



# Review of Team Collaboration Tools for Crisis Response in the Military and Government

Command and Control Research and Technology  
Symposium

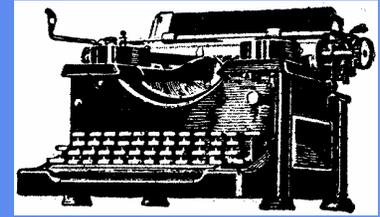
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Program Sponsor: Dr. Michael Letsky, ONR

Remember these...



Collaboration

Tools in the Military?



# Digital Collaboration: DoD

**“Collaboration technologies will be employed to assist users in making sense of the data that is pulled. For example, subject matter experts from diverse units or organizations are frequently called upon to come together to make sense out of special situations. The ability to pull expertise from both within a unit, as well as from across the Department is a value-added feature of a net-centric environment.”**

(Stenbit, 2003)



# Digital Collaboration: DoD

**“Leaders need to reevaluate their approach to defense spending because the character of warfare is changing. The military is finding that small numbers of large, expensive systems are not appropriate for irregular types of warfare, which are seen more and more, . . . Rather, we are moving into the age of the small, fast and the many. To do that, we need an entirely different approach to what things cost,” he said. “We need to change the way we shop.” (Cebrowski , 2005)**



# Digital Collaboration: DoD

## “Communication!”

The Honorable Thomas F. Hall’s single word reply when he was asked for his opinion about our lessons learned from Katrina.

(Mr. Hall is the Assistant Secretary of Defense for Reserve Affairs, and provided the kickoff address at West 2006 in San Diego, CA January 10, 2006).



# Defining Collaboration

“Defining ‘groupware’ is nearly impossible; various groupware packages from Lotus Notes to Microsoft Sharepoint to Novell Groupwise provide a wide range of functionality and capabilities.

Typical functionality includes:

- Shared contact lists usually with some auditing capability.
- Task lists and projects management.
- Facilitation of shared document maintenance.
- Document version control.
- Scheduling and resource management.
- Facilitation of meeting scheduling.”

# Agenda:

- **Objective:** Update Seymour (2002); It's all About...
- **Not That Long Ago:** 1899 and 1919
- **Disruptive Innovation:** Exponential growth
- **Background Research:** Two document searches
- **The Interim:** What's been happening?
- **Current U.S. Military Tools:** "Officially"
- **Now Imagine . . . .**
- **Behind the Curve:** High Tech Unofficially

# Objective

- At the DoD Human Factors Engineering Technical Advisory Group annual meeting in San Diego on April 29, 2002 Dr. Seymour briefed the then current status of digital collaboration tools. His list numbered more than 700.
- That brief URL: <http://tinyurl.com/64hqo>
- What is the status of military collaboration?
- What's new in collaboration technology and tools today?

# It's all About...

- People:

Mostly stay the same over time (cognitive and physical abilities and liabilities).

- Information:

Has exploded. We have too much information and not enough task-specific situational knowledge.

- Collaboration Tools:

Have exploded. Collaboration tools evolved slowly until the last few years.

# Not That Long Ago: - 1899 -

“U.S. Navy's Manual for the Care and Training of Homing Pigeons was published. This manual required that a flying book be kept on each pigeon and recorded such information as number of flights, length, and rate of miles per hour. According to a Bureau of Navigation enlisted code book of 1919, pigeon trainers (or Pigeoneers as they were known) were a part of the Quartermaster rating and were identified as Quartermaster (Pigeon), Q.M.(P).”



[Cher Ami](#) was an American carrier pigeon, “one of 600 birds owned and flown by the U.S. Army Signal Corps” which carried messages during World War I in Europe. Today we take telephones and satellite communications for granted, but communication has always been critical....”

Sources: <http://www.linking.to/Navy/> and <http://www.2-sir.com/customers/Bustl.html>

# Not That Long Ago: - 1994 -

**Early InterNet use was mostly a color-free, mono-font, silent, text based experience:**

- MSG, SNDMSG, RD, RDMAIL, etc 1971 (Unix based)
- ftp: 1972 <ftp://ftp.usask.ca/pub/hytelnet/README>
- BBS: CBBS was first in 1978: <[link](#)>
- Usenet: 1979 <ftp://rtfm.mit.edu/pub/usenet/news.announce.newusers/>
- IRC: 1988 <http://daniel.haxx.se/irchistory.html>
- ELM / PINE: 1989 [UW](#) (remember control-V for “page down”?) )
- Gopher: 1992 <gopher://gopher.floodgap.com/>
- WWW: 1993-4 [http://www.livinginternet.com/w/wi\\_mosaic.htm](http://www.livinginternet.com/w/wi_mosaic.htm)
- PowWow: 1994 <http://powwow.jazy.net/>

