



Test and Evaluation of the Medical Common Operational Picture (MedCOP)

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Naval Health Research Center

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Executive Summary

Background

This report represents a test and evaluation of the Medical Common Operational Picture (MedCOP) software, developed by ScenPro, Inc. for the Office of Naval Research (ONR) and the Field Medical Technologies program at the Naval Health Research Center (NHRC).

Method

Four main sources of data were used to conduct the study:

- A usability study of nine users who had experience with medical software. Usability testers filled out structured survey questions and provided comments.
- Review of the software by three technical consultants who evaluated the 43 operations above and provided ratings and feedback from the standpoint of users experienced in medical logistics in a deployed setting.
- A functionality survey that systematically tested 43 basic operational claims drawn from the most recent, available user's guide, updated with information on current versions of the ScenPro software.
- A review of available resources on competitive and integrated software.

Results

Results included the following:

- MedCOP met all of its advertised claims associated with reviewing supplies and assessing the readiness of medical treatment facilities. Most functional claims regarding tracking personnel and patients were also supported. However, some advertised functions (e.g., patient movement) were still unavailable, and some surveillance capabilities linked to the Medical Data Surveillance System (MDSS) were not present for this assessment.
- Survey results indicated that users found MedCOP appropriate for use as a tool by medical planners and preventive medical personnel. Testers stated that it represented an improvement over the status quo.
- Limitations noted included dependence on the accuracy and availability of Joint Medical Workstation (JMeWS) data and MDSS. Users also noted that the manual needed to be updated to include all functions present in current versions, and that online help functions should be available to aid users in taking advantage of all features.

Conclusions

MedCOP performed well in meeting advertised claims. Developers should address users' concerns about updating the user's guide and providing help functions. They should also consider refining user profile capability to let users with different roles customize reports to view information more efficiently and to ensure that reports on individual patient information are limited to authorized users.

1.0 Introduction

1.1 Background

This report summarizes the test and evaluation (T&E) of the Medical Common Operational Picture (MedCOP) software. ScenPro, Inc., has developed MedCOP for the Office of Naval Research (ONR) under a Small Business Innovation Research program contract (ONR Media, released January 1, 2002, www.onr.navy.mil/media/tipoff). Originally titled NavMedWatch, the program was commissioned as a tool to facilitate resource management by medical facilities and to track disease trends and patient movement. Although MedCOP was field tested during the Cobra Gold Joint Exercise (May 15–29, 2001; P. Martin, personal communication, October 8, 2003), there has been no formal report on its functionality. The present work was conducted at the Naval Health Research Center (NHRC) by a T&E team independent of MedCOP's developers to provide formal feedback on MedCOP's advertised functional claims.

1.2 Objectives

The objectives of the present study were:

- To test and evaluate the function of MedCOP Version 6.1.3 with regard to the claims and objectives of its developers
- To collect feedback and provide recommendations to improve the usability and functioning of the program.

1.3 Description of MedCOP

MedCOP is described in the user's guide as a platform from which to view medical logistical information relevant to an area of operations (User's Guide, Version 6.0, July 2003). MedCOP's Theater Level view provides a graphical representation of current medical treatment facilities (MTFs) in an area and their overall state of readiness. MTF pages provide specific information concerning the current state of supplies, medical personnel staffing, and availability of beds and other resources, both as an overall summary rating and in detail. MedCOP can also track patient movement and provide a link to the Medical Data Surveillance System (MDSS) to allow users to pursue medical surveillance information.

The present study focused on validation of the basic functions of MedCOP. These functions, gathered from the user's guide (Version 6.0, July 2003) and media material distributed by Scenpro and ONR, included:

- Tracking of patients and medical personnel
- Tracking of available beds, supplies, and blood
- Access to epidemiological predictions to track trends in disease and injury
- Presentation of relevant user data via graphics, text, and color coding

2.0 Market Research and Related Systems

The transfer of military medical logistical information to computer and Web-based technologies is in the early stages relative to other medical applications. The following review of military medical information and logistics systems that might parallel MedCOP reveals only one other competing system in circulation. In addition, the review describes MDSS, which can be accessed through MedCOP to provide epidemiological analysis capability. This section also describes the Composite Health Care System (CHCS), which provides some logistical information for MTFs that might overlap with MedCOP.

2.1 KnowledgeBoard

KnowledgeBoard was developed by Science Applications International Corporation (SAIC) as an electronic “whiteboard” to allow the integration and display of information from many sources, including Internet, video, and relational databases. KnowledgeBoard functions as a framework for clients to facilitate the aggregation of data and could be customized to bring together logistical data through the Joint Medical Workstation (JMeWS) database similar to that used and displayed by MedCOP. Earlier versions of the software were loaded from CD-ROM, but the newest version is Web-based. The ability to display geographical information, similar to MedCOP’s map function, is also a new feature.

Originally supported by the Defense Advanced Research Projects Agency (DARPA), versions of KnowledgeBoard, previously called the Electronic WatchBoard, are in use by the National Cancer Institute; the Hospitals, Universities, Businesses, and Schools program of Delaware, New Jersey, Maryland and Pennsylvania; and several Department of Defense (DoD) initiatives. These include the Defense Information Systems Agency and Joint Program Office programs Geospatial Force Planning Tool, Adaptive Course of Action, and Joint Theater Logistics (SAIC, 2003). KnowledgeBoard has also been incorporated in the Enhanced Consequence Management Planning and Support System (ENCOMPASS), developed by DARPA, which provides detection and verification of disease outbreaks and alerts to potential threats of biological warfare, similar to MDSS.

