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# Knowledge Management for Shared Awareness

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# EXECUTIVE SUMMARY

## OBJECTIVE

The purpose of this report is two-fold. First, it provides an information resource for development of a Combatant Command (COCOM)-focused Knowledge Management (KM) plan and its implementation. Second, it gives an overview of KM in the operational part of the Department of Defense (DoD), along with findings of KM program development at selected COCOMs. The results will serve as a basis for recommendations to the U.S. Strategic Command (USSTRATCOM) for planning and developing a KM program.

## RESULTS

The wide variation in command missions and cultures results in a variety of KM strategies, organizational barriers, and practices. However, USSTRATCOM and the other COCOMs are dealing with similar issues, including:

- Frequently, leadership does not actively support KM. If leadership does not consistently demonstrate and communicate that knowledge sharing is essential and has a high priority, people will not value it. Everyone in the organization must understand not only "what to share" and "how to share" but also the "why to share" – how sharing of their knowledge aligns with mission requirements and impacts the Command.
- Commands must deal with frequent turnover of personnel that creates knowledge flow and inefficiency problems. Methods are needed to collect, organize, and retain knowledge so that new people can quickly get up to speed. Intuitive tools must be provided for access, search, and discovery of Command information, including locating subject-matter experts.
- Inconsistent KM training for the KM team and the Command in general results in a range of problems; the most significant include: (1) The misuse of tools such as SharePoint. Policies are either not in place, misunderstood, or ignored. (2) A lack of coordination among directorates due to inadequate or incompatible collaboration policies.
- KM collaboration among the COCOMs is difficult due to diverse cross-organizational cultures and the lack of explicit processes. There is very little sharing among the KM teams in the COCOMs, with the exception of the use of the DCO_KM_COI (Defense Connect Online/Knowledge Management/Community of Interest) chat room, which helps build relationships among COCOM KM communities.

## RECOMMENDATIONS

Key recommendations for the COCOMs include:

- KM must be situated in the Command where it can be effective at all levels of the organization, typically under the Chief-of-Staff. When leadership demonstrates that it values communication at all levels, trust will increase and there will be a greater willingness to share.
- KM is a fundamental shift in strategic paradigm. Moving from "need-to-know" to "need-to-share" while still supporting "need-to-know" policies requires commitment from the entire Command. The COCOMs must foster a cultural change within their organizations, from collecting and controlling information to a culture of sharing information.
- Proper training is essential for KM leadership and for the entire Command. Training provides

the KM team with the knowledge to effectively demonstrate the value of KM to both the Command and individuals. Adequate training for tools, combined with consistent tool implementation and use policies, will result in greater knowledge sharing and collaboration.

- KM leadership should invest time to understand the organizational culture in order to implement KM that truly supports people in the organization. KM is not about forcing change on people; it is about making it easier for people to connect with other people and to knowledge assets.
- The COCOMs need to understand the functional and organizational relationships between Information Management and KM; making use of their complementary advantages will help enable proactive delivery of actionable information to the Command and joint decision makers.
- The process for information and knowledge sharing and collaboration among COCOMs must be improved in order to accomplish the supported and supporting roles in joint operation planning execution.

## PROPOSED FUTURE DIRECTIONS

As KM training, processes, and technologies mature, the real value of KM will become apparent when people recognize the value of KM to themselves and to the organization, and when it becomes part of the daily operations.

In the future, KM in DoD will be integral to operations. Warfighters will expect to not only collaborate, search, and share information, but to also be involved in solution development that is visible across the Command. Properly designed, implemented, and deployed KM processes and technologies will directly support mission areas, lines of operation, and objectives, both strategic and operational.

KM systems will evolve from simple information storage and search systems to systems that provide situational understanding for command and control. The next-generation common operational picture (COP) will be key to multi-level information representation and integration and will become a central point for information and knowledge sharing among collaborative participants. It will be an important component in future KM - solving the problem of how to dynamically collect and organize information in a way that is relevant to the Commander's decision process.

# CONTENTS

**EXECUTIVE SUMMARY** ..... **I**

**1. INTRODUCTION** ..... **1**

1.1 PURPOSE ..... 1

1.2 SCOPE ..... 1

**2. KNOWLEDGE MANAGEMENT OVERVIEW** ..... **2**

2.1 DEFINITIONS ..... 2

2.1.1 Data and Information ..... 2

2.1.2 Information Quality ..... 2

2.1.3 Information Management ..... 3

2.1.4 Information Sharing ..... 3

2.1.5 Knowledge ..... 3

2.1.6 Understanding and Situational Awareness ..... 3

2.1.7 Knowledge Management ..... 4

2.2 KNOWLEDGE MANAGEMENT FRAMEWORK ..... 5

2.2.1 KM Dimensions ..... 5

2.2.2 Aspects of KM ..... 6

2.2.3 Approaches to KM ..... 12

2.2.4 Metrics and the Value of KM ..... 14

2.3 BARRIERS AND CHALLENGES TO KM ..... 14

2.4 KM PRACTICES / LESSONS LEARNED ..... 15

2.4.1 General Principles ..... 16

2.4.2 KM Projects and Activities ..... 17

**3. KNOWLEDGE MANAGEMENT AT COMBATANT COMMANDS (COCOMS)** ..... **18**

3.1 COCOM KM PROGRAMS ..... 19

3.1.1 Other KM Programs ..... 19

3.2 USAFRICOM [1-3] ..... 19

3.2.1 Definitions ..... 19

3.2.2 Purpose ..... 20

3.2.3 KM Direction ..... 20

3.2.4 KM Framework ..... 20

3.3 USPACOM [1-13] ..... 23

3.3.1 Definitions ..... 23

3.3.2 Purpose ..... 24

3.3.3 KM Direction ..... 24

3.3.4 KM Framework ..... 24

3.3.5 KM Website(s) ..... 28

3.4 USEUCOM [1-4] ..... 28

3.4.1 Definitions ..... 28

3.4.2 Purpose ..... 28

3.4.3 KM Direction ..... 29
3.4.4 KM Framework ..... 29
3.4.5 Observations/Issues ..... 33
3.4.6 KM Website(s) ..... 33
3.5 USNORTHCOM [1-7] ..... 34
3.5.1 Definitions ..... 34
3.5.2 Purpose ..... 34
3.5.3 KM Direction ..... 34
3.5.4 KM Framework ..... 35
3.5.5 Observations/Issues ..... 38
3.5.6 KM Website(s) ..... 38
3.6 USSOUTHCOM [1-10] ..... 38
3.6.1 Definitions ..... 38
3.6.2 Purpose ..... 39
3.6.3 KM Direction ..... 39
3.6.4 KM Framework ..... 40
3.6.5 Observations/Issues ..... 42
3.6.6 KM Website(s) ..... 42
3.7 USCENTCOM [1-2] ..... 42
3.7.1 Definitions ..... 42
3.7.2 Purpose ..... 42
3.7.3 KM Direction ..... 43
3.7.4 KM Framework ..... 43
3.8 USSOCOM [1-2] ..... 45
3.8.1 Definitions ..... 45
3.8.2 Purpose ..... 46
3.8.3 KM Direction ..... 46
3.8.4 Framework ..... 46
3.8.5 Observations/Issues ..... 49
3.8.6 KM Website(s) ..... 49
3.9 USSTRATCOM [1-4] ..... 49
3.9.1 Definitions ..... 49
3.9.2 Purpose ..... 49
3.9.3 KM Direction ..... 49
3.9.4 KM Framework ..... 50
3.9.5 KM Website(s) ..... 51
3.10 USCYBERCOM [1-4] ..... 51
3.10.1 Definitions ..... 51
3.10.2 Purpose ..... 51
3.10.3 KM Direction ..... 52
3.10.4 KM Framework ..... 52
3.10.5 KM Website(s) ..... 54
3.11 COMPACFLT [1-10] ..... 55

3.11.1 Definitions ..... 55
3.11.2 Purpose ..... 55
3.11.3 KM Direction ..... 55
3.11.4 KM Framework ..... 56
3.11.5 KM Website ..... 58
3.12 DIRECTORATE OF INTELLIGENCE (J2) ..... 58
**4. COCOM KM ISSUES AND RECOMMENDATIONS ..... 61**
4.1 ISSUES AND BARRIERS TO KM ..... 61
4.2 RECOMMENDATIONS ..... 62
**5. RESULTS AND RECOMMENDATIONS FOR USSTRATCOM ..... 65**
5.1 GENERAL OBSERVATIONS ..... 65
5.2 RECOMMENDATIONS ..... 66
**6. CONCLUDING REMARKS ..... 68**
6.1 THE FUTURE ROLE OF KNOWLEDGE MANAGEMENT IN SHARED AWARENESS IN COMMAND AND CONTROL ..... 68
6.2 THE ROLE OF KM IN CREATING SHARED UNDERSTANDING FOR DECISION MAKING ..... 70
6.2.1 Common Operational Picture (COP) ..... 70
6.2.2 KM in the Next-Generation COP ..... 71
**7. KNOWLEDGE MANAGEMENT RESOURCES ..... 73**
7.1 CONTACTS ..... 73
7.2 KM WEBSITES ..... 75
7.3 KM TOOLS ..... 78
7.4 COCOM TOOLS ..... 79
7.5 KM TRAINING ..... 80
7.6 KM AND IM JOURNALS ..... 81
7.7 KM AND IM CONFERENCES ..... 82
**8. REFERENCES ..... 84**
8.1 GENERAL REFERENCES ..... 84
8.2 COCOM REFERENCES ..... 85
**9. BIBLIOGRAPHY ..... 88**
**10. GLOSSARY [15] ..... 93**
**11. ACRONYMS ..... 117**

**FIGURES**

Figure 1. Creating shared understanding. ..... 4
Figure 2. Overlapping aspects of Knowledge Management. ..... 6
Figure 3. Relationship of U.S. Combatant Commands. ..... 18
Figure 4. USSTRATCOM KM structure. ..... 50
Figure 5. The relationship between data, information, and intelligence. ..... 59

Figure 6. Ongoing central process in joint decision making. ..... 69
Figure 7. Relationship between knowledge management and the joint decision-making process. ..... 70

# 1. INTRODUCTION

Operational Department of Defense (DoD) organizations face considerable challenges in establishing and sustaining an effective Knowledge Management (KM) program that successfully creates, captures, and disseminates knowledge to meet mission requirements. Complex and challenging missions combined with the loss of valuable experience and expertise due to assignment changes and attrition directly impact Combatant Commands' (COCOM) capabilities and mission performance.

KM in the COCOMs has a distinctly different focus than in industry where the goals are centered on increasing profitability, improving products or sales techniques, etc. COCOM KM programs strive to develop mission-focused approaches to capturing and sharing the organization's knowledge and ensuring that relevant, accurate, and timely knowledge is available for Commanders, planners, and decision makers. Retaining and sharing valuable strategic and tactical information, lessons learned, and proven tactics play an important role in maintaining force readiness, flexibility, and maximum capability.

KM practices employed within DoD encompass a broad spectrum. In general, current KM efforts are focused on the Command's people, processes, and technology to improve the work environment and the ability to collaborate and share information in accomplishing the Command's mission requirements.

As KM processes mature, KM systems will evolve from simple information storage and search systems to systems that provide situation understanding for command and control. The value of KM in the future will be in solving the problem of how to dynamically collect and organize information in a way that is relevant to the Commander's decision process.

## 1.1 PURPOSE

This report serves as an information resource for the development of a KM plan and its implementation. It provides an overview of KM focused on the operational part of DoD along with descriptions of KM programs at selected COCOMs. Recommendations are given for improving organizational and team KM operations, including specific activities demonstrated to be effective at the COCOMs. The findings will serve as a basis for recommendations to U.S. Strategic Command (USSTRATCOM) for planning and developing a KM program.

## 1.2 SCOPE

KM programs and personnel in the DoD are constantly changing. Every attempt has been made to acquire current and relevant information on KM programs across the DoD. However, in some cases we were limited to reports, plans, presentations, and documents made available at the time and that may have been replaced by more current versions.

The report is primarily focused on Command Headquarters (HQ) KM programs. A brief summary of KM in J2 (Intel) is presented. Due to the multi-dimensional aspects of KM in the Intel Community (IC) as well as the generally higher classification required, COCOM J2 KM efforts are not included in this report.

# 2. KNOWLEDGE MANAGEMENT OVERVIEW

## 2.1 DEFINITIONS

One of the major issues in applying KM in DoD is the lack of agreement on definitions of basic terms. For example, a definition such as "KM processes ensure that knowledge products and services are relevant, accurate, timely, and usable for Commanders and decision makers" is very desirable in a COCOM, but often does not easily translate into daily operations.

KM is generally described in the context of data, information, and knowledge. Gray areas exist between definitions of data and information and even more so between information and knowledge. The diverse definitions frequently lead to considerable confusion and inconsistencies in how information management and knowledge management are related functionally and organizationally.

### 2.1.1 Data and Information

KM starts with data, which includes raw facts, unprocessed signals, and environmental sensor readings. When raw data is condensed and categorized, it becomes explicit information. Information is therefore data organized and placed in a context, which gives meaning and value.

### 2.1.2 Information Quality

Sharing of information and knowledge is the primary focus of KM. Since information is the precursor to knowledge, its quality is critical for knowledge to become actionable in decision making. Information is susceptible to distortion, both by the enemy (intended) and by friendly sources (unintended). For information to be of value to decision makers and supporting staff (Reference [14][1]), the following attributes that influence its quality should be considered:

- Accuracy − Information that conveys the true situation
- Relevance − Information that applies to the mission, task, or situation at hand
- Timeliness − Information that is available in time to make decisions
- Usability − Information with easily understood formats and displays
- Completeness − All the necessary information for the decision maker
- Brevity − Information that has only the level of detail required
- Security − Information with protection where required

Additional elements that can greatly increase the quality and usefulness of the information include:

- Author identity and background
- Where and when the information was created
- Length of time the information will be relevant, valid, and accurate
- Who validated the information
- Who else might be interested or has similar knowledge
- Where was it applied or proved to be useful
- What other sources of information are closely related

[1] For references in this section, see Section 8.1, General References

### 2.1.3 Information Management

Information Management (IM) involves collecting and distributing information. IM is an essential process that receives, organizes, stores, controls, and secures an organization's wide range of data and information in a manner that facilitates availability to relevant users, while concurrently preventing inadvertent disclosure of sensitive or proprietary information (References [1], [9], [12]). It provides an infrastructure focusing on the procedures, applications, rules, and tools to manipulate and share data and information. Effective IM is essential to the Commander's battle rhythm and information sharing to increase individual and collective knowledge development. IM and KM complement each other in the proactive delivery of actionable information to the Commander.

### 2.1.4 Information Sharing

The sharing of information with relevant U.S. agencies, foreign governments, inter-organizational partners, and the private sector is vital to military operations. Commanders at all levels need to determine and provide guidance on what information should be shared with whom and when. DoD information should be appropriately secured, shared, and made available throughout the information life cycle to mission partners to the maximum extent allowed by U.S. laws and DoD policy. Commanders and staff need to recognize the criticality of the information-sharing function throughout the operations (References [1], [9], [12]).

### 2.1.5 Knowledge

Knowledge is not easily defined because it originates from and exists in each individual – knowledge depends on experience, values, and context. There is no agreement on a single definition of knowledge because the definition can depend on the context in which it is used. The following are some examples:

- Explicit Knowledge: Documented knowledge, which is written, codified, and stored for others to use.
- Conscious Tacit Knowledge: Know-how knowledge − Things you know that you know or things you tell others.
- Unconscious Tacit knowledge: Deep knowledge − Things you don't know that you know or instincts.
- Knowledge is information placed in context of a decision.
- DoD examples include:
    - Knowledge is information from multiple domains that has been synthesized, through inference or deduction, into meaning or understanding that was not previously known (Reference [4]).
    - Knowledge is information that has been analyzed to provide meaning or value within a context or evaluated to give the information context or provide a synthesis with conclusions about the meaning. Knowledge includes individual or organizational knowledge of how to do something or knowledge gained from experience and culture (customs, institutions, and achievements of a particular nation, people, or group) (Reference [13]).

### 2.1.6 Understanding and Situational Awareness

Understanding is an appreciation for "why" things are happening and is crucial when an organization is faced with novelty or unexpected operational situations. Understanding means we have gained

knowledge and achieved situational awareness. With accumulated knowledge and understanding of situational awareness, the Commander will be better prepared to anticipate future events and make sound decisions, even in the face of uncertainty.

Knowledge sharing complements the value of IM in storing, organizing, and searching information to support team learning and knowledge exchange in creating shared understanding as shown in Figure 1, from (Reference [1]).

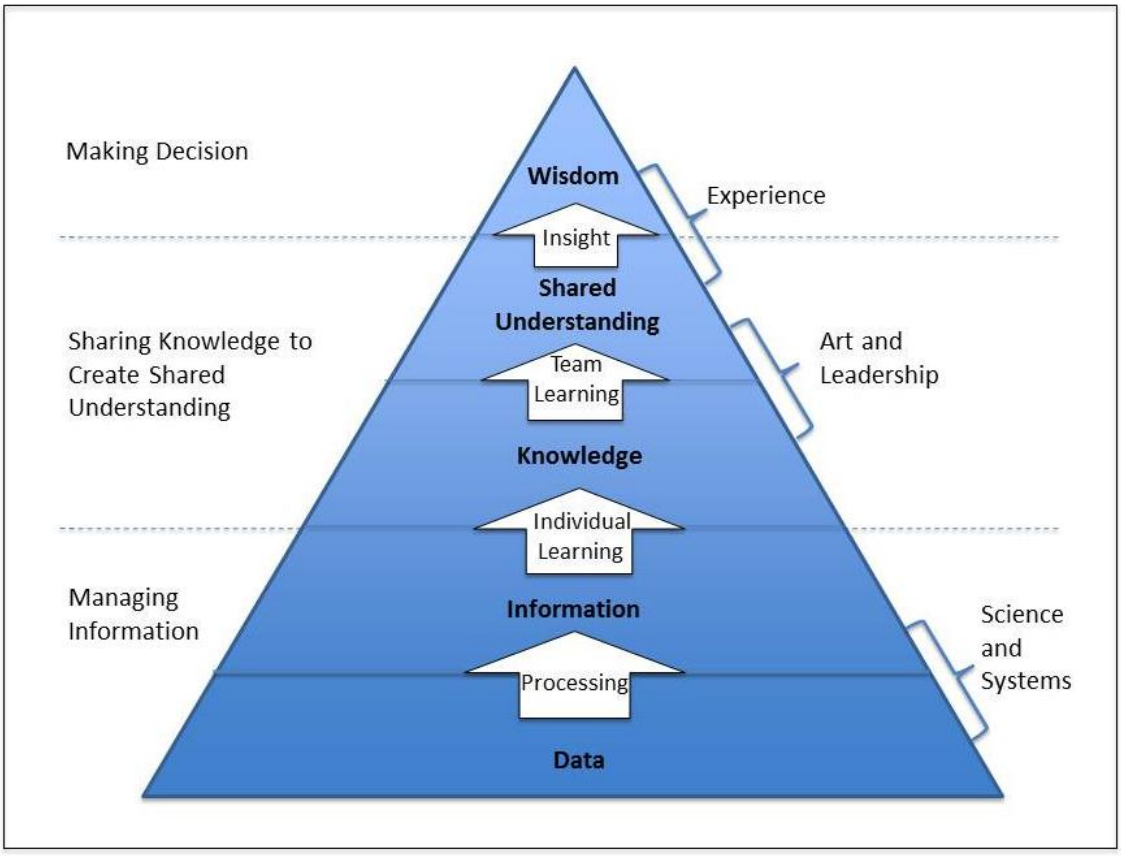


Figure 1. Creating shared understanding.

### 2.1.7 Knowledge Management

Despite different forms of definition of KM used in DoD, the common goal is to improve Command performance in collaboration and information sharing, and decision-making capability. Following are examples of definitions of KM from DoD components.

#### 2.1.7.1 Army

KM is the process of enabling knowledge flow to enhance shared understanding, earning, and decision making. The purpose of KM is to create shared understanding through the alignment of people, processes, and tools within the organizational structure and culture in order to increase collaboration and interaction between leaders and subordinates (Reference [2]).

#### 2.1.7.2 Navy

KM captures and quickly and easily provides (push and/or pull) knowledge (actionable information) to users (people, processes, and systems) when they need it to make a decision or complete an action.

KM systematically brings together people and processes, enabled by technology, to effect the exchange of operationally relevant information and expertise to increase organizational performance (Reference [3]).

#### 2.1.7.3 Air Force

KM is the capturing, organizing, and storing of knowledge and experiences of individual workers and groups within an organization and making this information available to others in the organization (Reference [4]).

### 2.2 KNOWLEDGE MANAGEMENT FRAMEWORK

Knowledge sharing for collaboration is a key goal of a KM framework. Knowledge sharing refers to the activities through which knowledge (e.g., information, expertise, etc.) is exchanged among people and Communities of Interest in an organization. Collaboration implies sharing of feedback, exchanging comments, ideas, sharing insights, and lessons learned to accomplish tasks. It can potentially help reduce work and training for new employees. The end state will be an improved organization with competitive advantages.

#### 2.2.1 KM Dimensions

There are four primary dimensions in a KM framework (Reference [5]):

- **Personal** – The personal or individual level refers to the personal knowledge, capabilities, experiences, competencies, and personal development issues for each individual. Therefore, the strategies and methods are at the personal level. Tools are used to personally capture, learn, interpret, analyze, synthesize, communicate, create, and share information and knowledge.
- **Team** – Teams are the key knowledge work units of the organization. The Community of Interest and Community of Practice are examples of teams. A team that collaborates well transfers knowledge between members much faster and is a powerful creator of new knowledge. Team knowledge management is best carried out based on the "share" (or "push") and "inquire" (or "pull") models for timely information and knowledge transfer.
- **Organizational** – The goal of organizational KM is to support organization-wide activities via a set of cohesive collaboration and social networking tools to maximize the functionalities of the infrastructure, mission, and personal requirements.

  Organizational KM helps create corporate assets of the organization. In addition to identifying the key (or critical) knowledge assets of the organization, an organization-wide infrastructure with standardized taxonomies, functionalities, and policies needs to be set up to enable identification, capturing, storing, sharing, applying and re-use of the knowledge assets.
- **Inter-organizational** – Inter-organizational KM is needed because the most valuable knowledge sources and resources are often outside the organization. It directly affects the collaboration among people working on a common goal with shared information to create a product or resolve an issue. We observed that commercial organizations and educational establishments are increasingly co-partnering with customers, suppliers, and even

competitors, to collaborate, share, and develop new knowledge, innovative products, and services.

To accomplish inter-organizational knowledge sharing, there is a need to develop KM processes and establish protocols governing the collaboration between Command HQ and its components and among COCOMs and DoD entities in daily operations and during exercises and crisis.

### 2.2.2 Aspects of KM

Figure 2 shows the key overlapping aspects of KM: People & Culture, Processes, Tools & Technology, Content & Content Management, and Governance.


Figure 2. Overlapping aspects of Knowledge Management.

#### 2.2.2.1 People and Culture

Of all the aspects of KM, the people and culture of an organization are the most important. Knowledge only has meaning in a human context; it moves between and benefits people. KM supports the people of the organization who create, organize, share, and apply knowledge, and the leaders who act on that knowledge to achieve understanding and make decisions.

People reside in an organization's culture, which is the collective human behavior encompassing attitudes, traditions, norms, habits, working language, beliefs, values, and vision. It determines how

the people of the organization behave and respond to its environment. It creates a social context consisting of norms and practices that affect directly the way the people and team interact with each other, with stakeholders, and with people of other organizations; and how they share information.

The primary focus of a KM program should be to make it easy for people to connect, to connect people to knowledge assets, and connect those with experience or know-how with those that need it.

Aspects of culture that are most relevant to DoD include (Reference [6]):

- **Individualism/collectivism** – How much people focus on personal gain versus making the organization better. Successful KM depends on:
  - A *willingness* to share knowledge so that others can benefit. If the KM program does not offer individual benefits and support for personal knowledge management, people will simply treat KM as yet another organizational initiative. There will be very little motivation to participate if "what's in it for me" isn't clear.
  - Building an environment of trust. Trust will be greatly impacted when the organization does not value communication at all levels. If people do not consider that sharing their knowledge is important to the organization, they may hoard information to be used for job promotion or recognition from leadership.
- **Power distance** – The extent to which the less powerful members of the organization expect and accept that power is distributed unequally. "High" power distance cultures, where subordinates are unlikely to approach or question superiors, are common in DoD. If people do not believe they can freely share their knowledge and ideas (and are appreciated) it becomes a great barrier to knowledge sharing.

  Fear destroys trust. People must feel free to ask "why" of anyone at any level. To build trust, management must demonstrate its support for people by appreciating their ideas, acknowledging their contribution, and offering explanations to their questions.

#### 2.2.2.2 Process

DoD organizations are mission-focused and process-driven. Knowledge is best understood as a process flow – not a fixed collection of resources. The KM process links knowledge input to produce outputs (e.g., situational awareness, action plans, etc.) by providing the capability to capture, access, search, integrate, and share knowledge; and control the information flow.

Currently KM does not have an explicit process integrated in the operations process because its processing steps depend on the organization's knowledge needs, the operational environment, and the KM techniques available.

The goal of the KM process is to enable:

- Knowledge to flow to the right processes at the right time to make decisions or accomplish tasks
- Making knowledge available to those who need it to complete an action/function

#### 2.2.2.3 Tools and Technology

KM is essentially a business process, not a technology process. Technology for KM is used to put knowledge products and services into organized frameworks. Technology solutions are driven by the organization's missions and processes, not the other way around.

KM Technology can generally be separated into two levels:

- Corporate level: Provide mechanisms for organizing, storing, and accessing information and knowledge (e.g., via databases, repositories, search engines, etc.).
- People level: Use communication and social networking tools to share information between people (e.g., wikis, blogs, chat, portals, etc.).

A variety of KM tools are employed throughout DoD, including those that were developed to address Command-specific needs. They are categorized as follows.

### Collaboration Tools

These tools provide online capabilities, including chat, white boarding, professional forums, Communities of Interest, Communities of Practice, and virtual teaming and collaboration. DoD examples include:

Defense Connect Online (DCO) – Knowledge flow via collaborative meeting spaces

SharePoint – Command repository

Defense Knowledge Online (DKO) – DoD enterprise-wide online collaboration

APAN – Asia Pacific Advanced Network for collaboration with peer international organizations and coalition partners

CAS – Collaboration at Sea for real-world and exercise information sharing and authoritative document storage.

### Expertise Location Tools

These tools support finding individual subject-matter experts (SMEs) from whom to ask questions, get help, and receive advice, communities of expertise, or knowledge artifacts created by experts. The following list a few tools or related mechanisms for locating expertise:

- TACIT ActiveNet™: Connect with one another on key topics.
- AskMe: Automatically process documents, email, and publications and send results to FAST (Fast Search and Transfer System) to select keywords (proprietary) and user-defined keywords.
- Autonomy IDOL K2: Automatically process text (documents, resumes, web pages) or email (Microsoft, Lotus); analyze user access to information and applications.
- Endeca: Support access to both structured and unstructured data; combine data from multiple sources; find the right person for staffing, resource management, and networking.
- Recommind: Its MindServer platform automatically extracts information from back-end enterprise systems (e.g., document management, records management, customer relationship management, customer support databases, project and portfolio management, contact, email with multi-level security to ensure privacy, etc.).
- Triviumsoft's SEE-K: A skill management tool that automatically extracts skills from text documents, including resumes, evaluation, project plans, or job descriptions in various formats.
- Entopia Expertise Location: Find the people in the organization with the most relevant knowledge or expertise to drive collaboration, knowledge sharing, and innovation based on people's activities; a K-Map or content visualization map can display relations of concepts among documents.

- APQC's Expertise Locator Systems.
- SharePoint: Develop expert location application in SharePoint Enterprise search (with MOSS 2007 "Knowledge Network").

### Data Mining Tools

These tools support predictive analytics, analysis, sorting, and visualization of data to identify patterns and establish relationships that had not previously been discovered. These tools are of great value in identifying potential threats or targets. In addition, data mining can be used to manage knowledge resources in extracting useful knowledge from large datasets to produce actionable information for mission planning.

Data mining tools are mostly used in the Intelligence community. However, their use for analysis has become important for operation planning. Future command and control systems will require support for analytics and business intelligence capabilities.

### Search and Discover Tools

These tools provide search engines that look for topics, recommend similar topics or authors, and show relationships to other topics. DoD examples include:

- Dashboards
- Wikis
- SharePoint
- Intelink
- JLLIS – Joint Lessons Learned Information System
- TRIM – Total Records & Information Management
- TWMS - Total Workforce Management System

### Websites and Portals

Many websites and portals have been created to facilitate secure enterprise-wide collaboration and information sharing. These sites typically provide capabilities such as:

- Email
- Find resources
- Share documents
- Collaborate
- Provide feedback
- Get News
- Chat and Blog

### Examples of DoD portals (URLs provided in Resources section):

- Defense Connect Online (DCO)
- Joint Knowledge Online (JKO)
- Defense Knowledge Online (DKO)
- Army Knowledge Online (AKO)

- Navy Knowledge Online (NKO)
- MarineNet
- Air Force Portal
- Air Force Knowledge Now (AFKN)
- Intelink

### SharePoint

Microsoft SharePoint and Microsoft Office Outlook are the two primary tools used for network-based information exchange in Non-Secure Internet Protocol Router (NIPR) and Secret Internet Protocol Router (SIPR) at the COCOMs. The goal of Outlook is to push, pull, exchange, and synchronize information. Many organizations establish a SharePoint portal that provides current and relevant personal, team, and public information to the Command. Documents that provide situational awareness are stored in a document library in SharePoint for information sharing while work-in-progress documents are often stored on a shared drive.

SharePoint provides the following basic capabilities to support KM:

- Document storage and search
- Collaboration tools
- Single infrastructure for organization websites
- Content management

### SharePoint Issues

Most of the COCOMs are either already using SharePoint 2010 or are in the process of transitioning from 2007 to 2010. Without careful design of the repository and applications with integrity enforcement, SharePoint can become an unmanaged dustbin of ungoverned content and ad-hoc information clutter. Some of the major issues involving SharePoint (primarily in reference to 2007 version) include:

- Not designed for knowledge exchange
- Inadequate search capability
- Poor or non-existing rules for tagging and storage of information
- Inadequate training, which results in misuse
- Use of MYSite can be beneficial for connecting people, but is only used by a small percentage of the Command
- Conversion to SharePoint 2010 is a huge effort. Lessons learned from selected COCOMs include:
    - Office 2010 must be used with SharePoint 2010 or significant problems can result.
    - Storage and naming rules and integrity enforcement need to be in place before use.
    - Adequate training for everyone is essential.
    - Need to maximize use of new features in SharePoint 2010.