# How Much Information?

Storage Medium	Terabytes Upper Estimate	Terabytes Lower Estimate	Upper Estimate	Lower Estimate	% Change Upper Estimates
	2002		1999-2000		
Paper	1,634	327	1,200	240	36%
Film	420,254	76,69	431,690	58,209	-3%
Magnetic	4,999,230	3,416,230	2,779,760	2,073,760	80%
Optical	103	51	81	29	28%
<b>TOTAL:</b>	<b>5,421,221</b>	<b>3,416,281</b>	<b>3,212,731</b>	<b>2,132,238</b>	<b>69%</b>

“Worldwide production of original information, if stored digitally, in terabytes circa 2002. Upper estimates assume information is digitally scanned, lower estimates assume digital content has been compressed”  
 (Lyman & Varian, 2003)

# How Much Information II

- “Print, film, magnetic, and optical storage media produced about 5 exabytes of new information in 2002. Ninety-two percent of the new information was stored on magnetic media, mostly in hard disks.”
- “How big is five exabytes? If digitized, the nineteen million books and other print collections in the Library of Congress would contain about ten terabytes of information; five exabytes of information is equivalent in size to the information contained in half a million new libraries the size of the Library of Congress print collections.”
- “Information explosion? We estimate that new stored information grew about 30% a year between 1999 and 2002.”

LOC: Shelves in miles?

# Terabytes Today—Tomorrow?

- Wal-Mart “operates a data warehouse with, at last count, 583 terabytes of sales and inventory data built on a massively parallel 1,000-processor system.”
- “With real-time or near-real-time data, the value of those insights increases exponentially. “We know how many 2.4-ounce tubes of toothpaste sold yesterday, and what was sold with them,” says Dan Phillips, Wal-Mart's VP of information systems.”

# A Decade of Technology

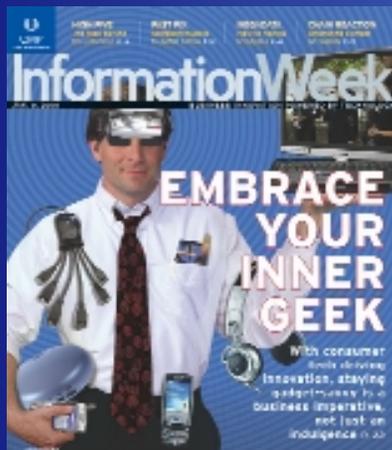


Computer, Telephone, and Cellular densities in the USA / 100 inhabitants.

# Information < One Decade Ago



In 1997 this was incredible; Windows 95 / 3.1 / NT 3.51 SVGA, 256-color monitor supporting 640 x 480 provided 2 CD Encyclopedia that features over 31,000 entries, 14,000 photos, etc.



In 2006 Information Week described the \$135 billion market showcase at the annual Consumer Electronics Show in Las Vegas. NB:

- Google (9/98) = 8 billion web pages + +
- Wikipedia (1/01) = 922,900 English articles

# Value of the Internet: 2005

## How is the Internet being Used Today:

1. e-mail,
2. general Web surfing,
3. reading news,
4. shopping,
5. entertainment news (searching and reading),
6. seeking information about hobbies,
7. online banking,
8. medical information (searching and reading),
9. instant messaging, and
10. seeking travel arrangements and travel info....

# Disruptive Innovation

- “Disruptive Technology” was coined by Clayton M. Christensen in his 1997 book *The Innovator's Dilemma*.
- The term “Disruptive Innovation” was used in a later book because he recognized that “few technologies are intrinsically disruptive or sustaining in character. It is strategy that creates the disruptive impact.”
- COTS collaborative technologies are disruptive.

# Background Research

- **Ad Hoc Research**
- **Systematic Document Research:**
  - ✓ Government Accountability Office (GAO) advanced search for the term “collaboration tools” anywhere in the document. Six documents were identified.
  - ✓ Defense Technical Information Center (DTIC) for any of these three terms, “collaborative software,” “collaborative assistants,” or “collaborative tools” during the most recent decade. Eighteen documents were found that met the criteria, nine of which were used.

