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Decision Superiority

A Junior Officer's Practical Guide to Knowledge-Based Operations

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Introduction

Anecdotal evidence suggests the informational videos, Sun Tzu quotes, and training programs designed to spread the word about Information Warfare (IW) to users in the field come across as simplistic and impractical. Service school members produce a wealth of intelligent thought on IW, however, these ideas filter down to the unit level only when the school members themselves graduate into unit level commander positions.

As junior officers in the field, we have neither the time nor the luxury to scale the "wall of separation" dividing the military-academic community from our active quest to train and/or conduct military operations on a routine basis. While we attend IW and Information Operations (IO) training seminars, these tend to focus on technologies, OODA loops, and the theoretical importance of IW. Some of us find ourselves in organizations that include "information operations" in the unit name ("The 544th Information Operations Group"), and some might actually dub us "information operators," but these, at times, appear as little more than definitions and hopes for a practical reality.

And what about those of us who do not explicitly work in IO? The Joint Chiefs of Staff have called on each of us to achieve the mutual vision of Information Superiority, but how do we do that in the finance squadron, from behind the turret of a tank, above the ocean in a Cold War era helicopter stuffed with new technology?

Our individual commands have issued their own visions, published articles on the significance of fighting in the information age, and lauded advances in military technologies, but how can we turn this information into *action*? How do we lead efforts, on a local level, to transform our superior information into what the JCS call "superior knowledge and decisions?"[1]

One answer holding substantial potential comes from the business community, which faces similar informational leadership issues within its ranks. The "competitive edge" increasingly goes to those companies engaging in an active management of their knowledge.[2] Practical suggestions for conducting knowledge management have evolved from several years of theoretical discussion and companies as diverse as those offering data-mining consultation services to those hawking plastic trinkets embrace these suggestions.[3]

This paper offers a practical approach to operating in the information age. While primarily focused towards junior officers, the suggestions also apply readily to the leadership decisions non-commissioned officers and junior enlisted members face. By building a foundational

understanding of knowledge-based operations, and then walking through several straightforward methods to assess an organization's knowledge needs, this paper establishes one basic method by which leaders can actively lead, decide, and innovate in the Information Age.[4]

Knowledge-Based Operations:
The Purpose

Together we praise and bash the progress of technology. It speeds communication and then bogs us down with too much information. We praise our smart weapons, but lament the fact that we have too much intelligence—either contradictory or overwhelming—and information overload slows down the decision on which target to strike. How did we get to this point, and how do we steer a correct course?

Concept for Future Joint Operations: Expanding Joint Vision 2010 made its debut several months after *JV 2010*, providing a practical framework for the vision that paved the way for joint operations in the information age. It echoes *JV 2010*'s praise for technology, noting, "Information-specific technologies give us a unique opportunity to achieve more than just incremental improvement to existing capabilities."[5] As one works through the chapters of *Concept*, the call for technological innovation seemingly dominates other themes, and technology enthusiasts and vendors rushed to fill the void. A careful reading, however, makes it clear that the CJCS intended no such emphasis, but rather, intended to emphasize technology as a force worth domesticating.

With military units around the globe rushing to acquire and develop the latest battlespace management technologies, and working hard to place the fastest communications and information systems on the desks of decision makers, *Joint Vision 2020* absolutely qualifies any mis-readings of *JV 2010* as a mandate for technology. The problems with focusing on technology—on gathering more information at an ever-quicker pace—is that "there is a risk of outstripping our ability to capture ideas, formulate operational concepts, and develop the capacity to assess results."[6] *JV 2020* states unambiguously that technology, while paramount, is secondary to "the development of doctrine, organizations, training and education, leaders, and people that take advantage of the technology."[7]

Joint Vision 2020 clearly calls for innovation, and it extols the importance of *information superiority*, calling it the "key enabler and capacity for our innovation."[8] The definition of information superiority has remained unchanged since *JV 2010* was published; it is "the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying and adversary's ability to do the same."[9] *Joint Vision 2020* puts a new twist on information superiority, though, and recognizes that information in a vacuum accomplishes nothing. Leaders use information, transformed into *knowledge*, to make the best possible decisions:

> "Information superiority provides the joint force a competitive advantage only when it is effectively translated into superior knowledge and decisions. The joint force must be able to take advantage of superior information converted to superior knowledge to achieve 'decision superiority'—better decisions arrived at and implemented faster than an

opponent can react, or in a noncombat situation, at a tempo that allows the force to shape the situation or react to changes and accomplish its mission. Decision superiority does not automatically result from informational superiority. Organizational and doctrinal adaptation, relevant training and experience, and the proper command and control mechanisms and tools are equally necessary."[10]

With this strong endorsement from the CJCS, a junior office needs guidance, not theory, to advance efforts to achieve decision superiority. *Joint Vision 2020* offers insight on where to start, stating that the purpose of information operations [IO] "is to facilitate and protect US decision-making processes, and in a conflict, degrade those of an adversary."[11] IO are "inextricably linked to focused logistics, full dimensional protection, precision engagement, and dominant maneuver, as well as joint command and control."[12]

While a specialized unit might engage in an explicit IO mission, *JV 2020* calls for IO across the spectrum of military operations. How does one implicitly conduct IO, no matter what his or her individual mission focus? As the introduction to this paper states, the corporate world is now aggressively pursuing knowledge management (KM) as a means to an end-state of competitiveness. KM acknowledges the supremacy of knowledge to information (see quoted paragraph above), and incorporating IO across operations might be more easily understood as engaging in knowledge-based operations.[13]

Knowledge-Based Operations:
The Fundamentals

At its most basic level, KM theory argues that the key to success within any organization lies in its ability to create, tap, and apply knowledge. The idea that prevails in both academic and practical writing about KM is that successful organizations must "provide the right content to the right people at the right time" in order to succeed.[14] Turning this theory into practice requires a basic understanding of what the theory calls for.

