Verification and Validation

of the

Phase 4 Combat Trauma Patient Simulation (CTPS) System Functionality:

An Independent Evaluation

Conducted by the

Center for Total Access (CTA)
Fort Gordon, Georgia

Prepared for the

Telemedicine and Advanced Technology Research Center (TATRC)
Fort Detrick, Maryland

and the

Simulation, Training and Instrumentation Command (STRICOM)
Orlando, Florida

1.0 Executive Summary

The Combat Trauma Patient Simulation (CTPS) system is a network of high-fidelity medical simulators and hardware components designed to portray casualty treatment at multiple echelons of care in the battlespace. This report reviews an independent test and evaluation of the Combat Trauma Patient Simulation (CTPS) system conducted by the Center for Total Access (CTA) at Ft. Gordon, GA. The purpose of the test was to analyze the functionality of the CTPS system by conducting an exhaustive usability analysis of the system to verify that the system functions according to specifications, and that it can be efficiently and effectively configured and used by relevant personnel. The evaluation addresses the following areas:

Installation. The CTPS system was successfully set up over a fourteen-day period. The logistical effort of installing the CTPS system is significant, including occupational health and safety inspections and facilities modifications. The layout used in this installation is effective, but a larger space will enhance the usability of the simulators.

Vendor Education and Training. Evaluation reports indicate that the training conducted by the vendor met the overall training objectives of the soldiers in setting up and utilizing the CTPS. However, a formal training curriculum will better addresses the training needs of less technologically adept soldiers, who received less effective training because of their lack of computer expertise. Trainees requested more time with the CTPS and more repetitions. The development of training aids, including handouts and quick start documentation would enhance the vendor training events.

Vendor Demonstration of System Capabilities. Vendor representatives demonstrated features of the CTPS system to CTA staff members. The components evaluated during this demonstration were limited to the casualty handler software, triage controller software interfaces, and the portions of the after action review software. Out of 97 evaluation criteria used during the vendor demonstration, the CTPS system components passed 88 system tests, failed one, and another 8 were not tested to the system errors or inapplicability of the evaluation criteria. Specifically, saving patient scenario physiology caused the system to lock. All other features and capabilities were demonstrated successfully.

Vendor Documentation. The documentation provided thus far is informative but not comprehensive. More documentation, specifically a CTPS specific setup guide and installation protocol, casualty handler user manual and trainees briefing materials are needed.

Independent Evaluation of System Capabilities. Out of 225 evaluation criteria, 218 passed and seven were not tested due to system errors. There are a small number of software bugs, and many procedures can be streamlined, but overall the system works as designed

In conclusion, the CTPS is a complex system that functions according to specifications and can be configured and used by trainees. The CTPS system requires formal policies, procedures and documentation. These additional value-added features will enhance the usability of the CTPS system and improve the quality of training provided to soldiers.

Table of Contents

2.0 Purpose of the Independent Evaluation

2.1 Background. The Combat Trauma Patient Simulation (CTPS) system was developed using congressional funds, by a commercial vendor, Medical Education Technologies Incorporated (METI). This government project was managed by two federal agencies, the Simulation, Training and Instrumentation Command (STRICOM) and Telemedicine and Advanced Technology Research Center (TATRC). To date, there have been four congressional awards to the Combat Trauma Patient Simulation (CTPS) project. Each phase has had specific developmental milestones. This independent evaluation is focused on the result of the Combat Trauma Patient Simulation (CTPS) Phase 4 development efforts.

2.2 System Overview. The Combat Trauma Patient Simulation (CTPS) system was developed to provide simulation of military casualty generation, handling and treatment. It is intended to simulate the emergency medical treatment process for combat trauma injuries at each echelon of care. The goal of the Combat Trauma Patient Simulation (CTPS) system is to provide the military health care system (MHS) with a tool to more realistically replicate battlefield casualties within the framework of a medical training exercise.

The Combat Trauma Patient Simulation (CTPS) system is a network of hardware components, including a casualty handler workstation, six triage controller workstations and six human patient simulators (i.e.,. computerized mannequins). Of the six human patient simulators, four are pre-hospital simulators (PHS) units and the remaining two units are hospital level simulators (HPS).

The Combat Trauma Patient Simulation (CTPS) system offers six pre-programmed clinical scenarios. These scenarios are intended to represent trauma conditions typically presented in military medical operations. Once a clinical scenario has been initiated at the first echelon of care, the triage controller software and human patient simulator present the corresponding vital signs and reacts to healthcare interventions with the appropriate physiological responses. The simulator's physiological status and medical interventions are recorded into a centralized database over the network architecture of the Combat Trauma Patient Simulation (CTPS) system. This data is utilized by the After Action Review (AAR) software at the conclusion of a training event for analysis of individual and collective training performance.

Once the first responder has completed triage activities and first aid at the first echelon, the Combat Trauma Patient Simulation (CTPS) system allows the patient to be electronically transferred to the appropriate echelon of care for additional treatment. This transfer can be continued through multiple echelons of care, if medically required. In this manner, comprehensive training opportunities are presented for the level I, II and III military healthcare providers.

2.3 Objectives. The purpose of conducting an independent test and evaluation of the Combat Trauma Patient Simulation (CTPS) system is two-fold, and will be conducted in two separate phases. In the first phase, testing will be conducted to verify system functionality. In essence, this phase will constitute a usability analysis of the system, intended to make sure that (a) the system functions according to specifications, and (2) that it can be efficiently and effectively configured and used by relevant personnel. In the second phase, assessment and validation of

the efficacy of the individual Medical Education Technologies Incorporated (METI) simulators as training tools, as contrasted with traditional training techniques utilized by the military health care system (MHS) will be accomplished using a combination of subjective and objective measures of task performance. This report is limited to the first phase of this independent test and evaluation.

Figure 1. CTPS system after initial installation at Fort Gordon

3.0 CTPS System Installation

3.1 Transportation and Shipping. Two commercial vehicles delivered the CTPS system components to Fort Gordon. Thirty-one crates were utilized: six mannequin cases (50" x 30" x 21"); twelve wooden crates (40" x 31"x 60"); twelve cardboard boxes (35" x 29" x 21"); and one plastic shipping container.

The CTPS components include: six computerized medical mannequins; twelve ruggedized crates containing computer equipment; seven desktops CPUs; seven 17" monitors; and seven laptop computers.

A pallet jack was required to move the shipping crates into their appropriate locations within the building, prior to uncrating. A handcart was utilized to remove packing material and individual Combat Trauma Patient Simulation (CTPS) system components throughout the building.

3.2 Physical Space. The Combat Trauma Patient Simulation (CTPS) system was installed within an environmentally controlled physical space of 2,040 square feet. This space configuration was determined in part, by a minimum standard of 240 square feet per simulator, a guideline established by the commercial vendor, Medical Education Technologies, Inc. (METI) and the additional space for the CTPS network components. The vendor additionally recommended that to the greatest extent possible, the system be installed into a location without walls acting as barriers between simulators workstations. This recommendation was made to allow the training exercise staff to maintain visibility of multiple training groups simultaneously. To address this recommendation, a request for modification to original building structure was sent to the facilities management office prior to the delivery of equipment. Eight sections of non-structural wall were removed to create two open "bays" of space to install the CTPS system.

A 168 square foot section was designated as an orientation and after action review briefing area for the training participants (figure 2). An additional 240 square foot external storage building was utilized to store all of the shipping crates and boxes for the CTPS system.

Seven LAN connections were required to network the CTPS system. METI required a network configuration of 10 Based T CAT-5 cable infrastructure to support the CTPS system. Connectivity to the Internet was requested to allow system updates and programming patches to be send electronically using TELNET, Secure Shell or FTP transmissions to the main CTPS server from METI. Due to security requirements on a military installation, establishment of these portals required advanced coordination with the TRISERVICE Infrastructure Management Program Office (TIMPO) in San Antonio, Texas.

Seven electrical outlets located in close proximity to the placement of each treatment station were also required. Gas lines, providing oxygen (O2), nitrogen (N2), carbon dioxide (CO2) and compressed air from centrally located bank of gas cylinders were also required to be placed in close proximity to the six treatment stations.

3.3 Additional Hardware

3.3.1 Air compressor. METI specifications stated that each simulator requires a peak flow of 1.0 standard cubic feet per minute (SCFM) at a pressure of 50 PSIG. Therefore, the operation of six simulators simultaneously was estimated to require a peak flow of 6.0 SCFM, with a recommended outlet pressure of 60 PSIG. Based on these estimations, the vendor recommended utilizing a minimum of a 2 horsepower (HP) air compressor. Based upon these criteria, the CTA obtained 2-stage oil-free air compressor with a 175-PSI maximum, 3.5 HP, 25-gallon tank that was commercially available.

3.3.2 Uninterrupted Power Supplies (UPS). Seven UPS devices (Belkan 450) were utilized for surge and power protection of the CTPS system.

3.3.3 Briefing Computer System.1 CPU with a large screen display for orientation and after action review briefings.

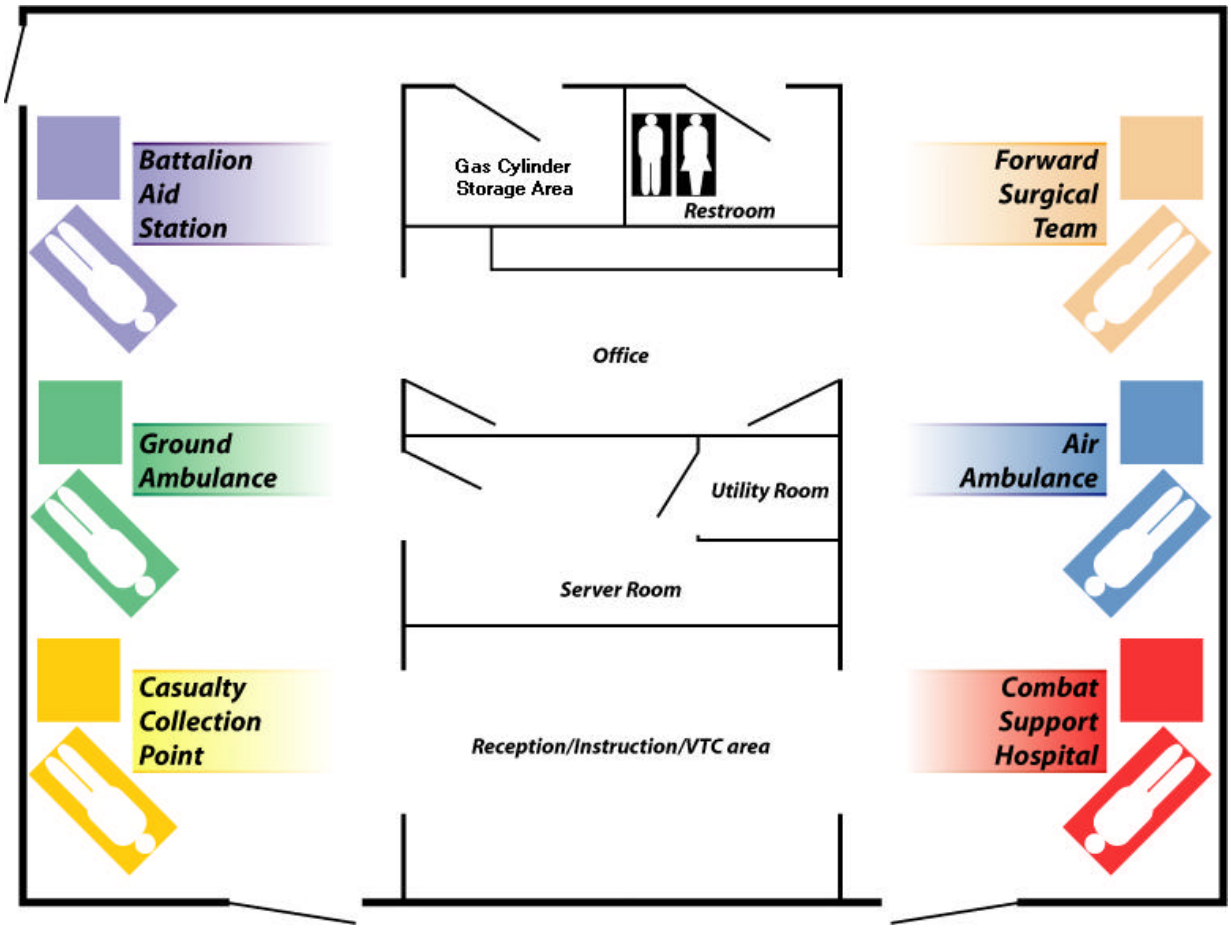


Figure 2. Layout of the Combat Trauma Patient Simulation (CTPS) system within the physical space

3.4 Furniture

3.4.1 Computer carts. METI provided seven wheeled computer carts for the laptop hardware. Six additional computer carts were supplied by the CTA for the desktop computer systems.

3.4.2 Medical.

3.4.2.a Litters. 6 litters and 2 litter stands

3.4.2.b IV poles. 12 IV poles

3.4.3 Office Furniture. 15 chairs, 2 desks, 1 credenza

3.5 Information Technology Support. To provide Internet connectivity to the CTPS server, for TELNET, Secure Shell and FTP transmissions, one fixed military IP address was required. A private network, using unpublished IP addresses was used to network all of the treatment nodes to the central CTPS server.

METI installed a 10 Based T, 24 port HUB to establish this private network for the CTPS system. Two CTA technical support staff members assisted the METI technical team with the configuration of the network during the first two days of the installation period.

3.6 Consumable supplies

3.6.1 Gases. Nitrogen, Oxygen and Carbon Dioxide are all required gases to operation the HPS and PHS units. Anticipating that large quantities could be consumed during an actual training event, and centralized back of gas cylinders was assembled to provide a central supply to the building. Four H-size cylinders of nitrogen, two H-size cylinders of oxygen and two H-size cylinders of carbon dioxide were all placed in this central gas "bank". A gas line drop to accommodate additional cylinders of compressed air was also installed, to serve as a backup source should the air compressor malfunction.

Figure 3. Central Gas " Bank" Cylinder Configuration
Black tanks = N2; Green tanks = O2 and Gray Tanks = CO2

3.6.2 Medical Supplies. METI provided a list of basic medical supplies required for the individual HPS or PHS units. This itemized list is located in Appendix A.

3.7 Labor. 600 man-hours were required to conduct the installation, on-site configuration, initial demonstration and vendor conducted training.

Medical Education Technologies Incorporated (METI) provided 5 staff members for the initial 5-day installation period. Three staff members returned for an additional 5-day of configuration and testing period. Four staff members were in attendance for an initial product demonstration. Subsequent to the initial two-week installation, three staff members returned for a 4-day training session.

Tekâmah Corporation provided one staff member for the second week (5 days) of configuration and testing, and two members for an initial product demonstration. Both staff members returned to assist in 2 days of the training session.

The CTA provided one active duty soldier to logistically assist during the initial 10 days of installation, and one civilian staff member to assist with information technology support throughout the installation, configuration, demonstration and training period.

3.8 Discussion. Several items developed as part of the multi-phased CTPS project were not included in the Fort Gordon configuration, and will not be evaluated. These items included the miles casualty card, trauma/disaster casualty kit and the portable gas station units.

Site preparation required a significant coordination effort between the CTA and METI. Weekly, and in some instances bi-weekly phone conferences were held, commencing sixteen weeks prior to the installation. Two representatives from METI arrived twelve weeks prior to the targeted installation date for a site survey and planning meeting for the logistics, occupational health, and safety offices at Fort Gordon. Use of inert gasses required approval by the medical safety officer prior to installation. Based upon this experience, it is evident that multi-disciplinary planning in advance is essential for a successful installation.

METI documentation for the CTPS system provided detailed requirements for the individual HPS or PHS units. Physical requirements for the CTPS system were not available prior to installation. CTPS system requirements were provided to the CTA through numerous e-mails, teleconferences and installation planning meetings on site. These activities adequately compensated for the lack of pre-existing requirements documentation.

Medical supply lists for the CTPS system were identified by the individual HPS and PHS system requirements in a civilian healthcare setting. For the CTPS system, a medical supply list for treatment on the battlefield is required. This disparity resulted in a medical supply list that did not correlate to the supplies that are doctrinally available at lower echelons of care (the casualty collection point, evacuation nodes and the battalion aid station). A complete military medical supply requirements list will be documented during the conduction of the phase II evaluation of the CTPS system. This should serve to supplement the METI documentation.

Final authorization to utilize physical space on Fort Gordon for the CTPS installation experienced delays within the military. This resulted in a delay in the physical building modifications and a subsequent shift in the installation timeline. These delays were irrespective of the vendor.

Due to military safety requirements, the air compressor could not be installed on the exterior of the building or in close proximity to the gas cylinders, so it was located in the server room. Noise and vibration are concerns, and insulations and noise abatement measures should be considered during a CTPS installation. While the compressor can be heard within the building, is not a distraction from training. The addition of ambient "field" sounds to the simulator lab will mask the noise generated by the compressor.

Physical space used in this configuration is the minimum acceptable size. Additional square footage is recommended for future use.

4.0 Assessment of On-Site Vendor Education and Training

4.1 Background. A five-day time period was identified to conduct the initial orientation and training of the Combat Trauma Patient Simulation (CTPS) system. Representatives from Medical Education Technologies Incorporated (METI) and Tekâmah Corporation provided on-site instruction on the Fort Gordon military reservation.

4.2 Assumptions. In the absence of formal curricula, the Center for Total Access developed a schedule and learning objectives for the training event. This documentation was then reviewed and modified by representatives from Medical Education Technologies Incorporated (METI) and Tekâmah Corporation. The final schedule and learning objectives for the training event were then disseminated to all participants. The initial training program was limited to no more than ten participants, with an optimal attendance goal of five students. Trainees were identified and selected for their clinical, operational and/or technical expertise.

4.3 Schedule of Training Events.

August 13, 2001	Overview of CTPS System
August 14, 2001	Introduction to the Individual HPS simulator
August 15-16, 2001	Review of CTPS System and Demonstration a. Casualty Handler b. Triage Controller c. CTPS Clinical Scenario orientation d. After Action review
August 16-17, 2001	HPS Clinical Scenario Training

4.4 Training Objectives. The first training module, the *Introduction to the Individual HPS Simulator* was a demonstration, followed by hands-on training of the individual human patient simulator units. Instructions of turning on, launching software and activating clinical features of the version 6.0 software were all reviewed. The terminal learning objective (TLO) for this lesson stated that: *at the conclusion of this lesson, each participant will demonstrate familiarity with the operation of an individual simulator unit, including turning on the system, launching software and activating clinical features.*

The second training module, the *Review of CTPS System and Demonstration* was a demonstration and orientation of the discrete components of the Combat Trauma Patient Simulation (CTPS) system. The terminal learning objective (TLO) for this lesson stated that: *at the conclusion of this lesson, each participant will be able to describe of the roles and interactions of the casualty handler, triage controller, clinical scenarios and the after action review process within the CTPS system*. There were four parts to this lesson, each with a specific enabling learning objective. The first part, *Casualty Handler* was a demonstration, followed by hands-on training in the use of the casualty handler software. The enabling learning objective (ELO) for this section stated that: *at the conclusion of this module, each group of 3-4 participants will be able to successfully operate the casualty handler software*. The second component of the lesson, the *Triage Controller* was a demonstration, followed by hands-on training in the use of the triage controller software. The enabling learning objective (ELO) for this section stated that: *at the conclusion of this module, each group of 3-4 participants will be*

able to successfully operate the triage controller. The third section of the lesson, the *CTPS Clinical Scenario Orientation* was a demonstration, followed by hands on training in the use of the six clinical scenarios provided with the CTPS system: blunt abdominal injury; blunt chest injury; compound fracture of the left leg (tibia); gunshot wound to the left chest; gunshot wound to the right thigh (femoral artery bleed); and closed head injury. The enabling learning objective (ELO) for this section stated that: *at the conclusion of this module, each group of 3-4 participants will be able to successfully operate each of the six available clinical scenarios in the CTPS system.* The final part of this lesson, the *After Action Review* was a demonstration, followed by hands-on training in the use of the after action review reporting process. The enabling learning objective (ELO) for this section stated that: *at the conclusion of this module, each group of 3-4 participants will be able to successfully operate the after action review software.*

The third and final training module, *HPS Clinical Scenario Training* was a demonstration, followed by hands-on training of the computer programming required to develop new clinical scenarios for the HPS units. The terminal learning objective (TLO) for this lesson stated that: *at the conclusion of this lesson, each participant will be able to describe the general steps required to develop a new clinical scenario for the individual medical simulator (HPS system).*

4.5 Measures of Performance. Prior to all training events, each participant completed an on-line demographic survey, to determine his or her professional background and baseline perceptions of medical simulator technology (see appendix B).

At the conclusion of each training module, all participants completed corresponding on-line evaluation survey, modeled after the standard evaluation criteria used for continuing medical education programs (see appendix C). This evaluation criterion generally utilized across the DoD for accredited continuing medical education courses, including medical device training. At the conclusion of the final training event, each participant completed a training and system evaluation questionnaire, which was derived in large part from evaluation tools utilized by the discipline of human factors[1] (see appendix D).

[1] Damos, D.; Handbook of Human Performance Assessment

4.6 Results. Each lesson was completed in the time period allotted. Eight participants attended the *Introduction to the Individual HPS Simulator* module, which was conducted by Medical Education Technologies Incorporated (METI) personnel. Five participants attended the *Review of the CTPS System and Demonstration* module, which was conducted by Tekâmah Corporation with support from Medical Education Technologies Incorporated (METI) personnel. Three participants attended the *HPS Clinical Scenario Training*, which was conducted by Medical Education Technologies Incorporated (METI) personnel.

Due to class size, the results of this evaluation are not statistically significant, and therefore have been treated as general trends for purposes of this report. The system evaluation completed by

all trainees will also be given to end-users during phase 2 of this evaluation. At that juncture, a comprehensive analysis of the aggregate data will be conducted.

Participant evaluations of the first lesson, the *Introduction to the Individual HPS Simulator* indicated that the majority of the participants found that the training did meet the stated learning objective, and the content was relevant to the learning objective. All of the participants who completed the survey indicated that the subject matter was effectively conveyed (figures 4 – 7). A complete evaluation report is available in Appendix E.

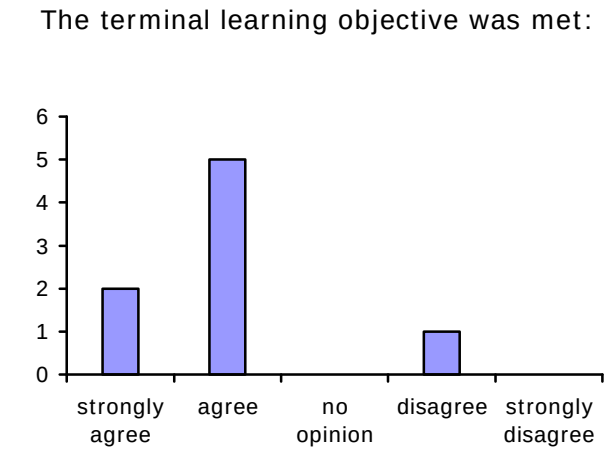


Figure 4. Evaluation of the first lesson, Introduction to the Individual HPS Simulator

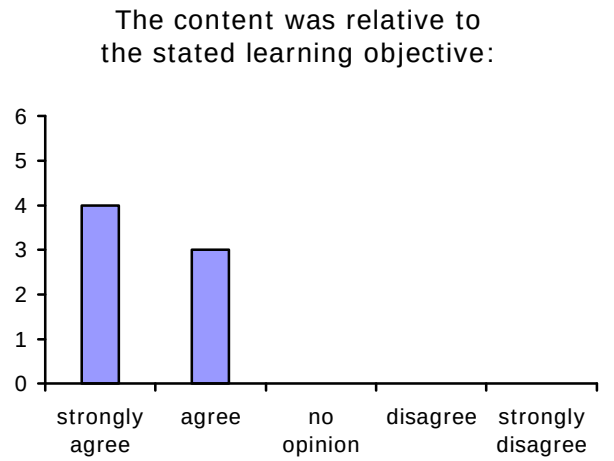


Figure 5. Evaluation of the first lesson, Introduction to the Individual HPS Simulator

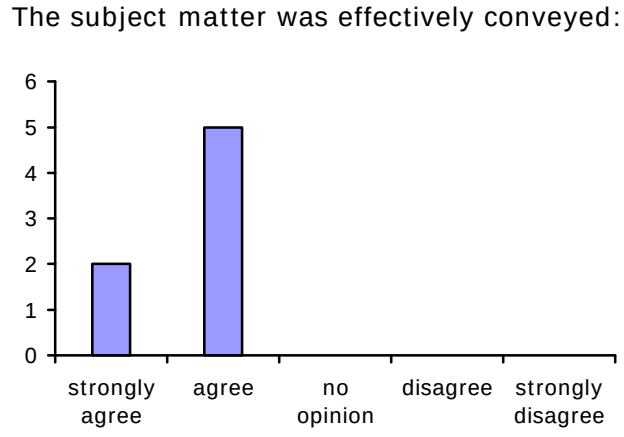


Figure 6. Evaluation of the first lesson, Introduction to the Individual HPS Simulator

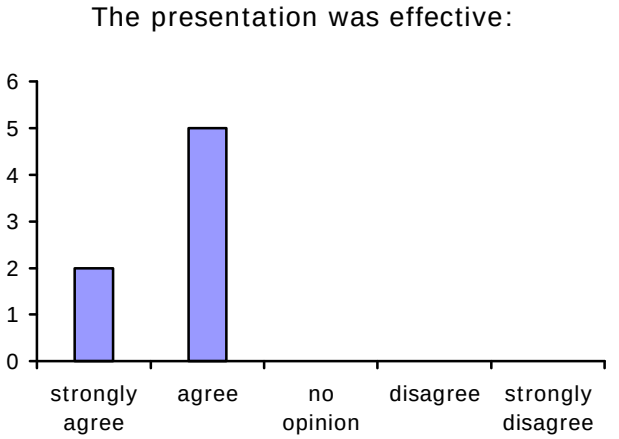


Figure 7. Evaluation of the first lesson, Introduction to the Individual HPS Simulator

Participant evaluations of the second lesson, the *Review of the CTPS System and Demonstration* indicated that the majority of the participants found that the training met the stated learning objective and the content was relevant to the learning objective. All of the participants who completed the survey indicated that the subject matter was effectively conveyed. The majority of the participants indicated that the presentation was effective, but a significant minority did not concur (figures 8 – 14). A complete evaluation report is available in Appendix F.

