



NTSB National Transportation Safety Board

Office of Aviation Safety

Emergency Medical Services (EMS) Aviation Operations

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Introduction: EMS Operations

- Provide important service to public
- Inherently dangerous due to pressures and environment
- Increasing number of accidents
- Strategies and technologies to ensure flight safety

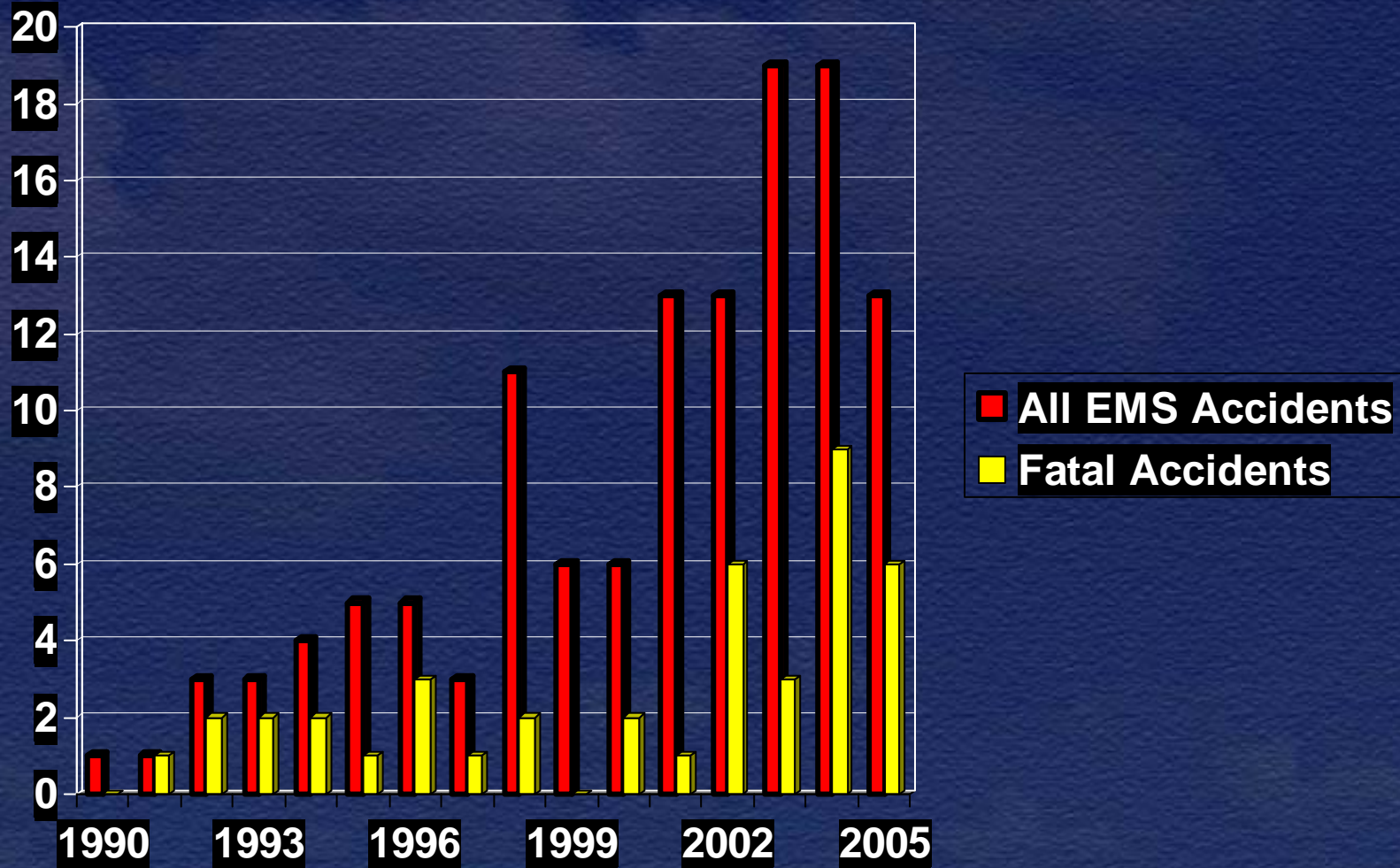
Introduction: EMS Accidents

- January 2002 – January 2005
- 55 EMS Accidents
 - 41 Helicopter
 - 14 Airplane
- 54 fatalities, 19 serious injuries
- Additional 9 EMS accidents since January 2005

Introduction: 1988 Safety Study

- 59 EMS accidents
- Weather, training, design, crashworthiness, management
- 19 recommendations to FAA
- FAA Advisory Circular 135-14A
- Advisory v. regulatory

EMS Accidents: 1990 - 2005



Introduction: Safety Issues

- Less stringent requirements when patients not on board
- Lack of aviation flight risk evaluation programs
- Lack of flight dispatch procedures
- No requirements to use TAWS or NVIS technologies

Introduction: Recent FAA Activity

- FAA Task Force on Helicopter Air Ambulance Accidents
- FAA guidance issued in 2005
 - Notice N8000.293: ops guidance
 - Notice N8000.301: risk assessment
 - Notice N8000.307: ops inspections
 - HBAT 06-01: stricter VFR minimums
 - HBAT 06-02: CFIT programs
- No requirements or rule changes

Introduction: Regional Investigations

- 7 regional aviation investigations presented as examples
- 3,500 man hours
- Probable causes submitted for Board's consideration