The authors of *Managing Knowledge: Building Blocks for Success*, begin by explaining the difference between data, information, and knowledge.

> When rules of syntax are applied to symbols, they become data. Data are capable of interpretation within a particular context, thus providing the receiver with information. When *information is networked* [italics added for emphasis], it can be used in a particular field of activity, and this we may call knowledge.[15]

This definition seems to suit the CJCS call to "convert" information into knowledge: networking is the transforming process. "Marine Corps Doctrine Publication 6, Command and Control", offers a similar definition, placing knowledge in the context of the armed forces, calling this idea the "Information Hierarchy." This viewpoint begins with collected, raw data (see **Figure 1**[16]). Formatted, plotted, translated, correlated data is called processed data. Analyzed, integrated, evaluated data is called knowledge. A Marine Corps officer synthesizes knowledge and gains understanding—*the* tool for decision-making.[17]
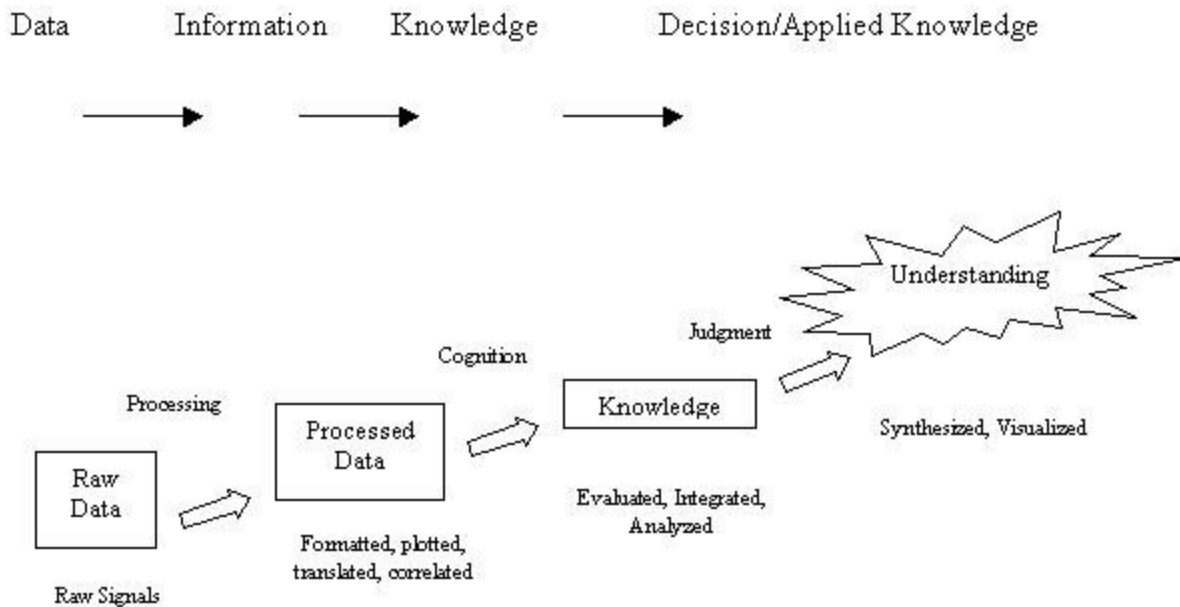
Figure 1: The Information Hierarchy

By recognizing the difference between knowledge and the simpler ideas of data and information, a leader can more readily assess whether she can make a good decision, or if more data, information, and knowledge will justify delaying the decision.

Effective decision-making requires situational awareness. Recognizing the right knowledge at the right time will maximize a decision-makers situational awareness. The three types of knowledge described here comprise battlespace knowledge—knowledge of the battlespace that is the basis of a decision.

Functional knowledge is "expert" knowledge. Experts assigned to a particular military career field possess this type of knowledge, and it generally sets them apart from other members of a larger organization. For example, an Air Force Information Manager holds certain expert knowledge relating to database management, file plans, and official correspondence. The amount of expert knowledge can vary, but specific milestones of expert knowledge must be attained before an information manager can upgrade his or her skill level. Experts *know what* to do in a particular situation, and they *know why* it must be done.[18] (p. 30)

Operational knowledge is "based on action." Operational knowledge is the knowledge a sailor gains through on-the-job training. It is the experience an action officer gains as she plans and executes increasing numbers of projects. Action officers, and skilled technicians *know how* to do their jobs efficiently. (p. 31)[19]

Contextual knowledge "arises by operating in specific environments." It is the knowledge a pilot uses to fly a successful mission whether over Kosovo or enforcing the Southern Watch no-fly zone. It is the knowledge a personnel technician uses to effectively operate in a squadron orderly room, or in the base military personnel flight. Effective warriors *know where* and *when* to apply their experience and expertise.[20]

Battlespace knowledge enables decision. It is the sum total of the three types of knowledge listed above and allows a Joint Force Component Commander to effectively prosecute a war. It is the knowledge an acquisition officer uses to integrate the *right* new software into operations. It is the knowledge an NCO uses to run an orderly room. Battlespace knowledge allows a leader to understand the situation, why she must act, how she must act, as well as when and where to act.

