

# Maryland, DC, Virginia Respond To Missouri Mock Earthquake



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Scenes from the National Disaster Medical System exercise.



## Responding to Missouri Mock Earthquake

On September 12 an earthquake devastated Missouri causing thousands of injuries and millions in property damage. The effects of the earthquake were felt in Maryland, DC, and northern Virginia when two days later approximately 600 victims were flown aboard huge military transport planes to Baltimore-Washington International Airport and Andrews Air Force Base. For five hours, hundreds of prehospital care providers, including more than 68 ambulance and 24 helicopter crews, and more than 100 communications personnel in the three-state area, worked feverishly in a cooperative effort to ensure that the 14 "waves" of patients were treated and transported to 40 area hospitals, where they would receive definitive care.

Fortunately, the earthquake was hypothetical—a scenario for the largest test of the National Disaster Medical System (NDMS), which was activated because the number and severity of injuries overwhelmed Missouri's medical facilities.

Some of the most critical resources utilized in the exercise were the fire departments and rescue squads whose operations are controlled by county or local governments. This core network of assets was further enriched by units from other organizations.

Coordinated by MIEMSS, the massive disaster exercise involved hundreds of Maryland, DC, and Virginia field providers and hospital personnel, as well as personnel from the military, federal agencies, AMTRAK, and support organizations such as the Red Cross. According to State EMS Director William E. Clark, "This exercise was the first military-civilian cooperative networking involving civilian prehospital, as well as civilian hospital, personnel."

Lt. General Quint Becker, Surgeon General of the U.S. Army, commented that it was one of the greatest exercises that he has been involved in. "It's absolutely essential in time of disaster that federal and state agencies and the civilian sector be tied together. We've demonstrated that with everyone assembled here and willing to work together that this is possible. The potential for saving lives is tremendous."

For the management of massive disasters, the combined assets of state and local EMS systems and of the military are essential. Each needs the other to be most effective during a disaster. For example, the military has large numbers of med-evac helicopters, ambulances, ambulance

buses, and huge medical transport planes (capable of carrying as many as 60 patients) that can be used during evacuation efforts nationally. But, as Major Lloyd Abbott (Chief of Plans, Operations, and Training Division at Walter Reed Army Medical Center and overall NDMS exercise coordinator) points out, you need the expertise of local people to maximize the best use of transportation and appropriate medical facilities in the region.

And operations go more smoothly if people know and have worked with one another prior to an actual disaster. Major Abbott says that there are plans to maintain dialog with participants throughout the year. "This was just an opening shot. We've spent a lot of time this year getting everyone to participate. Now we need to maintain that level of participation and do even more."

Because of the scope and complexity of the September 14th exercise, separate

articles follow on the events at BWI Airport and Andrews Air Force Base; the NDMS; disaster medical assistance teams (DMATs); the communication and computer linkages during the exercise; and transportation of the victims.

—Beverly Sopp



(Top—bottom) Moulaging disaster victims. Victims arrive aboard an Air Force C-130 transport plane. Capt. Stan Turner (military operations officer at BWI Airport) and Lt. Col. Charles Jordan (director of plans, training, and security at Walter Reed Army Medical Center) in front of moulage tent.



# National Disaster Medical System

When a disaster strikes, fire, ambulance, and rescue squads and hospitals from neighboring areas are usually on hand to aid in the evacuation and treatment efforts—the concept of mutual aid in action. But if the disaster is so great that the number and severity of casualties overwhelm local and state efforts to provide medical care, what then? The National Disaster Medical System (NDMS) is based on the concept of mutual aid between regions nationwide. When NDMS is activated, there will be a single nationally coordinated medical response to a peacetime disaster or national emergency.

The NDMS is a cooperative effort of the Department of Health and Human Services, the Department of Defense, the Federal Emergency Management Agency, the Veterans Administration, state and local governments, and the private sector. Its goal is to supplement—not to replace—state and local disaster efforts in three ways. First, it will provide an evacuation system comprised mainly of military aircraft to move patients quickly to any of the 71 urban areas where major health facilities are located (48 of these areas now participate in the system; it is hoped that the other 23 will soon participate). Second, it will provide approximately 150 disaster medical assistance teams (DMATs) throughout the nation ready to respond with equipment and supplies to provide on-the-scene aid and help “clear” patients from the disaster scene and to help assess and care for patients evacuated to any of the 71 receiving sites. Third, it will provide hospitalization in a national network of hospitals that have voluntarily pre-committed a total of 100,000 hospital beds in the event of a massive disaster.

The NDMS would be activated by the President after the governor of a state had requested federal assistance for medical aid or by the Department of Defense if military hospitals could not accommodate the casualties of an overseas armed conflict.

From the time NDMS is activated until patients are evacuated and enter hospitals at the various receiving sites, a defined call-down and notification procedure would be followed; for example, DMATs would be activated; bed status requested from the receiving hospitals for the categories of injuries of the disaster patients; operational centers for receiving and sorting patients established at various airports; state and local EMS agencies alerted to assist in transportation to the hospitals;

Red Cross and amateur radio personnel alerted; and so forth. During the September 14th exercise, approximately 24 hours was built into the scenario to accommodate these details; however, NDMS is working to shorten this response time.