2.2 Medical Data Surveillance System

The Medical Data Surveillance System (MDSS) is a Web-based information system that analyzes *International Classification of Diseases*, 9th Revision (ICD-9) codes and allows access to real-time medical threat assessment for deployed forces. The software facilitates response to medical threats by providing the Preventive Medicine Officer (PMO), epidemiologist, or Commander-in-Chief (CINC) Surgeon with automated tools to assist in the process of investigating, identifying, and reporting significant medical events.

MDSS automatically searches patient ICD-9 codes for trends based on epidemiological clues identified by the Centers for Disease Control and Prevention. The system is intended to provide epidemiologists with tools for early detection of disease outbreaks and chemical attacks. It also promises to give medical command and control the ability to integrate patient data from widely dispersed forces for mission planning.

The key feature of MDSS is advanced dynamic change point detection analysis, which is designed to allow early detection of illness trends and disease outbreaks. MDSS analyzes ICD-9 codes using a set of dynamic change point and signal detection algorithms to identify the start and end points of medical events, trends, and shifts within routinely collected data. The system is able to identify incidence spikes using relatively small data sets.

MDSS enables epidemiologists to set and adjust baseline and threshold values, detect shifts and trends within data, and reconstruct the signal to show the form of the underlying event. MDSS automatically alerts medical users of abnormalities and provides tools so that users can investigate the nature and source of medical events. The system can calculate a baseline based on a week's worth of data or less from an MTF and provides early warning of trends to alert the medical command of possible disease outbreaks before they become epidemic. MedCOP provides a link to MDSS from its primary navigation frame. When this feature is operating, medical surveillance alerts also appear next to the relevant MTFs on the map page. These functions were not available for the present review.

2.3 Composite Health Care System

The Composite Health Care System (CHCS) provides automated medical information support to all MTFs worldwide. CHCS captures data on patient registration, admission, disposition, and transfer; inpatient activity; outpatient administration; appointment scheduling; laboratory drug/laboratory test interaction; quality assurance; radiology; clinical dietetic administration; and pharmacy. The system conducts results reporting and order entry as well as ad hoc reporting. Through CHCS connectivity, users can access other medical facilities and receive specific patient information.

The release of CHCS-II expands the system to include support of general dentistry and optometry. It also includes interface capability with the Defense Enrollment Eligibility Reporting System, the Third Party Outpatient Collection System, and the Pharmacy Data Transaction Service. CHCS utilizes ICD-9 codes in processing data. While the Field Medical Surveillance System (FMSS) appears to be more mobile and can be used on a network or a stand-alone computer, CHCS is a network-driven program that excels when connected to numerous facilities. Currently, CHCS is integrated with MDSS, providing patient data to be analyzed for detecting and reporting changes in the state of the health of a population.

3.0 Method

The present study focused on the validation of the following claims for MedCOP basic functions, as described in the user's guide:

- Tracking of patients and medical personnel
- Tracking of available beds, supplies, and blood
- Access to epidemiological predictions to track trends in disease and injury
- Presentation of relevant user data via graphics, text, and color coding

Validation of these claims was conducted using three methods:

- Functionality testing
- Usability review
- Technical consultant review

3.1 Functionality Testing

Two members of the T&E team prepared a list of 43 functional requirements, which were extracted from the user's guide and from communication with ScenPro regarding updates from Version 6.0 to 6.1.3. Each function or group of functions was assigned a "pass" or "fail" decision. Only one function received a partial "fail" with regard to some of its components. In this case, recommendations were provided for developers, which will be discussed below.

3.2 Usability Review

Nine members of the T&E team with experience using medical software applications reviewed the functions of MedCOP. These were functional testers who focused primarily on basic software operations. The application was made available through the MTS Technologies, Inc., server with the cooperation of ScenPro, Inc. Members of the T&E team created test data for the JMeWs database, and these data were used for all phases of testing. Usability testers completed a survey based on current human factors research, adapted for the present application (Appendix A) (Armstrong, Brewer, & Steinberg, 2000).

3.3 Technical Consultant Review

Three technical consultants with experience using medical software and working with medical logistical data under deployment conditions evaluated MedCOP. Participants used the program for approximately 1 hour, working through a list of basic functions derived from the user's guide. They then completed the usability survey and the technical consultant survey (Appendices A and B).

4.0 Results

4.1 Functionality Testing

Using the MedCOP user's guide and information from ScenPro related to version updates, T&E team members generated a list of 43 basic functions to be tested. These functions derive from the major claims for the program that were outlined in section 3.0.

MedCOP requires information retrieved from the JMeWS database in order to produce its summary reports. T&E team members loaded appropriate test data for use in the functionality tests and during usability and technical consultant reviews. MedCOP was able to access these data from JMeWS version 3.1.3 and used them to test claims regarding the generation of tables and graphs.

The basic navigational tools functioned appropriately for all areas, including all hyperlinks and the other system tools, such as filter buttons and drop-down lists. Features constant across pages such as the Status Panel and the clock and date icons also performed consistently.

4.1.1 Tracking of Patients and Medical Personnel

Testers were able to complete all of the tasks identified on the Patient Status page of the user's guide. These included selecting patients by demographic, ICD-9 code, MTF, social security number (SSN), and other categories. Minor problems were identified in attempting to sort a list of patients by ICD-9 or primary diagnosis. Due to problems with the database, functional tests were not performed on the Patient Movement page. Testers successfully accessed all of the Personnel pages and were able to perform the basic functions on each page, including identifying personnel authorized and on hand, filtering by level and branch, and searching by available criteria.

