



Figure 1. Global 2001 “Knowledge Web” content being viewed on “Knowledge Wall” as installed at NWC.

The Global wargames serve as a forum for the test and evaluation of many new technologies and warfighting concepts. As part of the Global 2001 wargame, participants will be making use of a collection of technologies and a concept of operations known as the “Knowledge Web” (K-Web). These technologies are being developed by Space and Naval Warfare Systems Center, San Diego (SSC San Diego) as part of the Office of Naval Research sponsored “Command 21” project. The Command 21 project uses Commercial-Off-The-Shelf (COTS) and Government-Off-The-Shelf (GOTS) technologies to Web-enable command and control decision-making in operational command centers so that information can be rapidly disseminated.

The Command 21 technologies and concepts for supporting command and control are based on “knowledge engineering” done with Navy, Marine Corps, U.S. Strategic Command, and other high-level command centers over the last several years, with specific focus on the needs of COMTHIRDFLT and COMSECONDFLT. Early K-Web and Knowledge Wall (K-Wall) concepts were placed in accelerated development in FY 2000 at the request of COMTHIRDFLT and were first used in a realistic context during the Global 2000 wargame. The Global 2001 implementation is building on lessons learned from last year’s Global wargame and on recent efforts aboard the USS *Carl Vinson* (CVN 70) for COMCARGRU THREE to support their Summer 2001 deployment. The key idea with the K-Web is that “value-added information,” i.e., “knowledge” created by a command staff, can be captured in, and distributed in real time using Web pages as opposed to the traditional daily and/or watch-turnover briefings (often using Microsoft PowerPoint) found in most echelons of command

today. In so doing, the speed and effectiveness of the command can be dramatically improved.

Central components of the K-Web are intuitive, summary Web pages that show *operationally relevant* information for key functional areas of the command. The summaries are created using template-based authoring tools developed as part of the Command 21 project. When used in accordance with knowledge management-derived processes by designated information “producers,” these pages allow the rapid creation of summary information. Pages can then be rapidly published into a Web and shared, with minimal impact on available bandwidth. Summary page text and graphics may be linked to supporting information that is created with any number of COTS/GOTS tools. This capability allows information from the functional areas of the command to be readily adapted to unique requirements, as well as cross-linked to a wide variety of Web content. The result is a valuable and easy-to-use K-Web that can be viewed through conventional Web browsers, e.g., MS Internet Explorer, as well as on specially designed K-Web viewers such as Knowledge Desks (K-Desks) or K-Walls.

The K-Wall (Figure 1) is a large-screen display that allows a number of summary pages to be displayed at once in conjunction with tactical (or any other) information. It effectively allows the K-Web to be used as a dynamic status board that displays large amounts of summary information coherently. It is primarily intended for a group of information consumers, e.g., the CJTF and his senior staff, to support shared Situation Awareness or collaboration. As implemented at the Naval War College (NWC) for Global 2001, the K-Wall consists of three

50” SmartBoards run by a single IT-21 workstation. The K-Desk is an IT-21 based workstation that employs a 2x3 matrix of LCD panels configured as a single display (Figure 2). K-Desks are intended to be used by smaller groups of decision-

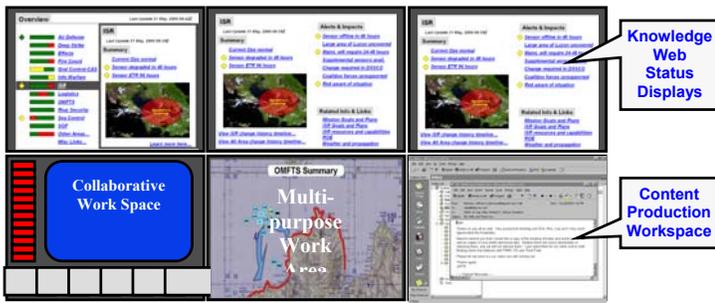


Figure 2. Representative K-Desk layout.

makers or individuals and to have sufficient display workspace to support both the production of value-added information and the monitoring of status information in the K-Web.