The NDMS, administered by the U.S. Public Health Service, is an outgrowth of the 1981 Emergency Mobilization Preparedness Board established by President Ronald Reagan and an outgrowth of the  
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## UMAB Chancellor Helped Form NDMS

*Chancellor of the University of Maryland at Baltimore, Edward Brandt, Jr., MD, was chairman of the Principal Working Group on Health, part of the Emergency Mobilization Preparedness Board that was charged by President Ronald Reagan to develop the National Disaster Medical System. Chancellor Brandt's group actually developed the NDMS. His comments on the September 14th NDMS exercise follow.*

“The National Disaster Medical System has been designed to provide a mechanism for responding to disasters that result in so many casualties that the local medical care system is overwhelmed. It is a coordinated national system of local hospitals and health care providers. Planning for this began in 1981, and it is now

being implemented.

“Maryland is fortunate since in MIEMSS we have a statewide system to respond to the needs for care of victims of emergencies. It is only reasonable, therefore, that MIEMSS be a part of the National Disaster Medical System. Furthermore, it is only natural that MIEMSS be a leader in this system because of its long history of successful operation. I am delighted that MIEMSS has chosen to lead the way in implementation of this effort and that the first full-scale test was held in the Baltimore and Washington area.

“With MIEMSS' involvement and leadership, I have no doubts that the National Disaster Medical System will reduce the suffering and death that occur as a result of disasters such as earthquakes, major explosions, and so forth.”



DMAT reassesses a patient.



A portion of the helicopter fleet used during the exercise.

# Thanks to All Participants in NDMS Exercise

*MIEMSS appreciates the cooperation and work of all the following agencies and the many individuals involved in the September 14th NDMS exercise, particularly the two incident commanders Prince Georges County Fire Department Chief Jim Estepp and BWI Fire/Rescue Service Chief Rudy Sagan.*

## National Disaster Medical System

Department of Defense  
Department of Health & Human Services  
Federal Emergency Management Agency  
Veterans Administration

## Public Health Service Implementation Office

Bethesda & Rockville NDMS Clearing/Staging Units

Department of Defense, Tri-Service Medical Region 9, Metro-Washington  
Sub-Region, Regional Committee

Federal Aviation Administration

## AMTRAK

University of Maryland at Baltimore

National Study Center for Trauma and Emergency Medical Systems

Maryland State Firemen's Association

Maryland State Police

Baltimore City Police

## Maryland Department of Transportation

State Aviation Administration  
Baltimore-Washington International Airport  
BWI Fire/Rescue Service

Office of Emergency Health & Medical Services, Washington, D.C.

Atlantic Bell Systems

## American Red Cross

Alexandria, VA Chapter  
Arlington County, VA Chapter  
Baltimore Chapter  
District of Columbia Chapter  
Fairfax County, VA Chapter  
Frederick County, MD Chapter  
Montgomery County, MD Chapter  
Prince George County, VA Chapter  
Prince Georges County, MD Chapter  
Prince William County, VA Chapter

## Amateur Radio Emergency Services Organizations

Alexandria, VA  
Anne Arundel County, MD  
Arlington, VA  
Baltimore City, MD  
Baltimore County, MD  
District of Columbia  
Fairfax City, VA  
Fairfax County, VA  
Howard County, MD  
Montgomery County, MD  
Prince Georges County, MD  
Prince William County, VA  
Vienna, VA

## AMBULANCE/RESCUE/FIRE UNITS

### Annapolis Fire Department

Anne Arundel County, MD Fire Department  
Arundel Volunteer Fire Company  
Cape St. Claire Volunteer Fire Company  
Deale Volunteer Fire Company  
Ferndale Volunteer Fire Company  
Green Haven Volunteer Fire Company  
Jessup Volunteer Fire Company  
Maryland City Volunteer Fire Company  
Odenton Volunteer Fire Company  
Woodland Beach Volunteer Fire Company

### Baltimore City Fire Department

Baltimore County Fire Department  
Arbutus Volunteer Fire Company  
Cockeysville Volunteer Fire Company

### Calvert County, MD

2nd District Volunteer Rescue Squad

### Carroll County, MD

Mt. Airy Volunteer Fire Company  
Pleasant Valley Volunteer Fire Company  
Sykesville-Freedom District Volunteer Fire Company

### Charles County, MD

Hughesville Volunteer Rescue Squad  
Ironsides Volunteer Rescue Squad

### Fairfax County, VA Fire Department

### Frederick County, MD

Brunswick Volunteer Ambulance Company  
Junior Volunteer Fire Company  
Middletown Volunteer Fire Company

### Harford County, MD

Joppa-Magnolia Volunteer Fire Department

### Howard County, MD

Elkridge Volunteer Fire Department  
Ellicott City Volunteer Firemen's Association

### Montgomery County, MD

Bethesda-Chevy Chase Volunteer Rescue Squad  
Cabin John Volunteer Fire Department  
Sandy Spring Volunteer Fire Department

### Prince Georges County, MD Fire Department

Allentown Road Volunteer Fire Department  
Baden Volunteer Fire Department  
Bowie Volunteer Fire Department  
Brentwood Volunteer Fire Department  
District Heights Volunteer Fire Department  
Landover Hills Volunteer Fire Department  
Laurel Volunteer Rescue Squad  
Tuxedo-Cheverly Volunteer Fire Department  
West Lanham Hills Volunteer Fire Department