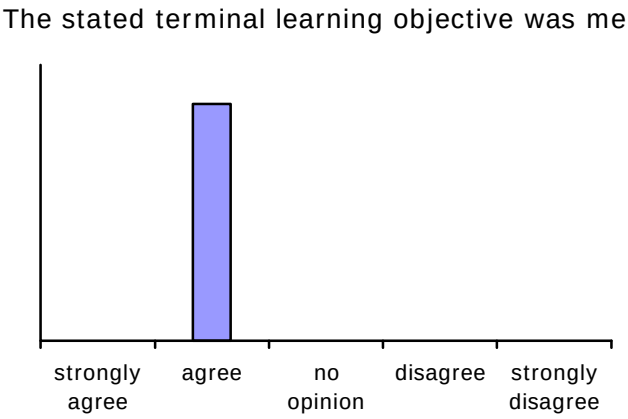


Figure 8. Evaluation of the second lesson, Review of the CTPS System and Demonstration

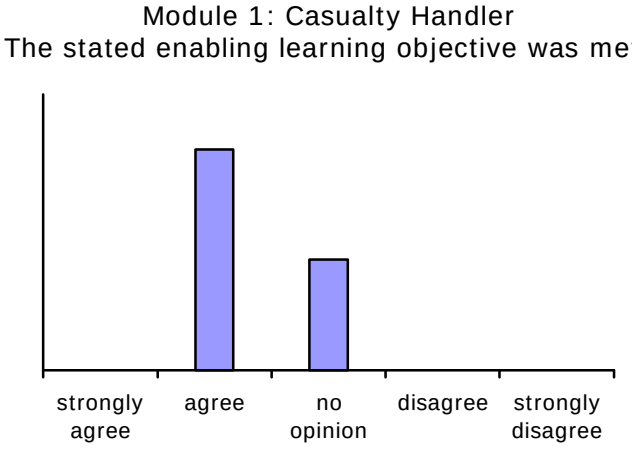


Figure 9. Evaluation of the second lesson, Review of the CTPS System and Demonstration

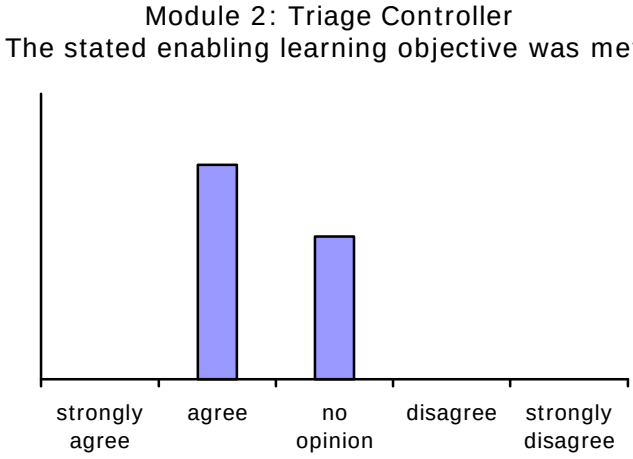


Figure 10. Evaluation of the second lesson, Review of the CTPS System and Demonstration

Module 3: CTPS Clinical Scenario Orientation
The stated enabling learning objective was met:

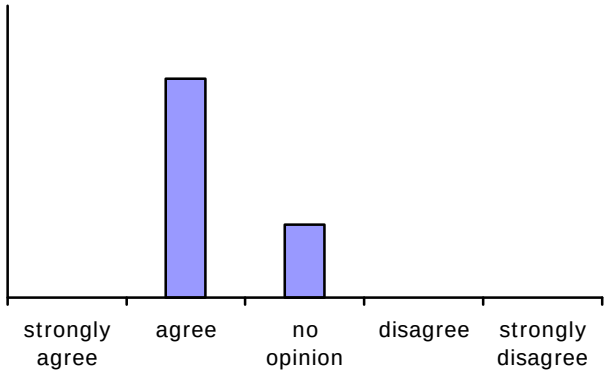


Figure 11. Evaluation of the second lesson, Review of the CTPS System and Demonstration

Module 4: After Action Review
The stated enabling learning objective was met:

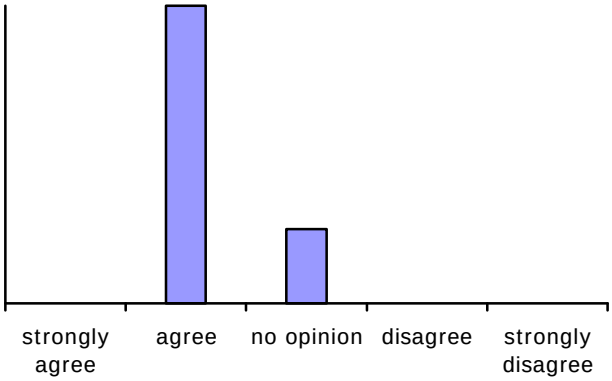


Figure 12. Evaluation of the second lesson, Review of the CTPS System and Demonstration

The subject matter was effectively conveyed:

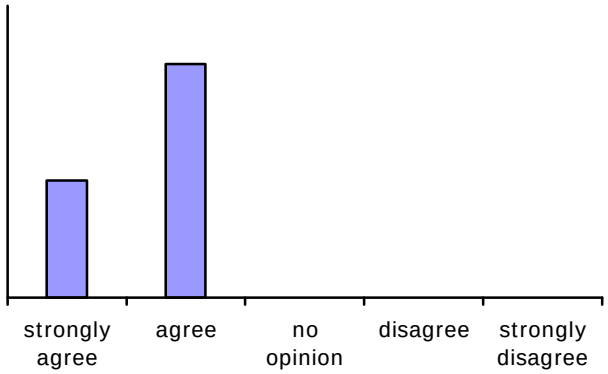


Figure 13. Evaluation of the second lesson, Review of the CTPS System and Demonstration

The presentation was effective:

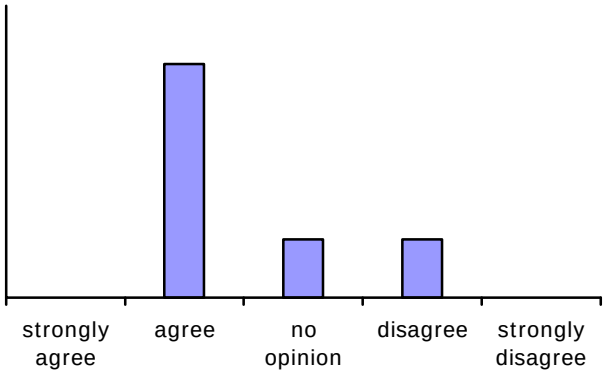


Figure 14. Evaluation of the second lesson, Review of the CTPS System and Demonstration

Participant evaluations of the second lesson, the *Review of the CTPS System and Demonstration* indicated that the majority of the participants found that the training met the stated learning objective and the content was relevant to the learning objective. Although a majority of the participants indicated the subject matter was effectively conveyed and that the presentation was effective, a significant minority of participants did not agree. (Figures 15 – 18). A complete evaluation report is available in Appendix G.

The stated terminal learning objective was met:

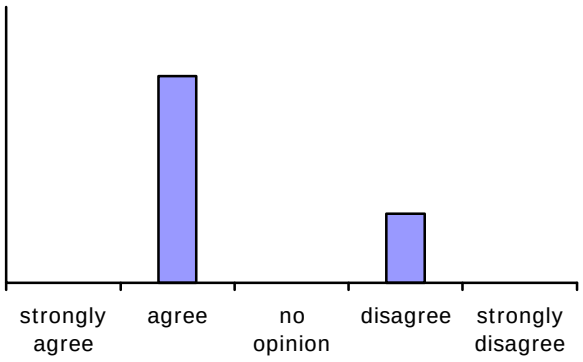


Figure 15. Evaluation of the third lesson, HPS Clinical Scenario Training

The content was relative to the stated learning objective:

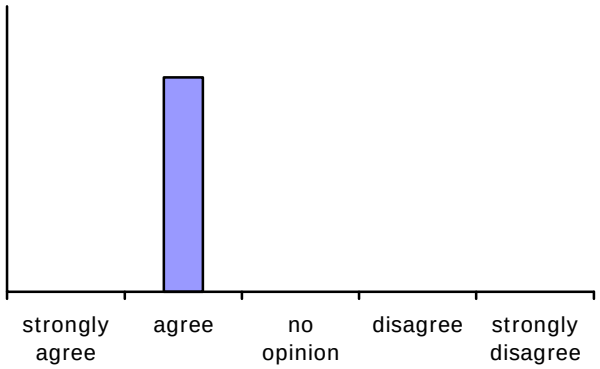


Figure 16. Evaluation of the third lesson, HPS Clinical Scenario Training

The subject matter was effectively conveyed:

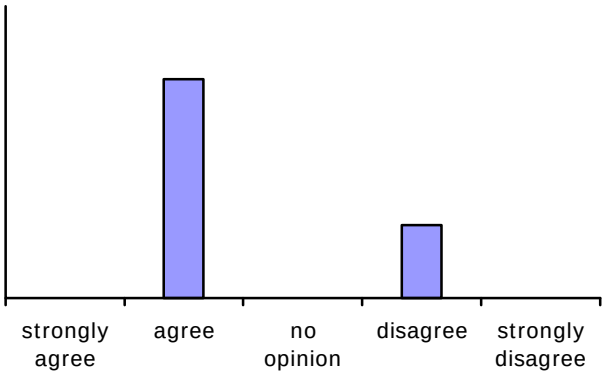


Figure 17. Evaluation of the third lesson, HPS Clinical Scenario Training

The presentation was effective:

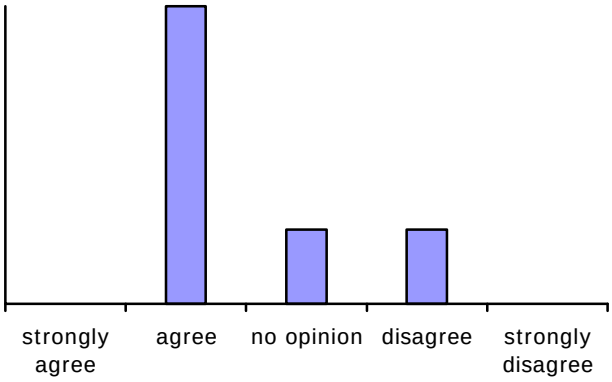


Figure 18. Evaluation of the third lesson, HPS Clinical Scenario Training

The results of the *CTPS Training and System Evaluation Survey* indicated that all of the participants would participate in training exercise using the CTPS system, however, the majority of the participants reported that they did not feel adequately trained to operate the system in an actual medical exercise (figures 19 –21).

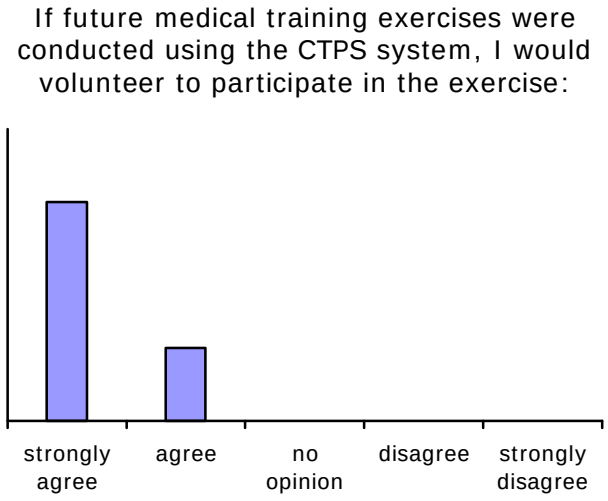


Figure 19. Human Factors Evaluation of the CTPS system

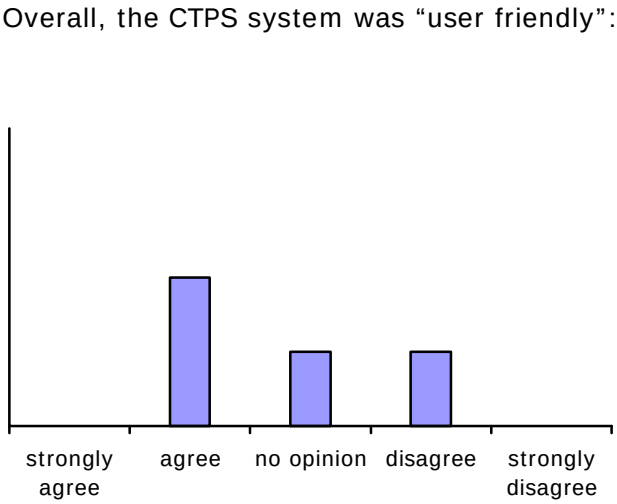


Figure 20. Human Factors Evaluation of the CTPS system

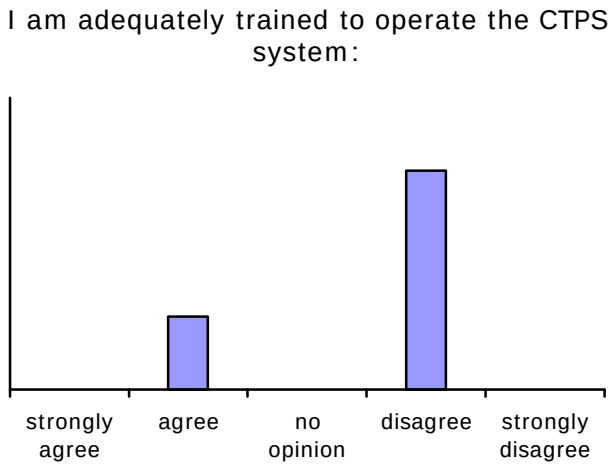


Figure 21. Human Factors Evaluation of the CTPS system

The results of the *CTPS Training and System Evaluation Survey* indicated that the participants were satisfied with the feedback provided by the CTPS system, however, the majority did lose "situational awareness" and encountered unexpected results (figures 22 – 24).

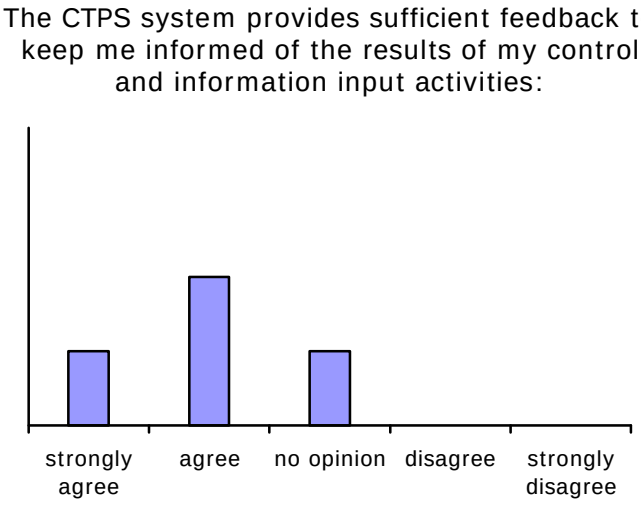


Figure 22. Evaluation of the CTPS system

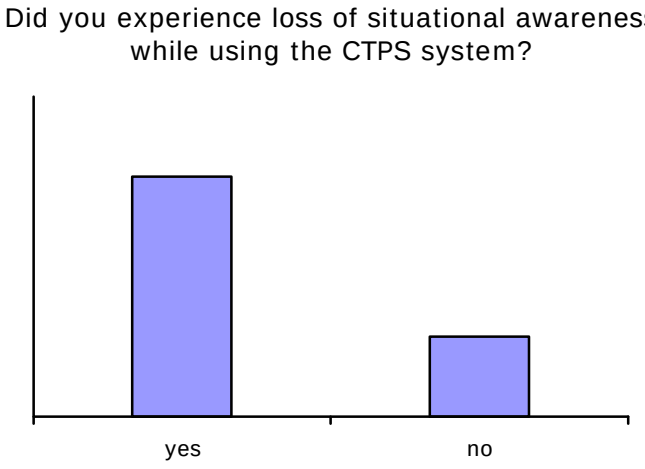


Figure 23. Evaluation of the CTPS system

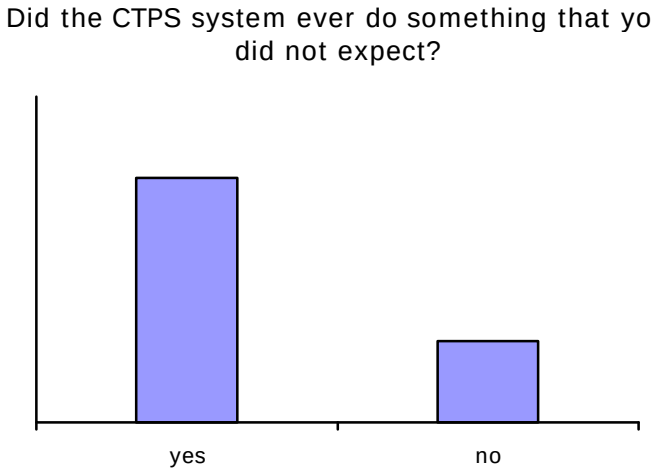


Figure 24. Evaluation of the CTPS system

The results of the *CTPS Training and System Evaluation Survey* indicated that the participants were partially satisfied with the procedures required to operate the casualty handler, and the graphical user interface and feedback notifications. Some users found the data processing not to be timely (figures 25 – 31). A detailed evaluation report is available in Appendix H.

The casualty handler on-screen interface kept me adequately informed and directed on what to do next:

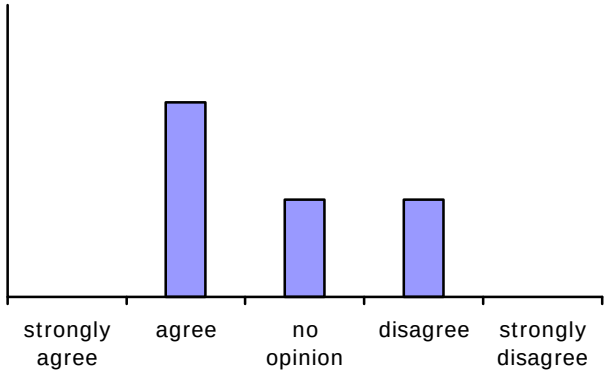


Figure 25. Evaluation of the Casualty Handler

The casualty handler interface was effective and meaningful. The system was organized and elements were grouped together in a meaningful way:

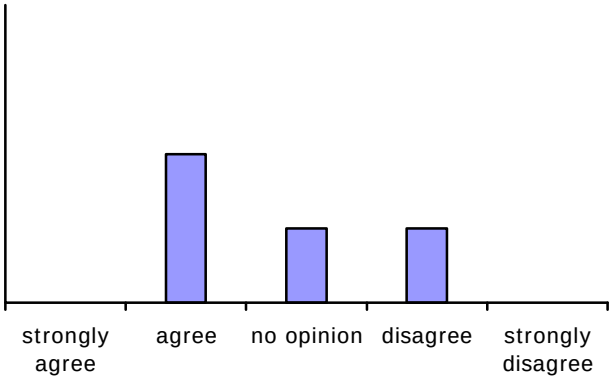


Figure 26. Evaluation of the Casualty Handler

The casualty handler software notified me as to what the computer was doing:

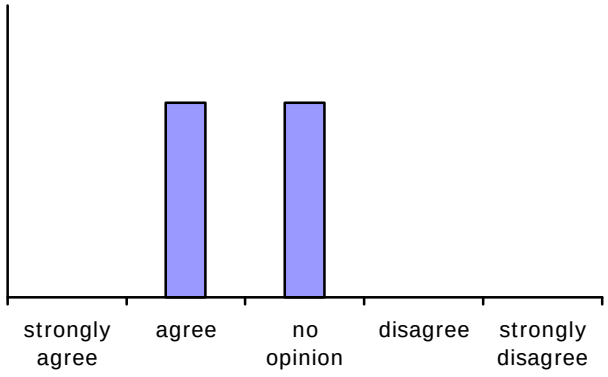


Figure 27. Evaluation of the Casualty Handler

The procedures used to complete tasks on the casualty handler software were logical.

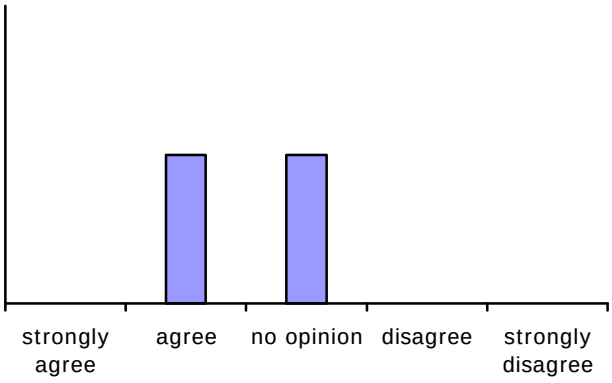


Figure 28. Evaluation of the Casualty Handler

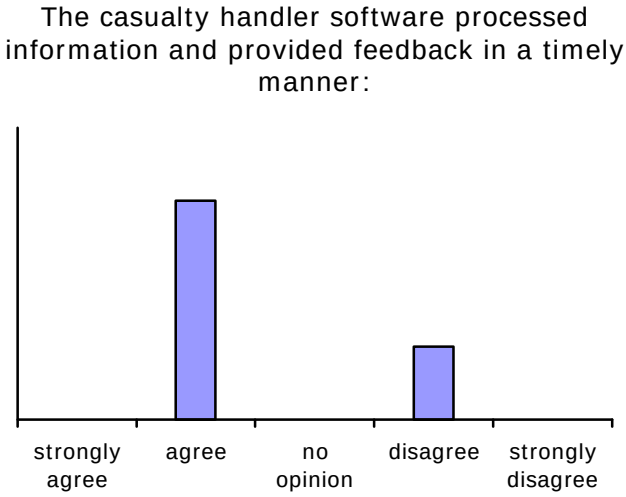


Figure 29. Evaluation of the Casualty Handler

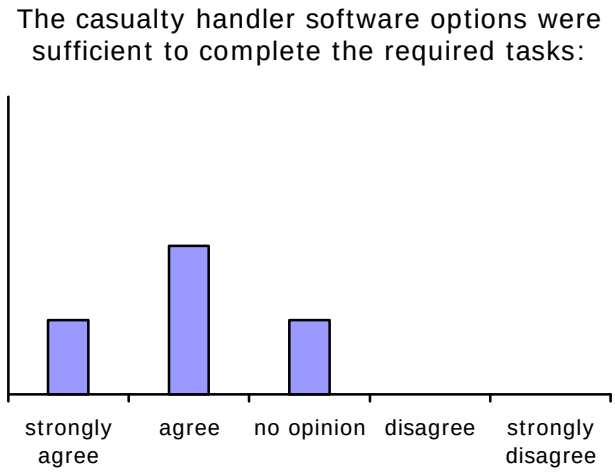


Figure 30. Evaluation of the Casualty Handler

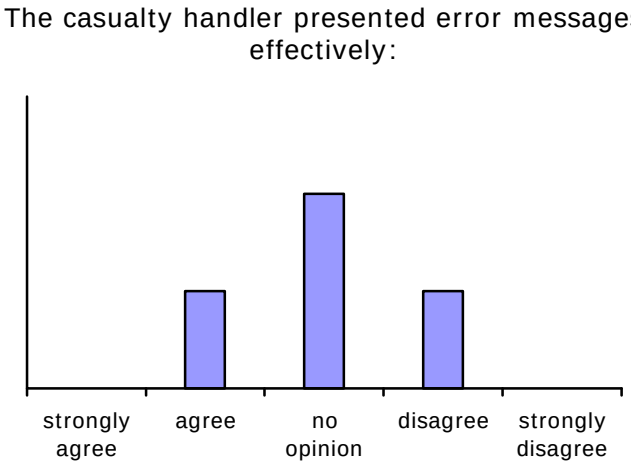


Figure 31. Evaluation of the Casualty Handler

The results of the *CTPS Training and System Evaluation Survey* indicated that the participants were generally satisfied with the procedures required to operate the triage controller software, as well as the graphical user interface and feedback notifications. Some users did not find the data processing to be timely (figures 32 – 38). A detailed evaluation report is available in Appendix H.

The triage controller on-screen interface kept me adequately informed and directed on what to do next:

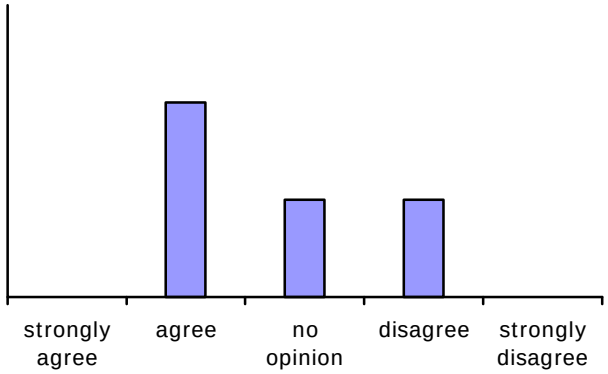


Figure 32. Evaluation of the Triage Controller

The triage controller software interface was effective and meaningful. The system was organized and elements were grouped together in a meaningful way:

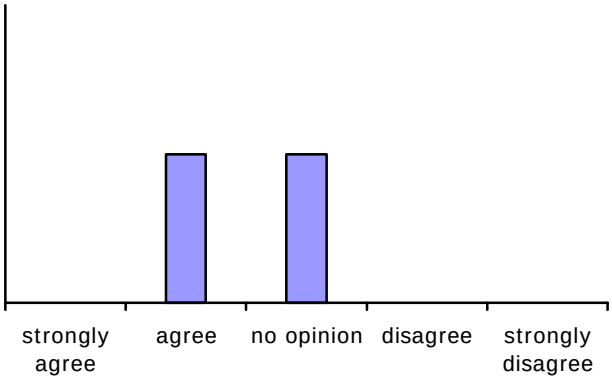


Figure 33. Evaluation of the Triage Controller

The triage controller notified me as to what the computer was doing:

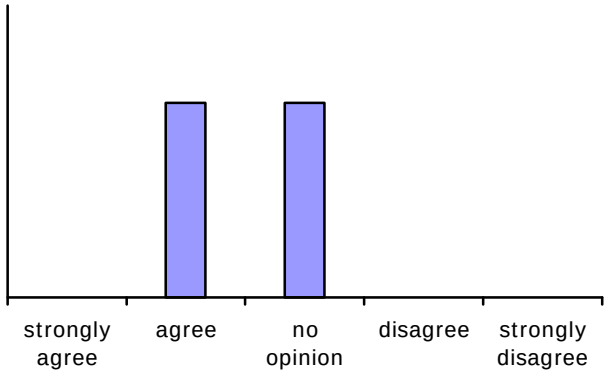


Figure 34. Evaluation of the Triage Controller

The procedures used to complete triage tasks were logical on the triage controller software interface:

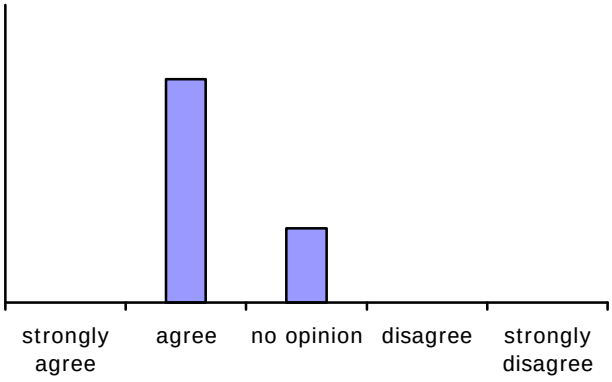


Figure 35. Evaluation of the Triage Controller

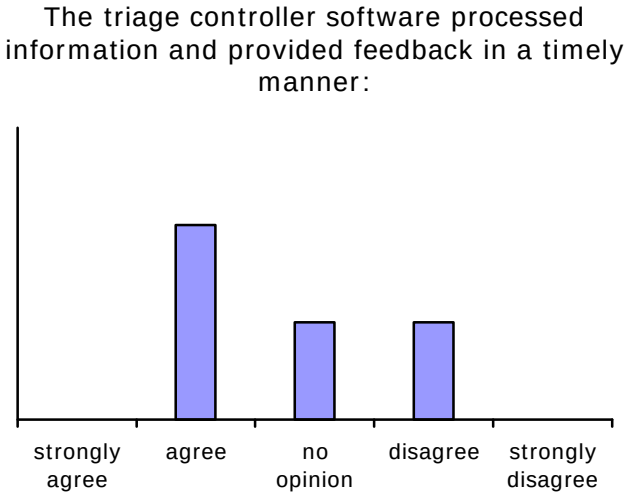


Figure 36. Evaluation of the Triage Controller

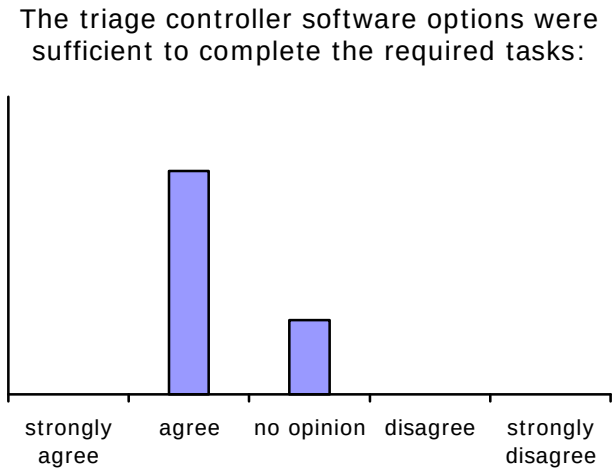


Figure 37. Evaluation of the Triage Controller

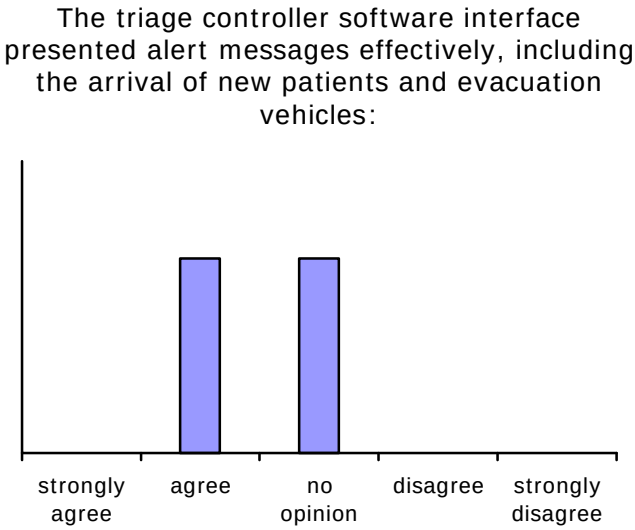


Figure 38. Evaluation of the Triage Controller

The results of the *CTPS Training and System Evaluation Survey* indicated that the participants were generally satisfied with the procedures required to operate the after action review, and the graphical user interface and feedback notifications. All of the users found the data processing timely (figures 39 – 42). A detailed evaluation report is available in Appendix H.

The procedures used to generate and review an after action review report were logical:

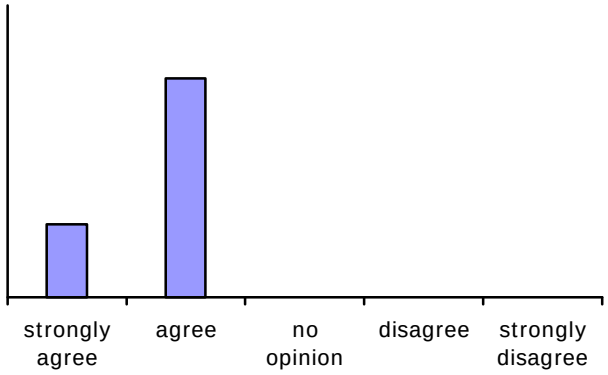


Figure 39. Evaluation of the After Action Review

The after action review interface was effective and meaningful:

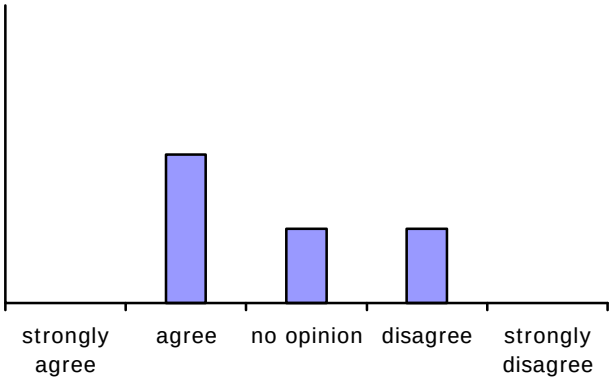


Figure 40. Evaluation of the After Action Review

The after action review software processed information and provided feedback in a timely manner:

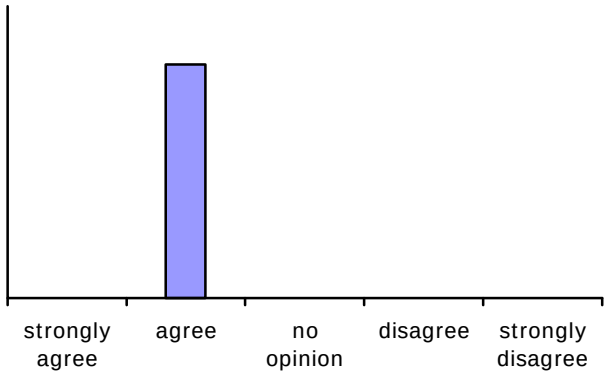


Figure 41. Evaluation of the After Action Review

The after action review software options were sufficient to complete the required tasks:

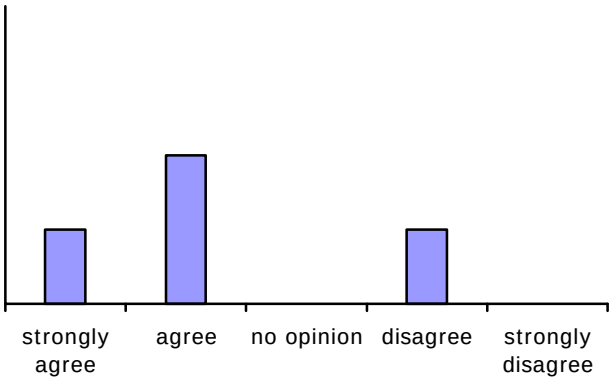


Figure 42: Evaluation of the After Action Review

4.7 Discussion. Lack of formal curricula, schedule and learning objectives created organizational issues at the onset of the training, including training coordination and facilities preparation.

