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MASTER OF MILITARY STUDIES

TITLE:

THRIVING IN THE INFORMATION AGE: WHY MARINE CORPS COMMANDERS MUST MAXIMIZE THEIR EXISTING INFORMATION-RELATED CAPABILITIES

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Executive Summary

Title: Thriving in the Information Age: Why Marine Corps Commanders Must Maximize Their Existing Information-Related Capabilities

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Thesis: Marine Corps commanders must maximize their existing information-related capabilities (IRCs) via a common framework in order to generate and share *quality information* and intelligence for Marines, leaders, and commanders to maintain a competitive edge and take decisive action across the range of military operations.

Discussion: Marine Corps commanders inherently understand how *timely* and *actionable* information and intelligence enhances decision-making across their range of military operations. Though there are subject matter experts (SMEs) within commands and organizations who are trained and tasked to achieve this end, there is a lack of standardization – from the tactical to the strategic level – with integrating and employing IRCs and these SMEs. This along with other systemic challenges have resulted in "information chaos," added friction, wasted time and money, information security vulnerabilities, and redundant IRCs. Efforts are currently underway within Headquarters Marine Corps to institutionalize information management across the Service; however, Marine Corps commanders require clear and practical IRC tactics, techniques, and procedures to best support their decision-making and operations, today.

This paper attempts to provide the commander and staff with insights and considerations for operating in the information environment – from garrison/steady-state to contingency/combat operations – leveraging their existing IRCs. The *IRCs Integration Continuum* is introduced as a framework for integrating IRCs to produce *quality information* and intelligence to best support decision-making and optimize staff operations. The continuum's *Time, Tasks, Talent* (T3) and *Championship, Culture*, and *Change* (C3) constructs include key variables that commanders and staffs *can* directly control, influence, and build upon to achieve these ends.

Conclusion: When the commander and staff place a premium on *quality information* as strategic capital and invests the time to accurately identify and align their existing IRCs, improvements in the commander's decision cycles and staff operations emerge. This includes the commander's proper employment and empowerment of the IRCs cadre – supervised and directed by the chief of staff / executive officer and led by an information management officer with a level of leadership, operational experience, and influence comparable to the commander's principal staff members.

Technological solutions and strategies do not always resolve issues in operational inefficiencies and barriers to sharing *quality information* and intelligence. These problems are often rooted in inadequate requirements analyses, misalignment of IRCs to command/organization strategic goals and objectives, and/or a lack of senior leader advocacy. Practical approaches such as the *IRCs Integration Continuum* acts as a force-multiplier, enabling commanders and staffs to maximize their existing IRCs to generate *actionable information and intelligence*, *shared understanding, unity of effort*, and *greater operational efficiencies and effectiveness*.

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DISCLAIMER

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

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Preface

Optimizing how information and intelligence is produced, managed, and leveraged to support senior leader decision-making and organizational operations is hard work and requires the commander's direct involvement. While serving in joint and Marine Corps commands and organizations, I have observed that many commanders and staffs simply do not know how or where to start. Furthermore, physical and virtual workspaces have become vast wastelands of years' worth of unstructured, unnavigable data and information. This has resulted in information silos, wasted time and money, information security vulnerabilities, and operational inefficiencies.

Technological solutions and strategies are often acquired and developed in vain due to inadequate requirements analyses, information-related capabilities' (IRCs) misalignment to strategic goals and objectives, and/or a lack of senior leader advocacy. Further, Marine Corps commanders are currently employing their information management officers (IMO) differently due to a common misunderstanding of the IMO's role and responsibilities. Commanders can no longer afford to accept the status quo, especially in the increasingly complex operational environments of today. This paper attempts to provide the commander with insights and considerations for mitigating and resolving these issues in order to thrive in the Information Age.

Credit is given to the many commanders, chiefs of staff, and executive officers that I have had the distinct pleasure of personally serving; and fellow Marines, Soldiers, Sailors, Airmen, Coast Guardsmen, civil servants, and colleagues I have been privileged to serve with to develop and implement strategies designed to optimize decision-making and staff operations with existing IRCs. The insights and best practices shared within this paper are directly attributed to these professionals' feedback, patience, open-mindedness, and willingness to break away from the norm.

Introduction

Since its inception, the US Marine Corps has defined itself as an innovative and adaptive institution that has demonstrated its value to the American public and Congress even while changes in society, science, and technology have taken place. The Marine Corps has continued to remain relevant. In the Information Age, the Marine Corps is now faced with the challenge of continuing to thrive in increasingly complex operational environments at the same level of agility and versatility for which the Marine Corps has become renowned. Operations will become more challenging as the speed and volume of information increases; advancements in information-related capabilities (IRCs) yield greater opportunities for both friendly forces' and adversaries' ability to access, leverage, and exploit information as strategic capital; and fiscal resources are further constrained. Marine Corps commanders must maximize their existing IRCs via a common framework in order to generate and share *quality information* and intelligence for Marines, leaders, and commanders to maintain a competitive edge and take decisive action across the range of military operations. *Quality information* includes the following attributes:

- **Accuracy** – Information conveys the true situation
- **Relevance** – Information applies to the mission, task, or situation at hand
- **Timeliness** – Information is available in time to make decisions
- **Usability** – Information is in common, easily understood formats and displays
- **Completeness** – All necessary information required by the decision maker is available
- **Brevity** – Information is succinct, but at the level of detail required
- **Security** – Information is afforded sufficient protection where required[1]

The information environment

The information environment is defined as "the aggregate of individuals, organizations, and systems that collect, process, disseminate, or act on information."[2] The three interrelated dimensions that make up the information environment include the *physical*, *informational*, and *cognitive* dimensions. The dimensions collectively interact with individuals, organizations, and

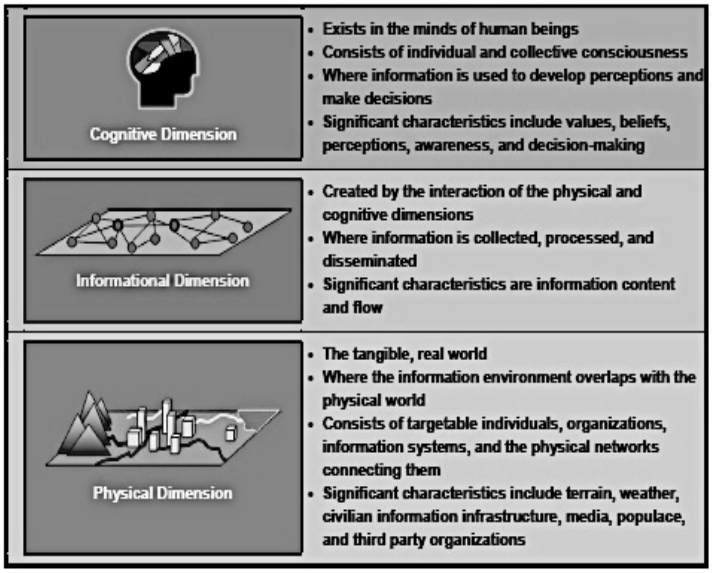
systems within the environment.[3] Joint Publication 3-13, *Information Operations*, and figure 1 describe each dimension as follows:

a. **Physical Dimension** – composed of command and control *(C2) systems, key decision makers, and supporting infrastructure* that enable individuals and organizations to create effects. It is the dimension where physical platforms and the communications networks that connect them reside. The physical dimension includes, but is not limited to, human beings, C2 facilities, newspapers, books, microwave towers, computer processing units, laptops, smart phones, tablet computers, or any other objects that are subject to empirical measurement. The physical dimension is not confined solely to military or even nation-based systems and processes; it is a defused network connected across national, economic, and geographical boundaries.

b. **Informational Dimension** – encompasses *where and how* information is collected, processed, stored, disseminated, and protected. It is the dimension where the C2 of military forces is exercised and where the commander's intent is conveyed. Actions in this dimension affect the content and flow of information.

c. **Cognitive Dimension** – encompasses *the minds* of those who transmit, receive, and respond to or act on information. It refers to individuals' or groups' information processing, perception, judgment, and decision making. These elements are influenced by many factors, to include individual and cultural beliefs, norms, vulnerabilities, motivations, emotions, experiences, morals, education, mental health, identities, and ideologies. Defining these influencing factors in a given environment is critical for understanding how to best influence the mind of the decision maker and create the desired effects. As such, this dimension constitutes the most important component of the information environment.[4]

