



NTSB National Transportation Safety Board

Office of Highway Safety

Mexican Hat, Utah

Motorcoach Overturn

January 6, 2008



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Introduction

Pete Kotowski, IIC

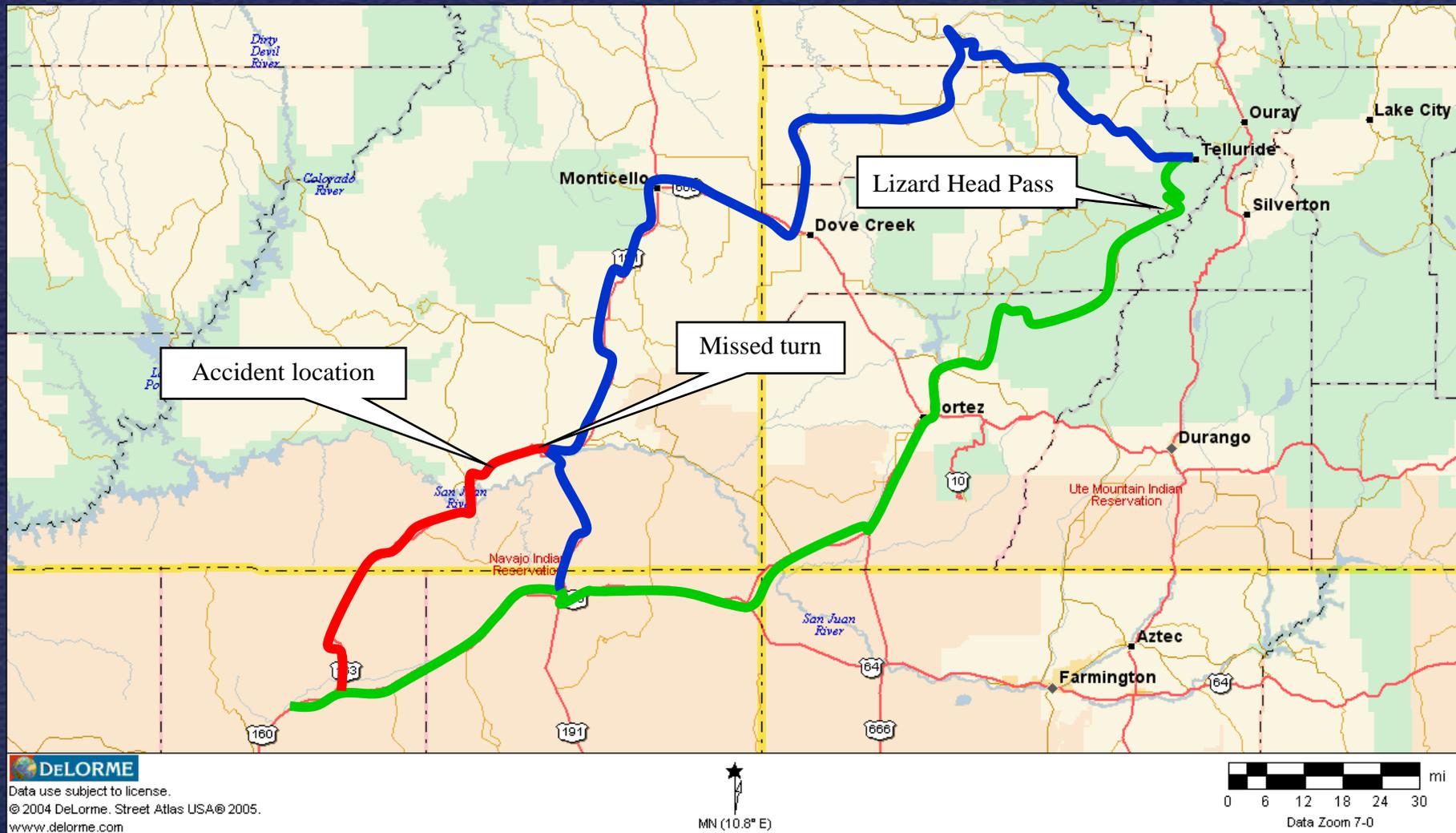
Introduction

- Sequence of events
- Vehicle speed
- Safety issues
- Investigative/support staff
- Parties to investigation