Knowledge of any type may be described as tacit (or implicit) knowledge, or explicit knowledge. An officer who understands these two types of knowledge can better extract the knowledge from its sources and build his or her battlespace knowledge.

Tacit knowledge is the unspoken knowledge a sharp personnel NCO uses to consistently produce quality results in the performance of her duties. It's her attention to detail, her project management intuition, and her "knack" for turning "bad" junior enlisted members into the unit's young stars. If commanders could tap this knowledge and give it to everyone in the unit, they would thrive operationally.

Tacit knowledge, while often positive, is unspoken and undocumented, and can lead to several pitfalls: "it can be wrong, it's hard to change, and it's difficult to communicate."[21] Think of the problems one could encounter with tacit operational (gained through experience) knowledge. For example, based upon years of precedent, an environment emerged in the military in which troops learned that persistently asking an uninterested co-worker for a date "won't get me in trouble." The Department of Defense consequently spent countless duty hours and millions of dollars ensuring each of its members realize it's inherently *wrong* to engage in any form of sexual harassment.

On the other hand, **explicit knowledge** is relatively easy to identify: it's tangible, accessible, and practical knowledge; it's "everything that remains when the employees go home."[22] Documented in web pages, continuity books, training manuals, and sophisticated databases, explicit knowledge gives leaders a tool to actively conduct knowledge-based operations. Leaders foster environments in which their warriors can successfully accomplish their duties; making the right tacit knowledge explicit, correcting it when wrong, and communicating it when right, gives everyone access to knowledge they need to succeed. The next section offers suggestions to help leaders identify which tacit knowledge merits transformation, and, more importantly, it describes how to determine what types of knowledge, tacit and explicit are important to your organization.

Knowledge-Based Operations:
The Practical Approach

These approaches are very straightforward: in fact, most military organizations probably engage in several of these activities already. What makes this approach "new" is the application of this knowledge. By assessing the type of knowledge an organization needs to conduct knowledge-based operations and comparing it to what knowledge the organization already has (or can quickly access), a junior officer can readily isolate the organization's knowledge gap. Understanding this gap allows organizations to work around weaknesses, concentrate their acquisition needs, and focus their innovation efforts. Other approaches listed help leaders adapt their missions towards *the JV 2020* goal of achieving information superiority, with each of these

suggestions centering on innovation. Each of these approaches enables leaders to overcome the problems of dwindling retention and high turn-over: documenting knowledge and making it readily accessible greatly reduces "spin-up time" for new members and gives expert knowledge to non-experts. Again, by conducting knowledge-based operations, decision-makers can always readily identify and access the knowledge they need to make the right decision.

Step 1. *Identify the types of knowledge your organization needs to succeed operationally* (Needs Assessment)

"Knowing what you need to know" enables knowledge-based operations: proceeding without this knowledge is like a train with out a track—it lacks direction. In business circles, the step involves identifying customers and what their specific needs are. Since the late 80s, most military units have engaged in the process of "identifying their customer," and junior officers often engage in this practice below the unit level to focus their own circles of influence. What's new to this process is going beyond identifying the customer: this step involves truly understanding what the customer wants and needs. Documenting this knowledge will also help leaders determine who their customers are not, which can prevent needless effort on the organizations part, and prevent information overload on the part of the "non-customer."[23]

Who uses the knowledge our organization creates?

> Who reads our reports (and why)?
> Who makes decisions based on the work we do (and why)?
> Who do we brief regularly (and why)?
> Who do we send our trip reports to (and why)?
> Who cannot do their job if we don't do our job (and why)?
> Who do we (I) lead (and why)? (Think beyond chains of command to working groups, project coordination, etc.)

How is our knowledge applied?

> Is anyone not using our knowledge that really should use it?
> Of the organizations we're sending our knowledge to, which are actually using it?
> What decisions are made using our knowledge applied?
> What additional information do our customers need to apply the knowledge we provide to them?
> Are their barriers to accessing our knowledge that make it undesirable?

These boxes suggest a starting point, but answering these questions presents certain challenges, particularly if your organization has traditionally conducted is operations in a knowledge vacuum. The goal here is to really understand the "give and take" of knowledge that occurs between organizations, and to pin-down whether the information networked between these separate entities actually engenders the right knowledge. Even in organizations praised for their operational excellence, knowledge transfer can be misguided.

Understanding the customer "is the worst managed intangible asset,"[24] and a condition of ignorance exists in a surprising number of organizations, including many large businesses where understanding the customer is vital to profitability. Knowledge management practices call for "dwelling in the mind of the consumer,"[25] which means understanding both what the consumer needs, and teaching them about the provider's organization. This can be done through a sort of organizational cross-flow.

In order to make up manning shortfalls in one career field, the Marine Corps, like the other armed services, will assign an officer to a job outside his or her field of expertise. For example, Marine Corps aviators will often spend a tour of duty serving as a unit intelligence officer. Although the learning curve is steep for performing assigned intelligence duties, the aviator takes significant knowledge back to the aviation community when he returns to flying, because of his ability to "dwell in the mind of the consumer." The aviator not only understands the importance of specific types of intelligence, he also understands the type of knowledge the intelligence shop needs from the aviators to do their jobs effectively.[26]

After establishing the content an organization and its customers need, focusing on the context of the knowledge will shed further light on knowledge areas where an officer can focus his efforts to initiate process improvement.