#### 2.2.2.4 Content and Content Management

##### Content

Content is the substantive part of information in digestive forms, which gives meaning to the information expressed. It conveys the intent of the information originator. For the receiver, it is what he perceives of the topic (e.g., of a document) based on his prior knowledge, which potentially becomes information or new knowledge in his mind. Content is used to create a relationship between the receiver and the originator(s) of the document in order to understand the information expressed.

Content is knowledge, which needs to be accessible, organized, managed, analyzed, and delivered to people in meeting the organization's needs. Content in the KM context encompasses all information that must be available and searched within the organization in order to create corporate knowledge, including:

- Structured and unstructured information, websites, documents, records, forms, multimedia, email, transactions, publications, reports, etc.
- Administrative documents
- Command and control information

##### Issues

Content is an important issue in DoD because of the need to share information across agencies and domains. However, many issues remain to be addressed:

- Content exchange: Many agencies have unique technology infrastructures, which make it difficult to exchange and synthesize valuable information among them.
- Permission for sharing: How to assign permissions to individuals and groups.
- Content protection: How to secure content in collaboration across networks of different classifications.
- Content search: How to employ techniques (e.g., labeling, etc.) for easy access.

##### Content Management

Content management focuses on how content is organized and transferred. It differs from similar activities in information management in that it deals with *finished knowledge products* rather than data or information. It includes processes that support the evolutionary life cycle of digital and non-digital information and knowledge for retrieving and sharing explicit knowledge, indicating who can use it, when it is used, where it is stored, and what happens with it.

Proper content management is critical for the success of KM. Otherwise, many problems such as the following can arise:

- Inconsistent record keeping
- Incompatible backup and recovery plans
- Difficulty of accommodating new types of content
- Duplication of data, servers, and storage
- Inability to search information across enterprise
- Excessive funds spent on hardware maintenance and software licensing

#### 2.2.2.5 Governance

The governance process guides the initial implementation and ongoing control and authority over KM strategies. While there are many barriers to implementation of KM strategies, research indicates that the problem usually lies not in the implementation of a given strategy, but in the lack of governance of strategies.

##### Governance Structure

A well-planned governance structure, which is part of the Command's guidance, can serve in a strategic and advisory capacity to:

- Create purpose and content
- Guide strategy
- Identify opportunities
- Manage risks

A KM governance structure should include the following basic components:

- KM Champions, members of leadership who understand the value of KM, and encourage its adoption through their words and actions. This is a critical component to a successful KM program.
- KM Board (KMB), which provides guidance, oversight, resources, and championship for the KM effort. The KMB will identify the most pressing KM needs in the Command, prioritize projects, review progress, and provide guidance to accomplish desired goals and objectives.
- Knowledge / Information Management Working Group (KIMWG), which serves as a venue for sharing best practices and that aligns the organization's KM and IM activities within Headquarters and with those of the component commands, subordinate commands, and other stakeholders.

### 2.2.3 Approaches to KM

Each Command has unique mission requirements and cultures, and therefore there is no "standard" approach to KM. The COCOMs employ a variety of top-down, bottom-up, and combination of approaches.

Prior to selecting an approach for implementation of a KM plan, it is important to understand the KM concerns at the Command.

#### 2.2.3.1 Understand the Problem First

Successful KM programs have started by focusing on understanding the Command climate and culture before initiating KM activities. Key steps include:

1. Determine the mission and strategy of the organization.
    - The KM strategy, goals, and objectives should be aligned with those of the Command and Commander's intent.
2. Determine the vision/goals/direction for the future.
    - People need to understand where the Command is headed. This allows for proactive information sharing.
3. Actively listen, observe, and ask questions to determine:
    - What are the most important goals the Command is attempting to accomplish?
    - What processes are broken in the Command?

- Where are the greatest barriers to success?

#### Knowledge Assessment Methodology

Conducting a Knowledge Assessment is a very useful approach to understanding knowledge-sharing issues. The assessment can also help eliminate reinventing the wheel, which is common where Commands are unaware that a solution already exists in the organization. It can also clarify the knowledge needed by decision makers and personnel in order to make more effective decisions and complete tasks.

#### Knowledge Assessment Tool

The Knowledge Audit (KA) is a useful tool for knowledge assessment. It identifies knowledge producers, consumers, information requirements, as well as the existing information-sharing architecture such as internal websites, databases, blogs, and wikis, etc. The audit can be done on a small scale to address specific problems, or on a larger Command-wide scale, depending on the time and funding available.

#### Knowledge Assessment Outputs

- Current status of the Command's capabilities, expertise, competencies, internal and external data, and information requirements.
- A directory of experts, knowledge assets, knowledge sources, knowledge structures and knowledge applications.
- Knowledge gaps and bottlenecks where "quick wins" of KM can be made.
- A Knowledge Map of the organization identifying key sources, opportunities, and constraints to knowledge creation and flows for both processes and technology. In addition to identifying islands of expertise, it provides ways to build bridges to increase knowledge sharing and exchange, and shows where and how individual tasks and information products can fit into the mission. Information from the Knowledge Map can help bring about a unity of effort at all levels. It can be invaluable for encouraging people to share information.

### 2.2.3.2 Examples of Approaches

Regardless of the KM approach, it is essential that all people share a common understanding of why they do what they do and how they contribute to and improve the Command. If people do not understand the "why" of what they do, the efforts to employ KM process will be misunderstood and undervalued.

#### Top-Down Approach

The top-down approach typically starts with mapping the Unified Joint Task List to the Command's specific tasks. It can be time-consuming and difficult depending on the level of tasks selected. It focuses on increasing efficiency of mission areas where standardized processes could be implemented. It also provides a useful return on investment (ROI) metric where improvement of performance of the mission tasks with respect to their processes can be obtained according to the Unified Command Plan. Two COCOMs have tried this approach.

### Bottom-Up Approach

The bottom-up approach is a relatively valuable low-risk way of proving the viability of a KM approach. It typically starts with a manageable set of task processes relevant to the Command. After the tasks are decomposed, they can be mapped to the Command's mission and capabilities. The mapping process will help identify the knowledge gaps where KM solutions could be applied.

### A Practical Approach

The most practical approach is to go after "low-hanging fruit" where the impact of KM can be easily observed. Opportunities for quick wins can be identified through knowledge of the Commander's priorities and current focus by attending high-level meetings and battle rhythm meetings. Alternatively, interviews and surveys with senior leaders are useful to quickly identify "pain-points" and knowledge gaps.

### 2.2.4 Metrics and the Value of KM

The development and implementation of KM processes are ongoing and therefore short-term benefits are usually not measureable. However, in most organizations, metrics of some kind are required to justify funding.

Quantitative metrics for KM, such as time savings through more efficient processes, percent of travel claims submitted correctly, etc., are not easily determined primarily because the value of KM comes from people's ability to effectively and efficiently use knowledge to improve performance. Below is a summary of general qualitative metrics:

- Customer satisfaction
- Quick problem resolution
- Professional development
- Improved employee satisfaction
- Improved knowledge retention
- Capturing and retaining at-risk data
- Stories related to validated success
- Improved skills/competencies

The real value of KM comes when individuals recognize the value of KM to themselves and the organization, and KM becomes part of the daily operations, not just an activity to perform tasks. People can then begin sharing knowledge because they know someone can benefit from what they know. As leadership becomes more involved, individuals will be more aware of what the leaders need to accomplish their goals, and will become more proactive.

## 2.3 BARRIERS AND CHALLENGES TO KM

Potential barriers to the implementation of a KM program are categorized as follows:

- Organizational barriers
    - Leadership does not fully understand how KM can play a role in joint decision making.
    - Leadership does not actively support and adopt KM as part of daily operations. Command support for KM can be measured by the degree to which it:
        - Rewards knowledge activities
        - Is tolerant of innovation-related risk and behavior

        - Supports learning activities
        - Is receptive to employee-driven change and external ideas
        - Encourages employees to participate in improving organizational performance
    - DoD does not operate as a cohesive enterprise. Each COCOM, Service, Combat Support Agency, etc., has its own data/information systems, which are not inter-connected. KM will add an extra burden to current information systems in terms of integrating data, information, and knowledge to be used for decision making.
    - KM is misplaced in the organization.
    - The people factor, the key component of KM, is not considered or promoted.
    - A big gap in mindset exists between people who advocate KM and the rest of the workforce.
    - Contention exists between traditional "need-to-know" and proposed "need-to-share" philosophies. Well thought-out strategies for KM advocacy are needed.
    - Incentives/rewards/recognition are not adequately in place.
    - Some COCOMs consider SharePoint as the KM tool and therefore do not pay attention to other KM solutions.
    - Lack understanding of the culture of the Command and relationships with partnering entities.

- KM-focused barriers
    - Difficulty of transforming tacit knowledge to explicit knowledge (i.e., frozen/snapshot of tacit knowledge) which makes knowledge resulting from KM an "isolated repository."
    - Lack ownership of KM.
    - Adequate training is not provided for KM leadership or personnel.
    - Focus on KM technology while excluding the people and culture factor.
    - Lack of a content management policy and plan.
    - KM governance polices are not enforced or synchronized with the Command's policies.
- Individual barriers
    - People often have a resistance to change.
    - Lack trust of people, sharing, consequence of sharing, and use of information.
    - Lack of time. In many Commands, a great deal of time is spent on urgent but not-so-important issues. This prevents people from sharing information to accomplish longer-range objectives.
    - Focus is on individual achievement, not team or organization. "What's in it for me?" must be clear to everyone.
    - Unique knowledge is seen as job security.
- Technical barriers
    - There is no long-term plan to address the real operational issues. This results in interoperability and incompatibility problems among tools, which greatly impact people's motivation in pursuing KM.

### 2.4 KM PRACTICES / LESSONS LEARNED

The wide variation in Command missions and cultures results in diverse best practices. For example, a Command knowledge audit may be the best way to start in smaller organizations but unreasonable in larger ones. Our observations are categorized as general principles and successful KM activities.

### 2.4.1 General Principles

#### 2.4.1.1 Command Level

- A well-defined KM strategic plan: A clearly stated KM strategic and action plan with well-defined scope, timeline, milestones, roles, and responsibilities help drive a successful KM implementation. The KM strategy, goals, and objectives should be aligned with those of the Command and Commander's intent. People must understand the essence of KM in terms of its definition and how it is applied to their job. It may be advantageous to change the name due to confusion in the past.
- KM function alignment: The KM function is most effective when aligned under the Chief of Staff (CoS). If this is not the case, the CoS must oversee and promote KM activities.

#### 2.4.1.2 KM Team

- Knowledgeable of the Command mission: Implementation of KM requires a strong project leader/facilitator, who understands the Command's missions, and a KM team that provides technical, functional, and process support. Knowledge managers embedded in mission areas are highly recommended.
- Personnel composition and requirement: Successful DoD KM organizations are permanently staffed and include a mix of military, civil service, and contractor personnel to provide a balance of familiarity with the military environment, continuity/stability, and a connection to industry best practices.
- Demonstrate the value of KM: Focus on what the Command needs, not what would be nice to have. People need to see immediate benefits. Make the user's life easier, more efficient, and save time – "Ease their pain."

#### 2.4.1.3 KM Implementation

- Invest time to understand the culture:
  - Conduct a knowledge audit of the Command.
  - Know the leaders through survey or interviews and attending meetings.
  - Use KM Working groups to understand different cultures in J-codes and identify opportunities for unity of effort.
- Communicate with senior leaders: Give frequent briefs to senior leaders to ensure they know of the KM activities with respect to the Command's mission.
- Participate in significant high- and low-level meetings:
  - Know the Commander's focus. Identify current initiatives and get involved. This provides the opportunity to be proactive in KM efforts.
  - Listen, observe, and ask questions about any KM-related issues.
  - Identify what the Command is attempting to accomplish in terms of KM solutions.

#### 2.4.1.4 Training

- Proper training for the KM leadership and Command personnel is essential.
  - KM leadership should be certified through the KM institute or other training programs.
  - New people need KM training and the others need periodic refresher training.
  - Provide workshops on topics that can provide solutions to people's need.

### 2.4.2 KM Projects and Activities

KM best practices in the COCOMs are generally "what works" given a Command climate. Often the most successful approach is to find key processes attributed to KM that will offer immediate benefits to the users. Following are examples of planned and successfully completed KM projects and activities:

- Develop and implement a "Task Tracker" process to standardize how internal and external taskings are assigned and monitored.
- Place people in specific Community of Interest according to their role.
- Create organizational "yellow pages" containing personnel expertise to allow decision makers to quickly access the right knowledge at the right time.
- Establish a relationship of portals that permit single sign-on and authentication across the enterprise and afford access to Service components and partners.
- Enhance the SharePoint Portal structure to serve as a communication/collaboration tool, virtual library, and learning center.
- Develop standard collaborative toolsets.
- Develop and implement standard protocols for storing and accessing knowledge, information, and data.
- Implement organizational training on SharePoint use. A 2-hour training class is a very good investment.
- Enhance quality of meetings:
    - Prior to the meeting, use a portal meeting workspace to post relevant documents where they can easily and efficiently be shared.
    - Shorter meetings will improve morale.
    - Post minutes and action items from meeting to portal workspace.
    - Start a blog for the Commander and Deputy Commander. This will give the organization a means to know the Commander's daily focus, as opposed to only knowing his general priorities.
    - Work with the CoS to project activities and decisions.
    - Focus on efforts that transcend directorates. For example:
        - Consolidate Command in-process checklists so that new people or transfers can find out what to do and how to find things.
        - Obtain support from senior leadership to create a wiki to allow people to express and share their viewpoints.
        - Develop a "dashboard" that displays key mission requirements and current needs. The KM team can then help identify dependencies of the requirements that require information and knowledge sharing. Ongoing monitoring of the dashboard may also help identify gaps and recommend solutions.

# 3. KNOWLEDGE MANAGEMENT AT COMBATANT COMMANDS (COCOMS)

There are currently nine COCOMs – six geographic COCOMs and three functional COCOMs (Figure 3). While Geographic COCOMs operate in clearly delineated areas of operation and have a distinctive regional military focus, Functional COCOMs operate worldwide across geographic COCOMs and the Services. Both Functional and Geographic COCOMs have integrated assets and representatives of other agencies and departments of the U.S. government into the COCOM's structure to enhance operations.

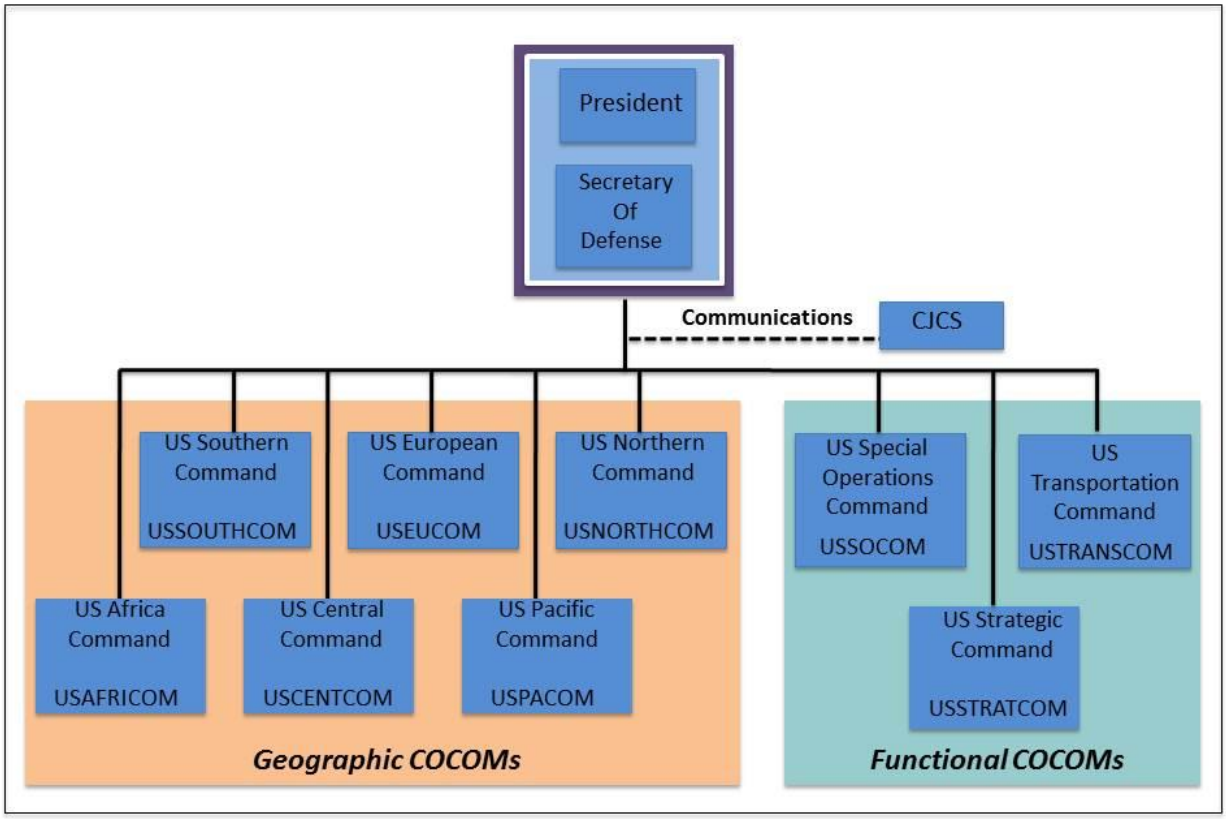


Figure 3. Relationship of U.S. Combatant Commands.

COCOM commanders are responsible for accomplishing the missions assigned to them as well as all aspects of military operations, logistics, and joint training. The COCOM Commander of a Joint Task Force (JTF) either plays the supported or supporting role in an operation according to an establishing directive. The supported Commander has the authority to exercise general direction of the supporting effort. The supporting Commander will advise and coordinate with the supported Commander on matters concerning the logistics, assist in planning, and ensure that support requirements are communicated throughout the supporting Commander's organization.

Knowledge sharing is essential to determining known facts, current status, and conditions during the Commander's decision cycle in order to identify his critical information requirements (CCIRs), including the critical friendly force information requirements (FFIRs) and priority intelligence requirements (PIRs). The involved COCOMs must collaborate in developing the mission objectives

and determining the availability, quality, and quantity of intelligence assessments, knowledge, and information to support the COCOM Commander's decisions, guidance, and intent relative to the joint mission. The KM program at each COCOM plays a key role in providing support to the COCOM in participating in such collaboration.

## 3.1 COCOM KM PROGRAMS

Research has been conducted using reports, documents, and presentations from the Knowledge Management programs at

U.S. Africa Command (AFRICOM),

U.S. Central Command (CENTCOM),

U.S. European Command (EUCOM),

U.S. Northern Command (NORTHCOM),

U.S. Special Operations Command (SOCOM),

U.S. Southern Command (SOUTHCOM),

U.S. Strategic Command (STRATCOM),

U.S. Cyber Command (CYBERCOM), and

U.S. Pacific Command (PACOM).

The research has been supplemented by teleconferences with key KM members of the organizations. The goal of this section is to provide a concise summary of each KM program: Definition, Purpose, Mission, Goals, Guiding principles, KM Organization and Responsibilities, Strategy/Approach, KM Training, and Tools employed for comparative evaluation.

Every attempt has been made to acquire the most current program information from documents, websites, and teleconferences. However, KM at the COCOMs is constantly evolving to better serve each Command and therefore some of the information may have changed.

### 3.1.1 Other KM Programs

Following the COCOM KM descriptions are:

1. A description of the Commander, U.S. Pacific Fleet (COMPACFLT) KM program. This is included because COMPACFLT has an established, proven KM program that serves as a model for Command KM.
2. A summary of Knowledge Management in the Directorate for Intelligence, J2.

## 3.2 USAFRICOM [1-3][2]

### 3.2.1 Definitions

- Knowledge Management (KM): the discipline of improving organizational and individual performance and efficiencies of Command processes, procedures, activities, and tasks engaged in knowledge intensive activities. KM comprises three tenets:
  - People: Knowledge producers and consumers
  - Processes: Defined repeatable tasks and sequences
  - Technology: Tools leveraged to support processes

[2] See Section 8.2, COCOM References.

- Information Management (IM): the function of managing an organization's information resources by the handling of knowledge acquired by one or many different individuals and organizations in a way that optimizes access by all who have a share in that knowledge or a right to that knowledge.

### 3.2.2 Purpose

- To apply KM and IM concepts and principles throughout USAFRICOM and its components to achieve the Command's KM strategic objectives in supporting the Command mission.

### 3.2.3 KM Direction

- Vision
  - Become a knowledge-enabled organization in compliance with laws, directives, security and individual's information needs.
  - Provide actionable information with context in an accessible format for supporting optimized Commander's decision-making and feedback processes in a changing environment.
- Mission
  - Support USAFRICOM mission with knowledge-centric teamwork, learning, and process improvement.
- Goals
  - Improve decision making: Facilitate decision superiority by creating and enhancing shared understanding of the Command's goals, objectives, and means to achieve them.
  - Enhance collaboration: Enhance horizontal and vertical communication across organizational boundaries by building meaningful, positive relationships using a standardized set of tools. Determine best practices among Communities of Interest (CoIs) and/or Communities of Practice (CoPs).
  - Prevent knowledge loss: Capture, transfer, and reuse knowledge in order to achieve repeatable, sustained decision superiority and improve Command efficiency, despite personnel turnover.
  - Enhance best practice transfer and integration: Rapidly develop, evaluate, and standardize innovative ideas into usable standards, practices, and tools distributed across the Command. Evaluate best practices from outside organizations, and share USAFRICOM best practices with the larger DoD community.
  - Improve Command processes: Facilitate the employment of process improvement tools and rapid improvement events to improve Command processes.
  - Foster a knowledge-sharing culture: Foster a culture where knowledge sharing and reuse are valued and promoted, and employees are recognized for their contributions.

### 3.2.4 KM Framework

#### 3.2.4.1 KM Organization, Roles and Responsibilities

- Organization and Roles
  - The Office of KM (OKM) provides theater-wide guidance and expertise related to process implementation in support of the Commander's KM vision and strategic objectives.

- The KM staff was previously under the Command, Control, Communications, and Cyber Directorate (J6). The current OKM is situated under the Chief of Staff consisting of 15 KM personnel. Among them, five are dedicated to developing KM services while the other seven contractors are working on the portal development. Key KM roles are carried out through the following positions:
  - Deputy Knowledge Management Officer (KMO)
  - KM Services, Chief
  - KM Specialist
  - Portal Services, Chief
  - SharePoint Support Analyst
  - SharePoint Architect
  - SharePoint Application Developer

- Responsibilities

  OKM is responsible for analyzing staff and operational processes throughout the Command, consolidating inputs, and developing and codifying KM policies. OKM works with USAFRICOM staff to ensure that the design, acquisition, and implementation of supporting KM tools and technology directly support the Commander's vision and goals. A major responsibility is to provide core technical and development services to mission-critical portals in support of a wide range of vested stakeholders. It also remains abreast of current and future trends in KM and integrates new technologies into the Command as appropriate. OKM also provides training resources and materials for staff training on collaborative tools. Specific KM responsibilities include:

  - KM Services Development
    - Develop guidance for employing KM to enhance situational understanding and facilitate decision superiority during training and operations, especially in time-constrained environments.
    - Mentor, advise, and assist the staff with applying lean and process improvement procedures to improve performance and activity and task efficiency.
    - Synchronize KM/IM requirements across the Command to enhance best practice transfer and integration.
    - Participate in requirements and capacity working groups to champion KM equities.
    - Champion KM principles within the directorates to demonstrate how KM can improve efficiency and enhance effectiveness.
  - Portal Services Development
    - Provide technical and development support for the Command's Non Secure Internet Protocol Router (NIPRNet), Secret Internet Protocol Router Network (SIPRNet), and Unclassified Information Sharing Service (UISC) portals, coalition, Joint Worldwide Intelligence Communications System (JWICS), and the public.
    - Conduct basic, intermediate, and advanced training on portal structure, use, and best practices.
    - Define content management business rules to include site structure, taxonomy, and page layout.

- Governance

  The governance for the KM initiatives provides guidance through the Joint Coordination Board, Knowledge Management Information Management Working Group, Portal Services Planning Team, and Battle Rhythm Planning Team.

- Joint Coordination Board (JCB): to approve USAFRICOM KM/IM policy and plans, and battle rhythm.
- KM and IM Working Group (KMIMWG): to synchronize and prioritize KM/IM projects across the Command; coordinate operational KM/IM efforts and policy across components and supporting Commands; monitor, assess, and revise operational IM processes [Commander's Critical Information Requirements (CCIR), Request For Information (RFI), Information Exchange Requirement (IER)] to support planning and execution; facilitate coalition and interagency information sharing; and manage improvement events.
- Portal Services Planning Team (PSPT): to coordinate portal policy across the Command; evaluate and prioritize proposed application development on the portal, and develop portal training topics and content.
- Battle Rhythm Planning Team (BRPT): to monitor, assess, and revise the Command's battle rhythm to ensure timely information flow and decision making; evaluate proposed battle rhythm and Boards, Bureaus, Centers, Cells & Working Groups (B2C2WG) changes for impact on Commander's decision cycle; synchronize crisis battle rhythm; and ensure compliance with Africa Command Instruction (ACI) 5100.02.

#### 3.2.4.2 Strategy and Approach

USAFRICOM envisions that all members of the organization have an inherent responsibility to share knowledge and quality information with others to increase situational awareness and understanding of activities occurring within the Command and at the supported and supporting organizations. Coordinated KM efforts will be carried out between the OKM, component KMOs, USAFRICOM Directorates, Directorate of Operations and Cyber (J3), and Joint Training and Exercises Directorate (J7). The mission portals will provide core services to support a wide range of vested stakeholders.

The KM strategic objectives ensure success in meeting customer expectations and needs, enhancing internal processes, building KM capacity, and fiscal responsibility.

- Activities

  Current prioritized KM activities include:

  - Implement USAFRICOM KM policy (5600 Series)
  - Ensure Battle Rhythm/B2C2WG compliance
    - SIPR SharePoint Portal Migration Support
    - User requirements/outreach
    - Conference Room Manager (Scheduler)
  - Establish B2C2WG Sites
  - Provide in-brief for USAFRICOM Newcomers Orientation Course
  - Become J037 Training and Exercise Program (JTEP) Manager for Joint Training Working Group (JTWG)

  Current prioritized activities for providing portal services include:

  - SIPR Share Point portal migration
  - Develop custom applications:
    - Senior Leader Coordination System (SLCS)
    - CoS Rollup/Dashboard
    - Country pages
    - Web Geospatial Common Operating Picture (GeoCOP)
  - Develop NIPR Share Point Portal Launch

- Provide user orientation and site manager portal training
- Support focal point portal
- Support Unclassified Information Sharing System (UISS) and All Partners Access Network (APAN)

#### 3.2.4.3 Training

Training is provided for the following:

- Portal Help: A centralized repository for all training materials (computer-based training manuals, presentations, etc.) for the information systems and technologies used by USAFRICOM staff.
- SharePoint: a self-paced computer-based training (PowerPoint, presentation, guides, video, etc.) on the Command's help portal or on Microsoft's Office website.
- AFRICOM Newcomers Orientation Course (ANOC): Provide training and support resources, basic structure, and navigation specific to USAFRICOM portals, overview of Command-wide tools on the portal.

#### 3.2.4.4 Tools

Different networks [TS (Top Secret), S/ACCM (Secret/Alternative or Compensatory Control Measures), SECRET, S/REL (Secret/Releasable), U/UISS (Unclassified Information Sharing Service), UNCLAS (DoD/FOUO)] are used for collaboration and the following KM/IM tools are used:

- SharePoint (for SIPR)
- DCO, DCO Instant Message/Extensible Messaging and Presence Protocol (XMPP)
- Unclassified Information Sharing Service (UISS)/APAN for access by unclassified mission partners (depending on discoverability/access settings)
- Global Command and Control System (GCCS)
- Joint Training Information Management System (JTIMS)
- Joint Lessons Learned Information System (JLLIS)
- Email
- Web
- Virtual meeting
- Tandberg (substitute for secure voice)
- Video teleconferencing (VTC)

### 3.3 USPACOM [1-13][3]

#### 3.3.1 Definitions

- Knowledge Management (KM): the operational discipline focused on the cyclic sharing, creation, and validation of knowledge and information in support of decision makers at all levels to ensure unity of effort in order to maintain decision superiority. KM improves organizational learning, innovation, and performance. It ensures that information products

[3] See Section 8.2, COCOM References.

and services are relevant, accurate, timely, and usable to Commanders and decision makers; and that expertise is available to those who need it.

- It is defined as the processes by which information is obtained, manipulated, directed, and controlled within the context of the organization, essentially turning information into knowledge. Information is categorized into four levels:
  - Level 1: Command-wide/Commander's Information: required by Commander's Critical Information Requirements (CCIRs)
  - Level 2: Directorate Wide Information: required for each Directorate to accomplish its mission
  - Level 3: "Good to know" or "Interesting" information but is not critical "Must know" or "Need to know" information
  - Level 4: "Nice to know" information

### 3.3.2 Purpose

- To provide information on KM, present considerations and benefits of adopting KM principles to become a knowledge-enabled organization, and generate discussion on leveraging KM at USPACOM.

### 3.3.3 KM Direction

- Vision:
  - Become a knowledge-enabled organization in compliance with laws, directives, security and individual's information needs.
  - Provide actionable information with context in an accessible format for supporting optimized Commander's decision-making and feedback processes in a changing environment.
  - Retain knowledge despite impact of senior-level turnover.
- Mission:
  - Maximize mission outcomes through knowledge.
  - Integrate KM into the operational environment to meet the mission requirements and align with the Commander's intent.
  - Enhance decision making by connecting those who know with those who need to know.
- Goals:

  To provide a timely flow of quality and fused information enabling the Commander to have greater situational awareness to anticipate and understand the consequences of changing conditions. Specific objectives include:
  - Understand knowledge-sharing needs.
  - Develop KM strategies, capabilities, and processes.
  - Implement KM solution in USPACOM HQ, measure effectiveness, and continuously improve.
  - Mature KM and expand across USPACOM enterprise.

