Marine Corps

Concept for

Command and Control

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Foreword

The *Marine Corps Concept for Command and Control* complements the Marine Corps' capstone concept *Expeditionary Force 21 Forward and Ready: Now and in the Future* and subordinate operating concepts. It describes how command and control (C2) capabilities will enable commanders to operate effectively in the future operating environment. This concept focuses on the commander and his organization in exercising the art and science of C2 in a way that enables him to gain knowledge advantage through enhanced situational understanding, collaboration, and information sharing.

This concept foresees an operating environment characterized by unprecedented levels of instability and complexity; one in which Marine Corps operating forces will require closer collaboration, situational understanding, flexibility, and greater integration with joint, interagency, governmental, and multinational partners. Success in such an environment requires an evolving C2 capability that will free commanders from their command centers and improve their ability to impart clear guidance and intent facilitating adjacent commanders and subordinates to develop a shared understanding of the mission area and mission parameters, monitor execution, devise plans, and direct operations. In a degraded information environment, this C2 capability will allow forces and subordinate commanders the ability to self-synchronize with a shared understanding of the commander's intent.

This concept emphasizes that C2 must be leader-centric and network enabled. It stresses that C2 structures must allow commanders the ability to both seamlessly integrate and weigh warfighting functions in order to operate in multiple domains to achieve objectives. It describes how a networked environment will enable Marine air-ground task forces (MAGTF) to conduct globally integrated operations with mission partners and facilitate integration across various elements and command echelons.

The fundamental purpose of this document is to inform and guide the Marine Corps Capabilities Based Assessment process by identifying the C2 capabilities the Marine Corps will require to achieve the vision described in *Expeditionary Force 21* and operate in future threat environments. Force developers and integrators can further examine these required capabilities for potential solutions using the doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy methodology. This concept addresses and applies to all elements and command echelons of the MAGTF, the headquarters, and the supporting establishment.
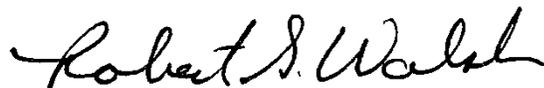
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1   Introduction

The *Marine Corps Concept for Command and Control* identifies the command and control (C2) capabilities that the Marine Corps will require to conduct the full range of military operations in joint, interagency, intergovernmental, and multinational environments. This document addresses compelling strategic, operational, and tactical challenges the Marine Corps will face. This concept aims to inform the Marine Corps' Capabilities Based Assessment process in order to enable force developers to pursue the needed C2 capabilities through appropriate changes in doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy (DOTMLPF-P).

This concept covers the 2017-2025 timeframe and applies to all Marine air-ground task force (MAGTF) elements and echelons of command. It addresses requirements for strategic, operational, and tactical levels of operation. MAGTF operations will employ the C2 activities (organize, understand, plan, decide, direct, and monitor) across all phases of a campaign. For the capability developer, the campaign-phasing construct frames the need for MAGTFs to be capable of: sustaining continuous forward presence operations; working with numerous and diverse partner organizations; quickly aggregating and responding to various contingencies; conducting wide-ranging and often simultaneous activities; effectively dealing with changing operational situations; and quickly transitioning from one mission to the next. It is essential that our philosophy of command support the way we fight. Command and control must be decentralized, primarily to generate the tempo of operations we desire and to cope with the uncertainty, disorder, and fluidity of combat.

This concept is derived from Joint and Service guidance and concepts. It enables and supports the vision and central ideas in the Marine Corps capstone concept *Expeditionary Force 21 Forward and Ready: Now and in the Future.* It reflects the strategic and operational considerations for employing and equipping MAGTFs to:

- Operate forward with a regional focus, yet be globally capable.
- Build partnerships and execute persistent forward engagement and security cooperation activities.
- Increase forward presence with posture that ensures one-third of active operating forces are immediately available for employment.[1]
- Prosecute complex combat operations throughout the littorals against asymmetric and adaptive threats as part of an integrated naval force.[2]
- Maximize speed and freedom of action through seabasing, while minimizing footprint ashore.
- Conduct joint forcible entry operations from the sea.
- Engage in sustained operations ashore, as required.
- Lead joint and multinational operations and enable interagency activities.
- Increase collaboration with Special Operations Forces.
- Operate in complex environments characterized by growth of social media, availability of information technology, importance of signature[3] management, challenges to electromagnetic spectrum access and the globalization of cyberspace capabilities.[4]

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[1] Expeditionary Force 21 Forward and Ready: Now and in the Future, 4 Mar 2014, p.12.
[2] Ibid.