Participants commented that the sequencing of the lessons was illogical, and a lack of preliminary reading materials and handouts contributed to student concerns.

Participants consistently reported that the training period was too short for the amount of material covered. Requests were made for more training time and repetition to increase proficiency. Additionally, a priming problem that was experienced with version 6.0 software on the final day of training resulted in not having enough time to explore developing new scenarios.

The participants who self-reported a technical background found the unstructured presentation style acceptable. The participants with either a clinical or operational background indicated a preference for a more structured classroom style of training.

Use of the small laptop LCD screen to demonstrate the features of the casualty handler, triage controller and the after action review prevented the entire group of trainees from observing a demonstration simultaneously.

The participants also offered observations about the functionality of specific CTPS system components. Students noted inconsistent activating commands on the casualty handler interface; some instances required a single mouse click while others required a double click. Participants also commented that the time delay for a casualty to appear on the triage controller seemed to be significant. However, the delay does not exceed the actual physical transfer time of a patient from an ambulance to a battalion aid station. Additionally, the after action review interface was felt to be counter-intuitive by participants.

5.0 Vendor Demonstration of CTPS System Capabilities

5.1 Background. A 90-minute time period was identified to conduct a focused demonstration of Combat Trauma Patient Simulation (CTPS) system capabilities by the vendor. The components evaluated during this demonstration were limited to the casualty handler software, triage controller software interfaces, and the portions of the after action review software. Representatives from Medical Education Technologies Incorporated (METI) and Tekâmah Corporation demonstrated features of the Combat Trauma Patient Simulation (CTPS) system to Center for Total Access (CTA) staff members.

5.2 Assumptions. Since the individual Human Patient Simulator (HPS) and Pre-Hospital Simulator (PHS) units are commercially available, off the shelf (COTS) products, the evaluation of these components was not a goal of this evaluation. The focus of this demonstration was to highlight the new features of the Phase 4 CTPS system that are not yet commercially available.

5.3 Measures of Performance. In the absence of formal specification documentation, the Center for Total Access (CTA) developed checklist based upon capabilities documentation provided by Simulation, Training and Instrumentation Command (STRICOM) and Medical Education Technologies Incorporated (METI). Specific details of Combat Trauma Patient Simulation (CTPS) system functionality checklist were then forwarded to the Simulation, Training and Instrumentation Command (STRICOM) program manager and discussed with representatives from Medical Education Technologies Incorporated (METI) and Tekâmah Corporation, to ensure that the capabilities documentation was correctly interpreted (see appendix I). Evaluation criteria forms were subsequently developed for the casualty handler, triage controller and after action review.

5.4 Procedures. Representatives from METI and Tekamah demonstrated specific features of the casualty handler software, triage controller software and the after action review process:

Casualty Handler

- Instantiation of casualties at any treatment station;
- Develop, track and execute scenarios;
- Monitor location and status of the casualties;
- Transfer casualties from one treatment station to another; and
- Pause/save/restart a simulation.

Triage Controller

- Perform triage
- Perform field lab tests
- Extend the range of diagnostic and treatment options of the HPS unit

After Action Review

- Record time of injury
- Record locations of casualties in the battlespace

Evaluators recorded the system performance as it was presented, based upon a pass, fail or n/a criteria.

5.5 Results.

5.5.1 Casualty Handler. During the vendor demonstration the casualty handler performed as expected, with one exception. Execution of the save physiology command under the scenario play caused the CTPS system to lock. Functionality was restored by a system re-boot. Because of this error, and in the interest of time, this function was not tested for each clinical scenario.

Instantiate casualties at any casualty treatment station

Casualty collection point	passed
Ground Ambulance	passed
Battalion Aid Station	passed
Forward Surgical Team	passed
Air Ambulance	passed
Combat Support Hospital	passed

Develop, track and execute scenarios that can be applied to any given casualty

Scenario editor	
Create new scenario	passed
Edit scenario	passed
Scenario player	
Start scenario	passed
Pause scenario	passed
Restart scenario	passed
Save physiology	failed

Monitor the location and status of casualties across the battlefield

Blunt abdominal injury	
Monitor location	passed
Monitor status	passed
Blunt chest injury	
Monitor location	passed
Monitor status	passed
Compound Fracture of the Left Leg	
Monitor location	passed
Monitor status	passed
Gunshot Wound to the Left Chest	
Monitor location	passed
Monitor status	passed
Gunshot Wound to the Left Thigh	
Monitor location	passed
Monitor status	passed
Closed head injury	
Monitor location	passed
Monitor status	passed

Transfer casualties from one treatment station to another

Casualty collection point to ground ambulance	passed
Casualty collection point to air ambulance	passed
Ground ambulance to battalion aid station	passed
Ground ambulance to forward surgical team	passed
Ground ambulance to combat support hospital	passed
Air ambulance to battalion aid station	passed
Air ambulance to forward surgical team	passed
Air ambulance to combat support hospital	passed

Pause/save/restart a simulation exercise

Blunt abdominal injury	
Load	passed
Pause	passed
Play	passed
save physiology	not tested
Blunt chest injury	
Load	passed
Pause	passed
Play	passed
save physiology	not tested
Compound fracture of the left leg	
Load	passed
Pause	passed
Play	passed
save physiology	not tested
Gunshot wound to the left chest	
Load	passed
Pause	passed
Play	passed
save physiology	not tested
Gunshot wound to the left thigh	
Load	passed
Pause	passed
Play	passed
save physiology	not tested
Closed head injury	
Load	passed
Pause	passed
Play	passed
save physiology	not tested

5.5.2 Triage Controller. During the vendor demonstration, the triage controller performed as expected. The system does not offer percussion for assessment purposes, and therefore was indicated by a "n/a" classification.

Determine classification of each casualty, virtually

Minimal	passed
Delayed	passed
Immediate	passed
Expectant	passed

Apply immediate care, virtually

Apply tourniquet	passed
Apply pressure dressing	passed
Give volume	passed

Re-assess patient, virtually

Primary Survey	
Airway	passed
Breathing	passed
Circulation	passed
Disability	passed
Vital signs	
Pulse	passed
Blood pressure	passed
Temperature	passed
Secondary Survey	
Inspection	passed
Auscultation	passed
Palpation	passed
Percussion	n/a

Perform field lab tests

Chest x-ray	passed
Arterial blood gas analysis	passed

Extend the range of diagnostic and treatment options of the HPS unit

Diagnostic options	
Visual presentation of patient	passed
Text-based patient history	passed
Text-based descriptions of visual inspection	passed
Text-based descriptions of auscultation	passed
Text-based descriptions of palpation	passed
Text-based descriptions of percussion	n/a
Treatment options	
Apply virtual tourniquet	passed
Give volume	passed
Send patient to virtual operating room	passed

5.5.3 After Action Review. During the vendor demonstration, the after action review software performed as expected, passing all evaluation criteria.

Record the time of injury

Blunt abdominal injury	passed
Blunt chest injury	passed
Compound fracture of the left leg	passed
Gunshot wound to the left chest	passed
Gunshot wound to the left thigh	passed
Closed head injury	passed

Record the location of casualty in the battlespace

Blunt abdominal injury	passed
Blunt chest injury	passed
Compound fracture of the left leg	passed
Gunshot wound to the left chest	passed
Gunshot wound to the left thigh	passed
Closed head injury	passed

5.6 Discussion.

5.6.1. Casualty Handler

The casualty handler software locked when the vendor attempted to demonstrate the "save physiology" command. Therefore, this feature was not successfully executed during the vendor demonstration. It was stated that the intention of this feature is not to capture the casualty's physiology at single moment in time, but rather to save the CTPS programming required in order to create a single scenario. If this feature executed correctly, its value for the system would be as a "save as" command to copy a single scenario, and then edit the programming for future use. However, this feature is located within the "scenario player" menu, and not under the "scenario editor" menu. Since the scenario editor menu allows the user to create new and edit scenarios, the purpose of the save physiology command is ambiguous. Due to this ambiguity, this feature was not evaluated further. It is noteworthy however, that the failure of this feature did not affect the CTPS system's ability to conduct a training scenario for demonstration purposes. It appears that this feature is not required for system functionality.

All other capabilities of the casualty handler were executed successfully, including instances that were not anticipated. For example, the vendor description of the baseline scenario outlines several physical conditions that must be accommodated during the exercise. One such condition is that the air ambulance is unable to land at the battalion aid station due to heavy vegetation (see appendix J). This is a realistic battlefield physical condition. However, despite this rule, the casualty handler allowed the vendor to successfully transfer patient from air ambulance to battalion aid station. Apparently, the casualty handler is not restricted to the physical rules presented to the trainees at the triage controller interface. There may be advantages for the exercise planner to have the

ability to override the system limitations with the casualty handler however; this also presents an opportunity for errors to be made during the frenzy of an actual training event. Exercise planners should assess the advantages and disadvantages of this override feature within the casualty handler during phase 2 of the CTPS evaluation.

5.6.2 Triage controller

The triage controller was evaluated, in part based upon the capability stated by the vendor: re-assess patient, virtually (see appendix I). This global statement, as opposed to a specific requirement, presents an opportunity for misinterpretation of the intended capabilities of the triage controller. In the absence of detailed specifications, the evaluation criteria utilized to determine if this capability existed on the triage controller was based upon the steps outlined for the assessment and re-assessment of a trauma patient[2]. This methodology includes a primary and secondary assessment. One of the secondary medical assessments is percussion. Percussion is the used to determine the presence of fluid or the dimensions, location and consistency of a structure or mass under the surface of the skin. It was evident during the vendor demonstration that the triage controller was not intended to offer an evaluation via percussion. In light of the system capabilities documentation, all percussion assessment was evaluated as "n/a."

[2] Special Operations Forces Medical Handbook, LTC John Holcomb, et al. pp. 7.1-7.5, Teton New Media and Geneva Foundation, Jackson, WY, 2001

5.6.3 After Action Review

The after action review software performed as expected during the vendor demonstration. It is noteworthy however, that comprehensive data reporting via the after action review cannot be accomplished accurately if the system locks during the medical exercise. Since system lockup occurred during the vendor demonstration (while using the "save physiology" command), it caused an incomplete patient record in the after action review. All other patient records and locations were recorded accurately. This is not a problem with the after action review software, but highlights the need for stable software in order to achieve maximum visibility and effectiveness in training conducted in a networked simulator configuration.

6.0 Review of Vendor Documentation

6.1 System Capabilities. A complete list of CTPS system capabilities can be found in Appendix I. Lack of formal specification documentation by the vendor provides an opportunity for broadening the evaluation criteria, and assessing for functionality that were never intended by the concept developers. Specific information related to the functionality of the Combat Trauma Patient Simulation (CTPS) system was relayed orally, providing opportunities for misinterpretation. However, the delivery of vendor documentation to STRICOM was not required until 60 days after the commencement of this phase 1 evaluation, therefore more specific requirements documentation may be available at a later date.

6.2 System Requirements. Documentation of the system requirements for the individual HPS units was provided 120 days prior to the delivery of the CTPS system. The documentation was detailed; it included sizes of shipping crates and a list of medical equipment and supplies. Oral descriptions of the network requirements of the CTPS system were also provided prior to installation. Comprehensive documentation of the entire CTPS system had not been developed at the time of this evaluation. Site preparation and logistical requirement were successfully coordinated through regularly scheduled phone conferences and two site visits by the vendor. The medical supply list provided with the individual HPS units was designed for a civilian, tertiary care setting, and was not appropriate for lower echelons of care. A supply list, by echelon will be developed as part of this evaluation to supplement the vendor documentation for other government applications.

6.3 HPS/PHS simulator unit. The individual HPS unit documentation includes: a 350-page user's manual; a 110-page Train the Trainer Manual (developed by the Florida Department of Education); a 13-page Customer Support Service Catalog; and a Software License and Registration Form.

6.4 Casualty Handler. At the time of this evaluation, no documentation was available.

6.5 Triage Controller and After Action Review. Tekâmah Corporation developed a 41-page manual for both the Triage controller and After Action Review software. The documentation is well organized, and provides an easy reference guide for an observer-controller or CTPS exercise coordinator. A 19-page section of this manual is dedicated to the triage controller software, and includes fifteen screen captures and step-by-step instructions for use. It includes the following sections: overview; components; getting started; station status panel; patient view and section panel; evacuation procedure; examination and treatment panel; system pause, resume, save and restore; and closing the triage controller. A 6-page section of the manual provides a sectional breakdown of the After Action Review software. It includes: the AAR Logger; AAR Viewer; AAR Map Panel; Station view Panel; and the Patient View Panel. Three screen shots are included in the AAR documentation.

6.7 Trainee Documentation. At the time of this evaluation, there was no documentation available specifically for training an end user on the operation of any element in the CTPS system prior to conducting an exercise. Sections of the triage controller and after action review documentation were developed in a manner allows for adaptation for an end-user guide at a later time.

7.0 Independent Validation of CTPS System Capabilities

7.1 Background. Following the installation and training at Fort Gordon, the CTPS system was evaluated for a 90-day period, based upon the system capabilities outlined by the vendor. Center for Total Access (CTA) staff members, previously trained on the use of the CTPS system by the vendors, operated the equipment and recorded results and observations.

7.2 Assumptions. Since the individual Human Patient Simulator (HPS) and Pre-Hospital Simulator (PHS) units are commercially available, off the shelf (COTS) products, a comprehensive assessment of these components was not a goal of this phase 1 evaluation. The focus was to highlight the new features of the Phase 4 CTPS system that are not yet commercially available: the casualty handler; triage controller and after action review.

7.3 Measures of Performance. In the absence of formal specification documentation, a checklist was developed based upon capabilities documentation provided by Simulation, Training and Instrumentation Command (STRICOM) and Medical Education Technologies Incorporated (METI). Evaluation criteria forms were subsequently developed for the casualty handler, triage controller and after action review. (See Appendix K, L and M)

7.4 Procedures. CTA staff members operated the CTPS equipment and recorded results and observations on the following specific features:

Triage Controller:

- Assess multiple casualties
- Perform triage:
  - Examine multiple casualties, virtually
  - Determine classification of each casualty, virtually
  - Apply immediate care, virtually
  - Re-assess patient, virtually
- Perform field lab tests
- Extend the range of diagnostic and treatment options of the HPS unit

Casualty Handler:

- Instantiated casualties at any Casualty Treatment Station
- Develop, track, and execute scenarios that can be applied to a given casualty
- Monitor the location and status of casualties across the battlefield
- Transfer casualties from one location to another
- Pause/save/restart a simulation exercise

After Action Review:

- Record the time of the injury
- Record the location of the casualty in the battlespace

- Record the time of treatment performed at each casualty treatment station
- Record the type of treatment performed at each casualty treatment station
- Develop a trackable report of the evacuation and movement throughout the battlefield
- Record each casualty medical outcome

Evaluators recorded system performance while it was presented, based upon a pass, fail or n/a criteria.

7.5 Results.

7.5.1 Casualty Handler. During the evaluation period the casualty handler performed as expected, however the save physiology command was not tested, based upon its failure during the vendor demonstration.

Instantiate casualties at any casualty treatment station

Casualty collection point	passed
Ground Ambulance	passed
Battalion Aid Station	passed
Forward Surgical Team	passed
Air Ambulance	passed
Combat Support Hospital	passed

Develop, track and execute scenarios that can be applied to any given casualty

Scenario editor	
Create new scenario	passed
Edit scenario	passed
Scenario player	
Start scenario	passed
Pause scenario	passed
Restart scenario	passed
Save physiology	not tested
Observe physiological state	passed

Monitor the location and status of casualties across the battlefield

Blunt abdominal injury	
Monitor location	passed
Monitor status	passed
Blunt chest injury	
Monitor location	passed
Monitor status	passed
Compound Fracture of the Left Leg	
Monitor location	passed
Monitor status	passed
Gunshot Wound to the Left Chest	
Monitor location	passed
Monitor status	passed
Gunshot Wound to the Left Thigh	

Monitor location	passed
Monitor status	passed
Closed head injury	
Monitor location	passed
Monitor status	passed

Transfer casualties from one treatment station to another

Casualty collection point to ground ambulance	passed
Casualty collection point to air ambulance	passed
Ground ambulance to battalion aid station	passed
Ground ambulance to forward surgical team	passed
Ground ambulance to air ambulance	passed
Ground ambulance to combat support hospital	passed
Air ambulance to battalion aid station	passed
Air ambulance to forward surgical team	passed
Air ambulance to combat support hospital	passed

Pause/save/restart a simulation exercise

Blunt abdominal injury	
Load	passed
Pause	passed
Play	passed
save physiology	not tested
Blunt chest injury	
Load	passed
Pause	passed
Play	passed
save physiology	not tested
Compound fracture of the left leg	
Load	passed
Pause	passed
Play	passed
save physiology	not tested
Gunshot wound to the left chest	
Load	passed
Pause	passed
Play	passed
save physiology	not tested
Gunshot wound to the left thigh	
Load	passed
Pause	passed
Play	passed
save physiology	not tested
Closed head injury	
Load	passed
Pause	passed
Play	passed
save physiology	not tested

7.5.2 Triage Controller. During the evaluation, the triage controller performed as expected. The system was shown not to offer percussion for assessment purposes during the vendor demonstration, and therefore was not tested.

Assess multiple casualties

Casualty Collection Point: 5 virtual casualties and 1 casualty on the PHS unit	passed
Casualty Collection Point: 6 virtual casualties	passed
Ground Ambulance: 5 virtual casualties and 1 casualty on the PHS unit	passed
Ground Ambulance: 6 virtual casualties	passed
Battalion Aid Station: 5 virtual casualties and 1 casualty on the PHS unit	passed
Battalion Aid Station: 6 virtual casualties	passed
Forward Surgical Team: 5 virtual casualties and 1 casualty on the PHS unit	passed
Forward Surgical Team: 6 virtual casualties	passed
Air Ambulance: 5 virtual casualties and 1 casualty on the PHS unit	passed
Air Ambulance: 6 virtual casualties	passed
Combat Support Hospital: 5 virtual casualties and 1 casualty on the PHS unit	passed
Combat Support Hospital: 6 virtual casualties	passed

Determine classification of each casualty, virtually

Minimal	passed
Delayed	passed
Immediate	passed
Expectant	passed

Apply immediate care, virtually

Apply tourniquet	passed
Apply pressure dressing	passed
Give volume	passed

Re-assess patient, virtually

Primary Survey	
Airway	passed
Breathing	passed
Circulation	passed
Disability	passed
Vital signs	
Pulse	passed
Blood pressure	passed
Temperature	passed
Secondary Survey	
Inspection	passed
Auscultation	passed
Palpation	passed
Percussion	not tested

Perform field lab tests

Chest x-ray	passed
Arterial blood gas analysis	passed

Extend the range of diagnostic and treatment options of the HPS unit

Diagnostic options	
Visual presentation of patient	passed
Text-based patient history	passed
Text-based descriptions of visual inspection	passed
Text-based descriptions of auscultation	passed
Text-based descriptions of palpation	passed
Text-based descriptions of percussion	not tested
Treatment options	
Apply virtual tourniquet	passed
Give volume	passed
Send patient to virtual operating room	passed

7.5.3 After Action Review. During the vendor demonstration, the after action review software performed as expected, passing all evaluation criteria.

Record the time of injury

Blunt abdominal injury	passed
Blunt chest injury	passed
Compound fracture of the left leg	passed
Gunshot wound to the left chest	passed
Gunshot wound to the left thigh	passed
Closed head injury	passed

Record the location of casualty in the battlespace

Blunt abdominal injury	passed
Blunt chest injury	passed
Compound fracture of the left leg	passed
Gunshot wound to the left chest	passed
Gunshot wound to the left thigh	passed
Closed head injury	passed

Record the time of treatment performed at each casualty treatment station

Blunt abdominal injury at CCP	passed
Blunt abdominal injury in GEVAC	passed
Blunt abdominal injury at BAS	passed
Blunt abdominal injury at FST	passed
Blunt abdominal injury in AIREVAC	passed
Blunt abdominal injury at CSH	passed
Blunt chest injury at CCP	passed
Blunt chest injury in GEVAC	passed
Blunt chest injury at BAS	passed
Blunt chest injury at FST	passed
Blunt chest injury in AIREVAC	passed

Blunt chest injury at CSH	passed
Compound fracture of the left leg at CCP	passed
Compound fracture of the left leg in GEVAC	passed
Compound fracture of the left leg at BAS	passed
Compound fracture of the left leg at FST	passed
Compound fracture of the left leg in AIREVAC	passed
Compound fracture of the left leg at CSH	passed
Gunshot wound to the left chest at CCP	passed
Gunshot wound to the left chest in GEVAC	passed
Gunshot wound to the left chest at BAS	passed
Gunshot wound to the left chest at FST	passed
Gunshot wound to the left chest in AIREVAC	passed
Gunshot wound to the left chest at CSH	passed
Gunshot wound to the left thigh at CCP	passed
Gunshot wound to the left thigh in GEVAC	passed
Gunshot wound to the left thigh at BAS	passed
Gunshot wound to the left thigh at FST	passed
Gunshot wound to the left thigh in AIREVAC	passed
Gunshot wound to the left thigh at CSH	passed
Closed head injury at CCP	passed
Closed head injury in GEVAC	passed
Closed head injury at BAS	passed
Closed head injury at FST	passed
Closed head injury in AIREVAC	passed
Closed head injury at CSH	passed

Record the type of treatment performed at each casualty treatment station

Blunt abdominal injury at CCP	passed
Blunt abdominal injury in GEVAC	passed
Blunt abdominal injury at BAS	passed
Blunt abdominal injury at FST	passed
Blunt abdominal injury in AIREVAC	passed
Blunt abdominal injury at CSH	passed
Blunt chest injury at CCP	passed
Blunt chest injury in GEVAC	passed
Blunt chest injury at BAS	passed
Blunt chest injury at FST	passed
Blunt chest injury in AIREVAC	passed
Blunt chest injury at CSH	passed
Compound fracture of the left leg at CCP	passed
Compound fracture of the left leg in GEVAC	passed
Compound fracture of the left leg at BAS	passed
Compound fracture of the left leg at FST	passed
Compound fracture of the left leg in AIREVAC	passed
Compound fracture of the left leg at CSH	passed
Gunshot wound to the left chest at CCP	passed
Gunshot wound to the left chest in GEVAC	passed
Gunshot wound to the left chest at BAS	passed
Gunshot wound to the left chest at FST	passed
Gunshot wound to the left chest in AIREVAC	passed
Gunshot wound to the left chest at CSH	passed
Gunshot wound to the left thigh at CCP	passed
Gunshot wound to the left thigh in GEVAC	passed
Gunshot wound to the left thigh at BAS	passed

Gunshot wound to the left thigh at FST	passed
Gunshot wound to the left thigh in AIREVAC	passed
Gunshot wound to the left thigh at CSH	passed
Closed head injury at CCP	passed
Closed head injury in GEVAC	passed
Closed head injury at BAS	passed
Closed head injury at FST	passed
Closed head injury in AIREVAC	passed
Closed head injury at CSH	passed

Develop a traceability report of the evacuation and movement throughout the battlefield

Blunt abdominal injury at CCP	passed
Blunt abdominal injury in GEVAC	passed
Blunt abdominal injury at BAS	passed
Blunt abdominal injury at FST	passed
Blunt abdominal injury in AIREVAC	passed
Blunt abdominal injury at CSH	passed
Blunt chest injury at CCP	passed
Blunt chest injury in GEVAC	passed
Blunt chest injury at BAS	passed
Blunt chest injury at FST	passed
Blunt chest injury in AIREVAC	passed
Blunt chest injury at CSH	passed
Compound fracture of the left leg at CCP	passed
Compound fracture of the left leg in GEVAC	passed
Compound fracture of the left leg at BAS	passed
Compound fracture of the left leg at FST	passed
Compound fracture of the left leg in AIREVAC	passed
Compound fracture of the left leg at CSH	passed
Gunshot wound to the left chest at CCP	passed
Gunshot wound to the left chest in GEVAC	passed
Gunshot wound to the left chest at BAS	passed
Gunshot wound to the left chest at FST	passed
Gunshot wound to the left chest in AIREVAC	passed
Gunshot wound to the left chest at CSH	passed
Gunshot wound to the left thigh at CCP	passed
Gunshot wound to the left thigh in GEVAC	passed
Gunshot wound to the left thigh at BAS	passed
Gunshot wound to the left thigh at FST	passed
Gunshot wound to the left thigh in AIREVAC	passed
Gunshot wound to the left thigh at CSH	passed
Closed head injury at CCP	passed
Closed head injury in GEVAC	passed
Closed head injury at BAS	passed
Closed head injury at FST	passed
Closed head injury in AIREVAC	passed
Closed head injury at CSH	passed

Accurately record each casualty medical outcome

Blunt abdominal injury	passed
Blunt chest injury	passed
Compound fracture of the left leg	passed

Gunshot wound to the left chest	passed
Gunshot wound to the left thigh	passed
Closed head injury	passed

7.6 Discussion.

7.6.1 CTPS System

7.6.1.a System Configuration. The CTPS system initially installed at Fort Gordon was configured to include a central processing unit (CPU) that would be dedicated to the casualty handler engine and scenario processing functions (Figure 43).

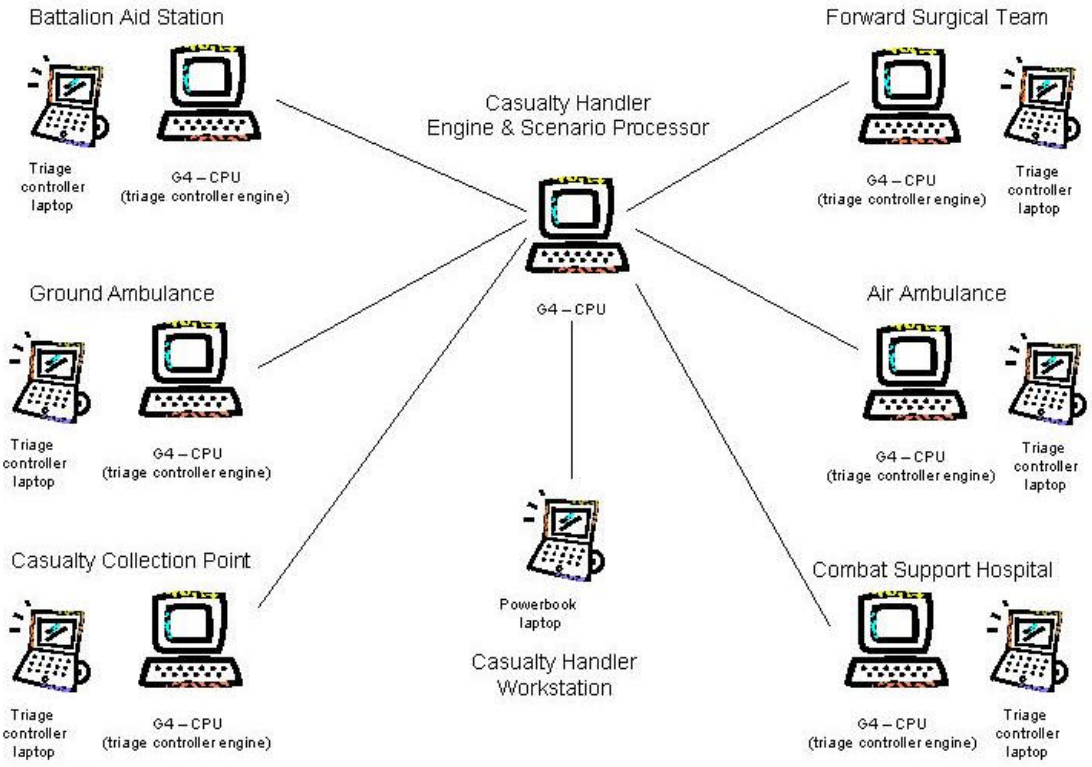


Figure 43. Original CTPS system configuration

This dedicated casualty handler engine CPU was placed in close proximity to the network hub for the building, and on installation, was configured to accept electronic update files transferred from the vendor's office. In part, for security reasons, this added functionality of the casualty handler engine CPU raised a concern about the integrity of the casualty handler engine and scenario processor. The vendor subsequently transferred these functions to the CPU that served the Air Ambulance node. All evaluations of the CTPS system were conducted with this revised configuration (Figure 44).