### 3.3.4 KM Framework

#### 3.3.4.1 KM Organization, Roles and Responsibilities

- Organization and Roles

The KM Branch (J625) is organizationally aligned under the Command, Control, Communications, and Cyber Directorate (J6) and Strategy and Integration Division (J62) at USPACOM. It serves as the Command's KM resource, consisting of the following military, civilian, and contractor billets/positions:

- Knowledge Management Officer (KMO)
- Branch Chief (Acting)
- Information Management Officer
- J7 IM and KM
- KM Lead

- Plan of Future KM Roles

  The KM Branch plans to align its organization under the CoS and integrate its roles into the Command structure to include the following positions and responsibilities:

  - KMO: serves as the Chief Knowledge Officer for USPACOM, supporting the Command and staff. Reports/collaborates directly to the USPACOM Chief of Staff (CoS) and supports all primary and special staff.
  - Deputy KMO: reports to the KMO; ensures section members understand KM processes and technology; understands the KM Doctrines and helps USPACOM to use the KM resources; collaborates with the J3 and J6 to map the processes and information systems that produce the common operational picture.
  - Knowledge Management Noncommissioned Officer (KMNCO): as the senior enlisted member of the KM section, advises the KMO and Headquarters on improving knowledge creation and transfer within the Directorates; integrates KM training into the J staff's individual and collective mission-essential tasks; oversees KM training and certification programs.
  - Knowledge Process Manager (KPM): works with the J Staff and other CCMDs, academia, and federal agencies to ensure USPACOM is current with doctrine and policy; provides KM implementation plan and input to concept of operation plans (CONPLANs)/operation plans (OPLANs) as necessary; support theater exercises.
  - Knowledge System Engineer (KSE): reviews new and existing capabilities and services for potential implementation and improvement; coordinates with Headquarters, components, and the theater on technology insertion.
  - Collaboration Manager: maintains leadership's awareness of DoD enterprise collaboration initiatives; represents USPACOM requirements throughout the selection, development, testing, acquisition, and implementation processes.
  - KM Trainer: investigates training opportunities and sends personnel to attend courses.
  - Knowledge Analyst (KA): observes, analyzes, assesses, and recommends process to improve the capability of the Command in gathering, storing, and sharing best practices across the Command.
  - Content Managers: assists the KMO with creating, facilitating, and managing a knowledge transfer system; ensures knowledge is available to users when they need it; collaborate with J6 to manage digital content with tools that exchange explicit knowledge; collaborate and connect with subject-matter experts (SMEs) across the organization.
  - KM Representatives (KMR): appointed by each J staff section to facilitate the KM process; receive training from KM cell; manage information, facilitate knowledge sharing, and conduct quality control of unit information for refining the portal; ensure uninterrupted use of system at all levels.

- Knowledge Management/Information Management Working Group (KIMWG): The J staff KM Representatives (KMRs), adjunct staff, and key supporting knowledge workers will meet with the KMO to resolve KM issues no less than once a month and will be hosted by the KM staff.
- Boards, Bureaus, Centers, Cells and Working Group (B2C2WG) provides close coordination, synchronization, and information sharing across the staff directorates to "pool" the knowledge resources available to the Commander according to the battle rhythms.

- Responsibilities

  At USPACOM, KM is a Chief Information Officer (CIO) responsibility. There is no Chief Knowledge Officer (CKO) identified. The KM Branch (J625) provides expertise and advice on the most effective approaches to KM implementation and executes the following strategy to fulfill the CIO role in supporting the KM vision.

  - Provide information resources strategic vision and policy leadership.
  - Provide information resource investment management.
  - Investigate emerging information technologies.
  - Improve operational and business process.
  - Leverage information management, knowledge sharing, and collaboration.
  - Implement information systems architecture and synchronization.
  - Provide security and Information Assurance as the Designated Approving Authority (DAA).

#### 3.3.4.2 Strategy and Approach

KM is focused on meeting mission requirements, integration into the operational environment, and alignment with the Commander's intent. The primary emphasis is on connecting those who know with those who need to know to enhance decision making through transition to a knowledge-enabled organization. Such transition requires a strong commitment from the leadership and special attention to the people, processes, and use of tools and technologies.

A two-pronged approach is used to strategize KM implementation. While trying to gain support from the senior leadership, the KMO takes advantage of being under J6, which is closely related to IM and tools development in order to accomplish KM advocacy and operational practice. Specific approaches for KM implementation include the following:

- Performed background research on KM program implementation and governance at AFRICOM, CENTCOM, EUCOM, NORTHCOM, SOCOM, SOUTHCOM, USSTRATCOM, U.S. Forces, Japan (USFJ), U.S. Forces, Korea (USFK), COMPACFLT, U.S. Army, Pacific (USARPAC), Joint Staff, Naval Special Warfare Command, and Marine Corps Forces Special Operations Command (MARSOC). The results were used as references for USPACOM KM planning.
- Establish key KM governance roles:
  - KM Champions/representatives from J0, J3, and J6
  - KIMWG consisting of representatives from HQ, Sub-unified, and Component Commands to address KM issues and share lessons learned
  - KM Management Board consisting of representatives from J020, J3, CIO, J62, J625, J64 to identify most important knowledge needs and review project priorities
  - KM Section: J625 is the Command's KM resource; provides strategy, expertise, guidance, training, and support to KM activities

    - Directorate IM Officers / Division, Branch, Section and Special Staff IM Officers consisting of representatives who serve as interfaces for IM/KM issues
- Establish proactive KM to guide the capture, storage, retrieval, and application of knowledge to improve situational awareness and optimize the Commander's decision-making and feedback processes. This includes implementation of organizational "yellow pages" to assist employees in identifying the knowledge resources and expertise required to meet a specific need and transfer of knowledge between the departing and arriving employees.
- In combination with IM, KM facilitates the functional and technical aspects of work in supporting operational decisions and provides capability and tools for the staff to determine the best solutions to meet the needs.
- Secure information and knowledge through governance and training.
- Leverage best practices in KM implementation in the public and private sector.
- Integrate rapid KM solutions.
- Develop a roadmap that details a phased, long-term effort outlining the KM objectives, activities, and products that is being used to embrace, improve, and sustain it on a long-term basis.
- Develop a KM Maturity Model to determine maturity levels (low to high) in accomplishing different aspects of KM (strategy, people, process, and technology).
- IM/KM Relationship
    - Information Management (IM) is the control over the structure, processing, storage, and delivery of information; whereby, KM consists of the three pillars – people, process, and tools – where experienced KMs will work with the users to identify process improvement areas, and then, if needed, use enabling technology to help improve processes and the capturing, sharing, and discovery of knowledge.
    - Information and Knowledge Management are not exclusive; they depend on each other to increase the efficiency of decision superiority.
    - Information technology and information management are essential to facilitate KM. Large volumes of increasingly complex information will continue to tax storage capacity. KM is facing the challenge to extract needed information from useless data and proactively deliver actionable information to the Commander.

#### 3.3.4.3 Training

Training is provided for the following tools:

- SharePoint 2007 internal developed tools: Slide Library, CCIR Trackers, Significant Event Tracker SIGEVENT, Action Tracker, Message Tracker, Rules of Engagement (ROE) Tracker
- Theater Security Cooperation Management Information System (TSCMIS)

#### 3.3.4.4 Tools

The KMO is responsible for the operational implementation of all information management tools.

SharePoint Portal and Microsoft Office Outlook are the two primary tools used for network-based information exchange in Non Secure Internet Protocol Router (NIPR) and Secret Internet Protocol Router (SIPR). The goal of Outlook is to push, pull, exchange, and synchronize staff information within USPACOM. The goal of the SharePoint Portal is to have only the most relevant and updated

information up front. The portal connects people to information of three specific domains: personal, team, and public governed by the PACOM SharePoint Portal Guidelines.

All documents that provide USPACOM situational awareness will be stored in a document library in SharePoint for information sharing while work-in-progress documents can be stored on the shared drive. During times of limited bandwidth, the Digital Rules of Engagement (DROE) will be enforced. Digital TTPs will be implemented for change management.

The KM-IM tools are categorized as follows:

- Collaboration: DCO, DCO XMPP Chat, Automated Message Handling System (AMHS), Video teleconferencing (VTC), AdHoc Information Warning System (IWS), Theater Security Cooperation Management Information System (TSCMIS)
- Scheduling: Master events calendar, NIPR Outlook calendar, JOC watch-bill, FO/GO schedule, Key personnel locator, VIP calendar
- Expertise locator: personnel database
- Store, search, and discovery: SharePoint
- Portals: DKO, AKO, Intelink, milSuite, Collaboration at Sea, APAN, Enterprise Portal for Information and Collaboration (EPIC)
- Record Management: TRIM
- Lessons Learned - JLLIS

#### 3.3.5 KM Website(s)

- NIPR:
  - https://intelshare.intelink.gov/sites/pacomkm/default.aspx
  - https://www.intelink.gov/sites/pacomkm/default.aspx
- SIPR:
  - http://psp-usa.hq.pacom.smil.mil/sites/common/b2c2wg/kimwg/default.aspx

### 3.4 USEUCOM [1-4][4]

#### 3.4.1 Definitions

- Knowledge Management (KM): the art of creating, organizing, applying, and transferring knowledge to facilitate situational understanding and decision making (based on Army Field Manual FM 6-01.1. Knowledge Management).
- The focus of KM is to understand USEUCOM situational awareness needs and demands of the decision-making process across the full spectrum of military activities and in response develop and field the best solutions to meet those requirements.

#### 3.4.2 Purpose

- The KM plan will serve as a Command-wide mission focusing on the Commander's priorities transecting all aspects of daily operations, planning, and policy. KM planning provides governance, standards, capabilities, roles, and responsibilities established based on USEUCOM Instruction EC 60001.01, 4 January 2012.

[4] See Section 8.2, COCOM References.

### 3.4.3 KM Direction

- Vision:
  - HQ: Effective collaboration and communication across EUCOM, DoD, national, and partner networks enables informed decision making.
  - Information Superiority and KM (ISKM) Division: to become a high-performance team with strategic and operational depth that continuously increases EUCOM's capability to collaborate, communicate, and act more quickly and effectively internally, DoD-wide, and with other partners based on the Commander's intent, priorities, and objectives.
- Mission:
  - HQ:
    - Increase certainty and speed in the planning and execution of theater strategy.
    - Accelerate the Command's ability to anticipate and respond to crises.
    - Promote warfighter success by enabling action inside the adversary's decision cycle.
  - ISKM:
    - Develop and implement the collaborative information environment to provide both process and technology solutions for decision makers to command and control forces with maximum efficiency.
    - Improve EUCOM's organizational execution capabilities through better use of individual and collective data, procedures, and technology in order to increase the certainty and speed of EUCOM's ability to plan and execute theater strategy and conduct military operations.
- Goals:
  - HQ: Apply KM principles and practices to ensure the accuracy, availability, and accessibility of the time-critical and routine information used to make operational decisions.
  - ISKM:
    - Plan and execute complex joint KM operations projects.
    - Enable improved decision making by integrating and fielding processes and systems to increase speed and accuracy of discovering, sharing, collaborating, and accessing information.
    - Facilitate information and knowledge exchange within EUCOM, DoD, and other partners.
    - Synthesize information to clearly depict useful knowledge (i.e., common operational picture, user-defined operational picture, etc.).
    - Enable the increase in detail, quality, and veracity of actionable information.

### 3.4.4 KM Framework

#### 3.4.4.1 KM Organization, Roles, and Responsibilities

- Organization and Roles

  The KM team, which is under the ISKM Division, has a unique organization in J3 similar to the EUCOM Plans and Operations Center (EPOC). The KM team, consisting of the following positions, carries out tasks under the direction of EUCOM Chief of Staff (CoS), who establishes, enables, and promotes EUCOM-wide collaboration toward an organizational culture of knowledge and information sharing required by the HQ EUCOM staff and Component Commands:

- KM Branch Chief
- KM Synchronization Officer
- Chief, Information Superiority and KM Division (ISKM)
- Deputy Chief, Information Superiority /Knowledge Management Division
- KM Outreach

- Responsibilities
  - Lead performance of KM for EUCOM HQ and theater: Assigned to the EPOC ISKM Division to assist in analysis of existing processes, develop new processes, and create/maintain knowledge content.
  - Develop KM strategy, policy, and guidance aligned to Command mission requirements and capabilities.
  - Foster an organizational culture of personal knowledge and information sharing with Supporting Commands, units, and other organizations.
  - Execute KM efforts and direct transformational improvements in accordance with strategy, policy, and guidance:
    - Propose changes to EUCOM KM policy and standards.
    - Create and maintain customized content and ensure developed products meet the end user's specific needs.
    - Establish and maintain a registry of authoritative data sources.
    - Provide updates of KM page on the portal based on information from the working groups.
  - Coordinate KM and process improvement actions within EUCOM and with EUCOM partners:
    - Chair KMWG consisting members from EUCOM Components, and Combined/Joint Tasks Forces; and advocate knowledge creation, capture, sharing, and reuse.
    - Implement best practice by sending out "KM tip of the day" during exercises.
  - Train Command and partner KM personnel and collaborative tools
    - Develop HQ EUCOM KM training plan for new and current employees.
    - Provide a Collaborative Information Environment functioning as a knowledge base system for the distributed participants in operational planning.

- Governance

  EUCOM KM is governed through the following parties:

  - Executive Steering Board (ESB): identifies and prioritizes KM initiatives and resources.
  - Council of Colonels: reviews KM concepts, policies, procedures, initiatives, and resource use to ensure effective KM throughout EUCOM; and determines what is forwarded to the ESB for review.
  - KM Working Group (KMWG): discusses information-sharing challenges and ensures issues/solutions are synchronized to support EUCOM decision-making processes. The KMWG also identifies and addresses challenges for aligning information-sharing tools to ensure effective flow of information at HQ.
  - The roles of KM governance of reporting, gathering requirements, providing guidance and coordination are carried out by the KM Executive Board, KM "Council of Colonels: Board, Theater KMWG, HQ KMWG, and ISKM Division.

#### 3.4.4.2 Strategy and Approach

The KM strategy at USEUCOM is tied to the DoD Information Sharing Strategy. USEUCOM seeks to iteratively improve theater-wide synchronization and collaboration by working closely with components and federal entities assigned in the EUCOM Theater of Operations to align and integrate KM practices in order to achieve interoperability across the Command's knowledge base.

USEUCOM is using a doctrinal approach derived from commercial best practices to develop KM capabilities. All KM programs are centered on people, processes, and technology, with emphasis on enforcing standards on metadata structures in the Collaborative Information Environment (CIE), new capabilities or systems, knowledge systems, and tools.

A KM plan was developed to provide an overview and seven annexes: Collaborate Best Practices, Taxonomies, Non-Intelligence Request for Information (RFI) Management, CIE Account Procedures, SharePoint Portal User's Guide, Multinational Collaboration Environment User's Guide, and InfoWorkSpace User's Guide. The KM plan is continuously being revised to incorporate inputs and ideas from users.

A strategic KM outreach program was established with the following objectives:

- Build relationship by knowing the staff, attending key meetings, identifying KM advocates, and making the KM team known.
- Promote KM by addressing staff concerns with KM efforts, communicating KM message, and demonstrating KM practices.
- Identify priority requirements.
- Recognize the training "thread."

All KM efforts focus on the following:

- Optimize exchange/flow of information through access of tacit knowledge from expertise/knowledge networks codification of tacit knowledge for learning, to improve personal and organizational situation awareness in the entire information life cycle.
- Maximize functional capacity of organizations through continuous process improvement in speed and accuracy.
- Strengthen/support knowledge networks and partnerships (Command-theater-/DoD-wide, interagency, coalition, internationally, including private partners, academia, industry, non-government, etc.) through understanding of relationships between organizational mission and personal duties and network communication.
- Improve corporate skills/coordination in knowledge work.
- Develop a learning organization.

##### IM/KM Relationship

Information resides in different locations with different formats and ways of organization. Multiple copies of the same information exist. This scenario causes difficulty and inefficiencies to find valid information when it's needed. Most of information searches are unsuccessful, which impacts the information flow. No adequate mechanisms are available to pass the knowledge from one person to another. Therefore, new employees need to figure out or relearn how to do the job when taking over the position of someone who has left the position.

Knowledge, which resides in the SMEs or exists in COPs/TTPs, CONOPs/Orders, lessons learned, news, and websites, etc., cannot be easily captured. A process for assessing knowledge availability,

which relates to the information life cycle, is necessary. This process determines if the information already exists, the people or systems that would need the information, the best ways for providing the information with context to the people for collaboration, prioritized information sharing, and dissemination.

The IM/KM plan, which was approved by the Commander, provides the following functionalities:

- Supporting decision making through communication between the staff and the Commander during the decision cycle, and satisfying CCIRs and battle rhythm requirements
- Staff organization through management of key IM/KM positions, IM/KM processes, and procedures
- Information sharing that handles information requests, creation, storage, dissemination, and distribution; use of Liaison Officers LNOs and B2C2WG in supporting the decision cycle

#### 3.4.4.3 Training

A learning paradigm is used to help meet the people dimension objective of KM. Training over the years has helped people better understand KM, resulting in cultural change. Training programs include:

- Training on Office 2010 and SharePoint 2010. EUCOM has found that Office 2010 and SharePoint 2010 must work together in order to take advantage of the new features of SharePoint 2010 and avoid unnecessary incompatibility problems.
- 3-hour KM orientation for new employees and advanced KM course for other employees.
- Trainings in specific areas: Class Document Library, DCO Virtual Training Room, KM 101 Training Survey, SharePoint 2010 for document storage and sharing, shared public calendars, task lists, discussion boards, MS Office integration, version control, personal pages (Mysite), and anonymous access.

#### 3.4.4.4 Tools

USEUCOM uses Microsoft SharePoint 2010 as a collaboration platform that enables end users to connect through the USEUCOM community to manage content effectively throughout the information life cycle. Available tools include:

- Locally hosted Microsoft SharePoint 2010: for SIPR and NIPR portals
- Microsoft SharePoint 2007: for DIA-hosted JWICS, coalition network
- Microsoft Lync 2010: for collaboration
- Microsoft SharePoint 2010: for expertise locator, storing, searching, and discovery of information, expertise finding
- Microsoft Outlook
- Total Records and Information Management (TRIM): for records management
- Net-Centric Enterprise Services (NCES) SIPR and NIPR Enterprise Collaboration including Jabber Messenger for Enterprise text chat
- Microsoft Office Communication Server (OCS) 2007 R2 for collaboration: integrates instant communication tool that provides presence awareness, LiveMeeting, text chat, secure voice chat, streaming video, collaborative sessions, which ties content to its owner in Portal and Outlook. It is currently available to EUCOM, AFRICOM, United States Air Forces in Europe (USAFE), and Supreme Headquarters Allied Powers, Europe (SHAPE) only.

- Joint Lessons Learned System (JLLIS): Microsoft SharePoint 2010-based custom solution and lessons learned
- Task Management Tool (TMT)
- DKO (NIPR/SIPR)
- JWICS: DIA-hosted Microsoft SharePoint 2007
- Internet
- Use Group Chat in B2C2WGs
- Email

### 3.4.5 Observations/Issues

- Lessons Learned
  - A reasonable KM plan ready for implementation is essential.
  - KM must be defined for this Command.
  - Be mindful of the KM basics and encourage disciplines for continual implementation of the KM basics. Use a simple plan to make sure people stay on track.
  - Methods for people to find expertise and collaborate are needed.
  - Good leadership is necessary.
  - KM is viewed as a weapon system for decision making.
  - Better communication is needed among EUCOM, CENTCOM, and AFRICOM.
  - The KM team needs to work with J6 who is responsible for IM to produce context for KM.
- Issues
  - KM Training program:
    - Poor penetration rate (~35%)
    - Need advanced and tailored studies/materials
  - Improve codification of business processes
    - Across staff
    - ECI, guidance, and best practices within KM
  - Collaborative tools policy/standards
    - Need approach leveraging standards across theater
    - "Too many meetings, too much information, not enough resources"
    - Lack of senior/key leader engagement

### 3.4.6 KM Website(s)

- NIPR:
  - Public-facing: https://www.eucom.mil/ and https://portal.eucom.mil/
  - Private: https://partners.eucom.mil / and https://command.eucom.mil/
- SIPR:
  - https://command.eucom.smil.mil/
  - https://portal.eucom.smil.mil/ (previous)

## 3.5 USNORTHCOM [1-7][5]

### 3.5.1 Definitions

- Knowledge Management (KM): the art of creating, capturing, organizing, applying, and transferring knowledge to ensure unity of effort, enable decision superiority, and foster a learning organization. KM processes ensure that knowledge products and services are relevant, accurate, timely, and usable to commanders, staffs, and mission partners.
- Information Management (IM): the science of using procedures and information systems to collect, process, store, display, disseminate and protect knowledge products, data, and information. IM spans from the technical control of data flowing across networks (information technology, or IT) to the staff management and automatic processes that filter through all available data and information to provide relevant information to the right person at the right time (information sharing, or IS).

### 3.5.2 Purpose

- To identify knowledge gaps and prioritize KM initiatives to most effectively achieve the strategic vision of the organization.
- KM systematically brings together people and processes, enabled by technology. KM stands on the shoulders of information technology, information management, and information sharing. Effective knowledge management puts operationally relevant information into context for the right person at the right time by the right method in order to facilitate situational understanding and decision making.

### 3.5.3 KM Direction

- Vision:
  - North American Aerospace Defense Command (NORAD) and USNORTHCOM (N-NC) will be among the best knowledge-centric organizations. They will expeditiously collect and process information, create and retain knowledge, and share it internally and externally with their mission partners in order to ensure the safety of the citizens of Canada and the United States.
- Mission:
  - Foster collaboration and knowledge sharing within NORAD and USNORTHCOM, throughout DoD, and with our mission partners.
  - Enhance situational awareness, improve information synchronization, enable process improvement, and direct an effective collaborative information-sharing environment to achieve decision superiority; as directed, support internal and external operational knowledge-sharing requirements.
- Goals:
  1. Optimize KM in accordance with the KM Maturity Model.
  2. Mature the knowledge-sharing culture.
  3. Optimize Command process.
  4. Leverage new and existing technologies.
  5. Manage enterprise knowledge.

[5] See Section 8.2, COCOM References.

6. Enhance decision support.

- Principles:
  - Exploit/capture tacit knowledge: From individuals to codified processes/practices.
  - Treat KM as a social and interpersonal activity: Learning, teaching, coaching, and mentoring with face-to-face exchanges.
  - Focus on sharing knowledge: Improve organizational effectiveness, operational processes, and decision making.
  - Integrate knowledge: Break hierarchies and boundaries to improve integration and collaboration.
  - Connect people with expertise: Tacit knowledge transfer into explicit knowledge practices accessed by all.
  - Foster learning organizations: Integrate informal and organizational learning with initiative and innovation.
  - Promote trust and mutual understanding: Willingness to share will be driven by value added to mission partners.

### 3.5.4 KM Framework

#### 3.5.4.1 KM Organization, Roles and Responsibilities

- Organization and Roles

  The KM team consists of the following key positions:

  - Deputy Chief of Staff for KM Office (DCSKM)
  - KM Engineer

- Responsibilities

  Responsibilities of the DCSKM are organized as follows:

  - Work with the Foreign Disclosure Officer (FDO) to protect controlled information while supporting timely sharing in furtherance of the Command's missions.
  - Work with the Freedom of Information Act (FOIA) and Privacy Act Requester Service Center to provide public access to records created by the USNORTHCOM in accordance with 5 USC Sec 552 in addition to protecting the privacy of individuals by providing Privacy Act program oversight.
  - Provide effective program management guidance in order to ensure N-NC forms and publications are efficiently developed and published in accordance with Air Force policies and regulations.
  - Implement an effective records management program that allows for an efficient ability to manage, share, and retrieve records; support both current operations and historical research; and be fully compliant with DoD and U.S. policy.
  - Implement knowledge management to enhance situational awareness, improve information synchronization, enable process improvement, and direct an effective collaborative information-sharing environment to achieve decision superiority; as directed, support internal and external operational knowledge-sharing requirements.

#### 3.5.4.2 Strategy and Approach

A KM plan focusing on the following is being developed. It requires senior leader and KM professional involvement from across the Command. The success of KM will depend on the involvement of the senior staff as the culture shift must begin at the highest levels.

- Establish KM vision for the Commands.
- Foster senior leadership involvement in KM.
- Identify key learning organization imperatives for N-NC and develop the KM structure that addresses the imperatives.
- Assist in the establishment of an N-NC Information Management Officer (IMO).
- Identify critical KM workforce positions and ensure the workforce addresses strategic, operational, and tactical requirements.
- Build a robust, trained KM Community of Practice.

Specific approaches for KM strategies implementation include the following:

- Promote a KM culture where information is put in proper context and fused by improving Command processes and leveraging technology to gain situational awareness and enhance decision making while improving effectiveness and efficiency.
- Focus the Command on the N-NC strategic end-states by improving and codifying processes, collaboration, and Communities of Practice while leveraging existing and new technologies.
- Optimize KM in accordance with the KM Maturity Model.
- Propose a "Best Practice Approach" to prioritization, integration, and synchronization of staff activities corresponding to the Commander's priorities. The staff integration and synchronization aligns to the KM goals 1, 3, and 5 listed above. Tools will be used to provide strategic, planning, and tactical views of mission areas.

KM Board Process:

- Identify, validate, and prioritize command, control, communications, computers, and intelligence (C4I) requirements.
- Shape and direct IM and KM standards, processes, and procedures for the commands, publish strategic KM guidance.
- Synchronize/integrate/charter the numerous KM, IM, IS, and C4I ad-hoc, non-doctrinal groups and boards across the commands.
- Increase knowledge transfer and champion DoD initiatives and best practices.
- Complement the Command's corporate process.
- Focus on KM strategy, IM/KM plan implementation, KMB charter, and portfolio charters.

KM Activities

- Develop IM/KM plan.
- Provide KM 101 course for the commands.
- Develop Command policy for conducting entrance, mid-term, and exit interviews with key personnel to capture tacit knowledge.
- Update Strategic Operations IS Plan of Action.
- Select IS specialist for each Directorate / Battle Staff Cell.

- Provide Automated Notification and Recall System (ANRS).
- Define Command's process for records management.
- Replace Task Management Tool (TMT).
- Develop KM analysis of Directorates / Battle Staff Cells.
- Provide best business practices initiative program.
- Charter all IS workgroups.
- Provide IS and lessons learned/AARs.
- Conduct surveys of the leadership and the staff to identify the areas of KM that might have the best short-term pay-off, while identifying long-term requirements.

KM Expected payoffs:

- Increased relevant information access for decision making in changing environment.
- Eliminated redundant processes and processing time.
- Ensured integration of processes and compatibility of knowledge products.
- Enhanced innovations and insights through capitalizing human capital.
- Facilitated collaboration and knowledge sharing to improve individual and networked speed, efficiency, and productivity.

IM/KM Relationship:

> KM is a process whereby information is discovered, selected, organized, distilled, shared, developed and used in a social context to improve organizational effectiveness. IM is the collection, storage, and control of information, but not the use of information. KM enables acting on information and therefore uses the IM processes and adds synthesis, analysis, and presentation of information in a usable fashion for decision makers. KM, in conjunction with IM, should provide an organizational framework to accumulate, create, and disseminate actionable knowledge.
>
> Knowledge is a commodity that must be managed effectively. A process needs to be developed for capturing data, cataloging expertise, realigning processes, and changing cultures. In addition to information sharing, knowledge sharing will provide context to information to establish a more holistic awareness to allow the leadership to make faster and better decisions.

#### 3.5.4.3 Training

The goal of the KM training plan is to produce a trained, motivated, and capable cadre of KM professionals to accomplish ongoing advocacy of KM and knowledge transfer. Training is built on:

- Formal venues: Orientation brief, classroom instruction, KM certification.
- Information sources: online classes, concept awareness, leadership support and mentoring, inter-COCOM KM Working Group.
- Tools and techniques: newsletters, video, website, workshops.

#### 3.5.4.4 Tools

The KM-IM tools are categorized as follows:

- Collaboration: DCO, XMPP Jabber, SharePoint 2003/2010, Homeland Security Information

Network (HSIN), DHS tools, Dynamic Synchronization Event Log (DSEL) for in-house positional logs

- Scheduling: Master Strategic Calendar (MSC) and Outlook
- Store, Search, and Discovery of Information: SharePoint 2003/2010, JLLIS
- Records Management: HP's TRIM
- Lessons learned: JLLIS
- Commander's Decision Cycle Framework (CDCF) Calendar for OPS, plans and assessments and websites are being developed for integration strategy for working groups to work and mature lines of efforts (LOEs) in support of lines of operations (LOOs) and mission areas and work plan of action and milestones (POA&Ms) for each LOE.

#### 3.5.5 Observations/Issues

- USNORTHCOM is a bi-national organization supporting both NORAD and USNORTHCOM missions
- Need to establish joint community
- Must balance need-to-know vs. responsibility to share
- Physical and geographic limitations impact KM
- Closed doors
  - Distributed operations
- Workforce turn-over
- Respond to new threats
  - Need to be able to adapt
  - Need shorter decision cycles

#### 3.5.6 KM Website(s)

- User account registration is required to access the following NIPR websites:
  - https://portal.noradnorthcom.mil/organizations/hq/cs/cskm/SitePages/Home.aspx
  - https://portal.noradnorthcom.mil/communities/km/SitePages/Home.aspx

### 3.6 USSOUTHCOM [1-10][6]

#### 3.6.1 Definitions

- Knowledge Management (KM): the art of creating, organizing, applying, and transferring knowledge to facilitate situational understanding and decision making. The three pillars of KM are people, processes, and technology. (Based on the USSOUTHCOM Enterprise Knowledge Management Order 01-09)
- KM is a concept and process to gather, organize, refine, and disseminate knowledge in terms of resources, documents, and people skills.
- KM is the integration and application of people, process, and technology, as described below:
  - People

[6] See Section 8.2, COCOM References.

        - Foster an enterprise culture that encourages and rewards learning, innovation, and consistent sharing of knowledge and information.
        - Identify, train, and develop KM professionals.
        - Motivate and reward personnel to use collaborative tools and portals to consistently share and request knowledge, information, and understanding within the operational boundaries and authorities of Foreign Disclosure (FD), Operational Security (OPSEC), and Security Management (SM).
    - Process
        - Establish, develop, document, and maintain standardized repeatable processes by leveraging best-known practices and linking them to enterprise KM organizational processes within the operational boundaries and authorities of Foreign Disclosure (FD), Operational Security (OPSEC) and Security Management (SM).
        - Enhance knowledge/information sharing, situational awareness understanding for rapid, valid, effective, efficient decision making and problem solving.
    - Technology
        - Enable valid, reliable, effective, efficient, and secure enterprise-wide knowledge and information transfer, collaboration, storage, and retrieval in addition to content and record management.
        - Develop and organize intuitive knowledge portals based on best practice experience to enhance and maximize knowledge/information sharing, situational awareness-understanding for rapid, effective, efficient decision making and problem solving that also foster innovation and learning.