2 Future Operating Environment[5]

The future operating environment will be increasingly volatile, unstable and complex, framing a security landscape where weapons and technology proliferation and exponentially increased cyberspace capabilities will empower the violent actions of both state and non-state actors. Hybrid threats, which include transnational criminal organizations and fundamentalist extremist groups, will threaten U.S. interests by fomenting instability and regional unrest. As they do so, the potential for such adversaries to obtain and employ weapons of mass destruction will increase. Responding to national and international challenges will stretch the employment capacity of the U.S. military, demanding a flexible force in readiness with capabilities that can enable an immediate, effective, global response.

Many of these challenges and opportunities will occur in the littorals, those congested and diverse areas where the sea and land merge. Most maritime activities—commercial shipping, fishing, and oil and gas extraction, for example—take place within 200 miles of the shore. Additionally, more than 80% of the world's population currently resides within 100 miles of a coastline—and the proportion is increasing. In many cases, threats to our interests may require expanding the concept of littoral maneuver to hundreds of miles inland to resolve crises. Geography and demographics are creating a future security environment with a significant littoral dimension; one in which an "Arc of Instability" that encompasses the littorals of South Central Asia, the Middle East, Africa and Central and South America is prominent.

Naval forces, because of their readiness, responsiveness, flexibility, precision and strategic mobility, are essential to ensuring continued access and security in the global commons and the littorals. The once likely need to conduct sustained operations ashore has decreased, as it is more probable that over the next ten years naval forces will need to address small-scale crises and limited contingencies in and around the littorals. It is increasingly certain that should major operations and campaigns occur, they will transpire in the maritime domain and the littorals.

The world's waterways support 90% of the world's trade. The littorals, therefore, are an important dimension of the operational environment. The ability to overcome political, geographic, and military impediments to access ashore has reemerged as a critical necessity for extending US influence and power overseas. The significance of securing the maritime domain cannot be overstated. This means that the Navy-Marine team will continue to use the sea as both maneuver space and a secure base of operations – seabasing. Our ability to seabase will combine the aspects of forward presence and engagement with the capability to rapidly deploy and employ forces to meet future security challenges. Operations within this environment will require improved integration, interoperability, enhanced awareness, and training.

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[3] "A signature is the characteristic of an indicator that makes it identifiable or causes it to stand out…Reducing the uniqueness or stability of the indicator's signature increases the ambiguity of the adversary's observations." MCO 3070.2A, The Marine Corps Operations Security (OPSEC) Program, 2 Jul 2013, p. 3-1.

[4] Expeditionary Force 21, p. 13.

[5] Extracted from Expeditionary Force 21, pp. 9-11.

Future campaigns are more likely to be naval in character due to conflicting claims over portions of the sea and its resources, growing naval competition, and the rise in littoral land-based threats. The development and proliferation of anti-access and area-denial (A2/AD) capabilities threaten freedom of action at sea and endanger the limited number of overseas U.S. bases.

Meeting these challenges requires the ability to conduct operations across all domains in a holistic, coordinated manner in order to both project power and control the sea. Accordingly, establishing and operating either from the sea base or advanced austere bases remain a key operational capability which future C2 must enable.

The Marine Corps must use the sea and advanced bases to "turn the A2/AD table" on an adversary, either prior to or in the midst of a conflict. Likewise, the ability to establish a network of numerous austere advanced bases—by occupation or seizure—as a means of dispersing aircraft, missiles, and intelligence, surveillance, and reconnaissance assets may become an imperative. Establishing, or merely demonstrating the ability to establish rapidly such "oceanic outposts" would strengthen our ability to reassure allies and deter adversaries.

