NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

PUBLIC HEARING
HELICOPTER EMERGENCY MEDICAL SERVICES

February 3 – 6, 2009

Hearing Summary

Helicopter emergency medical systems (HEMS) provide an important service to the public, transporting seriously ill patients or donor organs to emergency care facilities. However, the number of accident fatalities during HEMS operations has increased over the last several years, raising questions about the safety of these operations. From 2003 through 2008, 85 HEMS accidents claimed 77 lives, and 2008 was the deadliest year on record for HEMS operations with 8 fatal accidents and 29 fatalities, up from 2 fatal accidents and 7 fatalities in 2007.[1] This increase in fatalities and fatal accidents brought HEMS operations to the attention of Congress, the U.S. Government Accountability Office (GAO), and the National Transportation Safety Board (NTSB), as well as industry, the media, and the public. The Federal Aviation Administration (FAA) also took notice, and in 2005, created a "HEMS Task Force" after observing the spike in HEMS accidents. The resulting FAA analysis of HEMS accidents identified three primary safety concerns: inadvertent IMC encounters, night operations, and CFIT. As a result, the FAA took many actions, mostly to impose voluntary guidance, including issuance of FAA Notice 8000.293.

In an effort to examine the safety issues associated with HEMS operations, and to gather testimony from key players in the HEMS industry, the NTSB conducted a public hearing at its Board Room in Washington, D.C., on February 3, 4, 5, and 6, 2009. It was expected that the testimony recorded during the hearing would support the Board's development of appropriate safety recommendations and as the basis for future research to evaluate safety issues for which a clear understanding is not yet apparent.[2] The hearing called 41 witnesses representing HEMS operators, industry associations, manufacturers, and hospitals. Witnesses included helicopter pilots, medical doctors, regulators and policy makers, first responders, flight dispatchers, flight nurses, flight paramedics, administrators, and inspectors. Witnesses were queried in regard to the following issues:

- HEMS industry growth, which has been significant in recent years, and how this growth might increase competitive pressure to conduct flights.
- Flight operations procedures, including flight planning, weather minimums, and preflight risk assessment.
- Safety-enhancing technologies, such as Terrain Awareness and Warning Systems (TAWS) and night vision imaging systems.
- Flight recorders.

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[1] The NTSB classifies an EMS accident as *one in which the accident flight involves an aircraft dedicated to air medical operations, is configured for such operations, and is piloted by a dedicated EMS flight crew*. All three of these criteria are required to classify an aircraft accident as an EMS accident.

[2] The NTSB is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States, as well as significant accidents in the other modes of transportation, to determine the probable cause of these accidents, and to issue recommendations that will lead to improvements in transportation safety. To dispatch its duties, the NTSB is authorized to conduct public hearings for the purpose of gathering background information. The Board derives its authority from Title 49 of the United States Code, Chapter 11.

- Quality assurance programs.
- Training, including the use of flight simulators.
- Corporate and government oversight and safety management systems.

The hearing was conducted by a Board of Inquiry chaired by NTSB Member Robert L. Sumwalt. Also serving on the Board of Inquiry were Thomas E. Haueter, Director of the NTSB Office of Aviation Safety, Vernon S. Ellingstad, Director of the NTSB Office of Research and Engineering, and David L. Mayer, NTSB's Deputy Managing Director; Lorenda Ward, from the Major Investigations Division of the NTSB Office of Aviation Safety, served as the Hearing Officer. A Technical Panel comprising 13 NTSB investigators prepared the witnesses and conducted the primary questioning. Seven parties were designated, in accordance with federal regulations, to participate in the hearing.[3] The parties to the HEMS public hearing are listed below, along with the spokesperson for each:

- Air Methods: Craig Yale, Vice President, Corporate Development.
- Association of Air Medical Services (AAMS): Sandy Kinkade, President.
- CareFlite: Ray Dauphinais, Vice President/Director of Operations.
- Federal Aviation Administration (FAA): Hooper Harris, Acting Director, Office of Accident Investigation.
- Helicopter Association International (HAI): Matt Zuccaro, President.
- National Association of EMS Pilots: Gary Sizemore, Board Member.
- Professional Helicopter Pilots Association/Office of Professional Employees International Union, AFL-CIO (PHPA/OPEIU): Al Duquette, Safety Chairman.

The hearing was conducted according to the Safety Board's investigative hearing procedures (see 49 CFR Part 845). Witnesses were called and sworn by the Hearing Officer, and the primary questioning was initiated by the Board's Technical Panel. The parties, through their spokesperson, were then given the opportunity to question the witnesses. Finally, members of the Board of Inquiry concluded the questioning.

Previous NTSB Actions

The NTSB has conducted two formal examinations of the topic of HEMS safety prior to the February 2009 hearing. In 1988, the Board conducted a safety study of EMS operations.[4] That study, which evaluated 59 HEMS accidents and resulted in the NTSB issuing 19 safety

[3] See 49 *Code of Federal Regulations* §845.13.

[4] *Commercial Emergency Medical Service Helicopter Operations*, Safety Study NTSB/SS-88/01 (Washington, DC: National Transportation Safety Board, 1988).

recommendations, found that HEMS crashes were more common than non-EMS helicopter crashes and that HEMS crashes were 3.5-fold more likely to be fatal. This study also demonstrated that the most common factor associated with HEMS crashes was reduced visibility. In 2006, the Board addressed the topic again, this time in a special investigation report of EMS operations that examined both fixed wing aircraft and helicopter accidents.[5] In that report, the NTSB determined that 29 of the 55 reviewed accidents could have been prevented if corrective actions identified in the special investigation report had been implemented. As a result of the special investigation report, the NTSB issued four recommendations to the FAA:

- Require that all flights with medical personnel on board be conducted in accordance with FAR Part 135 regulations.
- Develop and implement flight risk evaluation programs.
- Require formalized dispatch and flight following procedures including up-to-date weather information.
- Require the installation of Terrain Awareness and Warning Systems (TAWS) on aircraft.

These recommendations were added to the NTSB's Most Wanted Transportation Safety Improvements in October 2008. At that time, three of the four recommendations were reclassified by the Board as "Open—Unacceptable Response." For more information on these recommendations, see <http://www.ntsb.gov/Recs/mostwanted/index.htm>.

The purpose of this document is to provide a brief summary of the testimony obtained during this 4-day public hearing. As with all of the Safety Board's investigative work, a public docket has been created to provide access to all of the testimony developed by this hearing. This docket includes the complete transcript of the 4 days of testimony and the exhibits used by witnesses.[6]

[5] *Emergency Medical Services Operations*, Special Investigation Report NTSB/SIR-06/01 (Washington, DC: National Transportation Safety Board, 2006).

