, mostly at the Tier 4 level, suggested that they did not have visibility into either CJFICC capabilities or effects, and that coordination via the XDOCE was weak. Players concluded that the CJFICC must balance between the offensive and defensive requirements between component commanders to gain the requisite operational effects across the joint force. Players viewed cyber as a key enabler to generating effects in other domains and emphasized the need to better understand the CJFICC's campaign plan and how the effects of each component commander are integrated and synchronized across multiple missions and lines of operation. To effectively employ joint and combined cyber capabilities in cross-domain operations, players concluded that joint planning staffs at the operational and tactical levels need to better understand how operations in a given domain influences cyber operations, how cyber capabilities can achieve kinetic and non-kinetic effects in other domains, and secondary and tertiary effects that impact future operations. In any case, the XDOCE role was deemed as critical to enabling CJFICC contribution to cross domain operations, both from a having CJFICC community expertise embedded in other component commands, as well as traditional warfare expertise embedded in the CJFICC.

Recommendation 1.2: The CONOP should include an illustrative example of cross-domain operations in order to help readers gain a better appreciation for what is meant by cross-domain operations.

Authorities And Processes

Delegating Authorities under the CJFICC Construct

Finding 1.3: USSTRATCOM may be more inclined to delegate space and cyber authorities to a CJFICC as the single commander with a similar mission set.

Discussion: Some players saw an increased likelihood that authorities would be delegated under a CJFICC construct, as space and cyber authorities are already under USSTRATCOM, which would be more inclined to delegate to a single commander with a similar mission set.

Insomuch as the players saw value in the CJFICC, many had severe reservations about the CJFICC's actual ability to exercise command or be given authorities over many of the strategic assets it wielded in the game. The following player comment best summarizes this assertion.

> *There is potential to develop this concept. However, in order to make it a reality, the [Department of Defense] and interagency will have to come to a consensus on authorities and responsibilities. Today, cyber and space fall under USSTRATCOM per the Unified Command Plan. There is still debate about making USCYBERCOM a functional combatant command ... There is merit to having a non-air component within the JTF focused on providing AOR-specific effects... but theatre space and cyber effects must be weighed against global impacts. This consideration requires close coordination with national agencies and HHQ [higher headquarters] along with significant delegation of authorities to the JTF level which are today held by [the president] and [secretary of defense].*

Several players identified the potential for undesired impacts outside the JOA as making the delegation of authorities difficult at best without some proven means of control. As one player noted: "The challenge of authorities is central. Because of the potential strategic [second and third] order effects getting authorities will be difficult even at the CJTF level." Other players countered that while authority delegation will always be a challenge, "We can't just accept that permissions and authorities are hard to get at the operational level. We need to change that now." Additional players noted that "... not all authorities will be delegated in our lifetimes. But cyber, EW, and information ops authorities already exist at component levels. The CJFICC idea is to put them under a single commander in theater ...to which both signals and cyber authorities can be delegated ...nothing about limitations on authorities undermines this idea."

The CJFICC will need these permissions *prior to* conflict, as getting the authorities *during* a conflict will be time consuming. The following player comment highlights this finding:

> *"Time to bring the comprehensive, centrally managed capabilities that CJFICC represent [in order to] gain more timely/rightly focused authorities from Tier 0 and manage the authorities from a JFC perspective and apply CJFICC resources efficiently horizontally and vertically throughout the JFC's organization."*

The CONOP currently states that "Unless cyberspace effects are pre-planned and pre-approved, authorization may be too cumbersome to be realistically available for tactical employment. Coordinating through operational and strategic level commands adds communication layers and time. A communication contested environment will make already cumbersome coordination highly impracticable for dynamic warfighting situations."

The CONOP further states that "The CJFICC is given the authority necessary to accomplish the missions and tasks assigned by the JFC," which seemingly over-simplifies a significant challenge to the practicality of the CJFICC concept, even though the CONOP goes to great length to delineate many of the authorities which currently govern cyber, space and EW operations.

Recommendation 1.3: The CONOP should clearly define the authorities needed by the CJFICC to operate as envisioned, as well as appropriate control measures to minimize the effects of undesired impacts outside the JOA (the specifics of this recommendation are beyond the classification and scope of this report). USCYBERCOM's "Emerging Joint Concept for Cyberspace" may provide additional insights for CONOP inclusion.

Controlling Information and Electronic Warfare Assets

Finding 1.4: Whether OPCON, TACON or 'TACON-plus, players identified the need to better define how cyber, information and electronic warfare assets will be controlled, by whom and under what command authority.

Discussion: Players questioned the right level of authority delegation across the tiers, from USSTRATCOM (Tier O) down to the task units (Tier IV). Who decides? In general, players tended to favor as much delegation as possible as low as possible. While some players asserted that the CJFICC functions should reside at Tier II, others countered that it is critical to have

CJFICC integration at the Tier III level in order to operationalize these capabilities, realizing that this will require work to resolve authority and process issues that currently exist.

By having the CJFICC as a Tier III commander, CJFICC members saw themselves as an "equal player" to the other component commanders, and were able to influence courses of action during planning, vice attempting to bring supporting capabilities to bear after the fact. Additionally this brought the CJTF commander non-kinetic effects that he otherwise would not have had under his control, alleviating the requirement to send requests up the chain of command which would have further complicated synchronization.

During game play, Tier 3 entities tended to delegate 'TACON-plus' authority to their subordinate Tier IV commands. Several players likened 'TACON-plus' as being the "easy button." One player postulated "that is an indication that such level of authority is the right way ahead. Pushing down authority (aligns) with mission command and with ops in an A2/AD environment against a competitor with comms degrading capability. Recommend continuing exploration of 'TACON-plus'...may be absolutely necessary in future ops."

Recommendation 1.4: Continue to develop the CONOP with the CJFICC as a Tier III level command. The authorities and command relationships between the Tier III CJFICC and its Tier II superior and Tier IV subordinates warrants further investigation. Currently the CONOP discusses OPCON and TACON relationships for forces under the CJFICC. Continue investigation of 'TACON-plus' or similar modification of existing command authorities as an effective means of exercising command over attached units complimentary to mission command, to include the requirement for command relationships to be specified using establishing directives in order to clearly articulate which OPCON-related command authorities should be delegated to the Tier 4 level to enable mission success.

Cyber Authorities and CJTF

Finding 1.5: The CJTF commander would benefit from having some level of cyber operations directly under his control and the CJFICC could "provide the bridge from national/strategic-level assets to the operational level." However, additional roles and responsibilities of the CJFICC are not well understood.

Discussion: Which roles and responsibilities should be retained at higher levels such as USSTRATCOM vice which should be assumed by in-theater commanders, and which should be combined under a single commander formed the core of the player discussions.[6]

Some players stated that too many missions were assigned to the CJFICC, and that cyber operations alone would consume a component commander's staff. Others argued for an incremental approach to CJFICC development, e.g. start with cyber operations and then expand to other information environment related missions. Which missions should be added, however, was not clear. Some advocated that cyber and information operations were logical fits, others that cyber and EW were better combined under the CJFICC.

[6] Note that the game was not designed to 'test' the ability of the players assigned to the CJFICC to perform all the potential tasks associated with cyber, space, EW and information operations as a measure of the utility of the concept or appropriateness of the assigned missions.

Even within information operations, some tasks may be better served under the CJFICC than others, but for each player in favor of a role for the CJFICC, there was another opposed. For example, while one player suggested that operational deception would be an appropriate mission for the CJFICC (currently included in the CONOP), another countered that CJFICC should NOT be the JTF planner for deception, stating that "planning, managing, and executing a deception plan for the JTF will consume all of the energy for the CJFICC and the important needs of synchronizing cyber and EW into the fight will be left out."

Fundamentally the players identified the need to "determine which parts of the information environment are best served by a component commander ...what elements are essential to Information Dominance in support of warfighter objectives." The diversity of the functions, authorities, and capabilities proposed for the CJFICC suggested to some players the need to coordinate those efforts under a central entity for synergy and unity of effort. For others, that diversity argued for NOT consolidating the missions under a single commander:

> *"Space, cyber and strategic/operational EW are currently very different functions with sets of problems in authorities and capabilities that require a wide range of expertise. Putting them together outside of an operational commander such as CJTF only adds additional demands on already strained formations without the proven benefit of any real results."*
>
> – Global '14 Player comment

While the Problem Definition portion of the CONOP states that "effects from both space and cyberspace domains can provide value and create cross-domain synergy for tactical forces," the Solution section does not make a specific case for why the two domains of cyberspace and space should be grouped together under one commander, stating simply that "The CJFICC is envisioned to be responsible for the integration and employment of assigned, attached, and/or forces available for tasking in the space and cyber domains…," nor does it justify why Information Operations (IO) are also to be included. The "interrelationship" argument made between cyber and space (space assets give cyber systems global reach, cyber systems control space assets), and similarly between cyber operations and EW are (1) not included in the Problem/Solution section (but instead in the later Space and Cyber Domain section), and (2) are not sufficiently compelling.

Recommendation 1.5: Focus the CJFICC roles and responsibilities specifically to cyber operations, while continuing to evaluate the utility of shifting SCA and IO responsibilities to a dedicated component commander. If the decision is made to retain IO and/or SCA responsibilities under the CJFICC, then revise the CONOPS (particularly the Problem and Solution sections) to include a compelling rationale that considers both the challenges (and opportunities) that such a C2 arrangement would create.

Organizational Composition

CJFICC vs. Current C2 System

Finding 1.6: While there was general agreement that the functions of the CJFICC as presented in the game need to be integrated, there were conflicting arguments as to whether a single command was the best way to accomplish this integration.

Discussion: Those supporting the CJFICC organizational construct cited advantages in terms of parity in planning vis-a-vis other component commanders, provided a bridge to connect national assets to operational effects, and the ability to synchronize otherwise disparate information effects. Others postulated that the same level of integrated effects could be achieved using existing C2 structures, and a new separate CJFICC staff was neither required nor desired.

The primary argument in support of the CJFICC component level organization is that without a central "information domain champion with a seat at the table" able to coordinate efforts from Tier 0 down to Tier 4, it simply does not happen. Cyber, Space, EW and information operations now run through such a wide variety of organizations with differing authorities, classification levels, approval processes, and employment timelines that synchronized operations within the information environment, let alone in concert with traditional kinetic operations, is highly unlikely. The CJFICC can best provide the operational-level integration of these capabilities in support of CJTF objectives. The following player comments highlight the perceived utility of the CJFICC attribute:

> *"The main benefit for the CJFICC is putting many of those things that exist behind "black doors" under a person that has the clearances and understanding to pull them together."*
>
> *"Putting the CJFICC at Tier 3 level brings the discussion into mainstream operations discussions and avoids it becoming a collateral duty for another. It also avoids IW capabilities being considered after-the-fact."*

In order to integrate effects throughout the task force, the CJFICC "must have all associated subject matter experts/XDOCEs and staffing in order to be effective." Rather than a new command, some players countered that the functions of the proposed CJFICC could be carried out just as well, if not better, under existing command structures (J2, J3/J5, and J6) supported by robust LNOs. The following player comment supports this viewpoint:

> *"Strongly believe the CJFICC needs to be a subordinate part of J3/J5 to accomplish the integration that ensures CJFICC capabilities are used effectively. I do not see the need for a separate CJFICC; rather, the CJFICC should be rolled into J3/J5 Ops/ Plans."*

Recommendation 1.6: Continue to examine and refine the CJFICC concept, focusing on its role as the functional component commander for cyber operations, to include an examination of the JFHQ-Cyber construct for possible organizational insights for a cyber-related Tier 2 and Tier 3 command structure.

The Role of the XDOCE and CJFICC

Finding 1.7: Specific to the CJFICC, the XDOCE could be an effective pathway to get information out from 'behind the green door" and demystify the 'magic' associated with cyber operations.