The increased range, precision, and proliferation of A2/AD systems highlight the need to conduct dispersed operations with smaller, task-organized forces. Moreover, Geographic Combatant Commanders (GCC) are increasing their demand for tailored forces to conduct theater security cooperation activities with a wider number of partner nations. Theater commanders must also be prepared to quickly aggregate and reorganize forces into larger formations to expeditiously deal with escalating crises and contingencies. These demands call for a new approach to how we organize, deploy and employ forces—especially with regard to effectively linking Marine Corps, Navy, Coast Guard, Special Operations Command and partner capabilities.

3 Military Challenge

Effective C2 is a cornerstone of MAGTF operations. Command and control integrates all elements of the MAGTF, the headquarters, and the supporting establishment, to create synergistic effects and meet mission needs across the range of military operations (ROMO). To leverage C2 across the ROMO, Marine Corps capability developers and integrators must develop, prepare, organize, train, and equip MAGTFs with the following attributes: flexibility, deployability, and interoperability. To realize these attributes and effectively exercise C2, the Marine Corps must overcome the following challenges to:

- Conduct assured C2 from anywhere in the operational environment to include non-contiguous areas and austere environments.
- Conduct C2 from non-traditional maritime platforms and vessels other than amphibious ships.
- Conduct dispersed operations with smaller task-organized forces, and quickly aggregate and reorganize forces into larger formations to address escalating crises and contingencies.
- Conduct dispersed operations in a communications denied or degraded environment with minimal centralized control and without continuous operational updates.
- Seamlessly integrate C2 of the MAGTF into C2 of the joint force.
- Seamlessly coordinate and collaborate with other USG agencies and partners.

- Integrate C2 of the MAGTF and C2 of Special Operations Forces in order to facilitate collaborative planning and synchronization of operations under the supported/ supporting relationship construct.
- Provide rapidly scalable crisis response C2 that can seamlessly expand to control a larger Combined Joint Task Force or support an already established JTF.
- Execute complex combat operations throughout the littorals as part of an integrated naval force.
- C2 disaggregated forces to conduct theater engagement in support of potentially multiple GCC needs.
- Operate in an increasingly complex information environment characterized by the growth of social media, availability of information and information technology, challenges within the electromagnetic spectrum, and the globalization of cyberspace capabilities.
- Access relevant information/data, process it into understanding, then share the processed information/data to enable decision making in an assured environment.
- Provide shared understanding[6] to facilitate self-synchronization[7] of forces.

Mitigation of these challenges will ensure the Marine Corps is able to contribute fully to globally integrated operations. It will also provide commanders with the needed resources and guidance to cope with complexity, uncertainty, and rapid change. Ultimately, the objective is to provide commanders the means to make timely, effective decisions that enable mission accomplishment.

4   Central and Supporting Ideas

Command and Control is the means by which a commander recognizes what needs to be done and sees to it that appropriate actions are taken.[8] The basic elements of a C2 system are people, information, procedures and a support structure, which aids the people who create, disseminate and use information.[9] As such, C2 is both art and science. Future MAGTFs require a C2 capability that allows decision-makers to operate effectively in a fluid environment. Advanced information technologies that provide seamless information flow across organizational boundaries will allow decision-makers to gain a knowledge advantage through enhanced situational awareness, collaboration, and information sharing. The result will be increased operations tempo due to effective and timely decision-making, and unity of effort.

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[6] Shared understanding is "a shared appreciation of the situation supported by common information to enable rapid collaborative joint engagement, maneuver, and support." Command and Control Joint Integrating Concept, Final Version 1.0, 1 Sep 2005, p. 48.

[7] Self-synchronization is "the ability of a well-informed force to organize and synchronize complex warfare activities from the bottom up. The organizing principles are unity of effort, clearly articulated by the commander's intent, and carefully crafted rules of engagement. Self – synchronization is enabled by high level knowledge of one's own forces, enemy forces, and all appropriate elements of the operating environment." Command and Control Joint Integrating Concept, p. 48.