### 3.6.2 Purpose

Under the USSOUTHCOM Enterprise KM Order 01-09, USSOUTHCOM Joint Lessons Learned Program, and USSOUTHCOM Migration to Net-Centric Enterprise Services (NCES), KM was established on an enterprise-wide basis to effectively and efficiently leverage knowledge to support situational understanding and decision making. Specific motivations were to:

- Move from the Information Age to the Knowledge Age, focusing on knowledge-intensive activities, not on information and data.
    - Improve effectiveness/efficiency of meetings (decision making, problem solving, and strategic planning), conferences, and knowledge-intensive activities.
    - Maximize innovation and learning to become a learning and innovative organization with diversified staff whose knowledge is viewed as organization's asset.
    - Reduce knowledge bottlenecks, loss of knowledge due to turnover of staff, and cost of employee training.
    - Leverage existing assets to reduce cost, risk, and cycle time.

### 3.6.3 KM Direction

- Vision:
    - HQs, Components, Joint Task Forces (JTFs), and Security Cooperation Offices (SCOs) will be able to create, organize, apply, and transfer knowledge to USSOUTHCOM standards and enable decisions based on information made available through the processes.

- Mission:
  - To carry out the KM Concept of Operations and policy described in the USSOUTHCOM Enterprise Knowledge Management Order 01-09 in the following phases to accomplish the Chief of Staff CoS intent:
    - Phase I (Preparatory): This phase begins with the publication of the USSOUTHCOM Enterprise Knowledge Management Order 01-09 and ends when KM training begins and all Command-wide business processes and core technologies have been identified.
    - Phase II (Execution): This phase begins with the start of training and identification of business practices and core technologies between HQs and subordinate elements.
    - Phase III (Sustainment): This phase begins after the enterprise is trained, business processes are aligned, and technology is interoperable between HQ2 and subordinate elements and continues indefinitely.
- Goals:
  - Assist the Chief of Staff (CoS) in providing KM oversight and guidance to the enterprise through the Enterprise Knowledge Management Working Group (EKMWG), and integrate KM protocols and standards into steady state exercise and contingency or crisis operations.
  - Establish knowledge transfer processes between the Partnership of the Americas Collaboration Center and the HQs, components, JTFs, and SCOs.
  - Establish processes to incorporate validated lessons learned and recommendations into the Defense Readiness Reporting System (DRRS).
  - Ensure core technologies supporting KM are interoperable with the SOUTHCOM HQs.
  - Develop training program on core technologies and KM processes.
- Principles:
  - To accomplish the goal of getting the right knowledge to the right person at the right time by creating a culture of collaboration and knowledge sharing where key information and knowledge is "pushed and pulled" within the enterprise to meet mission objectives. The 12 Army KM principles are implemented to the KM pillars: people/culture, process, and technology.

### 3.6.4 KM Framework

#### 3.6.4.1 KM Organization, Roles, and Responsibilities

- **Organization and Roles**

  The USSOUTHCOM Command Enterprise KM organization consists of the following positions:

  - Chief of Staff (CoS)
  - Director, Knowledge Management (DKM)
  - KM Coordinators (KMC)
  - Foreign Disclosure (FD), Security Management (SM), Operational Security (OPSEC)

  The KM team consists of the following positions:

  - Chief Knowledge Officer (CKO)
  - Technical Lead, Command KM

- A Command Historian is being selected to work the KM team to review the strategic goals/plan.

- Responsibilities
  - The CoS approves and enforces KM initiatives, plans, and processes.
  - The DKM initiates and manages KM initiatives, plans and process management, execution, and maintenance.
  - The KMC initiates and manages HQ, Component and JTF Directorate, Division and Branch KM initiatives, plans and process development, execution, and maintenance.
  - The FD office serves as a key enabler of knowledge sharing with the non-U.S. partners.

#### 3.6.4.2 Strategy and Approach

KM program development was based on the Socialization, Externalization, Combination, and Internalization (SECI) model proposed by Nanoka and Takeuchi (Reference [10]). The model identified four modes of knowledge conversion:

- Socialization: Tacit to tacit knowledge through collaboration to share knowledge
- Externalization: Tacit to explicit knowledge through capturing
- Combination: Explicit to explicit knowledge to build a knowledge base through transferring best practice knowledge
- Internalization: Explicit to tacit knowledge through learn-by-doing

A Knowledge Repository Framework (KRF) was established to support knowledge mobility in providing the foundation for shared and user-defined situational understanding and decision making through the following best-known practices to establish:

- Consistent, efficient enterprise-wide portals and public shared spaces for explicit data, information, and knowledge.
- A SME repository for tacit knowledge.
- Recognized and trusted authoritative data sources.
- Metadata standards for data, information, and knowledge assets.
- A set of steady state foreign disclosure standards.
- Record management protocols and content management standards.
- A robust guard infrastructure.
- Knowledge Process:
  - Acquire information/knowledge through searching, gathering, finding, capturing, and validating.
  - Produce knowledge through collaborating, refining, creating, and validating.
  - Integrate knowledge through publishing, structuring, instructing, and presenting.

KM principles and tactics are applied to the following KM activities:

- Established knowledge repository for change of command and command transition team – share lessons learned for meeting management improvement.
- Provide KM education, certification, and process management classes.
- Provide KM training and orientation during past pre-exercise and planning conferences.
- Draft KM Joint Mission Essential Tasks (JMETs).

- Conduct strategic knowledge gap analysis.
- Manage the knowledge processes of the knowledge-intensive activities and improve its cycle.

#### 3.6.4.3 Tools

Primary network being used is NIPRNet. Secondary network being used is SIPRNet. Knowledge transfer takes place via the following mediums:

- Websites and portals on NIPRNet and SIPRNet
- Email
- Defense Connect Online (DCO)
- Secretary of Joint Staff Tasker System
- TSCMIS (SIPRNet)
- Strategic Knowledge Integration Web (SKIWeb) (SIPRNet)
- WIC Portal (For SPECAT exercises only)
- Video teleconferences
- Phone conferences
- Partnership of the Americas Collaboration Center (PFACC) Watch

### 3.6.5 Observations/Issues

- Need to provide KM education to senior leaders and staff
- Must plan for culture change / change management

### 3.6.6 KM Website(s)

- https://schq.southcom.mil
- https://schq.southcom.mil/DIRANDLNOS/J3/J33/Watch/B2C2/KMWG/default.aspx

## 3.7 USCENTCOM [1-2][7]

### 3.7.1 Definitions

- Knowledge Management (KM): The organization, processes, and coordination of activities within an organization that enable situational understanding, decision making, and successful performance.
- Information Management (IM): The orchestration of tools and procedures to transfer information to the right people at the right time in an organization to support situational understanding, decision making, and performance.

### 3.7.2 Purpose

The roles of IM and KM are interdependent and not easy to delineate. IM and KM programs have the same purpose of achieving the Command's organizational strategic objectives.

[7] See Section 8.2, COCOM References.

### 3.7.3 KM Direction

- Vision: USCENTCOM transforms into a fully collaborative, learning organization where knowledge is shared to maximize situational awareness, accelerate the Commander's decision-making and feedback processes, and improve operational effectiveness in the Central Command Theater.
- Mission:
  - To enable the Commander's decision-making and feedback processes in order to improve campaign effectiveness and increase efficiency of task accomplishment.
- Goals:

  There are four interrelated goals:

  - People/Culture: Promote a Command culture that transcends organizational boundaries, educates the personnel on their roles, and integrates knowledge management and sharing initiatives into the flow of operations.
  - Process: Continually identify and improve organizational processes that facilitate successful knowledge sharing to improve campaign effectiveness.
  - Policy: Develop and promulgate guidance and policies that direct how personnel manage, share, store, and categorize organizational information and knowledge.
  - Technology: Leverage technologies to enable or enhance tactics, techniques and procedures that support mission requirements.

### 3.7.4 KM Framework

#### 3.7.4.1 KM Organization, Roles, and Responsibilities

- Organization and Roles

  The Chief of Staff approved the KM organization in February 2012. It consists of the following positions:

  - Knowledge Management Officer (KMO)
  - Deputy Knowledge Management Officer (DKMO)
  - Knowledge Management and Chief of Information Officer (CIO) Support
  - Chief of IM Branch
  - Information Management Officer

  Knowledge and Information Management Representatives (KIMRs), who have experience with KM training and experience with KM and IM tools, will be appointed to serve as interface between the KM Cell and Knowledge and Information Management Working Groups (KIMWG).

- Responsibilities

  Primary responsibilities of the KM cell include:

  - Develop the Command's KM Strategy and recommend a governance structure supporting the HQs and components.
  - Leverage with the KIMRs across the directorates to help educate and incorporate KM best practices and initiatives across the Command.
  - Identify prioritized efforts and measures that show impact of KM program activities.
  - Help solve the Commander's priority to improve decision-making process.

- Governance

USCENTCOM instituted the following venues to provide the organizational framework for planning and conducting KM and IM programs:

- Knowledge and Information Management Working Group (KIMWG): to address HQ-focused KM and IM initiatives at the AO (Action Officer) level.
- Joint Knowledge and Information Management Working Group (J-KIMWG): to incorporate Components and JTF's and their KM and IM efforts.
- Knowledge and Information Management Board (KIMB): A Chief of Staff-chaired Board with J2 CIO, J6/CIO, KMO, and IMO participation to review key issues and make decisions

#### 3.7.4.2 Strategy and Approach

The basic approach for increasing knowledge sharing is through integration of people, processes, policies, and technologies by employing resources and improvement in processes that systematically create, organize, and disseminate information and knowledge.

The KM cell identified the following initial broad focus areas for KM implementation:

- Integrated Battle Rhythm: The efforts include interface with B2C2WGs, exercise support and management of Information Exchange Requirements and Requests for Information.
- Process Improvements: Initiatives include process identification and mapping, best practices and lessons learned, and use of metrics and performance measures.
- Training and Education: Include conduct of KM fundamentals and collaborative tools training and advanced education for KM Representatives.
- Portal and Collaborative Tools: Inclusive of synchronous (desktop and VTC systems) and asynchronous (portal and email) capabilities, and Web 2.0 / social networking capabilities.
- Data Standards: Include identification and enforcement of metadata standards, data storage, access, and delivery in addition to content aggregation and interoperability.
- Situational Awareness: Focus on improved capabilities that leverage COP, GCCS, and Joint Command and Control Common User Interface (JC2-CUI) portals and dashboards, to include the use of alerts, warnings, and notifications.
- Information Sharing: Focus on creation of Communities of Interest, team sites, expertise directories, networking, and calendaring and tracking tools.
- Information Management: Address content management, records management, and naming conventions.
- Knowledge Transfer is critical for mission continuity in the dynamic USCENTCOM environment. It involves creating, organizing, capturing, and distributing knowledge and ensuring its future availability. After trying a number of informal approaches, the following methodologies were being planned to improve it and its impact.
    - Standardized Continuity Books: Departing staff should ensure a standardized continuity book is available. Suggested items include points of contact, key references and policies, primary roles and responsibilities, location of documents/files, daily battle rhythm and schedule, recurring meetings and activities, products or deliverables, training, travel, and administrative information. This continuity book should be maintained in soft copy for ease of updating.
    - Transition Checklist: It is used to facilitate sign-off for outgoing staff and to be used in conjunction with a transition period if overlap exists. This gives an up-front assessment of the function for the new staff member. For the outgoing member, it can be

incorporated into a self-inspection and/or used for an exit interview. The checklist can become a component of the continuity book.
    - On-the-Job Training: This assumes overlap or other staff are available to provide a hands-on "check ride" that allows the new member to go through the roles, responsibilities, and production of deliverables.
    - Networking: The intent of networking is to identify who does what in relationship to the specific role. To build relationship up front, and "connect the dots," this helps to improve mission knowledge and heighten situational awareness. By networking, one will better understand process flows and contribute to Communities of Interest.
- A knowledge audit was planned as an operational processes assessment in order to determine the inputs, outputs, constraints, technology enablers, operational processes, and customers for USCENTCOM knowledge workers.

#### 3.7.4.3 Training

The KM training program serves as the centerpiece of a learning organization. It uses a tiered training approach for the following:

- KM Staff Orientation: a 15-minute brief on the mission, roles, and responsibility of KM will be given to all newcomers as an introduction to KM.
- KM Fundamentals: a 1-day course on KM principles and practical applications for personnel assigned KM as a collateral or matrix duty.
- Introduction to Collaborative Tools: a 1-day course designed to provide working knowledge of various collaborative tools used at USCENTCOM.
- Facilitation: a 1-day course designed to create a cadre of trained, non-biased meeting and information-gathering facilitation.
- Continual Process Improvement: a 2-day course that offers how to arrive at, implement, document, and continually improve workspace best practices.
- SharePoint Portal Training: offered by CCJ6.

#### 3.7.4.4 Tools

Tools include synchronous (desktop and VTC systems) and asynchronous (portal and email) capabilities, and Web 2.0/ social networking capabilities. The tool set also includes the development and use of dynamic and configurable dashboards.

### 3.8 USSOCOM [1-2][8]

#### 3.8.1 Definitions

- Knowledge Management (KM): an integral part of Mission Command. It supports the Commander by providing the bridging focus between the art and science of command. It is the process of enabling knowledge flow to enhance shared understanding, learning, and decision making.
- Effective KM is an essential task in Mission Command, and can directly influence the organization's success in combat.

[8] See Section 8.2, COCOM References.

### 3.8.2 Purpose

To create shared understanding through the alignment of people, processes, and tools within the organizational structure and culture in order to increase collaboration and interaction between leaders and subordinates. This results in better decisions and enables improved flexibility, adaptability, integration, and synchronization to achieve a position of relative advantage.

### 3.8.3 KM Direction

- Vision:
  - KM becomes the key enabler in the Mission Command decision-making process.
- Mission:
  - Assist the Commander and Staff in developing shared understanding in Mission Command processes.
  - Integrate KM into the operational environment to meet the mission requirements and align with the Commander's intent.
- Goals:
  - To create shared understanding through the alignment of people, processes, and tools within the organizational structure and culture in order to improve collaboration and understanding. The creation of shared understanding results in better decisions and enables improved flexibility, adaptability, integration, and synchronization, resulting in better organizational decision making.
- Principles:

  The following principles of KM based on "Executing KM in Support of Mission Command" (Reference [1]) are applied to all levels of the organization.
  - Understand: Through collaboration, knowledge sharing enables an understanding of the operational environment, problems to be solved, and approaches to solving them. Results of understanding enable people of the organization to work together to achieve operational goals.
  - Share: Establish a strategy of linking sources of tacit knowledge for transferring and sharing knowledge among all levels of the organization in support of operational objectives.
  - Integrate: Forces do not operate independently but as a part of a larger joint effort. Integrating knowledge from individuals of different parts of the effort will help achieve a better understanding of the operational environment.
  - Connect: Sharing and transferring tacit knowledge between individuals, teams, and units through connecting people with the knowledge to others who need that knowledge.
  - Learning: Learning takes place directly or indirectly when individuals share information. Individual and collective learning contributes to developing a learning organization.
  - Trust: Building mutual trust in the Command is key to motivating and encouraging knowledge and information sharing to accomplish collaboration among individuals.

### 3.8.4 Framework

#### 3.8.4.1 KM Organization, Roles and Responsibilities

- Organization and Roles: USSOCOM has recently downsized to two positions:
  - Deputy of Chief Knowledge Officer
  - Chief, KM (Education and Training)

- Responsibilities:

  The KM function was carried out under C4I/IM before the KM team was formed. Current KM responsibilities include:

  - Provide KM training to new employees and assist in identifying SMEs and tools for finding information.
  - Introduce KM concepts in Command process.
  - Advocate shifting of "need to know" to "need to share."
  - Focus on the human aspect of KM.
  - Establish governance on content management and implement record management in SharePoint 2010.
  - Attend battle rhythms meetings to introduce KM concepts whenever possible.

#### 3.8.4.2 Strategy and Approach

Prior to 2008 when KM resourcing started, information sharing was not well coordinated. Portals had not been implemented and common operational picture for the battlefield was not available. A three-phased approach is used to develop a KM plan to implement the KM program:

1. Phase 1: Establish initial momentum of implementation of KM concept to help the Commander, staff, and organization while developing relationships with the staff.
2. Phase 2: Develop support of the staff and subordinate organizations for the near-term and long-term KM program consisting of a series of "quick wins" by identifying and solving knowledge gaps and information flow problems.
3. Phase 3: Build the KM program as an integral part of the mission command and decision-making process through improved decision-making and knowledge flow processes.

- Process: KM consists of four components (people, processes, tools, and organization) and is a five-step process portraying a knowledge map of an integrated series of sequential and parallel cycles (Reference [2]).
  - Assess information flow in organization: identify knowledge gaps, which are the obstructions to the free flow of information; identify knowledge solutions, which are the means of eliminating or minimizing those obstructions.
  - Design KM products and processes for improved information transfer; determine strategy for meeting the unit's information needs.
  - Develop knowledge solutions to problems, requirements, processes, and procedures that implement the KM solutions.
  - Pilot the KM solution on a small scale and test it with soldiers prior to full implementation.
  - Implement the validated solutions, including training personnel in their roles and responsibilities.
- Activities: The KM efforts started in 2009 with the following activities:
  - Identified the following gaps and challenges:
    - There was no formalized record management.
    - There was no content management.
    - There was no education for use of KM tools.
    - Challenges existed in sharing information with partners – both network sharing and security are problems.
    - The Command needs a better way to capture and share retirees' knowledge.
  - Provided a framework for implementation of solutions to the gaps

        - Provided education and training on tools (e.g., SharePoint, use of bulletin board, etc.).
        - Captured knowledge from people before exit from Command. Surveys were considered.
        - Used SharePoint 2010 for records management and workflow to identify records.
        - Used FAST (Fast Search and Transfer System) search engine running on SharePoint 2010 to provide document search and crawling of shared drives.
        - Developed a draft standard operations procedure (SOP) for advanced portal design.
        - Investigated alternatives to coordinate portals.
    - Formed KMWG that consists of 20 people from the subordinates to identify issues in monthly meetings.
    - Provided Knowledge Sharing Memorandum to the Commander.
    - Attended all meetings and was part of the Commander's email distribution groups in order to become proactive in offering information and assistance to the Commander.
    - Developed action trackers.
    - Used data from portals instead of PPT for meetings.

#### 3.8.4.3 Training

USSOCOM has the following training goals:

- Provide special training for SharePoint tools.
- Combine in-class and portal-based instructional methods focusing on novice and advanced users.
- Use MindSharp instructor to provide Power Business User instructions.
- KM Institute certification is recommended for KM leadership.

#### 3.8.4.4 Tools

The KM-IM tools are categorized as follows:

- Collaboration: use collaboration workspaces for hosting routine battle rhythm meetings and for staff documents.
- Scheduling: use Outlook and SharePoint Scheduling and Calendar for shared calendars and SharePoint Alerts for scheduling changes.
- Expertise locator: increased use of MYSITE profiles together with SharePoint search capability to function as an Expert Locator.
- Store, search, and discover information: use FAST search for SharePoint 2010.
- Portals: DKO, Milsuite. AKP KM forums for sharing ideas and facts gathering from fellow KMers.
- Records Management: Electronics Record Management (ERM) program is being developed using a combination of in-place records management, record-center features, and customized workflows.
- Lessons learned: subscribed to SOCOM JLLIS and USASOC Lessons Learned sites for weekly updates. Selective information based on their current interests to be shared with key leaders.

### 3.8.5 Observations/Issues

- Attended all meetings in unit if possible.
- Know the Commander's interests. This gives the opportunity to be proactive in KM efforts.
- Understand the baseline process of Lean Six Sigma in order to identify knowledge gaps and improved processes.
- Go after "low-hanging fruit" where the impact of KM can be seen. For example, make meetings work better by using a meeting workspace for posting relevant documents in the portal.

### 3.8.6 KM Website(s)

- NIPR: https://sof.socom.mil/sites/SOCS/KM/default.aspx
- SIPR: https://sofrelonline.socom.mil/sites/SOCS/KM/default.aspx

## 3.9 USSTRATCOM [1-4][9]

### 3.9.1 Definitions

Knowledge Management (KM) is a range of strategies and practices for creating, organizing, applying, and transferring knowledge to facilitate situational awareness, decision making, and mission execution.

### 3.9.2 Purpose

To establish KM mission, principles, governance structure, roles and responsibilities, and functions for improving information and knowledge sharing across USSTRATCOM.

### 3.9.3 KM Direction

- Vision
  - To ensure the right information reaches the right person, at the right time, in the right context to support decision superiority.
- Mission
  - By employing effective information and knowledge-sharing strategies, promote USSTRATCOM's mission effectiveness in coordination with other Combatant Commands, Joint Functional Component Commands, Services, USG agencies. and appropriate stakeholders.
- Principles

  KM shall leverage people, processes, and technology to:
  - Facilitate social networking and partnering to build professional relationships
  - Remove barriers to efficiency
  - Bring solutions to people
  - Simplify process participation

[9] See Section 8.2, COCOM references.

### 3.9.4 KM Framework

#### 3.9.4.1 KM Organization, Roles, and Responsibilities

- Organization and Roles
  - Office of Primary Responsibility: J639
  - Certified by J63 (CAPT Peter R. Falk)
  - In accordance with CJCSM57600.01A, Joint Staff and Combatant Command Records Management Manual, Vol I & Vol II

Figure 4 shows the USSTRATCOM KM structure.

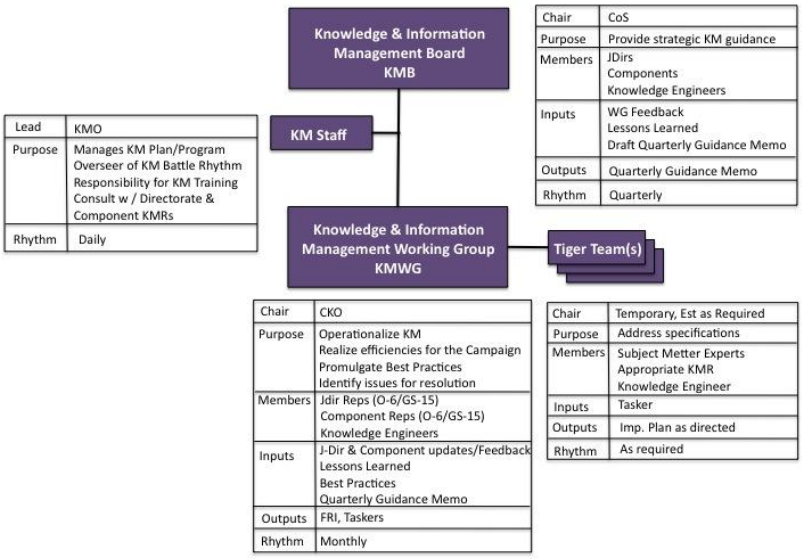


Figure 4. USSTRATCOM KM structure.

- Responsibilities
  - Effective use of USSTRATCOM knowledge resources: people, process, and tools
  - Appoint Knowledge Management Representatives (KMR) to USSTRATCOM governance structure, Knowledge Management Board (KMB), and Knowledge Management Working Group (KMWG)
    - Chief of Staff (CS)
    - KMB Voting members
    - Chief Knowledge Officer (CKO)
    - Knowledge Management Officer (KMO)
    - KM Engineer
    - Knowledge Management Representatives (KMR)

#### 3.9.4.2 Strategy and Approach

The goal of the KM plan is to enhance the Command's ability to effectively manage its knowledge resources to support strategic guidance. It will achieve that objective by operationalizing the process of discovering, distilling, sharing, and applying information in a social and technological context

relevant to improve warfighting capability. The KM plan will define appropriate associated resources, timeliness/milestones, and performance measures.

#### 3.9.4.3 Knowledge Operational Model

- KM is achieved by integrating people, processes, and technology:
  - People
  - Processes
  - Activities
  - Tools
- Knowledge Activities:
  - Identification
  - Capture
  - Exposure
  - Consumption
  - Application
  - Measurement/Assessment

### 3.9.5 KM Website(s)

- NIPR: https://vela.stratcom.mil/sites/kmportal/default.aspx
- SIPR: https://vela.stratcom.mil/sites/esa/blog/default.aspx

## 3.10 USCYBERCOM [1-4][10]

### 3.10.1 Definitions

Knowledge Management (KM) is the practice of creating, organizing, applying, and transferring knowledge to facilitate situational awareness, decision making, and mission execution. This includes managing the explicit and tacit knowledge.

### 3.10.2 Purpose

Because KM needs are often overshadowed by a focus on information technology, an organization's real intellectual capital and opportunities to improve situational awareness are lost as people (and their knowledge) leave the organization.

The KM plan seeks to leverage USCYBERCOM internal assets to improve mission, and to develop Strategic National (ST) and Operational (OP) measures that apply to the following Universal Joint Tasks List (UJTL) that could be incorporated into USCYBERCOM's Joint Mission Essential Task List (JMETL), which highlights best practice transfer, collaboration training for leaders, and virtual collaboration.

- ST 5.1.14 Establish Knowledge Management: Ensure the technological tools, networks, standard KM practices and information management standards for sharing knowledge, information, data, perceptions, ideas, and concepts are available at a strategic theater level.
- OP 5.1.14 Establish a collaborative environment in which joint, multinational, interagency, and non DoD stakeholders share data, information, knowledge, perceptions, ideas, and concepts.

[10] See Section 8.2, COCOM References.

### 3.10.3 KM Direction

- Vision:
  - Provide capability to manage the command's knowledge resources efficiently and effectively to bring success to USCYBERCOM mission and ensure that the Command evolves into an efficient learning organization.
- Mission:
  - The key missions are to transfer KM competency to the entire Cyber workforce and help grow a culture of knowledge capture and sharing throughout the Command. The KM program will identify, promote, and reward KM best practices that capture, reuse, and transfer corporate knowledge effectively and efficiently to enable operational efficiency and foster an ethos of continuous process improvement.
- Goals:
  - The goal of the KM plan is to enhance the Command's ability to efficiently and effectively manage its knowledge resources, especially its intellectual capital. To do so, the KM plan will address the following objectives:
    - Provide Senior Leadership with KM practices that enable mission objectives
    - Grow a culture of knowledge managers at USCYBERCOM through ongoing development of the KM plan
    - Employ continuous process improvement methodology
    - Prescribe roles-based collaboration and KM tools suites to enhance mission execution

### 3.10.4 KM Framework

#### 3.10.4.1 KM Organization, Roles and Responsibilities

- Organization

  The KM team consists of the following positions.
  - Chief Knowledge Officer (CKO)
  - Chief Knowledge Manager CKM)
  - Knowledge Manager
- Responsibilities
  - Develop the KM strategy; manage, and implement the KM program and process.
  - Manage day-to-day operations of the KM program at the Command level.
  - Serve as a Command-wide KM subject-matter expert.
  - Provide recommendations to senior leadership on how KM can best support mission goals.
  - Provide strategy to manage, capture, store, share, and reuse knowledge effectively in alignment with Command guidelines.
  - Support development of strategic directions and establish priorities for the KMWG.
  - Foster cultural change to move the organization to knowledge centricity.
  - Ensure that the best, relevant information for the area of practice is accessible to all personnel and developers.
  - Champion cross-organizational Communities of Practice, promote organizational learning principles, and establish incentive programs for knowledge sharing and reuse.

#### 3.10.4.2 Strategy and Approach

KM is an iterative process that evolves as the organization matures. The KM strategic planning, which follows USCYBERCOM's strategic planning, focuses on growing a culture of knowledge capture and sharing throughout the Command. A knowledge-mapping methodology is used to identify overlaps and gaps in mission process. The KM strategy states how the organization will use KM methods, tools, processes, and practices to achieve mission objectives by leveraging its content, people, and processes and how KM will support the organization's overall strategy. This strategy links to the Command mission and its readiness.

A two-phased approach is used:

1. The first phase will focus on needs analysis that will identify the Command's most pressing KM challenges.
2. The second phase will focus on identifying KM best practices that can be used to mitigate these challenges and developing a plan for implementing them.

The KM plan will focus across four core areas: Strategy, Process, Organization and Culture, and Technology:

- Strategy: The KM plan uses continuous process improvement methodology to enhance mission effectiveness. KM Initiatives will be integrated into USCYBERCOM's strategic plans and goals. KM Initiatives will aim at promoting and supporting strategic goals, and addressing organizational disablers that impede those goals.
- Process: KM promotes the development and use of repeatable, scalable, and efficient business processes that standardize explicit knowledge capture and incorporate knowledge transfer test practices.
- Organization and Culture: To foster adoption of KM practices and mission-enhancing capabilities, the KM plan will incorporate a dedicated organizational change management strategy.
- Technology: KM is enabled through the use of key information systems (e.g., content management systems, collaboration tools, etc.), but KM is not synonymous with information technology. The KM plan will ensure that USCYBERCOM's mission, functions, and processes will drive technology solutions.

**Establish Knowledge Management Working Group (KMWG):** KMWG is a cross-directive process-focused forum for information exchange, analyzing and providing solutions to KM challenges, and sharing best practices across the Directorates. The working group ensures that KM problems are addressed and potential solutions are identified.

**Develop KM Performance Measures:** The CKO will develop and use a set of performance measures to routinely assess the impact of the Command's KM practices and capabilities. The performance measures will be used to identify gaps or areas in need of improvement. It is a key component in changing an organization's culture since it provides individuals with "proof" of the impact of a certain KM practice or capability.

**Identify KM Success Factors:** The KM plan will capitalize on lessons learned from other successful KM plans in order to ensure that the Command evolves into a learning organization. The success factors for the core areas will be assessed in terms of pitfalls and lessons learned.

#### 3.10.4.3 KM Activities

- A KM Maturity Model was developed to assess the maturity of the KM practices and capabilities. Five levels (from novice to mature) are used to indicate the maturity of each core

area of KM. Current KM practice reflects a level 2 according to the model.

- Provide KM orientation
- Get people to certify in KM
- Use Community of Practice to consolidate people from 18 different places and provide in-house checklist for locating information
- Use mentoring approach for knowledge transfer.
- Start working with the mid-level personnel (04, 06), who have experience, skills, and know whom to connect with, as KM influencers to others
- Focused on lessons learned (J7), after action review (AAR)
- Advocate use of wiki to improve content through the edit mode and crowd-sourcing

#### 3.10.4.4 Training

An on-boarding process, which consists of the following steps, is in place to support individuals and new hires for internal collaboration and coordination of information and documents. This process provides training for a global understanding of the Command and KM orientation.