4.1.2 Tracking Available Beds, Supplies, and Blood

Testers were able to access the Joining/Capability page, the Beds page, and the Blood Report and verify that all levels of the pages were present and that search and filtering functions could be performed.

4.1.3 Access to Epidemiological Predictions to Track Trends in Disease and Injury

MedCOP provides epidemiological information primarily through an interface with MDSS, which was not available for review at this time. Some analysis was possible through the Status page, which allows patients to be sorted by primary diagnosis and ICD-9 code. Testers were also able to access the History page, which allowed graphical display of Patient Status information.

4.1.4 Presentation of Relevant User Data Via Graphics, Text, and Color Coding

Testers determined that the map functioned according to advertised claims by displaying icons representing the location and color-coded Situation Report (SITREP) status of MTFs. Time-sensitive data indicators flashed the appropriate color codes at 12+ and 24+ hours. Clock icons displayed the correct time on each page. Commander-determined color codes for MTF readiness functioned consistently across reports.

4.2 Usability Review

Six members of the T&E team and three technical consultants evaluated MedCOP for overall usability. Afterward, they filled out a survey that rated the program on 15 different aspects, including organization and efficiency, feedback and help functions, design and aesthetics, and navigation. Each item was rated on a 5-point Likert scale where 5 = strongly agree, 1 = strongly disagree, and 3 = undecided.

Table 1. Usability Review Results

ITEM SUMMARY	MEAN	SD
Uses simple language	4.33	0.50
Language familiar to target user	4.56	0.53
Requires minimal memory load	3.67	1.00
Consistent use of terms and format	4.00	0.87
Provides informative feedback on actions	3.44	1.24
Navigational functions are easy to find	3.67	1.00
Shortcuts available to experienced users	3.89	0.60
Error messages clear and constructive	2.62	1.19
Design minimizes errors	3.78	0.97
Provides help if necessary	2.22	1.48
Graphic design is simple and intuitive	3.78	0.83
Unwanted steps not necessary	3.78	0.44
Easy to learn basic functions	4.33	0.71
Basic functions are organized reasonably	4.11	0.33
Can undo or redo actions	4.00	0.87

Overall ratings for the program were positive and consistent. Users found the interface attractive and intuitive. One user described it as similar to surfing the Web. The language used was seen as consistent and appropriate, with the understanding that target users would most likely be medical personnel or those concerned with the logistics of an MTF. Navigational functions were generally given a positive rating. However, several users commented that the Navigation Frame itself should have had scrolling capability to allow users to reach all links easily. One user also commented that some links were not obvious. For example, some column headings were hyperlinks to more-detailed reports, while other similar headings were not. The lowest ratings were given for errors and help functions. MedCOP did not provide any online help functions or definitions of terms. Also, though the program was primarily designed for the display of information, making user error unlikely, it was possible to change the display inadvertently due to the similarity between column headings that let information be sorted (e.g., the Patient Status page) and those that led to more detailed information. It was also suggested that the name of the MTF being viewed could be included in the tables, rather than on a separate frame, to avoid confusion among various levels. Finally, comments pointed to inconsistency in the ratings for memory load, which might have been attributable to variations in the time that pages took to load across various sessions, rather than to MedCOP's functioning.

4.3 Technical Consultant Review

Nine members of the T&E team with experience using medical software applications checked the basic operation of the MedCOP software. Three were former military medical, while the remaining six were T&E team members with general software experience.

4.3.1 Survey Ratings

Three technical consultants responded to six survey statements on a Likert scale of agreement. Responses were coded from strongly disagree (1) to strongly agree (5). Questions and a summary of responses are as follows:

- *The medical information provided through MedCOP was useful (MIN = 4, MAX = 5).* All three technical consultants were in agreement that MedCOP presented useful information.
- *The medical information provided through MedCOP was easy to use (MIN = 3, MAX = 5).* Two of the technical consultants rated the program as easy to use. One suggested that some features of the program were more accessible with prior training. The lowest rating came from a technical consultant who experienced page-loading delays that appeared to be confined to one session.
- *The medical information MedCOP provided was presented in a useful format (MIN = 4, MAX = 5).* Technical consultants were favorable in their ratings of the format. However, two technical consultants commented that some format features would be easier to take advantage of with training or more accessible help features.
- *The quality of the medical information provided by MedCOP is better than that provided by previous reporting methods (MIN = 4, MAX = 5).* In comparison with the current method of using radioed verbal information posted on bulletin boards, raters agreed that MedCOP provided substantial improvements in speed and reductions in administrative load.
- *MedCOP was flexible enough to meet my needs. I could set it up to do what I wanted it to do efficiently (MIN = 2, MAX = 4).* Technical consultants who reviewed the product were less in agreement concerning this item. One question was whether MedCOP might require more training than usual to install the program and access data properly. A further concern was that the format of the program did not allow much customization of graphics or reports by users. For example, users concerned primarily with transportation logistics might have different desires in terms of reports than those concerned with blood supplies.

- *FMSS would help me do my job (MIN = 4, MAX = 5).* Raters agreed that MedCOP would improve the speed and efficiency of planning for Joint Task Force (JTF) Surgeons, medical planners, and others.