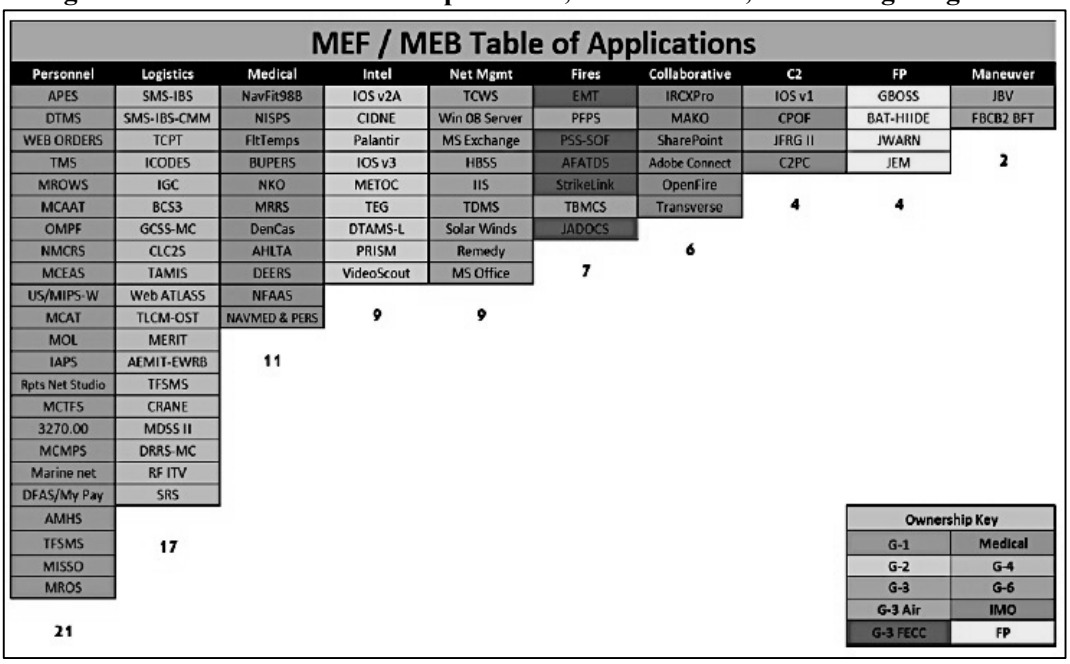
Figure 1 – Dimensions of the Information Environment



Source: HQMC CD&I, *Marine Corps Operating Concept for Information Operations*, February 4, 2013, p. 6.

IRCs – the tools, techniques, or activities employed within the information environment dimensions – can be used to create effects and operationally desirable conditions.[5] Marine Corps IRCs include the command, control, communications, computers (C4), intelligence, and reconnaissance (C4ISR) systems, services, and processes that enable C2. Common Marine Corps IRCs are depicted in figure 2 and also include Department of Defense (DoD) Internet services[6] and Internet-based capabilities[7] leveraged by a command/organization such as social media.

Figure 2 – Common Marine Corps C4ISR, collaboration, and warfighting IRCs



Source: HQMC C4, *Information Management Advocacy* brief, October 27, 2015, slide 12.

This paper attempts to offer the Marine Corps commander with insights and considerations for operating in the information environment – from garrison/steady-state to contingency/combat operations – leveraging existing IRCs. Taking an *ends*, *ways*, *means* approach, a framework and critical control variables are presented as a method to generate *quality information* within and across commands and organizations. *Quality information* directly correlates to providing commanders and staffs with *actionable information and intelligence*, *shared understanding and unity of effort*, and greater *operational efficiencies and effectiveness*.

The Problem Set

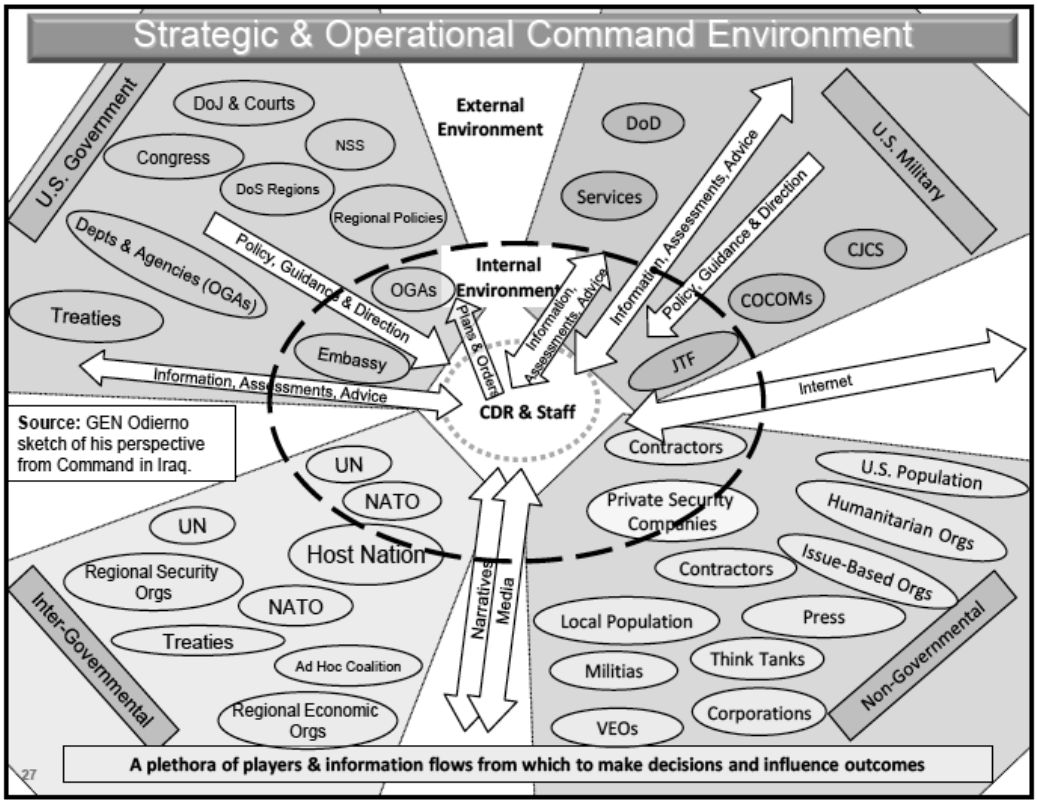
'Information and Intelligence' is the 'Fire and Maneuver' of the 21st Century.
~Lieutenant General Michael Flynn, US Army (retired)

Challenges of today's operational environment

Commanders inherently understand that *timely* and *actionable* information and intelligence enhances decision-making across their range of military operations. However, the ability to share *quality information* in near real time, anonymously, and securely has become both an asset and a potential vulnerability to the Marine Corps.[8] Today's commanders and staffs are challenged with making sense, responding, adapting, and command-and-controlling their forces[9] with the deluge of data and information constantly being produced, received, transmitted, and stored by stakeholders within and across their commands and organizations as illustrated in figure 3.

Physical and virtual workspaces, including file cabinets, document libraries, shared drives, webpages, and portals have become vast wastelands of years' worth of unstructured, unnavigable data and information within commands and organizations. For some Marine Corps commanders and staffs, it has become difficult to discern what data and information is useful and what is not. As a result, valuable information and intelligence is often overlooked or duplicated, thereby creating additional information silos, wasted time and money, and/or information security vulnerabilities. Difficulty with version control is a separate topic onto itself. Though there are subject matter experts (SMEs) within commands and organizations who are trained and tasked to prevent and mitigate these challenges, there is a lack of standardization – from the tactical to the strategic level – with integrating and employing IRCs and these SMEs.

Figure 3 – Information flows and stakeholders in the operational environment



Source: US Army General Raymond Oriderno, Address to the Knowledge Management Workshop, May 2011.

On a global scale, the Marine Corps and US military writ large is further challenged with the proliferation of IRCs within cyberspace – the global domain within the information environment that consists of the interdependent network of information technology infrastructures and resident data, including the Internet, telecommunications networks, computer systems, and embedded processors and controllers[10] – and their employment by state and non-state actors, including violent extremist organizations and their sympathizers.[11] In leading the US military's efforts to capture and kill key Al-Qaeda in Iraq leaders and insurgents between 2003 and 2008 as the commander of Joint Special Operations Command, retired US Army General Stanley McChrystal aptly notes that the Information Age has resulted in

> …an unprecedented proliferation of opportunities for small, historically disenfranchised actors to have a butterfly effect[12]. Some of this has positive consequences, like

> entrepreneurial success. Other manifestations are devastating: terrorists, insurgents, and cybercriminals have taken advantage of speed and interdependence to cause death and wreak havoc.[13]

The United States' adversaries understand the power that information yields, and are effectively leveraging cyberspace to exploit information as strategic capital. According to US Cyberspace Command, the DoD has observed a disturbing trend by adversaries in the cyber domain over the past two decades – from exploitation to disruption, and the next logical step, destruction.[14]

China and Russia, the United States' most formidable near-peer competitors, routinely attempt to hack into US computer systems, networks, and military aircraft.[15] China has been successful with stealing F-35 Joint Strike Fighter Jet plans and is responsible for attacking and attempting to affect the vast majority of US computer systems as a means of achieving legitimacy and an asymmetric advantage.[16] China is fully aware of the United States' dependence of its C2 systems to support military operations, and seeks to exploit this dependence through information warfare (IW) strategies and tactics as described in their 2000 Science Campaigns report:

> The goal of information warfare is, at the critical time and region related to overall campaign operations, to cut off the adversary's ability to obtain, control, and use information, to influence, reduce, and even destroy the adversary's capabilities of observing, decision-making, and commanding and controlling troops, while we maintain our own ability to command and control in order to seize information superiority, and to produce the strategic and campaign superiority, creating conditions for winning the decisive battle.[17]

Given adversarial state and non-state actors' advancements in cyberspace IRCs, the US military must continue to work to achieve and maintain the competitive advantage by maturing and building upon successes such as the information sharing techniques it leveraged during the surge in Iraq starting in 2007. During the surge, IW operations directly contributed to the removal of 4,000 insurgents from the Iraq battlefield. In its role of providing direct IRCs support

to US forces during combat operations in Iraq and Afghanistan, the National Security Agency noted that the senior US commander in Iraq credited IRCs for "saving US and allied lives by helping to identify and neutralize extremist threats across of both battlefields."[18] The Marine Corps' contribution to this greater effort largely depends upon its effective alignment and integration of its IRCs and supporting personnel, and the maturation and institutionalization of its IRCs-related doctrine, namely information management (IM).