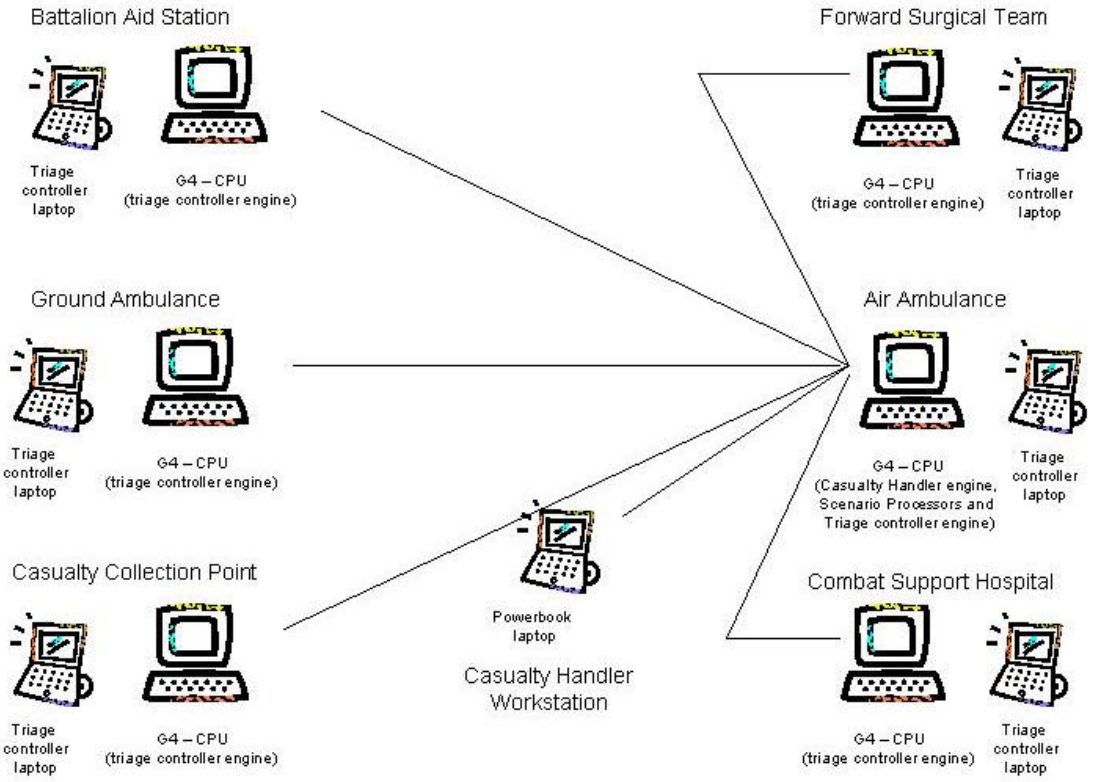


Figure 44. Revised CTPS system configuration

Theoretically, the workstation at the air ambulance treatment station should receive less data than the others due to the scenario "rule" than no more than two patients can be transported by air ambulance simultaneously. When patients are transferred to and from the air ambulance node with the triage controller, this rule is enforced, and the system performs as expected. However, the casualty handler allows the user to override this feature, creating the potential for an overload on the system. On one occasion during testing, six patients were placed on the air ambulance treatment station via the casualty handler software. This caused the system to lock, necessitating a restart. When repeated, the system performed correctly.

During a training event, this type of system overload should not occur, however, the lack of referential integrity of the scenario "rules" in the casualty handler software provides the exercise planner with the potential to lock up the system by mistakenly overloading the air ambulance node.

At the time of this report, no file transfers had been received for software updates. In light of the system performance issues, it appears that this modified configuration has decreased system stability rather than improving upon the original design.

7.6.1.b System Start Up Protocol. The air compressor used with the CTPS system takes approximately ten minutes to pressurize the system. Because the HPS simulator units will leak compressed air if they are started prior to the air compressor, or if the lines containing the compressed air do not attain a minimum pressure prior to the simulator being initiated,

the CTPS start-up procedures developed at Fort Gordon require a ten minute pressurization time before continuing with the remainder of the system set up.

It takes approximately thirty minutes to boot up and configure up all six treatment stations on the CTPS system. During the start up procedures, the HPS units typically display irregular lung inflation and or deflation until each system is calibrated. Therefore, it is recommended that system start up procedures be initiated 60 minutes before conducting any exercises.

7.6.2 Casualty Handler.

Establishing a new patient with a clinical condition is a two-step process. First, a new patient must be loaded into the casualty handler software. This "patient" is selected from a drop-down list, including different ages and gender choices. For the scenarios developed for the CTPS system, the patient profile "soldier" is selected. Each patient appears on a list in descending order, (numbered as patient 1, 2 etc.) based upon the time of initiation. It takes approximately three minutes to establish six healthy "solider" patients for the CTPS scenario.

The second step involves loading a clinical condition onto the baseline, healthy soldier. There are six clinical scenarios that have been developed by the vendor specifically for use with the CTPS system. Each scenario must be loaded onto the baseline patient physiology (solider). This process takes approximately three minutes.

The exercise planner can expedite this six-minute preparation time if he or she pre-loads the six healthy soldier patient files into the system prior to the arrival of any trainees for a specific training event. The actual exercise would begin after the exercise planner loads the clinical scenarios onto the baseline physiology.

The process of loading the scenarios is cumbersome. The operator of the casualty handler software must select the scenario tab from the main menu. When the scenario screen appears, there are two selections: scenario editor and scenario player. The scenario editor is used to modify existing clinical conditions and to create new clinical scenarios. The scenario player is used to load existing scenarios onto the baseline physiology of the patient (solider). The scenario player is used to initiate an exercise, yet it is not the default setting when a user selects the scenario tab. The end user must change the setting from scenario editor to scenario player, and then choose the "load" command from another drop down menu. By reversing the default from scenario editor to scenario player, a command could be eliminated, reducing confusion and saving time to initiate an exercise.

There is a lack of consistent patient identification in the casualty handler software and triage controller. Once loaded into the casualty handler, the patient is always labeled as "Patient" and then the number corresponding to the loading precedence (Patient 1, Patient 2, etc…). As the patient is established into the casualty handler, it simultaneously appears at the first treatment node (the casualty collection point). However, on the triage controller software interface, the patient is identified by a patient name, and appears in ascending, not descending order from the loading precedence. This inconsistency makes it logistically

difficult for a training exercise manager to track the progress of patients through the six nodes based the information available at the casualty handler software interface.

The operator can move patients from the default treatment station (the casualty collection point) to any other location within the CTPS system using the casualty handler software. This is a beneficial feature, allowing exercise planners to control patient flow, should a trainee make an error during a training event.

Moving patients with the casualty handler from one location to another requires the operator to wait until the system updates the vital signs of the patient before executing another command. If the operator of the casualty handler software is not cognizant of this delay, and initiates a second patient transfer prematurely, the CTPS system will lock, and will require a restart of the scenario processor. At present, there are no "please wait" messages, or any other means to prevent an operator from executing another command prematurely. The addition of such a visual cue could prevent operator error at the casualty handler workstation.

Using the casualty handler to move patients from one location to another allows the operator to break the "rules" of the scenario. Specifically, the transportation capacities of the ground ambulance and air ambulance treatment station, which are intended to support a maximum of four and two patients respectively. This lack of referential integrity offers the exercise planner the ability to override the CTPS system in the event of trainee error. However, this also creates the potential for a system overload at the air ambulance node due to the present system configuration (see section 7.6.1). In addition, it affords the end user at the casualty handler the potential for user error, which could disrupt the training event. An alert box, reminding the operator that the requested transfer violates the transportation capacity of either the ground or air ambulance would provide an effective visual cue to the operator.

Moving patients with the casualty handler software from one treatment node to another retains the patient "status" from the prior treatment node. For example, if the patient is "in treatment" at the first station, moving the patient to another treatment station maintains the "in treatment" state, and does not make the patient appear as "new" upon arrival. The casualty handler software lacks the ability to "reset" a scenario during a training exercise. If this functionality was added to the casualty handler software, the exercise planner could restore a patient at any treatment station, should participants make a technical error with the triage controller software. At present, patient movement can be controlled, but the specific triage controller settings cannot be overridden from the casualty handler workstation.

Additionally, the operator of the casualty handler software cannot establish a patient on a HPS unit at any treatment station. Only the local triage controller software can do this.

The casualty handler workstation, which should to allow the operator to completely control the CTPS system does not have control over every aspect of the setup, treatment and transfer of the patients at ever treatment node. Incorporating the needed amount of control will greatly enhance the seamlessness and effectiveness of the CTPS system.

7.6.3 Triage Controller.

During the evaluation, there was a single instance when the triage controller software did not appear on screen when requested. Closing the application and restarting it restored functionality, and did not require at CTPS system-wide restart.

7.6.3.a Graphical User Interface Viewing specific patient information requires the operator to switch to a secondary screen, which is accessed by either clicking on a button to transfer the patient from a new status to treatment status, or by clicking on a gray box found in the upper left hand corner of the screen. This gray box, identified as "show patient view and selection", functions as a button, and is not intuitively identifiable as a means to access detailed information because of its size (Figure 45).

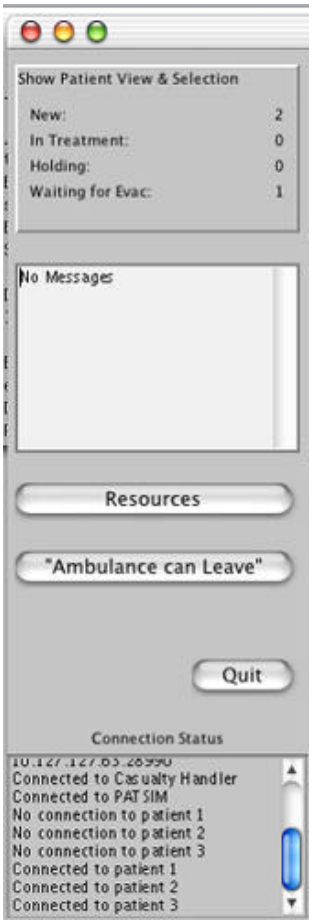


Figure 45. Station Status Panel, Triage Controller

7.6.3.b Patient Movement. There is a thirty-second average time delay transferring a newly established patient from casualty handler to triage controller at the casualty collection point. A similar delay is experienced with patient movement between triage controllers, whether the triage controller software or the casualty handler software initiates it. Participants in the vendor training noted this delay in the evaluation documentation, but also noted that there are time delays in loading and unload a patient

from an evaluation vehicle, and this electronic delay is not unrealistic. However, it would be important to emphasize to trainees not to expect "instantaneous" feedback from the system.

When a patient is transferred to a treatment station, the patient's name appears in the "New" box on the triage controller software interface. The visual appearance of the new arrival is unobtrusive, and could be easily overlooked by a trainee who is already conducting a virtual assessment of another patient. There are no auditory cues to alert the operator of the arrival of a new patient (Figure 46).

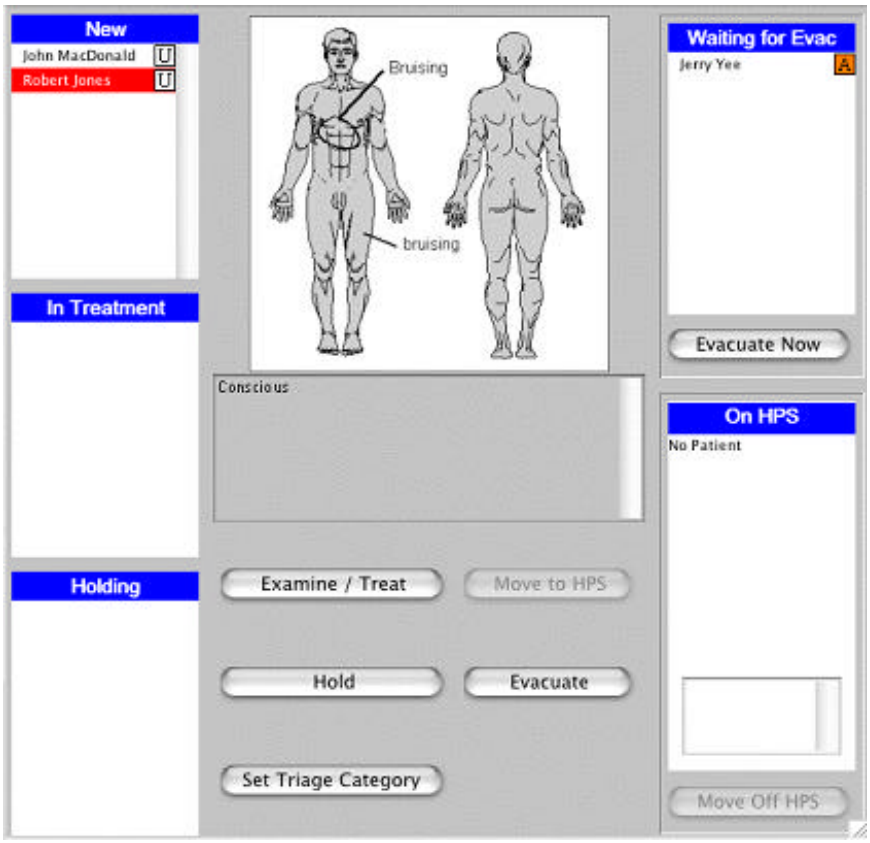


Figure 46. Patient View and Selection Panel, Triage Controller

The arrival of an evacuation vehicle (ground or air ambulance) is also subtle. An unobtrusive text message appears on the triage controller interface, stating that the transport vehicle has arrived. There are no auditory cues to alert the operator of the arrival of transportation vehicles.

During the evaluation, operators were unable to successfully manage the arrival and loading of patients into two transport vehicles at a single treatment node simultaneously. For example, if the ground ambulance and air ambulance both arrived at casualty collection point, patients could be transferred into the ground ambulance, even if the operator requested that the air ambulance transport the patient. Separate transfers to transportation vehicles were accomplished consistently without errors. Since these errors

were always experienced when the air ambulance workstation was involved, the modified system configuration may have contributed to the unexpected results (see section 7.6.1).

When patient movement is accomplished using the triage controller software, all of the "rules" of the scenario, included load capacities on the transport vehicles are enforced. Alert messages are available to prompt the user that there is no additional space on the transport vehicles, and the requested patient transfer is denied. In addition, upon arrival at a new treatment station, the patient status is re-set to "new", unlike the movement process with the casualty handler software.

When a patient scenario was transferred to the HPS unit from the triage controller software, there was a sixty to ninety second delay before the HPS unit began to exhibit physical symptoms. Patient transfer back to the triage controller software was nearly instantaneous.

7.6.3.c Patient Assessment. To conduct a clinical assessment and administer treatment using the triage controller software requires the operator to select a number of text-based options and expanding menu selections. Feedback from these requests, such as requesting vital signs resulted in a text box labeled for the appropriate vital sign with the appropriate information filled in. The text was visually unobtrusive, and there were not auditory cues that the information had been updated (Figure 47). Familiarization with the software navigation and displays are required prior to a training event.

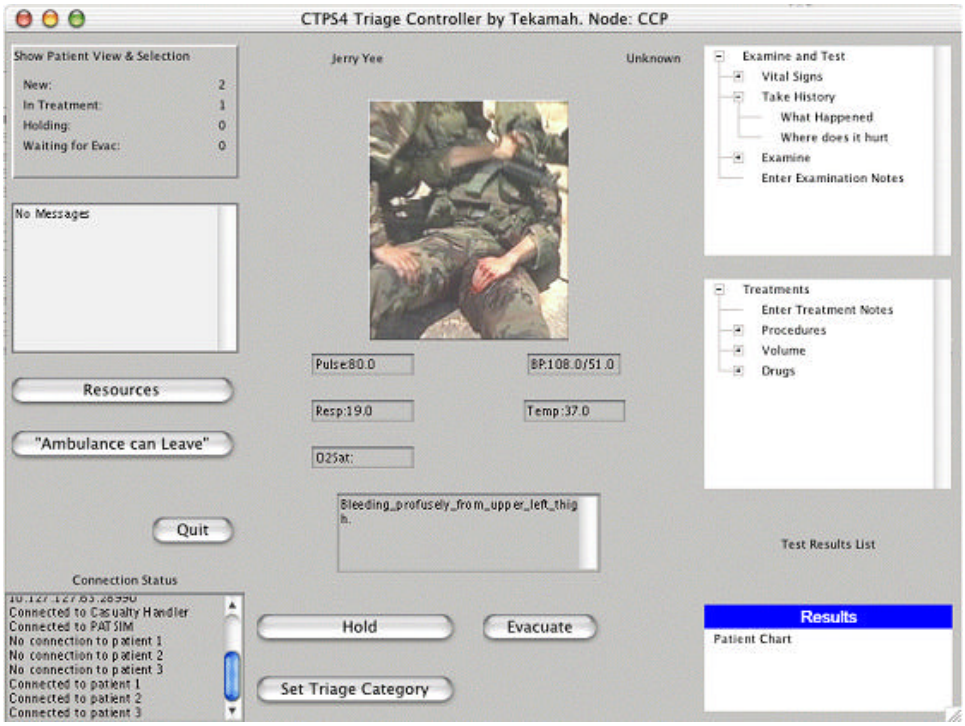


Figure 47. Examination and Treatment Panel, Triage Controller

Writing notes in patient charts requires keyboard skills, and was prompted during treatment. Generally, the operator of the triage controller must have basic computer skills, including use of the mouse, keyboard and general navigation to successfully use the triage controller software.

Patient information representation is inconsistent in the triage controller interface. The majority of the clinical scenarios are presented as patient diagrams, with labels indicating the initial clinical findings. However, two of the clinical scenarios (gunshot wound to the chest and gunshot wound to the left thigh) are represented by photographs instead of diagrams. In each instance, the triage controller cannot update for treatment already administered. For instance, if a tourniquet or pressure dressing has been applied to the wound, the representative diagram does indicate the presence of such a dressing. This means that interventions preformed at lower echelons of care are only presented to the next treatment station in a text format, not visually, as they would be in an actual patient care setting.

All of the text-based information is presented in a raw data format, which includes underbars between words in formal sentences. The font used by the triage controller is small, and there are no color changes on the screen to key the user in to where this information will appear. It seems that a translation of the raw data to include stripping the underbars off the text and creating a high impact message display would be a beneficial enhancement to the triage controller software

7.6.4 After Action Review

Utilizing the after action review software is a two-step process. Prior to initiating any training event, the exercise planner must open After Action Review (AAR) Logger software on the casualty handler workstation. The AAR Logger software captures all patient activity conducted by the CTPS system.

Once a training event is completed, the operator must save the AAR Logger file to a specified location on the hard drive of the casualty handler workstation. The AAR Logger is then closed, and the AAR software is launched to graphically represent the training event. The operator at the casualty handler workstation must note the file location of the saved AAR Logger file, so that the AAR Viewer software can upload the data. There is the potential for operator error in locating files on the hard drive.

The AAR Viewer software presents the training event information on a map panel (Figure 48). The map shows the geographic locations of treatment stations and their relative proximities. There are six gray bars positioned over the map at each treatment station. There is also a timeline at the bottom of the interface. As the timeline is advanced, colored boxes appear within in the gray sections of the map interface to indicate patient positions over time. The underlying map is detailed, contains multiple colors, and overwhelms the interface presentation. Until the operator becomes familiar with the AAR software, the general impression is that the interface is visually confusing.

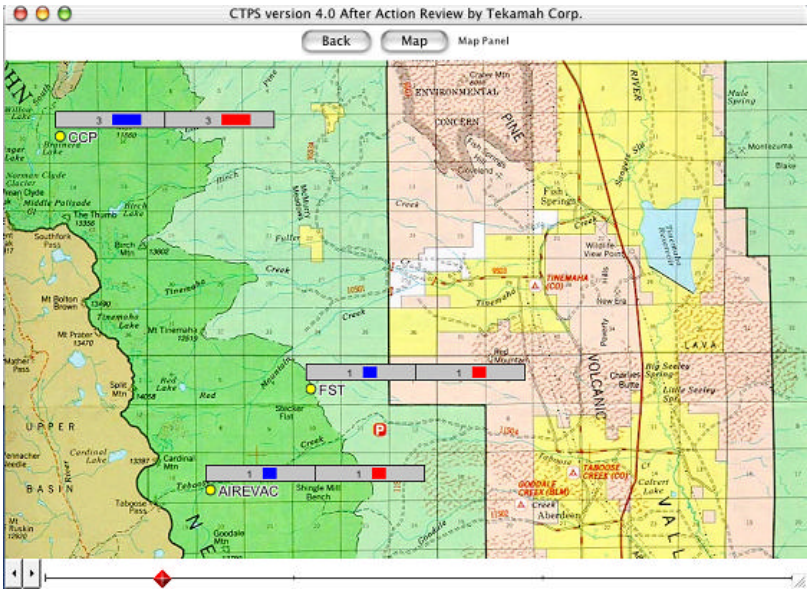


Figure 48. AAR Map Panel

There are small yellow buttons next to the names of the treatment nodes, just below the gray bars. These yellow buttons are only way to view detailed information about the events at that location. Clicking on the gray bars or the name of the treatment node produces no results.

Once the yellow button is successfully activated, the Station View Panel is launched (Figure 49). Within the Station View Panel, patients whom have been treated at that specific node are presented in distinct gray boxes. In some instances, the patient is shown to have red heart or a blue shape next to the name. These symbols are intended to indicate a cardiac alert or a respiratory alert, however, there is no key to explain these symbols to the viewer.

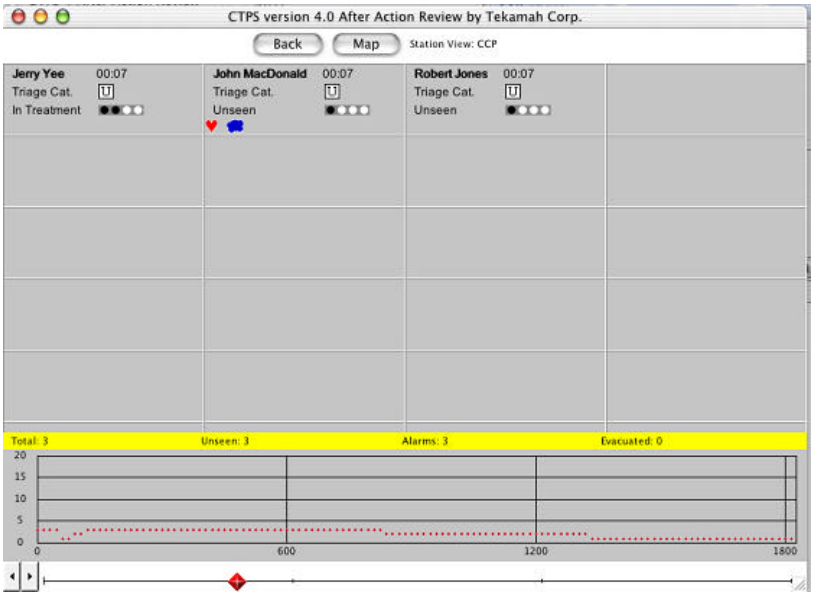


Figure 49. AAR Station View Panel

Clicking on gray boxes with the individual patient name presents the Patient View Panel interface (figure 50). The Patient View Panel contains all of the events that occurred to that patient in an event log. The event log displays the clinical interventions performed on that patient during the CTPS training event. Text based notes, for example, "set Triage_Category Set to 5.0" or "CTPS_Treatment_Status Set to 2.0" are not defined by a key or glossary feature for the end user. The event log does not record the patient history automatically. During the exercise, the operator at the triage controller must record patient history in the electronic chart, to be displayed in the AAR event log.

During the evaluation, operators were not successfully able to record interventions given at the HPS level (administration of medications) to the AAR event logger. All of the clinical interventions administered by the triage controller software tracked successfully. All other information, including treatment times and locations recorded successfully.

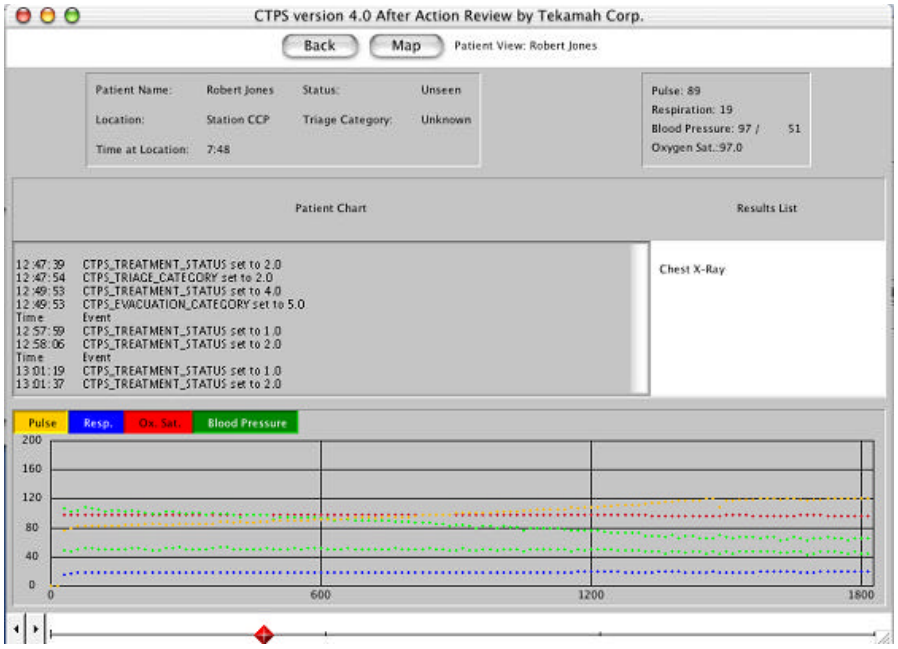


Figure 50. AAR Patient View Panel

Within the Patient View Panel, there is a timeline, which allows the user to view the patient events across all treatment nodes. There is a graphical representation of vital signs: pulse, respiration, oxygen saturation and blood pressure. Each vital sign is color coded, and can be turned on or off by user control. This graphical representation is a highly effective means of representing clinical data over time.

Appendix A: METI Mandatory Supply List

(from Appendix F, Human Patient Simulator, Rev. 2.0 - METI)

1) Heavy-duty extension cord

2) Surge protector electrical power strip

3) Four (4) 1- liter bags of sterile water

4) Fifty (50) syringes (10 – or 12-cc size)

5) Five (5) 20-cc syringes

6) 250 ml bag standard or saline solution

7) Self-inflating resuscitation bag

8) Two (2) IV poles

9) Stethoscope

10) Nasal cannula

11) Three, 8.0 endotracheal tubes

12) Endotracheal tube sylet

13) Laryngoscope handle and blades (Mac 3 and 4, Miller 2)

14) Adult medium face mask

15) Adult medium blood pressure cuff and sphygmomanometer

16) Defibrillators or AED (Physio-Control Lifepak 11 or Lifepak 500 recommended. Other models may also work)

17) 14-gauge catheter and needle, 3-6 cm long

18) 18-gauge spinal needle, 10-15 com long (Pericardiocentesis option only)

19) 28 – or 32 French chest tube (chest tube option only)

20) Peripheral nerve stimulator (Anesthesia option only)

21) Foley catheter (16 or French)

22) Urine collection bad (G/U option only)

23) Bucket (for trauma fluid collection)

Note: This list identifies the mandatory supplies for an single HPS unit. METI guidance for installation was to generally multiplied the items by six for the entire CTPS system.