Discussion: In terms of the other three C2 attributes - CJTU, SCC and XDOCE – the XDOCE was the one most discussed in connection with the CJFICC, though comments tended to conflate

XDOCEs with more traditional LNOs. [7] The degree to which the CJFICC was able to integrate effects across the task force via their XDOCE was hampered in no small part by the way the players attempted to employ the new concepts. The player comment below indicates that they wanted to look at the problem differently, but lacked the knowledge and situational awareness to do so:

> *"We haven't done good integration because we're playing the OLD way. We're NOT looking at RISK and using a different force than our own to perform a mission with less risk. We're trying to hit every nail with our OWN hammer. If I had that visibility, I would have USED a different cross domain asset, but I didn't have that understanding or SA. Without an understanding of [the] cyber component, [I can't] say 'do I think there is a cyber-capability that will enable me to do my job with less risk.' "*

The CONOP currently discusses the role of the XDOCE vis-à-vis the CJFICC. It suggests that "The CJFICC should establish XDOCEs with other commander's headquarters to better integrate information operations with the JFC's overall CONOPS. The XDOCEs will help facilitate information operations to the lowest tactical level in accordance with the JFC's joint information operations plan."

Recommendation 1.7: Not applicable (No CONOPS modifications are required).

The Role of the CJFICC and Sustainment

Finding 1.8: The "CJFICC could be a great asset for logistics."

Discussion: With logistics and sustainment so communications-intensive, and since the associated networks are susceptible to degradation and/or intrusion, a CJFICC could add value by centrally managing theater network defensive operations in order to improve network reliability and security.

Recommendation 1.8: Not applicable (No CONOPS modifications are required).

The role of the CJFICC and Intelligence

Finding 1.9: Players took both sides of the argument regarding the nature of the relationship between the CJFICC and Intelligence. The argument over Intel and its relationship to the CJFICC is in no small part due to the conflicting definitions and usage of terms like 'information warfare,' 'information environment,' 'information domain,' 'information operations,' and 'information dominance' and the role intelligence plays in each.

Discussion: Some players stressed that "Intel is definitely part of the CJFICC. Unity of effort principles would point out that Intelligence must be with the Information Component Commander," while others countered with "CJFICC is not JIOC," and "Intel needs to support CJFICC but [isn't] ...'part' of the CJFICC. There needs to be a theater/component/JTF/CC intelligence presence providing broad [situational awareness] and specific support (CJFICC is

[7] This highlights the difficulty in playing multiple new concepts with inexperienced players in the same game

one of those elements) but subordinating Intel to the CJFICC would negatively impact all the other components, et al."

Recommendation 1.9: Early discussions of CJFICC missions included an intelligence role, but later workshops concluded that the CJFICC was a consumer of intelligence like any other component commander. While no specific change to the CONOP with regard to Intelligence is recommended, the previous recommendation to reduce reliance on terms like information operations and information warfare is germane.

CROSS-DOMAIN OPERATIONS COORDINATION ELEMENT (XDOCE)

Strengths And Weaknesses

> *"XDOCE needs work, but it has promise. Some will want to hand-wave it away, but with a real understanding of the threat environment…it has potential to allow better joint force employment against a near-peer in a comms denied environment."*
>
> – Global '14 Player

Enhancing Cross-Domain Synergy

Finding 2.1: The XDOCE could serve as a "forcing function" to improve cross-domain operations in an A2/AD environment.

Discussion: The access challenges created by an adversary employing A2/AD capabilities may require the use of cross-domain capabilities to gain operational access. Players concluded that the XDOCE could serve as a "forcing function" to enhance the integration and application of capabilities from different services within a domain to gain or main access in another domain. Players emphasized that the XDOCE should contribute to the planning, directing, monitoring, and assessment of cross-domain operations on command staffs at the JTF, Component Commander, and task unit level. As one player noted: "As an XDOCE member, I learned we had responsibilities to quickly coordinate XD [cross-domain] operations in order to feed the planning process for my assigned domain." The contribution of the XDOCE at the Tier 3 level is highlighted by the following player comment:

> *"I think we're not looking at XDOCE from the right angle. We shouldn't value its role based on the ability to shift capabilities from one domain to another but rather the value of assessing who is better postured with forces and authorities to optimize the right effect which results in conditions being sought by the Commander. The benefit this brings to the Commander is from a holistic approach to finding the right combination of forces to achieve desired effects. No one does this at a Tier 3 level and [it] will certainly improve flexibility across domains."*

However, some players suggested that the XDOCE construct might violate the C2 principle of simplicity used in the Global game by creating additional processes, procedures, personnel and authorities at the Tier 3 level.

Recommendation 2.1: Continue to examine and refine the XDOCE Concept, to include how the XDOCE will integrate with current organizational staffs and C2 functions.

Authorities And Processes

Delegating Command Authority to XDOCEs

Finding 2.2: XDOCEs may require command authority to execute cross-domain operations.

Discussion: Players emphasized that CJTU staffs must possess the requisite cross-domain expertise to effectively employ all forces assigned to the CJTU Commander. They concluded that maintaining this expertise on staff will increase the likelihood of delegating operational control of forces to peer and subordinate commanders because they have a greater level of trust and confidence that their forces will be employed properly. While control of such forces may be retained by a functional component commander (FCC) or delegated to a subordinate CJTU, the command authority can also be retained by the assigned commander or delegated to an appropriate XDOCE member with the requisite domain knowledge and expertise to effectively plan and direct forces. For example, if an Aegis cruiser is assigned to a CJTU under the ACC, then a maritime domain expert, well-versed in the operational employment of such a platform, must be available on the CJTU staff to either advise the CJTU Commander or to assume control if delegated.

In Global '14, the XDOCE authorities were limited to coordination with XDOCE's at either the JTF (Tier 2) or FCC (Tier 3) levels, as no XDOCE's existed at the CTU/CJTU (Tier 4) level. As expected, this coordination often consisted of arranging cross-domain support, either as the requester or provider of a desired effect. However, much of the XDOCE coordination consisted of communicating logistical requirements between the SCC and the other Tier 3 FCC's, which is not envisioned as a responsibility of the XDOCE.

During Global '14, the control of all such forces was delegated by the FCC to their subordinate CJTU's, which were then responsible for the employment of those assets. Unfortunately, since the CJTU's were 1 or 2-person cells with no XDOCE, they generally lacked the relevant domain expertise and requisite staff capacity to effectively employ assets from other domains. While the CONOPS currently addresses the need for domain-specific expertise as part of both an XDOCE and CJTU staff, it does not address the potential for an XDOCE member being delegated command authority by either an FCC or CJTU commander.

Recommendation 2.2: Revise the XDOCE portion of the CONOPS to incorporate the potential for an XDOCE member to be delegated command authority by their assigned commander.

XDOCE Process and Integration with Current C2 Processes

Finding 2.3: The relationship between XDOCE processes and current processes used to plan, direct, monitor, and assess operations at the Tier 2, 3, and 4 level is not well defined and understood.

Discussion: Lack of specific XDOCE processes in the CONOPS makes it difficult to ascertain how the XDOCE will integrate with existing operational planning and execution processes. While no XDOCE processes are specified in the CONOPS, Global '14 created some notional products and processes in an attempt to begin to identify the relevant processes that the XDOCE may be involved in. Accordingly, the XDOCE participants in the game were responsible for producing the Component Commander Need Requests and Fill Orders. The Need Requests were intended to capture the component's capability or effects shortfalls or gaps, such as the need for logistics, transportation, or a desired effect (e.g., neutralize mine storage facility) due to a lack of organic capacity or capability. The Fill Orders provided the means for a component commander to satisfy another FCC's Need Request. The JTF XDOCE representative monitored the need-fill process and intervened as necessary to ensure that critical needs were either filled by component commanders or forwarded outside the task force for resourcing. While these products and processes were effective in giving the XDOCE players a viable role in the game, they tended to stovepipe the XDOCE participants from the other cell players, since these products could only be created and edited by the XDOCE, while the Integrated Task Order (ITO) that it supported could only be developed and modified by the non-XDOCE participants in the FCC cells.

Several players suggested institutionalizing the XDOCE as a board, cell or working group, with a clearly defined battle rhythm and responsibilities. For example, within the ACC and associated JFACC AOC, should the XDOCE participate in the apportionment and allocation processes? At the MCC and associated JFMCC MOC, how will the XDOCE support concurrent efforts within plans, future ops and current ops? As one player noted: "… [we] must find a way to integrate the XDOCE planning into the notional planning cycle in order to truly be effective."

Recommendation 2.3: The CONOPS should identify specific operational planning and execution-related processes that the XDOCE will participate in, what that participation will consist of, and how these processes interrelate with current PDMA processes at the tier 2, 3, and 4 levels. While many different approaches could be taken to incorporating the XDOCE in to the Boards, Bureaus, Centers, Cells and Working Groups (B2C2WG) process, pick one - such as a dedicated XDOCE cell - define the associated relationships and modify as necessary, based on feedback from games and exercises.

Roles And Responsibilities

XDOCE vs. LNOs

Finding 2.4: The difference between XDOCE planners and LNOs is not well defined and understood.

Discussion: Many players suggested that an XDOCE was simply a collection of super LNO's. Such comments, however, miss the point that the XDOCE is first and foremost a domain expert who can advise the commander, rather than a service rep that is present in many cases simply to protect their parent command's equities and serve as an additional conduit for information. The following player observation indicates a much more nuanced understanding of the role of the XDOCE and how it differs from simply an LNO:

> *"The tendency to employ XDOCEs as a coordinating element to move 'capabilities' across domains does not add value to how the Joint process works already. In other words, the XDOCE is not a LNO. The LNO works well under the Tier 4 level where you are looking at task-based actions to achieve effects. The XDOCE should be applied at the Tier 2 and 3 levels to look at cross-domain coordination to realize mission effects to achieve conditions."*

The following observation also highlights the role of the XDOCE, as well as whom they should work for and their authority:

> *"[The] XDOCE is meant to be integrated planners/operators who can coordinate integrated multiple domain solutions. They don't belong to another functional (service) commander, but to the domain component command where they are assigned. They should be empowered equally with members of the assigned CC."*

Recommendation 2.4: The CONOPS should be revised to specify how the roles and responsibilities of the XDOCE and an LNO are different in order to reduce confusion and aid in acceptance of the XDOCE construct. This explanation should highlight the fact that an XDOCE rep brings domain expertise to the staff, along with an allegiance to the assigned commander and the ability to exercise delegated authority that a service or function-based LNO does not.

The Role of Sustainment and XDOCE Planning and Execution

Finding 2.5: The CJFSCC XDOCE is fundamentally different from the other component commander XDOCE's because it supports a commander responsible for an operational function – sustainment – rather than a functional domain.

Discussion: The CJFSCC XDOCE's roles and responsibilities may be different from those of the other component commanders, since the CJFSCC is not responsible either for a domain or for achieving kinetic or non-kinetic effects. While the XDOCE played a similar domain coordination role in the domain-based functional component cells (CJFACC, CJFICC, CJFLCC and CJFMCC), the CJFSCC XDOCE was used more as a sustainment coordination cell to coordinate logistics and lift requirements with the other component commanders. That is not the intent of the XDOCE and the CJFSCC should maintain sustainment expertise as part of the staff that can interface with each of the other functional component commanders to consolidate sustainment requirements and to develop and execute a sustainment plan as part of their general staff responsibilities.

However, a CJFSCC XDOCE, fully manned with domain warfare specialists, could leverage domain assessments from the other functional component commanders to advise the CJFSCC on operational access and protection issues. For example, a Maritime XDOCE rep on the CJFSCC staff would help the CJFSCC understand the operational access and protection requirements associated with operating sustainment assets in the maritime domain. This would assist the CJFSCC in either articulating their protection requirements to the other component commanders or executing these missions themselves, should the CJFSCC be entrusted with that responsibility for assigned forces.

Recommendation 2.5: The CONOPS should be modified to include a discussion of the uniqueness of the CJFSCC XDOCE, including how the roles and responsibilities of the CJFSCC XDOCE related to operational access and protection support CJFSCC mission accomplishment.

Organizational Composition

Cross-Domain Expertise and CJTU Staffs

Finding 2.6: CJTU staffs must possess the requisite cross-domain expertise to effectively employ all forces assigned to the CJTU Commander.