[8] MCDP 6, p. 37.

[9] It is important to note that although we often refer to families of hardware as "systems" themselves, the command and control system is much more than simply equipment (MCDP 6).

Commanders and their staffs will achieve a refined, collective understanding of the situation through widespread information-sharing, understanding of the commander's intent, view of the operational environment, and collaborative situation assessments. They will integrate and submit requests for information to enable the conduct of operations forward, with some functions conducted in sanctuary or elsewhere, as appropriate. New mobile technologies and C2 platforms will free commanders from their command centers and allow them to conduct critical C2 functions from anywhere in the operational environment with minimal risk.

Enhanced awareness, coupled with continuous collaboration, should result in faster and better-informed decisions and plans as well as facilitate the self-synchronization of forces in fluid situations. Commanders will make decisions with greater confidence and accuracy due to relevant information gained through shared understanding. Planning will include broader information-sharing and more extensive collaboration, potentially enhancing the quality of the planning process.

Collaboration leverages the power and synergy of a group by allowing members to work together on a common task, such as a situation assessment or an operational plan. Robust network communications and collaboration capabilities will allow commanders to consult rapidly with each other and the senior commander when problems arise. These C2 enablers must be sufficiently agile and responsive to support forces operating at global distances, deploying and maneuvering independently on multiple lines of operations from multiple points of origin and concentrating fluidly. They must facilitate a shared understanding of commander's intent. Systems must facilitate integration and information sharing across multiple security levels, all domains, organizational echelons, and with partners and allies. Additionally, to maintain consistency of operational command, systems must be sufficiently common and scalable facilitating micro to macro adjustments as the force expands or contracts to adjust to the fluid environment.

Expeditionary Force 21 reinforces the concept that it is incumbent upon a commander to tailor the C2 structure and communications network to ensure mission success. In essence, he must be able to treat the network and C2 structure as a maneuver element where he task organizes capability to weigh the main effort across warfighting functions and command structures. The information environment must facilitate partner integration and allow for a networked environment that provides seamless information-sharing, shared understanding, and collaboration. Robust information sharing across all functions and echelons is integral to achieving the desired outcomes.

While this is the goal, the reality is the Marine Corps will never have the bandwidth available to meet all information requirements across the MAGTF. To mitigate this limitation, commanders must think of the network as a maneuver element that enables the performance of critical C2 functions throughout the operation and prioritizes support to required C2 capabilities. Simply, the complexity we anticipate in the future environment, especially in regards to contested cyberspace and limited bandwidth, will require commanders to think of the network in operational terms. That is, commanders must plan for and have the capability to maneuver and adjust the network to provide C2 at decisive points and time. Limited throughput capacity will require commanders to allocate network resources to the decisive point; much like shifting and concentrating fires to impart the desired effects on an adversary. C2 structures must allow for this flexibility and commanders and staffs must train for this eventuality.

Agile C2 capabilities must allow the commander to maintain effective and coherent C2 across all operational environments, physical domains, and cyberspace. Flexible options allow commanders to employ centralized or decentralized C2 as the situation dictates. Shared understanding gained through comprehension of commander's guidance and intent, coupled with appropriate decentralization of decision-making, planning and execution authority, reduces the time required to respond to new threats and changing situations. It facilitates force self-synchronization. Commanders maintain their authority through the ability to monitor the situation and change decision authority when appropriate. Capabilities should allow commanders and staffs to maintain situational awareness to ensure proper execution yet not interfere with subordinates' actions nor constrain their initiative.

Capabilities must enable commanders to visualize, describe, or direct necessary actions in a timely and trusted fashion. Commanders achieve this confidence through well-educated leaders and trained teams, working together with a common purpose and supported by reliable systems that provide relevant information facilitating a shared understanding. This shared understanding allows subordinate leaders facing both battlefield friction and increasing complexity, to understand their higher commander's mission, intent, and share a common operational view, empowering their initiative to exploit opportunity. Such opportunity is likely fleeting so issues of control and authority must be resolved to favor speed, distributed action and combat effectiveness.