### St. Marys County, MD

Ridge Volunteer Rescue Squad

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Washington County, MD  
 Community Rescue Service  
 Washington County Civil Defense  
 Rescue Company  
 Williamsport Volunteer Ambulance  
 Service

Washington, DC Fire Department

## HOSPITALS

### Maryland

Anne Arundel General Hospital  
 Baltimore County General Hospital  
 Children's Hospital  
 Church Hospital  
 Crownsville Hospital Center  
 Doctors Hospital of Prince Georges  
 County  
 Francis Scott Key Medical Center  
 Franklin Square Hospital  
 Frederick Memorial Hospital  
 Greater Baltimore Medical Center  
 Greater Laurel Beltsville Hospital  
 Harford Memorial Hospital  
 Johns Hopkins Hospital  
 Leland Memorial Hospital  
 Lutheran Hospital of Maryland  
 Maryland General Hospital  
 Mercy Hospital  
 Montgomery General Hospital  
 North Arundel Community Hospital  
 Prince Georges County Hospital  
 Provident Hospital  
 St. Agnes Hospital of the City of  
 Baltimore  
 Shady Grove Adventist Hospital  
 South Baltimore General Hospital  
 Southern Maryland Hospital  
 Suburban Hospital  
 University of Maryland Hospital  
 University of Maryland Shock  
 Trauma Center

### Northern Virginia

Alexandria Hospital  
 Arlington Hospital  
 Commonwealth Doctors Hospital  
 Dominion Hospital  
 Fairfax Hospital  
 Mary Washington Hospital  
 Mt. Vernon Hospital  
 National Hospital for Orthopedics &  
 Rehabilitation Center  
 Northern Virginia Doctors Hospital  
 Potomac Hospital  
 Prince William Hospital  
 Tidewater Memorial Hospital

### Washington, DC

Capitol Hill Hospital  
 District of Columbia Hospital  
 Georgetown University Hospital  
 Greater Southeast Community  
 Hospital  
 Howard University Hospital  
 Providence Hospital  
 Sibley Memorial Hospital  
 Washington Hospital Center

## MILITARY

Veterans Administration Medical District 6  
 Washington, DC

Command Aviation Company (Composite)  
 Tipton Army Airfield  
 Ft. George Meade, MD

Malcolm Grow US Air Force Medical Center  
 Andrews Air Force Base, MD

Military District of Washington  
 Ft. McNair, Washington, DC  
 Ft. Meyers, VA

Naval Hospital Bethesda  
 Bethesda, MD

Naval Medical Command, National Capital  
 Region  
 Bethesda, MD

NDM/CMCHS Coordinating Team #206  
 US Naval Reserve  
 Washington, DC

US Army Transportation Center  
 Ft. Eustis, VA

US Coast Guard Air Station  
 Cape May, NJ

US Marine Corps Development and Educa-  
 tion Command  
 Quantico, VA

Walter Reed Army Medical Center  
 Washington, DC

Washington Navy Yard  
 Washington, DC

10th Aeromedical Staging Facility  
 Andrews Air Force Base, MD

22nd Medical Services Squadron  
 US Air Force Reserve  
 Andrews Air Force Base, MD

85th Medical Battalion  
 Ft. George Meade, MD

115th Mobile Army Surgical Hospital (MASH)  
 District of Columbia National Guard

146th Army National Guard  
 West Virginia Army National Guard  
 Parkersburg, WV

400th Medical Detachment (Aviation)  
 District of Columbia Army National Guard

459th Tactical Air Lift Wing  
 US Air Force Reserve  
 Andrews Air Force Base, MD

1776th Air Base Wing  
 Andrews Air Force Base, MD

2290th United States Army Hospital  
 97th US Army Reserve Command  
 Rockville, MD

## MEDIA/AUDIOVISUAL

US Army Audiovisual Center  
 US Naval Imaging Command  
 US Marine Corps Documentation Unit  
 Aerospace Audiovisual Service (USAF)  
 WBAL-TV, Baltimore  
 WDVM-TV, Washington, DC  
 WMAR-TV, Baltimore  
 Walter Reed Army Medical Center Televi-  
 sion Branch  
 Walter Reed Army Institute of Research,  
 Division of Medical Audiovisual Services

## What's a Disaster?

What does disaster mean to you? Is it personal—You cannot work—Your company cannot function? Is the disability permanent? Is it money—Paying hospital bills—Loss of contracts—Loss of time? Or is it more personal—Someone dear to you, your child, wife, or mother? Or . . .

Is it a community problem? Everyone involved—not knowing what to do— which way to turn—or where to go. Can someone help? Is there no escape? . . .

Community disasters are really many little disasters suddenly thrust upon us.

A fully coordinated and integrated system of emergency medical response is absolutely essential to our nation in order to reduce mortality and morbidity caused by massive disasters. This is why the implementation of the National Disaster Medical System (NDMS) plan is so important.

We have been fortunate in the United States, as compared to other parts of the world, when it comes to mass casualty incidents. You know, it really isn't a question of *if* it will happen in the United States but rather *when* it will occur. And we believe that the full implementation of the NDMS throughout the nation will better prepare us all to respond when the time comes. It benefits us all to support the NDMS and to do whatever we can to see that this system is fully implemented throughout the country.