Charter Trip

- 17-motorcoach charter
- Ski trip excursion to Telluride, Colorado
- Trip originated in Phoenix, Arizona, January 3, 2008
- Scheduled to return January 6, 2008

Accident Trip



DeLORME

Data use subject to license.
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www.delorme.com

MN (10.8° E)

0 6 12 18 24 30 mi
Data Zoom 7-0

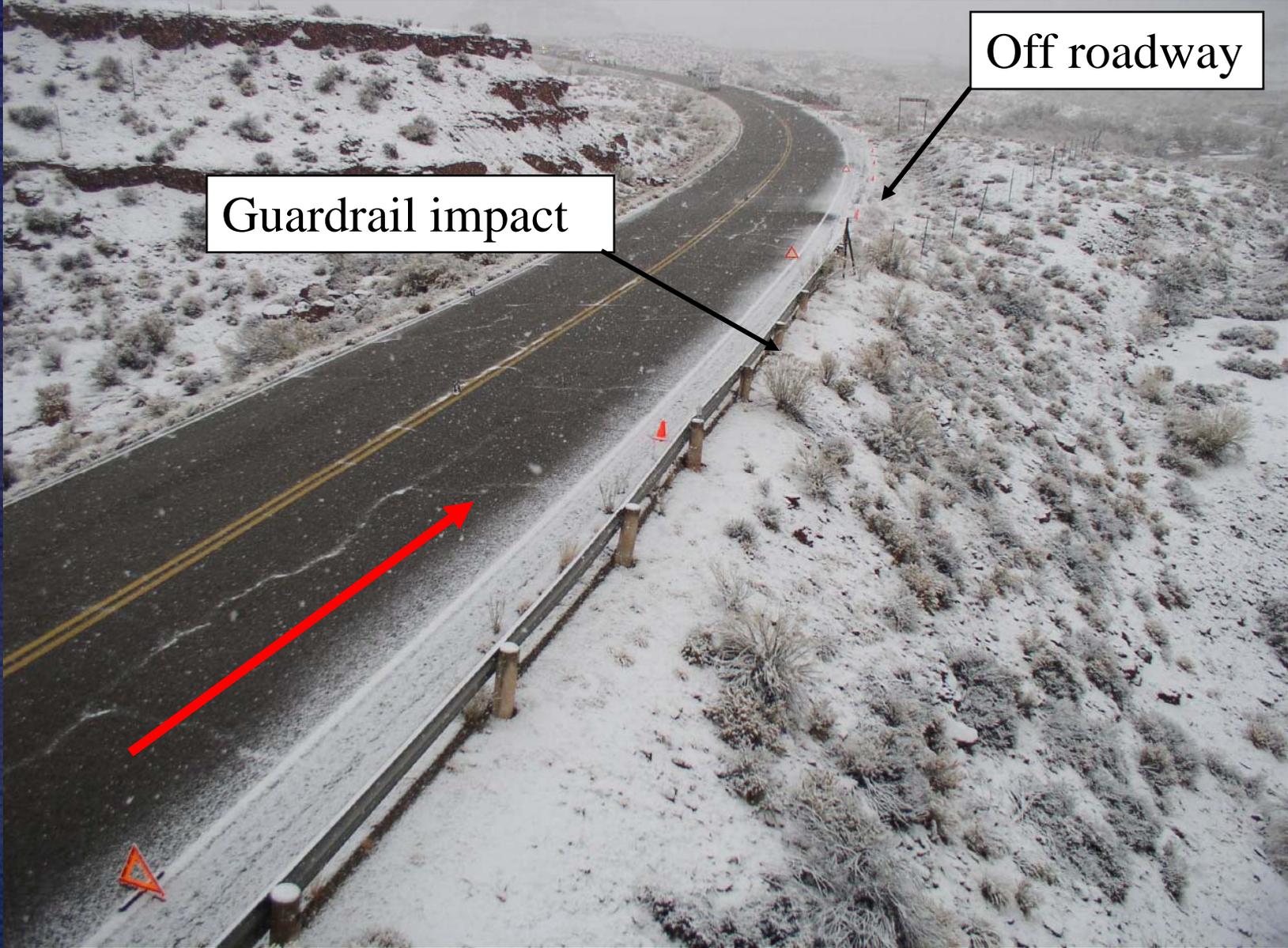


Accident Trip

- Departed Telluride, Colorado, at 3:15 p.m.
- Removed tire chains outside Telluride
- Driver missed turn
- Continued straight on Utah U.S. Route 163
- Accident occurred at 8:02 p.m.

Off roadway

Guardrail impact



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Accident Description

- Roof separated from motorcoach during rollover sequence
- 51 of 53 occupants ejected

Accident Description



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DriveCam II

- Motorcoach equipped with a video recording device
- Forward-facing view
- Rear interior view
- Acceleration and turning forces

DriveCam II

- Forward-facing view of the motorcoach as it approached curve
- Motorcoach moves right of center line

VIDEO

Mexican Hat, Utah
January 6, 2008
8:02 p.m.



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Vehicle Speed

- RE staff developed a video analysis program
 - Referenced points
 - Time of video image
- Speed determined to be 88–92 mph