To achieve the adaptability and discrimination required in future combat, commanders must embrace decentralized command with mission-type orders, backed by a networked control system that informs the commander in a timely manner. Such a decentralized approach, coupled with shared understanding and applied in an environment of trust, enables subordinates to develop the situation, seize the initiative, create and exploit opportunities and cope with uncertainty. Use of mission-type orders will remain especially important given that many future enemies will attempt to disrupt U.S. and coalition information systems through computer network attack and other means. Commanders and their staffs must prepare and train for operations in an electronic denied or degraded environment, operating with locally available data and networks until connectivity can be restored.

Mission command[10] must be understood in the context of the modern information environment, including advancements in command and control technologies and their vulnerabilities. Commanders must recognize the illusion of control that technology can present and resist the temptation to micromanage.

Common, shared doctrinal education provides the critical foundation for operations in a complex environment. Exercises and deployments that reinforce blue / green staff relationships to foster greater unity of effort, increase speed of action, and seamless execution of sea control are essential. Training must strain a commander's decision support mechanisms by introducing an uncomfortable level of imperfect knowledge

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[10] "Mission command is the conduct of military operations through decentralized execution based upon mission type orders. Successful mission command results from subordinate leaders at all echelons exercising disciplined initiative within the commander's intent." MCDP 1-0, Marine Corps Operations, 9 Aug 2011, p. 7-5.

resulting from missing or degraded information, intelligence, and communications capabilities. Training in the use of mission-type orders, which give rise to empowering subordinates, encouraging initiative and increasing self-synchronization, provides the most important and reliable defense against enemy disruption of friendly C2.

5   Required Capabilities

Evolving security concerns demand changes in our forward-deployed, crisis response force to include new operational thinking, concepts, capabilities, and partnerships. For the Marine Corps to continue providing GCCs with essential capabilities to deter conflict, build alliances, deny sanctuary and, when required, defeat adversaries, future MAGTFs will require the ability to:

Exercise command.

Command is the authority that a commander in the armed forces lawfully exercises over subordinates by virtue of rank or assignment. Effective exercise of command requires a commitment to employing mission command, the command philosophy that empowers individuals to exercise judgment in how they carry out their assigned mission. Mission Command emphasizes trust, force of will, intuitive judgment and creativity. Commanders must be able to exercise effective leadership of an interdependent force in rapidly changing scenarios involving complex distributed, simultaneous or sequential operations, often with other agencies and nations. Unity of effort and the authority of the commander must be preserved.

Establish/adapt command structures and enable both global and regional collaboration.

Commanders must be able to quickly establish or adapt command structures across the force and within the staff tailored to the mission, and to create the processes that will enable horizontal and vertical collaboration. The information environment should enable collaboration across multiple security levels without need for segregated hardware systems. Commanders must be able to quickly and seamlessly integrate scalable, crisis response C2 to control a larger task force or integrate with an already established JTF. It is essential that the infrastructure be in place to enable rapid reaction to new crises.

Develop and maintain shared situational awareness and understanding.

This capability includes the ability to access a common, user defined, operational picture presenting current and forecast information on adversary and friendly forces, neutral elements, the environment and geospatial information. The "picture" is built through access to both processed and raw data from sensors, analysts and other sources, and through collaborative analysis and assessment of this data. SA, transformed into knowledge through analysis, synthesis, experience and collaboration, enables situational understanding[11]. The information environment must support forces operating at global

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[11] Situational understanding is "the product of applying analysis and synthesis to relevant information to determine the relationship among mission, enemy, terrain, weather, troops and support available -- time available variables to facilitate decision-making." MCRP 5-12C, 16 Nov 2011, p. II-58.

distances, deploying and maneuvering independently along multiple lines of operations from multiple points of origin.

Communicate commander's intent and guidance.