[6] The public docket is available at http://www.ntsb.gov/Dockets/Aviation/DCA09SH001/default.htm. A CD of the webcast can be obtained through the NTSB at <http://www.ntsb.gov/pubmail/pubmail.asp>.

Summary of Safety Issues

Panel 1, EMS Safety Overview

Technical Panel[7]

Robert Dodd, Sc.D., Chief
Safety Studies and Statistical Analysis Division
Office of Research and Engineering

Witnesses

Ira Blumen, M.D., Director
University of Chicago Aeromedical Network
University of Chicago Hospitals
Chicago, Illinois

Matthew Zuccaro, President
Helicopter Association International
Alexandria, Virginia

Sylvain Séguin, Vice President
Safety & Quality
Canadian Helicopters
Edmonton, Alberta, Canada

The three witnesses who testified on the EMS Safety Overview panel were asked by the Technical Panel to provide an overview of safety issues associated with HEMS, including past losses and associated risk (Dr. Blumen), current industry-based safety initiatives (Mr. Zuccaro), and the safety process employed by a non-U.S. (Canadian) operator with an excellent safety record (Mr. Séguin).

Key Testimony Obtained from the Witnesses

- HEMS operations in the United States in 2008 involved more than 800 helicopters.
- The total number of HEMS helicopters has steadily increased since 1980.
- HEMS helicopters were involved in 264 accidents between 1972 and 2008.
    - Total occupants involved: 797 (approximately 3.1 per aircraft).
    - Number of accidents fatal to one or more occupants: 98 (37%).
    - Total number of fatalities: 264.

[7] The list of technical panel members is limited to the members who asked questions at the hearing.

- Weather was a significant factor in 19% of all HEMS accidents.
    - Of all crashes in which weather was a factor, 56% were fatal to one or more occupants.
    - In comparison, 34% of all crashes in which weather was NOT a factor were fatal to one or more occupants.

- The HEMS accident rate per 100,000 hours flown has decreased slowly but steadily since 2003.
    - This rate has been lower than that for all helicopters and general aviation aircraft.
    - The fatal crash rate per 100,000 hours rose markedly in 2008.

- The occupational risk to HEMS crewmembers of being killed in a crash was 164 per 100,000 in 2008.
    - This risk is higher than traditional high-risk occupations such as commercial fishing (112 per 100,000) or logging (86 per 100,000).
    - In comparison, the risk to patients of dying in HEMS accidents was 0.76 per 100,000 patients.

- The helicopter industry is working together to improve HEMS safety. Organizations involved in these efforts include HAI, AAMS, and the Air Medical Operators Association (AMOA).

- Industry/government initiatives include the International Helicopter Safety Team (IHST).
    - The IHST is co-chaired by the FAA and HAI. Its goal is to reduce all helicopter accidents, including HEMS operations, by 80% over the next 10 years.
    - The IHST consists of two teams: one to analyze accident data and determine remedial actions, and another to implement those actions through whatever process or methodology that is deemed appropriate within the industry.
    - According to IHST projections from current accident data, if the IHST effort is successful, 760 helicopter accidents would be prevented over the next 10 years in the United States, and 372 lives would be saved.

- Canadian HEMS operators use a different approach from the United States to pay for HEMS operations.
    - HEMS operations in Canada are funded by the government.
    - Operators compete for contracts that are then administered by the provinces.
    - Helicopters are dispatched through a centralized dispatch center.

- Twenty HEMS helicopters in Canada serve 21 million people.

- Canadian HEMS helicopters are required to be operated by two pilots, to have two engines, and to be equipped and approved to fly in reduced visibility under instrument flight rules (IFR).

- Canadian HEMS operators use formal safety management systems (SMS).

Panel 2, Current EMS Models and Reimbursement Structures

Technical Panel

Robert Dodd, Sc.D., Chief
Safety Studies and Statistical Analysis Division
Office of Research and Engineering

Bruce Coury, Ph.D., Transportation Safety Analyst
Safety Studies and Statistical Analysis Division
Office of Research and Engineering

Witnesses

Christine Zalar, Partner
Fitch & Associates
Platte City, Missouri

Thomas P. Judge, CCTP, Executive Director
LifeFlight of Maine
Bangor, Maine

Robert Bass, M.D., FACEP, Executive Director
Maryland Institute for Emergency Medical Services Systems
Baltimore, Maryland

Kevin Hutton, M.D., FACEP, CEO/Chairman
Golden Hour Data Systems, Inc.
San Diego, California

Marc Hartstein, Deputy Director of the Hospital and Ambulatory Policy Group
Centers for Medicare & Medicaid Services
Baltimore, Maryland

Suzanne Wedel, M.D., Chief Executive Officer
Boston MedFlight
Hanscom Air Force Base
Bedford, Massachusetts

Current EMS Business Models

The focus of the first part of panel 2 was to solicit testimony regarding the different business models (often called operating models) supporting HEMS operations. Operating models include government-run services, individual hospital-based services, and community-based

services. These operations may be either for-profit or not-for-profit. The discussion centered on the potential relationship between operating models and HEMS safety. Witnesses for this portion of the panel were Ms. Zalar, Mr. Judge, and Dr. Bass.

Key Testimony Obtained from the Witnesses

- The three primary operating model structures are the public sector, the traditional hospital-sponsored structure, and the community-based structure.

- The public sector is the least common operating model. Systems operating under this model are typically funded with public monies and are not regulated by the FAA's FAR part 135 air taxi regulations.

- The traditional hospital-based operating model relies on funding provided by a sponsoring hospital. Medical crews are usually hospital employees, and the aircraft are operated by a contracted part 135 air taxi operator or by the hospital itself, which in that case would hire the pilots and associated support staff. Hospital-based operations are conducted under FAR part 135 when transporting patients or carrying medical crew who are not employees of the air taxi operator. Operations en route to picking up patients or repositioning of the aircraft are conducted under FAR Part 91 if there are no passengers on the aircraft other than the pilot or employees of the air taxi operator. The hospital handles billing for transport.

    - The hospital-based model was the primary business model through the early years of HEMS operations but is now less common as alternative approaches have been developed.
    - Use of the community-based model has increased steadily over the last 10 years.

- The typical community-based model is not officially affiliated with a specific hospital and is often a stand-alone operation. The pilots and medical crew are usually employees of an aircraft operator that bills for patient transport. These services can be for-profit or not-for-profit. Transport of patients occurs under FAR part 135, and, again, flights en route to patient pick-up or to reposition the aircraft are conducted under FAR part 91.

