MARINE CORPS

STRATEGY FOR ASSURED COMMAND AND CONTROL

Enabling C2 for Tomorrow's Marine Corps, Today

MARCH 2017

Table of Contents

MESSAGE FROM THE COMMANDANT

As the Nation's expeditionary force in readiness, the Marine Corps continues to fight and win the Nation's battles while meeting the challenges of a complex security environment. To achieve success we will continue to focus our efforts in five areas: People; Readiness; Training; Integration with the Naval and Joint Force; and Modernization. Across these five interrelated areas, three major themes are related to how we Command and Control (C2) in the future operating environment. They include maintaining and improving the high quality people that make up today's Corps, decentralizing the training and preparation for war while adhering to maneuver warfare principles in the conduct of training and operations, and modernizing the force. Critical to achieving success in all these areas is the realization of a truly integrated network enhancing all warfighting functions, statutory functions, and C2 capabilities across the Marine Corps. This is especially important as we build and mature our Information Environment Operations (IEO) capabilities for the future force.

Marines around the globe, both in garrison and forward deployed, require a networked C2 environment that is ready, responsive, and resilient. Our ability to C2 in these dynamic times remains the focus. We must strive to build C2 agility and enhance our readiness throughout the Marine Corps. Maintaining a secure, adaptable, and innovative C2 environment ensures we preserve a decisive advantage over our adversaries. There are four critical characteristics the C2 environment/network must possess.

1. **Unified** – Multiple disparate networks lead to excessive complexity and slow mobilization and deployment. The post Navy-Marine Corps Intranet (NMCI) construct does not serve the purposes of deployed Marine Corps forces. We need one network with common standards, services, and security across the Marine Corps today.

2. **Resilient** – Marines operate in C2-contested environments. We must not become overly reliant on any single method or technology [e.g. Satellite Communications (SATCOM)]. Instead, we must master the basics while exploring options for survivable systems.

3. **Interoperable** – All elements of the Marine Corps Air Ground Task Force (MAGTF) must be able to quickly collaborate and communicate across common hardware systems and platforms. All information exchange requirements must be accounted for and warfighting functions synchronized. We must also ensure secure and reliable connections with our Joint and Coalition Partners.

4. **Expeditionary** – Our ability to operate from the sea is a key component of our readiness. Limited space and bandwidth require innovative methods (hardware and software) to integrate with the Navy. We must extend shipboard networks and leverage airborne C2 assets.

This strategy provides the framework for how the Marine Corps sets the conditions for achieving a resilient, survivable, rapid, and assured C2-networked environment delivering on the four critical characteristics. It describes the "what" through a coherent and achievable vision and the "how" by looking at the sum of parts we must invest in and mature to achieve results. Sequential execution of the strategy won't work and would take years to complete. In the past this practice was flawed. Continuing sequential execution will lead to systems becoming obsolete, risky, and less interoperable when finally integrated and fully fielded. Marines need expedient ways to solve their C2 challenges today while actively increasing capabilities of the future. Our approach will deliver the networked environment Marines need.

We must focus considerable effort on updating our C2 structures, processes, and alignments. Many of our management practices and processes are antiquated and will not deliver the results we need. Too many are outdated and obsolete. To make this strategy a reality, our key Information Technology (IT) stakeholders/organizations must evolve the way they manage, deliver, and C2 the network.

In creating our future networked environment, we must be aware of the fiscal and operational constraints which demand affordability, agility, and security. We must develop innovative ways to procure equipment that is ready now and adaptable to future missions. We must also look to leverage development efforts and commercial off-

Enabling C2 for Tomorrow's Marine Corps, Today

the-shelf (COTS) technology capabilities of other services where they make sense, not just a "build our own" mentality. Finally, we need flexible and dynamic processes to plan and invest in C2 technologies to meet warfighter demands. This will ensure we maintain a competitive advantage while maximizing investments to enhance Marine Corps current and future operations.

This strategy signals my commitment and provides guidance on the important steps the Marine Corps must take to deliver a C2 environment from "fighting hole to flagpole." To achieve our desired ends, I expect IT stakeholders to discuss, understand, plan, and implement C2 capabilities leveraing the framework of this strategy.

Robert B. Neller
General, United States Marine Corps
Commandant, United States Marine Corps

PART 1 OVERVIEW

The Marine Corps is a lethal naval expeditionary force. However, this is determinedly challenged by the realities of the operating environment, namely an Information Environment (IE) that is contested across the range of military operations. Adversaries use both simple and sophisticated methods designed to reduce Marines' Command and Control (C2) effectiveness. This requires a fundamental change in the way Marines create, share, disseminate, and store information across the battlefield.

Marine Corps Operating Concept (MOC), the Corps' capstone warfighting view, highlights the aforementioned challenges while revealing the push to conduct distributed, disaggregated, and autonomous operations as core competencies. Implied in the MOC is the requirement for rapid, accurate, and tailorable information, facilitating faster decision-making cycles while creating a force multiplier function throughout the Corps. Thus, it is not surprising the 37th Commandant has consistently declared our C2 network to be the Corps' Center of Gravity, providing the mission-critical connectivity from "fighting hole to flagpole".

Currently, Marine Corps C2 systems and applications do not adequately support evolving warfighter needs and expanding cybersecurity requirements. To maintain an operational edge, the Marine Corps must accomplish rapid and responsive approaches to future C2 challenges. This includes a strategy providing timely and assured information exchange in the most demanding environments. This is a paradigm shift from "old think," based on a distinction between garrison, shipboard, and field networks. Instead, the Marine Corps requires a single, assured C2 capability to provide enhanced information exchange for training, planning, and deploying. Leveraging the latest technology standards and processes will provide a common computing experience anywhere the Marine Air Ground Task Force (MAGTF) operates, on every type of computing endpoint used by Marines. The Marine Corps also requires assured information exchange across all warfighting functions for improved decision making. This is especially important as Marines expand their Information Environment Operations (IEO) capability and capacity while standardizing Information Management (IM) processes. Training, tactics, techniques, procedures, and policies must evolve to deliver this capability rapidly, ensuring Marines' ability to outsmart and outmaneuver their adversaries. To meet this need, Marines must be organized, ready, and capable of rapidly deploying with the same information, systems, and weapons with which they train and prepare.