Figure 3 shows a sample summary page. The top-left corner displays overall status indicators that are also shown in the overview. Status indicators may be red, yellow, or green, indicating “show-stoppers,” “caution,” or “going as planned.” A diamond indicates new or changed information. The status indicators are intended to reflect time-based summaries for Today (0-24 hours), Tomorrow (24-48 hours), and Beyond. However, business rules may be developed that allow the status indicators to be used for different purposes. The text next to each status indicator serves as a hyperlink to explanatory information provided on another Web page or document. The graphic in the bottom left corner, and the text entries on

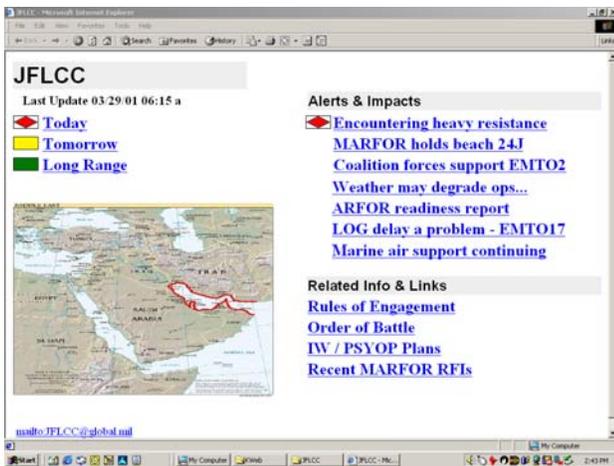


Figure 3. Template-based summary page.

the right side of the page function as hyperlinks as well. Alerts and Impacts entries serve as “headlines” for the functional area, while general reference material can be linked from the bottom-right text links.

Figure 4 shows a representative command Overview Web page. The page is automatically and dynamically built from HTML components created when summary pages are authored using the “SumMaker” template-authoring tool. The far-left pane shows high-level status information in the form of a three-light bar for each of the functional areas of the command listed in the middle pane. Clicking on a button in the middle pane causes the left side of the associated summary page for

that functional area to appear in the right-most pane. Right-clicking the button opens the full summary page in any available physical display on a multi-headed workstation.

Data collected from Global 2000 demonstrated that the employment of a K-Web could dramatically increase situational awareness and speed of command. During Global 2000, sufficient information was available in the K-Web so that the CJTF

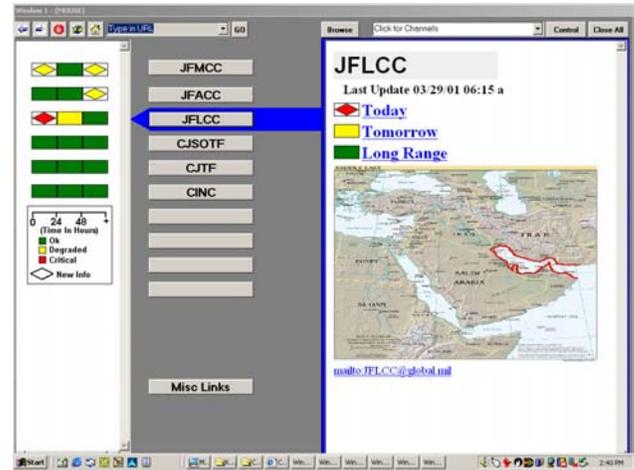


Figure 4. K-Web overview page.

staff was able to assess and make significant decisions regarding complex, unplanned events in minutes vice hours. K-Web content was shown to be frequently used and was often re-used by other decision-makers in producing their own content. However, significant issues need to be addressed before full-scale transition of K-Web technologies and concepts to the Fleet. There were issues in identifying and sharing K-Web content across command echelons, as well as a clear requirement for an evolutionary K-Web architecture that adapts to unique mission requirements. The development of the COM-CARGRU THREE K-Web aboard the USS *Carl Vinson* suggests that there are a number of processes and protocols that still need to be addressed in facilitating bandwidth management and K-Web content replication across fleet platforms. These and other issues will be the focus of K-Web development activities during the Global 2001 wargame and follow-on work in the coming year.

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