Vehicle Speed

Program: VideoTrack 1.0

Date: 16-May-2008 13:28:40

Image File: Frame21.bmp

Landmark File: drivecam_data.dat

HFOV: 70°

Camera Altitude: 2.58 m

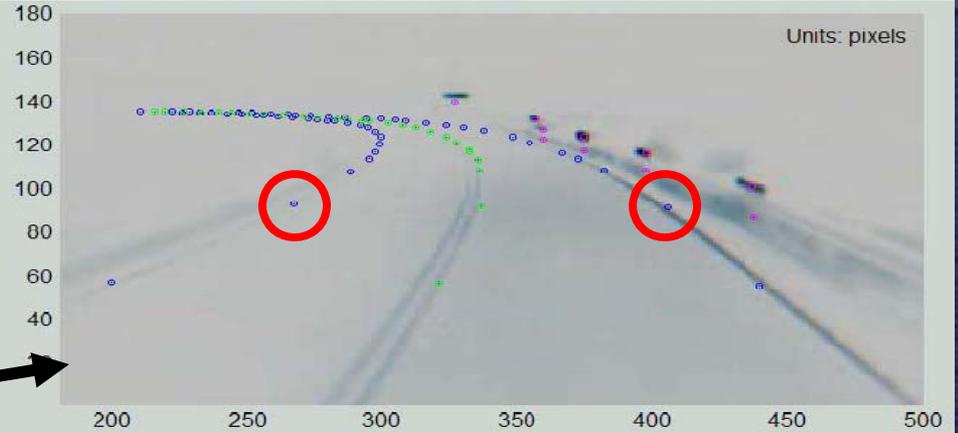
VFOV: 43.0°

Camera Mount Angles: 0° -5° 6°

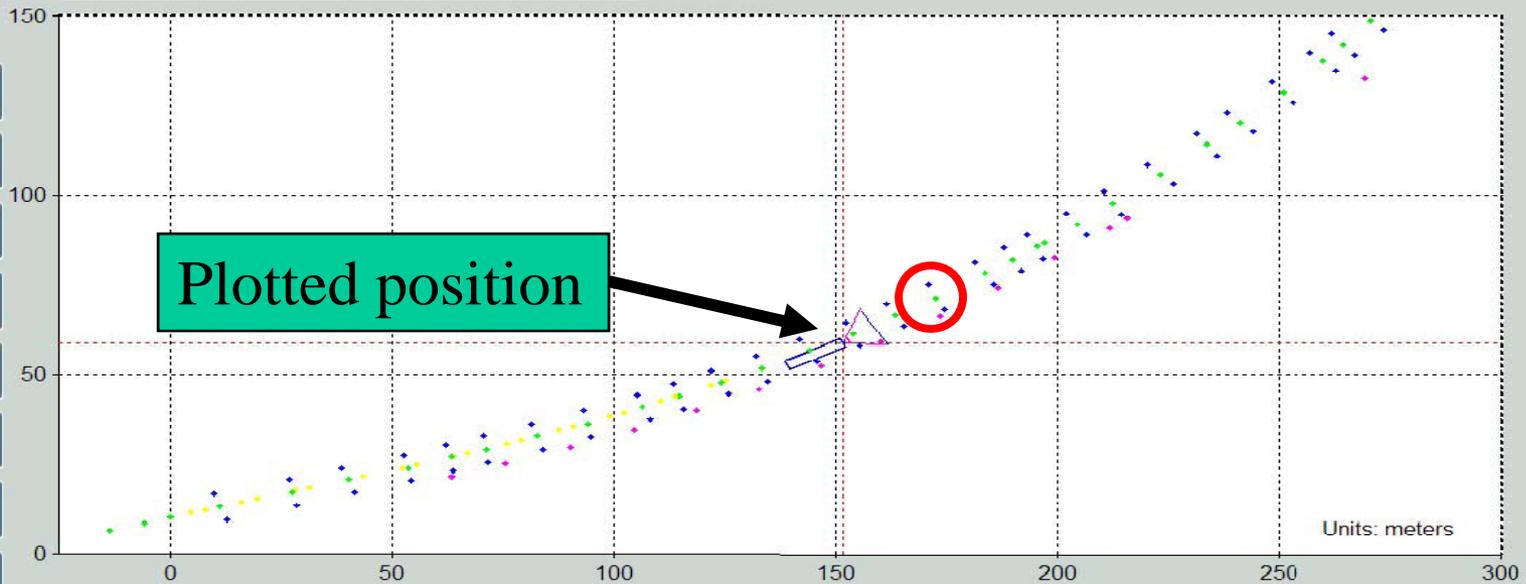
Landmarks on Screen: 88

Vehicle Angles (RPY): 0° 0° 27°

Vehicle Location: 150 57.9



Video forward view



Plotted position

- POS
- SAVE
- MOVE
- ZOOM
- MARKER
- FRAME
- PAUSE
- EXIT

- SENSITIVITY
- ULTRA
 - HIGH
 - NORMAL
 - LOW
 - MICRO

Vehicle Speed

- Vehicle Dynamics Study
- Acceleration Study
- Critical speed of curve
- Gear ratio considerations
- ECM operation and data

Vehicle Speed

- Motorcoach traveling south entering curve at real speed and positions

Simulation

**Mexican Hat, Utah
January 6, 2008
8:02 PM**

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Safety Issues

- Driver fatigue and excessive speed
- Hours-of-service violations and motor carrier trip planning
- Motorcoach occupant protection
- Emergency medical notification and response with regard to large buses traveling on rural roads

On-Scene Investigative Staff

Ron Kaminski	Survival Factors
Jim LeBerte	Motor Carrier
Burt Simon (Ret.)	Human Performance
Larry Yohe (Ret.)	Vehicle Factors
Dave Rayburn	Highway Factors
Michele Beckjord	Survival/Interviews
Chris Voeglie	Vehicle Recorders
Paul Sledzik	Transportation Disaster Assistance
Pete Kotowski	Investigator-In-Charge

Report Development Staff

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Human Performance

Vehicle Performance

Transportation

Research Analyst

Recorders Lab

Materials Lab

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Report Development Staff

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Recommendations

Safety Studies

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Visuals

Project Manager

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Parties to the Investigation

- Utah Highway Patrol
- Utah Department of Transportation
- Federal Motor Carrier Safety Administration
- Motor Coach Industries
- Busco, Inc. (dba Arrow Stage Lines)
- San Juan County, Utah



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