Discussion: The CONOPS states that "The XDOCE is purpose-built to address the assigned mission & areas of expertise not already present within the staff. The number of experts per domain or warfighting function will depend on the scale and scope of the operation." In Global '15, there was one "Lead" XDOCE rep assigned to the JTF staff (Tier 2), with each FCC (Tier 3) having reps from each of the "other" domains. For example, the Combined Joint Forces Land Component Commander (or CJFLCC) XDOCE had air, maritime, cyber and space domain reps, but no land domain rep, since land domain expertise was resident in the core CJFLCC staff. The CJTSCC XDOCE, while not responsible for a particular domain, had air, maritime, land and cyber, but no space rep, since it was envisioned that the SCC would not require such expertise to accomplish its mission.

While the game only had XDOCE's at the Tier 2 and 3 levels, the players often commented on the appropriateness of the XDOCE for the Tier 4 or TU/CJTU level. Some believed that a CJTU could benefit from the cross-domain expertise that an XDOCE would provide, while others felt that a CJTU staff would have such expertise by its very nature as a joint task unit staff. Regardless of whether such expertise is organic to the staff or provided by an XDOCE, there did seem to be a need for XDOCE-like capabilities at the CJTU in order to understand and be able to employ cross-domain solutions effectively. When establishing a CJTU, the CJTU Commander must ensure that his staff possesses the necessary cross-domain expertise - either organic or augmented by a purpose-built XDOCE - to effectively employ all capabilities assigned. This was illustrated by the following player comment:

> *"Need a Tier 4 XDOCE manned with experts in weapon systems attached to their CJTU. Can't have Tier 4 taking actions on attached weapon systems for which they have no experience, and especially, [no] understanding of the RISK they are incurring."*

Recommendation 2.6: The CONOPS should emphasize the need for a CJTU staff to possess the requisite cross-domain expertise, either organic or augmented by a purpose-built XDOCE, to effectively employ all assigned forces**.**

COMBINED JOINT TASK UNIT (CJTU)

Strengths And Weaknesses

> *"With the understanding of, education for, and training using mission command as the philosophic method to warfight this may work if the commander and staff at*

the CJTU are comfortable operating with limited information from his/her higher headquarters."

– Global 14' Player

Current Service Task Forces and CJTUs

Finding 3.1: The relationship between CJTUs and existing service task force organizations are not well defined and understood.

Discussion: The CONOPS does not adequately discuss the differences and similarities between existing service task force structures and the CJTU concept, and how they interrelate during both peacetime and conflict. The CJTU construct was suggested by some players as "another layer of bureaucracy" that may duplicate existing structures at the task force level. Carrier Strike Groups (CSGs), Air Force Air Expeditionary Wings (AEWs), Marine Air-Ground Task Force (MAGTFs), and Army Battalion Task Force were highlighted as examples of service specific organizations that currently integrate capabilities across different domains to achieve a specific mission. However, players concluded that combining specific capabilities from across these structures would enhance cross-domain synergy and operational integration by providing tactical commanders more options to rapidly gain domain superiority and achieve operational access early in a conflict, and quickly respond to changing situations or establish an advantage in some combination of domains. Accordingly, the CONOPS suggests that the CJTU concept is similar to any other tactical force under a functional component, except that it has the potential to integrate capabilities in all domains-including space and cyberspace- across services and nations. If current TUs and CJTUs are expected to operate together under the same command, "then planners and operators need to acquire a better understanding of the roles and responsibilities between them" and how forces from TUs are assigned to CJTUs. Some players suggested that removing forces from current TUs and placing them under the command of a CJTU during a conflict could help or hinder future options and capabilities available to tactical commanders. Specifically, some players posited that establishing CJTUs might reduce cohesion of current service organizations (MAGTF, CSG, etc.), while others suggested that the benefit would be lasting and far-reaching for both the staff and tactical forces. Understanding this relationship warrants further examination and consideration for inclusion into the CONOPS.

Recommendation 3.1: The CONOPS should identify the similarities and differences between existing service task unit structures and the CJTU concept; the roles and responsibilities between existing service task force units and CJTUs prior to and during a conflict; and the benefits and unintended consequences of integrating capabilities from standing TUs into CJTUs.

Organizational Composition

CJTU Mission and Deconfliction Requirements

Finding 3.2: CJTUs should be tailored and scaled based on mission, line of operation, and/or a geographical area of responsibility in order to integrate forces and effects from multiple domains in an A2/AD environment.

Discussion: The CJTU, as it is currently written, brings together forces from two or more services and two or more domains for a specific mission, line of effort or geographic area.

Players largely agreed that the creation and design of a CJTU should be based on a specific mission or task to be completed. One player noted the following:

> *"This idea works great at Tier 4 as long as it was created for a specific mission in space or time. In other words, their mission is to take island X, or their mission is to attrite land forces in a certain area from Time 0 to time X. Otherwise, there is potential to just morph into a regular Task Unit."*

Players compared the CJTU to the German concept of building on the fly Kamfgruppe for specific missions and for a finite time. As one player noted, "It took them a generation to inculcate this concept into their forces. If we are serious about this, we need to be prepared to devote the time, money and resources to train and grow the folks that can command CJTUs effectively." Similarly, another player suggested that "the danger of loose mission command and higher level intent is that all CJTUs could end up attacking the same target or ignoring a threat. Coordination is still needed. When missions are assigned to the CJTU they need specific boundaries in order to give them the freedom to act." Accordingly, the CJTU would need to be mission oriented, operating within clearly delineated geographical boundaries. Finally, some players suggested that CJTUs may operate most effectively when organized into smaller units over a short time period.

Recommendation 2.2: The CONOPS should include relevant examples or 'use-cases' for CJTU employment, such as Integrated Air and Missile Defense (IAMD), to help readers understand the CJTU construct, while also highlighting the need to specifically delineate area of responsibilities for assigned CJTUs to reduce coordination requirements and provide for improved freedom of action. Additionally, such mission-tailored CJTU's should be integrated into joint exercises and war games to further their development and acceptance.

Standing and Ad Hoc CJTUs and Training Implications

Finding 3.3: Both standing and ad hoc CJTUs may be required to deal with dynamic operational environments.

Discussion: Whether standing or ad hoc, players posited that the integration of capabilities across domains and services provides component commanders greater options to manage complex operations in an A2/AD environment. Both standing and ad hoc CJTUs were posited to enhance a commander's ability to establish superiority in some combination of domains in order to enable freedom of action required by the mission. The CONOPS suggests that CJTUs should be formed during crisis planning, "where the CJTU is formed with no prior integration or training," and prior to a conflict "with time to create synergy, team unity, and common TTPs among the CJTU forces." Players emphasized that both standing and ad hoc CJTUs should be guided by common organizational principles, plans, procedures, and protocols. Several players posited that risk to mission and forces would increase if CJTUs were not afforded adequate pre-deployment or pre-operation joint training. As one player noted, "By specifying a finite number of possible CJTU's, not only can a fixed number be certified, but training for the personnel in the CJTU's can be standardized and roles, responsibilities, and TTPs can be formalized and implemented throughout the force." Players suggested that both approaches have significant costs in terms of time, money, and resources required to fundamentally change the way the services organize, train, and equip its forces.

Some players posited that CJTUs may be "too dynamic to be certified, and any attempt to certify it would limit a commander's flexibility in forming a CJTU when urgently needed for a specific mission." If certification is required for a CJTU, "the UK method to certify staff and commanders to meet a number of missions" is worth considering. However, certifying the staffs still leaves individual units uncertified to work together in the CJTU construct. One player who supported CJTU certification stated, "I like the idea that CJTUs are purpose-built and require certification. This will mean that we only have a handful of CJTU "types" that are well understood and we can train to them."

Recommendation 3.3: The CONOPS should specify that while standing or pre-identified CJTUs would be the preferred approach (due to training and certification issues), ad hoc CJTUs may also serve a valuable function. The CONOPS should also clearly explain who is responsible for identifying the conditions or criteria for creating a CJTU during peacetime and in crises; discuss who retains the responsibility and authority to establish a standing or ad hoc CJTU; and identify the process for establishing and disestablishing a CJTU whether it is standing or ad hoc. In addition, CJTU training and certification requirements should be identified, with existing fleet and coalition certification procedures considered as a starting point.

XDOCE and CJTU Operations

Finding 3.4: Maintaining cross-domain expertise on the CJTU staff is a critical enabler for integrating kinetic and non-kinetic effects and capabilities from multiple domains into CJTU operations.

Discussion: Players concluded that CJTU staffs require a high degree of joint experience and expertise at a relatively junior level. They noted that current joint and service doctrine, training, and education is not sufficient to employ CJTUs. The CJTU concept will require a fundamental change to joint education and career progression and force the services to relinquish core service or domain competencies to support other functional component commanders on a permanent basis. While many theater and national assets may never be assigned to a CJTU commander, CJTU planners must maintain the resident expertise on their staffs to understand how these capabilities effect operations across the information domain and the traditional warfare domains. As one player noted: "We must train to integrate these systems into the theater of operations -- the CJTU must operate in all 5 domains simultaneously, for no other reason than our adversary does."

Players suggested that "in order for the full brunt of the cross-domain and joint assets to be effectively used, the 'ninja warriors' that were proposed for the XDOCE concept" would also be required for the CJTU. In fact, some believed that there would be no need for an XDOCE if the CJTU were comprised of experienced warfighters from across the services. This notion compliments the CONOPS, which suggests that as joint planners become more adept at cross-domain integration, the need for an XDOCE and the added manpower requirement will no longer be required. One player noted, "beef-up the CJTU and CJTF staffs with smart cross-domain planners and there is no need for an XDOCE." Similarly, another player suggested, "for CJTUs to be effective, they would need a full staff of joint SMEs capable of using the right kit regardless of domain to achieve an effect."

While the CONOPS generally describes the composition and responsibilities of the XDOCEs assigned to a CJTU staff, it does not explain the interaction between XDOCE planners and traditional planning teams assigned to existing task units. In addition to maintaining cross-domain expertise to plan and execute fires operations, a CJTU staff should be comprised of sustainment, intelligence, and communications experts skilled in supporting cross-domain operations at both the operational and tactical level. Maintaining this level of expertise at the Tier 4 level is critical when planning and executing cross-domain operations in a time constrained and communications degraded environment.

The CONOPS suggests that the composition of the CJTU staff should reflect the cross-service and combined composition of the forces assigned to the CJTU to ensure those employing the forces have a thorough knowledge of their capabilities and limitations. However, given that CJTUs may be created on the fly and re-organized to meet emerging mission requirements, CJTU staffs must possess a comprehensive knowledge of capabilities, limitations, and effects in all domains to tactically exploit the adversary, even when communication with senior and peer commanders is unavailable. This suggests that Tier 4 XDOCEs should possess similar knowledge, skills, and abilities as Tier 3 XDOCEs, but further consideration should be given to exploring additional qualities and attributes of a CJTU staff officer beyond just filling the job of a typical staff officer or LNO type billet.

Recommendation 3.4: The CONOPS should explain the interaction between XDOCE planners and traditional planning teams assigned to existing CJTU staffs; discuss the roles and responsibilities, and required knowledge and skillset of sustainment, intelligence, and communications planners assigned to CJTU staffs; and discuss the requisite knowledge and skillset required to integrate new capabilities and forces into an existing CJTU.

Authorities

Achieving Mission Success through Increased Command Authority

Finding 3.5: Having the ability to change mission, time, and force at the tactical level enabled commanders to rapidly respond and adapt to a wide range of missions across the JOA.