Strategic misalignment

All Marine Corps commands and organizations use some form of a *decision cycle* to assess, plan, direct, and monitor operations as observed by the Deployable Training Division (DTD) of The Joint Staff J-7[19], which describes the cycle as follows:

> The decision cycle assists the commander in understanding the environment and in focusing the staff to support critical decisions and actions. Communication throughout the decision cycle, both within the headquarters and with higher, adjacent, and subordinate commands helps to ensure shared situational awareness.[20]

While the days of asking, *"What do I know? Who needs to know it? Have I told them?"* are still applicable and fundamental principles in managing and sharing information and intelligence, this process is largely reductionist in nature and inadequate when operating in the information environment, which calls for *speed* and *focus* to maintain the competitive advantage. When processes are not in place to effectively capture, share, and transfer operational information and intelligence, internal friction ensues and commanders' decision cycles are negatively impacted.

In an attempt to gain control of the "information chaos,"[21] Marine Corps commanders and staffs often resort to technological solutions and/or develop strategic plans to improve decision-making and staff operations. Unfortunately, technology and theories only go so far. Information silos and barriers to sharing *quality information* and intelligence will continue to persist with a lack of a holistic approach to IRCs integration and employment, including their

direct alignment to the command or organization's strategic goals and objectives. These gaps and shortfalls ultimately translate into wasted time and money, information security vulnerabilities, redundant IRCs, and the Marine on the forward edge not receiving the timeliest and optimal services and support. As noted in a 2013 survey of one Marine Corps command, 199 Marines and civilians on the headquarters-level staff indicated that they spent approximately 90,000 hours per year just *searching* for information. Of those respondents, only 40% indicated they had a high degree of confidence that the information they did obtain was accurate and relevant. Further, only 32% of the Marines and civilians believed that the command's senior leaders effectively shared information.[22]

Marine Corps IM is not being fully maximized

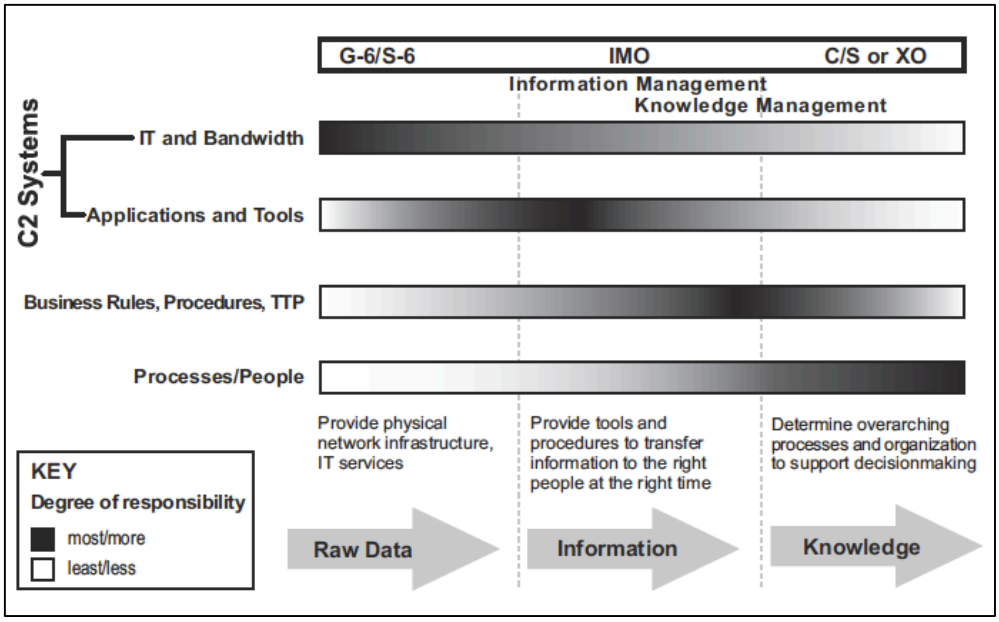
Information management is "the function of managing an organization's information resources for the handling of data and information acquired by one or many different systems, individuals and organizations in a way that optimizes access by all who have a share in that data or a right to that information."[23] IM primarily focuses on the rules, procedures, applications, and tools to gain, manipulate, and share data and information according to The Joint Staff J-7 DTD.[24]

Marine Corps commanders share a general understanding of IM and its value; however, there currently is no formal structure and training within the Marine Corps for the IM community.[25] As a result, commanders and staffs are employing their IMOs differently, to include their roles and responsibilities in relation to that of the command/organization's communications officer (J/G/S-6), intelligence officer (J/G/S-2), and other principal staff members. In an effort to address and begin resolving these institutional deficiencies, the Marine Corps communications community collectively agreed in October 2015 for the Headquarters Marine Corps (HQMC) C4 Director to become the Marine Corps' IM Advocate, a role that is

currently aligned under HQMC Combat Development and Integration (CD&I).[26]

While many Marine Corps communications officers have served and are currently serving as IM officers (IMOs) for their command or organization, the IM discipline spans far beyond the duties and responsibilities of that of a basic communications officer, who is primarily expected to plan and supervise the installation, operation, and maintenance of radio, data, and telecommunications network infrastructures and bandwidth. As depicted in figure 4, the IMO is responsible for facilitating the *flow* of information across these network infrastructures while synchronizing the integration and employment of IRCs. Together, these actions enable the commander and staff to plan, make informed decisions, and support operations.[27]

Figure 4 – Information Management levels of responsibility



Source: HQMC CD&I, MCWP 3-40.2, *Information Management*, p. 3-3.

According to MCWP 3-40.2, *Information Management*, the IMO must be able to effectively work by, with, and through principal staff officers such as the J/G/S-6 and J/G/S-2 to facilitate the following critical information within and across commands and organizations:

- Key decisions the commander is expected to make to successfully achieve desired results. Such decisions are normally reflected in the [commander's critical information requirements (CCIRs)] and decision support matrix.

- Information that is required to set conditions for tactical operations, is needed daily to maintain commander situational awareness, and is provided in daily reporting.

- Information required by the commander to reduce uncertainty about the force, the adversary, and the environment. Such information must be provided to the commander in a format that promotes understanding to make sound, timely decisions to satisfy CCIRs.[28]

While there are great opportunities that could result from the Marine Corps communications community taking the lead on IM, HQMC C4 must avoid the risk of Marine Corps IM becoming solely focused on technology and/or excluding the integration of people and processes as advised by The Joint Staff J-7 DTD:

> Technology by itself cannot sort through the plethora of players and information flows by which the commander will make decisions and influence outcomes. Key to success are people who instinctively comprehend what the commander needs through their intellect, experience, and trust-based relationships.[29]

Regardless of the long-term strategies that are implemented by HQMC over the course of the coming years, it is imperative for commanders and staffs to possess a basic understanding of integrating and maximizing their existing IRCs for Marines to *innovate, adapt,* and *win*[30] with today. Improvements and evolutions in Marine Corps IRCs and supporting doctrine in the coming years will largely depend upon the feedback that HQMC receives from the commanders and staffs who are making such effort and identifying legitimate requirements gaps.

Leveraging and Multiplying the Force

The commander must work in a medium which his eyes cannot see, which his best deductive powers cannot always fathom, and with which, because of constant changes, he can rarely become familiar. ~Carl Von Clausewitz

Ends – Producing quality information via a common framework

To successfully operate and thrive across the range of military operations in today's fluid information environment, all Marine Corps commanders and staffs must place a premium on the production of *quality information* to best inform their decision-making and enable staff operations. They must consider all of the data and information that is produced, received, transmitted, and stored within their command or organization – paper-based and digital alike – as strategic capital.

Data and information should be managed in the same manner as all other resources within the commander's charge. Just as the statuses and activities of personnel, equipment, and fiscal resources are managed and tracked, so too should the commander be apprised on how data and information is being managed and utilized within their command/organization. While this task may seem daunting for some, incredible results can be achieved if the right methodology is applied. Over time, IRCs integration techniques, tactics, and procedures become transparent and a normal part of staff operations. A starting point is the commander focusing their staff towards achieving and sustaining the following value proposition:

> ***Optimize how information and knowledge assets[31] are captured, shared, and transferred to provide Marines, leaders, and commanders with timely and actionable information and intelligence, while continuously improving organizational processes and continuity of operations.***[32]

Delivering this level of value throughout steady-state and complex operational environments requires more than mere lip service and/or technology solutions. Detailed, deliberate planning on the part of the commander and staff, leveraging a common framework, is

fundamental to setting the conditions necessary for optimizing decision-making and staff operations. The *IRCs Integration Continuum* is one such framework for effectively integrating and employing IRCs to produce *quality information* and intelligence.