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Marine Corps Enterprise Network Parts

- Installation/Tactical Processing Nodes
- Applications
- Cloud
- Unification
- People and Training
- Command and Control Diversity/ Network Survivability
- Cybersecurity
- Equipment
- Marine Corps Strategy for Assured Command and Control
- Policy and Governance/ Information Technology Value

MARINE CORPS OPERATING CONCEPT
How an Expeditionary Force Operates in the 21st Century
September 2016

MAGTF C2 transformation is realized via the interoperable and resilient Marine Corps Enterprise Network (MCEN). The Marine Corps cannot meet the demands of the future warfighter with separate networks designed for "garrison" and "field" operations. The need for greater mobility and rapid deployment render our current C2 construct grossly inadequate. Understanding the MCEN is best done via its main required components and conditions as depicted above.

Unification is the term used to describe all actions associated with moving from legacy systems, processes, and organizations to a modern MCEN. Key actions include domain and data center consolidation and elimination as network sprawl has led to increased costs and risk to the network. Vestiges of antiquated directorates, centers, and nodes no longer serve the purpose for which they were created and now complicate command relationships. This has blurred the unity of command to specify Commander responsibilities and authorities to support the operations and defense of the MCEN and MAGTF C2. Finally, processes, such as Information Technology (IT) acquisition, must continue to mature to meet the speed of change in this dynamic setting.

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Cloud services are needed to move applications and associated data to the point of need. Old "reach-back" models are too slow and are most susceptible to service outages during times of network segregation, especially at the tactical edge. Cloud services also are a crucial component to our mobility strategy both in warfighting and business (e.g., recruiting) operations. Finally, the cloud and our tactical services-oriented architecture enables our budding Ready Data Environment (RDE) by creating secure and accessible repositories to share information.

Applications have undergone fundamental changes in recent years and have proven to be highly adaptable and scalable in a wide setting. When poorly designed, applications tie up valuable computing resources and fail to work well in mobile settings. For example, limited bandwidth means slower performance and smaller devices lack display scalability. Clunky legacy "boxes" fail to leverage modern Size, Weight, and Power (SWaP) improvements. Standardizing the build and employment of this capability, in concert with cloud capabilities, ensures availability of data maximizing performance while increasing overall security. Marines have shown prowess in developing these tools, and the Marine Corps is taking advantage of this bottom-up creativity.

Installation Processing Nodes (IPNs) allow the Marine Corps to "house" all critical C2 network components, e.g., cloud, applications, storage, and core services. When properly configured, these nodes reduce the number of redundant data centers and serve as the execution hub of advanced security applications. They also look and act the same, similar in fashion to a Marine Corps unit's structure and Mission Essential Tasks (METs). This leads to better planning and execution of C2 requirements regardless of geographic location, since each IPN works in concert with the network, e.g., services, connections, security, and routing. Thus, IPNs deliver network "warm start" capabilities across the Corps, which currently only exist in specific areas supporting unique missions.

C2 Diversity/Network Survivability ensures the ability to fight through a C2-contested environment, a near-certainty given today's threat. For all the focus on the Internet of Things, innovative applications, and cyber-dependent weapons systems, it is easy to overlook the fact that these capabilities often are realized only when properly networked. Effectiveness is degraded or lost entirely during states of disconnect, making networks as important as the individual "things" that ride on them. To this end, our overreliance on satellite communication makes network survivability a high-value target to our adversaries. Investments in Line of Sight (LoS) and advanced Beyond Line of Sight (BLOS) technologies and training are paramount, e.g., MUX, Troposcatter, and Free Space Optics.

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Cybersecurity is a shared responsibility that must be "baked in" at all levels, from concept development to initial engineering design throughout the entire lifecycle. Key to achieving this endstate is standardization as it allows better detection of compromise, e.g., baselining to detect anomalies and better deployment of defensive tools and measures – a "one solution fits all" versus numerous solutions that work against each other. Consolidated authority at the Chief Information Officer (CIO) level (e.g., IT Procurement Approval and Authority to Operate) and network unity of command to operate and service the MCEN is required to achieve a secure network for the best value.

Equipment to meet this challenge must be modern at the time of fielding and kept current throughout its lifecycle. For example, the Marine Corps must significantly reduce "owning" software and hardware in favor of "as-a-Service" arrangements where feasible (e.g., lease rather than purchase). This guarantees upgrades on a predictable basis and keeps pace with the never-ending security challenges exacerbated by outdated, legacy systems and applications. This is in no way a return to the Navy-Marine Corps Intranet (NMCI) model, which was characterized as Contractor Owned - Contactor Operated (CO-CO). Instead, we will employ a "Government Controlled - Government Directed" model, which permits the provision of contracted goods and services, but in highly specific and flexible ways. The Marine Corps sets the terms and maintains control of how, when, and under what conditions these capabilities are realized. Finally, we must resist the "not built here" mentality and leverage capabilities already available if they meet our requirements.

Foundational elements that support this technical solution of MAGTF C2 transformation consist of ***Optimizing the Workforce*** (People and Training) and ***Practicing Information Technology Stewardship*** (Policy and Governance/Information Technology Value). Our workforce, both military and civilian, must reflect current and future warfighting demands. Modernization of the 06XX Military Occupational Specialty (MOS) is underway and will provide the appropriate structure and training the Marine Corps needs to deliver the MCEN. We are conducting an enterprise–wide IT work force Zero-Based Review (ZBR) to ensure we have the best capability at the right value. Practice Information Technology Stewardship acts as a counterbalance to the technical solutions by maximizing investments and standards. Policy and Governance enforce the adoption of common processes and standards throughout the network, which ultimately increase performance, security, and interoperability while ensuring best value.