4.3.2 Open-Ended Items

The remaining six survey items gave technical consultants the opportunity to give open-ended comments in response to questions about MedCOP. These questions focused on features of MedCOP that were particularly liked or disliked and gave technical consultants an opportunity to propose useful additions to the program (Appendix B).

Technical consultants agreed that MedCOP had the potential to be “a vast improvement on the status quo.” The graphical user interface map was cited as one of the strongest assets in logistical planning for providing “an effective overview of casualties, blood and supplies, MTF capabilities, and patient movement.”

Users rated MedCOP’s general format favorably for its simplicity and intuitiveness. However, users did note the lack of any help functions and also noted some cases where function definitions were not clear, such as the specific parameters used to determine color codes for facility or supply status.

5.0 Conclusions

5.1 Functional Claims by Developer

All tested functions performed as advertised. See Appendix C for the complete listing. Testers were able to view pages related to available personnel and supplies. Graphics and color codes performed as indicated. Some functions related to patient movement were not available for review at this time, but are scheduled as future capabilities. Also, the link to MDSS for epidemiological analysis was not available, though patient encounter information and searching of ICD-9 codes performed as indicated in the user's guide.

5.2 Usability and Technical Consultant Reviews

Usability and technical consultant reviews for MedCOP were generally positive. Testers agreed that the program was accessible to users and functioned as advertised. Technical consultants indicated that MedCOP represents a significant improvement over current procedures for obtaining medical logistical information. The main recommendations were that the user's guide be brought up to date and that help functions be introduced to aid the user in taking advantage of more advanced features. Users also suggested that the program could allow more customization of reports for particular categories of user for efficiency and greater security.

5.3 Compatibility With Code 23 Program Architecture

MedCOP appears to meet Field Medical Technologies program requirements by successfully incorporating data from JMeWS for use in reports. Preliminary tests also indicated that MedCOP was able to incorporate simulated data produced by the Joint Medical Semi-Automated Forces (JMedSAF) in order to produce reports on medical evacuation status.

5.4 Stand-Alone Capability

This review indicates that MedCOP can provide limited stand-alone functions for planners and preventive medicine personnel in the field. However, it does require ongoing support from JMeWS to provide up-to-date information. The full scope of surveillance information also requires a link to MDSS. MedCOP is primarily for the display of information and is not set up to receive data directly.

6.0 Recommendations

The present data suggest that this system has the potential to be a substantial improvement over current methods of disseminating medical logistical information and would benefit from field evaluations (see Appendix D for summary Readiness Assessment). Other recommendations include the following:

- The quality of MedCOP data is only as good as the quality of data entered into JMeWS. Developers should give thought to cases where gaps or inconsistencies can affect what is ultimately viewed as logistical data. For example, in the SITREP on supplies, inconsistencies in information drawn from the underlying database produced a detailed list of supplies needed from one MTF, but only an unexplained number code from another.
- Another recommendation from both users with previous military medical experience and with functional testers was to increase the capability for creating customized reports based on the particular role of the user. This concern incorporates both security and efficiency. For example, personnel concerned mainly with transport logistics or supplies might not need to see patient histories or have access to MDSS data more appropriate for epidemiologists and vice versa, whereas command personnel might need access to all areas of information. (See Appendix C, test case ID # FO-43.)
- Ratings of the overall interface were positive, but some enhancements could be made. Specifically, there was some concern over the lack of help functions. Users said that the main functions were intuitively accessible, but that some capabilities were not so readily obvious. For example, it was not always clear when mouse rollover would produce more detailed information. The criteria used to determine color codes also were not always explained in the current version.

7.0 References

Armstrong, S. D., Brewer, W. C., & Steinberg, R. K. (2000, October 10). Usability testing. In S. G. Charlton, & T. G. O'Brien (Eds.), *Handbook of human factors testing and evaluation* (pp. 403-432). Retrieved from www.onr.navy.mil/media/tipoff

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Appendix A

Usability Survey

Instructions

A) Rate each statement below as 1–5 for agreement
(1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree).

B) If you have any comments, write them in the space provided. Please include any suggestions you have and any examples that support your rating.

1) Uses simple language. _____

2) Language is familiar to target user. _____

3) Use requires minimal memory load. _____

4) Consistent use of key terms and format for navigation. _____

5) Feedback: System provides informative feedback to user on actions performed. _____

6) Navigational functions are easy to find on every screen. _____

7) Shortcuts are available for experienced or expert users but are not necessary. (Accessibility to varied user expertise.) _____

8) Error messages are clear and provide constructive solutions. _____

9) Design is built to prevent or minimize user error (forgiveness). _____

10) Provides help if necessary. _____

11) Aesthetics: Graphic design is simple and intuitive. _____

12) Efficiency: User doesn't have to repeat unwanted steps for each function. _____

13) Easy to learn to use. User can understand basic function within an hour. _____

14) Basic functions are grouped/organized in a reasonable fashion. _____

15) User can undo or redo actions. _____

Appendix B
Technical Consultant Survey

Your Name _____

Phone _____ **E-mail address** _____

Date _____

Gender: _____ Male _____ Female

Active Duty: _____ Yes _____ No

Service:

_____ Navy

_____ Army

_____ Air Force

_____ Marines

What was your position title?