The *IRCs Integration Continuum* includes three mutually supporting lines of effort (LOEs) for commanders and staffs to align and build their IRC strategies upon – *Mission, Marines,* and *Machines* (M3). M3 represents *the force* (the command or organization) writ large; what every Marine Corps commander is directly responsible for at all levels of command:

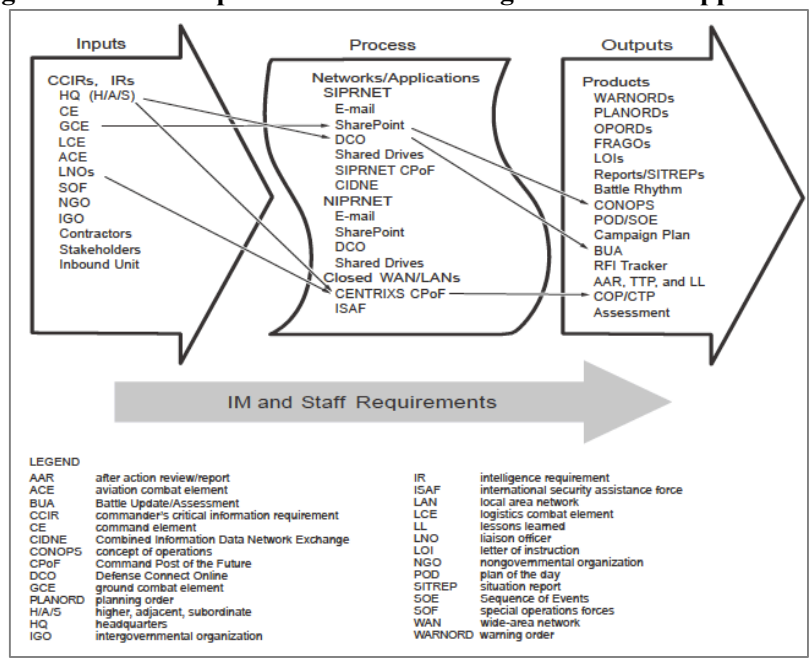
- **Mission – The task and purpose** of the command/organization.
- **Marines – The personnel** the commander leads, manages, and/or influences. This includes members of the command or organization – uniformed personnel, government civilians, contractors, and other key stakeholders. (Note – Sister services and Marines serving on joint staffs can opt to substitute "Manpower" here.)
- **Machines – The resources** the commander collectively brings to bear to accomplish the mission and equip Marines for success. This includes equipment, technology, funding, and operational processes.

With the M3 LOEs established as a baseline, commanders and staffs must next coordinate with key stakeholders within the command/organization to map out their respective (and/or the adversary's) information and intelligence requirements. This will take time and effort. Though M3 will differ between commands and organizations, the following questions help the commander and staff determine their baseline requirements:

- What information is critical to the commander and when is it needed?
- What format and style is required by the commanders?
- Who is responsible for obtaining, processing, analyzing, correlating, and disseminating the information?
- How should this information be protected and from whom?
- Does the required information already exist?
- Who else might need the information?
- Who has the need to know?
- Who has authority to release information?
- What is the best way to effectively get the information to other users?[33]

These inquiries include identifying the CCIRs and information exchange requirements (IERs) between the command/organization's higher headquarters, supported and supporting organizations, and other key stakeholders as depicted in figure 5. Once complete, the commander and staff must analyze and validate the requirements against their existing inventory of IRCs.

Figure 5 – Generic process for determining the IRCs to support IERs



Source: HQMC CD&I, MCWP 3-40.2, *Information Management*, p. 4-6.

Investing time towards this level of deliberate planning and requirements analysis helps commanders and staffs to accurately identify the gaps and shortfalls within their existing suite of IRCs while shedding light on opportunities for optimizing the use of IRCs to fulfill other information and intelligence requirements; saving time and money, and/or reducing redundancies. Moreover, commanders and staffs will discover that if their existing IRCs are not satisfying certain information and intelligence requirements, they are able to make informed decisions to fill those gaps. As the appropriate IRCs are determined, the critical drivers – the *ways* and *means* – for IRCs' operations start to become evident.

Ways and Means – Identify and integrate the critical IRCs drivers

With bona fide information requirements captured, the commander and staff must now identify and integrate the *ways* and *means* needed to optimize their IRCs' ability to produce *quality information* and intelligence. This integration should be facilitated by a competent IRCs cadre, supervised and managed by the command/organization's Chief of Staff (C/S) or Executive Officer (X/O), who is best positioned to synchronize and coordinate the cadre's actions and ensure the commander is continuously provided with the right information and intelligence to make informed decisions.[34]

The IRCs cadre should at minimum include the command/organization's IMO, J/G/S-6, J/G/S-2, J/G/S-1, public affairs officer (PAO), their staffs and contracted personnel; and other special staff members, including the knowledge management[35] officer (KMO), combat operations center (COC) senior watch officer (SWO), foreign disclosure officer (FDO), security manager, electronic warfare (EW), and cyber officers if the billets exist. The IRCs cadre is chartered and tasked with completing the following core tasks for the command/organization:

- Develop and publish IRCs-related operation orders or plans.
- Determine IERs that impact networks, systems, and applications required to plan for and integrate IRCs.
- Publish and update report matrices and standing operating procedures (SOPs).
- Develop the daily battle rhythm and support/facilitate Boards, Bureaus, Centers, Cells, Working Groups (B2C2WGs) collaboration.
- Coordinate additional training required by staff and component elements to support production of *quality information* through effective IRCs procedures.
- Ensure effective information exchange of operationally relevant information and intelligence within and across commands and organizations.
- Work closely with the principal staff members, IRCs representatives, and subordinate and higher headquarters' IMOs to ensure IRCs procedures and processes are published and understood.
- Ensure that recommended information flow improvements/enhancements are brought to the C/S / XO for evaluation and possible implementation; prepare/coordinate plans for any changes to established IRCs processes and procedures.
- Support continuous process improvement within the command/organization.[36]

The IMO reports directly to the C/S / XO and leads in managing the IRCs cadre, its tasks, projects, and requirements. Given the scope and impact of these responsibilities, it is most ideal that the IMO's level of leadership, operational experience, and ability to influence others be on par with the commander's principal staff members in order to effectively facilitate *information flow* within and across commands and organizations. The IRCs cadre is the *means* by which the commander and staff directly manages and shapes the critical control variables they *can* control to mitigate friction and generate *quality information* and intelligence.

Critical control variables are nested within the *Tasks, Time,* and *Talent* (T3) construct – a *way* to analyze and process the data and information that is produced, received, transmitted, and stored within the command/organization. T3 serves as the cornerstone for IRCs' employment across the range of military operations, and is summarized as follows:

- **Tasks** – **The operations, actions, and deliverables the command/organization** must complete in support of the mission.

  Critical control variables:

  - **Mission Essential Task List (METL)**. Includes the mission statement and tasks required to accomplish the multiple missions that are or may be assigned to a commander.[37] The METL is the command/organization's **strategic goals and objectives** and **a critical requirement for producing *quality information* and intelligence**.

  - **Commander's Intent**. Also referred to as the *commander's priorities*, commander's intent establishes the standards by which success will be judged within the command or organization.[38]

  - **CCIRs**. The commander's primary information requirements; focus the staff and its limited resources to provide relevant information to support decision-making. CCIRs serve as control measures by establishing priorities for collecting, processing, analyzing, and disseminating information and intelligence.[39]

  - **SOPs**. Authoritative sources for the command/organization's codified procedures and processes. SOPs are centrally-managed and maintained by the IRCs cadre.

- **Time** – Information regarding recurring friendly and/or adversary forces' **event and reporting timelines directly tied to the commander's decision cycle**.

Critical control variables:

- **Battle rhythm.** Manages the time and routine actions of the command and organization. Battle rhythm management is a process maintained by the C/S or XO due to the direct effect that it has on timely decisions and accurate assessments.[40]

- **Training Exercise and Employment Plan (TEEP)**. The commander's management tool designed to identify required unit, personnel, equipment and resources for the efficient and effective execution of training exercises or exercise deployments. Long-range in scope, the TEEP tracks resource utilization over time and defines the approved unit participation as it relates to a specified event.[41]

The Joint Staff J-7 DTD advises that the C/S / XO perform the following actions with regard to time management:

  - Direct use of planning time event horizons (future plans, future operations, and current operations) to focus staff efforts and set conditions for subordinates.
    - Anticipate, monitor, identify, and mitigate gaps and seams between horizons.
    - Discipline the process to move between event horizons - require hand-off briefs.
    - Consider use of several smaller touch points with the commander versus large briefs. This often results in better sharing of understanding and more timely guidance.
    - Identify potential and emerging transitions and proactively focus staff efforts.