*R Adams Cowley, MD  
 Director, MIEMSS*



*Dr. Cowley is interviewed by the news media.*

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Civilian Military Contingency Hospital System (CMCHS) created in 1980 so civilian hospitals would be used to treat military casualties exceeding the capability of military hospitals. All previous CMCHS agreements were incorporated into NDMS.

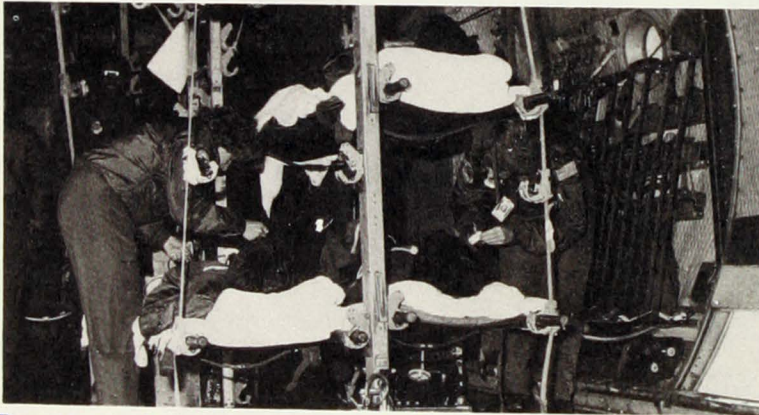
According to Tom Reutershan, director of NDMS, the September 14th exercise at BWI Airport and Andrews Air Force Base was the "biggest scale exercise seen so far." (Some sites of previous NDMS exercises have included Boston, Portland, and Los Angeles.) Viewing the exercise at BWI Airport, Mr. Reutershan said that it was "going outstandingly well. It's a prime example of the kind of cooperation that the national system is designed to foster—it involves the military, civilian, private, and government sectors. One thing basic about NDMS is that it's not creating any new organizations but getting the existing ones to work together."

In addition, since an NDMS exercise will satisfy hospital requirements for a disaster drill, he hopes that the disaster drills held by hospitals and communities in the future would be combined with and be part of NDMS exercises.

—Beverly Sopp



*Members of the DMAT offload patients.*



*Preparing to offload patients from the Air Force C-130 transport plane.*



*Chief Roger Simonds (EMS Division, Anne Arundel Co. Fire Dept.) and Lt. Gary Warren (EMS Division, Baltimore Co. Fire Dept.)*



*The Red Cross is essential for any disaster.*



*Chief Rudy Sagan (incident commander at BWI Airport) talks with Tom Reutershan (director, NDMS).*

# Baltimore-Washington International Airport

On September 14, it was "business as usual" at the Baltimore-Washington International Airport except for a portion of the north cargo area. There, by 7:50 am, military buses had been loaded with moulaged patients; other moulaged victims waited inside army tents, trying to keep warm in the 50 degree weather; army helicopters were lined up on one side of the tarmac, with ambulances from Regions II and III lined up at the other end; and the disaster medical assistance teams (DMATs) were in place. All the key people and components were ready, waiting for the disaster exercise to begin that would test the National Disaster Medical System (NDMS) and the Maryland Disaster Plan.

The disaster exercise that occurred was anything but typical. First, the "disaster" was not local. Seven "waves" of approximately 40 patients each began arriving from the hypothetical earthquake in Missouri that overwhelmed its local medical resources and resulted in the NDMS being activated. The DMATs, communication and computer components, and local fire, ambulance, and rescue squads worked to ensure that the "victims" were reassessed, treated, and transported as quickly as possible to more than 20 hospitals in Region III, as well as Frederick and Laurel. (Most of these hospitals were also testing their own disaster plans.)

The number of "victims" and agencies participating was also a first. Chief Rudy Sagan, incident commander at BWI Airport, noted that BWI Airport and local fire departments in Maryland have been doing disaster drills for years but never on this scale. "This was also the first time that we put together an exercise with so many agencies involved. And this is the first time we had a chance to try our concepts while working with the military."

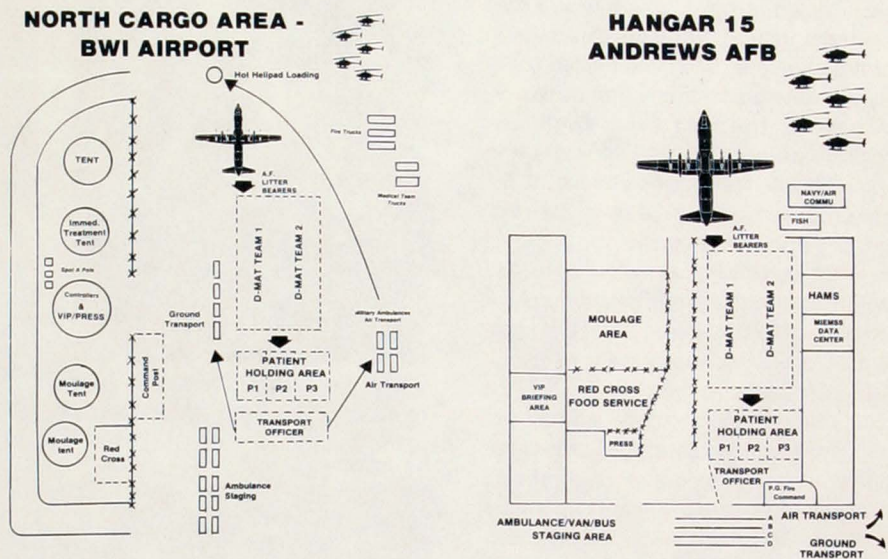
Intense preparations for the exercise had begun weeks ago. By 3 am on the day of the exercise, about 30 military personnel had left Walter Reed Hospital for BWI Airport to set up their moulage area and to start moulaging victims by 6 am. "Victims" included military personnel from nearby army bases and the DC National Guard.