Discussion: 'TACON-plus' was a notional authority created for the game that allowed commanders to change mission, time, and place of forces. Over the course of game play, functional component commanders increasingly delegated 'TACON-plus' to their Tier 4 commanders. Many players suggested that they would need authorities similar to 'TACON-plus' to effectively command capabilities in all five domains. However, some viewed it as a "crutch" that gave CJTU commanders "too much authority, therefore causing too much 'out of sync' with [the] component command[s] when executing the next set of orders." Furthermore, some players acknowledged that "rather than following a set of orders to attack different targets, CJTU Commanders might begin attacking the same targets all at once and leaving other enemy units unengaged." While the CONOPS encourages the need to delegate greater authority to CJTU commanders, it does not discuss potential risks or consequences for doing so. The following player comment highlights this concern:

> *Throwing a bunch of CJTUs in a geographic area, all capable of operating in multiple domains, then giving 'TACON -plus' to the respective CJTUs, then*

> *degrading comms to all is a recipe for disaster in terms of unity of effort (there will be none) risk to friendly forces (there will be lots) and ultimately failure to accomplish mission objectives.*

In general, however, the players concluded that increased levels of command authority at the tactical level decreases decision-making time by eliminating the need to coordinate with superiors to acquire permissions and capabilities. Having the expertise, authorities, and capabilities organic to a CJTU Commander enables mission command and allows commanders to quickly adjust and respond to changing conditions in the battle space. Players emphasized that tactical commanders will increasingly rely on such 'OPCON-minus' authority as both the operating environment and communications with higher authority deteriorates.

Recommendation 3.5: Revise the CONOPS to state that CJTU commanders should be delegated most of the authorities associated with OPCON (except for the authority to relieve commanders' of attached forces) via establishing directives in order to enable them to effectively exercise mission command, particularly in response to the challenges posed to C2 in a communications degraded or denied environment.

Processes

CJTU Operations and Battlespace Management

Finding 3.7: CJTUs require increased coordination and situational awareness to prevent fratricide, overlaps, and seams.

Discussion: Players suggested that integrating joint capabilities and managing the deconfliction process for concurrent fires missions remains a significant challenge today. The nature of cross-domain operations in a congested A2/AD environment increases the deconfliction problem for CJTU Commanders performing simultaneous missions with forces operating in the air, maritime, land, space and cyberspace domains. While players found the notional game processes and products beneficial to gain situational awareness and deconflict forces, they recognized that current processes, procedures, and products at the Tier 4 level do not account for this level of coordination within and across domains.

During the game, the Domain Coordination Order (DCO) was published for each domain by the lead component commander for that domain (CJFMCC for the maritime domain, CJFACC for the air domain, CJFLCC for the land domain, and the CJFICC for both the space and cyberspace domains). The DCOs served a purpose similar to current airspace control orders, water space management plans, and fire support coordination orders. Units operating under the authority of different Tier 3 commanders in the same area who did not appear on a common DCO (i.e. all aircraft on the ACO, all ships on the MCO, etc.) risked committing fratricide during the Combat Operations phase. While the gaming environment provided Tier 4 players with perfect communication and situational awareness of the JOA, the players acknowledged "a product like the DCO would be necessary to gain situational awareness and coordinate forces and effects within and across sections of the JOA."

Moreover, players at the Tier 3 and Tier 4 levels discussed the need to maintain a shared Integrated Task Order (ITO) and common operating picture that describes and depicts which

commands and forces are allocated to specific tasks, missions, and domains across the theater. A notional product similar to this was prepared by each Tier 3 commander and sent to Tier 4 task unit commanders to support the employment of their assigned forces. It brought all aspects of C2, targeting, maneuver, kinetic and non-kinetic fires, and logistics together in a single order to enable operations at the task unit level.

Although many players perceived the DCO and ITO as essential products to reduce fratricide and synergize planning efforts, several players questioned whether it would replace or complement existing real-world products that are in-place today. In order to reduce the likelihood of fratricide and prevent overlaps and gaps, tactical commanders may be required to adopt new processes and procedures to coordinate and deconflict forces and desired effects within and across domains. The CONOPS suggests that XDOCEs are responsible for developing plans that include battle-space control measures, domain management, restricted operations zones, and fire support coordination measures; however, the CONOPS does not identify the types of processes and products that a CJTU is required to develop or contribute to during current and future planning.

Recommendation 2.7: The CONOPS should identify relevant processes and products at the Tier 4 level that are required to deconflict forces and effects within and across domains, including how existing process and products can be modified to serve this purpose, while also enabling CJTU's to manage their local battlespace when required.

COMBINED JOINT FORCE SUSTAINMENT COMPONENT COMMANDER

Strengths And Weakness

> *"The game only allowed the CJFSCC to play 1 1/2 of the 6 or so objectives for the CJFSCC…the CJFSCC construct should be considered for a future game to test its ability to provide Operational Contracting Support, Host Nation Support, Interagency Logistics, Allied/Partner Logistics, etc."*
>
> – Global '14 Player

Enhancing Unity of Effort and Operational Integration at the Cost of Simplicity

Finding 4.1: The CJFSCC could enhance the ability to synchronize sustainment requirements across component commanders and integrate joint, interagency, and multinational sustainment forces at the operational level; however, tactical execution decisions risk being misaligned with the CJFSCC's sustainment plan in a communications denied or degraded environment.

Discussion: Several players suggested that the CJFSCC may enhance unity of effort and operational integration by serving as the single point of contact for engaging TRANSCOM, DLA, and multinational partners. Similarly, standardizing procedures, systems, and point of contacts-to include the operational plans and requirements of component commanders- may minimize inefficiencies in joint operations. As one player noted, the CJFSCC may "streamline multiple flows of supply into a single supply chain …and minimize the logistics footprint, forces, people, commodities, and resources required to accomplish its mission." When sustainment forces and supply are at its highest demand, some suggested that the CJFSCC synchronizes sustainment requirements and priority of effort at the operational level.

The CJFSCC was thought to have provided component commanders greater flexibility to shift priorities, which would allow them to focus on combat employment. The following player comment highlights the benefit of the SCC from the perspective of the CJTF:

> *"There was Centralized command and sustainment from the viewpoint of the CJTF. We felt like the CJFSCC could provide sustainability of the ENTIRE plan in real time. Synchronizing in near real time and tracking via XDOCE and the plan being put in place; whether or not you felt you were giving us your most up to date info."*

Similarly, some Tier 3 players suggested that they were more comfortable assuming greater risk in combat missions when communication and coordination between the CJFSCC was greatest. The following comment is representative of players who viewed the CJFSCC as a valuable contribution to game play:

> *Much like a super J4, it [CJFSCC] allowed us to accomplish what we needed. If the A2/AD environment degrades, our ability to [control is reduced, and we must] let lower echelons use their initiative to achieve the mission; it's going to be important to trust subordinates and push authority down.*

However, command authority of all operational sustainment forces may require greater coordination and situational awareness between the CJFSCC and component commanders to mitigate redundancies and ensure mission success. The 'pushing' and 'pulling' of sustainment requirements and capabilities emerged as a major source of contention between the CJFSCC and Tier 3 Commanders. For the most part, the CJFSCC only pushed sustainment capabilities when requested by component commanders. Working through the CJFSCC XDOCEs, component commanders relied on the CJFSCC to push capabilities based on their overall plan. This tension often pulled players away from planning combat missions and increased the need to coordinate and communicate with peer and subordinate commands. In a contested A2/AD environment, players suggested that the CJFSCC must have the capability to anticipate future requirements and push logistics forward. The following player comments highlight this disconnect.

> *"CJFACC asked for airlift to move jammers to proper locations and should have been allowed to send NEED and get prioritized IAW entire theater need--not rejected without submission. CJFSCC is a good idea to prevent dupe work but it's going to require a lot of coordination to ensure all missions are met."*

> *"The CJFSCC needs to push material base on situational awareness of plans/ops (vs pull) to all of us at the Tier 3 level. All Component Commanders need high level, if not same level, of joint situational awareness to better integrate and synchronize sustainment requirements and resources."*

> *"We need Logistics to be pushed, and following our schemes of maneuver."*

Recommendation 4.1: The CONOPS should address the relationship between component commanders and the CJFSCC as it relates to anticipating future requirements and

proactively providing sustainment capabilities, especially in a communications denied and degraded environment.

Roles And Responsibilities

SCC or JTF J4

Finding 4.2: It is unclear whether centralized sustainment is needed, and if so, whether the CJFSCC or JTF J4 should assume such responsibilities.

Discussion: Players were divided on whether the sustainment function needed to be centralized under a single entity, and if so, whether it should be carried out by a new component commander or handled by the JTF J4. Those in favor of the J4 suggested that adding a new component commander for sustainment would create span of control issues, particularly in a communications degraded or denied environment. Current and future resource concerns were cited as major barriers to creating a separate command structure when perhaps the responsibilities could be carried out by sustainment liaisons embedded into today's C2 structure. Conversely, some suggested that reducing overlaps and synchronizing efforts across the force would end up saving the department of defense over the long-term.

Others indicated that if the CJFSCC responsibilities were to include force protection responsibilities for the sustainment forces, including APODs and SPODs, then perhaps a separate entity would be required. The UK logistics model that is responsible for managing strategic lift to theatre for extensive land campaigns was cited as one possible model upon which to base the CJFSCC, based on its success at sustaining combat forces in theater.

Recommendation 4.2: Additional analysis should be undertaken to determine whether a centralized approach to sustainment is needed. If centralization is chosen as the preferred approach, then additional analysis should be undertaken to determine if the CJFSCC is better served to perform such a mission, rather than by the J4 on a JTF or Combatant Commander staff.

Management of the TPFDD (Time-Phased Force & Deployment Data)

Finding 4.3: There is confusion over the appropriate role of the CJFSCC regarding the TPFDD, as well as the transfer of command authority between TRANSCOM, CJTF, and the CJFSCC.

Discussion: Players were divided on whether the TPFDD should be managed by the CJFSCC or the JTF Commander. A shared responsibility where by the JTF manages combat forces and the CJFSCC manages sustainment forces into theater could result in gaps, seams, and overlaps that would disconnect these forces, especially in a communications denied or degraded environment. One player noted, "I fully agree that the CJFSCC should manage the TPFDD...during game play, some of us actually thought they were. In reality, the CJFSCC would manage the flow of sustainment forces into theater to TRANSCOM via the JTF Commander." If the JTF were to manage inter-theater sustainment and combat forces, then the J4 would assume a broader role in working with the

CJFSCC to ensure that forces arrive at the time and place designated by the CJFSCC. The following player comments highlight this discrepancy:

> *"CJFSCC's don't write the TPFDD - but they can enable it, and generate the Theatre sustainment/basing requirements in order to give the warfighter what he actually wants/needs - which is not a bit of kit - but a capability."*
>
> *"The CJTF should plan TPFDD (with input from CJFMCC, CJFACC, CJFLCC and CJFICC) and the CJFSCC should execute accomplishing the who, what, where and when in getting it there."*

Moreover, players had a limited understanding of the transfer of command authority of sustainment forces between TRANSCOM, the CJTF, and the CJFSCC. More broadly, players frequently highlighted the need to better understand the relationship between TRANSCOM, CJTF, and CJFSCC, as well as their associated inputs and outputs over phases of a campaign. A common operating picture and persistent coordination and planning between TRANSCOM, CJTF, and the CJFSCC is increasingly important to support inter- and intra-theater sustainment in an A2/AD environment.

Recommendation 4.3: The CONOPS should specify that the CJTF is responsible for managing the TPFDD, but that the CJFSCC supports the CJTF by ensuring that the plan is logistically sustainable. Additionally, the CONOPS should specifically identify the relationship between TRANSCOM, the CJTF, and the CJFSCC to reduce confusion regarding roles and responsibilities.

Operational Protection of Fixed and Mobile Forces and Infrastructure

Finding 4.4: The responsibility for protecting sustainment forces and associated land-based infrastructure warrants further examination.

Discussion: The risk posed to sustainment forces both at sea and ashore was frequently highlighted during game play. Some players suggested that the CJFSCC should maintain its own combat forces to protect sustainment assets, while others posited that assigning combat forces to the CJFSCC would take away from accomplishing more important combat missions. The CONOPS states that even though the CJFSCC does not provide operational protection of sustainment assets, it must identify and prioritize Force Protection requirements related to bases, supplies, and lines of communication (LOCs). Several players suggested that CJTUs should be assigned to the CJFSCC to protect both mobile and fixed sustainment forces; this may remove a layer of coordination and complexity and potentially increase the likelihood that sustainment forces will be adequately defended/protected. This assertion runs contrary to the CONOPS, which requires CJTUs assigned to the CJFSCC to rely on support from other functional component commanders for their defense/protection.

Recommendation 4.4: Further analysis should be undertaken to determine whether the CJFSCC should be responsible for operational protection for any or all of its assigned forces in the air, land and maritime domains, along with associated infrastructure, with the results incorporated into the CONOPS.