Vision

An assured enterprise warfighting network allowing timely and persistent information exchange in the most demanding environments and circumstances realized through efficient and responsible stewardship
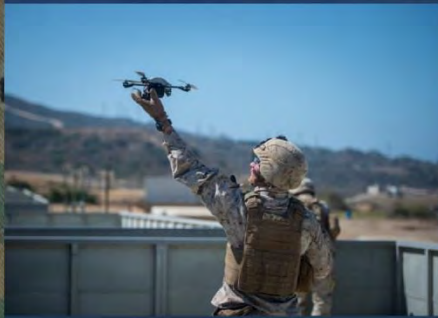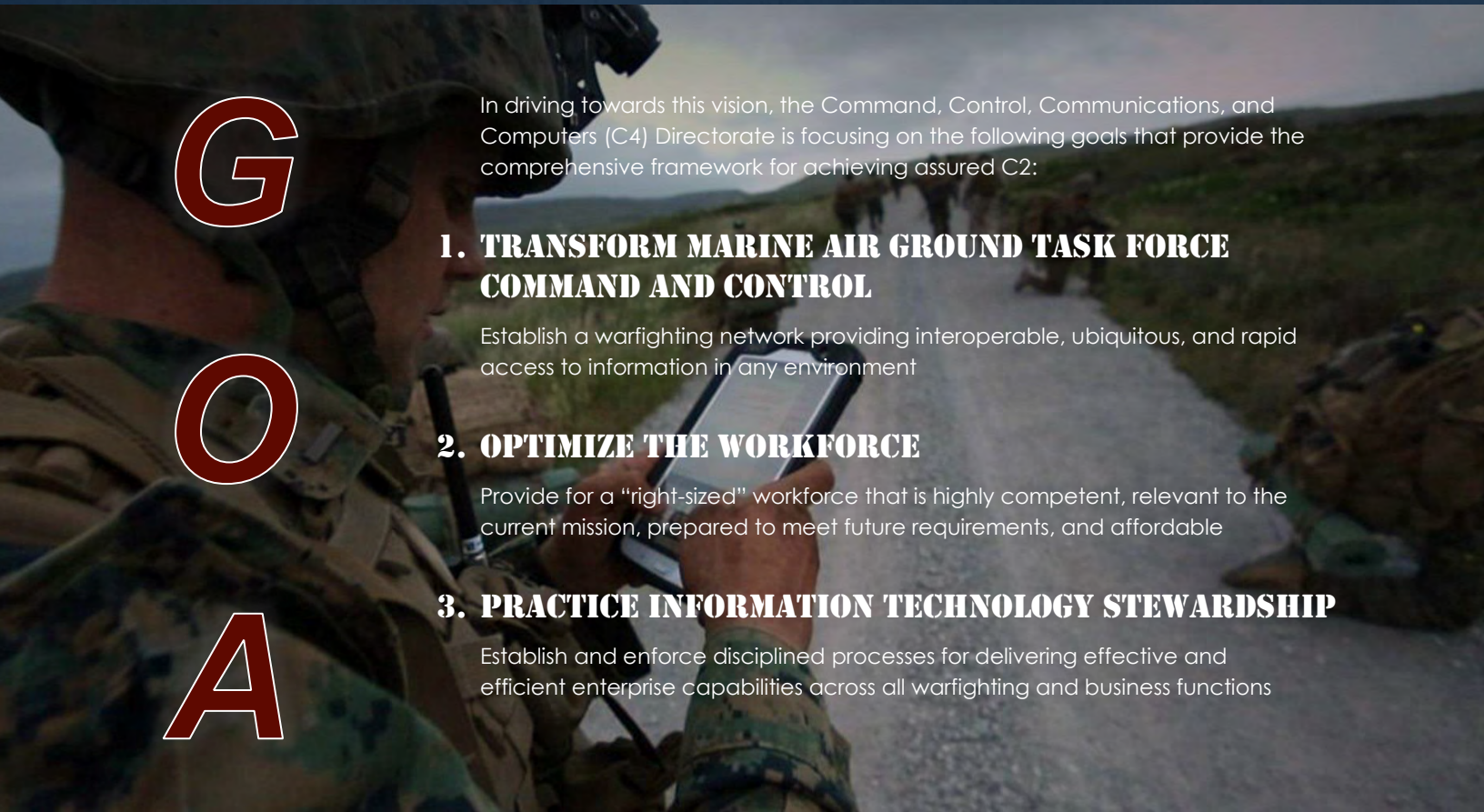
GOALS

In driving towards this vision, the Command, Control, Communications, and Computers (C4) Directorate is focusing on the following goals that provide the comprehensive framework for achieving assured C2:

1. TRANSFORM MARINE AIR GROUND TASK FORCE COMMAND AND CONTROL

Establish a warfighting network providing interoperable, ubiquitous, and rapid access to information in any environment

2. OPTIMIZE THE WORKFORCE

Provide for a "right-sized" workforce that is highly competent, relevant to the current mission, prepared to meet future requirements, and affordable

3. PRACTICE INFORMATION TECHNOLOGY STEWARDSHIP

Establish and enforce disciplined processes for delivering effective and efficient enterprise capabilities across all warfighting and business functions

Ultimately, Marines require a C2 network that enables interoperable systems to present relevant information for ready access and quick decision making. This C2 network provides the means to secure and mesh dynamic operations while consistently delivering the level of mission-critical information and situational awareness required by units at all levels. C4 is preparing for tomorrow by taking the initial and necessary steps to enable C2 from "fighting hole to flagpole". This means C4 and key stakeholders must enable enhanced decision making for both the warfighter and users in the Supporting Establishment. Finally, these goals and their associated objectives must be developed in parallel, as nearly every expected benefit is realized only when the entire enterprise is available and mature.

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PART 2
STRATEGIC GOALS

Yesterday's disparate garrison and tactical networks do not support today's expeditionary, Naval, and Joint force expectations. The Marine Corps must standardize its systems, applications, and associated processes and procedures to ensure interoperability, integration, increased security, and best value. C4 will transform the C2 network in accordance with a developed Enterprise Architecture (EA) encompassing the full range of missions and functions across the Marine Corps.

GOAL 1

Transform Marine Air Ground Task Force Command and Control

Establish a warfighting network providing interoperable, ubiquitous, and rapid access to information in any environment

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The following objectives achieve the transformation of the C2 network:

Unification

Command and Control Diversity/ Network Survivability

Cloud

Cybersecurity

Applications

Equipment

Installation/Tactical Processing Nodes

OBJECTIVE 1

Unification: Standardize the network by eliminating legacy systems, consolidating resources, and optimizing network operations

OPERATIONAL IMPACT

▶ **Allows the Marine Corps to best deliver and defend the C2 network**

▶ Completes the MCEN transition to one unified warfighting network

▶ Permits total force access to mission-relevant information regardless of location or time

▶ Reduces costs, increases efficiency, and improves security

CURRENT STATE/CHALLENGES

▶ **Does not support rapid deployment required of the MOC**

▶ Lacks adherence to standardized permissions models, structures, and procedures across the range of military operations

▶ Multiple networks are financially untenable, operationally ineffective, and difficult to defend

▶ Disparate network/segment architectures frustrate operations and compromise protection of vital information

▶ Organizational biases inhibit enhanced enterprise-wide capabilities/solutions

REQUIRED ACTIONS

▶ **Enforce a comprehensive network architecture with standards, controls, measurable performance, and consistent C2 services**

▶ Unify the Marine Corps Non-Classified Internet Protocol Router Network (NIPRNET) and Secret Internet Protocol Router Network (SIPRNET) domains by eliminating legacy networks, systems, and applications

▶ Position the Marine Corps to operate in the Joint and Coalition environment, including future Joint network security capabilities

▶ Implement a virtual solution for access and releasability of classified information with Coalition partners

▶ Advance integration with host networks aboard Naval vessels, alternative shipping, and platforms while identifying critical information exchange requirements, i.e., eliminate the need for multiple network configurations