- In-Process: complete security and administrative requirements; sign-up for the Start Right Program, new member data sheet, questionnaire, etc.
- Get connected: learn how the Command operates technically and the Command Orientation Program, obtain access to computer systems, websites on all networks.
- Get orientated: learn about the Command, Law of Armed Conflict, Counter Adversary, use of internet, Cyber lexicon, Cyber classification, and knowledge management.
- Get engaged: obtain early career support through frequent interaction with manager and co-workers.

#### 3.10.4.5 Tools

KM is enabled through the use of key information systems and tools that help an organization perform its mission and critical supporting functions (e.g., content management systems, social media, collaboration tools, etc.). The tools are available:

- USCYBERCOM Workflow Management System (SharePoint-based task management system that is introduced in conjunction with newcomers' orientation wikis) with training provided.
- SharePoint (introduced in conjunction with newcomers' orientation) additional training can be obtained through National Security Administration's (NSA)' Training Directorate
- Outlook (email, calendar)
- VTC with training provided
- Secure and non-secure telephone
- Defense Connect Online (DCO)

Each of the tools, with the exception of Outlook, which is used as basic email interface, has additional guidance for use posted on internal network wiki page.

### 3.10.5 KM Website(s)

NIPR: https://www.intelink.gov/sites/uscybercom/KM/default.aspx

https://www.intelink.gov/wiki/United_States_Cyber_Command

https://www.cybercom.mil/default.aspx (CAC required)

## 3.11 COMPACFLT [1-10][11]

### 3.11.1 Definitions

- Knowledge Management (KM) is the integration of people and processes, enabled by technology, to facilitate the exchange of operationally relevant information and expertise to increase organizational performance.
- KM is the art of creating, applying, organizing, and transferring knowledge to facilitate situational understanding and decision making.

### 3.11.2 Purpose

To establish the KM strategy for the Commander, U.S. Pacific Fleet and its supporting operational commands for advancing and sustaining a successful and aligned KM program throughout the Pacific Fleet.

KM will benefit the warfighter by codifying and implementing principles and strategies that leverage information, improve processes, and break stovepipes that impede sharing.

### 3.11.3 KM Direction

COMPACFLT supports the Navy's KM strategy (COMPACFLTINST 5300.9) and will maintain alignment with that strategy.

- Vision:
  - To become a credibly led, combat-ready, and surge-ready fleet that actively and systematically captures, shares, and leverages knowledge in ways that measurably improve productivity and operational performance.
- Mission:
  - The U.S. Pacific Fleet KM Program supports and advances Fleet readiness by educating teams of leaders on the principles of knowledge management as they can be applied to create operational advantage, improve the decision cycle, and more effectively support the warfighter.
- Goals:
  - Shape the leadership and the enterprise by identifying and advocating the purpose of KM.
  - Develop a strategic KM program that aligns with the highest COMPACFLT priority to strengthening warfighting readiness.
  - Put KM in action by applying KM concepts and techniques in task execution to support the Commander's objectives, process improvements for the warfighters, and improved command and control capabilities for operational commanders.
- Principles:

  The following guiding principles are used in KM planning and execution within COMPACFLT and with other stakeholders and external communities.
  - Servant leadership

[11] See Section 8.2, COCOM References.

- Warfighter focused
- Agile
- Networked and aligned
- KM organization and responsibilities

### 3.11.4 KM Framework

The COMPACFLT designates KM positions with responsibility to execute COMPACFLT's KM strategy.

#### 3.11.4.1 KM Organization, Roles and Responsibilities

- KM Organization and Roles:

  Under the direction of COMPACFLT's Chief Knowledge Officer, the KM team, which consists of the following positions, supports all COMPACFLT Commands by providing services related to decision support, process improvement, knowledge and information management, and training:

  - Chief Knowledge Officer (CKO)
  - Knowledge Management Officer (KMO)
  - Deputy Knowledge Management Officer (DKMO)
  - Advisor to the CKO and KMO
  - Operational Knowledge Management Advisor (KMA)
  - Lead Knowledge Management Advisor
  - Knowledge Management Advisors
  - Server Administrator
  - KM System Sustainment Team Lead
  - KM Systems Software Engineer

- Responsibilities:

  The KM team executes the following strategy for supporting and implementing the COMPACFLT's KM vision:

  - Assess and improve information and knowledge flows PACFLT-wide.
  - Expand fleet-wide awareness of KM concepts and assess the effect of KM concepts on overall mission accomplishment.
  - Provide operational support to COMPACFLT, assisting with KM and IM processes and training.
  - Establish working groups to discuss KM and IM issues.
  - Provide findings as lessons learned.
  - Assist server administration.
  - Standardize tools as appropriate.

#### 3.11.4.2 Strategy and Approach

Why KM is needed at COMPACFLT is at the center of the KM strategic planning. This core belief serves as the foundation for establishing the vision, operational plan, and implementation for the KM venture.

The mission of the U.S. Pacific Fleet is to advance Asia-Pacific regional security and prosperity by employing credibly led, combat-ready forces in naval, joint, and combined operations in support of

U.S. Pacific Command. To align with the COMPACFLT mission, the KM leadership identified the following strategic objectives and corresponding activities:

- Provide Commander and Deputy Commander Decision Support:
  - Provide support to Commander's Initiative.
  - Participate in the Maritime Operations Center (MOC) Working Group and coordinate the Knowledge and Information Management Working Group (KIMWG).
  - Support MOC daily operations and real-world events.
  - Support fleet exercises.
- Increase COMPACFLT internal communication and enhance staff processes:
  - Provide educational training, team learning series, seminars, and hands-on workshops.
  - Assist the staff in conducting communication assessments, developing plans, and measuring and reporting its effectiveness.
  - Provide account management and content management support for collaboration tools.
  - Report results of KM assessments and plan status.
- Outreach, experimentation, and innovation:
  - Present KM work in a transparent manner using KM tools.
  - Experiment with the use of social networking/social media tools.
  - Maintain KM blogs.
  - Voice out in Navy, DoD, and other government KM initiatives.
  - Attend and present KM model and best practices at DoD conferences and Command KM training.

The KIMWG, which is a cross functional representation, is led by the KMO and IMO to:

- Identify and process means to meet requirements.
- Address specific challenges or project related to day-to-day Command operations.
- Discuss issues/procedures/tools to address the needs of specific events/exercises.
- Develop resolutions to emerging challenges.
- Train staff personnel on KM.
- Advocate for KM implementation.

#### 3.11.4.3 Training

All staff is required to take the Personal Integrated Knowledge Orientation (PIKO) training, which covers the COMPACFLT's Areas of Responsibility (AOR) mission, and the KM program. People will be knowledgeable about how to access the COMPACFLT Instructions, Knowledge Information Management processes and tools. A detailed KM course checklist was designed to ensure personnel understand the KM concepts and collaborating tools.

#### 3.11.4.4 Tools

The following KM/IM tools are used at COMPACFLT in different situations:

- APAN (KM/IM): used for Humanitarian Assistance and Disaster Relief (HADR) and UNCLASS-only for collaboration with coalition partner.
- Collaboration At Sea (CAS) (KM/IM): portal with various tools used by cross-functional workgroups as well as vertical and horizontal, real-world and exercise information – sharing and authoritative document storage.

- Defense Connect Online (DCO) (KM/IM): for information sharing while lots of knowledge flow and decision communication take place in collaborative meeting spaces.
- Enterprise Knowledge Management (eKM) (KM/IM): for workflow collaboration and routing, document storage, etc.
- INTELINK (KM/IM): for KM conferences (UNCLASS), Knowledge Information Management Plan KIMP (SECRET) and other KM-related documents.
- Navy Knowledge Online (NKO) / Defense Knowledge Online (DKO) (KM/IM): for computer-based training for the Navy and is also used for IM/KM usage with other components.
- Secured Enterprise Access Tool (SEAT) (IM): a dashboard used for single sign-on to various tools.
- SharePoint Portal (IM): for document storage and calendaring; use Axceler's ControlPoint from the technical SharePoint management for SharePoint 2010 migration.
- Total Records and Information Management (TRIM) (IM): a mandated records management tool used by the administrative staff to post official documents.
- Total Workforce Management Services (TWMS) (IM): for personnel records (e.g., training, awards, certificates, muster/accountability).
- Navy Lessons Learned System (NLLIS) (KM/IM): a database on fleet and exercise lessons learned.
- Shared Drive (IM): for storing working documents.

### 3.11.5 KM Website

- NIPR: https://www.intelink.gov/wiki/CPF_N01KM

## 3.12 DIRECTORATE OF INTELLIGENCE (J2)

The primary function of the Directorate of Intelligence (J2) is to support the Commander and the staff by ensuring the availability of reliable intelligence and timely indications and warnings on the characteristics of the operational area. The J2 follows the Joint Intelligence preparation of the operational environment (JIPOE) process and produces intelligence products (e.g., enemy's center of gravity, intensions, Courses of Action (COAs), etc.) to help the JFC and staff better understand the operational environment from the adversary's perspective. The J2 participates in joint staff planning and shares with the JFC, staff, and components the assessment of the adversary capabilities, vulnerabilities, and intentions, and operational situations that can influence the outcome of operations.

Knowledge Management is crucial to the intelligence operations from data collection and exploitation, to analysis, interpretation, and dissemination of the available information and knowledge in order to produce intelligence of predictive estimate of adversary capabilities and intention. The relationship between data, information, and intelligence is depicted in Figure 5 from (Reference [10]).

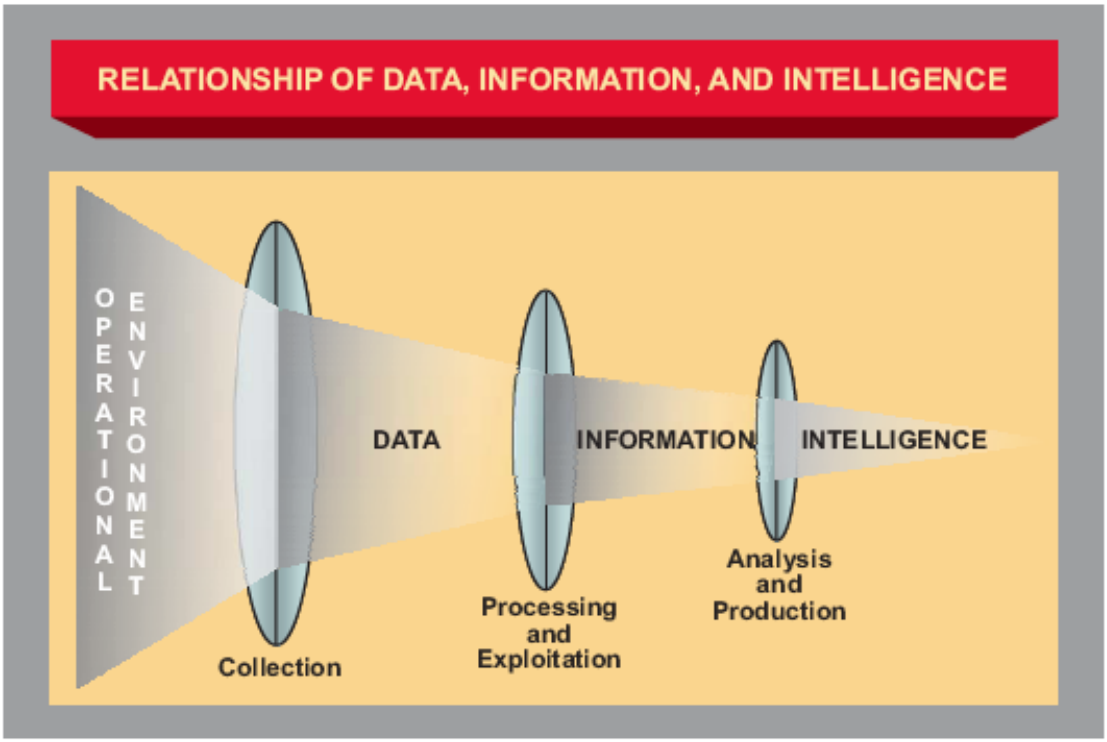


Figure 5. The relationship between data, information, and intelligence.

The J2 frequently deals with incomplete and ambiguous information. Raw intelligence must be combined with related data, significant information must be identified, and extraneous or false material deleted in order to satisfy the Commander's intent.

### Issues

The goal of KM in the J2 is to provide a decision advantage to the Command. To provide a holistic intelligence picture in uncertainty, many issues remain to be addressed:

- Collaboration between J2 and the Command:
  - J2 needs to provide fast and sound data analytics to enable Command analysts, planners, and decision makers to understand the core issues rapidly in addition to meeting the request for information (RFI) requirements from the Command's mission areas.
  - Knowledge sharing between the J2 and other J-Codes is essential in identifying and monitoring the Commander's critical information requirements (CCIRs), Priority Intelligence Requirements (PIRs), and Friendly Force Information Requirements (FFIRs) according to the mission objectives.
- KM Process:
  - The J2 KM is typically a separate entity in the Command. KM processes must be in place to govern knowledge sharing between J2 KM, HQ KM, mission areas, and J-Codes.
- Coordination among Intelligence Community (IC) and Command J2:
  - Collected intelligence from the IC needs to be integrated and shared with the Command J2. Mission areas need to be synchronized with their RFIs in a timely manner.
- Secure multi-domain and cross-organizational knowledge sharing:

- Security and sharing are often at odds. Protocols for secure knowledge sharing must coexist with methods for sharing information of different security classifications. Significant problems outlined in the following scenarios need to be addressed:
  - There are no adequate mechanisms to filter the information of higher security classification within a document without losing its meaning with respect to the entire document when passing it to receivers who have a lower security classification.
  - Sending information across networks of different security classification without a well-defined cross domain solution can result in inconsistent/incomplete content.

# 4. COCOM KM ISSUES AND RECOMMENDATIONS

Most Commands follow a similar KM definition. The KM teams have a general idea of where problem areas exist in the Command and are taking steps to address them. However, often the KM missions are being carried out slowly due to organizational barriers in the Command. Many of the COCOMs are dealing with similar issues, which are categorized below.

## 4.1 ISSUES AND BARRIERS TO KM

### Command Level

- Leadership does not actively support KM. If leadership does not consistently demonstrate and communicate that knowledge sharing is essential and has a high priority, then the workers will not care.
- KM is positioned in the organization such that it is not taken seriously.
- Frequent turnover of personnel creates inefficient knowledge flow. There are no adequate mechanisms for collecting, organizing, and retaining knowledge.
- Collaboration among mission areas is difficult due to:
  - Misaligned goals
  - Competition and power struggles among them
  - Incompatible collaboration policies
  - Lack of or inadequate process for collaboration

### Team KM Level

- The value of KM to both personnel and leadership is poorly demonstrated.
- Lack KM training for the KM team and the Command.
- SharePoint is often misused. Policies are either not in place, misunderstood, or ignored.
- Lack evaluation and coordination of KM and IM tools among directorates and their training prior to use.

### Individual Level

- Lack of trust.
- Unwilling to share.
- Lack understanding of how sharing of their knowledge could align with mission requirements.
- Lack of proper training on tools and guidelines for information sharing, including what to share and NOT to share, whom to share with and NOT to share with.
- There are no adequate tools for easy access, search, and discovery of Command information.
- Information/knowledge sharing is difficult because information systems were not designed for collaborative use. Extra efforts will be required to consolidate collected information from multiple systems.

### Inter-organizational Level

- Knowledge sharing among the KM teams in COCOMs takes place via DCO chat in the

DCO_KM_COI chat room, where a considerable amount of knowledge capturing and sharing occurs. It would be desirable for the chat room moderator to assign/propose topics for discussion and provide a discussion summary in addition to the current ad-hoc chatting.

- Collaboration among COCOMs is difficult due to diverse cross-organizational cultures and the lack of an explicit process.

## 4.2 RECOMMENDATIONS

### Command Level

- Paradigm change

  KM is a fundamental shift in strategic paradigm. Moving from "need-to-know" to "need-to-share" while still supporting "need-to-know" policies requires commitment from the entire Command. The COCOMs needs to foster a cultural change within the organization from collecting and controlling information to a culture of sharing information.

- Actively motivate participation in information sharing.

  Incorporate monetary and other rewards for information sharing. Recognize employee efforts to improve information sharing across directorates.

- Create an infrastructure incorporating information and knowledge management.

  Data, information, knowledge, and wisdom are intrinsically related in supporting understanding of situations. Current dispersed islands of information or knowledge have caused confusion and inefficient access of the required information for mission planning. It is necessary to develop a central knowledge base based on a conceptual model of the enterprise for storing, sharing, and sorting files with search functions, to be available anywhere to support the Command's mission.

- Incorporate KM policies into the COCOM general TTP (tactics, techniques, and procedures) and ensure they are consistent with the other related COCOM policies.
- Incorporate KM basic training in COCOM personnel training program.

### Team KM Level

- Persistency in pursuing KM

  KM is an evolutionary effort. Over time, as KM evolves and begins to reflect the values of the organization, KM can become a part of the organizational culture. Therefore start the effort as soon as possible and pursue it with persistence.

- Trust building

  Continue to promote trust building starting with small-scale activities to develop connections across the Command.

- Establish Community of Interest/Practice and collaboration.

  To establish an infrastructure for knowledge sharing, develop Communities of Interest/Practices and assign people to them according to their roles in mission requirements, and establish mechanisms for collaboration with ensured accountability.

- Maximize SME's knowledge capability.

Coordinate with SMEs and distribute them among Communities of Interest/Practice to provide opportunities for knowledge exchange on specific topics. Designate KM representatives to serve as moderators within and across the communities.

- Integration of portals

  Integrate all Command portals and establish relationships among them based on the Command's enterprise information architecture.

- Provide easy log-in to multiple related systems.

  Evaluate and streamline tools for implementation of single user, or single-system log-on for multiple systems based on user profile, roles, and access permission.

- Overcome information overload with knowledge services.

  Information overload is a common problem. Tools that were intended to increase efficiency and decrease confusion can actually have the reverse effect. Possible strategies resolving information overload include developing a set of consistent knowledge services in capturing and codifying knowledge with efficient information management practice to address how to store, sort, prioritize, summarize, and search relevant information according to the enterprise information architectural design.

- Design plan for collecting ongoing retained knowledge.

  To retain knowledge due to turnover, exit interviews can be used to collect the knowledge accumulated and lessons learned from the people who change jobs or retire. However, it could be quite difficult for the prospective retirees to provide their reflection of their entire career life right before their retirement.

  One approach would be to develop methods to capture their experience and knowledge during their tenure through lessons learned systems and after action reviews of events such as exercises, special Command events, projects, promotion, etc. Designated KM representatives would monitor the activities and post lessons learned and follow-on actions to the Command portal for knowledge sharing.

- Conduct KM case studies in exercises.

  Exercises are often designed for specific scenarios, which trigger the participants to perform collaborative tasks. Accomplishing the tasks requires discussions, active knowledge sharing, and information exchange. It offers an opportunity to collect baseline statistics of the KM activities. We may consider collecting data on the following by means of a system log or an application:

  - Who shares (initiate, respond) information?
  - What are the subjects of discussion?
  - What mechanisms or which systems are used to share information?
  - What were the meetings conducted?
  - What emails and attachments were exchanged, with whom?
  - Which social networking tools were used?
  - What were the RFIs?
  - What are the entries entered in JLLIS?

  After performing analysis of the collected data, the results can be used for establishing baselines and measures of KM activities in addition to follow-on exercise planning.

### Individual Level

- Adapting social networking behaviors

  Adapt personal social networking behavior to the work environment within a specific scope. People are more and more depending on the internet to get information via search engines and to share/post information by means of email and social networking tools. If the social networking environment at work is similar to the individual's, it would cause less reorientation for people to adapt to the information-sharing scenarios at work. The major difference would be the scope of information exchange at work focusing on the Command's mission requirements.

  Conduct a survey of personal use of social networking and provide training on mapping personal tools to work environment tools. This would help people expand their information-sharing behavior without reorientation. Results can be used to reduce resistance of others to information sharing, and motivate those who are not yet involved in information sharing.

- Training

  Provide educational programs that include training of KM and tools and provide for specific KM training.

### Inter-organizational Level

- Global synchronization and collaboration

  In responding to multiple crises in the future, coordination and collaboration among functional and geographic COCOMs to accomplish their supported and supporting roles must be improved. The Commanders need to be aware of the information critical to each of the Component Commands integrated in a manner to provide a global picture in order to support the supported Command. The KM organization should strive for seamless interoperability within the Command's knowledge base as well as across the other COCOMs.

# 5. RESULTS AND RECOMMENDATIONS FOR USSTRATCOM

The following findings are based on interviews, observations, and other meetings conducted at USSTRATCOM by the authors in 2011-2012. This information has been supplemented with results from a comprehensive USSTRATCOM research paper on information sharing completed in 2011 (Reference [7])[12].

The focus of the KM effort at USSTRATCOM is on shared awareness as demonstrated by the team's title "Enabling Shared Awareness (ESA)." The goal is to achieve shared awareness across the Command by integrating people, process, and technology, which will facilitate situational awareness, decision making, and mission execution at all levels.

Since at least 2006 there have been several attempts at establishing a KM program at USSTRATCOM. There have been several successful endeavors, but most have had short-term impact. These results can be traced back to a large extent to a lack of consistent KM policy and support from senior leaders.

Although personnel at USSTRATCOM understand the purpose of the Command mission is to keep our country safe, they often do not see how their contributions to information sharing impact either the success of the mission or their individual goals. This scenario is common to the COCOMs. When the value of their work and products are not realized, it is difficult to gain a feeling of unity of effort and purpose across the J-Codes. Thus, people are much less likely to feel the need for KM and information sharing.

## 5.1 GENERAL OBSERVATIONS

The following are observations from a sampling of USSTRATCOM personnel, which reveal that people are generally unaware or lack understanding of:

- The concept of USSTRATCOM as a unified enterprise, which provides a sense of belonging and personal commitment to the Command.
- The impact or value of their work for the Command.
- Who could use the result of their work.
- How one's work fits in with 'other people's projects.
- Location of information and how to find it efficiently.
- How to find expertise in the Command.
- SMEs' role with respect to information exchange among Communities of Interest/Practice.
- The Command's strategic plan, goals, and objectives.
- The relevance of the Command's business processes to their daily operations.
- Relationship among the B2C2WGs and the products they produce.

The USSTRATCOM's 2011 information-sharing research paper produced the following insightful results. Although the sample size was relatively small (117 respondents), it represented a cross-section of the entire Command.

[12] See General References, Section 8.1.

### Tools and Technology

- Less than half of the respondents thought that additional tools for information sharing would help with future collaboration. However, research showed that new tools are not always created with the user in mind and personnel are not given adequate training or time to acclimate to new tools.
- People frequently have become overwhelmed with too many tools that lack consistent implementation and use policies.
- Individual divisions and directorates have created their own tools, which are incompatible with each other. This has resulted in less collaboration.
- A large percentage of USSTRATCOM's enterprise knowledge resides on shared network drives, which are not available to the component Commands.

### Information Sharing

- 92% of respondents said that they share information. 93% thought that enhancing the culture would increase information sharing. Clearly people believe that information sharing needs to be increased, but there may be a disagreement on what constitutes sharing.
- 69% considered information sharing a problem. Only 31% believed the directorates collaborate well with one another. The study found that there is a presence of knowledge silos coupled with a lack of trust between directorates. Rivalries create situations where there is not just a lack of information sharing, but general dislike as well.
- Employees still hoard information to ensure recognition from leadership and/or job promotion. There needs to be a consistent KM policy with active support from senior leadership for this to begin to change.
- Information sharing needs connectivity and interoperability. However, the policies at USSTRATCOM limit interoperability and information sharing between the Directorates.

### SKIWeb (Strategic Knowledge Integration Website)

SKIWeb was developed in 2004 to help the USSTRATCOM Directorates better communicate. It was intended to create a way for any member of USSTRATCOM, regardless of rank or position, to share information with the Commander and Command personnel. Many people within the Command valued SKIWeb's capacity to facilitate rapid information flow and ideas directly to the Commander.

Complaints about the accuracy of SKIWeb's content, and untimely sharing of information resulted in a change to SKIWeb's role. It is no longer used to facilitate direct contact with senior leadership. Administrators now regulate content published on SKIWeb and employees are not authorized to post all questions and concerns. This has caused SKIWeb to become a message board instead of a place to share and discuss current issues.

Personnel who posted and received feedback from the Commander were intrinsically attached to the success of the Command because they understood that their ideas and the information posted were part of the big picture solution. Therefore, the challenge remains in maintaining accurate and useful content in SKIWEB.

## 5.2 RECOMMENDATIONS

Recommendations for COCOM KM planning and implementation described in Section 4 are applicable to USSTRATCOM. The following recommendations are specifically for the USSTRATCOM KM team.

### Approach

- Stay positive, agile, and flexible.
- Ensure that every member of the KM team be trained in KM processes.
- Use a project approach – Select KM projects that can be fielded or show results in 6 to 12 months. A small effort can have a large impact if selected correctly.
- Start with the basics – Begin with projects designed to facilitate greater collaboration among personnel that normally work together.

### Activities

- Create an organization profile/makeup for executing and supporting the Command's objectives across J-Codes.
- Establish Community of Interest/Practice for the Command according to Unified Command Plan (UCP) missions based on the organization profile.
- Organize the SMEs based on their roles in mission areas to serve as active knowledge clusters for the Command.
- Identify the Command's knowledge assets and knowledge gaps.
- Designate people to be in charge of Communities of Interest/Practice to plan for topics of discussion, summarize discussions, and post results to portals.
- Work with the IM group to develop a repository design according to a conceptual model of the Command prior to implementation. Alternatively, reengineer the current repository to an active conceptual model to be used as blueprints for subsequent repository and change development.
- Focus on key mission needs – Target key areas obtained by a survey of senior leaders and/or a knowledge audit. For example, focus on the KM processes and procedures associated with responding when a CCIR is triggered. KM can narrow the gap between relevant information the Commander requires and the relevant information he has.
- Embed sound, repeatable knowledge processes and activities into daily actions that improve people's working environment.

### Redesign SKIWeb

SKIWeb needs to return to an open, Command-wide tool for information exchange. Designated personnel could serve as a mediator to monitor activities and their relationships to provide a repository reflecting the current and historical Command states. Potential modifications to SKIWeb that would allow everyone to contribute include:

- Design naming convention guide for SKIWeb entries, to include contributor's identity, Community of Interest, mission areas, projects, content type, etc.
- Provide a means for people to provide comments and suggestions.
- Track action items relevant to KM/IM and make new procedures known to the Command.

# 6. CONCLUDING REMARKS

While knowledge and information sharing occurs continuously at the COCOMs, it is frequently in an unorganized and uncoordinated manner. Knowledge management struggles to demonstrate its value for a variety of reasons related to both the organization and the people.

As KM training, processes, and technologies mature, the real value of KM will become apparent when people recognize the value of KM to themselves and the organization, and it becomes part of the daily operations.

In the future, KM in DoD will be integral to operations. Warfighters will expect to be able to not only collaborate, search, and share information, but to also be involved in solution development that is visible across the Command. The intentions of the Commander will be understood, and proactive information gathering and sharing will be expected. Properly designed, implemented, and deployed KM processes and technologies will enable these advances.

Capabilities available to the warfighter through well-designed KM processes and technologies will directly support mission areas, lines of operation, and objectives, both strategic and operational. KM systems will evolve from simple information storage and search systems to systems that provide situational understanding for command and control. The value of KM in the future will be in solving the problem of how to dynamically collect and organize information in a way that is relevant to the Commander's decision process.

## 6.1 THE FUTURE ROLE OF KNOWLEDGE MANAGEMENT IN SHARED AWARENESS IN COMMAND AND CONTROL

Command and control (C2) is a key function of Joint Force Commanders (JFCs) and their staff in joint decision making. Joint planning and execution relies on situational understanding and collaborative information and knowledge sharing in each step. The ongoing central process of the Commander's Appreciation and Operational Design constructs a framework for understanding the mission and the mission's operational environment (Figure 6).

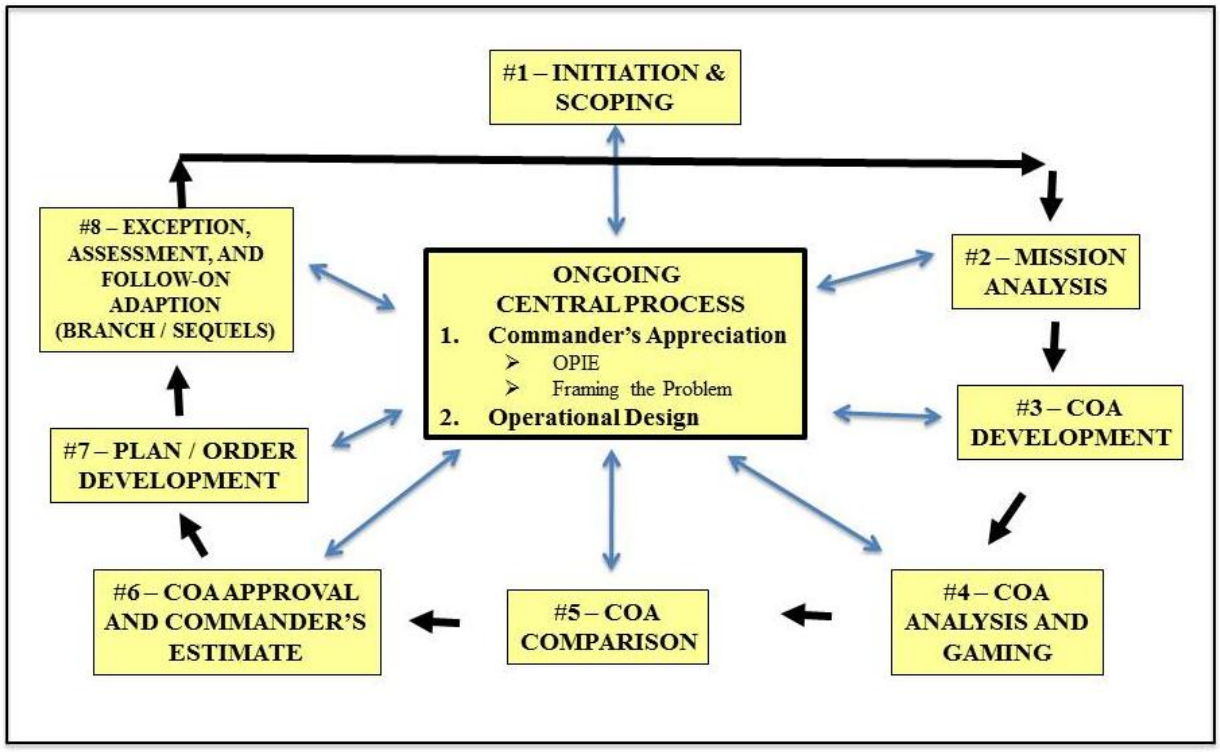


Figure 6. Ongoing central process in joint decision making.