Commanders seek to exercise command influence by issuing broad guidance rather than detailed directives or direction. Commander's intent is a concise expression of the operational purpose and desired end state. As the impetus for the planning process, it may also include the commander's assessment of the adversary commander's intent, a common understanding of the environment, and an assessment of acceptable operational risk. To facilitate shared understanding in a net-centric collaborative environment, the commander's clear guidance and intent must be comprehended to enable parallel planning and self-synchronized execution. If the commander's guidance or intent is revised, all must be informed as soon as possible. Commanders must prepare to operate in a communications-degraded or intelligence-denied environment.

Plan collaboratively across warfighting functions and domains.

This capability involves an effects-based approach that directly ties appropriate actions to campaign objectives, drawing on global resources and considering global consequences. Planners must have a shared understanding of the commander's intent and staff supportability in order to create an integrated, coherent plan. Planners must be able to focus on exploiting critical adversary vulnerabilities and must consider friendly critical capabilities and potential collateral damage. During deliberate planning, they will require the ability to assess the suitability of a plan through wargaming and mission rehearsal prior to execution. Parallel, distributed, collaborative planning capabilities, and improved assessment tools will compress process timelines. Collaborative planning across all warfighting functions and domains will widen the circle of actors who can support a given operation, allowing diverse stakeholders, to include special operations command and other elements of an integrated naval force, to contribute insights and expertise in real time.

Synchronize execution across all domains.

Detailed planning is an essential means of achieving synchronized action, provided the plan remains appropriate to the situation and is executed properly. The commander must be able to achieve synchronization as the situation changes. This can be done through centralized redirection, as in the past, or in a decentralized manner through self-synchronization of subordinate forces. The latter is the preferred method for future C2, but this approach may not always be feasible. The commander must have the ability to employ whichever method of synchronization is appropriate to the situation. Self-synchronization requires subordinates to have a clear understanding of the commander's intent, shared situational understanding and operational trust, good communications and the ability to assess and act without detailed direction from above. Cross-domain synergy, which is particularly important to defeating anti-access efforts, must be attained at lower echelons so that a commander can exploit the advantages in one domain to create or increase advantages in other domains.

Monitor execution, assess effects, and adapt operations.

This capability builds upon two other capabilities: Develop and Maintain Shared SA and Understanding, and Communicate Commander's Intent and Guidance. Commanders

need the ability to maintain SA, assess plan execution effectiveness and rapidly update plans by identifying/selecting alternative courses of action to redirect forces as circumstances change. Commanders and their staffs must have visibility over subordinate unit decisions and capabilities, and the ability to monitor and react to adversary actions. Planners must be able to predict desirable and undesirable attack consequences and anticipate how effects may propagate throughout an adversary's system. The ability to respond rapidly and effectively to changing circumstances will enable commanders to maintain the initiative. Networks must be agile and the technical architectures must be resilient to adversarial efforts to disrupt, degrade or destroy the systems. Commanders, staffs, and the forces must be able to operate in degraded environments with limited ability to monitor execution and assess effects.

Integrate mission partners.

Globally integrated operations place a premium on partnering. Partnering will increase the U.S. military's depth and effectiveness by outsourcing and integrating deficit expertise or resources to operate in future environments. MAGTFs must be able to integrate effectively with Joint and Special Operations Forces, DOD and non-DOD agencies, state, federal, tribal, coalition forces, and non-governmental and international organizations. This capability must be scalable, ranging from the ability of an individual unit to incorporate the expertise of a nongovernmental partner to multi-nation coalition operations. Greater integration will improve collaboration and contribute to unity of effort.

6 Risks

There are several potential risks associated with adopting the ideas proposed in this concept. While some require an exclusive technical solution, commanders can mitigate these risks through consistent training and education, and employing the tenets of mission command. To realize the vision and ideas in this concept, it is incumbent on force developers, commanders, and leaders at all levels to understand and accept the risks, then devise and implement strategies to manage the following risks:

Severe degradation or elimination of information networking capability.

Severe degradation or elimination of network communications and information trust due to cyber-attack, electronic attack, physical attack, or organic failure could decrease the commanders' SA and the ability to direct and synchronize operations. Loss of network communications could result in the inability to access enterprise services and intelligence/information sources. A temporary loss of significant communications capability is likely to occur in some scenarios, since a capable adversary will likely attack friendly information networks. However, loss of all communications, except for very brief periods, is unlikely. Loss of wideband communications connectivity would significantly degrade collaborative planning, targeting, video feeds, and other bandwidth-intensive functions. However, the most likely scenario is that commanders will maintain adequate SA and guidance/tasking, and some collaboration capability if narrowband communications remained available.