  - Prioritize staff efforts to ensure they remain focused on key tasks.
    - Look across the staff and integrate functions.
    - Incorporate some form of weekly staff-wide planning management/prioritization venue.
    - Personally manage battle rhythm acceleration to support dynamic tasking and decision requirements.
    - Assign staff lead and support for problem sets / tasks to appropriate staff sections and/or planning horizon.[42]

- **Talent** – Information regarding friendly and/or adversary's **subject matter expertise and current capabilities**.

Critical control variables:

- **Knowledge, skills, and abilities (KSA) data**. Provides commanders and staffs with insights into where subject matter expertise resides within in the command/organization. KSA data from Marines' performance evaluations, military/civilian training schools, counselings, personal awards, and other

manpower management database systems are fully exploited by the IRCs cadre.

Note – KSA data contains sensitive personally identifiable information[43] and, therefore, must be safeguarded appropriately.

- **Organizational charts**. Identifies the roles and responsibilities of the command/organization and touch points for the coordination of people, processes, and technology to support and integrate decision-making and staff operations.[44]

- **Journals and logs**. Primarily managed in the COC by the SWO, this information keeps the commander and staff up to date on significant activities and significant events. Products are used for analyzing operations, extracting lessons learned, and investigating, when requested.[45] Meeting notes and after action reports (AARs) can be grouped into this category.

The Joint Staff J-7 DTD advises that the C/S / XO perform the following actions with regard to managing staff roles and responsibilities and talent:

- Spend time up-front clarifying staff responsibilities for Command Element/headquarters functions (particularly assessment, integration of lethal and nonlethal fires/effects, and messaging).

- Balance headquarters manning with regard to numbers, experience, influence of position, and rank. Structure the staff commensurate with the composition of forces and the character of the contemplated operations to ensure that the staff understands the capabilities, needs, and limitations of each element of the force.[46]

As with M3, the T3 components are mutually supporting of one another and bring synergy to M3. This synergy can only result and be sustained with the commander's *Championship* and fostering a culture of *Collaboration* and *Change*, otherwise known as the *C3*. Like T3, critical control variables within the C3 construct are directly influenced by the commander and staff. Unlike T3, however, the C3 components are less tangible and largely dependent upon the climate the commander establishes within the command/organization, and the level of trust and rapport the commander and staff has with its higher headquarters, supported and supporting organizations, and other key stakeholders. C3 is *the fuel* that keeps the T3 *engine* operating. Thus, of the two *IRCs Integration Continuum* constructs, C3 is the most critical in setting the conditions necessary for optimal decision-making and staff operations.

The need for the commander's championship and guidance in the design of their IRCs' integration and employment strategies cannot be overstated. As an example, while serving as the commander for Marine Corps Forces Reserve (MARFORRES) in 2012, Marine Corps Lieutenant General Steven Hummer instituted and championed a command-wide directive to bring order to the "information chaos" and develop an information and knowledge-based culture.[47] His vision included "developing and sustaining an IM / [knowledge management (KM)] infrastructure and culture which provides decision makers at all levels prioritized, relevant and timely information to make the best decisions."[48]

The MARFORRES IM / KM Campaign Plan included six LOEs and milestones that aligned to Lieutenant General Hummer's priorities and MARFORRES' strategic goals and objectives as depicted in figure 6. Lieutenant General Hummer's vision and directive continue to actively drive the development of an effective collaborative information environment (CIE) that powers operations, increased staff cooperation and awareness, and efficiencies across the command according to the MARFORRES IMO.[49] It exemplifies the *IRCs Integration Continuum* C3 construct and the value that it yields. The construct and its critical control variables are summarized as follows:

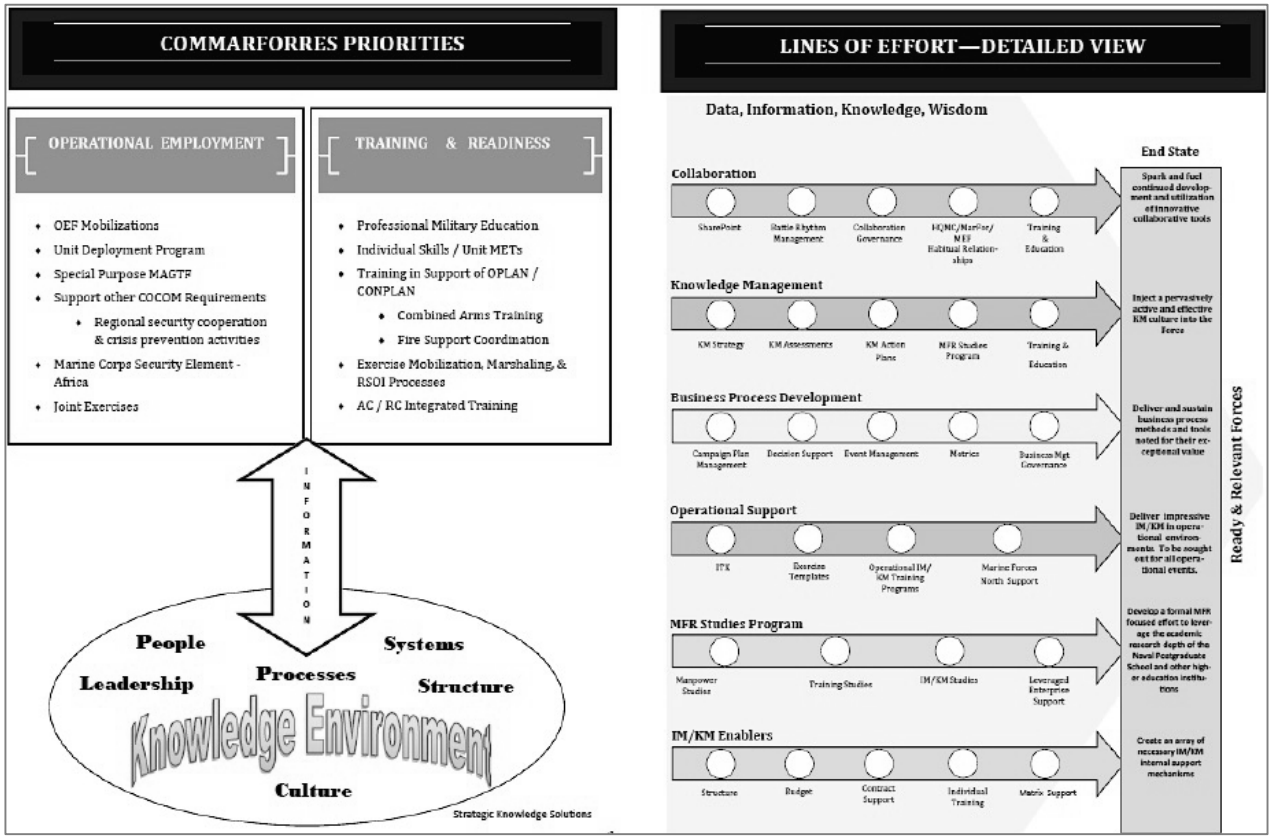
- **Championship** – The commander and staff's **advocacy, use, and support of the command/organization's IRCs and related initiatives**.

  Critical control variables:

  - **An empowered and unified IRCs cadre, directly supervised and managed by the C/S / XO.** Includes the IMO (lead), J/G/S-6, J/G/S-2, J/G/S-1, and other special staff members, including the KMO, SWO, FDO, PAO, security manager, EW, and cyber officers if applicable. The cadre's efforts are fully-integrated, synchronized, and enable the command/organization's lines of operation/effort.

  - **Strategic communications and guidance** regarding the capabilities, operations, and use of the command/organization's IRCs and related initiatives. Communications are routinely promulgated internally and externally with the command/organization's respective partners and stakeholders.

Figure 6 – MARFORRES commander's strategic approach to IRCs integration



Source: MARFORRES IM/KM program overview brief to the Marine Corps Knowledge Management Community of Practice on June 13, 2013, slide 15.

- **Collaboration** – The commander and staff's process of **incorporating all available expertise and IRCs** to develop plans, maintain situational awareness, and support the commander's decision cycle. Perspectives provided by stakeholders and sources outside of military channels, such as industry and academia, enhance situational understanding.[50]

  Critical control variables:

  - ***Action-oriented*** **Boards, Bureaus, Centers, Cells, Working Groups (B2C2WGs)** that **directly align to the commander's decision cycles**. Collaboration via B2C2WGs is **a critical requirement for producing *quality information* and intelligence**.

    - B2C2WGs, such as the IRCs cadre and operational planning teams, aggregate the **functional expertise from across the command/organization and external stakeholders to support decision-making**. Many commands and organizations leverage virtual collaboration IRCs to facilitate inclusiveness at these venues.[51]

- **A Collaborative Information Environment (CIE)** – secure and non-secure portals and enterprise content management IRCs that serve as the command/organization's **authoritative repository and information exchange hub**. CIE best practices include the following:

  - The CIE is designed to directly support the command/organization's strategic goals and objectives (e.g., METL) and incorporate the T3 critical control variables previously outlined.

  - Information and processes within the CIE are continuously reviewed, purged, organized, and archived by the IRCs cadre to ensure relevancy.