Several waves of patients had arrived and been transported by the time a camouflaged U.S. Air Force C-130 transport plane landed at BWI Airport with 51 patients. Another wave of 40 patients was brought from a specially configured AMTRAK train and taken by bus to BWI Airport.

By 1 pm, the last of the almost 300 patients had been transported. Most participants felt that the exercise had gone well and that they could be of national assistance if the NDMS were activated. According to George Pelletier, MIEMSS

Region III administrator: "The exercise shows that if a disaster did occur, the state EMS system—with all its resources and people—obviously would be capable of handling a mass evacuation."

—Beverly Sopp



## — Andrews Air Force Base —

The first of seven waves of patients from an earthquake in Missouri "arrived" at 8:07 am at Andrews Air Force Base on September 14. This was one phase of the test of the National Disaster Medical System and of the Maryland Disaster Plan, which was occurring simultaneously at BWI Airport.

The patients were actually military personnel (active duty and reserves) who had been moulaged earlier that morning. These earthquake victims, with a variety of injuries, were carried on litters to the disaster medical assistance teams (DMATs) from the Public Health Service. The DMATs reassessed the previously triaged patients and gave any medical treatment necessary to stabilize them before transport. The patients were then taken to the holding area, from which they were transported according to the severity of their injuries.

The transportation officer and staging officer (from the Prince Georges County Fire Department) coordinated the movement of patients from the holding area to the ambulances and buses outside the hangar. These vehicles took the patients directly to hospitals in Maryland, Virginia, and Washington, DC, or to the Army, Coast Guard, Air Force, and West Virginia

National Guard helicopters waiting on the airfield.

More than 250 patients were transported during the four-hour drill. "It couldn't have gone smoother," said MIEMSS Region V Administrator Marie Warner. "The Prince Georges County Fire Department has done an outstanding, first-class job. We have had great support from all of the ambulance companies involved." The ambulance teams that participated in the drill at Andrews Air Force Base were from Calvert, Charles, Montgomery, Prince Georges, and St. Marys counties in Maryland as well as from Washington, DC, and Fairfax County, Virginia.

Chief Jim Estep of the Prince Georges County Fire Department was incident commander of the drill at Andrews Air Force Base. "MIEMSS and its personnel did an absolutely superb job, providing overall coordination of the best military/civilian disaster drill that this department has ever participated in," said Chief Estep. "The shakedown of our disaster plan and response capability provided us with an excellent opportunity to measure our effectiveness to handle large-scale emergencies."

—Linda Kesselring

## Disaster Medical Assistance Teams

One of the chief ways that the NDMS exercise at Baltimore-Washington International Airport and Andrews Air Force Base differed from other disaster exercises was that participants were not responding to victims at the actual disaster scene. The victims they treated on September 14 had been "flown" from Missouri where they had been injured two days earlier in an earthquake. Most had been treated previously at the disaster scene and were relatively stable. The main role of the disaster medical assistance teams (DMATs) was to rapidly assess the victims arriving at the two airports in order to identify the category and priority of injuries.

After receiving patients who had been transported from Missouri by plane and a specially configured AMTRAK train, the DMATs reassessed patients to ensure that each patient's previously reported status marked on the triage tag had not changed; identified those patients whose conditions had deteriorated or improved; and upgraded or downgraded priorities based on their new needs while simultaneously moving patients to the appropriate transport areas for rapid dispersal to appropriate trauma centers and hospitals.

Two DMATs were on the scene at each airport—at Andrews Air Force Base, Public Health Service personnel comprised the two teams; at BWI Airport, there was a MIEMSS team of civilian field providers as well as a Public Health Service team. According to Lou Jordan (MIEMSS) who, along with Ron Schaefer (MIEMSS), recruited and managed the field providers on the MIEMSS DMAT, "each team was equally efficient, operating with minor variances."

Each team had approximately 30–40 members, although team members rotated and were not all on the tarmac at the same time.

The MIEMSS DMAT (which is the first civilian DMAT in the nation) was a mix of four physicians, two nurses, two paramedics, four CRTs, and two administrative officers in addition to 15–25 field personnel who functioned mainly as litter bearers. Although some of the Public Health Service DMATs had experience in previous NDMS exercises, the MIEMSS DMAT had never practiced as a unified team before. But they had the advantage of being well versed in all the skills since they practice them daily as part of their own ambulance and rescue teams. The morning of the exercise, they met as a "team," with Mr. Jordan and Mr. Schaefer



*Chief Jim Estep (incident commander at Andrews AFB) working at the command post.*



*A DMAT attaches Maryland triage tags to patients.*



*Patients in the holding area.*

explaining the scope of the operation, setting the scenario, and stressing the importance of teamwork.