Appendix B: Trainee Demographic Survey

1. Please enter the name of your workplace:

2. If military, please enter your primary MOS:

3. What is your professional background? (check all that apply)

- ☐ Clinical
- ☐ Healthcare Administration
- ☐ Medical Education
- ☐ Operational
- ☐ Technical
- ☐ Other

4. Please indicate your present level of exposure to medical simulator technology, like an interactive medical mannequin:

- ☐ Extensive experience with medical simulators
- ☐ Moderate experience with medical simulators
- ☐ Some experience with medical simulators
- ☐ Little experience with medical simulators
- ☐ No experience with medical simulators

5. Use of a computerized medical simulator system will enhance my abilities to train medical skills:

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

6. Use of a computerized medical simulator system will enhance military medical units in their collective medical skills:

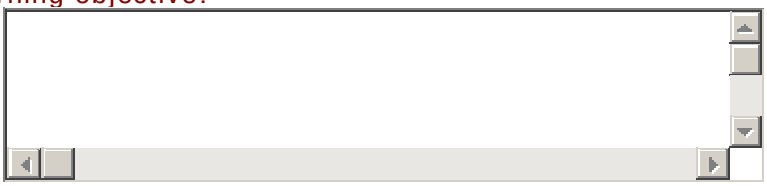
- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

Appendix C:
Training Evaluation Survey - Template

1. Terminal Learning Objective: At the conclusion of this lesson, each participant will _____. This stated learning objective was met:

- ☐ Strongly Agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

2. Please enter your comments about the effectiveness of this training, with respect to the stated learning objective:



3. The content of this lesson was relevant to the stated learning objective:

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

4. The subject matter was effectively conveyed:

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

5. The presentation was effective:

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

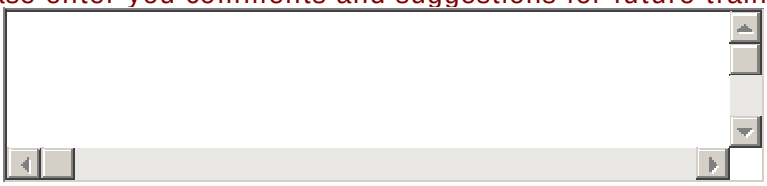
6. Please enter you comments and suggestions for future training sessions:

Appendix D:
Debriefing Questionnaire

1. Please indicate the lessons that you attended: (check all that apply)

- ☐ Introduction to the HPS Simulator (Tues 8/14/01)
- ☐ Review and Demonstration of the CTPS System (Wed 8/15/01 - am)
- ☐ Casualty Handler (Wed 8/15/01 - am)
- ☐ Triage Controller (Wed 8/15/01 - pm)
- ☐ CTPS Clinical Scenario Orientation (Wed 8/15/01 pm & Thrus 8/16/01 am)
- ☐ After Action Review (Thurs 8/16/01 am)
- ☐ HPS Clinical Scenarios Training (Thurs 8/16/01 pm & Fri 8/17/01 am)

2. Please enter you comments and suggestions for future training sessions:



3. If future medical training exercises were conducted using the CTPS system, I would volunteer to participate in the exercise.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

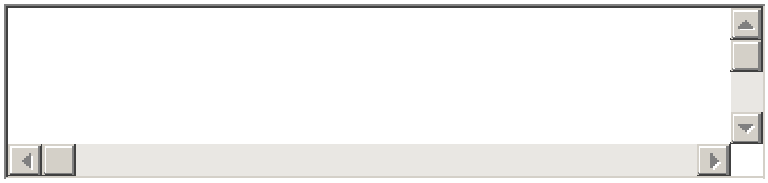
4. Overall, CTPS system was "user friendly"

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

5. I am adequately trained to operate the CTPS system.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

6. What other information did you require, or would have been helpful, in operating the CTPS system?



7. The procedures used to operate the CTPS system were **NOT** internally consistent, and did **NOT** seem to be performed in a logical sequence.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

8. Please enter any additional comments concerning the procedures used to operate the CTPS system:

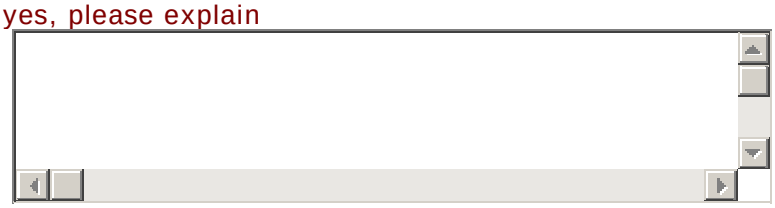
9. The CTPS system provides sufficient feedback to keep me informed of the results of my control and information input activities

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

10. Did you experience any instances of loss of situational awareness while using the CTPS system? That is, did you every fail to understand what the system was doing, what the implications of the action would be, or know what to do next?

- ☐ yes
- ☐ no

11. If yes, please explain



12. Did the CTPS system ever do something that you did not expect?

- ☐ yes
- ☐ no

13. If so, please explain

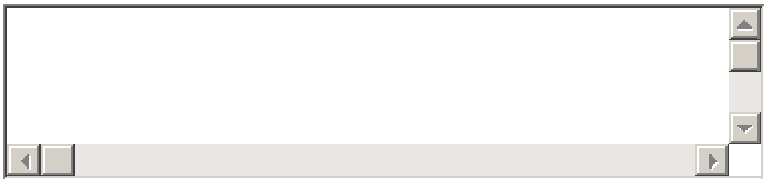
14. The casualty handler on-screen interface kept me adequately informed and directed on what to do next.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

15. The casualty handler interface was effective and meaningful. The system was organized and elements were grouped together in a meaningful way,

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

16. Please enter any additional comments you have about the on-screen interface of the casualty handler:



17. The casualty handler software did **NOT** oriente me to where I was in the training exercise process.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

18. The casualty handler software notified me as to what the computer was doing.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

19. The procedures used to complete tasks on the casualty handler software were logical. In other words, the procedures used to complete tasks make sense.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

20. The casualty handler software procedures used to perform tasks were **NOT** efficient.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

21. The casualty handler software processed information and provided feedback in a timely manner (e.g. location and status of patients and scenarios)

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

22. The casualty handler software options where sufficient to complete the required tasks (e.g, loading patients and scenarios, pausing and restarting scenarios, monitoring location and status of each scenario, transferring patient from one location to another, creating new patients and scenarios)

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

23. The casualty handler presented error messages effectively (e.g., error messages were clearly presented. I understood the error messages, and I was able to respond to the appropriately)

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

24. The triage controller on-screen interface kept me adequately informed and directed on what to do next.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

25. The triage controller software interface was effective and meaningful. The system was organized and elements were grouped together in a meaningful way.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

26. Please enter any additional comments you have about the on-screen interface of the triage controller:

27. The triage controller software did **NOT** oriented me to where I was in the triage process

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

28. The triage controller software notified me as to what the computer was doing.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

29. The procedures used to complete triage tasks were logical on the triage controller software interface. In other words, the procedures used to complete tasks make sense.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

30. The triage controller software procedures used to perform tasks were **NOT** efficient.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

31. The triage controller software processed information and provided feedback in a timely manner.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

32. The triage controller software options where sufficient to complete required tasks (e.g., assess multiple casualties, perform triage, perform field tests, diagnosis and treat patients virtually)

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree
- ☐ n/a I do not have a sufficient clinical background to make this assessment

33. The triage controller software interface presented alert messages effectively, including the arrival of new patients and evaluation vehicles. (e.g., error messages were clearly presented. I understood the error messages, and I was able to respond to the appropriately)

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

34. The triage controller software interface presented error messages effectively (e.g., error messages were clearly presented. I understood the error messages, and I was able to respond to the appropriately)

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

35. The procedures used to generate and review an after action review report were logical. In other words, the procedures used to complete tasks make sense.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

36. The after action review process was **NOT** efficient.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

37. The after action review interface was effective and meaningful. The system was organized and elements were grouped together in a meaningful way.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

38. Please enter any additional comments you have about the after action review interface:

39. The after action review software processed information and provide feedback in a timely manner.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

40. The after action review software options where sufficient to complete required tasks (e.g., retrieve the time of injury, locations of the patient on the battlespace, retrieve the time and type of treatment and the patient medical outcome, view an on-screen tractability report of evaluation and movement throughout the battlespace)

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

41. The clinical scenarios (blunt abdominal injury, blunt chest injury, compound fracture of the left leg, gunshot wound to the right chest, gunshot wound to the left thigh, closed head injury) were processed by the CTPS system in a timely manner.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

42. The clinical scenarios were presented in a manner that was adequate to represent a real trauma casualty.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree
- ☐ n/a I do not have a sufficient clinical background to make this assessment

43. The procedures used to operate the Human Patient Simulator (HPS or PHS unit) were logical. In other words, the procedures used to complete tasks make sense.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

44. The Human Patient Simulator (HPS or PHS unit) procedures used to perform tasks were **NOT** efficient.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

45. The clinical scenarios were processed by the Human Patient Simulator (HPS or PHS unit) in a timely manner.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

46. The Human Patient Simulator (HPS or PHS unit) interface was effective and meaningful. In other words, the simulator unit was organized and elements were grouped together in a meaningful way.

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

47. Please enter any additional comments you have about the Human Patient Simulator (HPS or PHS unit) interface:

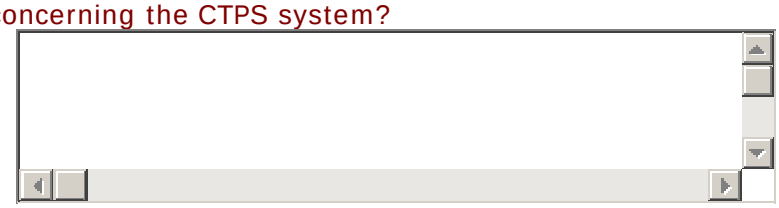
48. The Human Patient Simulator (HPS or PHS unit) was responsive to clinical interventions in a timely manner

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree

49. The Human Patient Simulator (HPS or PHS unit) options where sufficient to complete required tasks (e.g., treat a blunt abdominal injury, blunt chest injury, closed head injury, compound fracture of the left leg, gunshot wound to the left chest, and gunshot wound to the left thigh)

- ☐ Strongly agree
- ☐ Agree
- ☐ No Opinion
- ☐ Disagree
- ☐ Strongly Disagree
- ☐ n/a I do not have a sufficient clinical background to make this assessment

50. Do you have any additional comments about anything not covered in this questionnaire concerning the CTPS system?



Appendix E:
Evaluation of Vendor Training:
Introduction to the Individual HPS Simulator

1. Terminal Learning Objective: At the conclusion of this lesson, each participant will demonstrate familiarity with the operation of an individual simulator unit, including turning on the system, launching software and activating clinical features.

This stated learning objective was met:

Responses	Count
Strongly Agree	2
Agree	5
No Opinion	0
Disagree	1
Strongly Disagree	0

2. Please enter your comments about the effectiveness of this training, with respect to the stated learning objective:

It would be helpful to have critical tasks listed on paper under the objectives and then actively fill in the blanks when completed. This will ensure that you accomplish more the desired outcome. For example: What are the body sites that need to be primed prior to use.
initial familiarity was fine, will need more time to become proficient.
I have not become trained yet. We saw some of the capabilities today, but not all of us had hands on. I did spend time with one of the trainers and expressed my desires to have more contact with the program. I think that there should be a handout that is given to each student that outlines the "start-up" procedures and then let the students practice and explore the contents of the program. There were numerous interruptions that occasionally took us off track, so eventually the training got more and more sidetracked. I think that the instructors are very knowledgeable, but need to keep us all "entertained".
I thought it was very informative. I could start the virtual patient and move it to the manikin, overlay a scenario or change conditions manually.
An overwhelming amount of information for one day!! Perhaps if Monday had bee more structured and condensed, there would have been a bit of time to start on some of Tuesday's infor and make that day not as hard. i am looking forward to today, tho, after resting my brain!!
I feel I have the basic concept of operation and obviously will need lots of practice to utilize the simulator to its fullest capacity.
The training was very effective. Material was presented in an easy to understand format.
Had fun thanks

3. The content of this lesson was relevant to the stated learning objective:

Responses	Count
Strongly agree	4
Agree	3
No Opinion	0
Disagree	0
Strongly Disagree	0
(Blank)	1

4. The subject matter was effectively conveyed:

Responses	Count
Strongly agree	2
Agree	5
No Opinion	0
Disagree	0
Strongly Disagree	0
(Blank)	1

5. The presentation was effective:

Responses	Count
Strongly agree	2
Agree	5
No Opinion	0
Disagree	0
Strongly Disagree	0
(Blank)	1

6. Please enter you comments and suggestions for future training sessions:

More structure to the presentation. The information is communicated very well orally by the nurse but due to the complex nature of the various parts of the system it would help to have a fill in the blank handout that you can take home. We learn by hearing, seeing, doing, and repeating. This would be good recall of important task accomplishment.
charts/visuals for the "plumbing systems" blood, drug, etc... including entry points for provider intervention might be helpful.
I personally would have each person to be trained, sit in front of a computer and walk them through several times and then allow some practice time. Also, remember that everyone in the group might be at different skill levels. Some members are highly proficient in medicine, some are intermediate and some are basic. Don't lose your students by focusing on the highly skilled only.
The lesson was well done.
I thought that a structured presentation of operating the simulator may have been more effective. A basic overview of operating the system by the instructor followed by hands on learning would have been less confusing than having us read the instructions out loud. Also, an initial demonstration by the instructor at the keyboard followed by a student demo may have made a clearer presentation. The instructor while extremely helpful needs more training on the simulator.
Future sessions should remain similar to current presentation.
do presentations/training on big screen instead of lap top computer. Difficult to follow and see lap top screen

2. **Terminal Learning Objective:** At the conclusion of this lesson, each participant will be able to describe of the roles and interactions of the casualty handler, triage controller, clinical scenarios and the after action review process within the CTPS system.

   This stated learning objective was met:

Responses	Count
Strongly Agree	0
Agree	6
No Opinion	0
Disagree	0
Strongly Disagree	0

3. **Module # 1: Casualty Handler** (Wed 8/15/01 - am)

   Enabling Learning Objective: At the conclusion of this module, each group of 3-4 participants will be able to successfully operate the casualty handler software.

   This stated learning objective was met:

Responses	Count
Strongly Agree	0
Agree	4
No Opinion	2
Disagree	0
Strongly Disagree	0
n/a, I did not attend this portion of the training	0

4. **Module # 2: Triage Controller** (Wed 8/15/01 – pm)

   Enabling Learning Objective: At the conclusion of this module, each group of 3-4 participants will be able to successfully operate the triage controller.

   This stated learning objective was met:

Responses	Count
Strongly Agree	0
Agree	3
No Opinion	2
Disagree	0
Strongly Disagree	0
n/a, I did not attend this portion of the training	1

5. Module # 3: CTPS Clinical Scenario Orientation (Wed 8/15/01 - pm and Thurs 8/16/01 am)

Enabling Learning Objective: At the conclusion of this module, each group of 3-4 participants will be able to successfully operate each of the six available clinical scenarios in the CTPS system.

This stated learning objective was met:

Responses	Count
Strongly Agree	0
Agree	3
No Opinion	1
Disagree	0
Strongly Disagree	0
n/a, I did not attend this portion of the training	1
(Blank)	1

6. Module # 4: After Action Review (Wed 8/16/01 - am)

Enabling Learning Objective: At the conclusion of this module, each group of 3-4 participants will be able to successfully operate the after action review software.

This stated learning objective was met:

Responses	Count
Strongly Agree	0
Agree	4
No Opinion	1
Disagree	0
Strongly Disagree	0
n/a, I did not attend this portion of the training	1

7. Please enter your comments about the effectiveness of this training, with respect to the stated learning objectives:

Good initial orientation but not enough training to independently operate the equipment. Another hands on session would be helpful.
More hands on training. More computers
I thought the training was quite effective and demonstrated the need for multiple discipline (Techies and clinical) involvement in the project.
1.First define what successfully operate means.. I feel that I have received an overview of the capabilities of each of the modalities. The definition of successfully operate is not defined. I think it is necessary to define the specific tasks or critical skills that must be accomplished in order to successfully operate the modality stated in the objective. This would help define what is successful performance of the objective. I cannot agree that I was successful but I feel I was given an overview of each. 2.All the instructors were very competent and were easy to work with but did not use the educational methods to expedite learning. There were many modules to cover and ultimately the goal is to get the student to hands on as quickly as possible. But the following would have helped. a. brief orientation to the apple/mac software (since we are all on windows. (briefly explain in 10 min for example the buttons in the top left corner represent red button = off. b. Provide a file card resource at each modality whose goal is to express start you(you don't have time to wade into the user manual and you waste your time writing your own list down and miss what they are demonstrating. This way you get a copy of those notes and you can totally focus on what they are saying and doing. All the above reduces the time you spend trying to use their computer equipment and also writing down the order of events. You then have more time for hands on activity.
Training was effective but it should have been presented so all could readily see what the trainer was doing. We had to "jockey" for position. It was frustrating to everyone, even the trainers. All trainers should have been on the same Lesson scheme and not arguing about "we will do this first" "no we will do this first"
Successfully operate with assistance!! Would be helpful to incorporate more time for independent practice with a resource person to call on for help

8. The content of this lesson was relevant to the stated learning objectives:

Responses	Count
Strongly agree	2
Agree	4
No Opinion	0
Disagree	0
Strongly Disagree	0

9. The subject matter was effectively conveyed:

Responses	Count
Strongly agree	0
Agree	4
No Opinion	1
Disagree	1
Strongly Disagree	0

10. The presentation was effective:

Responses	Count
Strongly agree	0
Agree	4
No Opinion	1
Disagree	1
Strongly Disagree	0

11. Please enter you comments and suggestions for future training sessions:

thanks for allowing me to participate.
If possible in the future we could split classes into smaller groups working in different areas, as a laptop is a small screen to huddle around with a large group of people.
1.Provide the quick start notes for each modality. 2.Provide a wall diagram of the network so you can early on note the relationship. When I finally figured out the relationship of ctps from hps etc, all else came easy. 3. Identify the critical criteria to master for each objective. 4. Use a large screen for teaching points as we go over Triage controllers and AAR. EVERYONE can't see standing around the notebooks. 5. Put the notebooks on desktop level and have us in chairs for some of the learning so that your comfort level doesn't impede the learning process. 6. Future demos to the public should be much much better organized for marketing the CTA. The Monday demo was embarrassing. 7.I would use large wall charts located over modalities to reinforce important events, tasks, or computer information because you want to have the student spend their valuable time playing the medical war game and not on the unimportant. The goal is have the student demonstrate their judgment and skills in triage, trauma care at various levels of care and not to waste time learning to use the tools to work the scenarios. Finally, thanks for letting me attend because this was a valuable experience. I especially enjoyed the physician interaction with us. Please do not think I thought this was a negative training experience. I just wanted to provide input to move the content into a more desirable and efficient learning experience.
Devise a step by step guide (SOP) for the training. The guide could be deviated from but at least all trainers would be in step with each other.
A factor that negatively affected all presentations was having to stand around a small computer screen to see what was happening. Absolutely took away from the learning!! Handout info was not helpful at all to beginners. Start out simply and then advance to the comprehensive technical books. The progression of infor presented was confusing for me, and included info that is not pertinent for our immediate needs (editing scenarios etc.) That time could have been better used for hands on practice The instructors are certainly well versed in the subject matter and answered questions (once the true question was understood). An outline of some sort for the learner to follow that provides structure, and allows for anticipatory thinking and conclusive thinking would be helpful. MORE TIME FOR HANDS ON is needed for the beginner! Thanks for everyone's efforts.

Appendix G:
Evaluation of Vendor Training:
HPS Clinical Scenario Training

1. Terminal Learning Objective: At the conclusion of this lesson, each participant will be able to describe the general steps required to develop a new clinical scenario for the individual medical simulator (HPS system).

This stated learning objective was met:

Responses	Count
Strongly Agree	0
Agree	3
No Opinion	0
Disagree	1
Strongly Disagree	0

2. Please enter your comments about the effectiveness of this training, with respect to the stated learning objective:

By this time, there was so much information that I could not describe the steps without being prompted. Again, if the steps were listed in order visually...then I could have done this activity without assistance.
Definitely need some clinical background for this one
There were too many hardware and software errors that distracted from the objective. Learning did not flow smoothly.
This piece seemed to be an "extra", and contributed to my confusion. Down the line it will be important to know it (by which time I will have forgotten all the instructions), but for now the work with the scripted 6 combat patients is enough. Sorry that I sort of tuned out on this. Content was relevant to the objective, but is the objective relevant to the imminent job at hand?

3. The content of this lesson was relevant to the stated learning objective:

Responses	Count
Strongly agree	0
Agree	3
No Opinion	0
Disagree	0
Strongly Disagree	0
(Blank)	1

4. The subject matter was effectively conveyed:

Responses	Count
Strongly agree	0
Agree	3
No Opinion	0
Disagree	1
Strongly Disagree	0

5. The presentation was effective:

Responses	Count
Strongly agree	0
Agree	3
No Opinion	1
Disagree	0
Strongly Disagree	0

6. Please enter you comments and suggestions for future training sessions:

Well, the presentation was interesting and stimulating but not entirely effective without the addition of some learning tools..ie.handouts, chart, file card etc.
Very interesting class throughout all aspects of the training.
The personnel were very enthusiastic but were stopped short due to the hardware problems.
At a more appropriate time I hope Jeff will review this again.

Appendix H:
Evaluation of Vendor Training:
CTPS Training and System Evaluation Survey

2. Please enter you comments and suggestions for future training sessions:

Please refer to the listed items that I defined on previous day .
The scenario editor will definitely need clinical people, but it works like a scripting language complete with Boolean operators and there might need to be someone familiar with that type of thing present for the first few.
I was not available Thurs pm for training.
Flip-flop first and second sessions, with a general overview of the system. Then address the components of the system and allow more time for hands on. For me frequent repetition of how components fit together is essential. Eliminate conflicting info -- we can't figure out what is real. Example: the whole process of turning on and getting ready was modified several times to add gases, add compressor, have to initialize and then turn off the HPS etc. Need more time for the working of the HPS. I'm uncomfortable with the notion that bio-med or METI techs will have to be called. It seems that is not a timely fix if training is going to be going on. (although we could bypass that station, I guess)

3. If future medical training exercises were conducted using the CTPS system, I would volunteer to participate in the exercise.

Responses	**Count**
Strongly agree	3
Agree	1
No Opinion	0
Disagree	0
Strongly Disagree	0

4. Overall, CTPS system was "user friendly"

Responses	**Count**
Strongly agree	0
Agree	2
No Opinion	1
Disagree	1
Strongly Disagree	0

5. I am adequately trained to operate the CTPS system.

Responses	**Count**
Strongly agree	0
Agree	1
No Opinion	0
Disagree	3
Strongly Disagree	0

6. What other information did you require, or would have been helpful, in operating the CTPS system?

I. Brief orientation to the Apple software if the target audience has not used it (5-10 min) 2. Big Chart on the wall to show diagram of CTPS & HPS, so you can see what it is made up and its relationships. 3. Simple one page Handout to refer to so that you can prompt yourself. All this would allow you to focus on hands on and not on issues that are not the focus of the training.
I would like to go through this system one complete time without interruption. I feel I could "stumble through" with out assistance and after that I would feel more confident.
Would have been helpful to have the same info replicated. An early, visual diagram of the "system" might have clarified concepts for me. I don't even understand #7.

7. The procedures used to operate the CTPS system were **NOT** internally consistent, and did **NOT** seem to be performed in a logical sequence.

Responses	Count
Strongly agree	0
Agree	0
No Opinion	2
Disagree	2
Strongly Disagree	0

8. Please enter any additional comments concerning the procedures used to operate the CTPS system:

So much information was given during the training that it was hard to remember which started what. It was not intuitive but an outline of the critical tasks in order of use would have proved very effective in understanding the operation of the system.
All of the procedures are new at this point and as we perform them a few times will become easier.
The system seems to be designed where one could not do one step with doing what was required first.

9. The CTPS system provides sufficient feedback to keep me informed of the results of my control and information input activities

Responses	Count
Strongly agree	1
Agree	2
No Opinion	1
Disagree	0
Strongly Disagree	0

10. Did you experience any instances of loss of situational awareness while using the CTPS system? That is, did you every fail to understand what the system was doing, what the implications of the action would be, or know what to do next?

Responses	Count
yes	3
no	1

11. If yes, please explain

I knew what was happening but I may have difficulty remembering what button to choose to go where I needed to go next.
Due to hardware and software failures we (and sometimes the trainers) were confused as to what had happened when a scenario was started.
Did not operate it enough to GET any sense of situational awareness

12. Did the CTPS system ever do something that you did not expect?

Responses	Count
yes	3
no	1

13. If so, please explain

There were various failed events that occurred during the week. A patent died but the physiology failed to identify the event. I wanted to send a patient to Forward support but there was technical problems and it was unavailable (software issues)
At one point the causality handler engine failed to connect to some of the PatSims while under the CTPS system, but the software engineer walked me through the procedure of identifying the problem and correcting it. It shouldn't be a problem in the future
The manikin failed to perform the programmed function.
I didn't independently ask it to do much!

14. The casualty handler on-screen interface kept me adequately informed and directed on what to do next.

Responses	Count
Strongly agree	0
Agree	2
No Opinion	1
Disagree	1
Strongly Disagree	0

15. The casualty handler interface was effective and meaningful. The system was organized and elements were grouped together in a meaningful way,

Responses	Count
Strongly agree	0
Agree	2
No Opinion	1
Disagree	1
Strongly Disagree	0

16. Please enter any additional comments you have about the on-screen interface of the casualty handler:

When you select a resource such as vital signs or a procedure, sometimes you single clicked, some times you double click..this is not consistent. You should be able to click on a chart and write notes with out opening up the resource section and then select a section in order to type. Also, it would help to have he patient 's condition, follow his name after you identify him..john brown (gun shot abdomen) Very hard to keep track of what patient a had what. I feel I could provide better input when I have an opportunity to work it a few times. I really don't know it enough to know what I don't or do know.
I think the info in #15 is true, but worked with it for such a short time, I didn't really get a feel for how effectively it works. (Same is true for #16-23)

17. The casualty handler software did **NOT** orient me to where I was in the training exercise process.

Responses	Count
Strongly agree	0
Agree	0
No Opinion	2
Disagree	2
Strongly Disagree	0

18. The casualty handler software notified me as to what the computer was doing.

Responses	Count
Strongly agree	0
Agree	2
No Opinion	2
Disagree	0

Strongly Disagree	0

19. The procedures used to complete tasks on the casualty handler software were logical. In other words, the procedures used to complete tasks make sense.

Responses	Count
Strongly agree	0
Agree	2
No Opinion	2
Disagree	0
Strongly Disagree	0

20. The casualty handler software procedures used to perform tasks were **NOT** efficient.

Responses	Count
Strongly agree	0
Agree	0
No Opinion	2
Disagree	2
Strongly Disagree	0

21. The casualty handler software processed information and provided feedback in a timely manner (e.g. location and status of patients and scenarios)

Responses	Count
Strongly agree	0
Agree	3
No Opinion	0
Disagree	1
Strongly Disagree	0

22. The casualty handler software options where sufficient to complete the required tasks (e.g, loading patients and scenarios, pausing and restarting scenarios, monitoring location and status of each scenario, transferring patient from one location to another, creating new patients and scenarios)

Responses	Count
Strongly agree	1
Agree	2
No Opinion	1
Disagree	0
Strongly Disagree	0

23. The casualty handler presented error messages effectively (e.g., error messages were clearly presented. I understood the error messages, and I was able to respond to the appropriately)

Responses	Count
Strongly agree	0
Agree	1
No Opinion	2
Disagree	1
Strongly Disagree	0

24. The triage controller on-screen interface kept me adequately informed and directed on what to do next.

Responses	Count
Strongly agree	0
Agree	2

No Opinion	1
Disagree	1
Strongly Disagree	0

25. The triage controller software interface was effective and meaningful. The system was organized and elements were grouped together in a meaningful way.

Responses	Count
Strongly agree	0
Agree	2
No Opinion	2
Disagree	0
Strongly Disagree	0

26. Please enter any additional comments you have about the on-screen interface of the triage controller:

I felt that there was considerable info available to you but some of the tags were confusing . I knew where to get the info but some times I forgot the way to get there.
I did not see error messages that I thought should have appeared (system errors). As far as processing in a timely manner I feel that we had to "wait" too long for statuses to appear. Also I agreed on items 24 and 25 only because I assume that the trainees are suppose to select the patients to check on them and the system is NOT suppose to prompt a sense of urgency.
Didn't work with it enough to be able to judge. Same for #27-

27. The triage controller software did **NOT** oriented me to where I was in the triage process

Responses	Count
Strongly agree	0
Agree	0
No Opinion	2
Disagree	2
Strongly Disagree	0

28. The triage controller software notified me as to what the computer was doing.

Responses	Count
Strongly agree	0
Agree	2
No Opinion	2
Disagree	0
Strongly Disagree	0

29. The procedures used to complete triage tasks were logical on the triage controller software interface. In other words, the procedures used to complete tasks make sense.

Responses	Count
Strongly agree	0
Agree	3
No Opinion	1
Disagree	0
Strongly Disagree	0

30. The triage controller software procedures used to perform tasks were **NOT** efficient.

Responses	Count
Strongly agree	0
Agree	0
No Opinion	3
Disagree	1
Strongly Disagree	0

31. The triage controller software processed information and provided feedback in a timely manner.

Responses	Count
Strongly agree	0
Agree	2
No Opinion	1
Disagree	1
Strongly Disagree	0

32. The triage controller software options where sufficient to complete required tasks (e.g., assess multiple casualties, perform triage, perform field tests, diagnosis and treat patients virtually)

Responses	Count
Strongly agree	0
Agree	3
No Opinion	1
Disagree	0
Strongly Disagree	0
n/a I do not have a sufficient clinical background to make this assessment	0

33. The triage controller software interface presented alert messages effectively, including the arrival of new patients and evaluation vehicles. (e.g., error messages were clearly presented. I understood the error messages, and I was able to respond to the appropriately)

Responses	Count
Strongly agree	0
Agree	2
No Opinion	2
Disagree	0
Strongly Disagree	0

34. The triage controller software interface presented error messages effectively (e.g., error messages were clearly presented. I understood the error messages, and I was able to respond to the appropriately)

Responses	Count
Strongly agree	0
Agree	0
No Opinion	4
Disagree	0
Strongly Disagree	0

35. The procedures used to generate and review an after action review report were logical. In other words, the procedures used to complete tasks make sense.

Responses	Count
Strongly agree	1
Agree	3
No Opinion	0
Disagree	0
Strongly Disagree	0

36. The after action review process was **NOT** efficient.

Responses	Count
Strongly agree	0
Agree	0
No Opinion	1
Disagree	3
Strongly Disagree	0

37. The after action review interface was effective and meaningful. The system was organized and elements were grouped together in a meaningful way.

Responses	Count
Strongly agree	0
Agree	2
No Opinion	1
Disagree	1
Strongly Disagree	0

38. Please enter any additional comments you have about the after action review interface:

This was not a intuitive page and took explanation from somewhat to understand it. It is helpful once you know how to get around it.
The way that we had to "gather around" the small monitor made the AAR very frustrating. However, the software design presenting all the details of the patients was very thorough and impressive.
This is the only thing I think i might be able to accomplish.