▶ Establish a Marine Corps Enterprise Service Desk

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OBJECTIVE 2

Cloud: Provide cloud services supporting the full spectrum of Marine Corps' warfighting and business missions

OPERATIONAL IMPACT

► **Chief enabler for globally deployable C2 and Distributed Operations**

► Enables individual and organizational mobility

► Delivers accessible and survivable "fighting hole" C2 information

► Decreases the MAGTF's footprint, power, and lift requirements

► Allows enterprise data to be shared and analyzed (RDE)

► Supports the rapid deployment of mission critical applications/services

CURRENT STATE/CHALLENGES

► **No cloud capability results in long network engineering/provision lead times while reducing mobility and operational flexibility**

► Reliance on "build-from-scratch" networks and services impedes speed and tempo

► Inability to rapidly access common IT capabilities (applications/services)

► No secure means to share data for analytics

REQUIRED ACTIONS

► **Establish cloud capabilities delivering mobility, operational flexibility, and warm-start resources at reduced costs**

► Integrate the Kansas City IT Center and the regional IPNs as the Marine Corps' private cloud

► Execute a rapid acquisition program for cloud delivery of core services and C2 programs

► Implement a phased cloud strategy to deliver enterprise cloud capabilities now while incrementally expanding these capabilities to all tactical units (tactical cloudlets)

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OBJECTIVE 3

Applications: Establish and maintain application development standards, processes, and infrastructure that allow system capabilities to be delivered rapidly and efficiently

OPERATIONAL IMPACT

▶ **Provides application mobility, function, purpose, and sustainment at reduced costs while ensuring interoperability and compatibility**

▶ Enforces standard applications that are properly hosted, deployed, and interoperable across hardware, platforms, and missions

▶ Enables Marines to innovate their own solutions to mission requirements

▶ Allows for increased automation and analytics across the MCEN, which enables faster decision cycles

▶ Eliminates software dependencies on unique/proprietary hardware

CURRENT STATE/CHALLENGES

▶ **Numerous commercially developed applications hinder the ability to maintain security standards due to unacceptable variances in software code**

▶ Chaotic environment of disparate systems and information sources is counterproductive to mission success

▶ Lack of application standards results in poor performance, monolithic relationships with other applications, and higher maintenance costs with unsustainable overhead

▶ Burdensome application development process reduces the ability for Marines to quickly innovate and adapt to mission needs

REQUIRED ACTIONS

▶ **Enforce standards and processes through an enterprise application development protocol**

▶ Establish a comprehensive software developer's toolkit across the Marine Corps

▶ Standardize and automate application build, hosting, and deployment

▶ Migrate tactical and business applications to Marine Corps Enterprise Information Technology Services (MCEITS) or designated IPN

▶ Support Marine-developed applications

▶ Control software/application development and drive hosting in the Marine Corps cloud

OBJECTIVE 4

Installation/Tactical Processing Nodes: Standardize capabilities of the Marine Corps' regionally aligned Installation Processing Nodes, increasing effective access to secure information for Marines worldwide

OPERATIONAL IMPACT

▶ **Stores/enables all critical C2 network components (e.g., cloud, applications, storage, core services, and Continuity of Operations (COOP)), enabling rapid deployment of the network in support of global, Naval, and expeditionary operations**

▶ Delivers assured access to information regardless of physical location

▶ Provisions a Comply-To-Connect capability that greatly enhances network performance and security

▶ Facilitates single identity via a common user experience across the force with no distinction between garrison and tactical environments

CURRENT STATE/CHALLENGES

▶ **No alignment of network capabilities, resulting in uncoordinated deployment of non-standard systems too expensive to maintain, are at risk of failing, and pose significant security vulnerabilities across the force**

▶ Inability to distribute applications in a continuous fashion – this greatly limits MOC execution

▶ Bases, Camps, and Stations have disparate capabilities, infrastructure, and processes requiring duplicate resources to operate and maintain, e.g., unique hardware, processes, and services

▶ No automated ability to ensure network security compliance, e.g., cannot "see" end-to-end or push security patches across the enterprise

REQUIRED ACTIONS

▶ **Field standardized IPNs that interconnect with the Kansas City IT Center to allow applications and information to be moved to locations best supporting warfighting requirements**

▶ Standardize Tactical Processing Nodes (TPNs) and Tactical Entry Points (TEPs) to provide access to applications and information to the tactical edge (supports MOC execution)

▶ Transform Kansas City IT Center into a hosting platform consisting of the Marine Corps cloud, application hosting, and a testing development environment that interconnects all IPNs

▶ Consolidate and onboard data and application requirements from non-core data centers to a common hosting platform at Kansas City IT Center

▶ Build out COOP across the Marine Corps

OBJECTIVE 5

Command and Control Diversity/Network Survivability: Ensure survivability of the Command and Control network through the most austere, challenged, and contested conditions

OPERATIONAL IMPACT

▶ **Ensures the ability to fight through a contested C2 environment**

▶ Protects the MCEN and systems, delivering resiliency and redundancy across the force

▶ Mitigates adversarial use of technologies that disrupt and degrade our C2 capability

▶ Reduces electronic signatures

▶ Alleviates overreliance on highly vulnerable space-based capabilities

CURRENT STATE/CHALLENGES

▶ **The Marine Corps is vulnerable due to the lack of an established EA framework**

▶ Overreliance on satellite capabilities across the force

▶ Lack of holistic network/systems survivability plans

▶ Limited training for disconnected, intermittent, low-bandwidth (DIL) environments

REQUIRED ACTIONS

▶ **Enforce resilience and survivability performance parameters on Marine Corps C2 network architecture and systems**

▶ Incorporate radio waveforms designed for operations in a contested environment

▶ Increase Science and Technology (S&T) and Research and Development (R&D) efforts that incorporate emerging technologies for more survivable systems, e.g., free space optics, network foraging, and signal emission control

▶ Implement a Network Survivability Plan

▶ Train in information-contested/denied, DIL operating environments with realistic threats and operational challenges

OBJECTIVE 6

Cybersecurity: Establish appropriate measures to protect and defend data, users, systems, connections, and missions

OPERATIONAL IMPACT

▶ **Protects and defends Marine Corps data, information systems, and networks; delays, disrupts, and mitigates attacks**

▶ Provides for the integrity of trusted Marine Corps data

▶ Preserves the means to execute C2 across the force

▶ Operationalizes risk management for C2 networks

▶ Provides automation capabilities and procedures that respond to cyber threats outpacing response

CURRENT STATE/CHALLENGES

▶ **Lack of overall visibility of the MCEN, which increases risk and vulnerability to Marine Corps information systems**