  Note – A CIE can be digital and/or paper-based; as simple as a centrally-managed external hard drive, read board, and/or collection of SOPs and turnover binders.

- **Change** – The commander and staff's **continuous assessment and optimization of the command/organization's IRCs** to best support the institution's strategic goals and objectives, commander's decision cycle, and staff operations.

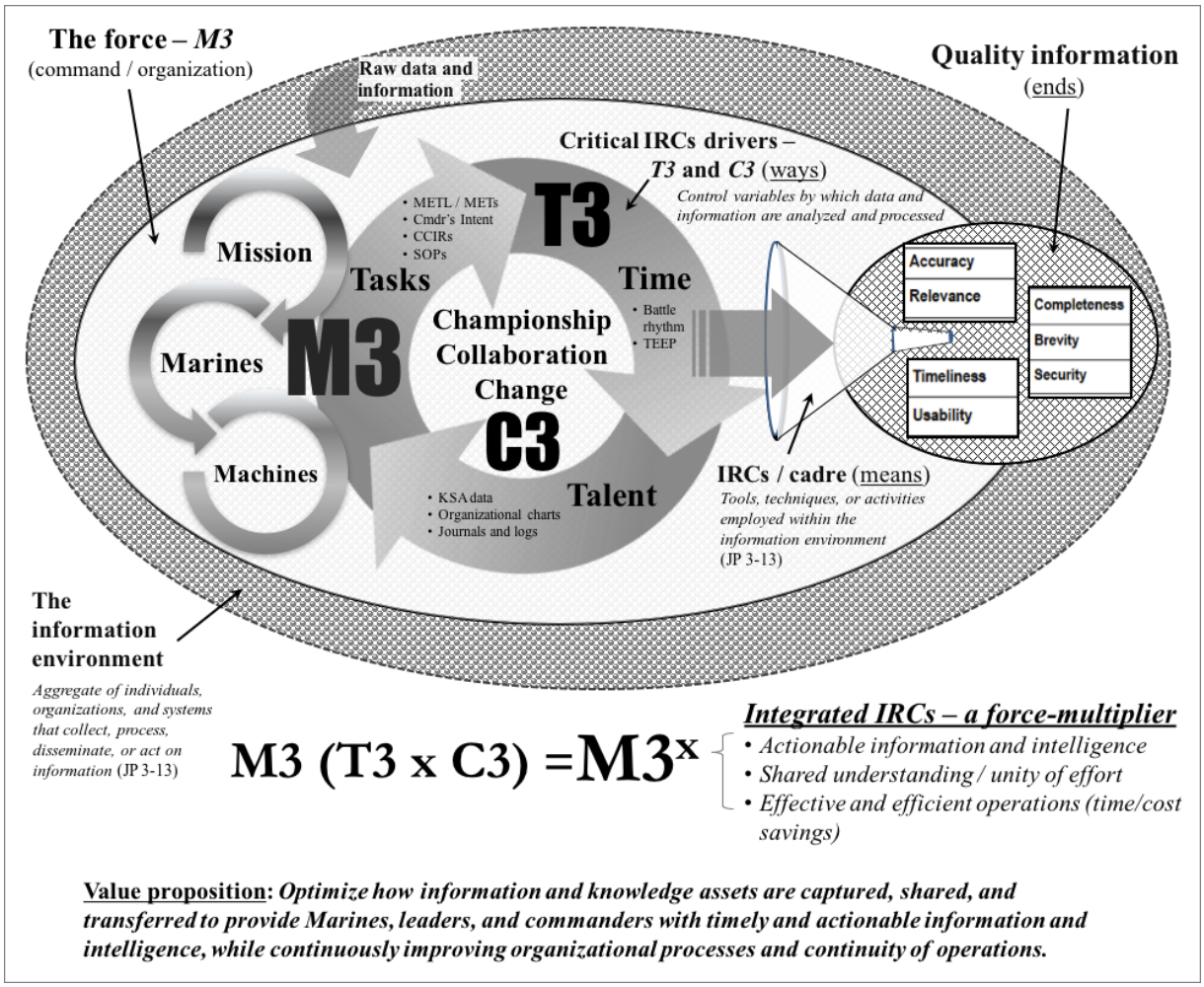
  Critical control variables:

  - **Strategic communications and training** that directly supports all major command/organization-wide IRCs change management efforts; routinely promulgated via official communications channels, meetings, and forums.

  - **Measures of performance and effectiveness metrics** to routinely assess IRCs against M3 (namely the METL) and T3 (namely IERs, CCIRs, and battle rhythm); making improvements as required.

As a whole, the *IRCs Integration Continuum* enables the commander and staff to adapt and thrive in the information environment by providing a framework to establish the parameters necessary for sensing, responding, adapting, and command and controlling *the force*. Conversely, the *IRCs Integration Continuum* can also be leveraged for designing information operations focused on manipulating the adversary's situational awareness and denying him the ability to C2 his forces. The resulting effects of the model – *actionable information and intelligence*, *shared understanding, unity of effort*, and *greater operational efficiencies and effectiveness* – collectively act as a force-multiplier. In essence, **M3 (T3 x C3) = M3^{x}** as conceptualized in figure 7.

Figure 7 – The *IRCs Integration Continuum* conceptual model



Proof of Concept

The [MAGTF CIE] became the backbone of the program allowing past, present, and future [MAGTFs] to communicate and continually improve the program.[52] ~MAGTF Commander

The following vignette briefly describes a firsthand account of the application of the *IRCs Integration Continuum* in the operating environment. It provides insights and observations into one Marine Corps force reconnaissance unit commander and staff's integration and employment of IRCs in support of the Marine Air-Ground Task Force (MAGTF) they formed and led between 2011 and 2012. Due to the classification of some operations and aim of this writing to emphasize the *why* and *how* over the *who*, the vignette provides the reader with a general

understanding of the methodology the commander and staff applied during the MAGTF's steady-state and contingency operations.

M3 – Mission, Marines, Machines

The mission of the MAGTF was to deploy task-organized teams to train and advise multiple partner nation forces in various tactical and logistics skills in order to prepare them for follow-on combat and stability operations. The MAGTF was also tasked with being prepared to conduct limited planning in support of contingency operations. With a force reconnaissance commander and staff serving as a MAGTF Command Element, key C2 planning considerations had to be taken into account, including how the command would integrate and employ its IRCs in support of distributed operations simultaneously, across multiple countries.

The Marines who made up the MAGTF's table of organization consisted of force reconnaissance Marines, combat engineers, and other combat support personnel, all who typically operated at the tactical-level prior to the joining the MAGTF. They were expected to perform at the operational- and strategic-levels, and operate and share information and intelligence with joint and interagency stakeholders, to include a Joint Special Operations Task Force, Combined Joint Task Force, Marine Expeditionary Unit, the Department of State, US Navy, and various Combatant Command Service components. Within the MAGTF Command Element, the XO, S-6/IMO, S-2, S-3, COC SWO, S-1, and PAO formed the IRCs cadre, integrating the MAGTF's IRCs to facilitate this level of interoperability.

Initially, the MAGTF's IRCs were limited, only including the commander's force reconnaissance table of equipment. Therefore, a large portion of the MAGTF IRCs had to be externally sourced. The MAGTF S-6/IMO leveraged no-cost DoD IRCs such as the Defense

Information Systems Agency and Office of Defense National Intelligence's suite of secure and non-secure enterprise services to engineer and implement the MAGTF's CIE.

First piloted to support the MAGTF's pre-deployment requirements, the MAGTF CIE eventually became critical to enabling C2 for the MAGTF's 24x7 operations and interoperability with the aforementioned stakeholders. In addition to the CIE, the commander and staff leveraged host tenant commands' information and intelligence network infrastructures and deployable data suites as a means to command and control MAGTF forces. The MAGTF liaison officers assigned to US embassies leveraged their respective Department of State embassies' networks to integrate into the MAGTF CIE and other IRCs. The S-6/IMO and S-2 also worked closely together to develop and implement robust cybersecurity systems and processes to protect and defend the MAGTF CIE, its supporting network infrastructure, and information writ large.

T3 – Tasks, Time, Talent

The MAGTF's pre-deployment period provided the force reconnaissance commander and staff with adequate time to transition to their role as a MAGTF Command Element, establish its M3 LOEs, and align the supporting T3 and C3 constructs prior to deploying. This period included the development of the MAGTF METL and the commander providing his initial intent and CCIRs. The IRCs cadre then identified and aligned the MAGTF's IRCs to support the METL, CCIRs, and IERs, which included daily situation reports, communications status reports, storyboards, country books, commander's update briefs, and AARs. Synchronizing staff actions to support these requirements and the MAGTF's METL became the next focus of effort.

Developed and managed by the XO and S-3, the MAGTF battle rhythm was critical for integrating and synchronizing the MAGTF's METL and supporting IRCs. The commander's decision cycle, training, reporting to higher, and engagements with external stakeholders were

incorporated as key battle rhythm events. As the mission transitioned between steady-state and contingency operations, the battle rhythm was updated accordingly. Overall, the establishment and maintenance of the battle rhythm facilitated the integration of IRCs, which enhanced cross-staff synergy, unity of effort, and shared understanding.