39. The after action review software processed information and provide feedback in a timely manner.

Responses	Count
Strongly agree	0
Agree	4
No Opinion	0
Disagree	0
Strongly Disagree	0

40. The after action review software options where sufficient to complete required tasks (e.g., retrieve the time of injury, locations of the patient on the battlespace, retrieve the time and type of treatment and the patient medical outcome, view an on-screen tractability report of evaluation and movement throughout the battlespace)

Responses	Count
Strongly agree	1
Agree	2
No Opinion	0
Disagree	1
Strongly Disagree	0

41. The clinical scenarios (blunt abdominal injury, blunt chest injury, compound fracture of the left leg, gunshot wound to the right chest, gunshot wound to the left thigh, closed head injury) were processed by the CTPS system in a timely manner.

Responses	Count
Strongly agree	0
Agree	2
No Opinion	2
Disagree	0
Strongly Disagree	0

42. The clinical scenarios were presented in a manner that was adequate to represent a real trauma casualty.

Responses	Count
Strongly agree	0
Agree	2
No Opinion	1
Disagree	0
Strongly Disagree	0
n/a I do not have a sufficient clinical background to make this assessment	1

43. The procedures used to operate the Human Patient Simulator (HPS or PHS unit) were logical. In other words, the procedures used to complete tasks make sense.

Responses	Count
Strongly agree	0
Agree	3
No Opinion	0
Disagree	1
Strongly Disagree	0

44. The Human Patient Simulator (HPS or PHS unit) procedures used to perform tasks were **NOT** efficient.

Responses	Count
Strongly agree	0
Agree	0
No Opinion	1
Disagree	3
Strongly Disagree	0

45. The clinical scenarios were processed by the Human Patient Simulator (HPS or PHS unit) in a timely manner.

Responses	Count
Strongly agree	0
Agree	3
No Opinion	1
Disagree	0
Strongly Disagree	0

46. The Human Patient Simulator (HPS or PHS unit) interface was effective and meaningful. In other words, the simulator unit was organized and elements were grouped together in a meaningful way.

Responses	Count
Strongly agree	0
Agree	2
No Opinion	1
Disagree	1
Strongly Disagree	0

47. Please enter any additional comments you have about the Human Patient Simulator (HPS or PHS unit) interface:

This was confusing. The word scenario is used in the HPS SOFTWARE and in the Interface and it confusing people. I spent a lot of time trying to figure out which I should use. The wording should be changed and if I could spend more time on it I would be able to make more appropriate recommendations.
Again -- getting the same info presented in the same manner over time would have been helpful

48. The Human Patient Simulator (HPS or PHS unit) was responsive to clinical interventions in a timely manner

Responses	Count
Strongly agree	0
Agree	4
No Opinion	0
Disagree	0
Strongly Disagree	0

49. The Human Patient Simulator (HPS or PHS unit) options where sufficient to complete required tasks (e.g., treat a blunt abdominal injury, blunt chest injury, closed head injury, compound fracture of the left leg, gunshot wound to the left chest, and gunshot wound to the left thigh)

Responses	Count
Strongly agree	0
Agree	2
No Opinion	1
Disagree	0
Strongly Disagree	0
n/a I do not have a sufficient clinical background to make this assessment	1

50. Do you have any additional comments about anything not covered in this questionnaire concerning the CTPS system?

I chose "no opinion" choice when I did not experience an event, such as, error messages. Or when the agree or disagree did not fit my answer because I didn't think I could give you an appropriate answer until I worked on the system more. I really felt we covered too much in too short a period. I also felt that I was concentrating on the fact that I was learning to operate the systems in case GWEN was ABSENT so my level of understanding all of it was important to include the starting and stopping of the systems, care of all of the equipment. This took time from the BASIC CTPS/PHS systems.
Better maintenance procedures documentation should be made available. Network connectivity block diagram should be made available.
Bottom line: all of the mechanics MAY BE grouped together in a meaningful way, function in a timely manner, and be efficient, but I don't know enough to say that from my experience.

Appendix I:
Capabilities of Individual Components of the CTPS System

Triage Controller:

- Successfully assess multiple casualties
  - a Six simultaneous virtual casualties at each treatment station or
  - b Five simultaneous virtual casualties and one casualty loaded on the HPS/PHS system at each treatment station
- Allow user to successfully perform triage
  - a Examine multiple casualties, virtually (maximum of 6)
  - b Determine classification of each casualty, virtually (minimal, delayed, immediate, expectant)
  - c Apply immediate care, virtually
  - d Re-assess patient, virtually
- Successfully perform field lab tests
  - a Chest x-ray
  - b Arterial blood gas analysis (ABG), pH, PaCO2, PaO2
- Successfully extend the range of diagnostic and treatment options of the HPS unit
  - a Diagnostic Options
    - i Visual presentation of patient
    - ii Text-based patient history
    - iii Text-based responses to visual inspection
    - iv Text-based descriptions of auscultation
    - v Text-based descriptions of palpation
  - b Treatment Options
    - i Apply virtual tourniquet
    - ii Apply virtual pressure dressing
    - iii Send patient to operating room

Casualty Handler:

- Successfully instantiated casualties at any Casualty Treatment Station
- Successfully develop, track, and execute scenarios that can be applied to a given casualty
  - a Scenario editor
    - i Create new scenario
    - ii Edit scenario
    - iii Save scenario
  - b Scenario player
    - i Start scenario
    - ii Pause scenario
    - iii Restart scenario
    - iv Save physiology
- Successfully monitor the location and status of casualties across the battlefield
- Successfully transfer casualties from one location to another
- Successfully pause/save/restart a simulation exercise

After Action Review:

- Accurately recorded the time of the injury
- Accurately record the location of the casualty in the battlespace
- Accurately record the time of treatment performed at each casualty treatment station
- Accurately record the type of treatment performed at each casualty treatment station
- Accurately develop a tracability report of the evacuation and movement throughout the battlefield
- Accurately record each casualty medical outcome

Appendix J:
Scenario Overview
(from Tekamah Corp)

OVERVIEW OF THE SCENARIO

Twelve soldiers were enroute to their garrison in two HMMWVs. They were driving on a dirt road when the lead vehicle ran over a mine. The explosion flipped the vehicle over killing two of the six occupants instantly. The other four survived the initial blast but were seriously injured. The trailing vehicle immediately pulled to the side of the road and its six occupants dismounted and rushed to render assistance. Immediately after dismounting, they began to take fire from a sniper concealed in the brush adjacent to the road.

One of the members from the trailing vehicle was hit by the snipers first shot. Two others began returning fire while a fourth radioed for assistance and the remaining two (one a medic) began attending to the injured soldiers. The exchange of gunfire lasted less than five minutes before the sniper was killed. In that short time he was able to inflict two gunshot wounds, raising the number of injured soldiers to six.

EVACUATION RESOURCES AND SUPPORTING MEDICAL TREATMENT FACILITIES

The scenario has six treatment nodes each with its own HPS, Triage Controller and supporting equipment. Four of the nodes represent treatment locations that are in fixed position and two nodes represent evacuation vehicles. The four "fixed" treatment nodes are: a Casualty Collection Point (CCP), a Battalion Aid Station (BAS), a Forward Surgical Team (FST), and a Combat Surgical Hospital (CSH). The two evacuation vehicles are a ground ambulance and an air ambulance.

The CCP is set up by the medic at the site of the explosion.

Ground ambulance evacuation times are as follows: The BAS is 10-15 minutes away from the CCP, the FST is 15-20 minutes away from the BAS, and the CSH is 20 minutes away from the FST. The ground ambulance is capable of transporting four casualties at a time.

Air evacuation times are: CCP to CSH is 10-12 minutes, the BAS is situated in a wooded area without easy access to a landing site – air evacuation is not supported, CCP to FST is 7-10 minutes, and FST to CSH is 5-7 minutes. The air ambulance is only capable of transporting two casualties at a time.

The first evacuation asset on the scene is a helicopter capable of transporting two litter casualties directly to a Combat Surgical Hospital (transport time: 10-12 minutes). Second on the scene is a ground ambulance capable of transporting four litter casualties directly to a Battalion Aid Station (transport time: 10-15 minutes).

THE UNFOLDING SCENARIO

In addition to managing the casualties, medical personnel at each of the locations will need to have a working understanding of the capabilities at the other nodes including the transit time between nodes. This situational awareness will nowhere be more important than at the CCP. In addition to the first look and triage of the casualties, the medic will need to re-triage each of the casualties prior to making an evacuation decision. Those most in need of definitive surgical care may not initially present as the most severe. If the one or more of the more severe cases were not loaded onto the air ambulance, the best course of action would be to hold the severe casualty at the CCP rather than evacuating to the BAS. Waiting for the second trip via air ambulance will get the casualty to definitive surgical care faster than sending them by ground.

Blunt Abdominal Injury (ruptured spleen)

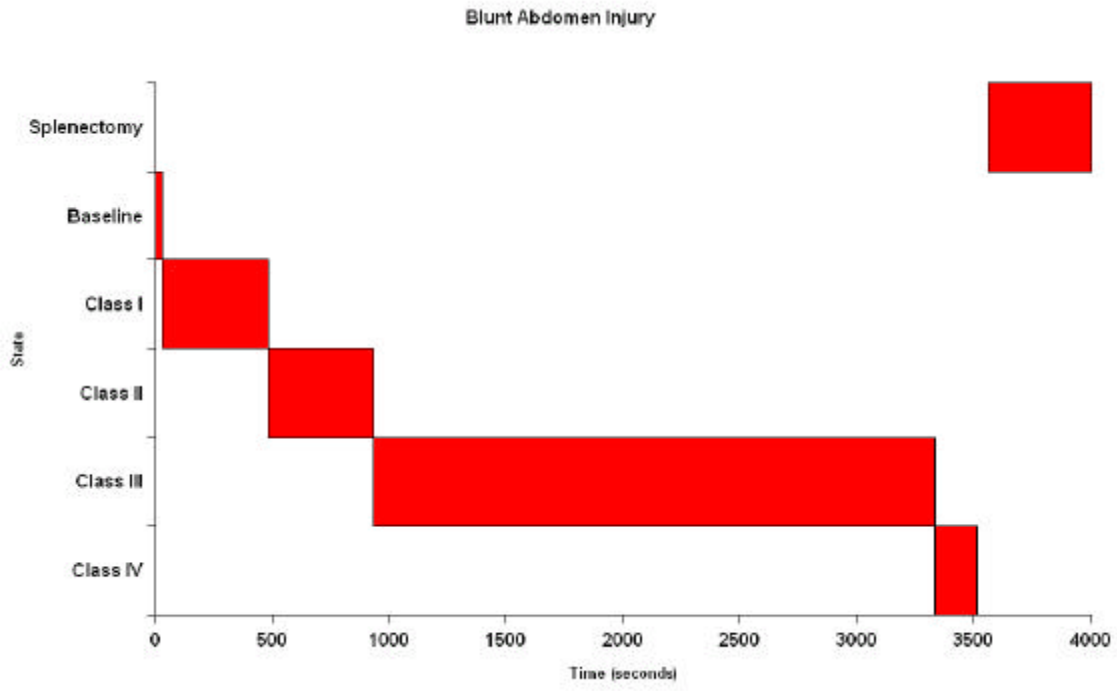
> The soldier riding in the front right seat was unbelted and was thrown out of the HMMWV, landing several yards from vehicle. Upon initial inspection he has a small laceration on his forehead and reports having a sharp pail in his left wrist. He is stoic when talking about his injuries and is very concerned about his fellow soldiers. Initial vitals reveal only a slightly elevated heart rate. With further examination he is tender on the left side of his torso where he apparently struck the ground. Breath sounds are normal. Abdomen is normal.

His underlying injury is a ruptured spleen. As he bleeds into his peritoneal space he becomes increasingly hypovolemic and has rebound tenderness upon examination. Volume replacement has little effect. His only hope for survival is prompt evacuation to a treatment facility with surgical capabilities. Without surgical intervention (splenectomy) this casualty will die in approximately 60 minutes.

HPS States

Baseline	30 seconds then Class I Shock
Class I Shock	450 seconds then Class II Shock
Class II Shock	450 seconds then Class III Shock
Class III Shock	2400 seconds then Class IV Shock
Class IV Shock	Death in approx two minutes
Splenectomy	Entered upon being sent to surgery

This casualty does not respond to volume resuscitation unless splenectomy is done. He transitions to “splenectomy” after arriving at a treatment facility capable of a laporatomy *and* surgical intervention are selected.



Example Readings for Blunt Abdominal Injury

Baseline

HR- 71	ABP- 115/51
CO- 5.9	PAP- 28/14
SpO2- 99	CVP- 9

Class I Shock

HR- 84	ABP- 113/55
CO- 6.5	PAP- 28/16
SpO2- 99	CVP- 5

Class II Shock

HR- 113	ABP- 110/60
CO- 7.4	PAP- 27/18
SpO2- 99	CVP- 7

Class III Shock

HR- 125	ABP- 92/52

CO- PAP- 18/10
SpO2- 99 CVP- 0

Class IV Shock

HR- 145 ABP- 73/46
CO- 5.1 PAP- 16/12
SpO2- 99 CVP- 0
Death after 2.5 - 3 minutes in Class IV Shock

Splenectomy

> adds one Liter of volume
> Systemic vasculature resistance factor to 1.00 onset 5.00 min
> Heart rate factor to 1.00 onset 5.00 min

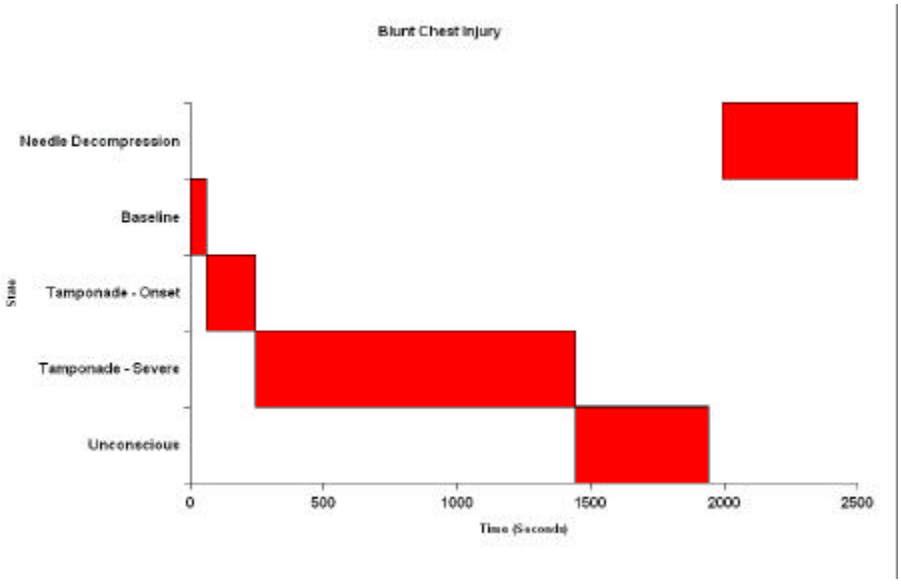
Blunt Chest Injury (pericardial tamponade)

The blast arrested the vehicle's forward motion and flipped it over on its top. The driver's chest struck the steering wheel. Upon inspection he has a bruise on his chest over the lower half of the sternum and well as a bruise on his left leg where it stuck the side of the vehicle during the rollover. He complains of soreness where he struck the steering wheel and a sharp localized pain with inspiration. As time progresses reports the chest pain becoming "sharper" with pain radiating to his neck. His respiratory rate increases and he has trouble breathing. He is anxious and lightheaded.

The force of the impact of his chest on the steering wheel fractured ribs immediately over his heart. The impact with the heart caused a small bleed into his pericardial sac. As the fluid accumulates his condition becomes more severe eventually leading to unconsciousness. The problem can be managed (temporarily) at any location with staff capable of a pericardiocentesis. (BAS, FST, of CSH). With the pressure in the pericardium relieved, the bleeding stops on its own and does not require surgical correction.

HPS States

Baseline	60 seconds	then	Tamponade – Onset
Tamponade – Onset	180 seconds	then	Tamponade – Severe
Tamponade – Severe	1200 seconds	then	Unconscious
Unconscious			
Needle Decompression	Entered upon needle decompression		



Example Readings for Blunt Chest Injury

Baseline

HR- 71	ABP- 114/51
CO- 5.9	PAP- 28/14
SpO2- 99	CVP-9

Tamponade - Onset

HR- 74	ABP- 108/51
CO- 5.6	PAP- 27/16
SpO2- 98	CVP- 9

Tamponade - Severe

HR- 86 (early)	ABP- 92/52 (early)
HR- 104 (late)	ABP- 74/50 (late)
CO- 4.5 (early)	PAP- 27/18 (early)
CO- 3.2 (late)	PAP-
SpO2- 98 (early)	CVP- 12 (early)
SpO2- 98 (late)	CVP- 16 (late)

Unconscious

HR- 104	ABP- 74/50
CO- 3.2	PAP- 27/22
SpO2- 98	CVP- 16

Needle Decompression

HR- 74	ABP- 114/51
CO- 6.0	PAP- 28/15
SpO2- 98	CVP- 9

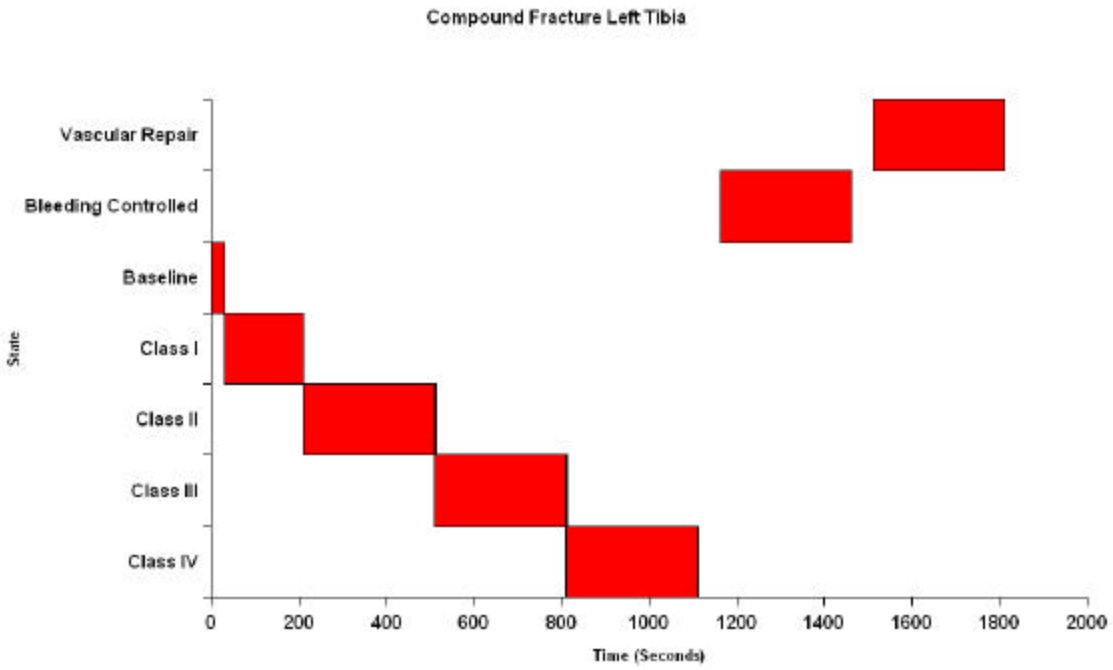
Compound Fracture of the Left Leg (tibia)

One of the four passengers riding in the rear of the HMMWV had his left foot and ankle wedged between two pieces of gear during the rollover while his torso twisted 180 degrees. The twisting of his left leg resulted in a compound, spiral fracture of his tibia. He did not sustain any other injuries. Upon examination he has significant external bleeding. His heart rate is elevated. His pedal pulse is absent on the left but he is neurologically intact.

The fractured tibia transected the popliteal artery. Without immediate application of a pressure dressing or tourniquet, he progresses through increasingly severe states of hypovolemic shock. Once the bleeding is properly managed, he responds well to volume replacement. Vascular repair is necessary to salvage the leg.

HPS States

Baseline	30 seconds	then to Class I Shock
Class I Shock	180 seconds	then to Class II Shock
Class II Shock	300 seconds	then to Class III Shock
Class III Shock	300 seconds	then to Class IV Shock
Class IV Shock		
Bleeding controlled	Entered upon pressure dressing / tourniquet	
Vascular repair	Entered upon being sent to surgery	



Example Readings for Compound Fracture of Left Tibia

Baseline

HR- 72	ABP- 116/52
CO- 6.0	PAP- 28/15
SpO2- 98	CVP- 8

Class I Shock

HR- 86	ABP- 114/56
CO- 6.5	PAP- 28/15
SpO2- 98	CVP- 8

Class II Shock

HR- 113	ABP- 111/62
CO- 7.3	PAP- 27/18
SpO2- 98	CVP- 7

Class III Shock

HR- 125	ABP- 92/51
CO- 6.7	PAP- 18/10
SpO2- 99	CVP- 0

Class IV Shock

HR- 144 (early)	ABP- 73/46 (early)
HR- 151 (late)	ABP- 54/34 (late)
CO- 5.2 (early)	PAP- 17/12 (early)
CO- 3.5 (late)	PAP- 10/6 (late)
SpO2- 99 (early)	CVP- 0 (early)
SpO2- 99 (late)	CVP- 0 (late)

Death after 2.5 - 3 minutes in Class IV Shock

Bleeding controlled

Vascular repair

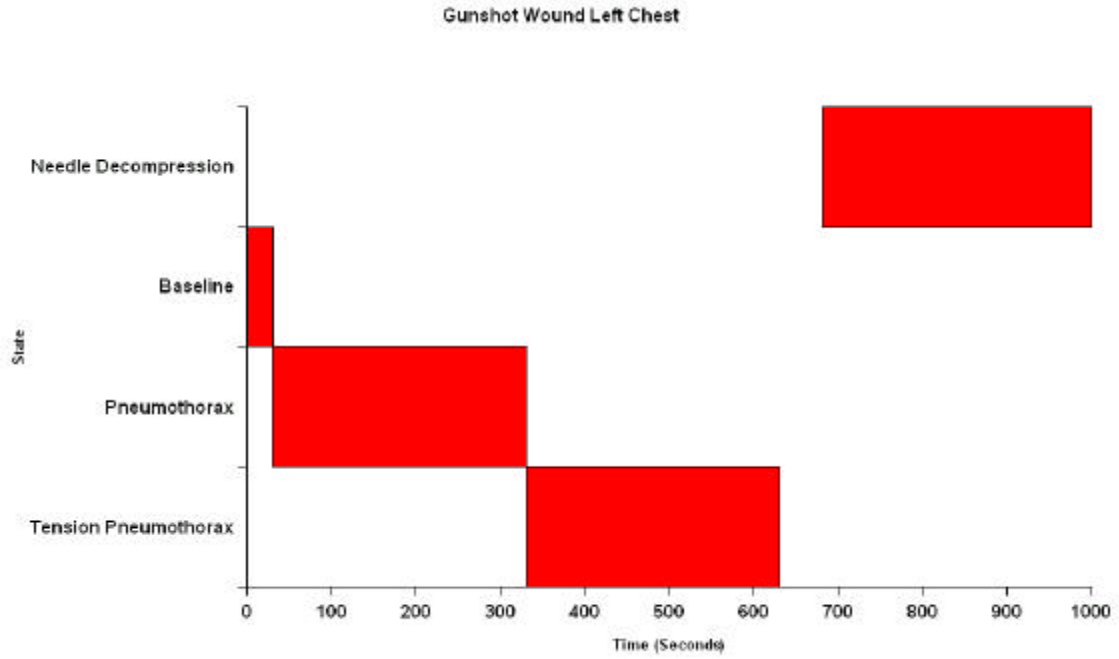
Gunshot wound to the Left Chest

The sniper hit one of the soldiers in the left chest. The bullet entered in left upper quadrant. The entrance wound is not grossly bleeding. No exit wound is found. Pulse is normal. Diminished breath sounds on the left. He remains conscious and over time begins taking more rapid, shallow breaths and complains of difficulty getting enough air. The rapid breathing is followed by tracheal deviation to the right and jugular venous distension.

The bullet missed his heart and large blood vessels but destroyed a portion of the upper lobe of the left lung leaving a significant opening between several larger bronchioles and the pleural space. Over time intra-thoracic pressure increases causing a tension pneumothorax. Treatment (needle decompression) can be done at any echelon. Once decompressed, the needle kinks or is clotted off with each transfer of the casualty until the needle decompression is replaced with a chest tube.

HPS States

Baseline	30 seconds	then to pneumothorax
Pneumothorax	300 seconds	then to tension pneumothorax
Tension Pneumothorax		
Needle Decompression	Entered upon needle decompression	



Example of Readings for Gunshot wound to the Left Chest

Baseline

HR- 72	ABP- 116/53
CO- 6.0	PAP- 28/15
SpO2- 98	CVP- 8

Pneumothorax

HR- 88	ABP- 107/62
CO- 5.5	PAP- 36/32
SpO2- 92	CVP- 25

Tension Pneumothorax

HR- 106	ABP- 84/60
CO- 3.2	PAP- 51/40
SpO2- 85	CVP- 43

Needle Decompression

HR- 79	ABP- 113/52
CO- 6.2	PAP- 29/14
SpO2- 96	CVP- 8

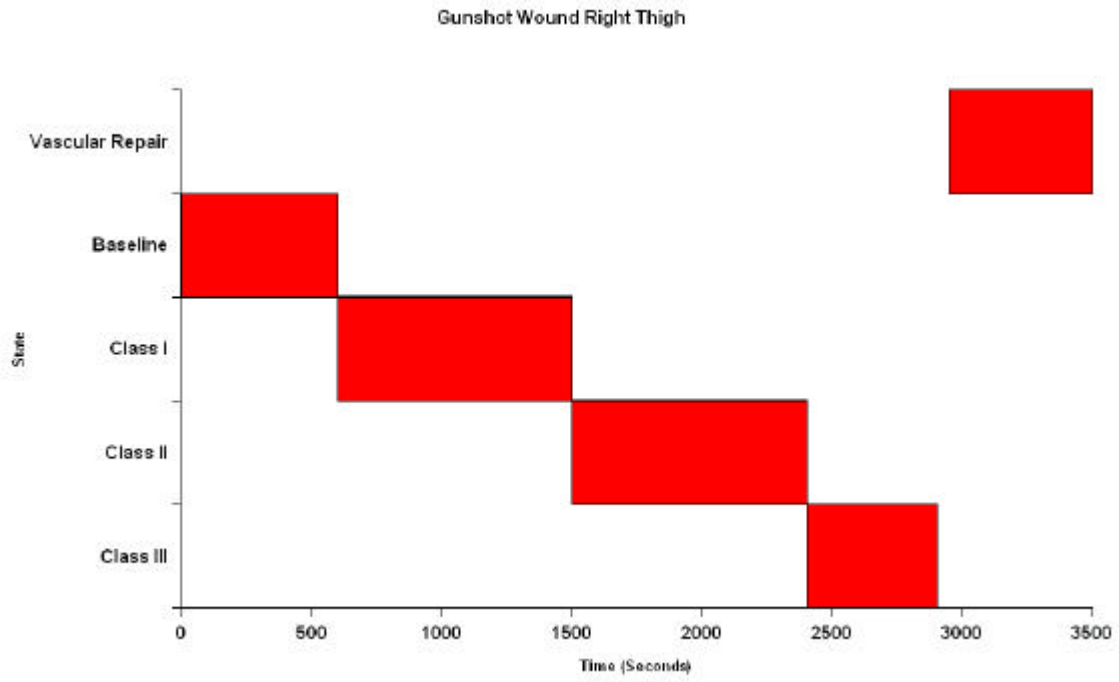
Gunshot wound to the Right Thigh (Femoral artery bleed)

The sniper's first bullet hit one of the soldiers in the left upper thigh. The entrance wound located in the high anterior-medial portion the midline is bleeding profusely. An exit wound is found on the mid-portion of the left gluteus. Popliteal and pedal pulses are absent in the injured leg. The solider is initially coherent but becomes confused then loses consciousness, as he becomes increasing hypotensive.

The bullet clipped the femoral artery. Direct pressure, a pressure dressing or tourniquet are not effective. He continues to bleed internally regardless of attempts to stop the bleeding externally and does not respond to volume resuscitation. His only chance of survival is to be evacuated to a treatment facility capable of surgical intervention (vascular repair).

HPS States

Baseline	600 seconds
Class I Shock	900 seconds
Class II Shock	900 seconds
Class III Shock	
Vascular repair	Entered upon being sent to surgery



Example of Readings for Gunshot wound to the Right Thigh

Baseline

HR- 156	ABP- 88/74
CO- 2.3	PAP- 6/4
SpO2- 98	CVP- 0

Class I Shock

HR- 180	ABP- 85/72
CO- 2.3	PAP- 6/4
SpO2- 98	CVP- 0

Class II Shock

HR- 180	ABP- 83/71
CO- 2.3	PAP- 7/5
SpO2- 98	CVP- 0

Class III Shock

HR- 180	ABP- 62/50

CO- 2.2 PAP- 8/7
SpO2- 98 CVP- 0
Vascular Repair

Closed Head Injury

One of the soldiers riding in the rear of the first HMMWffV was thrown against the metal frame of the vehicle. His head struck a metal post creating a small laceration and significant bruising. He suffered a brief loss of consciousness and reports both neck and head pain. After 5 minutes he loses consciousness.

His underlying injury is a cerebral contusion. He intra-cranial pressure increases over that courses of the scenario. His best chance of survival is evacuation to a treatment facility with an intensive care unit.