On the day of the exercise, each DMAT functioned the same way. The goal was to move the patients as quickly as possible from their arrival point through the DMAT area to the transportation officer. As the DMATs were reassessing the previously triaged patients, they assigned each patient a "Maryland" triage tag used throughout the Mid-Atlantic region and familiar to all prehospital and hospital personnel in the area; this tag gave a patient's current status. Looking at the patients, the DMAT physicians would determine that

some patients had deteriorated and needed immediate care to stabilize them. (The specific patient conditions that would deteriorate were not predetermined, but were left to the judgment of the physicians at the scene.) Stabilization procedures were performed quickly (for example, there were approximately 25 patients out of approximately 150 requiring immediate treatment by the MIEMSS DMAT, and the average length of time for treating each patient was five minutes). Those requiring corrective life-saving treatment included patients with blocked airways, those needing suctioning or bleeding control, or pain

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# DMATs

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medications. Stable patients were moved to the patient holding areas to await transport to area hospitals for definitive treatment.

Burt Kaplan, MD, medical officer for MIEMSS DMAT, recommends improving the entire process through a universal triage tag. "Then triage and tagging could be done before sending the patients. Electronics today make it feasible for us, while we're in the air, to get instant consultation for these patients during their two-hour trip. That's ample time to reevaluate all the patients and tag them, giving information as to what categories they're in and the hospitals where they would be transported. This would make it easier when the patients arrive."

One example of the speed and smoothness of the DMAT operations was the handling of the patients who arrived by AMTRAK. Several buses carrying the two DMAT teams arrived at the BWI AMTRAK station to transport the patients to BWI and the waiting ambulances and helicopters. The train was quickly emptied, the patients loaded on the buses, and the buses en route to BWI Airport. As soon as the patients were placed in the bus, the DMATs began evaluating and tagging each patient in the vehicle. Thus, the flow of patients from AMTRAK to the dispatch center was not delayed. The DMATs continued triaging during the 10-minute ride to BWI Airport. Three-quarters of the patients were moved immediately to priority areas and transported. The remaining patients were sorted as they left the buses. When patients arrived at the transportation area they were already categorized and prioritized—and this hastened the transportation process.

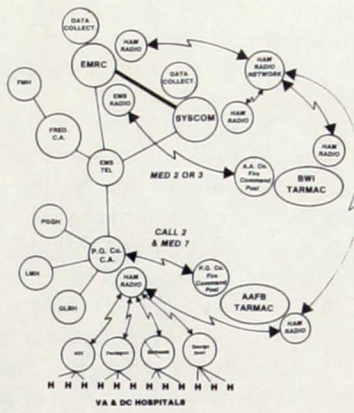
The DMATs at BWI Airport also coped with a real emergency. A patient arriving on the Air Force C-130 transport plane complained of numbness in his leg and after holding up his "red card" (given to each patient to indicate a true emergency) was promptly placed in a waiting ambulance. (Fortunately, the numbness was caused by a bandage that was too tight.)

With the NDMS exercise completed for the Maryland-DC-Virginia area, what becomes of the MIEMSS DMAT? There is discussion about developing civilian field teams throughout the nation, similar to Civil Defense teams—with summer training, uniforms, IDs, and a call-down system. Many members of the MIEMSS DMAT are hoping that this idea materializes.

—Beverly Sopp

# Communications, Computers

VOICE COM-NET



Four communications systems linked the many aspects of the combined three-state September 14th disaster drill. Those systems facilitated the movement of more than 500 patients through the exercise and created a final document that provides essential information about each disaster victim transported to this region.

Voice communication via radio was used by the transportation officers at the drill sites to relay patient information to EMRC from the command posts established by Anne Arundel (at BWI Airport) and Prince Georges (at Andrews Air Force Base) fire departments. When patients were leaving the staging areas, the transportation officer called EMRC with their estimated time of arrival at the designated hospital. "We were geared up for it," said Andy Pilarski, acting chief of communications operations for MIEMSS, "and the system worked very smoothly. This part of the drill was actually an extension of the emergency communications system that is used every day in Maryland."

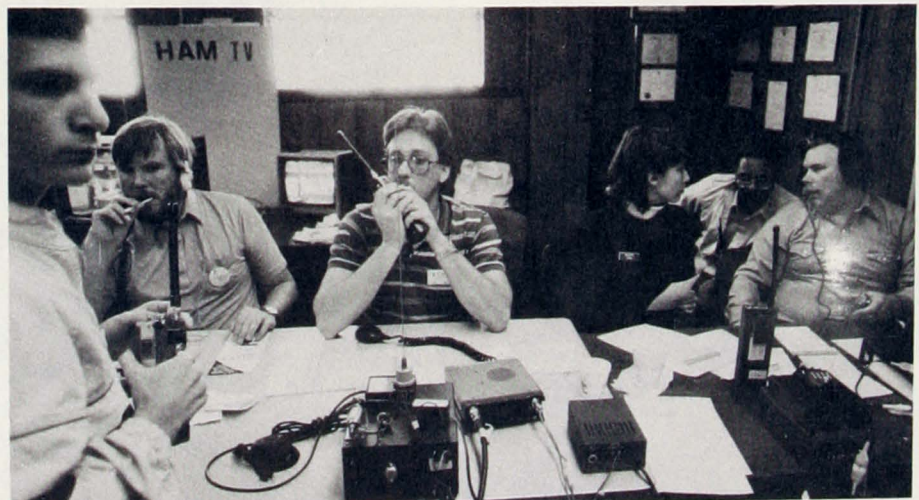
A data collection and communication system was used to tally the number of available hospital beds in the region and track patients from the staging areas to the receiving hospitals. According to Andy Trohanis, who was the data team leader at BWI Airport, and Tom Miller, who headed the overall data team operation for the drill, the system was composed of computers at BWI Airport and Andrews Air Force Base, which were linked by cellular, battery-operated telephones to computers at the MIEMSS Greene Street building as well as to SYSCOM and EMRC.