To maximize the MAGTF's operational effectiveness, thorough MAGTF-wide SME KSA data and equipment capabilities analyses were conducted by the commander and staff prior to and throughout the deployment. The analyses provided key insights for aligning and applying the MAGTF's T3 to best support its M3, and identified where shortfalls resided as depicted in figures 8 and 9. This information proved valuable during the crisis response exercises and operations when staff estimates, resourcing, and products were required by higher headquarters on short notice. Moreover, detailed information about each Marine's role and responsibility instilled a sense purpose, reduced friction, and increased awareness across the command.

C3 – Championship, Collaboration, Change

The MAGTF commander's advocacy for agility and operational efficiency fostered a culture of collaboration and innovative uses of the MAGTF's IRCs throughout the deployment. Over time, synergies emerged as a result of the commander and XO's feedback on the design and functionality of the MAGTF IRCs, namely the CIE.

Purposely engineered in a light and agile way, the MAGTF CIE adapted to the changing needs of the commander and staff's IERs while serving as the MAGTF's common operating picture. The CIE aggregated and housed the MAGTF's key planning products, briefs, and integrated its T3 critical control variables – the battle rhythm, task trackers, SOPs, staff directory, and AARs. As a result of its utility and design, the MAGTF CIE was accessed over 2,000 per day by higher headquarters, deployed MAGTF forces, and follow-on MAGTF rotations within a

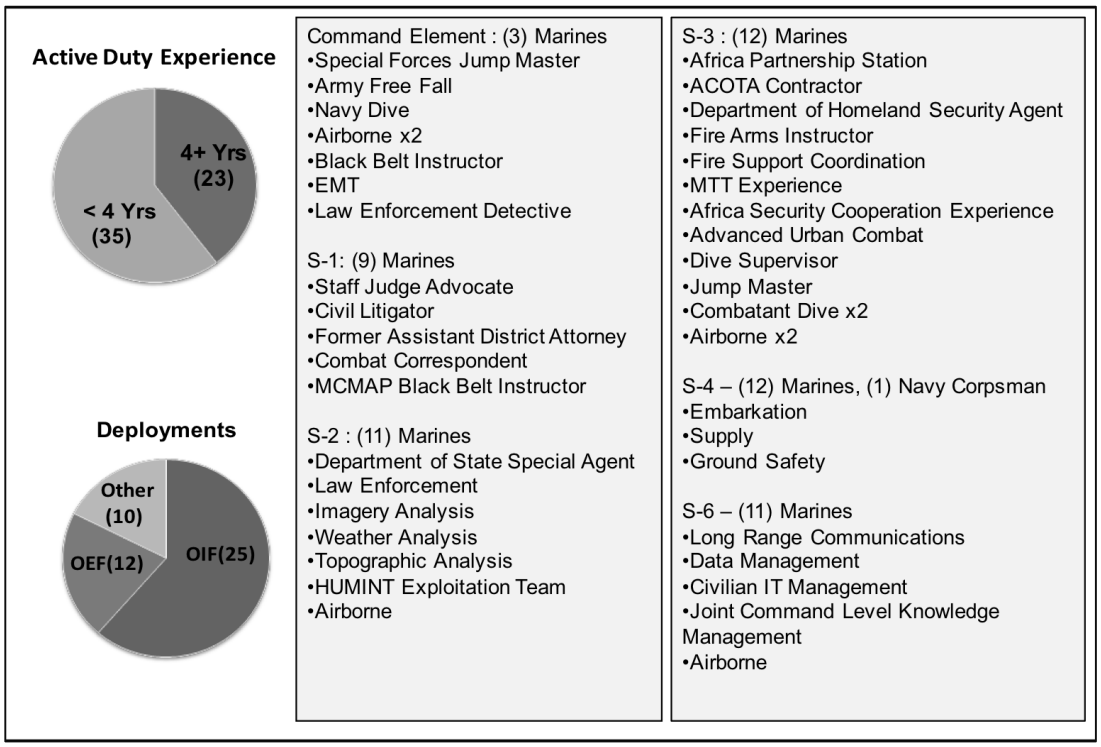
few short months of its establishment. This cross staff interaction and collaboration streamlined relief-in-place/turnover of authority efforts, mitigated duplicative efforts, and enabled continuity of operations between MAGTF rotations.

Overall, the degree of effectiveness and efficiency of mission-accomplishment, program continuity, and *quality information* exchanged was commended by higher headquarters and across the MAGTF as noted by one MAGTF principal staff officer:

> [O]perators, combat service support entities, and the Commanding Officer [had] the ability to share accurate and real time information thus resulting in extremely effective Information Management and Command and Control (C2)…real time voice and web communications with multiple [teams] operating thousands of miles away... greatly enhanced our Commanding Officer's decision making ability.[53]

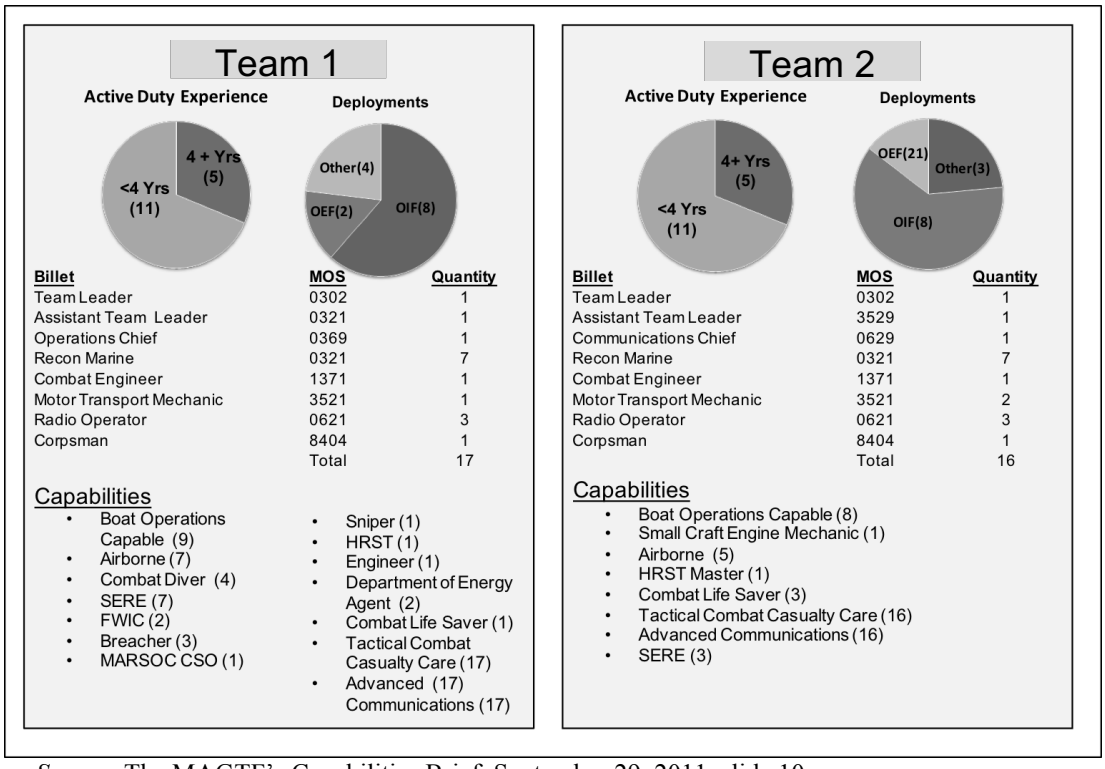
The results themselves were not simply a product of the IRCs cadre's efforts or the CIE, but rather a combination of the communication, collaboration, and trust-based relationships built amongst the staff and teams throughout the deployment. These key factors significantly enabled the IRCs cadre, XO, and principal staff members to continuously identify IRCs requirements, resolve gaps, improve staff processes, and manage change via various strategic communications and IRCs training initiatives.

Figure 8 – MAGTF Command Element KSA analysis and overview



Source: The MAGTF's Capabilities Brief, September 29, 2011, slide 9.

Figure 9 – Deployable MAGTF teams' KSA analysis and overview



Source: The MAGTF's Capabilities Brief, September 29, 2011, slide 10.

Conclusion

In summary, despite the challenges presented by the Information Age, there are variables within the information environment that Marine Corps commanders and staffs *can* control in an effort to better sense, respond, adapt, and command and control their forces. When the commander and staff places a premium on *quality information* as strategic capital and invests the time to accurately identify and align their IRCs, improvements in the commander's decision cycles and staff operations emerge. This requires the commander's proper employment and empowerment of the IRCs cadre – supervised and directed by the C/S / XO and led by an IMO with a level of leadership, operational experience, and influence comparable to the commander's principal staff members.