- Distribution of non-public sector HEMS resources appears to be closely associated with population density. HEMS programs incur substantial fixed costs, which are independent of the number of revenue-generating patient transport flights. Ordinarily these fixed costs must be derived from reimbursements for patient transport.

- Maryland's publicly based HEMS transport is provided by the state police. This service is funded by a supplemental vehicle registration fee paid by all Maryland residents.

- Maryland's HEMS system was designed to be a fully integrated HEMS transport system that provides one set of protocols for all EMS providers in the state.

- Maryland's HEMS system consists of eight bases distributed across the state. Response time from initial notification to the time of pickup is typically 25 minutes. Ninety-five percent of patients transported by this system arrive at the hospital within 60 minutes from the time of notification. This applies for all patients located throughout the state.

Reimbursement Structures

The second part of panel 2 focused specifically on HEMS reimbursement structures, including the types of financial models that underlie HEMS operations, the costs incurred by HEMS operators, and the source and extent of reimbursement obtained by HEMS operators to cover costs. This discussion showed that the type of financial model is directly linked to the organization of a HEMS operation and described the links that the operation has to reimbursement. (For example, providing medical transport to a consortium of hospitals leads to a different financial model than providing independent, community-based services that have no hospital support.) Witnesses for this portion of panel 2 were Mr. Hutton, Mr. Hartstein, and Dr. Wedel.

Key Testimony Obtained from the Witnesses

- The Medicare ambulance reimbursement fee structure differs between rural and urban services. Rural providers have a higher reimbursement fee structure because rural HEMS operators have less volume and longer distances to fly. The fixed rate for an urban area is $3,308 per trip plus $21.53 per mile. In rural areas, Medicare pays 50 percent more ($4,962 per trip plus $32.30 per mile).

- The distribution of HEMS operator locations and service coverage appears to be concentrated in populated areas. This distribution could reflect the volume of service required to support HEMS operations financially.

- At Boston MedFlight, safety and training costs have increased substantially in recent years for both aviation safety and medical care reasons. Specifically, the consortium has recently invested in night vision goggles, pilot simulator training, medical crew training, and a new twin-engine helicopter.

- At Boston MedFlight, reimbursement comes from a variety of sources, and these reimbursements do not cover the total cost of operations. In order to make up the shortfall, Boston MedFlight's six consortium hospitals provide the rest of the funding. The witness contended that this ensures that costs associated with safety are always covered, and that hospital services are standardized and robust.

- HEMS financial models have changed from early hospital- and public-based models to community-based models.

- A substantial shift from hospital and public models occurred when the Medicare ambulance fee schedule changed in 2002.

- Key market drivers include regionalization of medical care, rural care requirements and challenges, and growth and consolidation of providers.

- At Golden Hours, Medicaid and Medicare patients account for almost 40% of the air medical patients, but provide only 12% of the revenue. By far, reimbursements from commercial sources provide the bulk of the revenue for air medical providers.

- To be reimbursed for providing Medicare and Medicaid air medical services, enrolled providers and suppliers must meet specific criteria that include being equipped to respond to medical emergencies, compliance with emergency vehicle state and local licensing and certification requirements, and the possession of a valid FAA on-demand part 135 certificate for air ambulances.

- Medicare and Medicaid reimbursements are based on a fee schedule (calculated per trip and mileage and calculated differently for urban and rural services); this fee schedule replaced the previous charge system, which was based on actual costs in 2002. Providers are reimbursed only for those legs of the trip when a patient is on board.

- Air ambulance trips reimbursed by Medicare increased 24% from 2001 to 2004: from 1.65 transports per 1,000 beneficiaries in 2001 to 2.04 transports per 1,000 beneficiaries in 2004.

- The witnesses pointed out several safety issues that might require further consideration:

    - The effect of reimbursement structures on the HEMS operator's decision to undertake undue risks to increase revenue.
    - The effect of regionalization of medical services on HEMS operations and base locations.
    - The demands placed on rural HEMS operations, especially in remote areas where HEMS is used to provide critical care services and to reduce response times.
    - The adequacy of triage policy, dispatch, weather monitoring and reporting, communications, and emergent care coordination to meet the needs of rural HEMS operations.
    - The adequacy of current HEMS models and reimbursement structures to meet the needs of rural EMS, especially as they relate to rural HEMS operations.

Panel 3, State Oversight and Competition

Technical Panel

Robert Dodd, Sc.D., Chief
Safety Studies and Statistical Analysis Division
Office of Research and Engineering

Witnesses

Dan Manz, Director
Emergency Medical Services
Vermont Department of Health
Burlington, Vermont

Brian Bledsoe, DO
Emergency Physician
Midlothian, Texas

David P. Thomson, M.S., M.D., FACEP, CMTE, CHC
National Medical Advisor
PHI Air Medical

These witnesses were asked to discuss competition and associated issues, such as the rights of individual states to regulate certain aspects of HEMS, certificates of need, helicopter shopping, and federal oversight of HEMS patient care standards.

Key Testimony Obtained from the Witnesses

- State EMS organizations are responsible for setting medical training and qualification standards for EMS personnel, including HEMS personnel.

- The authority of the states to oversee certain aspects of HEMS operations has been preempted by the Airline Deregulation Act (ADA), passed by Congress and signed into law on October 24, 1978.

    - The ADA was designed to foster competition among air carriers by removing government control over fares, routes, and markets.
    - Under the ADA, states cannot control where HEMS programs are located, when they fly, or where they deliver patients.
    - The witnesses contended that state oversight of medical care is probably adequate.

- Competition to conduct ambulance flights among HEMS operators does not necessarily equate to a decrease in safety. However, the potential for accident risk

may be increased if HEMS providers base their decisions to conduct flights predominantly on the need to generate revenue, as opposed to a proper evaluation of flight risk.

- Competition is more likely to occur in areas with high concentrations of HEMS providers.

- Helicopter shopping refers to the decision by a requester of HEMS transport to contact a second HEMS provider after the first has declined the request based on safety of flight considerations.

    - The HEMS provider, not the HEMS requester, is responsible for deciding if it is safe to fly.
    - Some HEMS programs located in the same geographic area have voluntarily established communication protocols to alert each other to their flight status and transport requests to reduce the likelihood of helicopter shopping.

- No single federal agency is responsible for all aspects of HEMS oversight or coordination of oversight standards.