HPS States

Baseline	300 seconds
Unconscious	300 seconds
Level I ICP	
Level II ICP	
Level III ICP	

Example Readings for Head Injury

Baseline
HR- 72 ABP- 115/51
CO- 6.0 PAP- 28/15
SpO2- 98 CVP- 9
Unconscious
HR- 72 ABP- 115/51
CO- 6.0 PAP- 28/14
Level I ICP
Level II ICP
Level III ICP

Appendix K:
Evaluation Criteria for the Individual Components of the CTPS System:
Casualty Handler Assessment Form

Capability #1: Successfully instantiate casualties at any casualty treatment station

Casualty Collection Point	❑ pass	❑ fail	❑ n/a
Ground Ambulance	❑ pass	❑ fail	❑ n/a
Battalion Aid Station	❑ pass	❑ fail	❑ n/a
Forward Surgical Team	❑ pass	❑ fail	❑ n/a
Air Ambulance	❑ pass	❑ fail	❑ n/a
Combat Support Hospital	❑ pass	❑ fail	❑ n/a

Comments:

Capability #2: Successfully develop, track, and execute scenarios that can be applied to a given casualty

Scenario editor: Create new scenario	❑ pass	❑ fail	❑ n/a
Scenario editor: Edit scenario	❑ pass	❑ fail	❑ n/a
Scenario editor: Save scenario	❑ pass	❑ fail	❑ n/a
Scenario player: Start scenario	❑ pass	❑ fail	❑ n/a
Scenario player: Pause scenario	❑ pass	❑ fail	❑ n/a
Scenario player: Restart scenario	❑ pass	❑ fail	❑ n/a
Scenario player: Save physiology	❑ pass	❑ fail	❑ n/a
Scenario player: Observe physiological state by heads up display (real time feedback)	❑ pass	❑ fail	❑ n/a

Comments:

Capability #3: Successfully monitor the location and status of casualties across the battlefield

Blunt abdominal injury: Locations	❑ pass	❑ fail	❑ n/a
Blunt abdominal injury: Status	❑ pass	❑ fail	❑ n/a
Blunt chest injury: Locations	❑ pass	❑ fail	❑ n/a
Blunt chest injury: Status	❑ pass	❑ fail	❑ n/a
Compound fracture of the left leg: Locations	❑ pass	❑ fail	❑ n/a
Compound fracture of the left leg: Status	❑ pass	❑ fail	❑ n/a
Gunshot wound to the left chest: Locations	❑ pass	❑ fail	❑ n/a
Gunshot wound to the left chest: Status	❑ pass	❑ fail	❑ n/a
Gunshot wound to the left thigh: Locations	❑ pass	❑ fail	❑ n/a
Gunshot wound to the left thigh: Status	❑ pass	❑ fail	❑ n/a
Closed head injury: Locations	❑ pass	❑ fail	❑ n/a
Closed head injury: Status	❑ pass	❑ fail	❑ n/a

Comments:

Capability #4: Successfully transfer casualties from one to another

CCP to GEVAC	❑ pass	❑ fail	❑ n/a
CCP to AIREVAC	❑ pass	❑ fail	❑ n/a
GEVAC to BAS	❑ pass	❑ fail	❑ n/a
GEVAC to FST	❑ pass	❑ fail	❑ n/a
GEVAC to AIREVAC	❑ pass	❑ fail	❑ n/a
GEVAC to CSH	❑ pass	❑ fail	❑ n/a
AIREVAC to BAS	❑ pass	❑ fail	❑ n/a
AIREVAC to FST	❑ pass	❑ fail	❑ n/a
AIREVAC to CSH	❑ pass	❑ fail	❑ n/a

Comments:

Capability #5: Successfully pause/save/restart a simulation exercise

Blunt Abdominal Injury: Load	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: Pause	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: Play	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: Save Physiology	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: Load	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: Pause	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: Play	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: Save Physiology	❑ pass	❑ fail	❑ n/a
Compound Fracture of Left Leg: Load	❑ pass	❑ fail	❑ n/a
Compound Fracture of Left Leg: Pause	❑ pass	❑ fail	❑ n/a
Compound Fracture of Left Leg: Play	❑ pass	❑ fail	❑ n/a
Compound Fracture of Left Leg: Save Physiology	❑ pass	❑ fail	❑ n/a
Gunshot wound to left chest: Load	❑ pass	❑ fail	❑ n/a
Gunshot wound to left chest: Pause	❑ pass	❑ fail	❑ n/a
Gunshot wound to left chest: Play	❑ pass	❑ fail	❑ n/a
Gunshot wound to left chest: Save Physiology	❑ pass	❑ fail	❑ n/a
Gunshot wound to left thigh: Load	❑ pass	❑ fail	❑ n/a
Gunshot wound to left thigh: Pause	❑ pass	❑ fail	❑ n/a
Gunshot wound to left thigh: Play	❑ pass	❑ fail	❑ n/a
Gunshot wound to left thigh: Save Physiology	❑ pass	❑ fail	❑ n/a
Closed head injury: Load	❑ pass	❑ fail	❑ n/a
Closed head injury: Pause	❑ pass	❑ fail	❑ n/a
Closed head injury: Play	❑ pass	❑ fail	❑ n/a
Closed head injury: Save Physiology	❑ pass	❑ fail	❑ n/a

Comments:

Appendix L:
Evaluation Criteria for the Individual Components of the CTPS System:
Triage Controller Assessment Form

Capability #1: Successfully assess multiple casualties

CCP: 5 virtual casualties and 1 casualty on PHS unit	❑ pass	❑ fail	❑ n/a
CCP: 6 virtual casualties	❑ pass	❑ fail	❑ n/a
GEVAC: 5 virtual casualties and 1 casualty on PHS unit	❑ pass	❑ fail	❑ n/a
GEVAC: 6 virtual casualties	❑ pass	❑ fail	❑ n/a
BAS: 5 virtual casualties and 1 casualty on PHS unit	❑ pass	❑ fail	❑ n/a
BAS: 6 virtual casualties	❑ pass	❑ fail	❑ n/a
FST: 5 virtual casualties and 1 casualty on HPS unit	❑ pass	❑ fail	❑ n/a
FST: 6 virtual casualties	❑ pass	❑ fail	❑ n/a
AIREVAC: 5 virtual casualties and 1 casualty on PHS unit	❑ pass	❑ fail	❑ n/a
AIREVAC: 6 virtual casualties	❑ pass	❑ fail	❑ n/a
CSH: 5 virtual casualties and 1 casualty on HPS unit	❑ pass	❑ fail	❑ n/a
CSH: 6 virtual casualties	❑ pass	❑ fail	❑ n/a

Comments:

Capability #2: Allow user to successfully perform triage

Determine classification of each casualty, virtually: Minimal	❑ pass	❑ fail	❑ n/a
Determine classification of each casualty, virtually: Delayed	❑ pass	❑ fail	❑ n/a
Determine classification of each casualty, virtually: Immediate	❑ pass	❑ fail	❑ n/a
Determine classification of each casualty, virtually: Expectant	❑ pass	❑ fail	❑ n/a

Comments:

Apply immediate care, virtually: Apply tourniquet	❑ pass	❑ fail	❑ n/a
Apply immediate care, virtually: Apply pressure dressing	❑ pass	❑ fail	❑ n/a
Apply immediate care, virtually: Give volume	❑ pass	❑ fail	❑ n/a

Comments:

Re-assess patient, virtually: Primary Survey: Airway	❑ pass	❑ fail	❑ n/a
Re-assess patient, virtually: Primary Survey: Breathing	❑ pass	❑ fail	❑ n/a
Re-assess patient, virtually: Primary Survey: Circulation	❑ pass	❑ fail	❑ n/a
Re-assess patient, virtually: Primary Survey: Disability	❑ pass	❑ fail	❑ n/a
Re-assess patient, virtually: Primary Survey: Vital Signs: Pulse	❑ pass	❑ fail	❑ n/a
Re-assess patient, virtually: Primary Survey: Vital Signs: Blood Pressure	❑ pass	❑ fail	❑ n/a
Re-assess patient, virtually: Primary Survey: Vital Signs: Respiration Rate	❑ pass	❑ fail	❑ n/a
Re-assess patient, virtually: Secondary Survey: Temperature	❑ pass	❑ fail	❑ n/a
Re-assess patient, virtually: Secondary Survey: Inspection	❑ pass	❑ fail	❑ n/a
Re-assess patient, virtually: Secondary Survey: Auscultation	❑ pass	❑ fail	❑ n/a

Re-assess patient, virtually: Secondary Survey: Palpation	❑ pass	❑ fail	❑ n/a
Re-assess patient, virtually: Secondary Survey: Percussion	❑ pass	❑ fail	❑ n/a

Comments:

Capability #3: Successfully perform field lab tests

Forward Surgical Team: Chest x-ray	❑ pass	❑ fail	❑ n/a
Forward Surgical Team: Arterial blood gas analysis (ABG) ph, PaCO2, PaO2	❑ pass	❑ fail	❑ n/a
Combat Support Hospital: Chest x-ray	❑ pass	❑ fail	❑ n/a
Combat Support Hospital: Arterial blood gas analysis (ABG) ph, PaCO2, PaO2	❑ pass	❑ fail	❑ n/a

Comments:

Capability #4: Successfully extend the range of diagnostic and treatment options of the HPS unit

Diagnostic options: Visual presentation of the patient	❑ pass	❑ fail	❑ n/a
Diagnostic options: Text-based patient history	❑ pass	❑ fail	❑ n/a
Diagnostic options: Text-based responses to evaluation questions	❑ pass	❑ fail	❑ n/a
Diagnostic options: Text-based descriptions of visual inspection	❑ pass	❑ fail	❑ n/a
Diagnostic options: Text-based descriptions of auscultation (bowel sounds)	❑ pass	❑ fail	❑ n/a
Diagnostic options: Text-based descriptions of palpation	❑ pass	❑ fail	❑ n/a
Diagnostic options: Text-based descriptions of percussion	❑ pass	❑ fail	❑ n/a
Treatment options: Apply virtual tourniquet	❑ pass	❑ fail	❑ n/a
Treatment options: Apply virtual pressure dressing	❑ pass	❑ fail	❑ n/a
Treatment options: Give volume	❑ pass	❑ fail	❑ n/a
Treatment options: Forward Surgical Team: Send patient to virtual operating room	❑ pass	❑ fail	❑ n/a
Treatment options: Combat Support Hospital: Send patient to virtual operating room	❑ pass	❑ fail	❑ n/a

Comments:

Appendix M:
Evaluation Criteria for the Individual Components of the CTPS System:
After Action Review Assessment Form

Capability #1: Accurately record the time of injury

Blunt Abdominal Injury	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg	❑ pass	❑ fail	❑ n/a
Gunshot Wound to the Left Chest	❑ pass	❑ fail	❑ n/a
Gunshot Wound to the Left Thigh	❑ pass	❑ fail	❑ n/a
Closed Head Injury	❑ pass	❑ fail	❑ n/a

Comments:

Capability #2: Accurately record the location of the casualty in the battlespace

Blunt Abdominal Injury	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg	❑ pass	❑ fail	❑ n/a
Gunshot Wound to the Left Chest	❑ pass	❑ fail	❑ n/a
Gunshot Wound to the Left Thigh	❑ pass	❑ fail	❑ n/a
Closed Head Injury	❑ pass	❑ fail	❑ n/a

Comments:

Capability #3: Accurately record the time of treatment performed at each casualty treatment station

Blunt Abdominal Injury at CCP	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury in GEVAC	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury in AIREVAC	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury at BAS	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury at FST	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury at CSH	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury at CCP	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury in GEVAC	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury in AIREVAC	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury at BAS	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury at FST	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury at CSH	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg at CCP	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg in GEVAC	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg in AIREVAC	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg at BAS	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg at FST	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg at CSH	❑ pass	❑ fail	❑ n/a

Gunshot Wound to Left Chest at CCP	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest in GEVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest in AIREVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest at BAS	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest at FST	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest at CSH	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh at CCP	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh in GEVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh in AIREVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh at BAS	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh at FST	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh at CSH	❑ pass	❑ fail	❑ n/a
Closed Head Injury at CCP	❑ pass	❑ fail	❑ n/a
Closed Head Injury in GEVAC	❑ pass	❑ fail	❑ n/a
Closed Head Injury in AIREVAC	❑ pass	❑ fail	❑ n/a
Closed Head Injury at BAS	❑ pass	❑ fail	❑ n/a
Closed Head Injury at FST	❑ pass	❑ fail	❑ n/a
Closed Head Injury at CSH	❑ pass	❑ fail	❑ n/a

Comments:

Capability #4: Accurately record the type of treatment performed at each casualty treatment station

Blunt Abdominal Injury: CCP	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: GEVAC	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: AIREVAC	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: BAS	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: FST	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: CSH	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: CCP	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: GEVAC	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: AIREVAC	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: BAS	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: FST	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: CSH	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: CCP	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: GEVAC	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: AIREVAC	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: BAS	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: FST	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: CSH	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: CCP	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: GEVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: AIREVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: BAS	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: FST	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: CSH	❑ pass	❑ fail	❑ n/a

Gunshot Wound to Left Thigh: CCP	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh: GEVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh: AIREVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh: BAS	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh: FST	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh: CSH	❑ pass	❑ fail	❑ n/a
Closed Head Injury: CCP	❑ pass	❑ fail	❑ n/a
Closed Head Injury: GEVAC	❑ pass	❑ fail	❑ n/a
Closed Head Injury: AIREVAC	❑ pass	❑ fail	❑ n/a
Closed Head Injury: BAS	❑ pass	❑ fail	❑ n/a
Closed Head Injury: FST	❑ pass	❑ fail	❑ n/a
Closed Head Injury: CSH	❑ pass	❑ fail	❑ n/a

Comments:

Capability #5: Accurately develop a tracability report of the evacuation and movement throughout the battlefield

Blunt Abdominal Injury: CCP	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: GEVAC	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: AIREVAC	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: BAS	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: FST	❑ pass	❑ fail	❑ n/a
Blunt Abdominal Injury: CSH	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: CCP	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: GEVAC	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: AIREVAC	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: BAS	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: FST	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury: CSH	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: CCP	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: GEVAC	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: AIREVAC	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: BAS	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: FST	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg: CSH	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: CCP	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: GEVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: AIREVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: BAS	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: FST	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest: CSH	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh: CCP	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh: GEVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh: AIREVAC	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh: BAS	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh: FST	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh: CSH	❑ pass	❑ fail	❑ n/a

Closed Head Injury: CCP	❑ pass	❑ fail	❑ n/a
Closed Head Injury: GEVAC	❑ pass	❑ fail	❑ n/a
Closed Head Injury: AIREVAC	❑ pass	❑ fail	❑ n/a
Closed Head Injury: BAS	❑ pass	❑ fail	❑ n/a
Closed Head Injury: FST	❑ pass	❑ fail	❑ n/a
Closed Head Injury: CSH	❑ pass	❑ fail	❑ n/a

Comments:

Capability #6: Accurately record each casualty medical outcome

Blunt Abdominal Injury	❑ pass	❑ fail	❑ n/a
Blunt Chest Injury	❑ pass	❑ fail	❑ n/a
Compound Fracture of the Left Leg	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Chest	❑ pass	❑ fail	❑ n/a
Gunshot Wound to Left Thigh	❑ pass	❑ fail	❑ n/a
Closed Head Injury	❑ pass	❑ fail	❑ n/a

Comments:

Appendix N:
Evaluation of the Vendor Demonstration – Casualty Handler

1. Capability #1: Successfully instantiate casualties at any casualty treatment station

Casualty Collection Point

Responses	Count
Pass	2
Fail	0
n/a	0

2. Ground Ambulance

Responses	Count
Pass	2
Fail	0
n/a	0

3. Battalion Aid Station

Responses	Count
Pass	2
Fail	0
n/a	0

4. Forward Surgical Team

Responses	Count
Pass	2
Fail	0
n/a	0

5. Air Ambulance

Responses	Count
Pass	2
Fail	0
n/a	0

6. Combat Support Hospital

Responses	Count
pass	2
fail	0
n/a	0

7. Comments:

All patients and scenarios that are loaded from the casualty handler default to the CCP node. From this node, using the casualty handler, the patients/scenarios can be transferred to the other locations. The terminology of this capability implies that you can load a patient/scenario to any treatment station within the CTPS system initially. Actually, you can establish the patients at the CCP, transfer them to another location and then overlay the scenario onto the patient.

8. Capability #2: Successfully develop, track, and execute scenarios that can be applied to a given casualty

---

Scenario editor: Create new scenario

Responses	Count
pass	2
fail	0
n/a	0

9. Scenario editor: Edit scenario

Responses	Count
pass	2
fail	0
n/a	0

10. Scenario editor: Save scenario

Responses	Count
pass	2
fail	0
n/a	0

11. Scenario player: Start scenario

Responses	Count
pass	2
fail	0
n/a	0

12. Scenario player: Pause scenario

Responses	Count
pass	2
fail	0
n/a	0

13. Scenario player: Restart scenario

Responses	Count
pass	2
fail	0
n/a	0

14. Scenario player: Save physiology

Responses	Count
pass	1
fail	1
n/a	0

15. Scenario player: Observe physiological state by heads up display (real time feedback)

Responses	Count
pass	2
fail	0
n/a	0

16. Comments:

Attempts to save the physiology (i.e. save the scenario) resulting in the CTPS system locking the actual patient. The process of saving the physiology actually replicates the programming for that clinical state, and does not capture a "frozen state of time" the trauma injury. The utility of this feature appears to be best applied to modify an existing physiology and then adapting it to create another clinical scenario.

17. Capability #3: Successfully monitor the location and status of casualties across the battlefield

---

Blunt abdominal injury: Locations

Responses	Count
pass	2
fail	0
n/a	0

18. Blunt abdominal injury: Status

Responses	Count
pass	2
fail	0
n/a	0

19. Blunt chest injury: Locations

Responses	Count
pass	2
fail	0
n/a	0

20. Blunt chest injury: Status

Responses	Count
pass	2
fail	0
n/a	0

21. Compound fracture of the left leg: Locations

Responses	Count
pass	2
fail	0
n/a	0

22. Compound fracture of the left leg: Status

Responses	Count
pass	2
fail	0
n/a	0

23. Gunshot wound to the left chest: Locations

Responses	Count
pass	2
fail	0
n/a	0

24. Gunshot wound to the left chest: Status

Responses	Count
pass	2
fail	0
n/a	0

25. Gunshot wound to the left thigh: Locations

Responses	Count
pass	2
fail	0
n/a	0

26. Gunshot wound to the left thigh: Status

Responses	Count
pass	2
fail	0
n/a	0

27. Closed head injury: Locations

Responses	Count
pass	2
fail	0
n/a	0

28. Closed head injury: Status

Responses	Count
pass	2
fail	0
n/a	0

29. Comments:

The patient status is determined by the "heads-up" display on the casualty handler. This information is reported in a real time fashion, and does not provide historical information. In the phase 2 evaluation, it would be helpful to consider whether a exercise coordinator operating the casualty handler requires historical status information, or only real time information.

30. Capability #4: Successfully transfer casualties from one to another

---

CCP to GEVAC

Responses	Count
pass	2
fail	0
n/a	0

31. CCP to AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

32. GEVAC to BAS

Responses	Count
pass	2
fail	0
n/a	0

33. GEVAC to FST

Responses	Count
pass	2
fail	0
n/a	0

34. GEVAC to AIREVAC

Responses	Count
pass	0
fail	0
n/a	2

35. GEVAC to CSH

Responses	Count
pass	2
fail	0
n/a	0

36. AIREVAC to BAS **

Responses	Count
pass	0
fail	0
n/a	2

37. AIREVAC to FST

Responses	Count
pass	2
fail	0
n/a	0

38. AIREVAC to CSH

Responses	Count
pass	2
fail	0
n/a	0

39. Comments:

Transfers between the ground ambulance and the air evac and the air evac to the bas where not demonstrated by the vendor, because the "rules" of scenario overview do not allow these transfers to occur. The BAS is described as being surrounded by trees, and not in a terrain that allows for a helicopter landing. The reason for the limitation between the ground ambulance and the air ambulance is unclear.

40. Capability #5: Successfully pause/save/restart a simulation exercise

---

Blunt Abdominal Injury: Load

Responses	Count
pass	2
fail	0
n/a	0

41. Blunt Abdominal Injury: Pause

Responses	Count
pass	2
fail	0
n/a	0

42. Blunt Abdominal Injury: Play

Responses	Count
pass	2
fail	0
n/a	0

43. Blunt Abdominal Injury: Save Physiology

Responses	Count
pass	0
fail	1
n/a	1

44. Blunt Chest Injury: Load

Responses	Count
pass	2
fail	0
n/a	0

45. Blunt Chest Injury: Pause

Responses	Count
pass	2
fail	0
n/a	0

46. Blunt Chest Injury: Play

Responses	Count
pass	1
fail	0
n/a	0

47. Blunt Chest Injury: Save Physiology

Responses	Count
pass	0
fail	1
n/a	1

48. Compound Fracture of Left Leg: Load

Responses	Count
pass	2
fail	0
n/a	0

49. Compound Fracture of Left Leg: Pause

Responses	Count
pass	2
fail	0
n/a	0

50. Compound Fracture of Left Leg: Play

Responses	Count
pass	2
fail	0
n/a	0

51. Compound Fracture of Left Leg: Save Physiology

Responses	Count
pass	0
fail	1
n/a	1

52. Gunshot wound to left chest: Load

Responses	Count
pass	2
fail	0
n/a	0

53. Gunshot wound to left chest: Pause

Responses	Count
pass	2
fail	0
n/a	0

54. Gunshot wound to left chest: Play

Responses	Count
pass	2
fail	0
n/a	0

55. Gunshot wound to left chest: Save Physiology

Responses	Count
pass	0
fail	1
n/a	1

56. Gunshot wound to left thigh: Load

Responses	Count
pass	2
fail	0
n/a	0

57. Gunshot wound to left thigh: Pause

Responses	Count
pass	2
fail	0
n/a	0

58. Gunshot wound to left thigh: Play

Responses	Count
pass	2
fail	0
n/a	0

59. Gunshot wound to left thigh: Save Physiology

Responses	Count
pass	0
fail	1
n/a	1

60. Closed head injury: Load

Responses	Count
pass	2
fail	0
n/a	0

61. Closed head injury: Pause

Responses	Count
pass	2
fail	0
n/a	0

62. Closed head injury: Play

Responses	Count
pass	2
fail	0
n/a	0

63. Closed head injury: Save Physiology

Responses	Count
pass	0
fail	1
n/a	1

64. Comments:

Since the Save Physiology command had already caused the system to lock up, this action was not repeated for each clinical scenario.

Appendix O:
Evaluation of the Vendor Demonstration – Triage Controller

1. Capability #2: Allow user to successfully perform triage

Determine classification of each casualty, virtually: Minimal

Responses	Count
Pass	2
Fail	0
n/a	0

2. Determine classification of each casualty, virtually: Delayed

Responses	Count
Pass	2
Fail	0
n/a	0

3. Determine classification of each casualty, virtually: Immediate

Responses	Count
Pass	2
Fail	0
n/a	0

4. Determine classification of each casualty, virtually: Expectant

Responses	Count
Pass	2
Fail	0
n/a	0

5. Comments:

Assigning a text based triage classification was straightforward, and did allow a letter to appear adjacent to the patient name on the triage controller interface. More dramatic visual “cues” may be appropriate for this feature. In addition, audio “cues” for the arrival of a new patient at each “node” would prompt the healthcare provider to “virtual” situational awareness issues. A trainee could become so engaged with a single patient that he or she could miss the arrival of new casualties, due to the unobtrusive natures of the patient name and classification.

6. Apply immediate care, virtually: Apply tourniquet

Responses	Count
pass	2
fail	0
n/a	0

7. Apply immediate care, virtually: Apply pressure dressing

Responses	Count
pass	2
fail	0
n/a	0

8. Apply immediate care, virtually: Give volume

Responses	Count
pass	2
fail	0
n/a	0

9. Comments:

The triage controller interface lacks visual “cues” to indicate the application of immediate care. It would be beneficial to the end user if the diagrammatic display on the triage controller would update and display a tourniquet, pressure dressing or IV as an overlay to the initial diagram. These visual “cues” should be transmitted from one “node” to another, so that the healthcare providers at the next “node” could visually identify the virtual care that was previously given to the patient. The present text based solution meets the evaluation criteria, but may not be adequate or intuitive for the end user to quickly interpret information.

10. Re-assess patient, virtually: Primary Survey: Airway

Responses	Count
pass	2
fail	0
n/a	0

11. Re-assess patient, virtually: Primary Survey: Breathing

Responses	Count
pass	2
fail	0
n/a	0

12. Re-assess patient, virtually: Primary Survey: Circulation

Responses	Count
pass	2
fail	0
n/a	0

13. Re-assess patient, virtually: Primary Survey: Disability

Responses	Count
pass	2
fail	0
n/a	0

14. Re-assess patient, virtually: Primary Survey: Vital Signs: Pulse

Responses	Count
pass	2
fail	0
n/a	0

15. Re-assess patient, virtually: Primary Survey: Vital Signs: Blood Pressure

Responses	Count
pass	2
fail	0
n/a	0

16. Re-assess patient, virtually: Primary Survey: Vital Signs: Respiration Rate

Responses	Count
pass	2
fail	0
n/a	0

17. Re-assess patient, virtually: Secondary Survey: Temperature

Responses	Count
pass	2
fail	0
n/a	0

18. Re-assess patient, virtually: Secondary Survey: Inspection

Responses	Count
pass	2
fail	0
n/a	0

19. Re-assess patient, virtually: Secondary Survey: Auscultation

Responses	Count
pass	1
fail	1
n/a	0

20. Re-assess patient, virtually: Secondary Survey: Palpation

Responses	Count
pass	2
fail	0
n/a	0

21. Re-assess patient, virtually: Secondary Survey: Percussion

Responses	Count
pass	0
fail	1
n/a	1

22. Comments:

End users who are comfortable with a computer interface and possess strong mouse and keyboard skills should be able to accomplish the virtual assessments offered by the triage controller. However, since these skills are not necessarily technical requirements for a clinical healthcare provider, this feature should be reviewed carefully in phase 2 of this evaluation. The text-based information is displayed in a small font, which is could be difficult to read, and may not be readily apparent when it appears on screen. Visual “cues” are not as effective as they could be. Primary assessment elements are all present, however, as part of a secondary survey, percussion is not available. On one hand, how do you “percuss” virtually, yet, all other information is translated into a text-based description for a clinical assessment. Following this precedent, it seems that a test-based summary of chest percussion could be appropriately added to the assessment. The majority of the casualty scenarios did offer an opportunity to virtually “auscultate” for bowel sounds, yet the blunt abdominal injury scenario did not offer this secondary assessment elements. The presence or absence of bowel sounds would have a diagnostic value, therefore it is puzzling as to why this feature is not consistently available. There is a virtual “patient chart”, which allows the healthcare provider to add notes. The visual “cues” for the patient chart are limited, and rules or reminders about the patient chart are absent, as a patient can leave the triage controller without the end user being prompted about the existence of the patient chart, and the lack of notes for the individual case.

23. Capability #3: Successfully perform field lab tests

Forward Surgical Team: Chest x-ray

Responses	Count
pass	2
fail	0
n/a	0

24. Forward Surgical Team: Arterial blood gas analysis (ABG) ph, PaCO2, PaO2

Responses	Count
pass	2
fail	0
n/a	0

25. Combat Support Hospital: Chest x-ray

Responses	Count
pass	2
fail	0
n/a	0

26. Combat Support Hospital: Arterial blood gas analysis (ABG) ph, PaCO2, PaO2

Responses	Count
pass	2
fail	0
n/a	0

27. Comments:

The ability to perform filed lab tests and review virtual results is a beneficial feature of the triage controller at the forward surgical team and combat support hospital nodes. However, the limited number of lab tests to choose from forces the healthcare provider to make “correct” decisions by default, rather than due to good professional judgments. Additions to this feature displaying all the field tests that are “doctrinally available” at the node would provide a more robust training experience.

28. Capability #4: Successfully extend the range of diagnostic and treatment options of the HPS unit

---

Diagnostic options: Visual presentation of the patient

Responses	Count
pass	2
fail	0
n/a	0

29. Diagnostic options: Text-based patient history

Responses	Count
pass	2
fail	0
n/a	0

30. Diagnostic options: Text-based responses to evaluation questions

Responses	Count
pass	2
fail	0
n/a	0

31. Diagnostic options: Text-based descriptions of visual inspection

Responses	Count
pass	2
fail	0
n/a	0

32. Diagnostic options: Text-based descriptions of auscultation (bowel sounds)

Responses	Count
pass	1
fail	1
n/a	0

33. Diagnostic options: Text-based descriptions of palpation

Responses	Count
pass	2
fail	0
n/a	0

34. Diagnostic options: Text-based descriptions of percussion

Responses	Count
pass	1
fail	1
n/a	0

35. Treatment options: Apply virtual tourniquet

Responses	Count
pass	2
fail	0
n/a	0

36. Treatment options: Apply virtual pressure dressing

Responses	Count
pass	2
fail	0
n/a	0

37. Treatment options: Give volume

Responses	Count
pass	2
fail	0
n/a	0

38. Treatment options: Forward Surgical Team: Send patient to virtual operating room

Responses	Count
pass	2
fail	0
n/a	0

39. Treatment options: Combat Support Hospital: Send patient to virtual operating room

Responses	Count
pass	2
fail	0
n/a	0

40. Comments:

The visual presentation of the patient on the triage controller is primitive. Visual “cues” which display real-time updates of the physical presentation and interventions would be expected. Obtaining a patient history via text-based questions and answers requires keyboard skills that may not be second nature to all healthcare providers. Auscultation is not consistently available for all clinical scenarios, and percussion descriptions are lacking in all scenarios. The text-based comments are not accented, and may be difficult to read in the font they are presented. Comments on the triage controller for sending a specific patient (gunshot wound to the left thigh) were truncated on the interface, making information unavailable to the end user.