Commanders and staffs must understand that technological solutions and strategies do not always resolve issues in operational inefficiencies and barriers to sharing *quality information* and intelligence. These problems are often rooted in inadequate requirements analyses, misalignment of IRCs to command/organization strategic goals and objectives, and/or a lack of senior leader advocacy. Practical solutions such as the *IRCs Integration Continuum* acts as a force-multiplier, enabling commanders to maximize their existing IRCs to generate *actionable information and intelligence*, *shared understanding, unity of effort*, and *greater operational efficiencies and effectiveness* across the range of military operations. When focused on achieving these ends, Marines are better equipped to *innovate, adapt,* and *win* in the Information Age.

Endnotes

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[2] Joint Publication (JP) 3-13, *Information Operations (IO)*, (Change 1 from November 27, 2012), November 20, 2014, I-1, http://www.dtic.mil/doctrine/new_pubs/jp3_13.pdf.

[3] JP 3-13*, IO*, I-1.

[4] JP 3-13*, IO*, I-2 - I-3.

[5] JP 3-13*, IO*, I-1.

[6] "DoD Internet services": All information capabilities and applications available across the Internet in locations owned, operated, or controlled by the DoD. DoD Internet services include collaborative tools such as websites, social networking, social media, user generated content, social software, e-mail, and instant messaging and discussion forums delivered through a variety of platforms and presentation mediums. Definition from DoD Instruction (DoDI) 8550.01, *DoD Internet Services and Internet-Based Capabilities,* September 11, 2012, http://www.dtic.mil/whs/directives/corres/pdf/855001p.pdf.

[7] "Internet-based capabilities": All public information capabilities or applications available across the Internet from locations not directly or indirectly controlled by DoD or the Federal government (i.e., locations not owned or operated by DoD or another Federal agency or by contractors or others on behalf of DoD or another Federal agency). Definition from DoDI 8550.01, http://www.dtic.mil/whs/directives/corres/pdf/855001p.pdf.

[8] JP 3-13, *IO*, I-1.

[9] HQMC CD&I, MARADMIN 596/15, *Establishment of Marine Corps Information Warfare Task Force*, November 25, 2015, task d – The Marine Corps Information Warfare Task Force is tasked with recommending capabilities required by the MAGTF Commander to successfully operate within the information environment to *sense, respond, adapt, and command and control his forces* while manipulating the adversary's situational awareness and denying him the ability to command and control his forces; http://www.marines.mil/News/Messages/MessagesDisplay/tabid/13286/Article/175416/establishment-of-marine-corps-information-warfare-task-force-mciwtf.aspx.

[10] Joint Publication 3-12, *Cyberspace Operations*, v, http://www.dtic.mil/doctrine/new_pubs/jp3_12R.pdf.

[11] HQMC CD&I, *Expeditionary Force 21*, Concept. (Washington, DC: U.S. Marine Corps, March 4, 2014), 8, http://www.mccdc.marines.mil/Portals/172/Docs/MCCDC/EF21/EF21_USMC_Capstone_Concept.pdf.

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[13] Stanley A. McChrystal and Tatum Collins, *Team of Teams: New Rules of Engagement for a Complex World*. (New York, NY: Penguin Publishing Group, 2015), 62.

[14] US Cyberspace Command Overview Brief, April 11, 2014, slide 9 notes, https://intelshare.intelink.gov/sites/uscybercom/documents/uscybercom_unclass_overview_briefing_20140411.pptx.

[15] Shane Harris, *@War: The Rise of the Military-Internet Complex*. (Mifflin Harcourt Publishing Company, 2014), 199.

[16] Shane Harris, *@War*, 63-64.

[17] Wang Houqing and Zhang Xingye, eds., Science of Campaigns (Beijing: National Defense University Press, 2000).

[18] National Security Agency, Statement on surveillance programs, August 9, 2013, http://cryptome.org/2013/08/nsa-13-0809.pdf.

[19] The Deployable Training Division (DTD) of the Joint Staff J7 helps inform both the joint warfighters and key functions within the J7, notably lessons learned, doctrine, education, and future joint force development. The DTD gains insights on operational matters through regular contact and dialogue with combatant and joint task force commanders and their staffs as they plan, prepare for, and conduct operations. The DTD observer/trainers collect and compare practices among the different headquarters, draw out and refine "insights" and "best practices," publish them, and share them across the operational, training, lessons learned, doctrine, and joint development communities; http://www.dtic.mil/doctrine/fp/focus_papers.htm.

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[21] "Information chaos": Term used in Marine Corps Forces Reserves (MARFORRES) Commander's Information Management / Knowledge Management (IM / KM) strategy official message to staff.

[22] HQMC CD&I, Marine Corps Knowledge Management Community of Practice (USMC KM CoP) quarterly meeting brief, August 13, 2013; Training and Education Command's *The Cost of Status Quo* slide, https://eis.usmc.mil/sites/usmckm/Shared_Content/USMC_KM_CoP_Meeting_20130813.pdf.

[23] HQMC CD&I, MCWP 3-40.2, *IM*, 2-1.

[24] The Joint Staff J-7 DTD, *Gaining and Sharing Information and Knowledge*, 2.

[25] HQMC C4, *IM Advocacy Decision Brief*, October 27, 2015, slide 8.

[26] HQMC C4, *IM Advocacy Decision Brief*, slide 10.

[27] HQMC CD&I, MCWP 3-40.2, *IM*, 3-3.

[28] HQMC CD&I, MCWP 3-40.2, *IM*, 3-4.

[29] The Joint Staff J-7 DTD, *Gaining and Sharing Information and Knowledge*, 2.

[30] HQMC, Commandant's Planning Guidance, *FRAGO 01/2016: Advance to Contact*. (Washington, DC: U.S. Marine Corps, January 19, 2016), 1, http://www.hqmc.marines.mil/Portals/142/Docs/CMC%20FRAGO%2001%2019JAN16.pdf.

[31] "Knowledge assets": information or skills within a business that make it more valuable or competitive, https://dictionary.cambridge.org/us/dictionary/english/skill. Examples of knowledge assets within a military organization includes the knowledge, skills, and abilities (KSA) of personnel, standing operating procedures (SOPs), after action reviews/reports (AARs), best practices, lessons learned, policies, etc.

[32] This value proposition is derived from the Marine Corps IM/KM Community's value proposition, presented at the June 18, 2013 USMC KM CoP quarterly meeting brief (slide 4), https://eis.usmc.mil/sites/usmckm/Shared_Content/USMC_KM_CoP_Meeting_20130618.pdf.

[33] HQMC CD&I, MCWP 3-40.2, *IM*, 4-1.

[34] HQMC CD&I, MCWP 3-40.2, *IM*, 3-3.

[35] "knowledge management": The integration of people and processes, enabled by technology, to facilitate the exchange of operationally relevant information and expertise to increase organizational performance; from MCWP 3-40.2, *IM*, Section II – definitions.

[36] HQMC CD&I, MCWP 3-40.2, *IM*, 3-4 – 3-5.

[37] HQMC, Marine Corps Order 1553.3B, *Unit Training Management (UTM) Program.* (Washington, DC: U.S. Marine Corps, November, 23, 2011), 2, http://www.marines.mil/Portals/59/Publications/MCO%201553_3B.pdf.

[38] HQMC CD&I, MCWP 3-40.2, *IM*, A-1.

[39] The Joint Staff J-7 DTD, *Gaining and Sharing Information and Knowledge*, 5.

[40] The Joint Staff J-7 DTD, *Gaining and Sharing Information and Knowledge*, 8.

[41] MARFORRES, Force Order 3502.1, *TEEP Standard Operating Procedures*, 2-1.

[42] The Joint Staff J-7 DTD, *Chief of Staff Roles and Functions at Joint Headquarters*, April 2015, 3.

[43] "Personal identifiable information": Information which can be used to distinguish or trace an individual's identity, such as their name, social security number, date and place of birth, mother's maiden name, biometric records, including any other personal information which is linked or linkable to a specified individual. Definition from DoD 5400.11-R, *Department of Defense Privacy Program*, May 14, 2007, 8, http://www.dtic.mil/whs/directives/corres/pdf/540011r.pdf.

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[46] The Joint Staff J-7 DTD, *Chief of Staff Roles and Functions at Joint Headquarters*, 5.

[47] MARFORRES, Commanding General official message DTG: 032157Z Jul 12, IM/KM strategy mission statement.

[48] HQMC CD&I, USMC KM CoP quarterly meeting brief, June 18, 2013, MARFORRES IM/KM overview brief *IM/KM Vision*, slide 14, https://eis.usmc.mil/sites/usmckm/Shared_Content/USMC_KM_CoP_Meeting_20130618.pdf.

[49] Excerpt from MARFORRES Commanding General, LtGen Richard P. Mills', retirement award summary of action, August 2015. LtGen Mills continued to manage the IM/KM strategy LtGen Hummer initiated in July 2012, 11 months prior to their turnover.

[50] The Joint Staff J-7 DTD, *Gaining and Sharing Information and Knowledge*, 9.

[51] The Joint Staff J-7 DTD, *Gaining and Sharing Information and Knowledge*, 8.

[52] Remark from the MAGTF's commander on the MAGTF IMO's fitness report, September 13, 2012.

[53] Comment from the MAGTF's S-4 to the MAGTF IMO via LinkedIn.com, March 13, 2012.

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