_____ GMO (General Medical Officer)

_____ PMO (Preventive Medicine Officer)

_____ EHO (Environmental Health Officer)

_____ IDC (Independent Duty Corpsman)

_____ Nurse

_____ Physician's Assistant

_____ Command Surgeon

_____ Task Force Surgeon

_____ CINC Surgeon

_____ Epidemiologist

_____ Task Force Commander

_____ HAZMAT

_____ Other _____

Which area best describes your education and/or training (choose one)?

_____ Statistics

_____ Epidemiology

_____ Preventive Medicine

_____ Other _____

How much experience did you have with medical data software? (months/years)

How much experience did you have working aboard a deployed ship? (months/years)

Your written comments will assist in the development of this technology for the medical support of the armed forces. Please provide them wherever possible, even if it's just a few key words.

MedCOP Information

1. The medical information provided through MedCOP was useful.

☐ Strongly Agree ☐ Agree ☐ Neither Agree Nor Disagree ☐ Disagree ☐ Strongly Disagree
☐ Not Observed

Please Explain: _____

2. The medical information provided through MedCOP was easy to use.

☐ Strongly Agree ☐ Agree ☐ Neither Agree Nor Disagree ☐ Disagree ☐ Strongly Disagree
☐ Not Observed

Please Explain: _____

3. The medical information MedCOP provided was presented in a useful format.

☐ Strongly Agree ☐ Agree ☐ Neither Agree Nor Disagree ☐ Disagree ☐ Strongly Disagree
☐ Not Observed

Please Explain: _____

4. The quality of the medical information provided by MedCOP is better than that provided by previous reporting methods. (Please specify reporting methods previously used.)

☐ Strongly Agree ☐ Agree ☐ Neither Agree Nor Disagree ☐ Disagree ☐ Strongly Disagree
☐ Not Observed

Please Explain: _____

5. The MedCOP system was flexible enough to meet my needs. I could set it up to do what I wanted it to do efficiently.

☐ Strongly Agree ☐ Agree ☐ Neither Agree Nor Disagree ☐ Disagree ☐ Strongly Disagree
☐ Not Observed

Please Explain: _____

6. MedCOP would help me do my job.

☐ Strongly Agree ☐ Agree ☐ Neither Agree Nor Disagree ☐ Disagree ☐ Strongly Disagree
☐ Not Observed

Please Explain: _____

7. The most useful thing about MedCOP for my job would be _____

8. The least useful thing about MedCOP for my job was _____

9. If I could add one thing to MedCOP it would be _____

10. What features of MedCOP did you like?

Please Explain: _____

11. What features of MedCOP did you dislike?

Please Explain: _____

12. Where would you consider MedCOP a best fit in the military medical arena?

Please Explain: _____

Appendix C

Functionality Survey

MedCOP 6.1.3 TEST LOG	
PROJECT ID: MedCOP	
DATE: 25 Sept 2003	DEVELOPER/TEST ENGINEER:
PROGRAM/MODULE: MedCOP – Medical Common Operational Picture	

TEST CASE ID	TEST CONDITIONS	TEST RESULTS PASS/FAIL	COMMENTS	PROBLEMS ENCOUNTERED
MedCOP Ver 6.1.3 FO-1		Pass	The user was successful in performing all tasks associated with logging on to MedCOP. The program would not load with an erroneous user name or password. The user assigned both roles of having medical/surveillance access and not having medical/surveillance access to view detailed patient information. The medical role allowed the user to view patient information, and the nonmedical role did not allow the user to view detailed patient information.	
MedCOP Ver 6.1.3 FO-2		Pass	MedCOP displayed the two primary parts. The navigation and content frames displayed.	
MedCOP Ver 6.1.3 FO-3		Pass	The user was successful in performing all of the associated tasks as identified. All of the required information was viewable, and the user was able to use the scroll capability on the MTF information hyperlinks.	
MedCOP Ver 6.1.3 FO-4		Pass	The user was successful in completing all of the tasks associated with viewing information in the Content Frame. Information could be viewed in either a tabular or graphical format.	

TEST CASE ID	TEST CONDITIONS	TEST RESULTS PASS/FAIL	COMMENTS	PROBLEMS ENCOUNTERED
MedCOP Ver 6.1.3 FO-5		Pass	The user was able to access the hyperlinks, was taken to the correct predefined report, and the color of the hyperlink changed accordingly.	User was able to determine that upon using the internet browser “back” button, the active content window did not correspond to the Navigation Frame’s report name. I.e., the user clicked on “MedEvac Report” to leave “Summary Report.” When clicking the Microsoft Explorer “back” button, “Summary Report” appeared, but the “MedEvac Report” hyperlink in the Navigation Frame remained highlighted. It was noticed that the hyperlinks in the Theater Level (2nd frame) view did not remain with the highlighted text after selection of another report. The system reverted to normal, however, in the MTF level, and the hyperlinks remained as selected.
MedCOP Ver 6.1.3 FO-6		Pass	The user was successful in accessing the Information filter buttons, performed all available actions under the toggle buttons, and verified that the information could also be filtered by using dates and times and disposition.	