The first determination of hospital bed status was completed by noon on Friday, September 13, the same day that the call had been received from the Armed Services Medical Regulating Office (ASMRO) to announce the "disaster" in Missouri and initiate this test of the National Disaster Medical System and the Maryland Disaster Plan. The 40 participating hospitals were called from EMRC and SYSCOM to ascertain the number of available beds and the kinds of injuries that could be treated.

The information was entered on the computers at EMRC and SYSCOM, and the list was relayed to ASMRO. In an actual emergency, such a list would be used to determine how many patients with different types of injuries would be flown to a receiving site.

The hospital bed status was updated by 6 am on Saturday. The transportation officer at each site used this list to determine the destinations of patients. As patients left the scene by ambulance, the transportation teams noted their destina-

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Amateur radio operators were a back-up system for SYSCOM and EMRC.

## Communications, Computer Linkages

(Continued from page 9)

tions on the triage tags and took the tags to the computer operators for processing.

The information collected from the tags included the following: MIEMSS identification number, patient name, sex, social security number, type of injury, receiving hospital, mode of transportation, whether the patient was on a litter or was ambulatory, site of origin, and ASMRO code.

Such documentation has many important uses in a true emergency: (1) It is the source of information for answering inquiries from a patient's family and friends. (2) With further development, it will provide immediate updates on patient location and hospital bed status. (3) The final manifest would be used for payment of hospital costs, which is the responsibility of the federal government when the NDMS is implemented.

The data communication system at the drill (or emergency) sites can be completely portable. If electricity is not available, the computers, printers, and telephone linkages can operate on battery power.

The third communication system employed during the disaster drill was the amateur ("ham") radio network. Hams are trained and licensed in radio communication and, through the Amateur Radio Emergency Service, are organized for response during disasters.

During the disaster drill, hams at Andrews Air Force Base communicated with the participating hospitals that are not in the MIEMSS communication system. At BWI Airport, ham radio was ready as a back-up system for SYSCOM and EMRC.

Amateur radio was used to relay messages during the exercise and would have been fully activated if the other telephone and radio systems had been overloaded or had failed.

Dick Neat, MIEMSS director of communications who coordinated the communications effort during the drill, described the fourth communication network, which was provided by the Federal Emergency Management Agency (FEMA). FEMA supplied on-site telephone service at BWI Airport, unit-to-unit hand-held portable radios, and back-up helicopter ground-to-air communications as well as electricity to other agencies for their generator trailers.

Evaluation of the NDMS drill began immediately after the event. Modifications in several aspects of the communication systems are expected.

The ability to generate computer printouts of patient location and hospital bed status will be enhanced by a more adequate power supply for the computers

on site and by increasing the number of computer terminals at the sites.

Early in the drill, triage tags were not fully completed as patients were moved onto ambulances. The need for complete patient information for data entry was conveyed to the transportation teams and will be emphasized in future events.

The military helicopters that participated in this drill used a radio communication frequency that is not normally used in Maryland's emergency communication network. Therefore, telephone connections from the drill sites to the information center at MIEMSS and then to the hospitals were used to convey helicopter arrival times. Coordination of radio frequencies will improve this communication mechanism.

One of the benefits of an exercise of disaster plans is the opportunity to critique the systems, make appropriate adjustments, and thus improve response capability and patient care.

—Linda Kesselring



*Emergency operations command at BWI Airport.*



*Inputting patient data into the computer.*



*Forty patients arrived by AMTRAK.*



*Two methods of transportation used during the NDMS exercise.*



## Field Notes

By William E. Clark, State EMS Director

On Saturday, September 14, 1985, history was made when the largest test ever held of the National Disaster Medical System (NDMS) was conducted in a three-state area including Maryland, Northern Virginia, and the District of Columbia. But the real story was not just one of magnitude, but one of cooperation and sharing and coming together with one central purpose—saving lives on a massive scale.

We have been fortunate in this country when it comes to mass casualty incidents. One just has to look around the world to see so many instances where massive numbers of men, women, and children have been recently injured in various calamities. Examples such as the toxic materials leak in Bhopal, India, bombings in the Middle East, and the recent devastating earthquake in Mexico all resulted in medical emergencies that were overwhelming to the affected jurisdictions.

We all have disaster plans and they are regularly tested. But there comes a point where any local plan is simply overwhelmed because of the magnitude of the disaster. This is why the idea for the NDMS was conceptualized. The NDMS plan has three main objectives: to provide medical assistance to a disaster area in the form of medical assistance teams, medical supplies, and equipment; to evacuate patients who cannot be cared for in the area to designated locations elsewhere in the nation; and to provide hospitalization in a nationwide network of hospitals that have agreed to accept patients in the event of a

national emergency.