# The Interim

For example, in 2003 the National Institutes of Health performed an internal survey to identify collaboration tools being used by NIH at that time. Of the fourteen tools identified, eleven were recommended for use in the next two years: Conference Server, eRoom, Exchange 2000, Groove, Key Flow, Place Ware, Plumtree, Project Server, Share Point, WebDA, and WebX.

# Current U.S. Military Tools

- [Air Force Portal](#), [Army Knowledge Online](#), [Navy Knowledge Online](#).....(themes)
- Collaboration at Sea (CAS)
- Collaborative Information Environment (CIE)
- Defense Collaboration Tool Suite (DCTS)
  - \* Evoke and Groove \*
- InfoWorkSpace (IWS)
- Strategic Knowledge Integration Web (SKIWEB)

AKO = 97K to 1.8 m users; 3/6: new login record = 754,943/ day.

## Welcome to the Sea Warrior Portal

NKO User Name   
all lowercase

NKO Password   
case sensitive

[I forgot my User Name](#)

[I forgot my Password](#)



USS BOXER (LHD 4) well deck and deck department personnel help boat crews from 1st Battalion, 3rd Marines, practice small boat departures and arrivals.

### :: New Users

If you have never registered on NKO:

- [View the Registration Tutorial](#)
- [Register as a new user](#)
- [Register as a guest user](#)

### :: NKO Login Help

- [I need to change my User Name](#)
- [I need to change my Password](#)
- [Download Security certificate](#)
- [Help & FAQ's](#)

### :: Help Desk Contact

COMM: (850) 452-1001,  
Option 1

DSN: 922-1001, Option 1

Toll Free: (877) 253-7122,  
Option 2

[nln.helpdesk@netc.navy.mil](mailto:nln.helpdesk@netc.navy.mil)

Freedom of Information Act (FOIA)

This is an Official U.S. Navy Website  
Naval Education and Training Command 250 Dallas Street - Pensacola, FL 32508-5220

U.S. Navy Recruiting

### Read the Privacy and Security Notice

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# Collaboration at Sea

**Collaboration at Sea (CAS):** Collaboration at Sea is based on the popular IBM / Lotus collaboration toolset, and is used today mostly by the planning (J5 and N5) groups because of their need to support operations with coalition partners. Early uses of CAS included the “USS John C. Stennis and USS George Washington Battlegroup's use during 1999-2000, and following that, the USS Carl Vinson’s success with Knowledge Web (K-Web) in 2001-2002” (Natter, 2002). The Commander, Joint Task Force (CJTF) 950 and the Second Fleet/ NATO Striking Fleet Atlantic have used CAS. Since then the Navy has shared CAS with a large number of its coalition partners. CAS is the first collaboration system being used by the Navy that is moving into a program of record (i.e., acquisition funded as opposed to using O&M funds).

# Collaborative Information Environment (CIE)

**Collaborative Information Environment (CIE):** The JFCOM J9 supports CIE. Beginning “in November 2003, CIE developers and engineers provided actual working prototypes of the CIE to U.S. Southern Command (SOUTHCOM) and U.S. Pacific Command (USPACOM).” Recently, CIE “garnered the U.S. Joint Forces Command (USJFCOM) a prestigious award. The award from the E-Gov Institute was for ‘best practice in a public sector organization for innovative knowledge management (KM).’”

# Defense Collaboration Tool Suite

Supported by DISA, DCTS is a “flexible, integrated set of applications providing interoperable, synchronous and asynchronous collaboration capability to the Department of Defense’s agencies, Combatant Commands and military services.... Initial fielding of DCTS V1.1.12 began in April 2002.” According to Powers (2004), as of “January 2004, DCTS V2 P1 is installed at 138 sites worldwide, at all combatant commands, major components and services, with another 218 planned for 2004. DCTS will remain in place until the Next Generation Collaboration Service (NGCS) is on-line in 2005 or 2006.” This suite was “recommended as the interim standard DoD tool set by the OSD/Joint Staff Collaboration Tiger Team.” “It provides real-time and asynchronous collaboration using voice, video conferencing, document and application sharing, combined with instant messaging to assist in the planning and management of crisis situations. It is used by many military commands to support the mission planning process.”