Authorities

Benefits of Increased Authorities

Finding 4.5: Having the authority to change mission, time, and place of sustainment forces enabled CJFSCC-assigned CJTU Commanders to meet mission requirements.

Discussion: Players acknowledged the benefits of pushing greater authorities down to CJTU and TU Commanders. Having the authority to change mission, time, and place of sustainment forces enabled CJFSCC-assigned CJTU Commanders to rapidly adapt to emerging mission requirements. Even though Tier 4 players had perfect situational awareness and communications, they acknowledged that they had limited knowledge of sustainment operations and CJFSCC plans. One player noted the following:

> *"For most of the operations we were doing with the CJFSCC, what we were very focused on was what level of TACON or 'TACON-plus' we had. If it was TACON, we didn't feel comfortable going beyond mission; with 'TACON-plus' we went beyond that point."*

However, the authority to change mission, time, and place of sustainment forces occasionally misaligned CJFSCC plans with their CJTUs actions. This misalignment increased when communications between them were limited or denied. Moreover, the relationship between Directive Authority for Logistics (DAFL) and the delegation of OPCON, TACON, and 'TACON-plus' to tactical commanders was not well understood.

Recommendation 4.5: CJTU authorities should include the ability to change the assigned mission, time and place for assigned or attached forces, based on an understanding of commander's intent and the CJFSCC plan. Additionally, the CONOPS should be modified to explain the implications for the DAFL, based on the increased command authorities assigned to the CJFSCC and its subordinates.

Interagency and Multinational Operational Integration

Finding 4.6: Partners and allies remain essential to execute cross-domain operations in a complex A2/AD environment and understanding how they integrate into the CJFSCC requires further examination.

Discussion: The CONOPS suggests that the CJFSCC "must be capable of sustaining joint combat forces and interagency and multinational partners, from strategic-level national providers to forward units at the tactical level, while minimizing the logistics footprint in the area of operations". In an era of Combined Joint Task Units, players suggested that sustainment planners and operators at each level of the C2 structure must improve their understanding of the critical capabilities and barriers that help or hinder operational integration of interagency and multinational sustainment forces. The importance of establishing and maintaining basing and overflight access with regional partners and allies was frequently highlighted as a critical element to intra-theater sustainment of joint forces in an A2/AD environment.

As the single point of contact with international partners, several players suggested that the CJFSCC should be a standing organization that enables planners and operators to develop trust and confidence with multinational forces through persistent cooperation in the areas of information sharing, planning, and training. Under this premise, the CJFSCC would need to establish a formalized process that allows planners and operators to work together on a more formal and consistent basis in peacetime. This will provide U.S. and international planners and operators the opportunity to develop a shared awareness and understanding of how to work with each other when planning and conducting sustainment operations in future A2/AD environments. Similar to current functional component commanders in peacetime, the CJFSCC would be a standing organization responsible for planning sustainment operations for each combatant commander's area of responsibility, planning and executing joint and combined sustainment training exercises, and exercising command and control of sustainment operations in peacetime and wartime.

The CONOPS states, that "The Combined Joint Force Sustainment Commander must minimize contracting officers and sustainment contractors." In order to do so, players suggested creating a separate office within the CJFSCC responsible for managing Operational Contract Support (OCS) with interagency and multinational partners. As the single Operational level sustainment interface for our Allies and Partners, this office would be responsible for working with the GCC J4 and JTF J4 to ensure that Host Nation Support arrangements and Acquisition and Cross-Servicing Agreements (ACSA) are in alignment with operational sustainment plans. The CJFSCC would work with interagency and multinational partners to identify, integrate, and synchronize the types of support-including food, fuel, transportation, and ammunition- to execute the campaign plan.

Recommendation 4.6: The CONOPS should highlight the importance and role of allies and partners in executing the CJFSCC mission and identify critical capabilities and potential barriers to integrating multinational sustainment forces.

Communications and Intelligence Support to the CJFSCC

Finding 4.7: Reliable communications and intelligence is critical to executing the CJFSCC mission, particularly in an A2/AD environment.

Discussion: Players frequently highlighted the importance of protecting logistics data and communications from adversary exploitation and manipulation. Players highlighted that the CJFSCC must create contingency plans as the A2/AD environment changes and adjust "as necessary for continued connectivity and timeliness of sustainment." The CJFSCC portion of the CONOPS does not reflect the need to develop "back-up plans" or characterize the type of guidance that would help planners and operators understand how to coordinate and communicate with the CJFSCC in order to sustain combat forces throughout the conflict.

Moreover, the CONOPS also suggests that the "XDOCE will provide the systems connectivity and capacity for XDO C2." Players frequently emphasized the importance of defending logistics networks and ensuring that the SCC XDOCE maintains the resident cyber and communications expertise to do so. Regardless of whether the CJFSCC or J-4 manages sustainment, players acknowledged the importance of operational and tactical intelligence to support the movement and protection of fixed and mobile forces at sea and

ashore. Similar to other component commanders, players advocated for integrating a J-2 staff and its associated processes into the existing CJFSCC organizational structure.

While the CONOPS vaguely describes intelligence and information support to the JTF and CJTUs, it does not discuss its role in support of the CJFSCC. The CONOPS relies on the XDOCE to comply with established Joint C2 data exchange standards to accelerate data sharing across the operational and intelligence communities. The importance of intelligence and communications to the CJFSCC while planning, directing, monitoring, and assessing sustainment operations throughout each phase of the campaign plan is worthy of future examination and inclusion into the CONOPS. Specifically, the following information should be discussed in depth: how to coordinate and integrate information and intelligence to support the sustainment commander; and specific guidance on what information or intelligence is needed, where to get it from, and when to send or push it out between commanders.

Moreover, given the need to acquire and process information and intelligence, players were uncertain of who would "own" the land, sea, air, cyber, and space ISR platforms tasked to support the CJFSCC. Several players suggested that component commanders would support the CJFSCC in this role, while others advocated for temporally "chopping" these forces to the CJFSCC to conduct specific missions. Nevertheless, the CONOPS should describe how ISR and communications is acquired and processed at the Tier 3 level and its relation to CJTUs or TUs. One player comment suggested the following:

> *"There could be a scenario where the CJFSCC needs CJFICC capability added to one of their CJTUs - EW and ISR are potential examples. Likewise, it is reasonable to consider CJFSCC assets transferred to the CJFICC to achieve an objective. A relay-equipped cargo aircraft, transferred to the CJFICC, providing a Communications Bridge may be a good example."*

Recommendation 4.7: The CONOPS should highlight the role and responsibilities of communications and intelligence personnel in support of the CJFSCC mission, incorporate a J-2 and J-6 staff into the CJFSCC organization, and discuss who maintains control authority over ISR assets supporting CJFSCC mission requirements.

ANALYTIC HIERARCHY PROCESS RESULTS

Analytic Hierarchy Process (AHP) is a decision support tool that uses a series of pair-wise comparisons between criteria and options to determine collective criteria weighting and the resulting relative option ranking based on the degree to which the options meet the criteria.

Global '14 participants were divided into three cohorts based on their roles in the game – Tier 2 (JTF), Tier 3 (Component

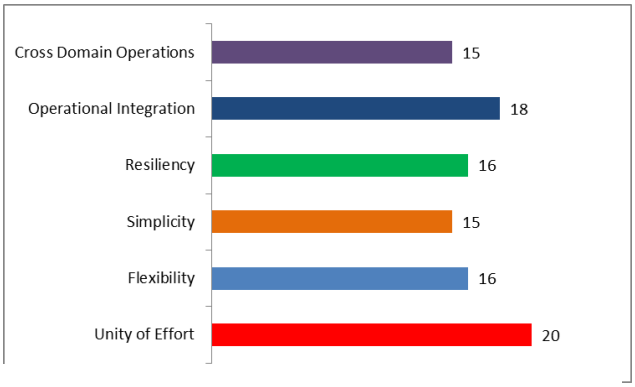

Figure 4: C2 Criteria Weighting

Commands) and Tier 4 (CJTUs and TUs). The Tier 3 cohort was then sub-divided into the five components (referred to here as the ACC, MCC, LCC, ICC and SCC).

During the final combined plenary session, participants were first asked to compare the relative importance of the six criteria to effective command and control. Using the mean data for all participants, the resultant criteria weighting is depicted above.

Using this weighting, the cohorts evaluated the degree to which each attribute (XDOCE, CJTU, ICC and SCC) demonstrated or contributed to the criteria in terms of an overall C2 system. Put another way, how desirable were each of the four attributes in terms of contributing to a C2 system's overall unity of effort, flexibility, simplicity, resiliency, operational integration and cross domain synergy?

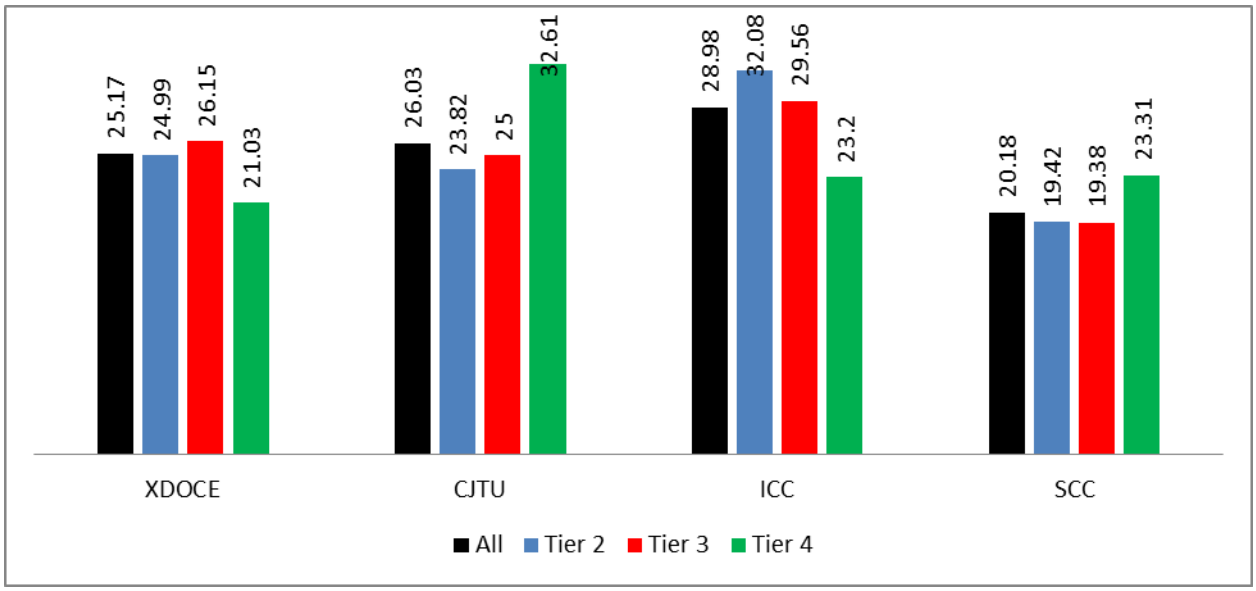

Figure 5: C2 Attribute Evaluation by Tier

Tier 2 and Tier 3 responses were closely matched, with the ICC attribute scoring highest and the SCC scoring lowest for both Tier 2 and 3. Conversely, Tier 4 scored the CJTU highest and the XDOCE lowest.

Taking the Tier 3 results above and breaking them into their constituent component commander parts produces the following results.