TEST CASE ID	TEST CONDITIONS	TEST RESULTS PASS/FAIL	COMMENTS	PROBLEMS ENCOUNTERED
MedCOP Ver 6.1.3 FO-7		Fail	The user verified that data 12+ hours displayed a yellow flash, data 24+ hours displayed a red flash, and new data received returned the clock to normal (data less than 12 hours). The user entered the data through the ANNEX Q reporting module to incorporate these actions in MedCOP.	The user created a change in Commander's status on 23 Sept 2003 at 2:52 local time (EST) for 4765 Combat Support Hospital. Upon refreshing the MedCOP program, the clock icon functioned properly and returned to normal. When checked again at 8:00 a.m., 24 September, the clock was not flashing yellow (for data 12+ hours old) and, at 11:47 a.m., the clock began to flash red, signaling data that are 24+ hours old. This was consistent with the MTF Commander's Status Box.
MedCOP Ver 6.1.3 FO-8		Pass	The user was able to access detailed MTF information displayed through the MedCOP map display. All of the hyperlinks directed the user to the correct report, and by mousing over the color-coded MTFs, the user was provided with an explanation of the color code.	
MedCOP Ver 6.1.3 FO-9		Pass	The MTFs were created in ANNEX Q, and specific latitudes/longitudes were entered knowing the specific locations. The user verified that they were displayed on the MedCOP map, that they could be accessed by selecting the desired MTFs, and that the information entered into ANNEX Q was correctly displayed. The user was also able to verify that the MTF readiness information was displayed correctly and that MedCOP was able to acknowledge the alert. The highlighted map links allow users to view maps from a closer perspective (zoom).	

TEST CASE ID	TEST CONDITIONS	TEST RESULTS PASS/FAIL	COMMENTS	PROBLEMS ENCOUNTERED
MedCOP Ver 6.1.3 FO-10		Pass	The user was able to track the number of patients and customize the information according to date/time, disposition, and service. The user also verified that mousing over the date made the initial report viewable.	
MedCOP Ver 6.1.3 FO-11		Pass	The user was able to view the bed status for the reporting MTFs and filter the information by selecting the echelons of care and the branch of service. The user also verified the defined status thresholds.	
MedCOP Ver 6.1.3 FO-12		Fail	The user was able to complete all of the tasks identified on the Status Web page. The user was able to select patients by SSN, Service, Unit, Disposition, MTF, Category, Data Range, Gender, ICD-9, and primary diagnosis. The user was also able to view 15 patients at a time using the “previous” and “next” buttons and sort the patients in ascending or descending order.	The user determined that the Primary Diagnosis column could not be sorted by ascending or descending order. Also, when the user tried to sort the ICD-9 Code drop-down, the user was directed back to the Patient Status screen, showing no results for the ICD-9 codes.
MedCOP Ver 6.1.3 FO-13		Pass	The user was able to access and view the Detailed Patient Status page and complete all of the required steps as identified in the user’s guide.	
MedCOP Ver 6.1.3 FO-14		Pass	The user selected the patient status tab and clicked on the patient record hyperlink. The user was directed to the Detailed Patient Status page and verified the patient information.	

TEST CASE ID	TEST CONDITIONS	TEST RESULTS PASS/FAIL	COMMENTS	PROBLEMS ENCOUNTERED
MedCOP Ver 6.1.3 FO-15		Pass	The user was able to access the Personnel hyperlink and verify that the Personnel information was presented in the form of “On Hand” versus “Authorized.” The user was able to filter the selections by level and branch. The Search Criteria button was accessible, and the clock icon displayed the correct data information.	
MedCOP Ver 6.1.3 FO-16		Pass	The user was able to view the information on the Medical Corps personnel page in the form of “On Hand” vs. “Authorized.” Upon selecting the Personnel box, the user was returned to the main Personnel page. The user also verified that the clock icon displayed the information according to the time when the report was submitted.	
MedCOP Ver 6.1.3 FO-17		Pass	The user was able to access and view the personnel information in the form of “On Hand vs. “Authorized” on the Dental Corps page. Upon selecting the main Personnel box, the user was taken to the main Personnel page. The user also verified that the clock icon displayed the information according to the time when the report was submitted.	
MedCOP Ver 6.1.3 FO-18		Pass	The user was able to access and view the personnel information in the form of “On Hand vs. “Authorized” on the Nurse Corps page. Upon selecting the main Personnel box, the user was taken to the main Personnel page. The user also verified that the clock icon displayed the information according to the time when the report was submitted.	

TEST CASE ID	TEST CONDITIONS	TEST RESULTS PASS/FAIL	COMMENTS	PROBLEMS ENCOUNTERED
MedCOP Ver 6.1.3 FO-19		Pass	The user was able to access and view the personnel information in the form of “On Hand” vs. “Authorized” on the Medical Services Corps page. Upon selecting the main Personnel box, the user was taken to the main Personnel page. The user also verified that the clock icon displayed the information according to the time when the report was submitted.	
MedCOP Ver 6.1.3 FO-20		Pass	The user was able to access and view the personnel information in the form of “On Hand” vs. “Authorized” on the Enlisted Medical page. Upon selecting the main Personnel box, the user was taken to the main Personnel page. The user also verified that the clock icon displayed the information according to the time when the report was submitted.	
MedCOP Ver 6.1.3 FO-21		Pass	The user was able to access and view the personnel information in the form of “On Hand” vs. “Authorized” on the Enlisted Dental page. Upon selecting the main Personnel box, the user was taken to the main Personnel page. The user also verified that the clock icon displayed the information according to the time when the report was submitted.	
MedCOP Ver 6.1.3 FO-22		Pass	The user was able to access and view the personnel information in the form of “On Hand” vs. “Authorized” on the Other Medical Personnel page. Upon selecting the main Personnel box, the user was taken to the main Personnel page. The user also verified that the clock icon displayed the information according to the time when the report was submitted.	