Under the leadership of the U.S. Public Health Service, the NDMS concept has been carefully developed and is now being implemented around the nation. But like so many things, going from theory into practice required incredible knowledge, skills, and cooperation. And this is the story behind the story.

In late June, Dr. Edward Brandt, the new chancellor of the University of Maryland at Baltimore, provided MIEMSS with information about the NDMS concept and encouraged us to become supportive of this effort. Within a few weeks, we met with leadership people at the Public Health Service, Federal Emergency Management Agency, Veterans Administration, and the Department of Defense to learn more about the NDMS and to offer our assistance in implementing the program.

From these meetings and with the full support of Chief Jim Estep came the idea to conduct a massive disaster exercise on September 14.

What we learned was that it took everybody to work together in a coordinated, sharing way to mobilize properly and respond to the scenario. Although the injuries were just make-believe, the realism of the exercise allowed everyone to get a feeling of what it might be like if it were the real thing.

The networking of all the assets was in itself tremendous. Many organizations and individuals came together to develop and facilitate the operational plan. Fire de-

partments, rescue squads, police, hospitals, the military, amateur radio operators, various federal and state agencies, the Red Cross, AMTRAK, and others all gave of their time and expertise to test the NDMS. And it worked. For those who were there at the two airports, the day will be long remembered. To see C-130 aircraft and an AMTRAK train arriving with victims, to witness nearly 600 moulaged patients being cared for by career and volunteer personnel, to see 24 helicopters and 68 ambulances transport the casualties to the 40 participating hospitals in a three-state area, and to see the hospitals mobilize internally to care for the influx of patients was truly awesome.

The lessons learned were many, providing everyone with a sense of purpose and resolve in being better prepared to effectively mobilize and respond to a true mass casualty situation.

One very important lesson that was reinforced by the exercise was the absolute importance of fire departments and rescue squads taking the leadership role in organizing and directing the prehospital phase. Their previous experience and ability to work well under extreme pressure proved conclusively their central role in the NDMS exercise.

On behalf of the NDMS and MIEMSS, I thank all who participated in the exercise for their tremendous support. Without you, this exercise could never have been done. With you, we are all better prepared to face the real thing.



(L-r) Col. Sam T. Seeley (chief of staff, Walter Reed Army Medical Center), Clifford Kendall (an operations manager for AMTRAK special trains), and Tom P. Reutershan (director, NDMS).



(L-r) Victor Esch, MD (FEMA), William E. Clark (State EMS Director of Maryland), Lt. Gen. Quint Becker, MD (U.S. Army Surgeon General), and Gen. Svend Trier (commanding general of NATO Medical Forces and director general of medical services of Danish Defense Command).

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## Transporting Patients during NDMS Exercise

Matchmakers were on the scene at Baltimore-Washington International Airport and Andrews Air Force Base during the NDMS exercise—but not matchmakers in the usual sense. The role of the transportation officers was essentially that of matching—matching patients arriving at the airports both with the hospitals that could best meet their needs and with the best method of transportation.

Roger Simonds (chief of the EMS division of Anne Arundel County Fire Department) and William Barnard (a captain in Prince Georges County Fire Department, who is with the Bureau of Advanced EMS) were transportation officers at BWI Airport and Andrews Air Force Base, respectively.

Because BWI Airport is located in Anne Arundel County, Chief Simonds and his EMS division are regularly involved in disaster drills at the airport. In many ways the transportation teams followed procedures done in previous disaster drills at BWI (for example, the traffic pattern was prescribed by BWI Airport's disaster plan); but the September 14th exercise was overwhelming in the number of people involved. However, according to Chief Simonds, they were able to pinpoint their mistakes and correct some of them with each new wave of patients. "We improved with practice and were also able to move each wave of patients more quickly. It took only 20 minutes for the seventh (and last) wave of 40 patients, and I'm sure we could have continued to cut our time even more."

Chief Jim Estopp of the Prince Georges County Fire Department, who was incident commander of the drill at Andrews Air Force Base, noted that there were some minor problems regarding their transportation operation but that "there really wasn't anything that wasn't corrected during the course of the exercise."

In terms of numbers, at BWI Airport there were 9 military aircraft and 31 ambulances (with 11 from Anne Arundel County and the rest from Annapolis City, Baltimore City, and Baltimore, Carroll, Frederick, Harford, Howard, and Washington counties). At Andrews AFB, there were 15 aircraft and 37 ambulances from Calvert, Charles, Montgomery, Prince Georges, and St. Marys counties in Maryland as well as from Washington, DC, and Fairfax County, Virginia).

Twenty hospitals received patients

from BWI Airport. By 6 am of the day of the disaster, each hospital had provided the number of beds it had available for each category of injury. However, throughout the day, it was difficult to update the 6 am listing and Chief Simonds pointed out that "in the future we need to streamline the process of obtaining an accurate bed check *during* the exercise."

During the exercise, the EMS portion of the Maryland Disaster Plan was tested as well as the NDMS. Chief Estopp said that it worked well and "proves that it's a viable document."

In general, Chief Simonds felt the exercise at BWI Airport had gone well and felt especially good about the cooperation of all the people and agencies involved. "The exercise was a tribute to all the people who put aside any turf problems and worked together for the common goal of saving lives." —*Beverly Sopp*



A military Chinook was used to transport many patients to local hospitals.