The operational design process requires effective communication between all involved parties in a collaborative environment to gather and assess information from inside and outside of the Command in order to create a shared understanding of the situation so that appropriate strategies can be developed and actions taken.

Continuous situational awareness and monitoring are necessary in order to allow the Commander to further understand the problem and situation and detail his intent for the mission objective throughout the planning cycle.

Integrated information and knowledge sharing in a collaborative environment directly supports situational awareness, understanding, and monitoring, which underpins the joint decision making process as shown in Figure 7 (from Reference[8][13]).

[13] See General References, Section 8.1.

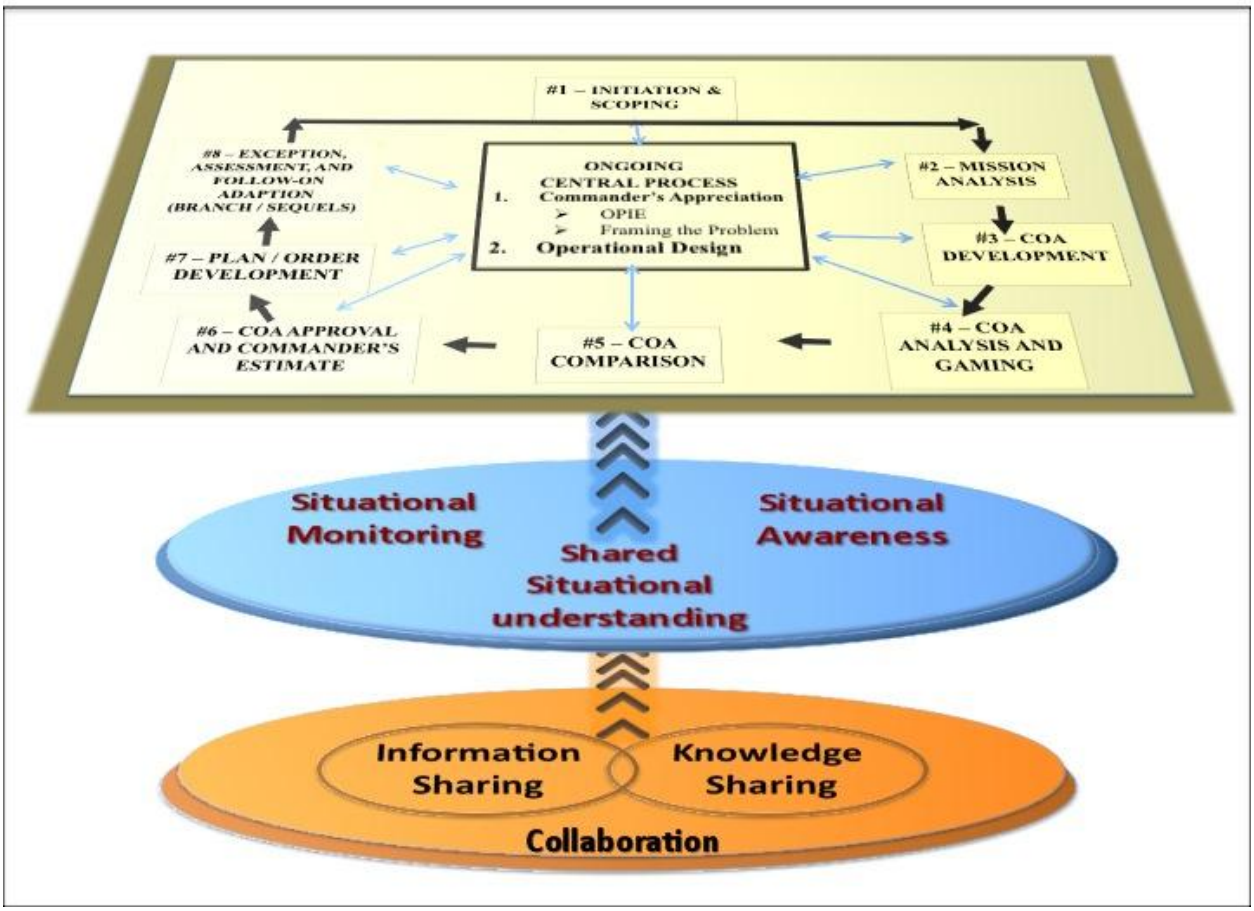


Figure 7. Relationship between knowledge management and the joint decision-making process.

### 6.2 THE ROLE OF KM IN CREATING SHARED UNDERSTANDING FOR DECISION MAKING

Decisions are the most important products of the C2 function as they guide the force forward to accomplish objectives and missions. Decision making needs information, knowledge, and wisdom in a continuum. The key challenge is how to dynamically collect, organize, and present information in a way that is relevant to the Commander's decision process. Knowledge sharing, a primary focus of KM, directly supports decision making by framing the problem, establishing the strategic context and assumptions, identifying knowledge gaps, and enabling planning execution.

#### 6.2.1 Common Operational Picture (COP)

Knowledge sharing is a key enabler of situational awareness (SA), the perception and comprehension of environmental situations and events. In operational environments, SA depends on a common operational picture (COP), which displays the relevant information shared across echelons and Command(s) to facilitate collaborative planning. Given the shared nature of the COP and the fundamental principle of shared understanding in KM, the effectiveness of any COP can be assessed by determining how well it complies with the KM principles, practices, and methods outlined in this report.

Furthermore, today's C2 systems are providing an increasing amount of information that can be injected into the COP. This calls for additional adherence by the COP to the principles of information

quality. Specifically, in order to effectively support shared understanding among COP users, the information it displays must be accurate, mission-context relevant, timely, usable, complete, concise, and secure. Additional desirable attributes include source and validator identification and an estimate of its useful "shelf life."

Current COPs are often composed of unrelated dispersed information, resulting in unfocused awareness, which could greatly impact the Commander's decision. COPs are mostly built on an outdated "information warehousing" paradigm where information is poorly organized and validated. The information is difficult to search and is of marginal relevance to decision makers.

There are no adequate mechanisms for integrating information and shared knowledge to be available on the COP during operation planning. By complying with the fundamental KM principles, the COP will be improved in that situation uncertainty, ambiguity, and information glut are all reduced. These improvements, in turn, increase the ability of the warfighter to quickly apprehend new emerging threats that might otherwise become lost in the information "noise."

### 6.2.2 KM in the Next-Generation COP

The next-generation COP will be a visual, real-time KM system that supports joint processes for distributed collaborative planning and execution across the full range of military operations on a global scale. In addition to supporting shared understanding of the situation/problem from different levels of decision making (i.e., strategic, operation, tactical), the COP will become a central point in monitoring and assessing information and knowledge about ongoing operations, the CCIRs, Priority Intelligence Requirements (PIRs), and Friendly Force Information Requirements (FFIRs) in order to execute the Commander's intent.

The future operating environment will be defined by complexity, uncertainty, change, and persistent conflict as outlined in the Capstone Concept for Joint Operations (Reference[11])[14]. This leads to the following challenges for KM practitioners who will incorporate KM into the COP:

- Multi-Perspective Integration

  The future COP will need to support multi-perspective joint planning because the Commander's situational understanding depends on information from a variety of sources (e.g., supported and supporting COCOMs, Service components, foreign entities, etc.) and perspectives that have been validated and integrated. Knowledge-flow from all levels of operations must be synchronized to create situational understanding using capabilities that enable collaboration and information exchange among dispersed forces.

- Mobility

  Recognizing that mobile devices will increasingly dominate the information market, integration of information and knowledge from multi-sources to provide a secure "real-time" mobile COP in a changing environment will be the key challenge in the near future.

- Continuous Situational Monitoring

  Today's COP implementation is based on a snapshot approach. The display represents a snapshot of the current situation and its related activities. However, it does not capture the continual changes in the snapshot and between the moving snapshots. Therefore, information about the changing situation over time is not fully captured. The missing temporal information results in many dynamic knowledge gaps.

[14] See General References, Section 8.1.

The future COP needs to represent historical information, which is crucial for situational monitoring. It should provide capability for monitoring the CCIRs with respect to the changing events, trend analysis, dynamic simulation of "what if" scenarios based on past information and current state, generation of lessons learned, etc. Additionally, automatic alert generation based on predefined conditions could be sent to the appropriate parties. The COP will not only help fill many knowledge gaps during mission planning, it will also provide a learning environment where sharing and exchange of knowledge and information among decision makers will be stimulated and captured.

# 7. KNOWLEDGE MANAGEMENT RESOURCES

## 7.1 CONTACTS

### DoD-COCOM KM Program Leads – FY12-13

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## 7.2 KM WEBSITES

| Name | Website | Remark |
|---|---|---|
| ACM Digital Library (ACMDL) | http://dl.acm.org/citation.cfm?id=1926620 | |
| APQC (American Productivity and Quality Center). | http://www.apqc.org/knowledge-management<br><br>Registration: http://www.apqc.org | CAC and NMCI not required |
| Army Operational Knowledge Management<br>(US Army Combined Arms Center) | http://usacac.army.mil/cac2/AOKM/ | |
| Association for Information Systems (AIS) | http://ais.affiniscape.com/displaycommon.cfm?an=1&subarticlenbr=269 | |
| DON KM Quarterdeck | https://www.intelink.gov/sites/donkmquarterdeck<br><br>Intelink Registration: https://www.intelink.gov/passport/register.flow?execution=e1s1 | CAC not required, NMCI required (Unless you have a DNI-U Remote Access (http://ra.intelink.gov)) |
| e-knowledge center | http://www.eknowledgecenter.com/ | |
| Federal Knowledge Management Working Group | http://wiki.nasa.gov/cm/wiki/?id=1926 | |
| IEEE Technology Navigator | http://technav.ieee.org/tag/1010/knowledge-management | |
| InsideKnowledge | http://www.ikmagazine.com/ | |
| INTECH | http://www.intechopen.com/books/new-research-on-knowledge-management-models-and-methods | |
| Joint Knowledge Management | https://www.intelink.gov/sites/kmconf/default.aspx | |
| Joint KM Working Group (WG) | https://www.intelink.gov/homepage/intelshareforward.html<br><br>https://intelshare.intelink.gov/sites/kmconf/KMJCW/default.aspx | CAC or Intelink login required |

| Name | Website | Remark |
|---|---|---|
| KM Basics | http://www.skyrme.com/resource/kmbasics.htm | |
| KM Glossary (US Army Combined Arms Center) | http://usacac.army.mil/cac2/AOKM/Glossary.asp | |
| KM Impact Challenge | http://kdid.org/kmic http://kmimpactchallenge.wikispaces.com/ | |
| KM in the DoD | http://www.slideshare.net/joannhague/kmdodhoopengardnerhague | |
| KM Institute | http://www.kminstitute.org/ | |
| KM Links | http://www.skyrme.com/resource/kmres_links.htm | |
| KM Magazines | http://www.skyrme.com/resource/kmres_mags.htm | |
| KM Network | http://www.kmnetwork.com/ | |
| KM Professional Society wiki | http://en.wikipedia.org/wiki/Knowledge_Management_Professional_Society http://en.wikipedia.org/wiki/Knowledge_Management_Professional_Society | |
| KM wiki | http://en.wikipedia.org/wiki/Knowledge_management | |
| KM.Gov | http://www.km.gov | CAC and NMCI not required |
| KMCI (Knowledge Management Consortium International) | http://www.kmci.org/ | |
| KMPro (Advanced Professional Certification Program) | http://www.kmpro.org/ | |
| Knowledge Board | http://www.knowledgeboard.com/ | |
| Knowledge and Innovation Network (KIN) | http://www.ki-network.org/ | |
| Knowledge Management & E-Learning: An International Journal (KM&EL) | http://www.kmel-journal.org/ojs/index.php/online-publication | |
| Knowledge Management in Education | http://www.iskme.org/ | |
| Knowledge Management Online Open Source KM | http://www.knowledge-management-online.com/ | |
| Knowledge Management Research & Practice | http://www.palgrave-journals.com/kmrp/index.html | |

| Name | Website | Remark |
|---|---|---|
| Knowledge Nature | http://www.knowledge-nurture.com/ | |
| Knowledgestorm | http://www.knowledgestorm.com/ | |
| MilSuite (US Government Information Systems) – account/CAC required | https://www.milsuite.mil/login/Login?goto=https%3A%2F%2Fwww.milsuite.mil%3A443%2F | |
| Open Journal of Knowledge Management | http://www.community-of-knowledge.de/en/open-journal-of-knowledge-management/ | |
| Orion Knowledge Networks | http://www.inteng.com.au/ | |
| The KNOW Network | http://www.knowledgebusiness.com/ | |

### 7.3 KM TOOLS

| Name | Website | Requirements |
|---|---|---|
| Air Force Blue Tube (YouTube Presence) | http://www.youtube.com/afbluetube | |
| Air Force Knowledge Now (AFKN) | https://afkm.wpafb.af.mil | CAC required<br>Registration required |
| Air Force Portal | https://www.my.af.mil | |
| Army Knowledge Online (AKO)/Defense Knowledge Online (DKO) | https://www.us.army.mil | |
| All Partners Access Network (APAN) | https://community.apan.org/<br><br>Registration:<br>https://passport.apan.org/passport/join.aspx | CAC and NMCI not required |
| Cheeky_geeky on Twitter | | |
| Defense Connect Online (DCO) | https://www.dco.dod.mil<br><br>Registration:<br>https://www.dco.dod.mil/public/dsp/verifyCAC.cfm | CAC required, NMCI not required |
| Defense Knowledge Online (DKO) – DoD version of AKO supporting DoD users | https://www.dko.mil<br><br>Registration:<br>https://www.us.army.mil/suite/pages/reg/startRegistration.ext | CAC and NMCI not required |
| DoD Live (Blogging) | http://www.dodlive.mil | |
| TroopTube (DoD's response to YouTube) | http://www.trooptube.tv | CAC required |
| Financial Management Knowledge Management | https://afkm.wpafb.af.mil/fmkm | CAC required<br>Registration required |
| Federal KM Working Group (KMWG) | http://KM.gov | |
| Intelink | https://www.intelink.gov<br>Registration:<br>https://www.intelink.gov/passport/register.flow?execution=e1s1 | CAC not required, NMCI required (Unless you have a DNI-U Remote Access (http://ra.intelink.gov)) |
| Joint Knowledge Online | Public:<br>http://jko.cmil.org<br>Unclass NIPR: | |

| Name | Website | Requirements |
|---|---|---|
| | http://jko.jfcom.mil<br>Classified<br>http://jko.jwfc.jfcom.smil.mil | |
| MarineNat | https://www.marinenet.usmc.mil/MarineNet/default.aspx | |
| milSuite | https://www.milsuite.mil<br><br>Registration: not required | CAC required, NMCI not required |
| Navy Forces Online (NFO) | https://www.portal.navy.mil<br><br>Registration: https://www.portal.navy.mil/registration/default.aspx | CAC required, NMCI not required |
| Navy Knowledge Online (NKO) | https://wwwa.nko.navy.mil<br><br>Registration:<br>https://wwwa.nko.navy.mil/gear/profilemanager/html/registerPart1.jsp | CAC and NMCI not required. |
| U.S. Army / Facebook | http://www.facebook.com/USarmy | |

### 7.4 COCOM TOOLS

The following is a list of IM/KM tools in use at the COCOMs compiled from documents and discussions with the KM teams.

AKO/DKO (Army Knowledge Online / Defense Knowledge Online)

AMHS (Automated Message Handling System)

APAN (All Partners Access Network)

CAS (Collaboration at Sea)

CDCF (Commander's Decision Cycle Framework)

DCO (Defense Connect Online)

DCO IM/XMPP (DCO Instant Message/XMPP)

DHS Tool (Department of Homeland Security)

DSEL (Dynamic Synchronization Event Log)

eKM (Enterprise Knowledge Management)

Email

GCCS (Global Command and Control System)

Group Chat

HSIN (Homeland Security Information Network)

IWS (Information Warning System)

Intelink

Intellipedia

Intelink Instant Message

Intelink Blog

Intelink Passport

iVideo

JLLIS (Joint Lessons Learned Information System)

JTIMS (Joint Training Information Management System)

Master Events Calendar

MSC (Master Strategic Calendar)

Microsoft Lync

Microsoft OCS (Microsoft Office Communication Server)

Microsoft Outlook

Microsoft Outlook Calendar

Microsoft SharePoint

Microsoft SharePoint Search Engine FAST (Fast Search and Transfer System)

Microsoft SharePoint Workflow Management System

MilSuite

NCES (Net-Centric Enterprise Services)

NLLIS (Navy Lessons Learned Information System)

NKO/DKO (Navy Knowledge Online / Defense Knowledge Online)

Phone (secure & non-secure)

SEAT (Secured Enterprise Access Tool)

Share Drive

SKIWeb (Strategic Knowledge Integration Website)

Tandberg

TMT (Task Management Tool)

TRIM (Total Records & Information Management)

TSCMIS (Theater Security Cooperation Management Information System)

TSMIS

TWMS (Total Workforce Management System )

Virtual meeting

VTC (Video Teleconferencing)

Web Portal

Wiki

### 7.5 KM TRAINING

| Name | Website |
|---|---|
| Air Education and Training Command – Lessons Learned | http://www.au.af.mil/au/awc/awcgate/awc-lesn.htm#stratcorp |
| Certified Knowledge Manager (CKM) Workshop<br>Toronto, ON<br>Feb 6, 2013 | http://www.kminstitute.org/certified-knowledge-manager-ckm-workshop-toronto |
| Certified Knowledge Manager (CKM) Workshop<br>Washington, DC | http://www.kminstitute.org/certified-knowledge-manager-ckm-workshop-washington-dc-2 |
| KM Institute | http://www.kminstitute.org/cms/content.jsp?id=com.tms.cms.section.Section_d682b3a0-ac1020f0-e280ec00-89d072b6 |
| Knowledge Management Certification Board | http://www.eknowledgecenter.com/ |
| Knowledge Management Courses Online at Stanford Management Science and Engineering Certificate, Stanford University | http://scpd.stanford.edu/ppc/knowledge-management-courses.jsp?_vsrefdom=Adwords-Other&gclid=CO6IjfmDrLMCFQtxQgodhUMAOg |
| Knowledge Media Institute, Open University | http://kmi.open.ac.uk/ |

| Name | Website |
|---|---|
| Knowledge Science Institute (KSI) | http://penta.ufrgs.br/edu/telelab/10/ksi.htm |
| Lancaster University Management School | http://www.lums.lancs.ac.uk/masters/MAHRMandKM/ |
| Kent State University Master of Science in Information Architecture and KM (IAKM) | http://www.kent.edu/slis/programs/master-of-science-in-information-architecture-and-knowledge-management-iakm.cfm<br>http://iakm.kent.edu/ |
| SharePoint Training | http://www.topsharepoint.com/upcoming-sharepoint-conferences |
| U.S. Army Combined Arms Center – Army Lessons Learned | http://usacac.army.mil/cac2/call/index.asp |

## 7.6 KM AND IM JOURNALS

**Websites for Knowledge Management and Information Management Journals**

| Name | Website |
|---|---|
| Electronic Journal of Knowledge Management (EJKM) | http://www.ejkm.com/main.html |
| Information and Knowledge Management | http://www.iiste.org/Journals/index.php/IKM |
| Interdisciplinary Journal of Information, knowledge, and Management (IJIKM) | http://www.informingscience.us/icarus/journals/ijikm |
| International Journal of Applied Knowledge Management | http://www.managementjournals.com/journals/km/index.htm |
| International Journal of Data Mining and Knowledge Management | http://airccse.org/journal/ijdkp/ijdkp.html |
| International Journal of KM (IJKM) | http://www.igi-global.com/journal/international-journal-knowledge-management-ijkm/1083 |
| International Journal of Knowledge and Learning | http://www.informatik.uni-trier.de/~ley/db/journals/ijkl/index.html |
| International Journal of Learning and Intellectual Capital | http://www.inderscience.com/jhome.php?jcode=ijlic#moredesc |
| Journal of Information & Knowledge Management (JIKM) | http://ideas.repec.org/s/wsi/jikmxx.html |
| International Journal of Knowledge Management Studies | http://www.ingentaconnect.com/content/ind/ijkms |
| Journal of Information & Knowledge Management (JIKM) @ World Scientific | http://www.informatik.uni-trier.de/~ley/db/journals/jikm/index.html |
| Journal of Information and Knowledge Management | http://www.worldscientific.com/worldscinet/jikm |

| Name | Website |
|---|---|
| Journal of Information and Knowledge Management Systems | http://www.emeraldinsight.com/products/journals/journals.htm?id=vine& |
| Journal of Intellectual Capital | http://www.emeraldinsight.com/journals.htm?issn=1469-1930 |
| Journal of Knowledge Management | http://www.emeraldinsight.com/products/journals/editorial_team.htm?id=jkm&PHPSESSID=552jm8lva6879804o6o434npr4 |
| Journal of Knowledge Management Practice | http://www.tlainc.com/boutjkmp.htm |
| Journal of Knowledge Management, Economics and Information Technology | http://www.scientificpapers.org/ |
| Journal of Organizational Knowledge Management | http://www.ibimapublishing.com/journals/JOKM/jokm.html |
| Knowledge Management Research and Practice | http://www.palgrave-journals.com/kmrp/index.html |
| The Learning Organization | http://www.ingentaconnect.com/content/mcb/119 |

## 7.7 KM AND IM CONFERENCES

| Name | Website |
|---|---|
| APQC's Annual Knowledge Management Conference & Training | http://www.apqc.org/events<br><br>http://www.apqc.org/2012-knowledge-management-conference-and-training-recap<br><br>https://www.thecsiac.com/event/apqcs-2013-knowledge-management-conference |
| Conference on Information and Knowledge Management (CIKM) | http://www.cikmconference.org/<br>http://www.cikm2013.org/ |
| Conferences and Meetings on Information & Knowledge Management | http://www.conference-service.com/conferences/knowledge-management.html |
| European Conference Knowledge Management (ECKM) | http://academic-conferences.org/eckm/eckm-home.htm<br>http://www.clocate.com/conference/14th-European-Conference-on-Knowledge-Management-ECKM-2013/16379/ |
| Government Information and Analytics Summit (GIAS) | http://www.govinfosummit.com/Events/2012/Home.aspx<br>http://www.govinfosummit.com/presentations |
| International Conference on Information and Knowledge Management (ICIKM) | http://www.icikm.org/ |

| Name | Website |
|---|---|
| International Conference on Information, Process, and Knowledge Management (eKNOW) | http://www.iaria.org/conferences2013/eKNOW13.html |
| International Conference on Knowledge Management and Information Sharing (KMIS) | http://www.kmis.ic3k.org/ |
| KM Conferences | https://sites.google.com/site/stangarfield/kmconferences |
| KMIS 2013 | http://www.kmis.ic3k.org/ |
| KMWorld 2013 | http://www.kmworld.com/ |
| Knowledge and Information Management Conference (KIM) | http://www.theorsociety.com/Pages/Conferences/KIM2013/KIM2013.aspx |
| Knowledge Management and Enterprise Solutions Conference | http://www.kmworld.com/conference/2012/ |
| Knowledge Management Resources | https://sites.google.com/site/stangarfield/home |

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# 10. GLOSSARY [15][15]

## Knowledge Management Glossary

### *Knowledge Research Institute, Inc. and Other Sources.*

**A**

**Abductive Reasoning:** A special case of inductive reasoning resulting in specific assertions that imply the available information in context of the background knowledge without logical certainty. Example: *Premise:* "Those dogs are mastiffs." *Background knowledge:* "All Erik's dogs are Mastiffs." *Hypothesis:* "Perhaps those dogs are Erik's."

**Acquisition:** (Also see Knowledge Acquisition) Knowledge may be acquired and represented for inclusion in a knowledge model. Acquisition can be performed by eliciting knowledge from a domain expert, inducing knowledge from examples, porting knowledge from databases, and by other methods.

**Action Space:** The realm, the "space," within which a person – or enterprise – is competent, willing, comfortable or otherwise prepared to make decisions and act. The Action Space is not a passive domain with fixed boundaries. It is formed by the creative capabilities, methodologies and attitudes, mentalities and motivations that allow actors to perform regular tasks and consider novel actions and innovate within the boundaries of what they find to be permissible and acceptable and is closely related to what is considered to be allowable.

**Actor:** An agent that perform actions – predominantly a person but can be an organizational entity or a computer programmed to handle situations.

**Adaptive Learning:** See Single-Loop Learning.

**Adjacent Function:** A business function that exchanges (provides or receives) consultation or collaboration resources, information, or secondary work products with the target function.

**After Action Review:** A process developed by the U.S. Army to help teams to learn quickly from their successes and failures and share their learning with other teams. Involves conducting a structured and facilitated discussion after a task or project has been completed to review what should have happened, what actually happened and why it happened; this allows participants to learn how to sustain strengths and improve on weaknesses in subsequent tasks or projects.

**AI Technologist:** A professional with good applied knowledge of basic AI techniques and selected tools used in the professional's environment. AI technologists are capable encoders of knowledge from codified knowledge and may be proficient AI programmers.

**Artificial Intelligence (AI):** AI is sub field of computer science concerned with pursuing the possibility that a computer can be made to behave in ways that humans recognize as "intelligent" behavior in each other. Applied AI becomes a broader field than AI, including cognitive, social and management sciences.

**Asset Management Mentality:** Management attitude and practice required manage intangible assets with the same objectives as for tangible assets. The mentality to focus on operational and strategic objectives to create, renew and maintain, safeguard, and use and leverage Intangible Capital

[15] See General References, Section 8.1.

throughout the enterprise.

**Automated Knowledge:** Explicit knowledge that has been embedded in an automatic device (such as a computer).

**Automatic Knowledge:** The lowest abstraction level of conceptual knowledge, where we hold *Routine Working Knowledge*. We know this knowledge so well that we have automated it. Most has become tacit – we use it to perform tasks automatically – without conscious reasoning.

**Automatic or Automatized Knowledge:** The lowest abstraction level of tacit knowledge. People know this knowledge so well that it has been automated and is used to perform tasks automatically – without conscious reasoning.

**B**

**Backward-Chaining:** A (computerized) search technique used in production (i.e., "if-then" rule) systems. Begins with the action clause of a rule and works backward through a chain of rules in an attempt to find a verifiable set of condition clauses. (Also termed "goal-oriented reasoning" or "top-down search.") Inference engines backward-chain from one "if-then rule" to other rules in the knowledge base to find new values needed to test if-conditions stated in the rule.

**Balanced Scorecard:** A business model developed by Kaplan and Norton as a tool to measure organizational performance against both short and long-term goals. The balanced scorecard is designed to focus managers' attention on those factors that most help the business strategy and so alongside financial measures, it adds measures for customers, internal processes and employee learning. Some organizations have used the balanced scorecard model in setting and measuring knowledge management strategies.

**Basic Knowledge Analysis (BKA):** A relatively extensive analysis and characterization of the knowledge in the task environment. It focuses on how knowledge is held, used, etc., and encompasses Task Environment Analysis (TEA), Critical Knowledge Function Analysis (CKFA), business function analysis, and knowledge acquisition – or knowledge elicitation and modeling.

**Benchmarking:** The practice of comparing the performance of your organization, department or function against the performance of "the best" − whether they be other organizations, industry standards or internal departments. The aim is to look at how well you are doing compared to others in the same field or industry, and to learn from their best practices as a basis for improving your own.

**Best Practice (or: Good practice):** A process or methodology that has been proven to work well and produce good results, and is therefore recommended as a model. Some people prefer to use the term "good practice" as in reality it is debatable whether there is a single "best" approach.

**Blackboard Systems:** Knowledge-based systems that consist of several separate reasoning processes that use a "blackboard" to "post" intermediate results or information that needs to be communicated between the various systems. Blackboard systems may be used for multiple-hypothesis reasoning.

**Browser:** See Web Browser.

**C**

**Capacity Building:** A term sometimes used in knowledge management to describe the process of enhancing an organization's ability to implement knowledge management principles and practices.

**Case-Based Learning:** Approach to learning using "cases" (stories, scenarios, descriptions of real events, etc.) to illustrate the material to be internalized. Case-based learning is supportive of building mental reference models.

**Case-Based Reasoning (CBR)**: Reasoning approach often used by people but also implemented as KBS reasoning strategy. In case-based reasoning, we compare the present situation or condition to previously experienced situations (reference cases) and interpolate between the most likely ones to arrive at conclusions for how to handle the present case.

**CBT**: See Computer-Based Training.

**Certainty Factor:** Either a number supplied by an expert system to indicate the system's level of confidence in the conclusion, or a number supplied by the user of an expert system to indicate the user's level of confidence in the validity of the information supplied to the system.

**Champion:** A person who proactively promotes something with the aim of persuading others of its benefits.

**Chief Information Officer (CIO):** A senior position with strategic responsibility for information management and information technology.

**Chief Knowledge Officer (CKO):** A senior position with strategic responsibility for knowledge management.

**Chunking:** A mental activity that allows aggregating several (typically five to nine) entities such as concepts into a single, new concept.

**CIO:** See Chief Information Officer.

**CKF:** See Critical Knowledge Function.

**CKFA:** Critical Knowledge Function Analysis.

**CKO:** See Chief Knowledge Officer.

**Closed System:** A system-theoretic concept – A system that is isolated from its environment such that its final state is determined by its initial state. Many physical systems are examples of closed systems that in addition have manipulated and observable input variables that will change their states. The states of such closed systems are "observable." Hence they are "identifiable" and "controllable" in contrast to open systems.

**Coaching:** A one-to-one relationship that aims to bring about individual learning and performance improvement, usually focusing on achieving predefined objectives within a specific time period. The role of the coach is to create a supportive environment in which to challenge and develop the critical thinking skills, ideas, and behaviors of the person being coached, so that they might reach their full potential. Related term: Mentoring.