# InfoWorkSpace (IWS)

IWS is the official collaboration tool for Joint intelligence commands, including J2 and N2. It is used in the JBMC2 project at JFCOM, and also at PACOM, EUCOM, TRANSCOM, and CENTCOM. According to Powers (2004), “IWS is comprised of several third-party products including Placeware/Microsoft, Oracle, IPlanet/Sun One Directory Server and Web Server, and the Tomcat Servlet Engine/Apache. IWS provides a secure virtual office organized into buildings, floors and rooms where users can build online meeting places to interact on projects in realtime. Accessed via a Web browser or Java client, it includes a number of features, including an instant-messaging client (LaunchPad), text chat (public and private), audio, Web video, application casting, desktop conferencing, Virtual File Cabinet, a bulletin board, Collaborative Whiteboard and shared Text Tool, threaded discussions (news groups), mail, and a calendar.” IWS is owned by Ezenia.

# Strategic Knowledge Integration Web

SKIWEB is used by USSTRATCOM to provide real-time command status, scrolling news, significant events and announcements, as well as, uniquely, a blog function. In other words, anyone in STRATCOM can get on SKI WEB and see what's going on and have a threaded discussion. The Commander will ask a question and anyone, regardless of rank, is encouraged to get on and add his or her input in a rolling discussion. Very high usage and the commander "loves it". He operates in a very short time frame, so doesn't like the old staffing of issues through formal taskers - generate discussions on line in a chat room, for lack of a better term, and get thoughts and ideas from the E-1 through O-10, civil servants, and contractors.

# Groove

- Ray Ozzie founded Groove Networks in October 1997. They shipped the first beta version of Groove in October 2000. Microsoft acquired Groove in April 2005.
- In four years Groove had become one of the most frequently used military COTS collaboration tools.
- The U.S. Department of State “used Groove to coordinate the establishment of the U.S. Embassy in Baghdad. Gallaher and O’Rourke (2004) reported that 27 percent of their Naval Postgraduate School survey respondents reported using Groove.

# The Rise of Wise Groups

- Howard Rheingold publishes *Smart Mobs: The Next Social Revolution*,
- James Surowiecki publishes *The Wisdom of Crowds*.
- Ever hear of “collective online brain trusts?”
- The “architecture of participation”
- The tactical role of social behavior is increasing only for those who know it.

# Groups + Technology =

- Hamachi = free software that lets you create a quick, simple, and secure virtual network between any two or more computers with a connection to the Internet.
- iMediaPOLL = “integrates the smartest features of a dynamic online poll, and allows you set the look of your poll. And what about having it for free?”
- Jot Spot Live = allows you & others to take notes on the same web page at the same time. You can see changes other are making, drag to rearrange, edit in real-time.
- netomat = keeps you connected to friends at home on your computer or on the go with your cell phone. It works through the creation of netomat “hubs.” It’s free.
- Skype = A proprietary protocol VoIP system built using Peer-to-peer (P2P) techniques. Free for non commercial use . “It’s over.” FCC Chairman.
- Vlog It = the world's first video blogging software.
- Zoho Writer = online word processor that edits, stores and shares your documents from anywhere.

# Recent “Disruptive” Technologies

- Cell phone
- Digital camera
- E-learning
- Internet
- Mini steel mills
- Open source
- Transistor
- Blogs
- Bridge Blogging
- Chat / IM
- Podcasting
- RSS
- VoiceXML
- Webcasts
- Wikis

# Now Consider:

- Disruptive Technologies (1997) becomes Disruptive Innovations in 2003.
- Military Transformation: Drivers = Asymmetric war & Budgets & Democratization \* of Communication.
- Seymour (2002) identified >700 COTS / GOTS collaboration tools available to, or in use by, the U.S. Military.
- Since then, hundreds and hundreds of world-wide collaboration technology companies each hired dozens and dozens of young “geeks” who work overtime striving to create the next greatest application, service, or tool. Can anyone keep up to date?
- Seymour (today) identifies 14 “disruptive” collaboration technologies (not tools).

# Collaboration: 2006

- ∇ For thousands of years, information creation has been structured, institutionally based, and flowed **one-way** (Scribes, Books, Dictionaries Newspapers,, Encyclopedias).
- ∇ Today all that has changed. We're web enabled.
- ∇ These 14 digital-based technologies (not tools) are driving innovation/change everywhere:

℞ Blogs

℞ Bluetooth

℞ Chat / IM

℞ Pocketcasting

℞ Podcasting

℞ RFID

℞ RSS

℞ Videoconferencing

℞ VoiceXML

℞ VoIP

℞ VPOs

℞ Webcasts

℞ Wikis

# BLOGS

- Word “blog” coined by Peter Merholz in 1999.
- On July 30 2005, Technorati tracked >14.2 million weblogs, twice the number found 5 mos. previously.
- Warwick University gives all their students and staff the opportunity to develop a blog <http://blogs.warwick.ac.uk/>
- Oxford University Press: <http://oupblog.typepad.com/oupblog/>
- Soldiers serving in the Iraq war created "milblogs" and provided readers a new perspective on the realities of war. Currently 284 participants contribute to the Milblog Ring.
- Today, however, we have audioblogs, moblogs (mobile blogs), photoblogs, etc.