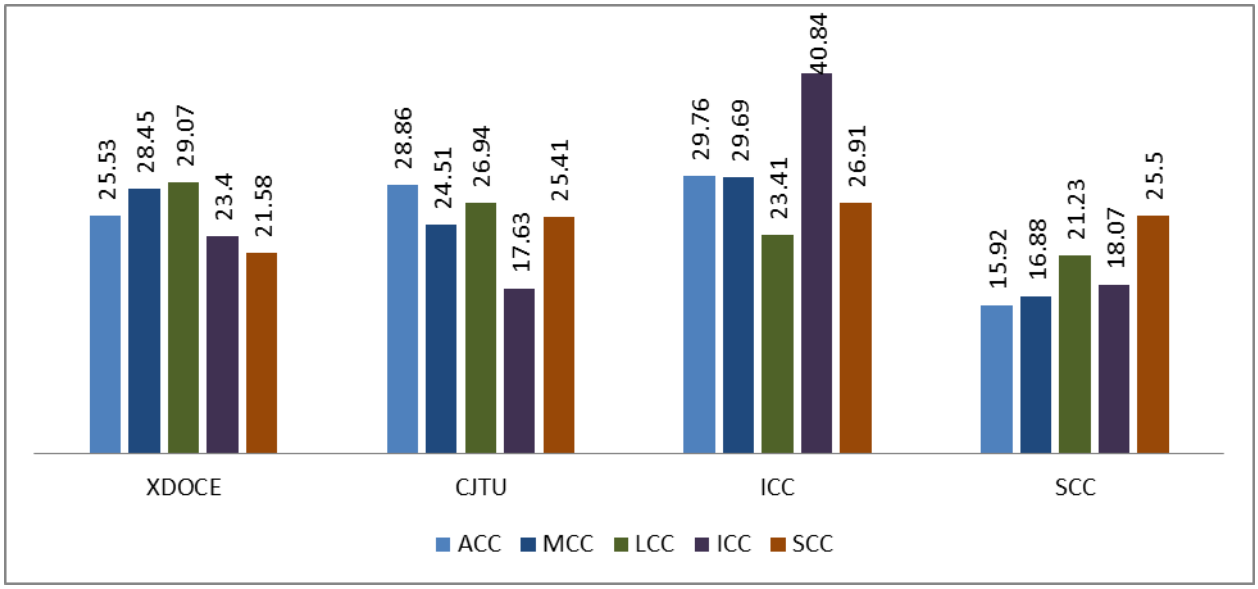

Figure 6: C2 Attribute Evaluation by Component

ACC, MCC, ICC and SCC scored the ICC highest, while LCC scored the XDOCE highest. ACC, MCC and LCC scored the SCC lowest; ICC scored the CJTU lowest; SCC scored the XDOCE lowest.

For Tier 2, unity of effort and cross-domain synergy were the dominant factors contributing to the high ICC score, as indicated by the graphs on the following page.[8]

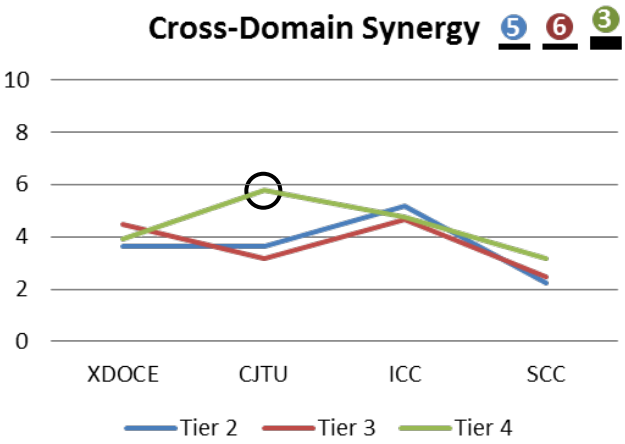

Figure 7: Cross-Domain Synergy Assessment by C2 Attribute and Tier

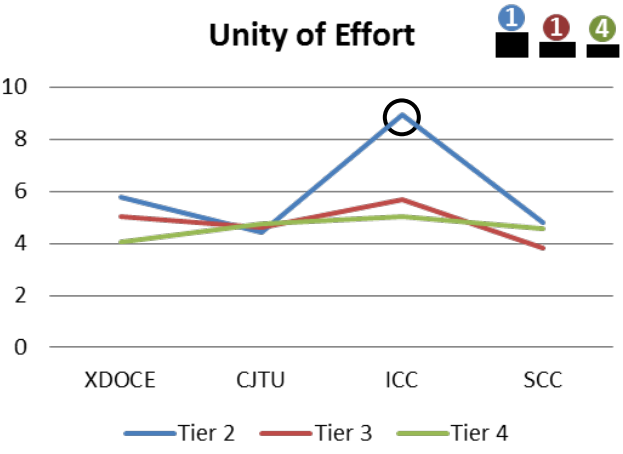

Figure 8: Unity of Effort Assessment by C2 Attribute and Tier

[8] Corner bar graphs show the relative criterion weighting and ranking for each tier.

For Tier 4, flexibility, operational integration and cross-domain synergy were the most significant criteria contributing to the CJTU high score, as indicated primarily by the following graphs, as well as the cross-domain synergy graph above.

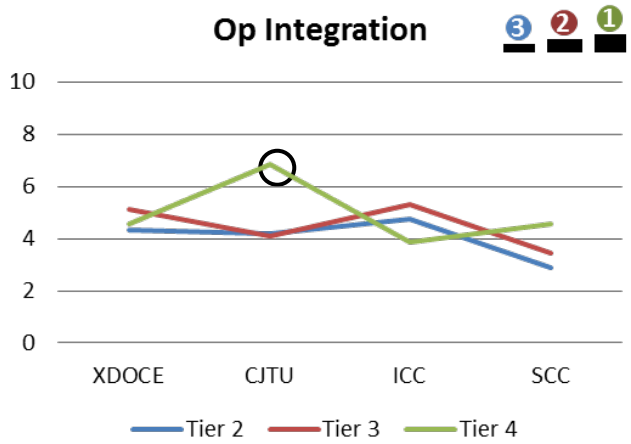

Figure 9: Flexibility Assessment by C2 Attribute and Tier

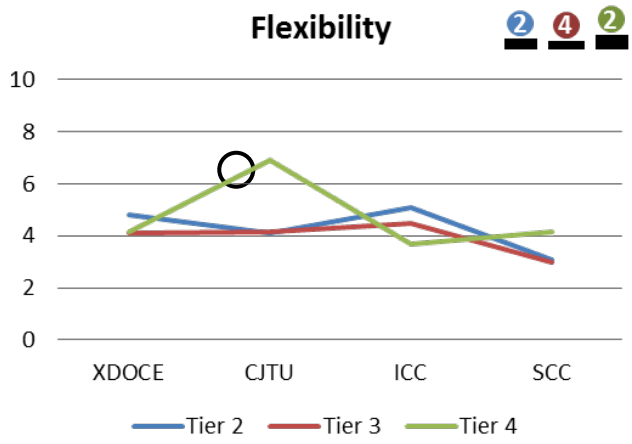

Figure 10: Op Integration Assessment by C2 Attribute and Tier

Simplicity and resiliency had the least amount of variation between the tiers and the attributes, and therefore did little to discriminate between the attributes.

Consistent with Miles' Law[9], i.e. "Where you stand depends on where you sit," Tiers 2 and 3 saw the greatest utility in the ICC and XDOCE attributes, as those attributes were embedded and exercised at those levels. Similarly, Tier 4 saw the greatest value in the CJTU as it was exercised at their level, while the XDOCE and other Tier 3 entities were largely "out of sight, out of mind," outside of receiving the periodic task orders and sending turn reports. This essentially resulted in an 'out of phase' outcome; where Tier 2 and 3 scored an attribute high, Tier 4 scored it low, and vice-versa.

AHP does not directly tell us anything more about the four attributes in terms of changes to the draft CONOP. It does suggest that if further development and analysis is desired with regard to C2 of cross-domain operations in A2/AD environments, then the priority for investigation should be:

1. ICC
2. XDOCE
3. CJTU
4. SCC

[9] Rufus E. Miles, Jr. (1910-1996) was an assistant secretary under Presidents Eisenhower, Kennedy and Johnson. He developed Miles' Law and Six Other Maxims of Management; "Where you stand depends on where you sit," i.e. we see things and form judgments of things from our own perspective.

SUMMARY OF PLAYER-DERIVED THEMES

> *"Joint XDO success is dependent upon level of expertise, authority, ability to work together, and trust up, down, and across the commands; must have rich joint operational expertise and experience to decide and act quicker than our adversary…communicating information is a fundamental problem of C2, and one that will only get worse in an A2/AD environment."*
>
> – Global '14 Player

Enabling Unity of Effort in Joint XDO

Achieving unity of effort was the central challenge to effective joint cross-domain operations in an A2/AD environment. Three themes of expertise, authorities, and PDMA emerged as being most important to players for enabling unity of effort in joint cross-domain operations. Players concluded that no single service or nation has all the necessary capabilities to respond to the wide range of required missions across the JOA. Unfortunately, integrating and synchronizing capabilities across the joint force has been excessively complex and challenging. The challenge in joint cross-domain operations is not due to a lack of resources or capabilities, but rather in being able to quickly bring the right combination of capabilities together, regardless of service or nation, at the right time and place to achieve an effect.

Expertise

XDO

Players emphasized that cross-domain operations would be necessary in future A2/AD environments to achieve effects from domains where access is greater and risk is lower. While each service has historically conducted cross-domain operations, players concluded that joint cross-domain operations require a higher level of integration and expertise. Players at each level of command recognized the lack of cross-domain expertise to plan and execute joint cross-domain operations. Specifically, they proposed that joint planners and operators need to develop a broader knowledge base of joint capabilities operating in a single domain and the effects these capabilities can provide to gain or maintain access in other domains. The integration of cyber, space, and SOF at the operational and tactical level were three capability areas least understood by players. As one player noted, "We need to integrate SOF into planning efforts, especially as the CJFICC looks for ways to degrade Red C2 and prevent Red from degrading our C2." Similarly, another player noted the following:

> *"The greatest challenge with truly embracing the concept of the XDO is providing the commander with the requisite expertise to command space, cyberspace, air, maritime, and land units unilaterally and simultaneously. These domains are so different and so specialized from one another that the SME's in that area currently provide direct support to a single commander."*

Players concluded that current doctrine, education, and training does not sufficiently provide joint planners and operators with the knowledge and skills to effectively plan, direct, monitor, and assess joint cross-domain operations in an A2/AD environment. As one player noted:

> *"We haven't done good integration because we're playing the OLD way. We're NOT looking at RISK and using a different force than our own to perform a mission with less risk. We're trying to hit every nail with our OWN hammer. If I had the visibility and understanding of different capabilities, I would have used a different cross domain asset, but I didn't."*

Players emphasized that the joint community needs to develop, agree to, and understand definitions for each domain, as well as cross-domain operations. As one player noted, "How can we do cross- domain thinking when services have not clearly defined where some domains begin or end?" The participants suggested that cross-domain operations should become a core competency and that joint training cycles for operational and tactical planning staffs should be modified to include exercises involving cross-domain operations. Similarly, the joint professional military education (JPME) curriculum should integrate cross-domain operations as a complimentary approach for responding to the full spectrum of required missions, in both steady state and crises response. Finally, the joint community should develop and publish an overarching Cross-Domain Operations (XDO) Capstone Concept for Joint Operations (CCJO) to complement the ASB Concept and Joint XDO C2 CONOPS and guide the development of future joint force capabilities. The capabilities and competencies for executing joint cross-domain operations in an A2/AD environment should be identified and trained to prior to conflict in order to effectively execute theater campaign plans.

Joint XDO C2 CONOPS

In order to assess the efficacy of the four C2 attributes moving forward, players concluded that the *Joint XDO C2 CONOPS* needs greater detail and the four attributes warrant further examination. Specially, players emphasized the need to better understand the relative strengths and weaknesses of the four attributes compared to the existing C2 system, as well as how their integration would impact current organizational structures, roles and responsibilities, processes, and authorities. For example, some questioned whether breaking up existing service organizations (e.g., CSG, MAGTF, etc.) to form CJTUs would reduce unit cohesion and mission effectiveness. Whether standing or ad hoc, players posited that all four C2 attributes would have significant Title 10 (organize, train, and equip) implications and further analysis is warranted to understand the short and long-term costs and benefits associated with implementation. Nevertheless, players agreed that the services should further integrate platforms and personnel to achieve future warfighting missions.