What form does this knowledge take?

Do we make decisions based on verbally passed knowledge (telephone conversations, meetings, briefings, etc.)? Do we make decisions using analyzed data? Do we need a picture to strike the target? Will the coordinates suffice? Do we use trended data (graphs, pie charts, spreadsheets)?

How quickly do we need the knowledge?

Which is better: faster or more accurate? Which knowledge do we need first? Second? When do we use knowledge? Which sources provide us the same knowledge? Which is the most timely?

These boxes represent starting points for gauging the importance of the knowledge an organization needs. They may not even be close to the actual questions a unit asks to assess knowledge importance, but they will undoubtedly shed light on a necessary process.

Documenting the knowledge identified here makes the exercise practical; obviously conducting this exercise without establishing the knowledge in a useable format is a waste of time. One can archive this knowledge in a continuity book, but a computer-based application provides the quickest access and easiest method to update or correct content. The two most effective tools for documenting this knowledge are web pages and spreadsheets. Web pages can display the specifics about a customer in an easily understood narrative, and offer the advantage of quickly accessing specific knowledge through the use of a search engine. A spreadsheet offers flexibility and utility to the knowledge tracking process, because the knowledge gathered can be readily compared to other knowledge sources. Because it's so important to make knowledge quickly accessible to everyone within an organization, the ideal solution is likely a spreadsheet accessed through a web page, via a shared folder on a common network drive, or a part of a larger database (also networked for those who need it). **Figure 2** provides an example of how this spreadsheet might look.

Product	Provider	User	Format	Frequency	Timeliness
System Status	7ACOMS	Me	??	Weekly	As needed
Threat Briefing	Me	555 FS	Briefings	??	Prior to sorties
RWR Gear Settings	S&T Community	Me	??	??	Delivery: per AFI System Capability: Real Time
Imagery Products	Me	??	Annotated Imagery	As Annotated	??
Analytic Expertise	??	Me	Personnel	N/A	ASAP

Figure 2: Needs Assessment

The question marks in the table above indicate a lack of knowledge that can be easily gained by talking to customers and other members of the organization.

Step 2. Inventory the types of knowledge your organization currently possesses or has reliable access to

As stated previously, an inventory of an organization's current knowledge (which includes all knowledge the organization can reliably access either from its own resources or from a source external to the organization) compared to the knowledge an organization needs (identified in step 1) highlight knowledge gaps that can focus many basic leadership processes. The amount of time necessary for taking an accurate inventory of the knowledge a unit possesses will depend on the size of the organization. The suggestions provided here focus on breaking the task into smaller projects, and on ways to track down elusive types of information.

While the identification process allowed the unit to identify the extent of battlespace knowledge necessary for successful decision-making, this process allows a unit to recognize the level of battlespace knowledge it actually possesses. The "delta" between the two presents an opportunity for junior officers to close these gaps, maximize their battlespace knowledge, and step closer to achieving information and decision superiority. These boxes suggest ways to approach this task—decision-makers engaging in the art of leadership can address the task as they see fit, and fill in these gaps with as much or as little knowledge as they need to consistently make good decisions.

Break the task into subtasks

If you're looking across a unit, break down the inventory task into sub-units, such as divisions, branches, and flights.
Assign leadership to the inventory subtask forces
Begin with technology: the information in databases is easy to account for
Tackle tacit knowledge second, when those being asked for their knowledge understand the concept

Account for every category of organizational knowledge

Remember knowledge can be functional, operational, and contextual—what does the unit possess
What are the organization's areas of expertise?
Where are the fields of expertise?
What unique knowledge do unit members possess?
What training have members been through?

Step 3. Translate tacit knowledge into explicit knowledge and make knowledge grow

How many times have officers started a project from scratch, spent a solid week on it, shown it to their operations officer only to have him say "That's great! We did the exact same thing when I was at Offut!"? How many times have NCOs hunted through databases on the weekend, trying to find out who Private First Class Everest's supervisor is, only to find three names listed, none with phone numbers? How many times have cell chiefs tried to find out who in the squadron has

analytic experience in South East Asia, but can't get a straight answer because everyone seems to work the opposite shift of the chief?

This step focuses on making the knowledge identified and inventoried in steps one and two accessible to decision-makers. Time is wasted in each of the above scenarios because knowledge was not shared or because it cannot be found. Missing or mismanaged knowledge can slow or even halt the decision-making process, but avoiding these scenarios is relatively easy to do. Someone always has an answer to these dilemmas, probably a sharp Senior NCO who seems to know everything the O-6 and the E-1 did over the weekend, what their favorite foods are, and every assignment they've ever taken. If the junior officer happens to know this Senior NCO (and if the NCO likes her), she's in luck: she has a reliable source of tacit knowledge. However, if the NCO works the shift opposite the officer's his knowledge is useless—unless it's effectively shared with others.

Initiate Corporate Yellow Pages

Corporate yellow pages allow decision makers to access the right knowledge at the right time.

Every text purporting to provide readers "practical guidance" on knowledge management raves about "corporate yellow pages," a simple though extremely effective means of sharing knowledge. Like the yellow pages at home, corporate yellow pages are a reference, annotating sources of knowledge. The yellow pages at home provide access to someone who can fix the electrical system in the Volkswagen; corporate yellow pages allow decision makers to access the right knowledge at the right time, for example they can provide access to someone on the other shift who can help out with the South East Asian analytic problem. Yellow pages not only provide decision-makers with the right information at the right time, they minimize organizational information overload. They can eliminate the unnecessary e-mailing of trip reports, meeting minutes, and mission summaries to bosses who don't even know if they need to read them.