Panel 4, Patient Transport Request Processes

Technical Panel

Loren Groff, Ph.D., Transportation Safety Analyst
Safety Studies and Statistical Analysis Division
Office of Research and Engineering

Jeff Guzzetti, Deputy Director
Regional Operations
Office of Aviation Safety

Witnesses

Carlton Burkhammer, Battalion Chief
Emergency Medical Services
Fairfax County Fire and Rescue Department
Fairfax, Virginia

Daniel Hankins, M.D., Co-Medical Director
Mayo One Helicopter
Mayo Clinic Medical Transport
Rochester, Minnesota

Jack Davidoff, M.D., President
Air Medical Physicians Association
Salt Lake City, Utah

The witnesses called to testify about patient transport request processes focused on emergency scene response, dispatch protocols, medical necessity, patient triage, flight requests, inter-facility patient transfer, early activation and auto-launch, landing zone setup, and associated communications and training issues. Also discussed were the benefits of air transport and the differences between air and ground transport. Witnesses represented first responders, a hospital-based air medical program, and a national association of air medical program directors.

This topic is important to the discussion of HEMS safety because of the possibility that air transport may be overused, subjecting patients to increased risk when they have no choice about being transported. Procedures and training associated with medical requests are also important because of the possibility that, in response to perceived pressures based on patient or medical circumstances, flight crews may make flights they should decline due to weather or other risks.

Key Testimony Obtained from the Witnesses

- EMS response and capability, including ground and air transport, as well as the availability of critical care facilities, differ greatly by region.
- In some areas, air transport is the only available means of timely EMS response.
- Air is not necessarily faster than ground transport; the benefits of air transport are specifically associated with accessibility, response coverage, and the higher level of care that can be provided. Air medical services are typically equipped and staffed to provide a higher level of care than ground ambulance services.
- Pre-hospital scene response is normally initiated based on 911 calls. The type of response is typically determined by a 911 operator or EMS dispatcher using pre-defined protocols that cover all emergency/medical responses and are not limited to air transport.
- Launch decisions based on mechanism of injury alone (for example, through a description of vehicle damage) are not an effective means of assessing the need for air transport.
- Air medical response may be pre-alerted for serious vehicle accidents (for example, accidents involving rollover or entrapment) or serious injuries (for example, severe burns or falls of more than 20 feet).
- Both Fairfax County, Virginia, and the Mayo Clinic use "auto-launch" procedures (in which an aircraft may be dispatched before emergency responders arrive on the basis of 911 or citizen reports when certain criteria are met). Both report that they have found auto-launch to be helpful, and noted that it does not compromise the flight crews' authority because for them, all launch requests are the same.
- Fairfax County and Mayo Clinic have established pre-designated landing areas for on-scene response. Crews can train for those areas, and these areas can be referenced in communications between dispatch, ground response, and flight crews.
- Fairfax County requires landing zone training for all first responders. Mayo Clinic stated that they provide similar training, but that training is the responsibility of the air medical service provider and is not a requirement.
- Unlike pre-hospital scene response, inter-facility transfers are governed by the federal Emergency Medicine Treatment and Active Labor Act (EMTALA) of 1986. EMTALA requires that patients be stabilized before transfer, and if a sending facility is not equipped to do that, they must request a higher level of care to transport.
- One metric that has been used to evaluate the appropriate use of air transport is how quickly the patient is subsequently released from the hospital, with the number of patients released within 24 hours from admittance considered an indication of over-triage or unnecessary use of air transport. However, Mayo Clinic conducts regular post-flight triage reviews and this witness suggested that the standard review metric of "released within 24 hours" may not be a good indication of the necessity of transport because, even with valid medical decisions for transport, patients may be

released within 24 hours, and some conditions (intoxication, for example) may present symptoms that could also be indicative of very serious injury or illness.

- Mayo isolates its flight crews from the medical details of a request by providing only the time/location details of the flight request. The medical crew then contacts the communications center to get the medical details of the request so they can prepare the necessary equipment while the flight crew checks weather and plans the flight.

Panel 5, Flight Dispatch Procedures

Technical Panel

Aaron Sauer, Senior Air Safety Investigator
Central Region
Chicago, Illinois

Jeff Guzzetti, Deputy Director
Regional Operations
Office of Aviation Safety

Witnesses

Garet Hickman, NAACS Board Member and CAMTS Representative
National Association of Air-Medical Communication Specialists
Nashville, Tennessee

Dennis McCall, Manager
Aviation Compliance & Operational Control Center
Air Methods Corporation
Englewood, Colorado

Raymond Dauphinais, Vice President, Flight Operations
CareFlite
Grand Prairie, Texas

Questions regarding the air medical dispatch system from the differing perspectives were asked of witnesses from a national association, a large HEMS operator, and a small HEMS operator. Topics included flight following, role of communicators, communications center functions and technology, flight risk assessment, dispatch safety, and training. This topic is important to HEMS safety because flight dispatch provides the initial communications between HEMS operations and flight crews. Dispatch communicators frequently assist flight crews with weather data, scene data, and flight following along the route of flight. Flight dispatch is instrumental in laying the groundwork for HEMS flights.

Key Testimony Obtained from the Witnesses

- Operational Control Centers (OCC) can provide flight dispatching and flight following functions to aid pilots in the decision-making process of accepting and completing a HEMS flight assignment. This includes relaying information regarding the expected route of flight, airspace activity, and updated weather information. An OCC has access to computers, networks, maps, and procedures. They can also assist with conducting an assessment of risk for the assignment.

- Those persons that provide OCC services are known as communications specialists, and it is estimated that about 1,500 of them are employed in the HEMS industry.

- Currently, the option of using an OCC for HEMS operators is voluntary. There are no FAA requirements for one.

- There is no defined program or standard for OCCs, nor does the FAA require them. However, in May 2008, the FAA issued an advisory circular (AC 120.96, "Integration of Operations Control Centers into Helicopter Emergency Medical Services Operations") that provides recommendations and guidance that may assist HEMS operators conducting flight operations under parts 135 and 91 to realize the safety (and economic) benefits of the implementation and integration of an OCC and enhanced operational control procedures.

- Accurate and current weather reporting is sparse in many rural communities due to the lack of automated weather observation stations (AWOS) in those areas, and the lack of an integrated network of private AWOS stations that are not tied to the National Weather Service network.

- The FAA does not currently require communications specialists to participate in a mandatory training program, nor are communications specialists required to be certified. However, all of the witnesses indicated that they would support requirements for standardized training.

- Communications specialists are not required to have any aviation-related training.

- There are no hours of service regulations or standards for HEMS communications specialists.