Introduction: Part 91 v. Part 135

- Part 91 prescribes rules for all aircraft
- Part 135 prescribes rules for commuter or on-demand operations



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**Safety Issue:
EMS Operations Without
Patients On Board**

Safety Issue: Operations Without Patients Onboard

- While carrying patients or organs, Part 135
- Less stringent requirements without patients on board (Part 91)
- Medical crewmembers primarily responsible for patient care
- 35 of 55 accidents Part 91

Safety Issue: Operations Without Patients Onboard

- Weather minimum requirements:
 - Part 91: “Remain clear of clouds”
 - Part 135: 1,000-foot cloud ceiling
3 miles of visibility
- Positioning flights operate under Part 91

Safety Issue: Operations Without Patients Onboard

- Crew Rest Requirements:
 - Part 135: 14-hour duty time
 - Part 91: No duty time restrictions
- Pilot fatigue affects safety

Safety Issue: Operations Without Patients Onboard

- All EMS legs critical
- Part 135 imposes additional safety controls
- EMS Operators must already comply with Part 135 for patients on board



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Safety Issue: Flight Risk Evaluation Programs

Safety Issue: Risk Evaluation

- Risks include pressure, weather, environment, spatial disorientation, and human factors
- Risk evaluation requires pilot to assess situation without influence of urgency
- Most operators had no formal risk evaluation process

Safety Issue: Risk Evaluation

- Salt Lake City: weather, route, night would have raised flight risk rating
- Risk evaluation may have prevented 13 of 55 accidents

Safety Issue: Risk Evaluation

- FAA Notice N8000.301: Operational Risk Assessment Programs for Helicopter EMS
- Not required
- Flight risk evaluation programs would enhance safety



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**Safety Issue:
Flight Dispatch
Procedures for EMS**

Safety Issue: Flight Dispatch

- Many EMS operators lack flight dispatch procedures
- 911 and hospital dispatchers
 - Not required to have aviation-specific knowledge
 - Provide minimal information regarding route, landing, or weather
- Participate in risk assessment

Safety Issue: Flight Dispatch

- Airline flight dispatch
 - Airworthiness
 - Weather conditions
 - Communication and navigation in route
- Flight dispatch may have prevented 11 of 55 accidents





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**Safety Issue:
Use of Technology in
EMS Flight Operations**

Safety Issue: Night Vision Imaging Systems

- Night accidents over represented
- Benefits
 - Enhance ability to see and avoid obstacles
 - Reduce stress and spatial disorientation
 - Increase safety
- Not widely used by EMS
 - Recent introduction
 - Cost
 - Cannot be used in ambient light

Safety Issue: Night Vision Imaging Systems

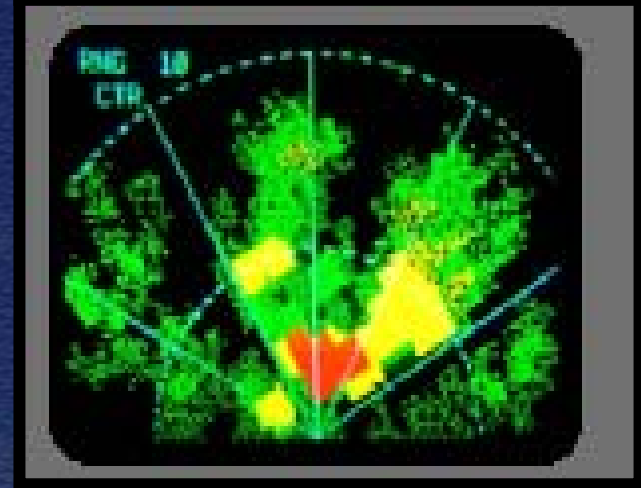
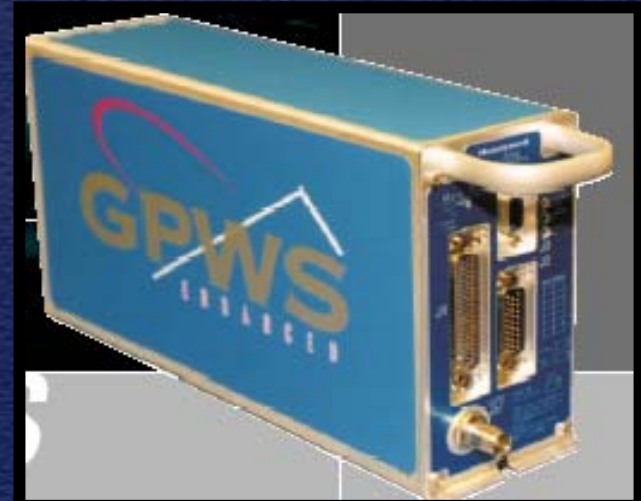
- 13 of 55 accidents may have benefited from use of NVIS
- FAA encourages use of NVIS
- Feasibility of NVIS
- Staff to monitor effectiveness

Safety Issue: Terrain Awareness and Warning System

- CFIT common in EMS operations
- Increases safety margin in poor visibility
- Battle Mountain, Nevada

Safety Issue: Terrain Awareness and Warning System

- 17 of 55 accidents may have been prevented with TAWS
- FAA requires TAWS on turbine-powered airplanes with 6 passengers
- FAA Notice 8000.293 only “encourages” operators to use TAWS





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