Players emphasized the need to identify and remove barriers to effectively employ joint capabilities for cross-domain operations in an A2/AD environment. Leaders and organizations at all levels must find better ways to combine their efforts, resources, and capabilities to respond to future warfighting missions. As part of this effort, theater planners should determine which missions warrant the use of cross-domain operations, to include CJTUs. Many players suggested that junior personnel should have a greater role in exploring new and innovative command and control ideas and concepts, while others suggested that this demographic of leaders may lack sufficient experience and expertise to examine potential problems with current structures and processes. Enhancing joint XDO C2 requires new ways of thinking about and managing joint operations prior to and during a conflict. Leaders at all

levels must be open to evolving and adapting the legacy C2 system of today to meet future warfighting challenges.

Air-Sea Battle Concept

While not a new approach to warfare, players acknowledged that advanced adversary A2/AD capabilities would challenge the ability of U.S. and allied forces to gain and maintain operational access. Players concluded that theater campaign planning and design would benefit from using cross-domain operations to disrupt, destroy, and defeat adversary forces as envisioned in the Air-Sea Battle Concept. However, many players reported they had not been exposed to the concept, thus developing a better understanding of it would only enhance their ability to plan and execute cross-domain operations in an A2/AD environment. Similar to the XDO Concept, operational and tactical leaders should ensure planning staffs gain a deeper understanding of the ASB Concept by first exploring threats posed by adversary A2/AD capabilities, how ASB might address these threats, and how ASB and XDO impacts service and joint force development.

While service Title 10 war games continue to explore various aspects of the evolving A2/AD environment, Combatant Commanders should leverage the results of these efforts in their own war games and exercises to continue the examination of the ASB concept in realistic operational scenarios. Such events provide an effective forum for strengthening relationships between operational level and tactical level units, which is essential to effective implementation of the ASB Concept. The results of these efforts should be shared with other Combatant Commands, the Air-Sea Battle Office, the Joint Staff, and the Services, as well as Echelon 2 and 3 organizations such as the USAF's Air Combat Command (ACC), the Navy's Fleet Forces Command (FFC), the Army's Training and Doctrine Command (TRADOC), and the Marine Corps' Combat Development Command (MCCDC).

Authorities

Players concluded that having the ability to change mission, time, and force (e.g., 'TACON-plus') at the tactical level enabled commanders to rapidly respond and adapt to a wide range of missions across the JOA. 'TACON-plus' becomes increasingly important when operating in a communications denied or degraded environment. During game play, Tier 3 commanders routinely delegated 'TACON-plus' authority to Tier 4 Commanders because they had perfect situational awareness of the battlespace and could coordinate with their peers in real-time. This allowed them to quickly adjust, fulfill new requirements, and shift forces to mitigate threats.

However, several players noted that 'TACON-plus' may have served as a "crutch" to compensate for the lack of cross-domain expertise required to establish CJTUs during game play. On several occasions, Tier 4 execution of combat and sustainment missions became misaligned with Tier 3 operational plans. To address this, some participants emphasized that operational commanders should retain operational control of forces and identify specific conditions or criteria (e.g., communications are denied with higher authority; time, space, or missions) for delegating 'TACON-plus' to tactical commanders. As one player noted, "OPCON seems right for the CCs, with, for the Maritime Command being vested in the senior officer afloat - in this construct the CJTUs acts as Officer in Tactical Command with freedom to change or modify missions as operational circumstances dictate."

Players concluded that the CJFICC will need to acquire permissions prior to conflict to effectively employ cyber and space capabilities to gain and maintain domain access in Phases 0 and 1. They posited that significant changes to policy and doctrine would need to occur for this to come to fruition. As one player noted, "Cyber and space within the CJFICC will need permissions prior to conflict or it will have a hard time completing its tasks." Acquiring these permissions requires close and continuous coordination and cooperation between national agencies, the combatant commander, JTF Commander, and the CJFICC, as well as tactical cyber forces embedded into CJTUs.

Players concluded that developing a shared understanding of ROE at the tactical level becomes more critical when planning and executing cross-domain operations in a communications denied or degraded environment. They noted that XDOCEs could play a role in facilitating this understanding with peers and subordinates prior to and during a conflict. Finally, players emphasized that overcoming culture and doctrine barriers requires joint commanders at every level to establish a shared understanding of each service's viewpoint and act from a common set of joint principles that guide the delegation of increased authorities to tactical commanders executing missions in an A2/AD environment.

PDMA: Planning and Directing XDO in an A2/AD Environment

Players indicated that commanders at all levels of the C2 system need a shared understanding of the JTF's and component commander's overall plans (e.g., CONOPS and scheme of maneuver), as well as their intent and guidance. Moreover, roles and responsibilities and authorities across Tier 3 and 4 commanders were often unclear to players. The lack of information sharing up, down, and across the C2 system, as well as insufficient detail in both plans and commander's intent and guidance were highlighted by players as the primary barriers to achieving this shared understanding across the joint force. Within each campaign phase, players highlighted the need to develop a shared understanding of the sequence of operational objectives to achieve the JTF commander's desired end-state and the sequence of cross-domain actions to achieve each objective. As one player noted:

> *"The CJTU idea is a good solution for a communications degraded environment where clear Lines of Operations and operational tasks exist within the context of the Commander's campaign plan. However, since the campaign plan was unclear (e.g., phase triggers, end states, transition points, task organizations), the logic for having CJTUs was lost."*

Prior to executing turn zero, the JTF Commander and his component commanders met face-to-face for an hour to develop the campaign plan. During this meeting, the JTF Commander discussed priority and level of effort, primary and intermediate objectives, sequencing of actions, and encouraged commanders to discuss their ideas and disseminate plans and guidance at the 60 percent level, rather than waiting for the 100% solution. One player later noted, "By the Admiral's guidance and intent ...we anticipated bad comms, and we anticipated that Tier 4 had better SA. A 60 percent plan is better than a 100 percent plan too late." While component commanders and their staffs had access to the broad campaign plan created from the initial planning session, they tended not to share it with their Tier 4 subordinates. As one Tier 4 player

noted, "Without a clear understanding of where the CJTF was moving in that - and future - moves, long-term unity of effort will not be accomplished."

There was a clear disconnect between Tier 3 and Tier 2 commanders related to prioritizing missions and level of effort across Tier 3 commanders. Tier 3 commanders looked to the Tier 2 Commander to prioritize current and future missions and weight of effort, while the Tier 2 Commander directed Tier 3 Commanders to prioritize their missions and efforts based on the overall plan. Players often cited the need to better understand the scheme of maneuver or CONOPS of each component commander, most notably the CJFSCC and CJFICC. Developing and maintaining this shared understanding may result in less intervention being required by higher headquarters to arbitrate competition of resources between Tier 3 commanders and potentially Tier 4 commanders. Planning and executing cross- domain operations in a communications denied or degraded environment also places greater emphasis on identifying and prioritizing information requirements to support commanders at each level. This assertion is best reflected by the following player comment:

> *"Ironic that now that we want to collaborate more, we won't have comms. Our best tool is our adaptability to the environment ...You're going to have limited widows of communication so talk to your teams and figure out what you want to get across and to whom ...if you have an idea that someone else is better suited to complete a task, then turn to your boss and tell them that you think they should offer it to someone else."*

The conditions created during the game to degrade communications between commands often resulted in confusion and tension between players, as expected. Turn Reports sent from Tier 4 to higher headquarters and Integrated Tasking Orders sent from Tier 3 to subordinates were often late, missing, or inaccurate. As one player noted, "ITOs were often reworked at Tier 4 because assets had moved and weren't able to accomplish the mission given due to range/fuel/sustainment." This prevented Tier 3 commanders from developing a shared understanding of Blue-Red force laydown and the results of past combat and sustainment missions in order to accurately develop future plans and orders. Lastly, players advocated for an ITO that provides awareness of requirements across the force to support intelligence analysis, targeting, apportionment, and execution. One player noted, "We have to adjust things on the fly because there isn't a common ITO at the Tier 3 level that they can share with us. If we could get the CJFACC/CJFMCC picture early on, it would preclude us attempting to do this on our own through personal networking."

Planning and intent and guidance were discussed in 33% of the qualitative data coded and analyzed. This observation is not surprising since planners and operators rely on intent and guidance from higher authority to execute missions. The players offered that planners at every level of command - perhaps most importantly at the Tier 4 level - need a clear and common understanding of the JTF and Functional Component Commanders' intent and their Concept of Operations across the campaign. Planning and executing cross-domain operations in an A2/AD environment places greater emphasis on commanders, starting at the JTF level, to prioritize missions and level of effort across the force, prioritize and sequence cross-domain actions and effects, identify the degree of latitude in departure from orders, delineate authorities and

responsibilities between commanders, and discuss what to do in the event of a communications failure. As one player noted,

> *"We believe we have a need and right to increasingly available real-time information and we are modifying our processes to flexible but vulnerable "just in time" mechanisms. If we don't have a solid backup plan and mechanisms (and trained people to use this plan), we will be dead in the water."*

In a communications denied or degraded environment, prioritizing missions and level of effort becomes increasingly important for tactical commanders. As one Tier 4 player noted, "If there is one thing the Tier 3 could provide it would be the weight of effort. If we can focus on specific missions, we will figure out what we need. We're getting ITOs where everything is wrong and if you have given us the authorities, give me the weight of effort." Continuously requesting approval increases time spent planning, directing, monitoring, and assessing operations in a time compressed decision cycle. As one player noted, "We (Tier 4) felt we had enough authorities, but as we tried to cross authorities (CJFACC/CJFMCC) we had issues because we needed to check with Tier 3. Trying to change priority levels in real time is challenging and limited our ability to achieve our objectives."

Players recognized that clarifying intent and guidance becomes increasingly difficult in a communications denied or degraded environment so it is critical that commanders and their staffs develop a shared understanding with their superiors, subordinates and peers prior to a conflict. As a result, players identified the need to educate and train leaders at all levels of command to practice writing and interpreting effective intent and guidance through joint education and training exercises. As one player noted:

> *"Clear and concise phrasing of Command intent is an essential skill to enable mission command…we may need to reach back to some of the great commanders of the past and understand how they phrased their orders - something perhaps that we have forgotten in recent years when we have been able to saturate our subordinates with plans, lists and spreadsheets."*

Finally, players concluded that intent and guidance should discuss "domain hopping" or the "Red and Blue trip wires" that would cause horizontal and vertical escalation across domains, and Blue actions to deescalate or deter further RED escalation within each domain. One player said, "Give them (subordinate and peer commanders) the off ramp to STOP, down to setting-up conditions for freedom of maneuver…" Players noted that future analysis and gaming efforts are warranted to explore how operational deterrence and escalation of actions across all five domains – land, air, maritime, space, and cyberspace interrelate against an advanced A2/AD adversary.

Players concluded that current C2 processes and products (e.g., control orders and tasking orders) at the Tier 3 and 4 levels are insufficient to coordinate cross-domain requirements, effects, and capabilities to prevent fratricide and mitigate mission overlaps and gaps. They emphasized that commanders at all levels of command must develop and maintain a common understanding of all five domains on a near-real time basis and possess the expertise internally to their staff to monitor and assess cross-domain operations. Players concluded that cross-domain

based assessments, control orders, and tasking orders should be developed to compensate for the lack of cross-domain products in place today. They also emphasized that common indicators or measures of effectiveness should be developed to assess the effects of cross-domain operations on mission accomplishment.

Specifically, players noted that current battlespace control measures, such as the Air Control Order (ACO) and Waterspace Management Plan, are necessary but probably insufficient to provide commanders with the required battlespace control required to fight effectively in all five domains without significant fratricide. Each domain will require control orders, and these orders will need to be integrated and made available to every functional component – and their subordinate commanders – who have forces operating in those domains. While current service and joint planning processes do not prevent planners from taking a domain-based approach to campaign planning, with a focus on domain access and the ability to project power to achieve effects, participants suggested that current planning processes at the Tier 3 and 4 levels should be modified to include the use of cross-domain assessments. While XDOCEs at each level of command would most likely perform these functions, players agreed that tactical commanders assume more responsibility to monitor and assess domain access and risk in an A2/AD environment.