While many units have built informational databases in the past, only to see them fail, if managed properly, they are terrific sources of information. One of the keys to success is to make the database as accessible as possible.[27] Obviously, secure and privacy act information must be safeguarded, but why can't everyone in the organization know that Sgt Hillary is PFC Everest's supervisor? Why can't everyone in the Wing know that the 97th at Offutt was cited as having the most diverse snack bar in the command? Corporate yellow are full of information useless to many, but invaluable to the right person at the right time. They allow decision-makers to extract the information they need on demand.

Initiatives like the yellow pages suggested here fail because leaders force their troops to maintain them, even if no one sees the value. Little compares to the tedium of updating massive databases, and very few commanders will willingly give up their much needed information managers or systems experts to do what could become a full time job. Making it a full time job for one person, or making it an on-going requirement for a variety of people in the unit will turn a good idea into a bureaucracy everyone resents, and forcing people to use them will doom them to non-use. "Knowledge workers, who create value [workers creating and using information to improve

the way they operate—just about everyone in today's armed forces], don't like systems. Customers, who pay for value, don't like systems either."[28]

Like the knowledge inventory, these yellow pages should be networked, made available on-line. The box below lists examples of knowledge to list in an organization's corporate yellow pages.

Detailed chains-of-command
Detailed training records
Biographical data on every unit member
Descriptions of unit "best practices"
Telephone numbers
Duty Descriptions

Creating the database will take the most time, but implementing simple rules for their use and maintenance—all current and new members of the unit fill out basic biographical information about themselves listing technical schools and areas of expertise—will probably prove its value. Encouraging further development to make even more practical (say, linking other internal documents the unit maintains such as training progress databases), allowing flexible use as it establishes itself as a tool, and eliminating if becomes bureaucratic (i.e., no one uses it, or it's too tedious—both unlikely scenarios) will ensure that it only adds value to operations.

Make Debriefing Matter of Habit

Debriefing is personal, responsive, and can be tailored on the fly to a participant's specific needs.

Another method for making tacit knowledge explicit to those who can use it is engaging in debriefs. In their paper, "Cognitive Skills for the Naturalistic Battlespace: a Human Performance Enhancement Strategy for US Forces," Troy Thomas and Sam Grable argue for a comprehensive enhancement strategy for US military members to operate successfully in a "naturalistic setting characterized by time, compression, uncertainty, and high stress."[29] To successfully accomplish the mission, the authors offer several simple, yet remarkable suggestions for developing the necessary mental skills for such an environment. One effective tool is the debrief:

> For the combat pilot, debriefings are an integral part of any mission. In fact, training missions may be considered successful, despite substandard flying, if the debriefing is excellent. Often, more learning occurs during the debriefing than the actual flight. In-depth debriefing skills are important because critical learning points typically reside not in the first (and simplest) level of detail (e.g. airspeed, visibility, etc.), but in the underlying mental processes. For example, a debrief should include discussions regarding what assumptions were made, where these assumptions led, what critical cues were used, what was ignored, what feedback was pursued, opportunities for process improvement, and so forth. Good debriefings should expose assumptions and processes that led to particular decisions and actions.[30]

The interaction between pilot and debriefer presents an extraordinary learning opportunity for both officers, and by extending the debriefing exercise to a variety of mission areas (post-exercise, post-project, post-decision, etc.), a leader can foster an environment in which the importance of thought and knowledge development becomes a fundamental part of operations.

While not as inherently useful as the debrief itself, documenting theses debriefs allows the pilot, the debriefer, and anyone responsible for their training to re-use the knowledge emerging from the session repeatedly. Trainers and planners can use this knowledge to build realistic training or exercise scenarios (another human performance enhancement strategy recommended by the authors). Anyone forced to spend any classroom time in front of a computer knows how grueling (and ineffective) computer-based training can be; debriefing is personal, responsive, and can be tailored on the fly to a participant's specific needs.

In Leadership is an Art, Hermann Miller CEO Max DePree writes that effective leaders are those who promote "empowerment," "teamwork," and "coaching" within their organizations, which are cornerstones to knowledge management.[31] This personal responsiveness seems to be lacking in many organizations that mindlessly throw technology at leadership issues,[32] but good leaders employ technology in ways to make organizational processes more human. While the Air Force Materiel Command's Air Force Knowledge Management (AFKM), might initially come across as another database networking information for web users, it really focuses on fostering teamwork, empowerment, and coaching:

> AFKM applies commercial knowledge management concepts and technologies to address Air Force business problems and includes the following components: lessons learned database, collaborative workspace for communities of practice, and internet- based learning technology to provide training via the Web. The objective is to enhance job performance by integrating the corporate lessons learned from past experience and current training technology in a collaborative environment to support current and future projects.[33]

Designed and used primarily within the development and acquisition communities, it is open to any Department of Defense user (accessing the site from a ".mil" domain computer), and reviewing will offer a browser further insight into the military's work with knowledge management concepts.

Build Communities of Practice

The practical corollary to this is to foster group learning.