▶ Amorphous environment consisting of multiple organizations not aligned and deploying disparate network configurations

▶ Unsynchronized planning, programming, and execution of cybersecurity requirements and capabilities throughout the system lifecycle

▶ Lack of consistent policy and security standard implementation in systems design

▶ Cyberattacks against Marine Corps systems occur at an increasing rate with ever-increasing complexity

REQUIRED ACTIONS

▶ **Expand automated end-to-end network visibility and assured interoperability through a single security architecture framework, e.g., IPNs and Comply-to-Connect**

▶ Enforce cybersecurity standards and policies for systems from inception through fielding, including sustainment

▶ Drive organizational compliance with the Marine Corps' single security architecture framework that reduces the external attack surface, standardizes security controls, and aligns with Joint Information Environment (JIE) concepts

▶ Enhance shared analytics, real-time metrics, information sharing, and reporting to improve security and situational awareness

▶ Conduct cybersecurity technology pilots and expand the Cyber Range to improve cross-organizational training exercises and security testing efforts

▶ Implement automation capabilities and procedures that proactively respond to cyber threats

OBJECTIVE 7

Equipment: Maintain proven Command and Control capabilities, while fielding capable, relevant, and interoperable systems employed in innovative ways

OPERATIONAL IMPACT

▶ **Equips the MAGTF for the future operating environment with modern, interoperable equipment across all warfighting functions providing the means to employ assured C2 with increased tempo and lethality**

▶ Enables the Marine Corps to achieve a high state of institutional readiness and flexibility across the force

▶ Enhances the Marine Corps' ability to outpace potential cyber threats

▶ Takes advantage of new waveforms and capabilities supporting "On-The-Move" requirements

CURRENT STATE/CHALLENGES

▶ **Capability development, planning and programming, policy, and acquisition processes impede rapid delivery of C2 solutions to the warfighter**

▶ Inventory comprised largely of legacy, end-of-life systems with no path to modernization, resulting in sustainment costs that hinder the ability to modernize and upgrade

▶ Maintenance ability is limited due to unsustainable costs (constant state of poor readiness)

▶ Inability to anticipate and respond to evolving threats and technology

▶ Lack of standards for Coalition equipment and programs

REQUIRED ACTIONS

▶ **Innovate rapid capability development, planning and programming, policy, and acquisition methodology to obtain required technologies, e.g., lease and acquire modern, reliable equipment "as-a-Service" staying proactive with emerging technology**

▶ Provide an approved equipment and services list (e.g., software, hardware, and applications) to enable the Marine Corps to rapidly fulfill operational requirements

▶ Enforce standard configurations to optimize protection and usability to include the Joint, Allied, and Partner community

▶ Leverage modern technologies to enable automated, holistic management of the enterprise

▶ Migrate from hardware-centric solutions to software-defined capabilities

GOAL 2

Optimize the Workforce

Provide a "right-sized" workforce that is highly competent, relevant to the current mission, prepared to meet future requirements, and affordable

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To maintain a Communications and IT management force of the highest quality, the Marine Corps must modernize the force using the right number of people with the appropriate skillsets trained through top-tier educational centers of excellence. The following objectives achieve the transformation of the C2 workforce:

People

Training and Resources

OBJECTIVE 1

People: Execute a holistic workforce strategy incorporating Force Modernization requirements that address future Communications/Information Technology skillsets

OPERATIONAL IMPACT

▶ **Provides a qualified workforce to meet current and future mission requirements**

▶ Delivers agile workforce hiring mechanisms to meet emerging missions/requirements and mitigate risks

▶ Delivers manpower systems, policies, and processes to attract, develop, retain, and support highly qualified Marines and civilian employees

CURRENT STATE/CHALLENGES

▶ **The Marine Corps lacks a Communications/IT workforce (uniform, civilian, contractor) baseline to assess its ability to meet current and future mission requirements**

▶ Outdated IT roles and skills requirements impede the Corps' ability to organize, train, and resource the necessary workforce

▶ No comprehensive workforce analysis leading to a workforce strategy, e.g., number of Marines, civilians, and contractors necessary to operate and sustain the MCEN

▶ The Communications MOSs are structured to operate and maintain legacy equipment and thus cannot meet current and future C2 demands

▶ People are the most important and most expensive investment in Communications/IT

REQUIRED ACTIONS

▶ **Structure the Communications MOSs to operate and maintain new technology while ensuring flexibility to adjust with advancements and innovation**

▶ Develop a comprehensive workforce strategy

▶ Periodically conduct an analysis of the Marine Corps Communications workforce (ZBR) and Force Modernization Plan alignment to the workforce strategy

▶ Recruit, train, and retain a high-caliber civilian workforce capable of planning, managing, and sustaining a world-class enterprise network

▶ Leverage contractor support to augment and enhance the Marine Corps mission

▶ Facilitate appropriate integration of C2 enabler MOSs to enhance the Marine Corps mission, e.g., 26xx, 6694, and 88xx

OBJECTIVE 2

Training and Resources: Provide innovative training using regionalized training centers and methods to increase proficiency at a sustainable cost

OPERATIONAL IMPACT

► **Delivers a modern, dynamic training environment resourced, e.g., personnel, equipment, facilities, time, and funding, to support Marine Corps C2 requirements and technology**

► Ensures Marines are trained to compete and win in an information-contested/denied, DIL operating environment

► Invests in educational opportunities ensuring skillsets keep pace with technological changes

► Leverages modern, immersive training and simulation technologies meeting both classified and unclassified requirements that are fully integrated with training and standards

► Integrates IEO in the IT workforce training curriculum

CURRENT STATE/CHALLENGES

► **Existing IT/Communications community training and infrastructure does not meet the evolving needs of the Marine Corps**

► Technology is implemented within the Corps faster than the workforce can be formally trained

► Brick-and-mortar training facilities require designs to implement modern training techniques

► Brick-and-mortar training facilities require the ability to inject resources into a virtual environment within the classroom and are unable to access secure resources

► Brick-and-mortar facilities are not adaptable, scalable, and accessible to integrated C2-related training

► IT workforce lacks qualification processes and standards

REQUIRED ACTIONS

▶ **Synchronize military and civilian education and training for the entire Marine Corps IT workforce, adapting to changing requirements, incorporating emerging technologies, and providing integrated solutions across the training and knowledge continuum**

▶ Provide Marine Corps Communication-Electronics School (MCCES) main campus and Command and Control Training Centers (CTCs) with the appropriate resources (e.g., personnel, equipment, facilities, time, and funding) to support current and future C2 training requirements