**Codification:** Knowledge codification deals with obtaining, characterizing, and validating knowledge. It includes of elicitation or acquisition, analysis, and synthesis (rational reconstruction) of knowledge to generate internally consistent knowledge models that are congruent with domain knowledge as held by experts or existing as previously codified bodies of knowledge. The process of getting people's knowledge into a form by which it can be communicated independently of those people. The most common method is writing things down and putting them into documents and databases. Other methods include pictures, and sound and video recordings. Related term: Knowledge Harvesting

**Cognition:** The act or process of knowing (Webster, 1986).

**Cognitive Engineering:** A recently coined term to denote the professional field concerned with analysis and synthesis of systems that interact with human cognitive functions. Cognitive engineering encompasses: Human behavior in the real target world; ecological aspects of that world; semantic contents of the target domain; behavior and performance; and implications of changing cognitive-related aspects of the target domain.

**Cognitive Science:** The field that investigates the details of the mechanisms and processes of human intelligence (such as learning, memory, recall, decision making) to determine the procedures and functions that produce and use that intelligence.

**Cognitive Style:** An individual's mental approach and reasoning style. Cognitive styles include preferences for graphic or verbal representations of concepts, hemispheric dominance, and so on.

**Collaboration, Collaborative Working:** A generic term that simply means teamwork or a group effort. It also has a more specific meaning in knowledge management, where it is often used to describe close working relationships involving the sharing of knowledge.

**Communities of Interest (CoI):** Networks of people who share a common interest in a particular topic, either work-related or peripheral to work, and who come together informally to share knowledge on that topic. Related term: Communities of practice.

**Communities of Practice (CoP):** Networks of people who work on similar processes or in similar disciplines, and who come together to develop and share their knowledge in that field for the benefit of both themselves and their organization(s). They may be created formally or informally, and they can interact online or in person.

**Competence:** The capacity and capability of a person or other actor to function with a desired effectiveness – the ability to deliver quality work within a particular domain.

**Competitive Advantage:** A widely used term in the private sector to describe something that differentiates a company from its competitors in the same industry and makes it more likely to gain profits than the others.

**Completed Staff Work:** The study of a problem and presentation of a solution, with alternatives, to a manager, so that all that remains to be done by the manager is to indicate approval or disapproval of the completed action.

**Computer-Based Training (CBT)**: Training program delivered by interactive computers. Modern CBTs include multimedia (sounds, video clips) hyper-links, and may also have embedded intelligence to guide or challenge students. Some CBTs allow students to react to simulated real-life situations (such as being confronted by angry customer) and will record a student's behavior as computer changes the path of interaction.

**Concept Hierarchy:** A hierarchy of related concepts, particularly as they relate to a particular position, role, task, or activity. Concept hierarchies build on concepts that are consolidated through chunking and are related to semantic nets and knowledge maps.

**Concept Net:** A net(work) of related concepts, often pertaining to particular situation. The connections between concept nodes may be specified as to relation type.

**Concept:** An abstract or general idea often generalized from specific instances. A concept can be a mental model and be tied to other concepts through associations.

**Conceptual Blending:** The human capability to integrate and find new meaning in large amounts of

knowledge coming from different sources and that may be semantically distant from one another.

**Conceptual Knowledge**: Abstract mental models of the world. **Concepts, Perspectives**, and **Gestalts** are meta-models for complex situations built from observations and available facts and data. Conceptual knowledge includes abstract images such as how to view the economic situation, how to think about behavior and operating status of difficult chemical plants (when the operator says: "It is unstable today"), the frame of reference applies to a particular competitive situation, and so forth.

**Content Management:** "Content" in this context generally refers to computer-based information such as the content of a website or a database. Content management is about making sure that content is relevant, up-todate, accurate, easily accessible, well organized etc, so that quality information is delivered to the user.

**CoP:** Abbreviation for Community of Practice

**Corporate Memory:** See: Organizational Memory.

**Critical Knowledge Function (CKF):** Knowledge-related situation or condition that warrants KM attention. CKFs can be characterized by five factors: 1. Type of knowledge (understanding, expertise or skill) involved in performing a task; 2. Business use of that knowledge; 3. Constraint that prevents knowledge to be used fully, the vulnerability of the situation, or the unrealized opportunity that is not exploited; 4. Opportunities and alternatives for managing (i.e., improving) the CKF; 5. Expected incremental value of improving the situation – release knowledge constraint, exploit (take advantage of) the opportunity to use knowledge differently.

**Critical Thinking:** Effective mental methodologies, strategies, and representations people use for handling situations, decision making and acting, learning, and innovating.

**CRM:** Abbreviation for Customer Relations Management

**Culture:** The culture of an organization is an amalgamation of the values and beliefs of the people in an organization. It can be felt in the implicit rules and expectations of behavior in an organization where, even though the rules are not formally written down employees know what is expected of them. It is usually set by management whose decisions on policy usually set up the culture of the organization. The organizational culture usually has values and beliefs that support the organizational goals. (from <http://opax.swin.edu.au/~388226/howto/it2/o_cultre.htm>)

**Customer Capital:** The combined value of all the relationships an organization has with its customers including current, past, and potential customers. This includes intangible factors such as customer opinions of, and loyalty to, the organization or its products or services. Customer capital is one component of Intellectual Capital. It includes customer goodwill and relations and non-financial aspects of customer contracts and obligations.

**Customer Relationship Management:** A business strategy based on selecting and proactively managing the most valuable customer relationships. It requires a customer-focused philosophy to support effective marketing, sales, and customer service processes.

**D**

**Data Mining:** A technique for analyzing data in very large databases and making new connections between the data in order to reveal trends and patterns.

**Data:** A set of facts, concepts, or statistics that can be analyzed to produce information.

**Database:** Information stored in a computer for subsequent retrieval. Databases are structured to

support data architectures; modern databases are relational databases. Data bases may be "flat," relational, or object-oriented.

**Declarative Knowledge:** Facts about, and relations between, objects (such as abstract concepts or physical objects), events, and situations stated in some representation such as rules or clauses.

**Deductive Reasoning:** Reasoning to deduce information about the situation under analysis, such as deducing facts or premises from hypotheses and rules, given the background or domain knowledge.

**Deutero-Learning** (DL). Deutero-learning occurs when organizations learn how to carry out single-loop and double-loop learning.

**Document Management:** Systems and processes for managing documents including the creation, editing, production, storage, indexing, and disposal of documents. This usually refers to electronic documents and uses specific document management software.

**Document:** A record of an event or knowledge, taken so that the information will not be lost. Documents are usually written, but they can also be made up of images or sound. Documents can also be put into electronic or digital form and stored in a computer.

**Domain Expert:** A person with expertise in the domain of the target knowledge area such as a knowledge-based system being developed. The domain expert often works closely with the knowledge engineer (particularly the knowledge professionals) to allow capturing of the expert's knowledge for codification into a knowledge model, which can then be encoded into a knowledge base.

**Domain Knowledge:** See Work-Domain Knowledge.

**Domain:** A bounded part of a larger system. It may be a specific area of knowledge such as "the domain of financial knowledge." At times, it may be the knowledge or expertise area of a knowledge-based system.

**Double-Loop Learning** (DLL). DLL occurs when, in addition to detection and correction of errors, the organization is involved in the questioning and modification of existing norms, procedures, policies, and objectives. DLL involves changing the organization's knowledge-base or firm-specific competencies or routines (Dodgson, 1993). DLL is also called higher-level learning (Fiol and Lyles, 1985), generative learning or learning to expand an organization's capabilities (Senge, 1990), and strategic learning (Mason, 1993). (Initially defined by Argyris and Schön 1978.)

**Double-Loop Learning (or: Generative Learning):** In contrast to Single Loop Learning that involves using knowledge to solve specific problems based on existing assumptions and often based on what has worked in the past, double-loop learning goes a step further and questions existing assumptions in order to create new insights. For example, take the problem "how do we prevent earthquakes from killing people?" The single-loop answer would be to learn how earthquakes happen and try to predict them in order to be prepared. The double-loop answer would question our notion of "earthquake" and might conclude that earthquakes do not kill people, falling buildings do.

**Downstream Function:** A function that receives the target function's work products.

**E**

**E-Business** The use of electronic information systems (especially internet technologies) in business processes.

**E-Commerce:** The use of electronic information systems (especially internet technologies) to perform transactions, i.e., buy and sell things.

**Economic Value Added (EVA):** A measure of financial performance calculated by determining net operating income and subtracting charges for capital expended to produce that income (Economic value added equals net operating income − capital charge)

**Effective Behavior:** Behavior that achieves implementation of objectives and goals.

**E-Government:** The delivery of government services using electronic information systems (especially internet technologies).

**E-Learning:** The use of electronic information systems (especially internet technologies) to deliver learning and training.

**Elicitation:** The process of obtaining domain knowledge from experts through one of several elicitation methods such as interviews, observation, simulation, and so on.

**Email:** Short for electronic mail. Uses internet technologies to send messages and documents to and from computers around the world in a matter of seconds. Sending or receiving email requires internet access and an email address.

**Encoding:** Encoding of knowledge involves translating codified knowledge models to a representation such as that required for an expert system tool or shell. Encoding is similar to "programming," and may in many instances include computer programming to augment tools or shells. Encoding may fully be a programming task as when an expert system is directly implemented in LISP Prolog, or another computer language.

**Episode:** A *relatively independent incident or scene* that occurs in the context of a larger situation – a script or story line. As such *episodes have meaning.* An episode is the collection of distinct steps we observe as the situation unfolds. We may choose to divide a situation into many episodes depending on which detail we wish to work with. Or episodes may be relatively aggregate entities consisting of several events.

**Episodic Memory:** Human memory that stores recollections of personally experienced episodes and events as they occurred without further analysis or integration.

**Event:** An *isolated occurrence within a particular situation.* Events are concrete and detailed – the numerous distinct steps that occur as a situation unfolds. Events are normally observable and are typically, by themselves, without context and meaning.

**Evidence-Based Medicine, Evidence-Based Practice:** Evidence-based medicine involves integrating individual clinical experience with the best available external clinical evidence from systematic research when making decisions about patient care. Evidence-based practice is a term strongly associated with healthcare and so is often taken to mean the same, although it is now also being used in other fields so can have a broader meaning.

**Exit interview:** A survey that is conducted with an employee when he or she leaves an organization. The information from each exit interview is used to provide feedback on why employees are leaving, what they liked about their employment and what areas of the organization need improvement. Exit interviews can also be used as part of knowledge harvesting to extract knowledge from the departing employee so that it is kept in-house.

**Expectational Knowledge**: Our *Expectations, Judgments, Working Hypotheses, Associations*, and *Beliefs* are derived mental models and connections that lead us to opine how situations – simple and complex – might evolve and how to handle them. Expectations are partly based on working

hypotheses for how the situations work and what influences them. They include our associations that often become premises and reasoning stepping stones for potential conclusions and interpretations of contexts. Beliefs are formed by expectations and working hypotheses and are based on concepts, perspectives, and facts, and confirmed data.

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**Expert Networks:** A formal or informal arrangement that allows people with operational problems access experts for assistance.

**Expert System:** A knowledge-based computer program containing expert domain knowledge about objects, events, situations, and courses of action, which emulates the reasoning process of human experts in the particular domain. The components of an expert system include: (a) The Knowledge Base; (b) Inference Engine; and (c) User Interface. Types of expert systems include rule-based systems and model-based systems. A branch of Artifical Intelligence (AI).

**Expertise Directory, Experts Directory (or: Skills Directory):** A staff directory in the form of a database that includes details of people's skills, knowledge, experience, and expertise so that users can search for people with specific know-how.

**Explicit Knowledge:** Knowledge that "is not tacit or implicit," that is, it has been made available for inspection by being explicated through oral or written language, expert system rules, computer programs, diagrams, or in any other manner. Knowledge that has been explicated and made available for examination as personal knowledge about which a person can talk or write or as knowledge captured in documents, video clips, computer programs through oral or written language, expert system rules, computer programs, diagrams, or in any other manner, etc. Knowledge that can be easily expressed in words or numbers, and can be shared through discussion or by writing it down and putting it into documents, manuals or databases. Examples might include a telephone directory, an instruction manual, or a report of research findings. Structural knowledge is often explicit.

**Externalization:** The process of making tacit knowledge explicit. Related term: Internalization.

**Extranet:** A website that links an organization with other specific organizations or people. Extranets are only accessible to those specified organizations or people and are protected via passwords.

**F**

**Factual Knowledge:** Our knowledge of what we "know to be true" consists of *Facts, Confirmed Data, Known Causal Chains, Remembered Sensory Inputs and Episodes.* Much of it is retrieved from memory in the form of declarations. It is semantic knowledge pertaining to particular domains and is organized to be relevant to particular contexts. When we elicit and codify knowledge in external knowledge bases, most of the initial knowledge is of this type. It is knowledge of isolated facts – data and information – and of relations between facts and concrete and reality-connected details. (Example: knowing the constants of the metric system and how they relate.) Also see Pragmatic Knowledge.

**Firewall:** Software that protects an organization's computer systems from problems such as viruses

that can be carried by internet technologies or hackers seeking to gain unauthorized access.

**Forward Chaining:** A search technique used in production (i.e., "if-then" rule) systems, which begins with the condition clause of a rule and works "forward" through a chain of rules in an attempt to activate implied action rules. (Also termed "data-driven reasoning" or "bottom-up search.") During forward chaining, the inference engine searches for if-condition matches in other rules in the knowledge base when new values are generated by then-action in rules that have been "fired."

**Fuzzy Logic:** A formal type of logic that is defined to work with fuzzy operations.

**Fuzzy Reasoning:** A reasoning method that is based on fuzzy logic. It is similar to Qualitative Reasoning.

**Fuzzy Systems:** Knowledge-based systems that employ fuzzy reasoning.

**G**

**General Principles:** Mental models of underlying principles within a domain.

**Generative Learning:** See Doubleloop Learning.

**Goal Setting Knowledge:** See Idealistic Knowledge.

**Good Practice:** See Best Practice Government Secure Intranet (GSI)**:** An intranet that links UK government departments.

**Groupware:** Computer software applications that are linked together by networks, and so allow people to work together and share electronic communications and documents.

**H**

**Harvesting**: See Knowledge Harvesting.

**Hermeneutics:** The branch of epistemological philosophy that deals with methodological interpretation of the intended meanings, often of written or verbal communications.

**HTML**: Abbreviation for HyperText Markup Language. The major language of the internet's world wide web. Websites and web pages are written in HTML, which basically comprises a set of instructions for creating web pages.

**Human Capital:** The knowledge, skills, and competencies of the people in an organization. Human capital is one component of Intellectual Capital. The enterprise's human capital consists of the knowledge, understandings, skills, experience, and relationships of its employees. Human capital is the property of employees and is only leased or rented by the enterprise.

**I**

**Idealistic Knowledge:** The highest abstraction level of conceptual knowledge at which we hold *Vision and Paradigm Knowledge.* Part of this knowledge is well known to us and explicit – we work consciously with it. Much of it – our visions and mental models – is not well known, it is tacit, and only accessible nonconsciously.

**Implicit Knowledge:** Knowledge that is contained implicitly in oral or written language, actions (also when videotaped or provided as part of a hypermedia system), trained neural networks, embedded in technology, culture, practices, and so on.

**Implicit Learning:** The process of learning without intending to learn (by being engaged in an activity or by passive observation), without being aware of learning and resulting in tacit – and

mostly inaccessible – knowledge.

**Inductive Reasoning:** Reasoning to generate hypotheses based on background or domain knowledge and information such as premises, statements, or facts. Example: *Premise:* "The engine is powerful. " *Background knowledge:* "Engine is part of a car. " *Hypothesis:* "The car is powerful." Induction can also be used to generate hypotheses from background knowledge and other hypotheses. Rules are often used to perform inductive inference.

**Inference Engine:** The component of a computerized knowledge-based system that controls its reasoning operation by selecting which rules to use, accessing and executing those rules, and determining when an acceptable solution has been found. This component is sometimes called the "control structure" or the "rule interpreter."

**Informatics:** A term that is used in a variety of ways. Some regard it as the study of the impact that technology has on people. Some take a broader view and consider it to be the science of information and information technology. Others regard it as being broader still, referring to the creation, recognition, representation, collection, organization, transformation, communication, evaluation and control of information in various contexts.

**Information Audit:** A method of reviewing and mapping information in an organization. An information audit looks at things like what information is needed, what information there currently is, where it is, in what forms, how it flows around the organization, where there are gaps and where there is duplication, how much is it costing, what its value is, how it is used etc.

**Information Communication Technology (ICT):** Technology that combines computing with high-speed communications links carrying data, sound and video.

**Information Management:** The management of an organization's information resources in order to improve the performance of the organization. Information management underpins knowledge management, as people derive knowledge from information.

**Information overload:** A state where a person has so much information that they are no longer able to effectively process and make use of it.

**Information Technology (IT):** A term that encompasses the physical elements of computing including servers, networks and desktop computing that enable digital information to be created, stored, used and shared.

**Information:** Information describes a particular circumstance or case. Information consists of facts or data and may take on any one of several forms, levels of abstractions, and degrees of certainties. Information is used by *knowledge* to interpret or reason about a particular circumstance or case. *The role of information is description.* Data that has been organized within a context and translated into a form that has structure and meaning. (Note: while most people have an idea about what information is, it is rather difficult to define in a meaningful way).

**Innovation:** The creation of something new or different; the conversion of knowledge and ideas into a new benefit, such as new or improved processes or services.

**Intangible Assets:** The non-physical resources of an organization. An example might be the reputation linked to a brand name such as Mercedes or Microsoft, or the loyalty of customers to a company such as Marks & Spencer. These assets are not generally accounted for in an organization's financial statements, but they are of great value to the organization.

**Integrative Management Culture:** When an enterprise builds and orchestrates an internal practice to deal systematically and deliberately with knowledge by having people share insights and seek

assistance from one another, a new and open culture emerges. People open up and discuss difficult issues, emerging ideas, and tentative opportunities with one another. They take mental risks that would be unthinkable in conventional environments. They seek collaboration to achieve better results quicker, and build on ideas of others and let others build on their own ideas. By opening up to new approaches and perspectives, and by building on the capabilities of others instead of only relying on their own, they expand their action space. As people expand action spaces, and become more effective through capable collaboration, the enterprise becomes smarter and more effective. Complex tasks are addressed better and faster, and innovations abound and make the enterprise more capable and able to engage in activities that previously were infeasible.

**Intellectual Assets Management:** The management of an organization's intellectual assets in order to improve the performance of the organization. In theory, synonymous with knowledge management but in practice, intellectual assets management tends to focus on issues relating to intellectual property such as organizing and exploiting patents, copyrights, trademarks and other intellectual property rights.

**Intellectual Assets:** See Knowledge Assets.

**Intellectual Capital:** The sum of the enterprise's human capital, customer capital and structural capital. Intellectual capital is part of the enterprise's intangible capital. The value, or potential value, of an organization's intellectual assets (or knowledge assets). An attempt by organizations to place financial value on their knowledge.

**Intellectual Property Rights:** The legal rights associated with Intellectual Property.

**Intellectual Property:** Explicit intellectual assets (or Knowledge Assets) that are protected by law. Includes things like patents, trademarks, copyrights, licenses, etc. Intellectual Property is part of Structural Capital.

**Internalization:** The process of absorbing explicit knowledge and making it tacit. Opposite of Externalization.

**Internet:** The internet is a vast system of computers that are "networked" (linked together) to exchange information and resources. It is a shared global resource that is not owned or regulated by anyone.

**Intranet:** A computer network that functions like the internet, but the information and web pages are located on computers within an organization rather than being accessible to the general public.

**IT Literacy:** A person's competency in using information technologies.

**IT:** Abbreviation for Information Technology and for Information Communication Technology (ICT).

**K**

**KADS:** "Knowledge Analysis and Documentation System" or "Knowledge Analysis and Design Support" developed under the sponsorship of ESPRIT.

**KADS-OBJECT:** Knowledge representation and analysis approach generally based on the KADS model.

**KBS:** See Knowledge-Based System.

**KFA:** See Knowledge Flow Analysis:

**K-I Activity or Task:** See Knowledge-Intensive Activity.

**KMap:** See Knowledge Mapping.

**Know-How:** Skill or capability derived from knowledge and experience.

**Knowledge:** Operational definitions: **1.** The content of understandings and action patterns that govern sensemaking, decision making, execution, and monitoring. **2.** Knowledge consists of facts, perspectives and concepts, mental reference models, truths and beliefs, judgments and expectations, methodologies and know-how. **3.** Knowledge is used to interpret information about a particular circumstance or case to handle the situation. Knowledge is about what the facts and information means in the context of the situation. **4.** Knowledge is possessed and represented on many conceptual levels, in many forms, of many types, and in many domains. **Other relevant definitions:** *A. Formal Language Use Definition:*[16] ***(a)*** Cognizance; **2 a** (1): The fact or condition of knowing something with familiarity gained through experience or association; (2): acquaintance with or understanding of a science, art or technique; **b** (1): the fact or condition of being aware of something; (2): The range of one's information or understanding; **c:** The circumstance or condition of apprehending truth or fact: Cognition; **d:** The fact or condition of having information or of being learned; **4 a:** The sum of what is known; the body of truth, information, and principles acquired by mankind. ***B.*** *Epistemological Definition:* The body of internalized data, concepts, perspectives, judgments, strategies, and so on, *that a person believes to be true*. ***C.*** *Operational Definition:* Truths, perspectives, judgments, and methodologies that are available to handle specific situations. Knowledge is used to interpret *information* about a particular circumstance or case to handle the situation. Knowledge is about what the facts and information means in the context of the situation. **Yet other definitions of knowledge:** Collins English Dictionary definition is "the facts, feelings or experiences known by a person or group of people." Knowledge is derived from information but it is richer and more meaningful than information. It includes familiarity, awareness and understanding gained through experience or study, and results from making comparisons, identifying consequences, and making connections. Some experts include wisdom and insight in their definitions of knowledge. In organizational terms, knowledge is generally thought of as being "know how," "applied information," "information with judgment" or "the capacity for effective action."

**Knowledge-Based System (KBS)**: A computer-based system that contains explicit or implicit domain knowledge used specifically for reasoning about specific situations. Examples of KBSs are case-based reasoning (CBR) systems, expert systems, and neural nets.

**Knowledge-Intensive Activity (K-I Activity):** An activity that requires extensive knowledge to perform appropriately. As a result of the depth of knowledge required, the knowledge may be internalized (and automated) by the performer. Consequently, many K-I activities will be executed within the performer's mind – hidden from outside observation – and are therefore difficult to identify and characterize.

**Knowledge-Intensive Work:** All work is invariably knowledge-intensive (K-I), also when some part of it has become *automatic*. It frequently requires focused thinking and explicit reasoning and involves nonroutine conditions that require expertise to handle. Even highly automatic clerical work, such as "uncomplicated" correspondence filing, requires extensive judgment and concept knowledge, although much is so familiar that proficient office workers have automated it and perform complicated activities within fractions of a second.

[16] Webster's Ninth New Collegiate Dictionary (1986)

**Knowledge About Knowledge:** Understanding what knowledge is about; how it is created, used, and structured – as studied by the field of epistemology (also see Metaknowledge).

**Knowledge Analysis:** A general term for investigation, characterization, and structuring (modeling) of knowledge as possessed by experts or other knowledge workers, required to deliver quality work, used in practice, and so on. Knowledge analysis may involve the use of specific methods, including basic knowledge analysis (BKA), critical knowledge function analysis (CKFA), knowledge mapping (KMap), knowledge use and requirements analysis (KURA), knowledge scripting and profiling (KS&P), knowledge flow analysis (KFA), and KADS-OBJECT-based analysis.

**Knowledge Assets (or: Intellectual Assets):** Those parts of an organization's Intangible Assets that relate specifically to knowledge, such as Know-How; Best Practice; Intellectual Property; and the like. Knowledge assets are often divided into human (people, teams, networks and communities), structural (the codified knowledge that can be found in processes and procedures) and technological (the technologies that support knowledge sharing such as databases and intranets). By understanding the knowledge assets an organization possesses, the organization can improve its ability to use them to best effect and also to spot any gaps that may exist.

**Knowledge Audit:** A method of reviewing and mapping knowledge in an organization including an analysis of knowledge needs, resources, flows, gaps, users and uses. A knowledge audit will generally include aspects of an Information Audit but is broader than an information audit. Survey and characterization of the status of knowledge in an organization. Knowledge audit may refer to identifying specific knowledge assets such as patents and the degree to which these assets are used, enforced, and safeguarded.

**Knowledge Base (KB):** The component of a knowledge-based system that contains the system's domain knowledge in some representation suitable for the system to reason with. Knowledge in knowledge bases is typically represented in a standard format. The fundamental body of Knowledge available to an organization, including the knowledge in people's heads, supported by the organization's collections of Information and Data. An organization may also build subject-specific knowledge bases to collate information on key topics or processes. The term "knowledge base" is also sometimes used to describe a database of information.

**Knowledge Broker:** A person who facilitates the creation, sharing and use of knowledge in an organization. Many organizations have created knowledge broker roles such as "Knowledge Co-coordinator." The term knowledge broker is also sometimes used to describe companies or individuals that operate commercially as knowledge traders or provide knowledge-related services.

**Knowledge Economy:** An economy in which knowledge plays a predominant part in the creation of wealth.

**Knowledge Engineer:** Specialists responsible for analyzing knowledge-intensive functions to design appropriate knowledge management activities such as technical development of a knowledge-based system. Knowledge engineers may be "knowledge technologists," focusing on the content and functionality of knowledge use in a knowledge-based function, or "AI technologists" focusing on implementation of a knowledge-based system. Only rarely is a knowledge engineer both an AI technologist and a knowledge technologist.

**Knowledge Engineering:** The professional activities associated with acquiring or eliciting, codifying, and encoding knowledge, conceptualizing and implementing knowledge-based systems, and engaging in activities to formalize knowledge and its use – particularly through

application of artificial intelligence.

**Knowledge Enhanced Government (KEG):** A government-wide policy framework for knowledge management.

**Knowledge Flow Analysis (KFA):** Explicit analysis of existing or potential flows of knowledge within an organization. KFA may focus on threats, opportunities, weaknesses, and strengths of knowledge flows, and on flows in four dimensions: (a) application of knowledge to work objects; (b) learning to perform work better; (c) application of knowledge to improve the system of production and service; and (d) application of knowledge to improve the products and services themselves.

**Knowledge Flows:** The ways in which knowledge moves around, and in and out of, an organization.

**Knowledge Harvesting:** A set of methods for making Tacit Knowledge more explicit - getting people's knowledge into documents, so that it can be more easily shared with others. Related term: Codification.

**Knowledge Holder:** The person (domain expert) who holds the knowledge of interest. Knowledge holders can behave in different ways and can be classified as a: "Professional Practitioner;" "Practical Knowledge-Worker;" "Performer;" or "Communicating Negotiator."

**Knowledge Management:** Knowledge Management is the systematic, explicit, and deliberate building, renewal, and application of knowledge to maximize an enterprise's knowledge-related effectiveness and returns from its knowledge and intellectual capital assets. The field covers deliberate and systematical analysis, synthesis, assessment, and implementation of knowledge-related changes to attain a set of objectives and to monitor that KM activities are carried out appropriately and meet their objectives. It comprises activities needed to facilitate direct knowledge-related work. KM includes fostering "Knowledge Asset Management Mentality" required to create, maintain, and use appropriate Intangible Capital. There is a wide variety of definitions of knowledge management such: "The creation and subsequent management of an environment that encourages knowledge to be created, shared, learnt, enhanced, organized and used for the benefit of the organization and its customers."

**Knowledge Management Activity:** Distinct knowledge-related changes to manage knowledge such as analyzing a situation using KM analysis tools, creating and implementing KM capabilities, practices and initiatives, or engaged in KM practices, utilizing or operating KM capabilities.

**Knowledge Management Solution:** Strictly speaking, a solution to a knowledge management problem, or the use of knowledge management techniques to solve an organizational problem. However, a "knowledge management solution" may refer to a piece of knowledge management technology or software.

**Knowledge Management Strategy:** A detailed plan outlining how an organization intends to implement knowledge management principles and practices in order to achieve organizational objectives.

**Knowledge Manager:** A role with developmental and operational responsibility for promoting and implementing knowledge management principles and practices.

**Knowledge Map:** Variant of semantic network. The TCU knowledge mapping system generates a special kind of knowledge maps with characterizations of the links between concepts using a specific grammar.

**Knowledge Mapping (KMap):** The methodology used to generate knowledge maps.

**Knowledge Mapping:** A process to determine where Knowledge Assets are in an organization, and how knowledge flows operate in the organization. Evaluating relationships between holders of knowledge will then illustrate the sources, flows, limitations, and losses of knowledge that can be expected to occur.

**Knowledge Model:** Knowledge models take many forms. They may be documentation of domain knowledge on paper, in computer-based knowledge base, or videotaped "show-and-tell" for performing a particular task. Knowledge models may be represented using a formal "knowledge representation," it may be in natural language as a narrative, a set of diagrammatic representations, and so forth.

**Knowledge Professional (KP):** A professional who focuses on optimal creation, organization, availability, and use of *knowledge* in a domain or within a business function. Knowledge professionals have applied understanding of task environment analysis, various KM approaches, business use of knowledge, and support of knowledge workers with automated reasoning and other means. Knowledge professionals may be trained in cognitive sciences, artificial intelligence, philosophy, and management sciences.

**Knowledge Profiling:** A method to characterize particular knowledge domains in terms of specific knowledge areas (often less than 20) and the levels of existing or desired proficiency for individual roles or persons in each of these areas. A polar coordinate graphical display is often used to portray the resulting "profiles."

**Knowledge Repository:** A place where knowledge is gathered and stored and can be accessed and used by other people. It may be a Community-of-Practice or one or several experts. It may be a physical place like an R&D team, a library, a "virtual" place like an interactive website or an online discussion board, or a place where people gather such as a café or an informal meeting room or discussion area created to encourage knowledge sharing. A low-tech knowledge repository could be a set of file folders. A high-tech knowledge repository might be based on a database platform.

**Knowledge Representation:** The formal structures used to store information in a knowledge base in a form that supports the reasoning approach to be employed. Knowledge representation techniques include "production rules" ("if-then rules"), logic (often "first-order logic"), semantic networks, frames, and scripts.

**Knowledge Script:** A step-by-step representation of knowledge-related work processes. Knowledge scripts may specifically focus on knowledge-intensive activities to ensure that they are properly represented.

**Knowledge Scripting and Profiling (KS&P):** A method for explicating K-I work performed a function and describing the particular knowledge, skills, and personal characteristics required to deliver routine and exception work. KS&P is used to identify the requirements for different work-roles. KS&P produces knowledge scripts and profiles.