The AFMC web site description mentions the term 'communities of practice.' The phrase appears in a number of knowledge management texts, and, put into operations, a community of practice offers participants an informal, though active, opportunity to learn, build knowledge, and increase skills "as in an apprenticeship system."[34] The obvious example of a community of practice is the informal alliance between senior enlisted personnel and their more junior troops in the form of mentorship. The Institute of Research on Learning (IRL) studies how people learn, focusing on learning in the Information Age. Over the last ten years, the "fundamental finding in

IRL's work is that learning is a social activity…learning happens in groups."[35] The practical corollary to this is to foster group learning.

Group learning exists quite openly somewhere in every organization, but probably goes unnoticed since it is not generally a formal piece of a unit's training plan. Say an Air Intelligence Squadron's production flight's primary concern is to identify areas of dangerously configured surface-to-air missiles: that shop shares (teaches) this knowledge with the target development shop, which earns its paychecks identify targets designed to eliminate high-level threats. At the same time, the target development shop must be open and specific about the types of information they need to develop meaningful targets. By better understanding the targeting flight's functions, a member of the intelligence production flight becomes a far more valuable asset to the Air Force—she not only understands her sister flight's mission better, she can use this tacit knowledge about targeting if she happens to deploy to another organization during a time of contingency.

How does a leader capture the human knowledge he fosters in these informal professional exchanges? Junior officers are trained to formalize a working group, to hold routine meetings, and to ensure anyone who misses the meeting has access to the meeting minutes. But this does not mean this idea leads to knowledge growth. The junior officer should create an environment conducive to learning knowledge that fills in the gaps of the needs assessment (steps one and two). Adding the informal professional exchange to the training plan, or making it another mandatory weekly meeting, could very well undermine its intended results.

Thomas Stewart cites a study in which researchers studied two major projects in a large American corporation. The first project, a significant upgrade in the company's technology, was heavily managed with routine meetings held "to keep everyone up to speed." The other was a "radical innovation" involving sessions that were extremely informal in nature. The heavily managed team failed because it created an environment hostile to learning: known knowledge was withheld because committee members either mistrusted or disagreed with each other, or members simply did not want to listen to one another. The informal group was "self-organizing…informal…egalitarian," and succeeded wildly.[36]

Although the military, with its clearly defined chains of command, is not exactly egalitarian, junior officers should focus on creating relatively informal environments in which customs and courtesies are adhered to, but in which every member of the group feels entitled to voice his or her opinion. See the following sections for specifics on actually doing this.

Step 4. "Foster Organizational Innovation"—tying it all together

By encouraging open communication and lateral thinking, junior officers can explore new ways of getting the job done. Joint Vision 2020 calls on leaders to encourage innovation through experimentation and to grant a "reasonable level of tolerance an idea fails."[37] One cannot order her troops to engage in innovation, because "no one has found a way to create creativity."[38] But one can empower troops to seek it, recognize it, and implement it.

Encourage Openness

"Knowledge written and stored in computers is effective only about 20 percent of the time: you can either read the operating instructions of your new video card for one hour, or talk to a colleague for five minutes to figure out how it works."[39]

As already shown in the previous section, open organizations allow communication to move readily between people and organizations, and this leads to a growth in organizational knowledge. Quite simply, "the real difference between frontrunners and 'pack members' in terms of innovation is the way in which they organise their innovation processes…[this happens through] better communication and steering of knowledge processes."[40] Steering knowledge processes means leading efforts to document known and needed battlespace knowledge. Better communication involves making the right information available to the right people at the right time, and building an organizational climate in which knowledge is openly shared between the people with ideas and those who can turn them into action.

Even if the boss claims she has an "open door policy," communication to her rarely flows openly because of a military culture that places heavy emphasis on not circumventing the chain of command. Although some organizations demand strict protocols for communication, technology has already initiated a change in the culture. While members previously needed chain-of-command approval to attend an out-of-state meeting, the same meeting can take place with little notice via video teleconferencing (VTC). A junior enlisted member who might have previously avoided speaking to the O-4, now feels relatively comfortable sending him an e-mail note, and more than likely, the O-4 doesn't mind the open communication, because he receives honest insight into a frustration a number of the troops may share.

A simple quote points out the intuitively obvious benefit to encouraging open communication. "Knowledge written and stored in computers is effective only about 20 percent of the time: you can either read the operating instructions of your new video card for one hour, or talk to a colleague for five minutes to figure out how it works."[41] That sort of efficiency (perhaps made possible by your organizational yellow pages) is worth noting. But how does open communication lead to innovation? If a leader is trying to minimize the amount of extraneous information floating about an organization, shouldn't strict protocols be enforced?

To achieve excellence, Aristotle recommends a moderate approach to all practices. Some units enforce strict military protocols with the threat of disciplinary action, and all but the most confident junior enlisted members will be frightened into silence with such a policy. At the same time, too open a policy could lead not only an unmanageable explosion of information within an organization, but also to a climate in which customs, courtesies, and military discipline are ignored.

Von Krogh, Ichijo, and Nonaka, three of the "kings" of knowledge management list several practical suggestions to create open communication to encourage the growth of knowledge and innovation, without making the communication unwieldy. Two of their ideas are described here. Open communication does not involve brainstorming sessions, orders to send new ideas to the boss, or weekly "stand-ups" in which shop bosses speak their minds. Rather, open communication comes from personal conversations with the people who do the organization's work.[42]

Von Krogh, Ichijo, and Nonakasay leaders must first encourage active participation in conversations, soliciting ideas on where the organization is going, how it performs its mission, and about its values. A good leader will know where to find answers, going directly to those with the right functional knowledge in the area in which he or she wishes to foster innovation.[43] Second, the officer must establish conversational etiquette to maximize the utility of conversations. Figure 3 contains eight rules for managing a productive conversation that are readily adaptable to staff meetings.[44] These two steps will give an officer a "taste" for the ideas in his or her organization, and allow the leader to proceed as his or her leadership style dictates.