Commanders can mitigate this risk by issuing commander's intent and guidance, which allows subordinates to retain freedom of action. Commanders and staffs must also train to operate in a denied/degraded environment. The decentralization of decision-making authority inherent in this concept mitigates the impact of loss of network

communications. Future C2 enabling capabilities must support effective C2 despite degraded communications.

Severe degradation or elimination of network enterprise services.

This includes collaboration capability, due to cyber, physical attack or system/network failure. Network enterprise services will include collaboration, discovery, delivery, messaging, directory, and common identity assurance services. Extensive information sharing and collaboration are essential elements; severe degradation or elimination of these enterprise services would adversely affect operations. Use of voice communications could partly offset the loss of enterprise messaging and collaboration. Use of commercial services that are not standardized across the enterprise could mitigate the loss of these enterprise services, but might result in interoperability problems. Commercial services may also add additional operational risk that may not be immediately known. The loss of enterprise information discovery, mediation, and storage would force reliance on local backup databases that may not be as current or complete as the enterprise databases. It is unlikely that all enterprise services would be lost simultaneously, except through total loss of network communications connectivity.

Commanders could mitigate this risk by having a contingency plan for continuity of operations that could include procedures for forward-caching data and services to meet tactical needs when systems are degraded. Employing cybersecurity principles such as isolation, containment, redundancy, layers of defense, and physical/logical segmentation of networks, services, and applications may enable continued operations in a degraded environment.

Severe degradation or elimination of information sources.

Severe degradation or elimination of information sources, such as friendly force location, environmental data, and geospatial information, would severely degrade the implementation of this concept due to loss of SA. However, it is unlikely that these sources would be lost simultaneously except through a total loss of network communications connectivity. It is more likely that one or more of the sources would be individually degraded through kinetic/non-kinetic attack or system failure, and even more likely through information attack.

Commanders could mitigate the risk of losing intelligence and other information sources by cultivating alternative sources and incorporating backup methods into their operational plans, such as scheduling of weather reconnaissance missions to compensate for the loss of satellite observations.

Loss or lack of information assurance.

Implementation of this concept depends heavily on trusted information and information sharing. The fielding of robust information assurance (IA) capabilities and processes to provide access control and ensure the availability, integrity, authenticity, confidentiality and non-repudiation ability of C2 information, is one of the most important measures for mitigating the foregoing risks. It will be difficult to achieve the desired enhancements to future C2 envisioned by this concept without a robust IA capability.

The Marine Corps can mitigate this risk by stressing and emphasizing network security training at all levels and by developing new IA strategies and technologies.

Over-reliance by commanders on extensive information.

This can result in difficulty reaching decisions in a timely manner. Commanders must not rely completely on achieving perfect information and intelligence. Instead, commanders must pair the information and intelligence available with intuition, experience and the Art of Command to gain the initiative and provide timely guidance, intent and decisions. The trust gained through education, training and leadership will support a rapid, timely decision-making process built on a shared understanding of commander's guidance and intent.

Information overload.

Overwhelming levels of information may lead to increased decision times or the inability of leaders to locate and identify decision-relevant information.

The Marine Corps can manage this risk through information ordering and through enterprise-wide and local information/knowledge management processes and training, investment in smart agent technology, and wargaming in a live virtual training environment.

Micro-management by senior commanders due to greater access to data on lower-level situations.

Elimination of intermediate echelons and the ability to monitor force activity at an arbitrary level of detail may lead to information-enabled micromanagement, inhibiting the decentralization of decision-making to lower echelons.

Commanders can mitigate this risk through leadership and education, training, doctrine, wargaming and experimentation. Leaders need to encourage a culture that enables the inventiveness, creativity and initiative of subordinates to emphasize the value of decentralization.