▶ Enhance MCCES main campus resources to support a state-of-the-art training center (e.g., access to classified networks), including traditional and non-traditional training venues

▶ Provide live and virtual training, hands-on laboratories, and realistic operational exercises

▶ Ensure college credit for highly technical skillsets while expanding MCCES regional CTC resources to deliver cutting-edge instruction for mid- to advanced-level skillset requirements

▶ Enable MCCES main campus and CTCs to include qualification processes modeled after the Marine Aviation Weapons and Tactics Squadron (MAWTS)/Marine Corps Tactics and Operations Group (MCTOG)

▶ Establish and enforce standards and qualification processes for Marine Corps IM and IT requirements

▶ Consolidate training facilities (e.g., CTCs/Regional Intelligence Training Centers (RITCs)) into Regional IEO Training Centers to integrate warfighting functions and adaptable, scalable, and accessible C2-related training

GOAL 3

Practice Information Technology Stewardship

Establish and enforce disciplined processes for delivering effective and efficient enterprise capabilities across all warfighting and business functions

Effective and efficient stewardship enables a flexible and dynamic process of planning and investment of C2 technologies to meet the demands of the warfighter. This ensures a competitive advantage while maximizing investments to enhance Marine Corps current and future operations. The following objectives support practicing stewardship for IT:

Policy and Governance

Information Technology Value

OBJECTIVE 1

Policy and Governance: Establish enterprise policies, processes, and standards that govern the implementation, operation, and sustainment of the Command and Control network

OPERATIONAL IMPACT

► **Provides governance, policy, and oversight based on law for Marine Corps data strategy, data architecture, and data management efforts**

► Maximizes Marine Corps IT investments while minimizing the amount of unnecessary redundancy resulting from disparate planning and development efforts

► Establishes accountability for data stewardship, data quality, and accessibility

► Delivers prioritized list of IT investments, maximizing Return on Investment (ROI) to the Marine Corps

► Establishes and governs the use of data, information exchange, and interoperability standards

CURRENT STATE/CHALLENGES

► **Current ungoverned processes lead to duplicative and wasteful efforts across the enterprise resulting in lack of balance in oversight and security**

► IT Program Objective Memorandum (POM) initiatives are not in compliance with the Marine Corps' published policies, goals, and objectives

► No EA to minimize unnecessary redundancy from disparate IT efforts and guide IT investments

► Lack of strategic planning for IT and EA standards include not maximizing business values for Corps IT systems interoperability with the Department of Defense (DoD), Department of the Navy (DON), Joint, Federal, Allied, and Coalition systems

► Inadequate validation techniques to ensure information security controls are effective

► Programs of Record (PORs)/Functional Area Managers (FAMs) are not adhering to existing cybersecurity guidance and lifecycle support to their POR

REQUIRED ACTIONS

- **Oversee strategic planning and governance for all information and IT management functions**

- Provide governance, policy, and oversight of Marine Corps data strategy; data architecture; enterprise data management; data sharing; and information, spectrum, and circuit management

- Leverage the EA to maximize IT investment value, inform decision making, and minimize unnecessary redundancy through a unified IT system, collapsing disparate IT efforts

- Assess Corps IT POM initiatives against DON Deputy Chief Information Officer, Marine Corps [DDCIO (MC)] goals and objectives, IT EA, and policies

- Provide IT expertise for all Corps IT requirements in support of Joint Capabilities Integration and Development System (JCIDS) and Marine Corps Capabilities Based Assessment (MC CBA) process

- Ensure Corps IT systems acquisition and development efforts continues to observe laws, regulations, and policies while expediting delivery of capabilities

- Manage the Marine Corps IT Capital Planning and Investment Control process

- Provide oversight, management, and execution of Marine Corps IT resources

- Oversee Corps IT interoperability with DoD, DON, Joint, Federal, Allied, and Coalition systems

- Partner with DoD to establish EA standards for infrastructure, education, and services

- Ensure compliance to DON CIO guidance for interoperable, cost-effective, and secure IT systems

- Recommend the continuation, modification, or termination of IT programs to Marine Corps advocates

- Prioritize a list of IT investments via a value and risk assessment to maximize ROI to the Marine Corps

- Develop procedures for detecting, reporting, and responding to security incidents

- Advocate the Marine Corps' position throughout DoD by influencing policies to meet the needs of the Marine Corps Operating Forces and Supporting Establishment

OBJECTIVE 2

Information Technology Value: Influence and shape investment opportunities to demonstrate fiscal responsibility while guiding innovation throughout the Marine Corps Capabilities Based Assessment

OPERATIONAL IMPACT

► **Improves quality of services, increases IT cost transparency, and allows for innovation**

► Eliminates labor and costs associated with duplicative networks and systems and reduces spending of separate investment paths

► Leverages an enterprise approach while advocating for the development of Navy and Joint capabilities

► Implements IT lifecycle best practices of planning, installing, operating, maintaining, and continuously improving the MCEN

► Eliminates the procurement of disparate, non-interoperable systems, and duplicative equipment while leveraging sister-service acquisitions

CURRENT STATE/CHALLENGES

► **Process that rewards expenditure of money, not the provisioning of services**

► Procurement of disparate, non-interoperable IT systems, and duplicative equipment and software are not in line with the DDCIO (MC) goals and objectives

► Organizational funds are being used to implement special projects without aligning solutions to the larger enterprise view

► Enterprise visibility of the full sustainment costs are not captured as part of the Planning, Programming, Budgeting, and Execution (PPB&E) process

REQUIRED ACTIONS

► **Enforce the IT Investment Strategy aligning policies, projects, acquisitions, and funding**

► Provide modern, cutting-edge technology. Evaluate means, such as leasing or other nonstandard methods, to deliver rapid capabilities not normally associated with technology refreshes and maintenance cycles where feasible

► Establish integrated IT priorities by linking the governance and IT Investment Strategy processes to improve the Marine Corps IT resourcing process

► Ensure the IT Investment Strategy includes the tactical edge

► Provide metrics and measurements to assess the value of the systems within the Marine Corps' IT portfolio

► Reform the IT Procurement Request Review Approval System (ITPRAS) process ensuring its approval process provides compliant solutions that align to the strategic vision and goals

Enabling C2 for Tomorrow's Marine Corps, Today

PART 3
NEXT STEPS

The rigor in building this document included research, analysis, and in-depth stakeholder discussions. The completion of this document represents the transitional point between designing the *Marine Corps Strategy for Assured Command and Control* and enabling its implementation.