Panel 6, Safety Equipment and Flight Recorders

Technical Panel

Tom Jacky, Aerospace Engineer (Aircraft Systems)
Aviation Engineering Division
Office of Aviation Safety

Jim Cash, Chief Technical Advisor for Vehicle Recorders
Office of the Director
Office of Research and Engineering

Jeff Guzzetti, Deputy Director
Regional Operations
Office of Aviation Safety

Witnesses

T.K. Kallenbach, Vice President, Marketing and Product Management
Honeywell Aerospace
Phoenix, Arizona

Scott Baxter
Assistant Chief Flight Instructor
Bell Helicopter Training Academy
Fort Worth, Texas

Dave Downey, Vice President, Flight Safety
Bell Helicopter
Fort Worth, Texas

David Batcheller, Director of Quality Process and Program Management
Appareo
Fargo, North Dakota

Tim Shaver, Assistant Manager
Avionics Systems Branch (AIR-130)
Federal Aviation Administration
Washington, DC

These witnesses were asked about the state of the art of helicopter safety equipment and flight recorders, the cost to install such equipment, the experiences of operators that have installed the equipment, and FAA policy regarding the new technology.

Safety Equipment

The topic of safety equipment is important to HEMS safety because these technologies, which may reduce pilot workload, have been identified as increasing safety for operators that use them and may have prevented accidents. In addition, the NTSB has issued safety recommendations that ask the FAA to require helicopters used in HEMS operations to be so equipped. Safety equipment was addressed by Mr. Kallenbach and Mr. Baxter.

Key Testimony Obtained from the Witnesses Regarding Safety Equipment

- At least one available Enhanced Ground Proximity Warning Systems (EGPWS) not only meets the recently-issued FAA Technical Standard Order (TSO) on Helicopter Terrain Awareness and Warning Systems (HTAWS), but would also meet NTSB Safety Recommendations A-06-15 and A-06-19.

- To date, no helicopter accidents attributed to controlled flight into terrain (CFIT) have involved a helicopter equipped with an operating HTAWS.

- It is estimated that only 30% of the U.S. fleet of helicopters are equipped with HTAWS.

- Most permanent obstacles, such as radio towers, can be contained within the HTAWS database. However, obstacles associated with temporary landing zone helipads are not. Advanced technologies such as helicopter synthetic vision are being developed to improve the capability to see and avoid these obstacles.

- According to Honeywell, they currently have two HTAWS systems available. One system costs between $25,000 and $30,000 per unit. A more capable system costs between $100,000 and $120,000 per unit depending on how the aircraft is equipped.

- According to Honeywell, the traffic collision alerting system (TCAS) is not an effective solution to prevent helicopter mid-air collisions and automatic dependent surveillance-broadcast (ADS-B) and synthetic vision are better solutions.

- Witnesses contended that with proper crew training, night vision goggles (NVG) can be a critical part of a helicopter's safety equipment. These devices significantly enhance situational awareness.

- NVGs are only meant to be used for flight under Visual Flight Rules (VFR).

- NVG technology has advanced over the past few years, and NVGs are now available that meet FAA's new TSO for NVGs. Today's version of NVGs is effective in urban areas that emit manmade lighting. Law enforcement helicopter pilots in major cities have had success with NVG use.

- Current estimated costs for NVGs range from $10,000 to $15,000, but additional expenses of retrofitting cockpit lighting can range from $15,000 to $80,000

- Witnesses observed that the additional cost for cockpit lighting would be much less if helicopter manufacturers could install the lighting on the production line; however, current international trade and arms regulations prohibit manufacturers from producing and shipping new helicopters with this technology to foreign countries. Therefore, the more expensive option of retrofitting is the only way to equip helicopters with compatible lighting.

Flight Recorders

The flight recorders portion of panel 6 focused on new recorder technology that is currently available and how this technology could be applied to the HEMS community to increase safety. Recorders were addressed by Mr. Downey, Mr. Batcheller, and Mr. Shaver.

Key Testimony Obtained from the Witnesses Regarding Flight Recorders

- Witnesses suggested that some helicopter manufacturers believe that the recording and analysis of routine flight data is a key to reducing the accident rate.

- The installation of conventional flight data recorders (FDR) into helicopters has been met with resistance due to the penalties associated with their cost and weight. However, technology currently exists to build image and data recording devices that are relatively inexpensive and lightweight for installation on new and existing helicopters. While these devices do not meet current crashworthiness standards required for conventional FDRs in FAR Part 121 for transport aircraft, they are crash-resistant and can provide significant information for investigators to determine accident causation.

- The FAA asserted a willingness to work with the HEMS industry to streamline the approval of these low-cost recording devices.

- Several U.S. helicopter manufacturers (Bell Eurocopter USA, for example) are equipping their new helicopters with on-board video/voice-data recording devices.

- The FAA has not initiated regulatory action to require on-board recording devices, nor is such action anticipated by the FAA, despite recommendations by the Safety Board to do so.

Panel 7, Flight Operations Procedures and Training

Technical Panel

Ron Price, Aerospace Engineer (Rotorcraft)
Major Investigations Division
Office of Aviation Safety

Jeff Guzzetti, Deputy Director
Regional Operations
Office of Aviation Safety

Witnesses

Neil Weink, Chief Pilot, Safety Operations Base Manager
Mayo Clinic
Rochester, Minnesota

Kevin High, Flight Nurse, President
Air/Surface Transport Nurses Association
Nashville, Tennessee

Bruce A. Webb, Chief Flight Instructor
American Eurocopter
Grand Prairie, Texas

Terry Palmer, Manager, Rotorcraft Programs
FlightSafety International
Dallas/Fort Worth, Texas

Tony Bonham, Chief Pilot
Air Evac EMS, Inc.
West Plaines, Missouri

Larry Buehler, Aviation Safety Inspector
Flight Standards Service
Federal Aviation Administration
Washington, DC

James P. Riley, President
International Association of Flight Paramedics
Snellville, Georgia

The NTSB's 2006 Special Investigation Report identified several safety issues regarding EMS flight operations, including risk assessments, the hazards of flight at night and in instrument meteorological conditions (IMC), flight dispatch, and the use of technologies such as night vision imaging systems (NVIS) and TAWS. Three years have passed, and HEMS accidents continue to occur because of these same issues. The witnesses questioned about flight operations procedures and training were asked to comment about the industry's stance on these issues and to explore other safety issues and possible avenues to improve the safety record in the area of flight operations. Crew training was also addressed in detail.

Key Testimony Obtained from the Witnesses:

Flight Operations

- The current airspace infrastructure is not conducive to efficient, low-altitude HEMS operations. The lack of navigational routing and the strict regulatory IFR structure make local, low-altitude HEMS flights in metropolitan areas impractical. As a result, some operators are forced to fly VFR only, or under less stringent Part 91 regulations.

- The FAA witness asserted that flying under IFR is the most effective countermeasure against CFIT because of the positive control provided by the FAA's air traffic control system.