Appendix P:
Evaluation of the Vendor Demonstration – After Action Review

1. Capability #1: Accurately record the time of injury

Blunt Abdominal Injury

Responses	Count
Pass	2
Fail	0
n/a	0

2. Blunt Chest Injury

Responses	Count
Pass	2
Fail	0
n/a	0

3. Compound Fracture of the Left Leg

Responses	Count
Pass	2
Fail	0
n/a	0

4. Gunshot Wound to the Left Chest

Responses	Count
Pass	2
Fail	0
n/a	0

5. Gunshot Wound to the Left Thigh

Responses	Count
Pass	2
Fail	0
n/a	0

6. Closed Head Injury

Responses	Count
pass	2
fail	0
n/a	0

7. Comments:

The time recorded by the after action review is related to the time the patient/scenario are loaded, and not actual clock times. The after action review does not record patient injury and history automatically - it must

be recorded in the patient chart by the health care provider at the triage controller.

8. Capability #2: Accurately record the location of the casualty in the battlespace

Blunt Abdominal Injury

Responses	Count
pass	2
fail	0
n/a	0

9. Blunt Chest Injury

Responses	Count
pass	2
fail	0
n/a	0

10. Compound Fracture of the Left Leg

Responses	Count
pass	2
fail	0
n/a	0

11. Gunshot Wound to the Left Chest

Responses	Count
pass	2
fail	0
n/a	0

12. Gunshot Wound to the Left Thigh

Responses	Count
pass	2
fail	0
n/a	0

13. Closed Head Injury

Responses	Count
Pass	2
Fail	0
n/a	0

14. Comments:

The system "lock-up" caused by the save physiology command affected the after action review report as well. This means that a good AAR report is dependent on a stable system during training.

Appendix Q:

Independent Evaluation – Casualty Handler

1. Capability #1: Successfully instantiate casualties at any casualty treatment station

Casualty Collection Point

Responses	Count
pass	2
fail	0
n/a	0

2. Ground Ambulance

Responses	Count
pass	2
fail	0
n/a	0

3. Battalion Aid Station

Responses	Count
pass	2
fail	0
n/a	0

4. Forward Surgical Team

Responses	Count
pass	2
fail	0
n/a	0

5. Air Ambulance

Responses	Count
Pass	2
Fail	0
n/a	0

6. Combat Support Hospital

Responses	Count
Pass	2
Fail	0
n/a	0

7. Comments:

All pnts originate at the CCP as a default setting of the system. After the initial "instantiation", pnts can be moved with the CH to any treatment station. When patients are loaded into the CH, they appear as: Patient 1; Patient 2 etc...The next step is to overlay the clinical scenario onto each pnt. The display remains as Patient 1; Patient 2 etc on the CH, but they appear as patient names on the TC unit, in ascending order. Very confusing to track pnts from the CH to the TC units with these inconsistencies. Cannot determine a pnt name from the TC.

8. Capability #2: Successfully develop, track, and execute scenarios that can be applied to a given casualty

Scenario editor: Create new scenario

Responses	Count
pass	2
Fail	0
n/a	0

9. Scenario editor: Edit scenario

Responses	Count
pass	2
Fail	0
n/a	0

10. Scenario editor: Save scenario

Responses	Count
pass	2
Fail	0
n/a	0

11. Scenario player: Start scenario

Responses	Count
pass	2
Fail	0
n/a	0

12. Scenario player: Pause scenario

Responses	Count
pass	2
Fail	0
n/a	0

13. Scenario player: Restart scenario

Responses	Count
pass	2
Fail	0
n/a	0

14. Scenario player: Save physiology

Responses	Count
Pass	0
Fail	0
n/a	2
(Blank)	0

15. Scenario player: Observe physiological state by heads up display (real time feedback)

Responses	Count
Pass	2
Fail	0
n/a	0

16. Comments:

The save physiology feature was not tested, based on the results on the vendor demonstration. All other features performed correctly. The scenario player is used more frequently than the scenario editor, yet the default setting is for the scenario editor. This causes the operator of the CH unit to always have to click on the drop down menu and select the "scenario player" before stating any scenarios. Not a logical process for the exercise operator.
Head up display is busy, requires an adjustment by the user. Since the operator of the CH is the "exercise operator", he/she should be able to master this interface with practice. “Tabing” back and forth is cumbersome

17. Capability #3: Successfully monitor the location and status of casualties across the battlefield

Blunt abdominal injury: Locations

Responses	Count
Pass	2
Fail	0
n/a	0

18. Blunt abdominal injury: Status

Responses	Count
Pass	2
Fail	0
n/a	0

19. Blunt chest injury: Locations

Responses	Count
Pass	2
Fail	0
n/a	0

20. Blunt chest injury: Status

Responses	Count
pass	2
fail	0
n/a	0

21. Compound fracture of the left leg: Locations

Responses	Count
pass	2
fail	0
n/a	0

22. Compound fracture of the left leg: Status

Responses	Count
pass	2
fail	0
n/a	0

23. Gunshot wound to the left chest: Locations

Responses	Count
pass	2
fail	0
n/a	0

24. Gunshot wound to the left chest: Status

Responses	Count
pass	2
fail	0
n/a	0

25. Gunshot wound to the left thigh: Locations

Responses	Count
pass	2
fail	0
n/a	0

26. Gunshot wound to the left thigh: Status

Responses	Count
pass	2
fail	0
n/a	0

27. Closed head injury: Locations

Responses	Count
pass	2
fail	0
n/a	0

28. Closed head injury: Status

Responses	Count
pass	2
fail	0
n/a	0

29. Comments:

CH and CTPS system will lock if you try to move pnts too fast using the CH. You must wait until the pnt vitals begin to update again before you move another pnt between treatment stations. A alert box stating "please wait" would prevent the operation from "locking up" the system.

30. Capability #4: Successfully transfer casualties from one to another

CCP to GEVAC

Responses	Count
pass	2
fail	0
n/a	0

31. CCP to AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

32. GEVAC to BAS

Responses	Count
pass	2
fail	0
n/a	0

33. GEVAC to FST

Responses	Count
pass	2
fail	0
n/a	0

34. GEVAC to AIREVAC

Responses	Count
pass	2
Fail	0
n/a	0

35. GEVAC to CSH

Responses	Count
pass	2
fail	0
n/a	0

36. AIREVAC to BAS **

Responses	Count
pass	2
fail	0
n/a	0

37. AIREVAC to FST

Responses	Count
pass	2
fail	0
n/a	0

38. AIREVAC to CSH

Responses	Count
Pass	2
Fail	0
n/a	0

39. Comments:

With the CH, an operator can move a pnt from anywhere, to anywhere....even if the rules of the scenario don't allow this (i.e. AIREVAC to BAS). It also doesn't limit the number of pnts at any location (GEVAC & AIREVAC) the way the TC does. Might help the exercise planner at the CH to have more control...but may also cause confusion during a busy exercise. Using this override function, 6 patients could be placed on the AIREVAC TC. Because the AIREVAC treatment station CPU is also responsible for running the CH engine and the scenario processor, this "override" request did cause the system to lock up. AIREVAC is the "fragile" node in this configuration

40. Capability #5: Successfully pause/save/restart a simulation exercise

Blunt Abdominal Injury: Load

Responses	Count
pass	2
fail	0
n/a	0

41. Blunt Abdominal Injury: Pause

Responses	Count
pass	2
Fail	0
n/a	0

42. Blunt Abdominal Injury: Play

Responses	Count
pass	2
fail	0
n/a	0

43. Blunt Abdominal Injury: Save Physiology

Responses	Count
pass	0
fail	0
n/a	2

44. Blunt Chest Injury: Load

Responses	Count
Pass	2
Fail	0
n/a	0

45. Blunt Chest Injury: Pause

Responses	Count
Pass	2
Fail	0
n/a	0

46. Blunt Chest Injury: Play

Responses	Count
pass	2
fail	0
n/a	0

47. Blunt Chest Injury: Save Physiology

Responses	Count
pass	0
fail	0
n/a	2

48. Compound Fracture of Left Leg: Load

Responses	Count
pass	2
fail	0
n/a	0

49. Compound Fracture of Left Leg: Pause

Responses	Count
pass	2
fail	0
n/a	0

50. Compound Fracture of Left Leg: Play

Responses	Count
pass	2
fail	0
n/a	0

51. Compound Fracture of Left Leg: Save Physiology

Responses	Count
pass	0
fail	0
n/a	2

52. Gunshot wound to left chest: Load

Responses	Count
pass	2
fail	0
n/a	0

53. Gunshot wound to left chest: Pause

Responses	Count
pass	2
fail	0
n/a	0

54. Gunshot wound to left chest: Play

Responses	Count
pass	2
fail	0
n/a	0

55. Gunshot wound to left chest: Save Physiology

Responses	Count
pass	0
fail	0
n/a	2

56. Gunshot wound to left thigh: Load

Responses	Count
pass	2
fail	0
n/a	0

57. Gunshot wound to left thigh: Pause

Responses	Count
pass	2
fail	0
n/a	0

58. Gunshot wound to left thigh: Play

Responses	Count
pass	2
fail	0
n/a	0

59. Gunshot wound to left thigh: Save Physiology

Responses	Count
pass	0
fail	0
n/a	2

60. Closed head injury: Load

Responses	Count
pass	2
fail	0
n/a	0

61. Closed head injury: Pause

Responses	Count
pass	2
fail	0
n/a	0

62. Closed head injury: Play

Responses	Count
pass	2
fail	0
n/a	0

63. Closed head injury: Save Physiology

Responses	Count
pass	0
fail	0
n/a	2

64. Comments:

when selecting the pause command, the scenario pauses correctly, but the readout in the drop down menu still appear with the "play" command selected. This inconsistency may be visually confusing for the operator.

Appendix R:
Independent Evaluation – Triage Controller

1. Capability #1: Successfully assess multiple casualties

CCP: 5 virtual casualties and 1 casualty on PHS unit

Responses	Count
pass	2
fail	0
n/a	0

2. CCP: 6 virtual casualties

Responses	Count
pass	2
fail	0
n/a	0

3. GEVAC: 5 virtual casualties and 1 casualty on PHS unit

Responses	Count
pass	2
fail	0
n/a	0

4. GEVAC: 6 virtual casualties

Responses	Count
pass	2
fail	0
n/a	0

5. BAS: 5 virtual casualties and 1 casualty on PHS unit

Responses	Count
pass	2
fail	0
n/a	0

6. BAS: 6 virtual casualties

Responses	Count
pass	2
fail	0
n/a	0

7. FST: 5 virtual casualties and 1 casualty on HPS unit

Responses	Count
pass	2
fail	0
n/a	0

8. FST: 6 virtual casualties

Responses	Count
pass	2
fail	0
n/a	0

9. AIREVAC: 5 virtual casualties and 1 casualty on PHS unit

Responses	Count
pass	2
fail	0
n/a	0

10. AIREVAC: 6 virtual casualties

Responses	Count
pass	2
fail	0
n/a	0

11. CSH: 5 virtual casualties and 1 casualty on HPS unit

Responses	Count
pass	2
fail	0
n/a	0

12. CSH: 6 virtual casualties

Responses	Count
pass	2
fail	0
n/a	0

13. Comments:

All treatment stations accepted 6 simultaneous patients on the triage controller, and all were able to support 5 pnts on the TC and 1 on the HPS. This was done in part with the CH - the rules on the TC don't allow the GEVAC to accept more than 4 pnts, and the AIREVAC to accept more than 2
It takes 60 - 90 seconds to load a casualty onto the HPS unit from the TC

14. Capability #2: Allow user to successfully perform triage

Determine classification of each casualty, virtually: Minimal

Responses	Count
pass	2
fail	0
n/a	0

15. Determine classification of each casualty, virtually: Delayed

Responses	Count
pass	2
fail	0
n/a	0

16. Determine classification of each casualty, virtually: Immediate

Responses	Count
pass	2
fail	0
n/a	0

17. Determine classification of each casualty, virtually: Expectant

Responses	Count
pass	2
fail	0
n/a	0

18. Comments:

Once a triage status is set at the first treatment station, it remains with the patient as the casualty travels from one node to another. This may cause some confusion, as the pnt should be re-triaged at each location in relationship to the other patients at that location??

19. Apply immediate care, virtually: Apply tourniquet

Responses	Count
pass	2
fail	0
n/a	0

20. Apply immediate care, virtually: Apply pressure dressing

Responses	Count
pass	2
fail	0
n/a	0

21. Apply immediate care, virtually: Give volume

Responses	Count
pass	2
fail	0
n/a	0

22. Comments:

All of these treatments can be accomplished with mouse clicks. It would be helpful if the visual representation of the pnt on the TC would update to show a pressure dressing, tourniquet or IV. Doesn't specific where the pressure dressing is placed....which should be self-evident with these scenarios, but could become confusing with more complex medical presentations

23. Re-assess patient, virtually: Primary Survey: Airway

Responses	Count
pass	2
fail	0
n/a	0

24. Re-assess patient, virtually: Primary Survey: Breathing

Responses	Count
pass	2
fail	0
n/a	0

25. Re-assess patient, virtually: Primary Survey: Circulation

Responses	Count
pass	2
fail	0
n/a	0

26. Re-assess patient, virtually: Primary Survey: Disability

Responses	Count
pass	2
fail	0
n/a	0

27. Re-assess patient, virtually: Primary Survey: Vital Signs: Pulse

Responses	Count
pass	2
fail	0
n/a	0

28. Re-assess patient, virtually: Primary Survey: Vital Signs: Blood Pressure

Responses	Count
pass	2
fail	0
n/a	0

29. Re-assess patient, virtually: Primary Survey: Vital Signs: Respiration Rate

Responses	Count
pass	2
fail	0
n/a	0

30. Re-assess patient, virtually: Secondary Survey: Temperature

Responses	Count
pass	2
fail	0
n/a	0

31. Re-assess patient, virtually: Secondary Survey: Inspection

Responses	Count
pass	2
fail	0
n/a	0

32. Re-assess patient, virtually: Secondary Survey: Auscultation

Responses	Count
pass	2
fail	0
n/a	0

33. Re-assess patient, virtually: Secondary Survey: Palpation

Responses	Count
pass	2
fail	0
n/a	0

34. Re-assess patient, virtually: Secondary Survey: Percussion

Responses	Count
pass	0
fail	0
n/a	2

35. Comments:

The airway is determined in part by asking the pnt questions. If a text-based response appears on the TC, it is implied that the patient has a patent airway. Inspection was inconsistent. In most scenarios, a pnt diagram was displayed, however both GSW presented with a photograph of the wound instead. Auscultation was inconsistent; bowel sounds were described for all scenarios except the blunt abdominal injury, which did not offer an option for the presence or absence of bowel sounds. Palpation is limited to the text-based descriptions offered on the TC screen. Percussion was not evaluated based upon the findings of the vendor demonstration.

36. Capability #3: Successfully perform field lab tests

Forward Surgical Team: Chest x-ray

Responses	Count
pass	2
fail	0
n/a	0

37. Forward Surgical Team: Arterial blood gas analysis (ABG) ph, PaCO2, PaO2

Responses	Count
pass	2
fail	0
n/a	0

38. Combat Support Hospital: Chest x-ray

Responses	Count
pass	2
fail	0
n/a	0

39. Combat Support Hospital: Arterial blood gas analysis (ABG) ph, PaCO2, PaO2

Responses	Count
pass	2
fail	0
n/a	0

40. Comments:

41. Capability #4: Successfully extend the range of diagnostic and treatment options of the HPS unit

Diagnostic options: Visual presentation of the patient

Responses	Count
pass	2
fail	0
n/a	0

42. Diagnostic options: Text-based patient history

Responses	Count
pass	2
fail	0
n/a	0

43. Diagnostic options: Text-based responses to evaluation questions

Responses	Count
pass	2
fail	0
n/a	0

44. Diagnostic options: Text-based descriptions of visual inspection

Responses	Count
pass	2
fail	0
n/a	0

45. Diagnostic options: Text-based descriptions of auscultation (bowel sounds)

Responses	Count
pass	2
fail	0
n/a	0

46. Diagnostic options: Text-based descriptions of palpation

Responses	Count
pass	2
fail	0
n/a	0

47. Diagnostic options: Text-based descriptions of percussion

Responses	Count
pass	1
fail	0
n/a	1

48. Treatment options: Apply virtual tourniquet

Responses	Count
pass	2
fail	0
n/a	0

49. Treatment options: Apply virtual pressure dressing

Responses	Count
pass	2
fail	0
n/a	0

50. Treatment options: Give volume

Responses	Count
pass	2
fail	0
n/a	0

51. Treatment options: Forward Surgical Team: Send patient to virtual operating room

Responses	Count
pass	2
fail	0
n/a	0

52. Treatment options: Combat Support Hospital: Send patient to virtual operating room

Responses	Count
pass	2
fail	0
n/a	0

53. Comments:

The visual presentation of the pnt was inconsistent, some cases a photograph, some cases a diagram. All text read outs on the TC were in a small font, no evident visual "keys" to attract your attention to them. All sentences had underscores between words....made interpretation of the small font difficult. Auscultation was available, except in the blunt abdominal injury. At the FST and CSH, all pnts could be sent to the OR, even if the injury did not warrant such treatment.

Appendix S:
Independent Evaluation – After Action Review

1. Capability #1: Accurately record the time of injury

Blunt Abdominal Injury

Responses	Count
pass	2
fail	0
n/a	0

2. Blunt Chest Injury

Responses	Count
pass	2
fail	0
n/a	0

3. Compound Fracture of the Left Leg

Responses	Count
pass	2
fail	0
n/a	0

4. Gunshot Wound to the Left Chest

Responses	Count
pass	2
fail	0
n/a	0

5. Gunshot Wound to the Left Thigh

Responses	Count
pass	2
fail	0
n/a	0

6. Closed Head Injury

Responses	Count
pass	2
fail	0
n/a	0

7. Comments:

Time is recorded relative to "start" of exercise, and not actual time of day.

8. Capability #2: Accurately record the location of the casualty in the battlespace

Blunt Abdominal Injury

Responses	Count
pass	2
fail	0

n/a	0

9. Blunt Chest Injury

Responses	Count
pass	2
fail	0
n/a	0

10. Compound Fracture of the Left Leg

Responses	Count
pass	2
fail	0
n/a	0

11. Gunshot Wound to the Left Chest

Responses	Count
pass	2
fail	0
n/a	0

12. Gunshot Wound to the Left Thigh

Responses	Count
pass	2
fail	0
n/a	0

13. Closed Head Injury

Responses	Count
pass	2
fail	0
n/a	0

14. Comments:

Locations can be accessed only by clicking on the "yellow" dot on the map - not very intuitive access on the AAR interface. Map itself is "too busy" to be informative.

15. Capability #3: Accurately record the time of treatment performed at each casualty treatment station

Blunt Abdominal Injury at CCP

Responses	Count
pass	2
fail	0
n/a	0

16. Blunt Abdominal Injury in GEVAC

Responses	Count
pass	2
fail	0
n/a	0

17. Blunt Abdominal Injury in AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

18. Blunt Abdominal Injury at BAS

Responses	Count
pass	2
fail	0
n/a	0

19. Blunt Abdominal Injury at FST

Responses	Count
pass	2
fail	0
n/a	0

20. Blunt Abdominal Injury at CSH

Responses	Count
pass	2
fail	0
n/a	0

21. Blunt Chest Injury at CCP

Responses	Count
pass	2
fail	0
n/a	0

22. Blunt Chest Injury in GEVAC

Responses	Count
pass	2
fail	0
n/a	0

23. Blunt Chest Injury in AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

24. Blunt Chest Injury at BAS

Responses	Count
pass	2
fail	0
n/a	0

25. Blunt Chest Injury at FST

Responses	Count
pass	2
fail	0
n/a	0

26. Blunt Chest Injury at CSH

Responses	Count
pass	2
fail	0
n/a	0

27. Compound Fracture of Left Leg at CCP

Responses	Count
pass	2
fail	0
n/a	0

28. Compound Fracture of Left Leg in GEVAC

Responses	Count
pass	2
fail	0
n/a	0

29. Compound Fracture of Left Leg in AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

30. Compound Fracture of Left Leg at BAS

Responses	Count
pass	2
fail	0
n/a	0

31. Compound Fracture of Left Leg at FST

Responses	Count
pass	2
fail	0
n/a	0

32. Compound Fracture of Left Leg at CSH

Responses	Count
pass	2
fail	0
n/a	0

33. Gunshot Wound to Left Chest at CCP

Responses	Count
pass	2
fail	0
n/a	0

34. Gunshot Wound to Left Chest in GEVAC

Responses	Count
pass	2
fail	0
n/a	0

35. Gunshot Wound to Left Chest in AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

36. Gunshot Wound to Left Chest at BAS

Responses	Count
pass	2
fail	0
n/a	0

37. Gunshot Wound to Left Chest at FST

Responses	Count
pass	2
fail	0
n/a	0

38. Gunshot Wound to Left Chest at CSH

Responses	Count
pass	2
fail	0
n/a	0

39. Gunshot Wound to Left Thigh at CCP

Responses	Count
pass	2
fail	0
n/a	0

40. Gunshot Wound to Left Thigh in GEVAC

Responses	Count
pass	2
fail	0
n/a	0

41. Gunshot Wound to Left Thigh in AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

42. Gunshot Wound to Left Thigh at BAS

Responses	Count
pass	2
fail	0
n/a	0

43. Gunshot Wound to Left Thigh at FST

Responses	Count
pass	2
fail	0
n/a	0

44. Gunshot Wound to Left Thigh at CSH

Responses	Count
pass	2
fail	0
n/a	0

45. Closed Head Injury at CCP

Responses	Count
pass	2
fail	0
n/a	0

46. Closed Head Injury in GEVAC

Responses	Count
pass	2
fail	0
n/a	0

47. Closed Head Injury in AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

48. Closed Head Injury at BAS

Responses	Count
pass	2
fail	0
n/a	0

49. Closed Head Injury at FST

Responses	Count
pass	2
fail	0
n/a	0

50. Closed Head Injury at CSH

Responses	Count
pass	2
fail	0
n/a	0

51. Comments:

All treatment times are relative to the "start" of the exercise and not actual time of day. Since the TC and the CH laptops clocks were not "synched" during the evaluation, this was a good feature!

52. Capability #4: Accurately record the type of treatment performed at each casualty treatment station

Blunt Abdominal Injury: CCP

Responses	Count
pass	2
fail	0
n/a	0

53. Blunt Abdominal Injury: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

54. Blunt Abdominal Injury: BAS

Responses	Count
pass	2
fail	0
n/a	0

55. Blunt Abdominal Injury: FST

Responses	Count
pass	2
fail	0
n/a	0

56. Blunt Abdominal Injury: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

57. Blunt Abdominal Injury: CSH

Responses	Count
pass	2
fail	0
n/a	0

58. Blunt Chest Injury: CCP

Responses	Count
pass	2
fail	0
n/a	0

59. Blunt Chest Injury: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

60. Blunt Chest Injury: BAS

Responses	Count
pass	2
fail	0
n/a	0

61. Blunt Chest Injury: FST

Responses	Count
pass	2
fail	0
n/a	0

62. Blunt Chest Injury: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

63. Blunt Chest Injury: CSH

Responses	Count
pass	2
fail	0
n/a	0

64. Compound Fracture of the Left Leg: CCP

Responses	Count
pass	2
fail	0
n/a	0

65. Compound Fracture of the Left Leg: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

66. Compound Fracture of the Left Leg: BAS

Responses	Count
pass	2
fail	0
n/a	0

67. Compound Fracture of the Left Leg: FST

Responses	Count
pass	2
fail	0
n/a	0

68. Compound Fracture of the Left Leg: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

69. Compound Fracture of the Left Leg: CSH

Responses	Count
pass	2
fail	0
n/a	0
(Blank)	0

70. Gunshot Wound to the Left Chest: CCP

Responses	Count
pass	2
fail	0
n/a	0

71. Gunshot Wound to the Left Chest: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

72. Gunshot Wound to the Left Chest: BAS

Responses	Count
pass	2
fail	0
n/a	0

73. Gunshot Wound to the Left Chest: FST

Responses	Count
pass	2
fail	0
n/a	0

74. Gunshot Wound to the Left Chest: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

75. Gunshot Wound to the Left Chest: CSH

Responses	Count
pass	2
fail	0
n/a	0

76. Gunshot Wound to the Left Thigh: CCP

Responses	Count
pass	2
fail	0
n/a	0

77. Gunshot Wound to the Left Thigh: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

78. Gunshot Wound to the Left Thigh: BAS

Responses	Count
pass	2
fail	0
n/a	0

79. Gunshot Wound to the Left Thigh: FST

Responses	Count
pass	2
fail	0
n/a	0

80. Gunshot Wound to the Left Thigh: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

81. Gunshot Wound to the Left Thigh: CSH

Responses	Count
pass	2
fail	0
n/a	0

82. Closed Head Injury: CCP

Responses	Count
pass	2
fail	0
n/a	0

83. Closed Head Injury: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

84. Closed Head Injury: BAS

Responses	Count
pass	2
fail	0
n/a	0

85. Closed Head Injury: FST

Responses	Count
pass	2
fail	0
n/a	0

86. Closed Head Injury: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

87. Closed Head Injury: CSH

Responses	Count
pass	2
fail	0
n/a	0

88. Comments:

All interventions given at the TC interface were recorded by the system automatically, and in the notes that were entered by the operator. Drugs administered to the pnt when they were instanted on HPS did not appear in the AAR. Unclear from the vendor documentation whether this was supposed to be supported by the AAR....an more detailed investigation will be made to determine if this was operator error or a software problem.

89. Capability #5: Accurately develop a tracability report of the evacuation and movement throughout the battlefield

Blunt Abdominal Injury: CCP

Responses	Count
pass	2
fail	0
n/a	0

90. Blunt Abdominal Injury: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

91. Blunt Abdominal Injury: BAS

Responses	Count
pass	2
fail	0
n/a	0

92. Blunt Abdominal Injury: FST

Responses	Count
pass	2
fail	0
n/a	0

93. Blunt Abdominal Injury: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

94. Blunt Abdominal Injury: CSH

Responses	Count
pass	2
fail	0
n/a	0

95. Blunt Chest Injury: CCP

Responses	Count
pass	2
fail	0
n/a	0

96. Blunt Chest Injury: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

97. Blunt Chest Injury: BAS

Responses	Count
pass	2
fail	0
n/a	0

98. Blunt Chest Injury: FST

Responses	Count
pass	2
fail	0
n/a	0

99. Blunt Chest Injury: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

100. Blunt Chest Injury: CSH

Responses	Count
pass	2
fail	0
n/a	0

101. Compound Fracture of the Left Leg: CCP

Responses	Count
pass	2
fail	0
n/a	0

102. Compound Fracture of the Left Leg: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

103. Compound Fracture of the Left Leg: BAS

Responses	Count
pass	2
fail	0
n/a	0

104. Compound Fracture of the Left Leg: FST

Responses	Count
pass	2
fail	0
n/a	0

105. Compound Fracture of the Left Leg: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

106. Compound Fracture of the Left Leg: CSH

Responses	Count
pass	2
fail	0
n/a	0

107. Gunshot Wound to the Left Chest: CCP

Responses	Count
pass	2
fail	0
n/a	0

108. Gunshot Wound to the Left Chest: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

109. Gunshot Wound to the Left Chest: BAS

Responses	Count
pass	2
fail	0
n/a	0

110. Gunshot Wound to the Left Chest: FST

Responses	Count
pass	2
fail	0
n/a	0

111. Gunshot Wound to the Left Chest: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

112. Gunshot Wound to the Left Chest: CSH

Responses	Count
pass	2
fail	0
n/a	0

113. Gunshot Wound to the Left Thigh: CCP

Responses	Count
pass	2
fail	0
n/a	0

114. Gunshot Wound to the Left Thigh: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

115. Gunshot Wound to the Left Thigh: BAS

Responses	Count
pass	2
fail	0
n/a	0

116. Gunshot Wound to the Left Thigh: FST

Responses	Count
pass	2
fail	0
n/a	0

117. Gunshot Wound to the Left Thigh: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

118. Gunshot Wound to the Left Thigh: CSH

Responses	Count
pass	2
fail	0
n/a	0

119. Closed Head Injury: CCP

Responses	Count
pass	2
fail	0
n/a	0

120. Closed Head Injury: GEVAC

Responses	Count
pass	2
fail	0
n/a	0

121. Closed Head Injury: BAS

Responses	Count
pass	2
fail	0
n/a	0

122. Closed Head Injury: FST

Responses	Count
pass	2
fail	0
n/a	0

123. Closed Head Injury: AIREVAC

Responses	Count
pass	2
fail	0
n/a	0

124. Closed Head Injury: CSH

Responses	Count
pass	2
fail	0
n/a	0

125. Comments:

The tracablilty view with the timeline was a good concept for an after action review teaching point. Movement of the timeline manually was the most successful part of this visual presentation. The map was acutally distracting to the complex information that was being displayed. All the information is being successfully displayed, but the graphical user interface needs to be improved.

126. Capability #6: Accurately record each casualty medical outcome

Blunt Abdominal Injury

Responses	Count
pass	2
fail	0
n/a	0

127. Blunt Chest Injury

Responses	Count
pass	2
fail	0
n/a	0

128. Compound Facture of the Left Leg

Responses	Count
pass	2
fail	0
n/a	0

129. Gunshot Wound to the Left Chest

Responses	Count
pass	2
fail	0
n/a	0

130. Gunshot Wound to the Left Thigh

Responses	Count
pass	2
fail	0
n/a	0

131. Closed Head Injury

Responses	Count
pass	2
fail	0
n/a	0

132. Comments:

Icons representing cardiac and respiratory alerts are presented in the AAR, however, there is no "key" or instructions when these icons appear.