Each of the 11 objectives listed in this strategy becomes a portfolio of aligned projects/tasks that demonstrate standardized requirements in meeting strategic milestones, with project progression and metrics fed into a hierarchal dashboard supporting near real-time decision-making. This dashboard provides performance indicators validating or identifying progression to Executive Steering Council (ESC) meetings and bi-annual Operational Advisory Group (OAG) sessions. Validation, verification, and adjustment of milestones take place at regular intervals. The dashboard provides the enterprise view of project/tasks progression towards the strategic vision. The dashboard also enables sound decision-making on prioritized resources supporting the effectiveness of IT programs and capabilities.

Each aligned project includes supporting Plans of Actions and Milestones (POA&Ms) that encompass issues, risks, and mitigation plans to meet the overall strategic vision. Each project contains measurable parameters verified in advance of commencement. Project progress measures against the originally set parameters quantifiably tracking each project's advancement. Planning, prioritization, and coordination of these project efforts are necessary to establish and maintain tempo and momentum in our Marine Corps POM development.

Associated appendices linked to the objectives of this document address technical methodology and details. These appendices provide the engineering details and parameters of interrelated projects across the strategy. In other words, they provide the "how" in regards to the technical parts, processes, and policies required in achieving assured C2.
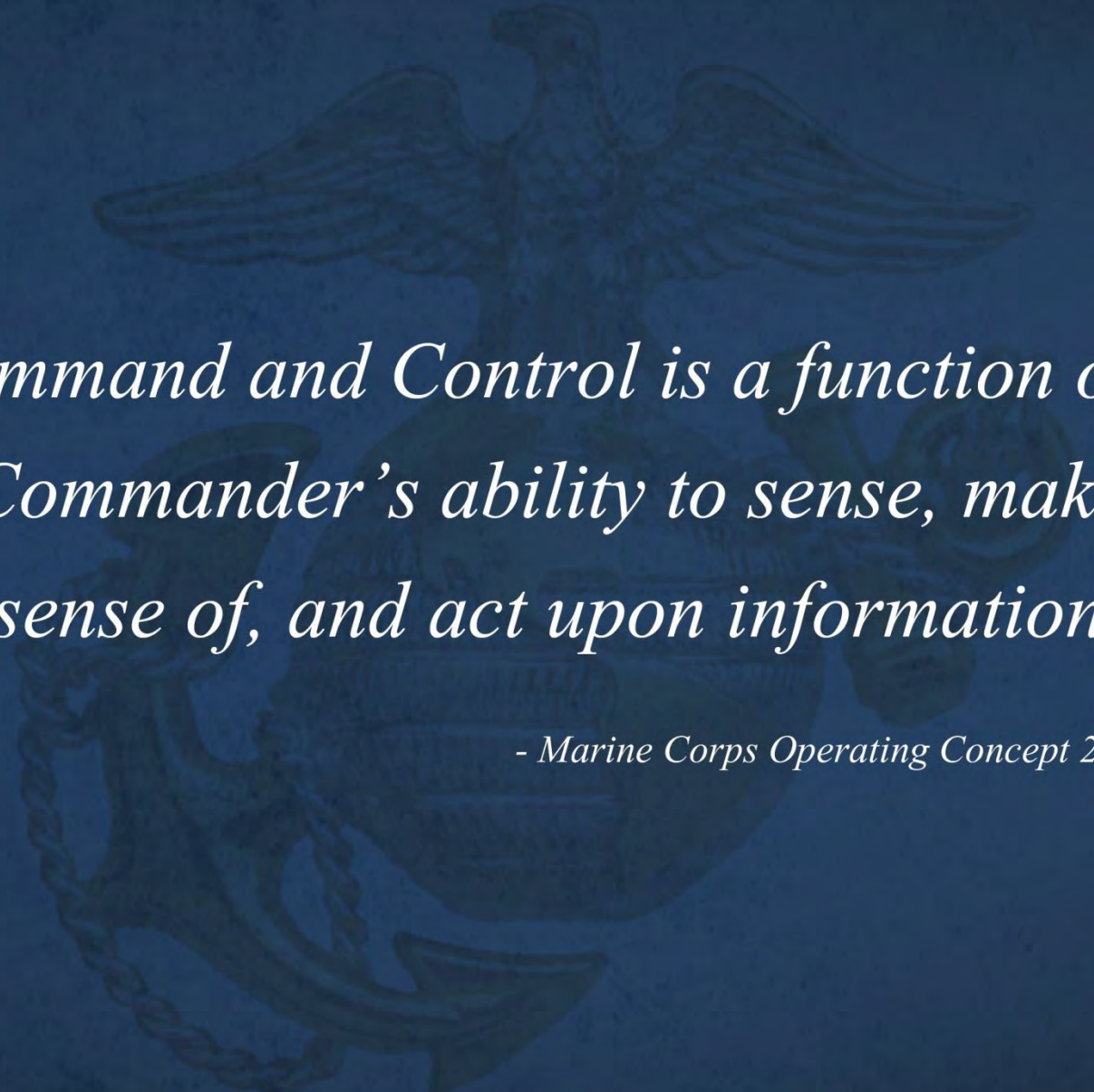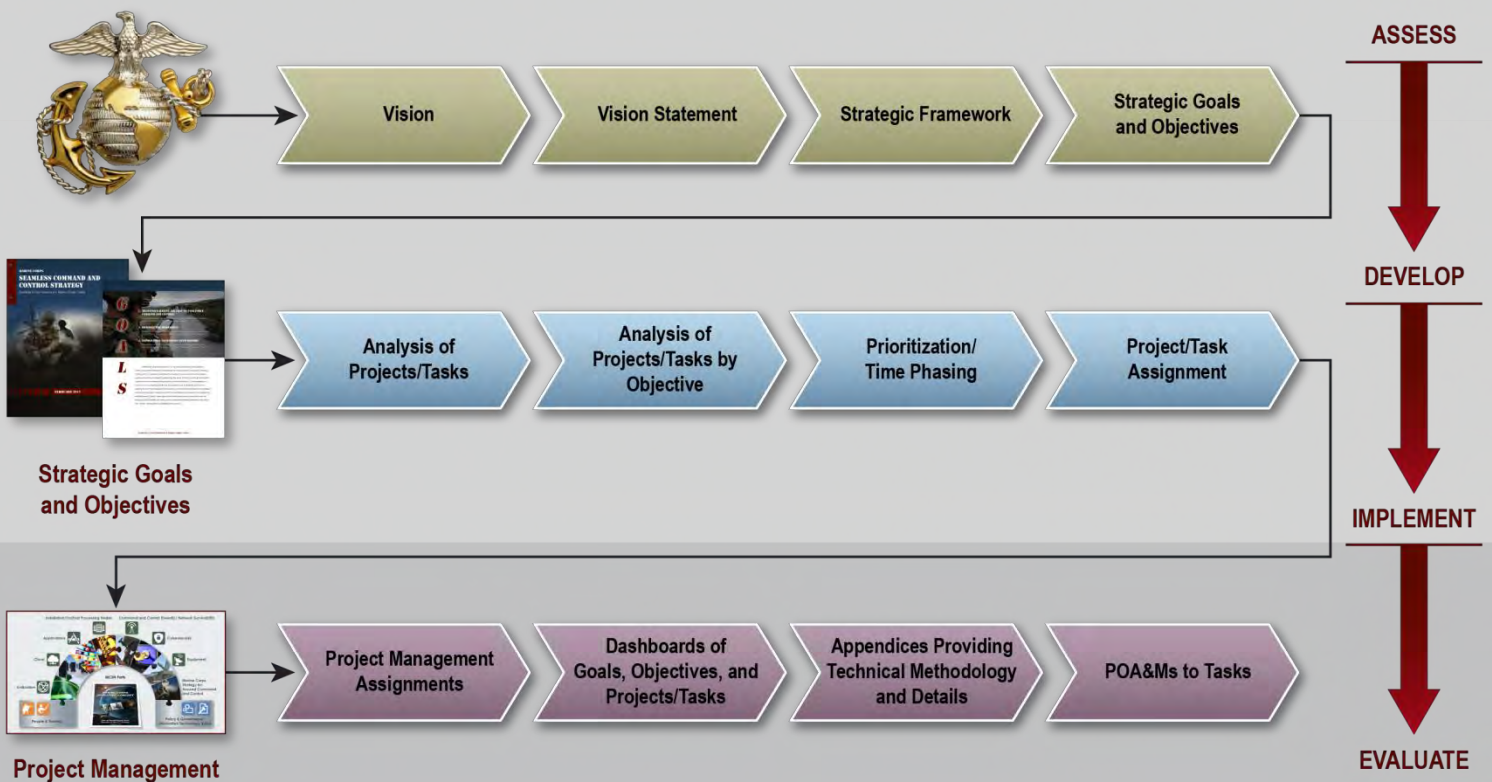
Appendix I – Vision, Goals, and Objectives Overview