Avoid unnecessary ambiguity (do not conceal a lack of knowledge) Avoid intimidation Avoid exercising authority (do not use rank to steer conversations) Avoid premature closure Be brief Be orderly Allow free and courageous speech Be honest

Fig 3: Conversational Etiquette

Lateral Knowledge

While fostering open communication encourages innovation, applying a unit's knowledge laterally actually creates new knowledge, which can be a component to innovation. Going back to functional and operational knowledge, a junior officer can apply his section's expertise (functional knowledge) and his leadership experience (operational knowledge) to a new environment (context), and in the process, innovates/creates new knowledge. Several examples of this applied knowledge are listed below:

An officer with strong project leadership skills and two NCOs possessing substantial database development expertise, won't innovate anything if they spend all of their time building databases to track budget issues. They innovate when they apply those same skills to track unit manning, maintenance history, knowledge assets, etc.

A crisis breaks out in Kosovo; war planners in the Air Operations Center at Vicenza adapt lessons learned in the Air Operations Center at

> Osan AB, Korea and quickly gain air
> superiority.

> The lieutenant applies the lessons he learned as
> the squadron snack officer (SNACKO) while
> stationed at Offutt, assembles the most diverse
> snack bar at Buckley, and quickly gains a
> reputation as the "Chubby Lieutenant."

Lateral knowledge, as the name implies, is knowledge gained from sources close to, yet external to knowledge that an organization possesses. It is the knowledge the production flight shares with the targeting flight, the intelligence officer shares with the pilot, the British maintenance officer with the American maintenance officer.

Building lateral knowledge does not equate to innovation, it is simply a method of encouraging it. This process is as human as processes come. Computers do not nurture or facilitate innovation: the process is a form of leadership, an art.

Conclusion

The practical suggestions presented in this paper are merely a starting point for conducting knowledge-based operations. They are only processes, algorithms for getting closer to an end-state of decisional certainty. An officer's personal leadership style—perhaps an emphasis on "gut instinct" over facts—will certainly shade the degree to which he or she engages in the practices described here. Achieving decision superiority in an absolute sense is impossible, but these suggestions will aid officers in recognizing what battlespace knowledge they possess, and to leverage that knowledge to make the best possible decision a scenario warrants. While achieving these visions across the spectrum of military operations will take a larger, more general effort than the one described here,[45] officers embracing these concepts will at least, if not "changing the world," lead with a better understanding of their organization's knowledge, and attain a superior battlespace knowledge to the one they currently possess.

Notes

1. Chairman of the Joint Chiefs of Staff (CJCS), Joint Vision 2020. (Pentagon, Washington D.C.: US Government Printing Office, June 2000) p.11 Obviously important reading for any military member, JV 2020 is interest reading, too—while it continues many of the themes introduced in JV2010 in 1996, it really addresses some new material, and the context has shifted.
2. Jerry Honeycutt, Knowledge Management Strategies. (Redmond, WA: Microsoft Press, 2000) p. xvi.
3. Thomas J. Stewart, Intellectual Capital. (New York, NY: Doubleday, 1997) p. 162. Data-mining note (not included in Stewart's work): Browsing through magazines such as

Information Weekly and Intelligent Enterprise will impress any reader with the vast numbers of data-mining, data-warehousing, and customer relations management software available on the market.

4. Technology, the information revolution, and Joint Vision 2020 justify this work, but these are really only a context in which we conduct operations: what follows is a brief discussion of applied knowledge, and how one translates knowledge to successful operations.
5. The Joint Chiefs of Staff (JCS), "Concept for Future Joint Operations: Expanding Joint Vision 2010" (Pentagon, Washington, D.C., US Government Printing Office May 1997) Chapter 5, Section 9, p. 38.
6. CJCS, p. 11.
7. Ibid., p. 3.
8. Ibid., p. 10.
9. JCS, p.i.
10. CJCS, 11-12.
11. Ibid., p. 34.
12. Ibid., p.36.
13. In the business world, one can trace the roots of contemporary KM theory studies initiated at several East Coast business schools in the 1960s. In the early 1990s, the idea of knowledge really began to take shape in the form of theories derived from case studies of companies that successfully adapted to technologies allowing users to accumulate and access information more rapidly than ever before. People like Leif Edvinsson, Director of Intellectual Capital at Skandia, a Swedish insurance company, pushed to actively manage information and transform it into knowledge—and in doing so, pioneered the use of knowledge to transform organizations and processes to improve business. Books like Peter Senge's The Fifth Discipline (1990), Ikujiro Nonaka and Hirotaka Takeuchi's The Knowledge Creating Company (1995), Working Knowledge by Thomas Davenport and Laurence Prusak (1997), and Thomas Stewart's Intellectual Capital (1997), inspired companies to buy knowledge management software, systems, and consulting services.
14. Wayne Applehans, Alden Globe, and Greg Laugero, Managing Knowledge: a Web-Based Approach, (Reading, MA: Addison-Wesley, 1999) p. 17 While not cited much, the authors of this text do for corporate Knowledge Officers what this paper hopes to accomplish on a smaller scale for junior officers: their writing is very basic, and very practical. Compared to a growing number of competing KM 'how-to" books, this text is very to the point: it establishes their rationale for conducting KM early, and then proceeds to a step-by-step approach to implementing it within an organization.
15. Gilbert Probst, Steffan Raub, and Kai Romhardt, Managing Knowledge: Building Blocks for Success. (Chichester, UK: John Wiley & Sons, Ltd, 2000) p. 15-16.
16. Marine Corps Doctrine Publication (MCDP) 6, Command and Control. (Washington, D.C: Department of the Navy, Headquarters United States Marine Corps, 1996). Adapted from an illustration titled "The Information Hierarchy," p. 67.
17. MCDP 6, 1996, p 66-67.
18. J Friso den Hertog and Edward Huizenga, Series on Technology Management: The Knowledge Enterprise. (London: Imperial College Press, 2000) p. 30.
19. Ibid., p. 31.
20. Ibid., p. 31.