**Knowledge Technologist:** A professional who focuses on codification and automation of knowledge content in a domain. The knowledge technologist must have applied understanding of knowledge elicitation, analysis, and modeling, and support of knowledge workers with automated reasoning. Knowledge technologists may be trained in cognitive sciences or artificial intelligence.

**Knowledge Technology:** Technology – physical and methodological – for support of knowledge management activities.

**Knowledge Use and Requirements Analysis (KURA):** A method to identify and characterize the

knowledge required to deliver quality work and the actual use of knowledge in the target work functions.

**Knowledge Vigilance:** The degree to which an enterprise exhibits knowledge awareness and pursues explicit and systematic knowledge management with the understanding that such pursuits are vital for success and viability.

**Knowledge Work:** Work that requires application of knowledge to a work object. Knowledge work may involve highly abstract knowledge such as when a judge or lawyer assesses the applicability of a precedence, or it may involve concrete knowledge as when a machinist selects feed speed to match a tool to the material to be turned. Knowledge work may be routine as when an underwriter reviews a standard life insurance application, or when a marketing specialist faces a totally new situation.

**Knowledge Worker:** Individual who makes her/his contributions through exercising intellectual expertise and understanding.

**KOA:** KADS-OBJECT Analysis.

**KS&P:** Knowledge Scripting and Profiling.

**KURA:** Knowledge Use and Requirement Analysis.

**L**

**Learning Models:** In the learning sciences, a large number of different types of individual learning have been distinguished. To name a few: Incidental learning, Implicit Learning, Learning by reflection, Simulation-based learning, Case-based learning, Learning by exploring, Goal directed learning.

**Learning Organization:** An organization that views its success in the future as being based on continuous learning and adaptive behavior. It therefore becomes skilled at creating, acquiring, interpreting, and retaining knowledge and then modifying its behavior to reflect new knowledge and insights.

**Lessons Learned:** Lessons learned are concise descriptions of knowledge derived from experiences that can be communicated through mechanisms such as storytelling, debriefing etc., or summarized in databases. These lessons often reflect on "what we did right," "what we would do differently," and "how we could improve our process and product to be more effective in the future."

**Leverage:** To realize the inherent value of an asset − physical or knowledge-based − beyond what is currently being realized. In short, to get more value out of it.

**Logic:** A technique for drawing inferences that relies on formal rules for manipulating symbols. Logic is a branch of philosophy. Symbolic logic is also considered a branch of mathematics.

**M**

**Machine Learning:** An area of AI research that investigates techniques for creating computer programs that can learn from their own experience.

**Machine Translation:** An area of AI research that attempts to use computers to translate text from one language to another. Machine translation programs often use combinations of natural language understanding and natural language generation techniques.

**Mental Model:** Mental models are the conceptual and operational representations in the mind of

situations, events, etc., that have been experienced or are learned from other sources. These are "real mental models." "Imaginary mental models" result from thought experiments and self-imagined situations. Kenneth Craik (1943) suggested that the mind constructs "small-scale models" (mental models) of reality that it uses to anticipate events. Such mental models are also used to generate decisions and actions. People construct mental models from what they perceive or imagine, or from readings and from communications. Mental models may be visual images or abstract representations of situations. The broader representation of "mental models" mean representations in the human mind of situations, events, etc. that have been experienced or are learned from other sources. These are "real mental models." Mental models may also result from thought experiments and self-imagined situations to become "imaginary mental models" that may be untrue.

**Mental Reference Model:** Mental model that can act as a principle, guide, template or example for thinking or action.

**Mentoring:** Mentoring is a one-to-one learning relationship in which a senior member of an organization is assigned to support the development of a newer or more junior member by sharing his or her knowledge, experience and wisdom with them. Related term: Coaching. (Note: While the strength of mentoring lies in transferring the mentor's specific knowledge and wisdom, in coaching it lies in the coach's ability to facilitate and develop the other's own personal qualities.)

**Menu-Based Natural Language:** An approach to natural language understanding in which the computer helps build a natural language sentence by presenting "menus" (options lists) of choices that are available in each context and allowing the user to select the options that meet the user's requirements.

**Meta Reasoning:** Allows a person (or an inanimate system) to know what it knows – and what it does not know.

**Metacognition:** Cognition that reflects on, monitors or regulates first order cognition (Kuhn 2000).

**Metacognitive Reasoning:** Allows a person (or an inanimate system) to know what it knows – and what it does not know.

**Metaknowledge:** Normally considered to be "Knowledge about Knowledge" possessed by people or descriptions of knowledge in a physical knowledge base. Much of a person's metaknowledge is tacit that on the lowest conceptual level consists of "Procedural Metaknowledge and "Declarative Metaknowledge." On a higher conceptual level metaknowledge is "Metastrategic Knowing" consisting of "Metastrategic Knowledge," "Metatask Knowledge," and "Metacognitive Knowing."

**Methodological Knowledge:** Provides our methodological approaches and reasoning strategies with the metaknowledge for how to think and reason within particular contexts and situations, given information about the situations and the background knowledge in terms of facts, data, perspectives, and judgments.

**Model-Based Expert System:** A type of expert system, usually intended for diagnostic purposes, which is based on a model of the structure and behavior of the device or system it is designed to "understand."

**Model-Based Reasoning:** Complex reasoning strategies that allow the use of mathematical models as representations of the domain knowledge.

**N**

**Natural Language (NL):** A language in common use by people to communicate among themselves (Example: Chinese or English).

**Natural Language Generation:** The part of natural language-processing research that attempts to have computers present information to their users in a natural language.

**Natural Language Interface (NLI):** A computer program that allows the user to communicate with a computer in a natural language. An NLI may incorporate both natural language-understanding and natural language-generation capabilities. An NLI is sometimes called a "natural language front end."

**Natural Language Processing (NLP):** An area of AI research that allows computers to use a natural language. Natural language processing is divided into natural language understanding and natural language generation.

**Natural Language Understanding:** The part of natural language-processing research that investigates methods of allowing computers to understand a natural language.

**Natural Language:** A language in common use by people to communicate among themselves (Example: English).

**Neural Nets:** A family of reasoning strategies and knowledge representations that are patterned on the neural architecture of the brain. Neural nets often consist of a large number of nodes connected by links that transmit signals. Neural nets must be "trained" using examples to modify the strength of the couplings between nodes to change the net's reasoning behavior. Neural nets are used in a number of applications where the knowledge is amorphous and ill understood, like handwriting interpretation, seismic data interpretation, and so on.

**Nonmonotonic Reasoning:** A reasoning method that allows retraction of hypotheses, conclusions, or facts given new (and better) information or understanding. Also often supports multiple lines of reasoning (multiple-hypothesis reasoning). Nonmonotonic reasoning is useful where knowledge is not well understood or information is unreliable.

**Numeric Processing:** The traditional use of computers to manipulate numbers.

**O**

**Object-Oriented System:** A system built around "objects" that are independent computer procedures that perform one of its operations when passed a message. Object-oriented systems also employ "inheritance" of characteristics, and "encapsulation." Most Knowledge-Based System (KBS) tools and shells are implemented as object-oriented systems.

**Object-Oriented View:** The perspective of a complex system where the different entities are regarded as independent objects.

**Open System:** A system-theoretic concept – A system that is integrated with, and continually influenced by its environment. Many open systems, such as human and social systems have scores of unobservable inputs. Moreover, dimensions of their internal states are large and not fully observable. Their internal states cannot be observed or measured. Open systems are "unidentifiable" and "uncontrollable."

**Operational Model:** A mental model of procedures for how to perform certain tasks. An operational model is more abstract than a routine and less general than a script. In specific situations beyond prior experience, operational models may be generated by operationalizing

scripts.

**Organizational Culture: (**Also, see **Culture)** In short, "the way we do things around here." An organization's culture is a mixture of its traditions, values, attitudes and behaviors. Different organizations can have very different cultures. In knowledge management, an organization's culture is extremely important - if it is not based on qualities such as trust and openness, then knowledge management initiatives are unlikely to succeed.

**Organizational Learning:** The ability of an organization to gain knowledge from experience through experimentation, observation, analysis and a willingness to examine both successes and failures, and to then use that knowledge to do things differently. While organizational learning cannot happen without individual learning, individual learning does not necessarily produce organizational learning. Organizational learning occurs when an organization becomes collectively more knowledgeable and skillful in pursuing a set of goals.

**Organizational Memory:** The knowledge and understanding embedded in an organization's people, processes and products or services, along with its traditions and values. Organizational memory can either assist or inhibit the organization's progress.

**Organizational Learning Models:** Argyris and Schön 1978 described the following three types of organizational learning Single-loop learning (SLL). Organizational learning occurs when errors are detected and corrected and firms carry on with their present policies and goals. According to Dodgson in 1993, SLL can be equated to activities that add to the knowledge-base or firm-specific competencies or routines without altering the fundamental nature of the organization's activities. (Argyris and Schön 1978.) Double-loop learning (DLL). DLL occurs when, in addition to detection and correction of errors, the organization is involved in the questioning and modification of existing norms, procedures, policies, and objectives. DLL involves changing the organization's knowledge-base or firm-specific competencies or routines (Dodgson, 1993). DLL is also called higher-level learning (Fiol and Lyles, 1985), generative learning or learning to expand an organization's capabilities (Senge, 1990), and strategic learning (Mason, 1993). (Argyris and Schön 1978.) Deutero-learning (DL). Deutero-learning occurs when organizations learn how to carry out single-loop and double-loop learning. (Argyris and Schön 1978.)

**P**

**Pattern-Matching:** A human (or computational – AI) reasoning method that recognizes similarities between patterns and objects or events.

**Peer Assist:** A process pioneered by BP-Amoco, in which an individual or team calls a meeting or a workshop in order to tap the knowledge and experience of others before embarking on a project or activity.

**Planning and Decision Support:** An area of AI research that applies AI techniques to planning and decision-making processes, primarily to assist managers who have decision-making responsibilities.

**Planning Systems:** A type of AI-based systems used to reason about sequential situations such as scheduling, resolution of time conflicts, and so on. Planning systems may use nonmonotonic reasoning.

**Portal:** A special web page that organizes access to all of the online resources about a topic, providing a one-stop shop of sorts.

**Pragmatic Knowledge:** The next lowest abstraction level of conceptual knowledge at which we hold Decision making and Factual Knowledge. Decision-making knowledge is practical and mostly explicit. It supports everyday work and decisions, is well known, and is used consciously.

**Predicate Calculus:** A formalization of classical logic that uses clauses of functions and predicates to describe relations between individual entities or symbols.

**Procedural Knowledge:** Knowledge and information about courses of action that may be sequential in nature. It may in particular refer to sequential steps of a procedure or methodology.

**Production Rule:** A rule in the form of an "if-then" or "condition-action" statement often used in the knowledge base of an expert system. A production rule typically represents a single heuristic. The **If** (Condition) is called the "antecedent," the **Then** (Action) is called the "consequent."

**Production System:** A knowledge-based system that relies on a reasoning approach that uses knowledge representation in the form of production rules. Production systems consist of a rule base, an inference engine, and a user interface.

**Proficiency:** Capability to perform.

**Protocol Analysis:** Structured analysis of verbal protocols to extract knowledge elements and fragments.

**Q**

**Qualitative Reasoning:** A reasoning method that is based on qualitative relations. Example: *Background Knowledge:* "All **attractive** products, while **priced slightly high**, will **sell well**." *Premise:* "The present product is ***very*** **attractive** and **priced slightly high**." *Conclusion:* "The present product will **sell *very* well**."

**Quick win:** An initiative or a solution that yields rapid positive results.

**R**

**Records Management:** Every organization creates records, whether in paper, film, electronic record, or some other format. Records management helps an organization to make sure it is creating and maintaining an adequate documentary record of its functions, policies, decisions, procedures, and essential transactions. It then helps the organization to decide which ones to keep and which ones to destroy and how best to organize them all. Hence it involves processes relating to the generation, receipt, processing, storage, retrieval, distribution, use and retirement of an organization's records.

**Reference Methodology Knowledge:** Knowledge of how to proceed with particular activities – what to do next. Reference methodology knowledge is often possessed in the form of procedural knowledge and is used to govern planning as well as real-life actions at the time of execution.

**Reference Models:** See Mental Reference Model and Mental Model.

**Return on Investment (ROI):** An estimate of the financial benefit (the return) on money spent (the investment) on a particular initiative.

**Role of Knowledge Worker:** The particular function that a knowledge worker may assume in the work situation. Examples include: passive observer, apprentice, professional team member, team leader. The role that is assumed to a large extent governs the knowledge worker's behavior and contribution.

**Routine Working Knowledge:** See Automatic Knowledge.

**Routine:** A regular, often *unvarying procedure* for what to expect and how to handle a *specific kind of situation.* A routine is detailed, concrete, and inflexible. It consists of numerous and relatively deterministic, rigid steps that might cover many of the tasks in the process. Other tasks may still require explicit reasoning (they are still part of the script that underlies the routine).

**Rule:** See "Production Rule."

**Rule-Based Knowledge-Based Systems:** A type of knowledge-based system where the domain knowledge is represented in the form of production rules.

**S**

**Schema Knowledge:** Abstract and generalized knowledge that provides understanding of underlying principles and generic attributes of complex domains.

**Schema:** A broad and conceptual *plan or scheme* for a *class of situations.* A schema is a generalized concept that defines our understanding of the underlying structure, nature, or principles of a general type of story, situation , or "system." Schemata are concepts or mental models by which a static or dynamic situation can be characterized and understood. Schemata are typically abstract models of a generalized situation. Scripts – often several – are more concrete and specific than schemata and can be generated from schemas to form more definite expectations for evolutions of specific situations. It is a generalized concept that defines our understanding of the underlying structure, nature, or principles of a general type of story, situation , or "system. A spatially and/or temporarily organized structure in which the parts are connected on the basis of contiguities that have been experienced in space or time. A schema is formed on the basis of past experience with objects, scenes, or events and consists of a set of (usually nonconscious) expectations about what things look like and/or the order in which they occur. The parts, or units, of a schema consist of a set of variables, or slots, which can be filled, or instantiated, in any given instance by values that have greater or lesser degrees of probability of occurrence attached to them. Schema vary greatly in their degree of generality – the more general the schema, the less specified, or the less predictable, are the values that satisfy them." (Adapted from Mandler, 1979, p. 263)

**Script:** A *general event sequence* that underlies a *referenced type of situation.* Scripts are flexible, somewhat abstract, and include general expectations and directions. Typically, scripts consist of several steps made up of episodes and events. Scripts are similar to, but more general than, operational models and routines. The main difference is that scripts and their steps are general, broad, and flexible compared to the routines' specific and unvarying steps. Accordingly, hiring scripts, for example, may cover a range of positions – not only competent professionals as covered by a routine. *Technologically:* A technique for representing knowledge that stores in a series of "slots" the events and expectations for situations that evolve over time.

**Search Engine:** A piece of software that carries out searches for information.

**Semantic Network:** A graphic knowledge representation method for representing associations between mental objects using a network of nodes with arcs between the nodes. The nodes represent mental objects (such as concepts or events); the arcs represent the relations between the objects. Semantic networks are related to concept hierarchies and knowledge maps.

**Server:** A computer that shares resources with other computers on a network.

**Silo:** An individual group within an organization, such as a department or unit. The term is often used to suggest that such groups tend to be inward-looking, in that they do not take into account what other similar groups are doing or how their work affects other such groups.

**Single-Loop Learning (or: Adaptive learning):** Single-loop learning involves using knowledge to solve specific problems based on existing assumptions, and often based on what has worked in the past. In contrast, Double-Loop Learning goes a step further and questions existing assumptions in order to create new insights. For example, take the problem "how do we prevent earthquakes from killing people?" The single-loop answer would be to learn how earthquakes happen and try to predict them in order to be prepared. The double-loop answer would question our notion of "earthquake" and might conclude that earthquakes do not kill people, falling buildings do. Organizational learning occurs when errors are detected and corrected and firms carry on with their present policies and goals. According to Dodgson in 1993, SLL can be equated to activities that add to the knowledge-base or firm-specific competencies or routines without altering the fundamental nature of the organization's activities. (Argyris and Schön 1978.) (Also, see double loop learning).

**Situational Awareness:** Situational Awareness is the functional proficiency by which a person is aware and makes sense of a situation. Any time a person encounters a situation, she observes it by obtaining, decoding, analyzing, interpreting, and accepting information about it.

**Socialization:** The process of sharing tacit knowledge by bringing people together to discuss things, share experiences, or work together.

**Speech Recognition:** Techniques that allow computers to recognize words and phrases of human speech.

**Speech Synthesis:** Techniques that allow speech generation by a computer.

**Storytelling:** The use of stories in organizations as a way of sharing knowledge and helping learning. Stories can be very powerful communication tools, and may be used to describe complicated issues, explain events, communicate lessons learned, or bring about cultural change.

**Structural Capital:** Structural capital is part of Intellectual Capital and includes all of the enterprise's intellectual property and intellectual property rights. It includes factors such as technology, practices, organizational structure, patents, copyrights, and so on. It includes an organization's "captured knowledge" such as best practices, processes, information systems, databases etc. Often described as the knowledge that remains in the organization "after the employees have gone home for the night."

**Symbolic Processing:** Symbolic processing is the basis of AI programming. It uses computers to manipulate symbols, in contrast to conventional numeric processing.

**Symbolic Reasoning:** The use of symbolic processing to solve reasoning problems using strategies and heuristics to manipulate the symbols.

**System:** A group of objects that interact partially or completely with each other.

**Systematic Knowledge:** The next highest abstraction level of conceptual knowledge at which we hold *System, Schema, and Reference Methodology Knowledge.* Our knowledge of underlying systems, general principles, and problem-solving strategies is, to a large extent, explicit and mostly well known to us.

**Systems Theory:** The transdisciplinary study of the abstract organization of phenomena, independent of their substance, type, or spatial or temporal scale of existence. It investigates both the principles common to all complex entities, and the (usually mathematical) models that can be used to describe them. (Heylighen and Joslyn 1992)

**Systems Thinking**: Systems thinking refers to a broad and comprehensive perspective of how

components of larger entities (systems) work together and how their activities need to be coordinated to facilitate effective and smooth operation without conflicts and inefficiencies. Systems thinking embraces concepts for projecting implications of changes and behaviors of dynamic situations where many parallel activities are coupled and affect each other in complex, often nonlinear, ways. (Does not refer to "information systems.")

**T**

**Tacit Knowledge:** Knowledge that a person possesses unconsciously. Tacit knowledge may be inaccessible to conscious recall and reasoning because it: (a) Is not well understood; or (b) Is highly routinized and automatic and has transgressed the recall barrier. The knowledge or know-how that people carry in their heads. Compared with Explicit Knowledge, tacit knowledge is more difficult to articulate or write down and so it tends to be shared between people through discussion, stories and personal interactions. It includes skills, experiences, insight, intuition and judgment. Note: Some authors draw a distinction between tacit and implicit knowledge, defining tacit knowledge as that which cannot be written down, and implicit knowledge as that which can be written down but has not been written down yet. In this context, explicit knowledge is defined as that which has already been written down.

**Talk-Aloud:** Narrative produced by a person while performing an activity to reflect aspects under consideration at the time. Is related to "Think-Aloud," which is narrative that reflects thoughts and reasoning of a person while undertaking a Knowledge-Intensive (K-I) activity. "Verbal Protocol" is the talk-aloud narrative produced by knowledge workers while undertaking K-I tasks.

**Task Environment Analysis (TEA):** Detailed knowledge-focused TEAs consist of in-depth investigations of how knowledge workers perform business tasks and the conditions under which they work. The focus is on knowledge, its manifestations, presence, use, etc., and how important knowledge is, given the environment's driving forces. Its focus is on how the task is performed, what its inputs are, what its deliverables are and, to some extent, how they are used by "customers." Most TEAs also take the next step of considering how deliverables may be used as business and operating practices change, and how the task may be modified and strengthened by changing its organization or operation or by introducing different perspectives or different support systems.

**Taxonomy:** A hierarchical structure used for categorizing a body of information or knowledge, allowing an understanding of how that body of knowledge can be broken down into parts, and how its various parts relate to each other. Taxonomies are used to organize information in systems, therefore helping users to find it.

**Text Understanding:** The area of natural language understanding that allows computers to recognize the content of written text.

**Thesaurus:** An organized language, used for inputting and searching information systems, which predefines the relationships between terms and concepts used in its vocabulary.

**Think-Aloud:** Narrative that reflects the thoughts and reasoning of a person while undertaking a K-I activity.

**Thinking about Thinking:** Being consciously able to engage in meta-reasoning and understand mental processes such as strategies and models.

**U**

**Upstream Function:** A function that supplies the target function with work products.

**User Interface:** The facility of a knowledge-based system that supports bidirectional communication between the system and its user. Most user interfaces use natural language-processing techniques and bit-mapped graphics.

**V**

**Verbal Protocol:** Talk-Aloud narrative produced by knowledge workers while undertaking Knowledge-Intensive (K-I) tasks.

**Virtual (Virtual team):** "Virtual" is a term used to describe something that exists or is brought together via electronic networks, rather than existing in a single physical place. For example, a "virtual team" is a team whose members are not located together and who use electronic networks for communication, collaboration, and work processes.

**W**

**Web browser:** A software program that resides on your computer enabling you to access the internet and view World Wide Web (www) pages and documents. Netscape and Internet Explorer are examples of web browsers.

**White Pages:** In knowledge management terms, a "white pages" is a structured directory of people within an organization, usually in electronic form. It is often the basis for an Expertise Directory or Knowledge Inventory System.

**Work Role:** The often complex role that a knowledge worker is given or takes on. The role reflects the passive-active and learner-teacher behavior. Examples are: Expert and team leader; Apprentice and project assistance; Quality controller.

**Work-Domain Knowledge:** (Also Domain Knowledge) Knowledge that pertains directly to performing primary work such as a design engineer's engineering knowledge, knowledge of systems and procedures for performing design work, etc.

**World Wide Web:** The terms the "internet" and the "web" are often used interchangeably, however the World Wide Web is actually a collection web pages that can be accessed on the internet. The web has become the most popular area on the internet because everyone can view the pages regardless of what kind of computer they are using.

**X**

**XML:** Abbreviation for eXtensible Markup Language. A successor technology to the markup language HTML that is used for creating web pages and documents.

# 11. ACRONYMS

| | |
|---|---|
| AAR | After Action Report |
| AFKN | Air Force Knowledge Now |
| AFRICOM | U.S. Africa Command |
| AKO | Army Knowledge Online |
| AMHS | Automated Message Handling System |
| ANOC | AFRICOM Newcomers Orientation Course |
| ANRS | Automated Notification and Recall System |
| AO | Action Officer |
| AOR | Area of Responsibility |
| APAN | All Partners Access Network |
| APAN | Asia Pacific Advanced Network |
| APQC | American Productivity and Quality Center |
| | |
| B2C2WG | Boards, Bureaus, Centers, Cells & Working Groups |
| BRPT | Battle Rhythm Planning Team |
| | |
| C2 | Command and control |
| C4I | Command, Control, Communications, Computers, and Intelligence |
| CAC | Common Access Card |
| CAS | Collaboration at Sea |
| CCIR | Commander's Critical Information Requirements |
| CCMD | Combatant Command |
| CDCF | Commander's Decision Cycle Framework |
| CENTCOM | U.S. Central Command |
| CIE | Collaborative Information Environment |
| CIKM | Conference on Information and Knowledge |
| CIO | Chief Information Officer |
| CJCS | Chairman of the Joint Chiefs of Staff |
| CKM | Certified Knowledge Manager |

| | |
|---|---|
| CKO | Chief Knowledge Officer |
| COA | Course of Action |
| COCOM | Combatant Command (Command Authority) |
| CoI | Community of Interest |
| COMPACFLT | Commander, U.S. Pacific Fleet |
| CONPLAN | Concept of Operation Plans |
| COP | Common Operational Picture |
| CoP | Community of Practice |
| CoS | Chief of Staff |
| CSKM | Chief of Staff for KM |
| CYBERCOM | U.S. Cyber Command |
| | |
| DAA | Designated Approving Authority |
| DCO | Defense Connect Online |
| DCSKM | Deputy Chief of Staff for KM Office |
| DHS | Department of Homeland Security |
| DKM | Director, Knowledge Management |
| DKMO | Deputy Knowledge Management Officer |
| DKO | Defense Knowledge Online |
| DoD | Department of Defense |
| DON CIO | Department of the Navy Chief Information Officer |
| DROE | Digital Rules of Engagement |
| DRRS | Defense Readiness Reporting System |
| DSEL | Dynamic Synchronization Event Log |
| | |
| ECKM | European Conference Knowledge Management |
| EJKM | Electronic Journal of Knowledge Management |
| eKM | Enterprise Knowledge Management |
| EKMWG | Enterprise Knowledge Management Working Group |
| eKNOW | International Conference on Information, Process, and Knowledge Management |

| | |
|---|---|
| Email | Electronic Mail |
| EPIC | Enterprise Portal for Information and Collaboration |
| EPOC | EUCOM Plans and Operations Center |
| ERM | Electronic Record Management |
| ESA | Enabling Shared Awareness |
| ESB | Executive Steering Board |
| EUCOM | U.S. European Command |
| FAST | Fast Search and Transfer System |
| FD | Foreign Disclosure |
| FDO | Foreign Disclosure Officer |
| FFIR | Friendly Force Information Requirements |
| FOIA | Freedom of Information Act |
| GCCS | Global Command and Control System |
| GeoCOP | Geospatial Common Operating Picture |
| GIAS | Government Information and Analytics Summit |
| HADR | Humanitarian Assistance and Disaster Relief |
| HSIN | Homeland Security Information Network |
| IER | Information Exchange Requirement |
| IJIKM | Interdisciplinary Journal of Information, Knowledge, and Management |
| IJKM | International Journal of KM |
| IM | Information Management |
| IMO | Information Management Officer |
| ISKM | Information Superiority and KM |
| IT | Information technology |
| IWS | Information Warning System |
| JC2-CUI | Joint Command and Control Common User Interface |

| | |
|---|---|
| JCB | Joint Coordination Board |
| JFC | Joint Force Commander |
| JIKM | Journal of Information & Knowledge Management |
| JIPOE | Joint Intelligence Preparation of the Operational Environment |
| JKO | Joint Knowledge Online |
| JLLIS | Joint Lessons Learned Information System |
| JMET | Joint Mission Essential Task |
| JTEP | J037 Training and Exercise Program |
| JTF | Joint Task Force |
| JTIMS | Joint Training Information Management System |
| JTWG | JTEP Manager for Joint Training Working Group |
| JWICS | Joint Worldwide Intelligence Communications System |
| | |
| KA | Knowledge Analyst |
| KA | Knowledge Audit |
| KIM | Knowledge and Information Management Conference |
| KIMB | Knowledge and Information Management Board |
| KIMP | Knowledge Information Management Plan |
| KIMR | Knowledge and Information Management Representative |
| KIMWG | Knowledge Management/Information Management Working Group |
| KM | Knowledge Management |
| KMA | Knowledge Management Advisor |
| KMB | KM Board |
| KMIMWG | KM and IM Working Group |
| KMIS | Knowledge Management and Information Sharing |
| KMNCO | Knowledge Management Noncommissioned Officer |
| KMO | Knowledge Management Officer |
| KMR | KM Representatives |
| KMWG | KM Working Group |
| KPM | Knowledge Process Manager |
| KRF | Knowledge Repository Framework |

| | |
|---|---|
| KSE | Knowledge System Engineer |
| KSI | Knowledge Science Institute |
| LNO | Liaison Officer |
| LOE | Lines of Effort |
| LOO | Line of Operation |
| MARSOC | Marine Corps Forces Special Operations Command |
| MDMP | Military Decision Making Process |
| MNF SOP | Multinational Force Standing Operating Procedures |
| MOC | Maritime Operations Center |
| MPAT | Multinational Planning Augmentation Team |
| MSC | Master Strategic Calendar |
| NCES | Net-Centric Enterprise Services |
| NIPR | Non-Secure Internet Protocol Router |
| NKO | Navy Knowledge Online |
| NLLIS | Navy Lessons Learned System |
| N-NC | NORAD and USNORTHCOM |
| NORAD | North American Aerospace Defense Command |
| NORTHCOM | U.S. Northern Command |
| NSA | National Security Administration |
| OKM | Office of KM |
| OPLAN | Operation Plan |
| OPSEC | Operational Security |
| PACOM | U.S. Pacific Command |
| PFACC | Partnership Of the Americas Collaboration Center |
| PIKO | Personal Integrated Knowledge Orientation |
| PIR | Priority Intelligence Requirement |
| POA&M | Plan of Action and Milestone |

| | |
|---|---|
| PSPT | Portal Services Planning Team |
| R&D | Research and Development |
| RFI | Request for Information |
| ROE | Rules of Engagement |
| ROI | Return on Investment |
| SCO | Security Cooperation Offices |
| SEAT | Secured Enterprise Access Tool |
| SECI | Socialization, Externalization, Combination, and Internalization |
| SHAPE | Supreme Headquarters Allied Powers, Europe |
| SIGEVENT | Significant Event |
| SIPR | Secret Internet Protocol Router |
| SKIWeb | Strategic Knowledge Integration Web |
| SLCS | Senior Leader Coordination System |
| SM | Security Management |
| SME | Subject-Matter Expert |
| SOCOM | U.S. Special Operations Command |
| SOUTHCOM | U.S. Southern Command |
| SPAWAR | Space and Naval Warfare Systems Command |
| SPECAT | Special Category |
| SSC Pacific | Space and Naval Warfare Systems Center Pacific |
| STRATCOM | U.S. Strategic Command |
| TMT | Task Management Tool |
| TRIM | Total Records and Information Management |
| TSCMIS | Theater Security Cooperation Management Information System |
| TTP | Tactics, Techniques, and Procedures |
| TWMS | Total Workforce Management Services |
| UCP | United Command Plan |

| | |
|---|---|
| UISC | Unclassified Information Sharing Service |
| USAFE | United States Air Forces in Europe |
| USARPAC | U.S. Army, Pacific |
| USFJ | U.S. Forces, Japan |
| USFK | U.S. Forces, Korea |
| USSTRATCOM | U.S. Strategic Command |
| VTC | Video teleconferencing |
| XMPP | Extensible Messaging and Presence Protocol |

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The purpose of this paper is two-fold. First, it provides an information resource for development of a Combatant Command (COCOM)-focused Knowledge Management (KM) plan and implementation. Second, it gives an overview of KM in the operational part of the Department of Defense along with findings of KM program development at selected COCOMs. The results will serve as a basis for recommendation to the U.S. Strategic Command (USSTRATCOM) in planning and development of a KM program.

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