- The FAA has granted exemptions to allow HEMS operators to use weather reporting locations taken from any airport within 15 nautical miles of the route and flight, which has opened up a significant number of hospital heliports for the operators.

- It is estimated that no more than 10% of all HEMS flights are conducted in IMC.

- The majority of HEMS operators conduct VFR operations only.

- HEMS operators that operate under IFR assert that conducting flights under IFR provides a safer environment; however, VFR operators generally do not agree with this assertion and cite the difficulties and challenges of IFR operation.

- The percentage of HEMS flights that are conducted between medical facilities (that is, "interfacility") as opposed to flights to and from scenes (that is, "scene work") ranges from 80% interfacility and 20% scene work, to 50% interfacility and 50% scene work, depending on the operation and location.

- The Garmin 396 TAWS does not comply with the recently issued TSO for TAWS. If TAWS is mandated, a large operator with a fleet of nearly 100 helicopters will be required to remove these Garmin units and replace them with TSO-approved TAWS equipment, which poses a significant financial burden.

- The expense to equip helicopters and train crewmembers on NVGs would be significant. One large operator testified that these devices cost $75,000 per HEMS base (typically one or two helicopters per base).

- All HEMS operators who testified indicated that there is no financial incentive provided to pilots to accept all flight assignments.

- According to the FAA, there are currently 74 HEMS operating certificates, about one-third of which are authorized to fly IFR.

- FAA analysis of HEMS accidents over the past several years indicates that predominantly, the causes were associated with flying at night, inadvertent flight into IMC, and CFIT. As a result of that analysis, the FAA developed guidance materials for HEMS operators that targeted those three areas.

- The FAA believes that flight planning is essential in conducting a HEMS flight safely. This allows pilots to ensure that their route of flight, and the altitude at which the flights are conducted, will prevent them from encountering weather and obstacle hazards.

- The difference between a flight nurse and a flight paramedic involves the amount and type of education, training, and certification for each. Additionally, paramedics are trained to provide clinical care in an out-of-hospital or clinic environment.

- Flight nurses and paramedics are trained and available to help the pilot to offload some of the stress experienced by the pilot in areas that are highly populated and urban, and where radio traffic is significant. They can help look for potential air traffic and listen to radio communications.

- In a survey of flight paramedics conducted by the International Association of Flight Paramedics, 30% of the respondents reported that the pilot becomes aware of the urgency of the flight request, despite the industry norm to shield the pilot from that knowledge in order to prevent internal pressure to conduct the flight. Additionally, only 70% reported that their programs do not push any limits on aircraft capabilities.

- Both associations that represent flight paramedics and flight nurses strongly support a requirement for crew resource management training for flight paramedics and flight nurses.

Training

- Some operators require greater amounts of training than others. There is no required training other than Part 135 rules, nor is there a specific FAA training requirement for HEMS operators.

- Many pilots involved in HEMS flight training believe that scenario-based training could prevent many of the HEMS accidents that occur today. Although the functions and systems associated with HEMS operations have become more complex, training requirements have not kept pace.

- Helicopter simulators have been available for the past 30 years; however, the availability of new helicopter flight training devices, including simulators, has increased significantly over the past few years.

- Flight training devices allow pilots to deal with perishable skills that need to be reinforced, which are best performed through scenario-based training in a simulation environment where crewmembers can practice skills that are not practiced on a routine basis.

- Simulators are beneficial because they enable pilots to train in skills that are too risky to perform in a real helicopter. Also, unlike a real helicopter, simulators can be used anytime, day or night, and in any kind of weather.

- Simulators provide training for a complete flight, including an emergency. Simulator flights can also be tailored to a specific type of flight operation such as interfacility HEMS flights, off-shore helicopter flights, or law enforcement flights.

- Simulator training can be very useful for scenarios involving avoidance of, or response to, inadvertent flight into IMC, which has been cited in numerous HEMS accidents.

- At one time, a shortage of single-engine flight training devices prevented their use in helicopters; however, many more of these devices are now available, including simulators for the Bell 206, Bell 407, and Aerospatiale A-Star helicopters.

- Simulators are available at various levels: the higher the fidelity of a simulator (that is, the more realistic it is), the higher its classification. For example, Level 7 devices allow crewmembers to receive the maximum amount of training credit from a flight training device.

- Level 7 is the most realistic flight training device that does not use a full-motion Level D simulator. A full-motion Level D simulator can be used for 100% of training. Level 7 flight training devices are meant to give the training credit equivalent to all of Part 135 training, including part of a Part 135 check ride.

- Training devices can reduce the cost of training since training in an actual helicopter can be expensive due to fuel, maintenance, and other operational costs associated with helicopters.

- Simulators can be "dry leased," meaning that an operator may provide its own instructors. Dry leasing these devices is significantly less expensive than using the operator's actual helicopter.

- The flight training industry is attempting to educate insurance carriers, many of whom have not yet realized that new simulators are being made available. This education could be useful to the insurance industry when deciding what requirements to place on HEMS operators for coverage.

- Witnesses agreed that TAWS, NVGs, and radar altimeters are valuable for enhancing safety, but also asserted that training to use these devices is critical.

- Instrument flight training that leads to proficiency in IMC flight also enhances a pilot's ability to fly safely at night and in VFR conditions.

- There are currently no requirements for instrument proficiency training, and this training can be cost-prohibitive for many HEMS operators.

- The most common training for HEMS operators is a once-a-year VFR check ride.

Panel 8, Corporate Oversight

Technical Panel

Leah Yeager, Senior Air Safety Investigator
Central Region, Dallas, Texas
Office of Aviation Safety

Robert Dodd, Sc.D., Chief
Safety Studies and Statistical Analysis Division
Office of Research and Engineering

Witnesses

Christopher Bassett
Chief Pilot, Air Methods
Englewood, Colorado

Thomas P. Judge, CCTP
Executive Director
LifeFlight of Maine
Bangor, Maine

Eileen Frazier
Executive Director, CAMTS
Anderson, South Carolina

These three witnesses focused on oversight, safety and reporting systems, communications procedures, site inspection processes, hospital oversight, external and internal audits, and certification. This topic is important to HEMS safety because not all HEMS operators conduct business the same way. The safety challenges, communications, and costs associated with a larger operator vary greatly from those of a smaller operator. HEMS operators can volunteer to earn accreditation from the Commission on Accreditation of Medical Transport Services (CAMTS), which is currently the only set of standards that exists for the industry. The FAA does not regulate the industry outside of the requirements outlined in 14 CFR Part 91 or 135.