TEST CASE ID	TEST CONDITIONS	TEST RESULTS PASS/FAIL	COMMENTS	PROBLEMS ENCOUNTERED
MedCOP Ver 6.1.3 FO-23		Pass	The user was able to access the History Graph and complete all of the associated tasks. All four input boxes contained all the fields as identified in the user's guide. When selected, MedCOP displayed the selected information. The right side of the History Graph is a future capability.	
MedCOP Ver 6.1.3 FO-24		Pass	The user was able to select the Joining and Capability Report toggle button and enter search criteria by filtering out the level and MTF. The user also verified that the selected MTF Level page appears when the MTF hyperlink is selected. The four navigation buttons also were present, and when the user selected the search button, the available information was displayed for the loaded MTFs. When the user selected the Joining Report, the status boxes became disabled. When the user selected the Capability Report, the color codes appeared in the status column.	
MedCOP Ver 6.1.3 FO-25		Pass	The user was able to select the Beds page hyperlink and sort the information by selected MTFs, along with the level and service branch. The search button also allowed the user to search MTFs for critical shortfalls.	
MedCOP Ver 6.1.3 FO-26		Pass	The user was able to select the Supplies/Equipment tab from the capability report and access the drop-down list of supplies and view the MTF by selecting the hyperlink. The search button allowed the user to search MTFs for critical shortfalls.	

TEST CASE ID	TEST CONDITIONS	TEST RESULTS PASS/FAIL	COMMENTS	PROBLEMS ENCOUNTERED
MedCOP Ver 6.1.3 FO-27		Pass	The user was able to view the Medical Personnel status by MTF, level, and service branch. The information was presented in the “On Hand” format, and the column heading hyperlink provided detailed information. The search button allowed the user to search MTFs for critical shortfalls.	
MedCOP Ver 6.1.3 FO-28		Pass	The user was able to select the Transport page from the capability report and verify that the MTF hyperlinks directed the user to the selected MTF. The user was able to sort by level and service branch. The user was also able to verify that the Commander-defined status was viewable by “mouse-over.” The search button allowed the user to search MTFs for critical shortfalls.	
MedCOP Ver 6.1.3 FO-29		Pass	The user was able to view the SITREP page by selecting the SITREP hyperlink. The user was also able to view MTF level information by selecting several of the MTFs listed and was able to sort the information by level of care and branch of service.	
MedCOP Ver 6.1.3 FO-30		Pass	The user was able to select the Blood Report from the frame and verify that there were two tables to view the information on selected MTFs. The user was able to view the information by filtering the four radio buttons and was able to display the changes by clicking on the update button.	The user could not get the results to display when the selection of “All MTFs” was chosen on the left side or right side of the report. The Refrigerators and Freezers columns populated, but the total inventory and blood types (e.g., A+, A-) did not populate the tables.

TEST CASE ID	TEST CONDITIONS	TEST RESULTS PASS/FAIL	COMMENTS	PROBLEMS ENCOUNTERED
MedCOP Ver 6.1.3 FO-31		Pass	The user was successful in viewing the hospitalization data for the theater and verified that the column headings provided detailed information. The MTF hyperlinks also directed the user to the selected MTF, where the user could filter the selections by level and branch. The user was also able to view the data by selecting the available choices in the drop-down box and the disposition data.	
MedCOP Ver 6.1.3 FO-32		Pass	The user was able to view the Admits by service by selecting the Admits column heading. The user was able to select the MTF and filter the data by level and branch for detailed information. Upon selecting the Hospital Report button, the user was directed to the main Hospital Report page.	
MedCOP Ver 6.1.3 FO-33		Pass	The user was able to view the medical evacuation data that were populated through JMedSAF. The MTF hyperlinks directed the user to the selected MTF and indicated the mode of transportation. The user was able to filter the selections by level and branch. The clock icon was correct.	
MedCOP Ver 6.1.3 FO-34		Pass	The user was able to access the MTF level data, and by clicking on a specific MTF (all), the user was able to view data on the selected MTF chosen.	
MedCOP Ver 6.1.3 FO-35		Pass	The user was able to access the bed status for a particular MTF by selecting the MTF and then selecting Bed Status. The Commander's status was identified for the MTF, and the percentage was displayed for Occupied Beds vs. Mission Capable Beds.	

TEST CASE ID	TEST CONDITIONS	TEST RESULTS PASS/FAIL	COMMENTS	PROBLEMS ENCOUNTERED
MedCOP Ver 6.1.3 FO-36		Pass	The user was able to view the MTF level-specific data for a particular MTF and view the MTF level Commander's status as determined.	
MedCOP Ver 6.1.3 FO-37		Pass	The user was able to access and search patient-related data for a particular MTF (Misawa AFB), and complete all of the functions of the Search and Advanced tab features. The Ascending and Descending sort function sorted the data as chosen.	
MedCOP Ver 6.1.3 FO-38		Pass	The user was able to view detailed patient information by selecting the hyperlink in the Patient Status form. All of the selected hyperlinks directed the user to patient specific information, and the user was able to view patient name, service, branch, and rank. Upon selecting the hyperlink in the patient log, the user was able to view the history of the encounter.	
MedCOP Ver 6.1.3 FO-39		Pass	The user was able to select the Patient Name hyperlink and was directed to patient information for that particular patient and MTF. The user was also able to utilize the drop-down choices to filter the selection.	
MedCOP Ver 6.1.3 FO-40		Pass	The user could view personnel information for a particular MTF.	
MedCOP Ver 6.1.3 FO-41		Pass	The user was able to view blood data for selected MTFs (all), and use the four radio buttons to display the updated data for each blood product.	