Over reliance on the information network to enable C2.

While the information network is a key enabler of this concept, it cannot replace the intellectual capacity, judgment, intuition, and leadership of commanders. For example, commanders must avoid the temptation to believe that the computer-generated display of the common operational picture is ground truth or that the computer-based course of action analysis has considered all the relevant factors. Over-reliance on information and communications technologies may result in forces incapable of operating effectively in the absence of those technologies due to failure or attack.

Commanders can manage this risk through increased training and realistic exercises that simulate conditions of failure and attack on Marine Corps C2 systems. Commanders must continue to refine the art and science of command, to facilitate the commander's ability to remain agile and execute timely decisions based on the information available and his intuition.

7   Conclusion

This concept lists the C2 challenges the Marine Corps must overcome to perform assured C2 in complex operational environments, conduct dispersed operations, integrate capabilities, and collaborate with mission partners. The C2 capabilities envisioned in this concept will enable the Marine Corps to contribute fully to globally integrated operations

and allow commanders the ability to cope better with the uncertainty, complexity, volatility, and instability that will characterize the future operating environment.

This concept describes how agile C2 structures, coupled with our philosophy of mission command, will enable commanders to maintain effective and coherent C2 across all operational environments. Mission command provides the flexibility and responsiveness to deal with uncertainty and generate the tempo we recognize as a key element to success in operations.

Force developers must consider these central and supporting ideas, required capabilities and risks during a follow-on Capabilities-Based Assessment to address the vision in *Expeditionary Force 21 Forward and Ready: Now and in the Future.*

Appendix A - References

Guidance

Defense Strategic Guidance, January 2012

National Security Strategy, 6 February 2015

Quadrennial Defense Review, 4 March 2014

U.S. Marine Corps Service Campaign Plan 2014-2022, 20 June 2014

U.S. Marine Corps 36th Commandant's Planning Guidance, 26 February 2015

Concepts

A Cooperative Strategy for 21st Century Seapower, March 2015

Capstone Concept for Joint Operations Activity Concepts Version 1.0, 8 November 2010

Capstone Concept for Joint Operations: Joint Force 2020, 10 September 2012

Command and Control Joint Integrating Concept Version 1.0, 1 September 2005

Expeditionary Force 21 Forward and Ready: Now and in the Future, 4 March 2014

Expeditionary Force 21, Marine Expeditionary Brigade Concept of Operations, Forward and Ready: Now and in the Future, 11 July 2014

Joint Command and Control Functional Concept, February 2004

Joint Concept for Entry Operations, 7 April 2014

Joint Operational Access Concept Version 1.0, 17 January 2012

Marine Air Traffic Functional Concept of Operations, 23 July 2012

Marine Corps Information Enterprise Strategy, 14 December 2010

Mission Command White Paper, 3 April 2012

Naval Operations Concept 2010, 27 April 2010

U.S. Army Functional Concept for Mission Command, 13 October 2010

Doctrine

JP 3-30 Command and Control of Joint Air Operations, 10 February 2014

JP 3-31, Command and Control for Joint Land Operations, 24 February 2014

Marine Corps Doctrinal Publication 1, Warfighting, 20 June 1997

Marine Corps Doctrinal Publication 1-0, Marine Corps Operations, 9 August 2011

Marine Corps Doctrinal Publication 6, Command and Control, 4 October 1998

Marine Corps Warfighting Publication 3-40.1, Marine Air-Ground Task Force Command and Control, 17 March 2003

Other

Bold Alligator – 2014 Final Report, 17 March 2015

CJCSI 3110.01H, 2010 Joint Strategic Capabilities Plan, (Secret), 3 November 2014

Command and Control Joint Capabilities Document, 22 December 2006

Expeditionary Warrior 2014 Final Report, 16 July 2014

Expeditionary Warrior 2015 Quicklook Report (Secret), 3 April 2015

Marine Air-Ground Task Force C2 ICD, February 2008

Marine Corps Reference Publication 5-12C, 16 November 2011

POM-17 JCA 5 and 6 CBA Database (Secret), accessed February 2015

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