33.7 million / double @ six months / L

# CHAT / IM

Chat and IM are not the same:

- IRC allows you to connect to any channel and **talk in real-time** to people with the same interests. Jarkko Oikarinen (Finland) developed Internet Relay Chat (IRC) in 1988.
- In March, 1991, there were more US-based IRC servers (69) than non-US. based ones (66) for the first time.
- IM was popularized by AOL starting in 1992.
- As of August, 2005, AIM had 53 million active users.
- Interoperability is a big issue. The major players are AOL, Google, ICQ, MSN, PSI, Skype, Windows, and Yahoo.
- In December Google & AOL agreed to combine IM usage.

IM 50-70%

# Milblogs

The following five popular military blogs support the notion that technology will be used, and that consequently it is better used when managed:

- A soldier's thoughts ([misoldierthoughts.blogspot.com](http://misoldierthoughts.blogspot.com))
- Boots in Baghdad ([bootsinbaghdad.blogspot.com](http://bootsinbaghdad.blogspot.com))
- Life in this girl's Army ([sgtlizzie.blogspot.com](http://sgtlizzie.blogspot.com))
- 365 and a wake up ([thunder6.typepad.com](http://thunder6.typepad.com)) and
- Ma Deuce Gunner ([madeucegunners.blogspot.com](http://madeucegunners.blogspot.com))

Milblogging.com currently has 1,125 military blogs in 23 countries with 1,119 registered members.

1,378 / 27/1,521

# RSS

## 2005: The year of RSS

- Feb 23: “The Associated Press begins to deliver content via RSS feeds. Can you say mainstream?”
- May 2: Business Week says that RSS aggregators “could turn the web on its head” by eliminating the need for web surfing.
- June 24: “Microsoft announces that it will support RSS in Longhorn (now Vista) and Internet Explorer 7.”
- Oct. 10: Yahoo releases whitepaper: *RSS – Crossing Into the Mainstream*. Key findings include:
  - > 12% of users are aware of RSS and 4% knowingly use it.
  - > 27% of internet users use RSS without knowing it.

25,226

# Videoconferencing

- Remember the decade-old VTC promise?
- Today VC is alive and being used:



From an Army camp in Iraq

“You look very beautiful today, hon,” Capt. Jason Hughes told his wife, Chrissy, who bought a new dress for the teleconference. Sons Christian, 3, and Patryk, 15 months, also were on hand in Clayton.”

# Wikis

- “Wiki is Hawaiian for “quick,” and is a method for many users to create and edit web page content quickly and easily. A Wiki is . . . the simplest online database that could possibly work.”
- The author knows of no official military wikis in use, but noted that all branches of the military refer to, and provide links to, the Wikipedia, if not others:

[http://en.wikipedia.org/wiki/Main\\_Page](http://en.wikipedia.org/wiki/Main_Page)

# Innovation Squared

December `05: Macromedia partners with Jabber. The plan: Integrate Macromedia's Breeze Meeting and Jabber's Extensible Communications Platform (Jabber XCP).