TEST CASE ID	TEST CONDITIONS	TEST RESULTS PASS/FAIL	COMMENTS	PROBLEMS ENCOUNTERED
MedCOP Ver 6.1.3 FO-42		Pass	The user was able to access the History Graph and perform the analysis functions of Time, Group, Item, and Type. The Update Graph button displayed the requested information. The right side of the History Graph is a future capability.	
MedCOP Ver 6.1.3 FO-43		Fail	The user created the account, modified the account, assigned several roles, focusing on administrator privileges, and was able to view both User Profile and User Profiles. The user was not able to view User Profiles when not assigned the role of Administrator.	A user can gain administration or any other desired privileges through the My User Profile screen. This is obtained by viewing his or her user profile through the System Administration link, then clicking on the Administrator (or any other) check box in the Security Info section. The user can then click update and logout; upon logging back in to the system, the user has administration rights. A nonmedical user can easily give himself or herself access to medical information by clicking on the Medical Role, gaining access to personal patient information through MedCOP Patient Status.

Appendix D
Readiness Assessment

PRODUCT INFORMATION**Product:** MedCOP, Version 6.1.3**Developer:** ScenPro, Inc.**Cost:** \$ Not Determined**Installation/Support****Software:** Login through Web page to Version 6.1.3**Documentation:** MedCOP User's Guide Version 6.0
July 2003**Training:** User's Manual only**Specifications:** Hardware: Pentium II 233MHz processor; 128 MB RAM; 3 GB hard disk space; CD-ROM
Software: Windows 2000 w/Service Pack 3; Oracle 9i Client software; Java SDK 1.4.1; Tomcat 4.1; Microsoft Access 2000 (to edit MeWs Database Interface)**CLAIMS****Functional:** See functional claims on right.**Technical:** See technical claims on right.**Readiness Assessment
EVALUATION****FUNCTIONAL****Claim**

Tracking of patients and medical personnel

Tracking of available beds, supplies and blood

Access to an epidemiological predictions system

MDSS alerts visible through map

Requirement

DoD Medical Surveillance

Medical readiness assessment

DoD Medical Surveillance

Must link to MDSS

Observed

Tracked available medical personnel. Patient Movement function not available in this version.

Tracked available beds, supplies, and blood

MDSS link not available for this report.

MDSS link not available for this report.

TECHNICAL**Claim**

Color-coded graphical data

Provides a map of operational theater with available medical treatment facilities (MTFs) identified

User may view MTF summary status at theater level or double-click on individual MTF icons to obtain detailed status.

Requirement

Medical readiness assessment

Medical readiness assessment

Medical readiness assessment

Observed

Color codes and graphics functional

Map functional

Theater and individual level status information functional. User was not able to view Patient Movement pages or link to MDSS

Compatibility with Program Architecture:

Data transfer from MeWS satisfactory. Unable to assess compatibility with MDSS.

Requirements

Functional: Medical logistics, medical records, surveillance

Technical: See technical claims on right.

Rating

Functional: Satisfactory for use by remote command staff, medical planners, and medical care providers with access to laptop computer.

Technical: Satisfactory for integration with JMeWS. Unable to assess link to MDSS.

Overall: Not a stand-alone tool. Satisfactory for field use with link to current JMeWS database and MDSS.

Appendix E

Acronyms

Acronyms

CHCS	Composite Health Care System
CINC	Commander-in-Chief
DARPA	Defense Advanced Research Project Agency
DoD	Department of Defense
ENCOMPASS	Enhanced Consequence Management Planning and Support System
FMSS	Field Medical Surveillance System
ICD-9	International Classification of Diseases, 9th Revision
JMedSAF	Joint Medical Semi-Automated Forces
JMeWS	Joint Medical Workstation
JTF	Joint Task Force
JTL	Joint Theater Logistics
MDSS	Medical Data Surveillance System
MedCOP	Medical Common Operational Picture
MTF	Medical Treatment Facilities
NHRC	Naval Health Research Center
ONR	Office of Naval Research
PMO	Preventive Medicine Officer
SAIC	Science Applications International Corporation
SITREP	Situation Report
SSN	Social Security Number
T&E	Test and Evaluation

REPORT DOCUMENTATION PAGE

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13. SUPPLEMENTARY NOTES
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14. ABSTRACT (maximum 200 words)
This report summarizes the test and evaluation (T&E) of the Medical Common Operational Picture (MedCOP) software, commissioned as a tool to facilitate resource management by medical facilities and to track disease trends and patient movement. The present work was conducted at the Naval Health Research Center (NHRC) by a T&E team independent of MedCOP's developers to provide formal feedback on MedCOP's advertised functional claims.

Survey results indicated that users found MedCOP appropriate for use as a tool by medical planners and preventive medical personnel. Testers stated that it represented an improvement over the status quo.

Limitations noted included dependence on the accuracy and availability of Joint Medical Work Station (JMeWS) data and the MDSS. Users also noted that the manual needed to be updated to include all current functions, and that on-line help should be available to aid in taking advantage of all features.

MedCOP performed well in meeting advertised claims. Developers should address users' concerns about updating the user's guide and providing help functions. They should also consider refining user profile capability to let users with different roles customize reports to view information more efficiently and to ensure that reports on individual patient information are limited to authorized users.

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