Even though the game chat function, like other communications paths, experienced delays due to enemy action, the Tier 3 players continued to rely on it to coordinate plan, direct, monitor, and assess cross-domain operations throughout the game. Players concluded that chat provided the high-level of communication and coordination necessary to prevent fratricide and improve multi-domain awareness at the Tier 3 level. They noted that improving access and interoperability between service chat forums is paramount to rapid decision-making in a high-paced A2/AD environment. Players agreed that Tier 2, 3, and 4 XDOCEs and traditional planners should operate within the same chat forum to prevent overlaps and gaps in mission planning and build broader multi-domain awareness.

XDO C2 IMPLICATIONS FOR INTELLIGENCE

While not an area of focus in the game, an effort was made to examine the impact that XDO C2, in particular the 4 new attributes, would have on existing intelligence processes and procedures. Resulting from that effort, players noted that collecting, analyzing, and disseminating relevant, timely, and actionable intelligence to joint planners and operators becomes problematic when communications are denied and degraded. They concluded that current intelligence processes and command relationships may be insufficient to effectively support cross-domain planning at the tactical and operational levels, as well as planning and directing intelligence operations. Players emphasized that an overreliance on national intelligence products and platforms lengthens the time required for decision-making and places forces in theater at a disadvantage. The genesis and implication of this assertion is best characterized by the following player quote:

> *"This is borne of decades of information superiority, permissive environments, and CONUS as a sanctuary. We'll need to go "back to the future" and start to live with denied comms, unavailable Intel, and providing initiative via mission command to lower level commanders. The ISR / Intel 'Monster', as it*

> *currently exists, will not be able to properly function in a contested environment."*

To mitigate this shortfall, players concluded that CJTU Commanders should maintain organic tactical ISR capabilities to collect, analyze, and disseminate information and intelligence to provide tactical indications and warnings and force protection intelligence to enable CJTU Commanders to conduct cross-domain operations across a range of missions. They highlighted the need to identify intelligence and information requirements of the XDOCE, CJTU, CJFICC, and CJFSCC, how each of the services would integrate national and theater intelligence capabilities, and who retains command authority of service and theater ISR assets to support the four C2 attributes. Players also emphasized that current intelligence assessments and estimates of adversary intentions, capabilities, and COAs may need to be refined and tailored to meet operational and tactical commanders' needs. Given the need for intelligence support at each level of command, players suggested that intelligence planners should be fully integrated with the XDOCE, CJTU, CJFICC, and CJFSCC to support the development of the overall campaign plan, desired cross-domain effects, and cross-domain measures of mission success. It was assumed that standardizing intelligence protocols, processes, and procedures will help intelligence planners identify intelligence requirements, plan and direct intelligence operations, process and analyze information, and produce and disseminate the intelligence products needed to effectively support the XDOCE, CJTU, CJFICC, and CJFSCC.

Finally, players emphasized that significant changes to service and joint doctrine, education, training, and career progression would be necessary to support cross-domain planning at the tactical and operational levels, as well as planning and directing intelligence operations. They highlighted that intelligence planners need to develop a broader and deeper level of joint expertise and experience related to joint intelligence capabilities and limitations, joint campaign planning and design, and how an adversary would deny friendly forces sanctuary and freedom of maneuver by employing cross-domain operations to disrupt, destroy, and defeat friendly forces within the operational environment. Players posited that developing and maintaining a cadre of joint intelligence planners and operators that specialize in supporting XDOCE planning and CJTU operations requires joint education and training earlier in their careers. This expertise not only supports the development of intelligence processes and products, but it may help intelligence planners challenge current planning assumptions and provide alternative perspectives.

V. Conclusions and Recommendations

While the ASB concept highlights the need to command and control cross-domain operations which are joint, networked, and integrated, no organizational structure is proposed; only the requirement that any suitable structure must be capable of tight, real-time coordination. Establishing unity of effort among joint and combined forces engaged in cross-domain operations against an advanced A2/AD adversary can be complex and challenging. Doing so in a communications degraded or denied environment requires commanders to exercise authority and direction over assigned and attached forces in real time while critical information, systems and services are reduced or prevented. To attain the level of speed and coordination required to outpace the adversary, a commander must be able to quickly direct and control forces operating in the air, maritime, land, space and cyberspace domains.

Hard choices must be made in allocating limited resources while executing joint cross-domain operations in an A2/AD environment, and the same is true when it comes to continuing to develop and explore the concept of XDO. Therefore, the joint community should officially designate a lead organization responsible for XDO development and implementation. While this has been de facto the ASB Office, the joint community should determine whether they or another service or joint organization, such as the Joint Staff J7, is best suited to officially lead this effort. This organization should develop an XDO Concept document in order to build a common understanding of what cross-domain operations are, why they are important, and the challenges of conducting them. Such a concept document should provide the justification for XDO C2 and the associated CONOPS. Concurrently, that lead should oversee the continued development of the XDO C2 CONOPS, to include the incorporation of the recommendations contained in this report.

Regarding the 4 C2 attributes, whose examination was the focus of this year's Global effort:

- The CJFICC should be implemented now, but solely as a Cyber Component Commander, under the lead of USCYBERCOM, and leveraging the results of other ongoing Cyber C2 efforts. In addition, work should continue to evaluate whether the Space domain and/or Information Operations would benefit from a dedicated component commander.
- Both the XDOCE and CJTU should be pursued through the development of detailed implementation plans that include incorporation into joint and combined war games and exercises (Both of these attributes, along with the CJFICC, were intended to be examined in the Air Force's Unified Engagement'14 Title 10 War Game, which took place in Hawaii in January, 2015).
- The CJFSCC is not ready to move forward, as it requires further evaluation to determine whether it contains sufficient utility to warrant further development and implementation.

INTENTIONALLY BLANK

VI. Annexes and Supplemental Data

ANNEX A: PLAYER MANNING BY CELL

Billet	Rank	Service	Country	Command
CJTF CDR	RADM	USN	US	COMNAVSURFLANT
Deputy CJTF CDR	RDML	USN	US	INSURV
CJTF XDOCE	CAPT	USN	US	OPNAV N3N5- ASB
CJTF Air SME	Wg Cdr	RAF	UK	RAF Air Warfare Centre
CJTF Air SME	Col	USAF	US	HQ AF/CVAR
CJTF Cyber SME	CAPT	USN	US	Joint Staff, J5 Cyber Policy Division
CJTF Intel SME	CIV	USN	US	Naval War College
CJTF XO	MAJ	USA	US	TRADOC
CJTF Maritime SME	CIV	USCG	US	USCG HQ
CJTF Maritime SME	CDR	USN	US	COMUSFLTFORCOM
CJTF Land SME	CAPT	USA	US	EWCT/Futures Directorate
CJTF SOF SME	CIV	DOD	US	USSOCOM
MCC	Capt	RN	UK	UK Maritime Warfare Centre
MCC Maritime SME	CAPT	USN	US	OPNAV N3N5- ASB
MCC Maritime SME	CAPT	JMSDF	JPN	Maritime Staff Office/JMSDF
MCC Maritime SME	Cdr	RN	UK	UK Maritime Warfare Centre
MCC Naval Intel SME	CDR	USN	US	NAVCYBERFOR/IDFOR
MCC Naval Sub SME	CMDR	RAN	AUS	UK Maritime Warfare Centre
MCC Naval TACAIR	CDR	USN	US	OPNAV N98
MCC Air XDOCE	WGCDR	RAAF	AUS	USAF ACC / 505th Training Group
MCC Cyber XDOCE	Maj	MoD	UK	Joint Force Cyber Group
MCC Land XDOCE	CIV	USA	US	FWD, ARCIC, TRADOC
MCC Maritime XDOCE	LCDR	USN	US	COMSEVENTHFLT
MCC Space XDOCE	Maj	USAF	US	HQ USAF / SAF-SP
ACC	CIV	USAF	US	OPNAV N3N5- ASB
ACC Air SME	LtCol	USAF	US	AFGSC/A8P
ACC Air SME	CIV	USAF	US	HQ AF / A5XS Wargaming

Billet	Rank	Service	Country	Command
ACC Air SME	LCDR	JMSDF	JPN	Japan MSDF LNO OPNAV N51
ACC Air SME	LCDR	USN	US	NWDC
ACC Air Intel SME	Maj	USAF	US	AF/A2D
ACC Army Msl Def SME	CIV	USA	US	Army SMDC/ARSTRAT
ACC Air XDOCE	CIV	USN	US	NWDC
ACC Cyber XDOCE	LCdr	RCN	CAN	CNavy/Director of Naval Strategy
ACC Land XDOCE	Lt Col	RM	UK	UK Joint Forces Command
ACC Maritime XDOCE	CDR	JMSDF	JPN	NWDC JMSDF PEP
ACC Space XDOCE	CIV	USAF	US	HQ USAF/A5XS
ICC	CAPT	USN	US	FCC/C10F
ICC Intel SME	CDR	USN	US	FCC/C10F
ICC Joint Cyber SME	CIV	USA	US	Army Cyber Center of Excellence
ICC Joint Cyber SME	Lt Col	USMC	US	MARFORCYBERCOM
ICC USAF Space SME	Col	USAF	US	PACAF/A3/6
ICC USN Space SME	LCDR	USN	US	COMTENTHFLT/FLTCYBERCOM
ICC Air XDOCE	Col	JASDF	JPN	Air Staff Office/Japan Air Self Defense Force
ICC Land XDOCE	CIV	USA	US	ARCIC/JACD
ICC Maritime XDOCE	CMDR	RAN	AUS	Royal Australian Navy
LCC	COL	USA	US	Mission Command Battle Lab
LCC Ground Intel SME	CIV	USA	US	US Army TRADOC/DCS, G-2
LCC Land Domain SME	Lt Col	USMC	US	HQMC I&L
SOF SME	MAJ	USA	US	SOCOM
LCC Air XDOCE	Lcol	RCAF	CAN	1 Canadian Air Division HQ
LCC Cyber XDOCE	CMDR	RAN	AUS	Royal Australian Navy
LCC Maritime XDOCE	Cdr	RCN	CAN	CNavy /Director Naval Strategy
LCC Space XDOCE	MAJ	RCAF	CAN	SAF/SP
SCC	LTC	USA	US	CADD / MC CoE
SCC Air Log SME	CIV	USAF	US	AMC
SCC Combat Eng SME	CDR	USN	US	NECC
SCC Ground Log SME	CIV	USA	US	US Army TRADOC
SCC Intel SME	CIV	USMC	US	MCIA
SCC Joint Log SME	Cdr	RN	UK	British Defence Staff
SCC Naval Log SME	CAPT	USN	US	OPNAV N41
SCC Naval Log SME	LCDR	USN	US	COMPACFLT

Billet	Rank	Service	Country	Command
SCC Air XDOCE	LtCol	USAF	US	ACC/A3F Joint Integration
SCC Land XDOCE	LTC	AA	AUS	HQ TRADOC
SCC Maritime XDOCE	CDR	USN	US	NAVCENT / CMF
ACC Tier 4	CIV	USAF	US	AF/A8X
ACC Tier 4	LtCol	USAF	US	Air Combat Command
ACC Tier 4	CIV	USAF	US	Air Combat Command
ACC Tier 4	Lt Col	USMC	US	OPNAV N98
ICC Tier 4	LtCol	USAF	US	AF/A5XS
ICC Tier 4	LtCol	USAF	US	HAF/A3S
LCC Tier 4	Maj	USAF	US	PACAF A3/6/C2
LCC Tier 4	MAJ	USA	US	TRADOC, JACD
MCC Tier 4	LCDR	USN	US	COMSUBLANT
MCC Tier 4	LT	USN	US	MCWL Wargaming
MCC Tier 4	Lt Col	USMC	US	CD&I / SID
MCC Tier 4	CMDR	RAN	AUS	Royal Australian Navy
SCC Tier 4	CIV	USAF	US	AMC/Strategic Planning Division
SCC Tier 4	LCDR	USN	US	USFF N413
HHQ	CDR	USN	US	JS J7
HHQ	CIV	USCG	US	USCG HQ
HHQ	CIV	DoD	US	JS J7 FJFD JWD
HHQ	CIV	DoD	US	JS J7 JWD

INTENTIONALLY BLANK

U.S. NAVAL WAR COLLEGE

Est. 1884

NEWPORT, RHODE ISLAND