Key Testimony Obtained from the Witnesses

- CAMTS is a peer review organization that is dedicated to medical transport safety. The organization provides standards for a wide range of air medical services such as medical protocols, pilots, mechanics, aircraft, medical configuration of the aircraft, quality management, utilization review, and ground safety. At the time of the hearing, approximately 50% of HEMS programs were CAMTS accredited.

- CAMTS endorses, and has recently implemented, standards for safety management system (SMS) implementation.

- Air Methods and LifeFlight of Maine conduct internal and external safety audits as a routine practice and both are CAMTS-accredited. They also have implemented SMS programs.

- Air Methods operates a fleet of 335 helicopters at 254 bases in 43 states. They employ 1,048 pilots and 505 mechanics. About 60% of Air Methods helicopters are hospital based, and the other 40% are community based. The company stated that they manage safety through an SMS program, a dedicated safety team, numerous communication methods, and audits.

- CAMTS is very concerned about the potential role that human fatigue may play in HEMS accidents since many of them occur at night. As a result, CAMTS has proposed a study to determine the effects of fatigue on HEMS crewmembers.

Panel 9, Safety Management Systems (SMS)

Technical Panel

Evan Byrne, Ph.D., Human Performance Investigator
Human Performance and Survival Factors Division
Office of Aviation Safety

Witnesses

Don Arendt, Ph.D., Manager
Flight Standards SMS Program Office
Federal Aviation Administration
Dulles Airport, Virginia

Keith Johnson, Safety Program Manager
Airborne Law Enforcement Association
Los Angeles, California

Ed Stockhausen. Director of Safety
Air Methods Corporation
Englewood, Colorado

The International Civil Aviation Organization (ICAO) has advanced a requirement for all member nations to adopt SMS programs for air carriers in their member states. The FAA is involved in establishing SMS standards in the United States, and the NTSB has made recommendations in this regard. The SMS panel explored the potential benefits and challenges of applying SMS to HEMS operations.

Key Testimony Obtained from the Witnesses:

- SMS is intended to be a formal management system that guides decision-making of an organization, to manage risk.

- The four elements of an SMS program are safety risk management, safety policy, safety assurance, and safety promotion. Fatigue risk management is a subset of safety risk management overall.

- The IHST has developed an SMS toolkit for small helicopter operators, which can be downloaded at <http://ihst.org/Portals/54/SMS-Toolkit.pdf>.

- Witnesses suggested that the development of a mature SMS system is estimated to take about 3 years, and that SMS must involve a fundamental change in the culture of an organization. SMS programs require full support from the CEO and upper

management. SMS programs can and should be scaled to each HEMS operator; one size does not fit all.

- Non-punitive reporting systems are part of an SMS program but surveillance and oversight by the FAA, which are statutory responsibilities, are not precluded by the SMS.

- Air Methods, a large HEMS operator, has implemented an SMS program and volunteered to be part of an FAA pilot study for SMS.

- In an SMS program, all reported hazards are analyzed for root cause determination and correction. The information is then transmitted to the appropriate department or individuals within the company that would be accountable for resolution.

- There are currently several published FAA orders addressing SMS implementation within the FAA and an advisory circular (AC 120-92, "Introduction to Safety Management Systems for Air Operators"), which provides guidance to air operators. These orders do not specifically apply to HEMS operators, however.

Panel 10, FAA Principal Inspector Functions

Technical Panel

Tom Latson, Air Safety Investigator
Central Region, Dallas, Texas
Office of Aviation Safety

Jeff Guzzetti, Deputy Director
Regional Operations
Office of Aviation Safety

Witnesses

Jon Prater, Operations Supervisor
Air Methods Certificate Management Team
Federal Aviation Administration
Denver, Colorado

Kent Gibbons
Hawker Program Manager (SimuFlite) and Principal Operations Inspector (CareFlite)
Federal Aviation Administration
Fort Worth, Texas

These FAA witnesses discussed the oversight and surveillance of HEMS operations from the perspective of FAA field inspectors. They were also asked about potential concerns and areas for improvement to ensure the safety of HEMS operations.

Key Testimony Obtained from the Witnesses:

- Large HEMS operators with a separate Certificate Management Unit (CMU) formed within the past year generally have good support, adequate inspector resources, adequate remotely sited inspectors, adequate funding for travel, and adequate support from geographic inspectors in other offices. The inspectors in a separate CMU generally are assigned to only that one operator.

- HEMS operators that have principal inspectors from a Flight Standards District Office (FSDO) usually have only one principal inspector in each specialty (operations, maintenance, and avionics). Those inspectors have generally less support, only adequate inspector resources, no remotely sited inspectors, and less funding for travel, but they do have adequate support from geographic inspectors in other offices. The inspectors in FSDOs are typically assigned oversight duties for many different operators, sometimes as many as 15 other operators.

- FAA Flight Standards has no requirements for inspectors to conduct surveillance of Dispatcher/Flight Locator training or to inspect Dispatcher/Flight Locator qualifications or training records.

- FAA Flight Standards has no requirements for inspectors to conduct surveillance of medical crewmember training or to inspect medical crewmember qualifications or training records.

- FAA Flight Standards has no requirements for inspectors to conduct cockpit en route inspections on operational flights with medical crew and a passenger (patient) on board the helicopter. The POI for the large HEMS operator said he had conducted this kind of surveillance in the past, but only infrequently.

- FAA Flight Standards has no requirements for inspectors to conduct Part 135.299 line checks with the medical crew on board the helicopter.

- Both witnesses said FAA Flight Standards Inspectors are required to conduct other activities that detract from their HEMS oversight and surveillance duties, such as daily counter duty, accident/incident investigation standby, complaint investigations, violation investigations, 135 flight tests for other non-HEMS Part 135 operators, Part 91 flight tests, pilot reexaminations, inspector training, special projects, and initial certifications of other new operator applicants.

Panel 11, FAA Flight Standards National Policy and Regional Implementation

Technical Panel

Jeff Guzzetti, Deputy Director
Regional Operations
Office of Aviation Safety

Witnesses

Dennis Pratte, Manager
Part 135 Air Carrier Operations Branch
Federal Aviation Administration
Washington, DC

Bradley D. Pearson, Manager
Flight Standards Division, Northwest Mountain Region
Federal Aviation Administration
Renton, Washington

FAA aviation safety inspectors who are tasked with providing surveillance of HEMS operations receive their guidance, policies, and procedures from FAA Headquarters in Washington, D.C. These witnesses are the FAA experts who develop these polices and questioning by the Technical Panel and Board of Inquiry was intended to determine how and why these policies were developed and whether they are adequate. These witnesses were also questioned regarding the FAA's response to the NTSB EMS recommendations issued in 2006.