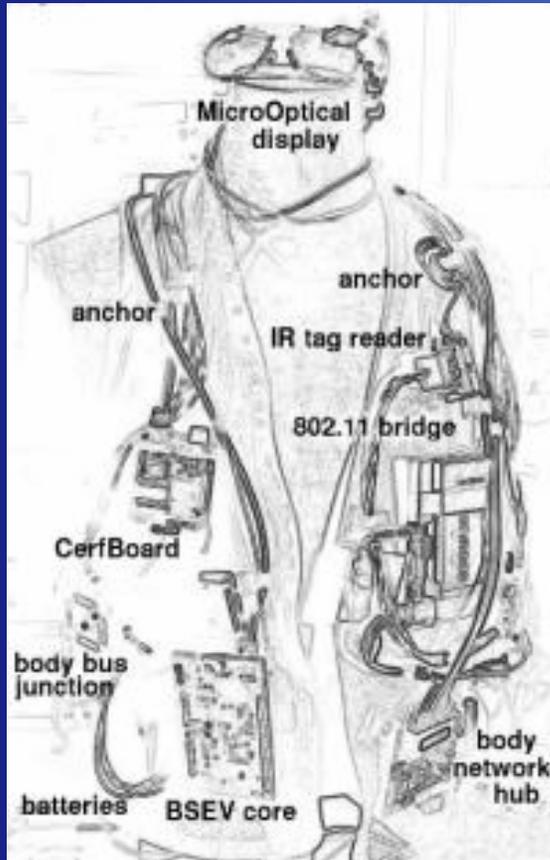
“The joint offerings are intended to allow DoD and other federal agencies to deploy a Web conferencing, instant messaging, chat, presence, and awareness solution that meets the standards requirements of the federal government.”

**Think VoIP + XML**

# Collaboration Innovation Drivers:

- The number one blog site (Blogspot.com), draws more web-based traffic than the NYTimes.com, USA Today.com, or WashingtonPost.com
- Podcasting, a way to publishing audio broadcasts using the Internet , is being used by every branch of the military.
- ComVu is first to offer mobile users the ability to transmit live video broadcasts.
- instaColl ... a free program that allows for 1:1 online document editing.
- MIThril is a next-generation wearables research platform developed by researchers at the MIT Media Lab
- MySyndicaat: First true RSS news mastering engine (it's free for now).
- P-ISM: Network gadget packages enhance mobile collaboration.
- Podzinger & Podscope: two tools to convert podcasts (audio) to text.

# MIThril



The MIThril hardware platform combines body-worn computation, sensing, and networking in a clothing-integrated design. The MIThril software platform is a combination of user interface elements and machine learning tools built on the Linux operating system.

<http://www.media.mit.edu/wearables/mithril/index.html>

# P-ISM: The Future Now



A Pen-style Personal Networking Gadget Package:  
P-ISM is a five function pen set of virtual keyboard, handwriting, camera scanner, projector, and personal ID using short-range wireless and cell phone internet technology.

# Conferences:

- Beyond Blogs & Social Networks (2005) <[link](#)>
- C2: Connect & Collaborate (2005) <[link](#)>
- Collaborative Communications Summit (Feb 2006) <[link](#)>
- Collaborative Technologies Conference (June 2006) <[link](#)> <[loop](#)>
- Convergence Conference (2005) <[link](#)> <[blog](#)>
- Emerging Technology (Mar 2006) <[link](#)>
- Emerging Telephony (Jan 2006) <[link](#)>
- VON (Voice on the Net: Mar 2006) <[link](#)>
- Web 2.0 (2005) <[link](#)> <[speakers](#)>

# Selected Resources:

- ❑ Lyman, P. & Varian, H. (2003). How Much Information. Retrieved from <http://www.sims.berkeley.edu/how-much-info-2003>
- ❑ Schneiderman, R. (2005). Preparing for the Disruptive Technologies of Tomorrow. <http://forum.ecoustics.com/bbs/messages/34579/129798.html>
- ❑ Seymour, G. E. (2001). IM: Historical Foundation, Current Status & Proposal. Unpublished document available for review by request to [George.Seymour@Navy.mil](mailto:George.Seymour@Navy.mil)
- ❑ Seymour, G. E. (2002). "[Enabling the Information Dominance Transformation Via COTS Collaboration Tools](#)" Presented at the Department of Defense Human Factors Engineering Technical Advisory Group annual meeting in San Diego, April 29.
- ❑ Warner, N., Letsky, M. & Cowen, M. (2005). Cognitive model of team collaboration: macro-cognitive focus. Paper presented at the 49th Annual Meeting of the Human Factors and Ergonomics Society. Orlando, September.
- ❑ Warner, N. & Wroblewski, E. (2004). The Cognitive Processes used in Team Collaboration during Asynchronous, Distributed Decision Making. [http://www.dodccrp.org/events/2004/CCRTS\\_San\\_Diego/CD/papers/092.pdf](http://www.dodccrp.org/events/2004/CCRTS_San_Diego/CD/papers/092.pdf)
- ❑ Web Conferencing Guide: <http://thinkofit.com/webconf/>
- ❑ Web Conferencing Picks: <http://www.conferencevillage.com/softdirect.html>

Thank You.

**Questions are Welcome**