21. Stewart, p. 73.
22. Von Krogh, Ichijo, and Nonaka p. 92-93.
23. Stewart, p. 134.
24. Ibid., p. 144.
25. Von Krogh, Ichijo, and Nonaka, p. 60.
26. Interview with Major Dan Rodman, at the Marine Air Weapons and Tactics School, Marine Corps Air Station Yuma, AZ, 24 August 2000.
27. For technology enthusiasts, rest assured, your interests are a driving force in KM, though a discussion of specific technologies makes little sense in a practical introduction to employing knowledge-based operations, because technologies are changing too rapidly to make them worth documenting. Reliability is another liability to discussing these cutting-edge technologies. Data-mining software, "a merry band of technologies that includes artificial intelligence (AI), predictive modeling, pattern recognition, and visualization," holds great potential for delivering the right knowledge to the right users at the right time, "does not work miracles overnight." (Stodder, David, "Data Mining: New Economy Wizardry?" Intelligent Enterprise, 29 September 2000, p. 14) This is still true, in spite of the fact that (literally) hundreds of companies employing the nation's brightest minds and spending mind-boggling sums of venture capital have been trying to fine-tune data-mining software for years. Apparently, developing a successful piece of smart software requires improving a tool's ability to accurately retrieve the information a user requests. The best search engines on the market (and under development) produce accurate results in only 3 of 5 data pulls. (Grushkin, Barry, "Context Dependency," Intelligent Enterprise, 29 September 2000, pg. 20). Once developers learn to overcome a number of complexities (See Grossman and Frieder's Information Retrieval and Heuristics), these tools may make our jobs infinitely easier. This is not to suggest that human-based processes will allow for the delivery of the correct knowledge to the correct users at the correct time, 100 percent of the time. It serves more as a warning that even deep budgetary pockets will not solve organization inefficiencies with technology. While many junior officers work to develop technologies to help us do our jobs more efficiently, and although many can influence organizational budgets—even as organizational commanders—it's probably safe to say that none has the money to buy the software or networks necessary to conduct successful, knowledge-based operations.
28. Stewart, p.140.
29. Troy S. Thomas and Sam Grable, "Cognitive Skills for the Naturalistic Battlespace: a Human Performance Enhancement Strategy for US Forces," Draft p. 1.
30. Ibid., p. 16.
31. Stewart, p. 50.
32. Ibid, p. 48. At the dawn of the 20th Century, a mature industrial age gave birth to Henry Ford and his successful, massive assembly line attended to by a giant workforce. Comprised of workers who were prodded along and encouraged to mimic the unthinking efficiency of the machine parts of his auto-plant, Ford incorporated the cutting edge management techniques of Frederic Winslow Taylor whose scientific management called on workers to become more machine-like. The US Military succeeded similarly by industrializing its soldiers, sailors, and airmen, driving them towards machine-like efficiency in technologically marvelous tanks, ships, and airplanes.
33. http://afkm.wpafb.af.mil/ This is Air Force Knowledge Management.

34. Von Krogh, Ichijo, and Nonaka, p. 179-180
35. Stewart, p. 95.
36. Ibid., 97-98.
37. CJCS, p. 14.
38. Coakley, Thomas P. Command and Control for War and Peace. (Washington, D.C.: National Defense University Press, 1992) p. 110. Coakley devotes an entire section (p. 111) to the impossibility of creating creativity: "But no one has provided evidence to contradict the poet John Yeats' assertion: 'That which is creative must create itself." Creativity appears to be much a gift of God, Fate, or Chance as "art" is. We can use the personality profiles developed by behavioral scientists to try to select creative people to become leaders. We can support strong curricula in literature and mathematics. But we can't create creativity ex nihilo. To guarantee a creative genius comparable to a Thomas Edison, a William Shakespeare, a Frank Lloyd Wright, or a General Patton, we would have to recreate the lives, environments, and experiences of those individuals. And that of course is impossible."
39. Von Krogh, Ichijo, and Nonaka, p. 131.
40. The Knowledge Enterprise, p. 56-57.
41. Von Krogh, Ichijo, and Nonaka, p. 131.
42. Ibid., p. 132.
43. Ibid., p. 132-134.
44. Adapted from Von Krogh, Ichijo, and Nonaka, p. 135.
45. One example of a broader effort is AFKM (http://afkm.wpafb.af.mil/), described earlier in the paper.

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