Command and Control Network Vision, Goals, and Objectives Overview	
Vision	
An assured enterprise warfighting network allowing timely and persistent information exchange in the most demanding environments and circumstances realized through efficient and responsible stewardship	
Goals	**Objectives**
1. **Transform Marine Air Ground Task Force Command and Control** – Establish a warfighting network providing interoperable, ubiquitous, and rapid access to information in any environment	1. **Unification** – Standardize the network by eliminating legacy systems, consolidating resources, and optimizing network operations
	2. **Cloud** – Provide cloud services supporting the full spectrum of Marine Corps' warfighting and business missions
	3. **Applications** – Establish and maintain application development standards, processes, and infrastructure that allow system capabilities to be delivered rapidly and efficiently
	4. **Installation/Tactical Processing Nodes** – Standardize capabilities of the Marine Corps' regionally aligned Installation Processing Nodes, increasing effective access to secure information for Marines worldwide
	5. **Command and Control Diversity/Network Survivability** – Ensure survivability of the Command and Control network through the most austere, challenged, and contested conditions
	6. **Cybersecurity** – Establish appropriate measures to protect and defend data, users, systems, connections, and missions
	7. **Equipment** – Maintain proven Command and Control capabilities, while fielding capable, relevant, and interoperable systems employed in innovative ways
2. **Optimize the Workforce** – Provide a "right-sized" workforce that is highly competent, relevant to the current mission, prepared to meet future requirements, and affordable	1. **People** – Execute a holistic workforce strategy incorporating Force Modernization requirements that address future Communications/ Information Technology skillsets
	2. **Training and Resources** – Provide innovative training using regionalized training centers and methods to increase proficiency at a sustainable cost
3. **Practice Information Technology Stewardship** – Establish and enforce disciplined processes for delivering effective and efficient enterprise capabilities across all warfighting and business functions	1. **Policy and Governance** – Establish enterprise policies, processes, and standards that govern the implementation, operation, and sustainment of the Command and Control network
	2. **Information Technology Value** – Influence and shape investment opportunities to demonstrate fiscal responsibility while guiding innovation throughout the Marine Corps Capabilities Based Assessment

Appendix II – Acronyms

Acronyms	
BLOS	Beyond Line of Sight
C2	Command and Control
C4	Command, Control, Communications, and Computers
CBA	Capabilities Based Assessment
CIO	Chief Information Officer
CO-CO	Contractor Owned - Contractor Operated
COOP	Continuity of Operations
COTS	Commercial Off-The-Shelf
CTC	Command and Control Training Centers
DDCIO (MC)	DON CIO Marine Corps
DIL	Disconnected Intermittent and Latent
DoD	Department of Defense
DON	Department of the Navy
EA	Enterprise Architecture
ESC	Executive Steering Council
FAM	Functional Area Manager
IE	Information Enterprise
IEO	Information Environment Operations
IM	Information Management
IPN	Installation Processing Node
IT	Information Technology
ITPRAS	IT Procurement Request Review Approval System
JCIDS	Joint Capabilities Integration and Development System
JIE	Joint Information Environment
LoS	Line of Sight
MAGTF	Marine Air Ground Task Force
MAWTS	Marine Aviation Weapons and Tactics Squadron
MC CBA	Marine Corps Capabilities Based Assessment
MCCES	Marine Corps Communications-Electronics School
MCEITS	Marine Corps Enterprise Information Technology Services
MCEN	Marine Corps Enterprise Network
MCTOG	Marine Corps Tactics and Operations Group

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Acronyms	
MET	Mission Essential Task
MOC	Marine Corps Operating Concept
MOS	Military Occupational Specialty
NIPRNET	Non-Classified Internet Protocol Router Network
NMCI	Navy-Marine Corps Intranet
OAG	Operational Advisory Group
POA&M	Plan of Action and Milestones
POM	Program Objective Memorandum
POR	Program of Record
PPB&E	Planning, Programming, Budgeting, and Execution
R&D	Research and Development
RDE	Ready Data Environment
RITC	Regional Intelligence Training Centers
ROI	Return on Investment
S&T	Science and Technology
SATCOM	Satellite Communications
SIPRNET	Secret Internet Protocol Router Network
SWaP	Size, Weight, and Power
TEP	Tactical Entry Point
TPN	Tactical Processing Nodes
ZBR	Zero-Based Review

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Command and Control is a function of a Commander's ability to sense, make sense of, and act upon information

- Marine Corps Operating Concept 2016