Key Testimony Obtained from the Witnesses:

- In 2005, the FAA created a "HEMS Task Force" after noticing a spike in HEMS accidents. Analysis of HEMS accidents from 1998 to 2004 indicated three primary safety concerns: inadvertent IMC encounters, night operations, and CFIT. As a result, the FAA took many actions, including issuance of FAA Notice 8000.293.

- Other than issuing regulations, the FAA can impose specific requirements on HEMS operators by placing those requirements in the operations specifications document, which requires operator compliance. The operator's training program can also be used to stipulate requirements. Both the operations specifications document and the training program must be "FAA approved" under 14 CFR Part 135.

- The FAA recently issued two operations specifications for HEMS operators that addressed weather and equipment requirements. The FAA indicates that it recognizes the benefit of TAWS and NVGs and has tried to provide incentives for the use of that equipment by providing different weather minima.

- The FAA implemented policy in which a certificate management team of FAA inspectors is assigned to a HEMS operation that has 25 or more dedicated helicopters. This team emulates the functions of a certificate management office assigned to major air carriers.

- According to the FAA, there are about 70 HEMS operators in the U.S. today; seven are "large" operations that have about 80% of the helicopters (a total of 678 dedicated helicopters). Each of these large operators has an FAA CMT within the Flight Standard District Office.

- The FAA believes that they employ an adequate number of inspectors for, and are conducting adequate surveillance of, all HEMS operations, large and small, including those operations that have bases scattered over a large geographic area.

- The FAA witnesses discussed the HEMS Weather Tool, and indicated that they are "actively working to make it an official tool."

- FAA witnesses acknowledge the benefits of flight training devices, and they encourage their use to improve safety. However, they are reluctant to require use of these devices, which may not be economically feasible for smaller HEMS operators that, if forced out of business, could reduce critical service to remote communities.

- FAA witnesses indicated that they "don't consider HEMS to be different from any on-demand operator," and that current regulations for these operations are plentiful and appropriate.

- The FAA has not yet considered expanding current flight and duty times required for Part 135 pilots to medical crews because FAA "does not believe that they're performing safety essential functions." Additionally, the FAA noted that imposing requirements on medical crews who are not employees of the operator would be difficult.

- The FAA estimates that about 30% of all HEMS operators use NVGs.

- The FAA currently has 15 inspectors qualified for NVG operations. They are beginning to hire inspectors who will be dedicated to helicopter operations and will train them in NVGs during initial training.

- The FAA has not yet required the use of HTAWS in HEMS operations because of its concerns that the technology may not be appropriate for every operator.

- The FAA indicated that 89% of all HEMS operators are using some form of OCC and that OCCs need to be scalable to the type of operation.

- FAA legal interpretations are necessary to determine if a HEMS flight is required to be conducted under Part 135 rules or less stringent Part 91 rules when considering the role of the medical crew on board and the compensation (if any) being received for the flight. Other issues such as a flat monthly rate for the HEMS services and medical crew training are also considerations.

Panel 12, FAA Aviation Safety Policy

Technical Panel

Jeff Guzzetti, Deputy Director
Regional Operations
Office of Aviation Safety

Witnesses

John Allen, Director
Flight Standards Service
Federal Aviation Administration
Washington, DC

The final witness at the public hearing was the head of the Fight Standards Service, which oversees more than 4,800 FAA aviation professionals responsible for promoting the safety of flight for civil aircraft by setting regulations and standards for air carriers, air agencies, general aviation, and airmen and designees, including HEMS operations. Questions to this witness explored in more detail the aviation policies discussed by other FAA witnesses. He was also asked to comment on the FAA's response to the NTSB EMS recommendations issued in 2006.

Key Testimony Obtained from the Witnesses:

- The witness announced that FAA is "considering rulemaking" to specifically address HEMS operations in risk assessment, flight dispatch, HTAWS, the use of radar altimeters, and training, but he did not provide a time line for such rulemaking activity or indicate that the rulemaking process has actually been initiated.

- The witness claimed that the FAA recognizes the need for a "layered approach into implementing technology and training" with the use of regulation, but after developing "voluntary programs."

- This witness asserted that the implementation of technology requires establishing a safety culture infrastructure, including a training mechanism, so that technology can be leveraged appropriately.

- The witness agreed with previous FAA witnesses that the FAA has enough inspectors for adequate surveillance of HEMS operations.

- When asked about the extremely slow progress of FAA rulemaking, this witness responded that "you don't want government reacting too quickly so that we make sure that everybody is heard…we rely very heavily on voluntary measures… so [that]

when the regulation comes forward…it's not as intrusive and not as difficult on [the operators]."

- The witness indicated that "instead of using a stick to beat [operators] over the head for a regulation, [we] … bring them into it and … provide the carrots … necessary for good safety leadership."

- The witness indicated that the FAA is working to implement Automatic Dependent Surveillance Broadcast (ADS-B) throughout the entire National Airspace System by 2013 as part of a low-altitude infrastructure that will facilitate more efficient and safer HEMS operations. The FAA has also funded grants for the Dallas/Fort Worth area to develop special approaches into hospitals.

- When questioned about the paucity of HEMS flight activity data, the witness stated that he preferred that FAA staff act as "hunters" tracking down safety problems, rather than "gatherers" of data that might indicate where those problems lay. He claimed that implementing a requirement for HEMS operators to report flight hour activity is "problematic," and the FAA has no current plans to develop such a requirement. "It's not [the FAA's] primary focus," and other agencies "could attend to that as well or better than [the FAA] can."

- The witness agreed with the previous FAA witnesses that NVGs should not be required at this time because "it depends on the operation." The witness also stated that "we have to be very careful [in] how we apply [that technology]."

- The witness stated that the FAA recognizes the use for flight recorders in HEMS operations, including new, lighter weight devices, but there are no current plans to pursue regulations that would require the carriage of such recorders.

- In regard to flight and duty time limitations for HEMS pilots, the witness claimed that the FAA intends to "provide enhanced guidance" that they will "base on science" but that they had no plans to revise current flight time and duty requirements for HEMS (or any other) operations. He agreed that Fatigue Resource Management Programs (FRMS) should be a part of SMS, but did not indicate how such programs might function in the HEMS environment.

- The FAA has no oversight responsibilities for "public" HEMS operations (those operations conducted by federal, state, or local government agencies). The witness also asserted that the FAA is prohibited by law from using FAA resources for oversight of public aircraft operations, due to the potential drain of resources required for surveillance of commercial aviation operations. However, the FAA continues to have partial oversight responsibility in the area of aircraft certification and air traffic operations within the National Airspace System.

- In determining if a HEMS flight is a public operation, the FAA must evaluate the flight on a case by case basis and consider such things as compensation and legal statutes.