



# National Transportation Safety Board

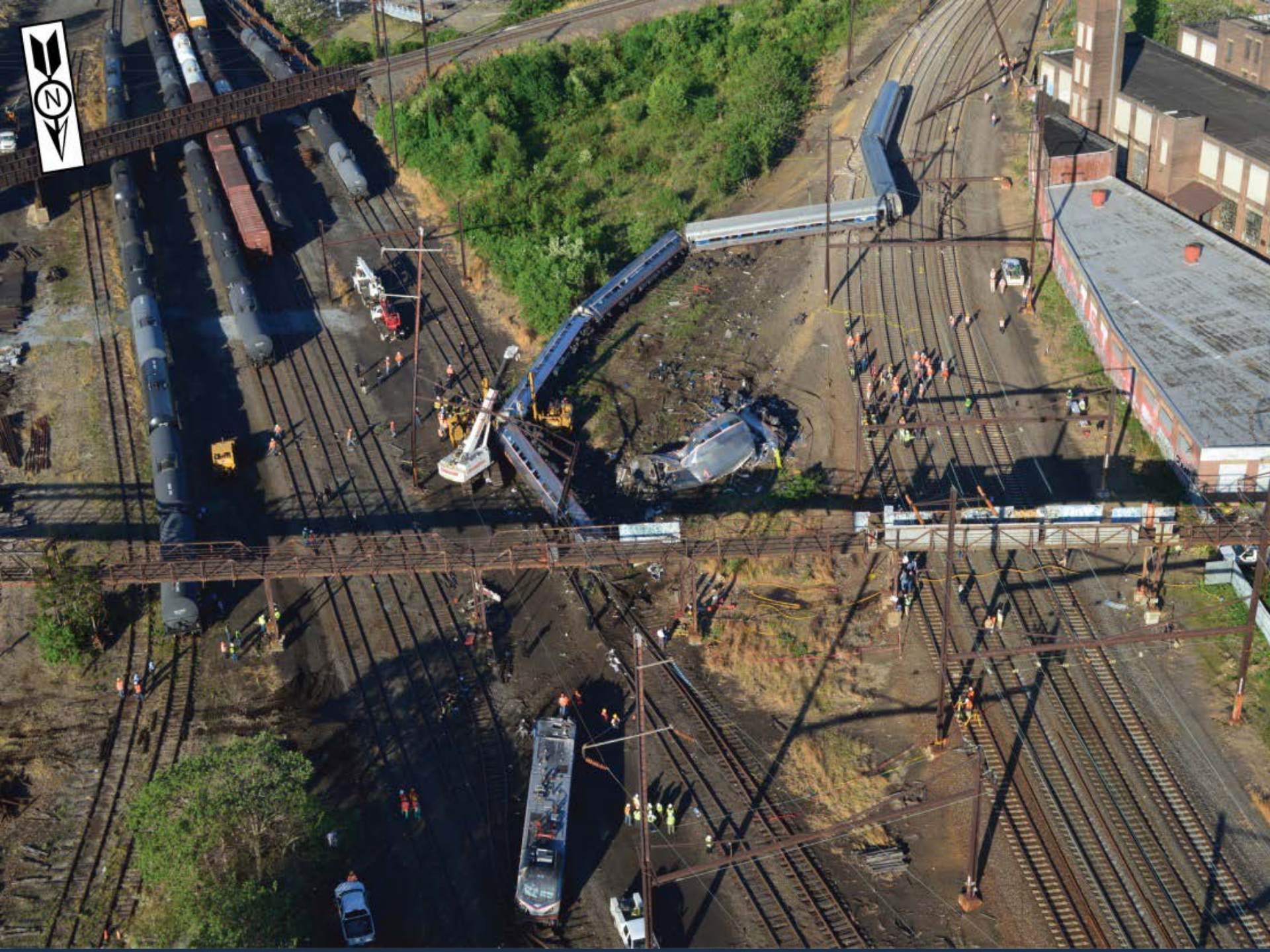
## Derailment of Amtrak Passenger Train 188

Philadelphia, Pennsylvania

May 12, 2015

DCA15MR010







# NTSB Team On Scene

- |                      |   |
|----------------------|---|
| • Robert Sumwalt     | Board Member                            |
| • T. Bella Dinh-Zarr | Vice Chairman                           |
| • Mike Flanigon      | IIC On-Scene                            |
| • Ted Turpin         | IIC                                     |
| • Tim DePaepe        | Signals                                 |
| • Steve Jenner       | Human Performance                       |
| • Mike Hiller        | Mechanical                              |
| • Dave Bucher        | Operations                              |
| • Cy Gura            | Track and Engineering                   |
| • Kristen Poland     | Scanning Group                          |
| • Dana Sanzo         | Crashworthiness and<br>Survival Factors |

# NTSB Team On Scene

- |                     |                      |
|---------------------|----------------------|
| • Ronald Kaminski   | Passenger Interviews |
| • Thomas Barth      | Passenger Interviews |
| • Gena Evans        | Passenger Interviews |
| • Mary Pat McKay    | Medical Officer      |
| • Charles Cates     | Image Recorders      |
| • Cassandra Johnson | Event Recorders      |
| • Max Green         | TDA                  |
| • Stephanie Matonek | TDA                  |
| • James Rodriguez   | GC                   |
| • Peter Knudsen     | Public Affairs       |

# NTSB Team

- Karen Bury Report Writer
- Donald Kramer Materials Laboratory
- Dennis Crider Technical Assistance
- Kevin Renze Technical Assistance
- Deborah Tedford Editor
- Christy Spangler Graphics
- Alice Park Animation
- Mike Hamilton Recommendations

# Parties

- Federal Railroad Administration
- Amtrak
- Brotherhood of Locomotive Engineers and Trainmen
- International Association of Sheet Metal, Air, Rail and Transportation Workers
- Brotherhood of Maintenance of Way Employees Division
- Philadelphia Police Department
- Philadelphia Fire Department
- Philadelphia Office of Emergency Management

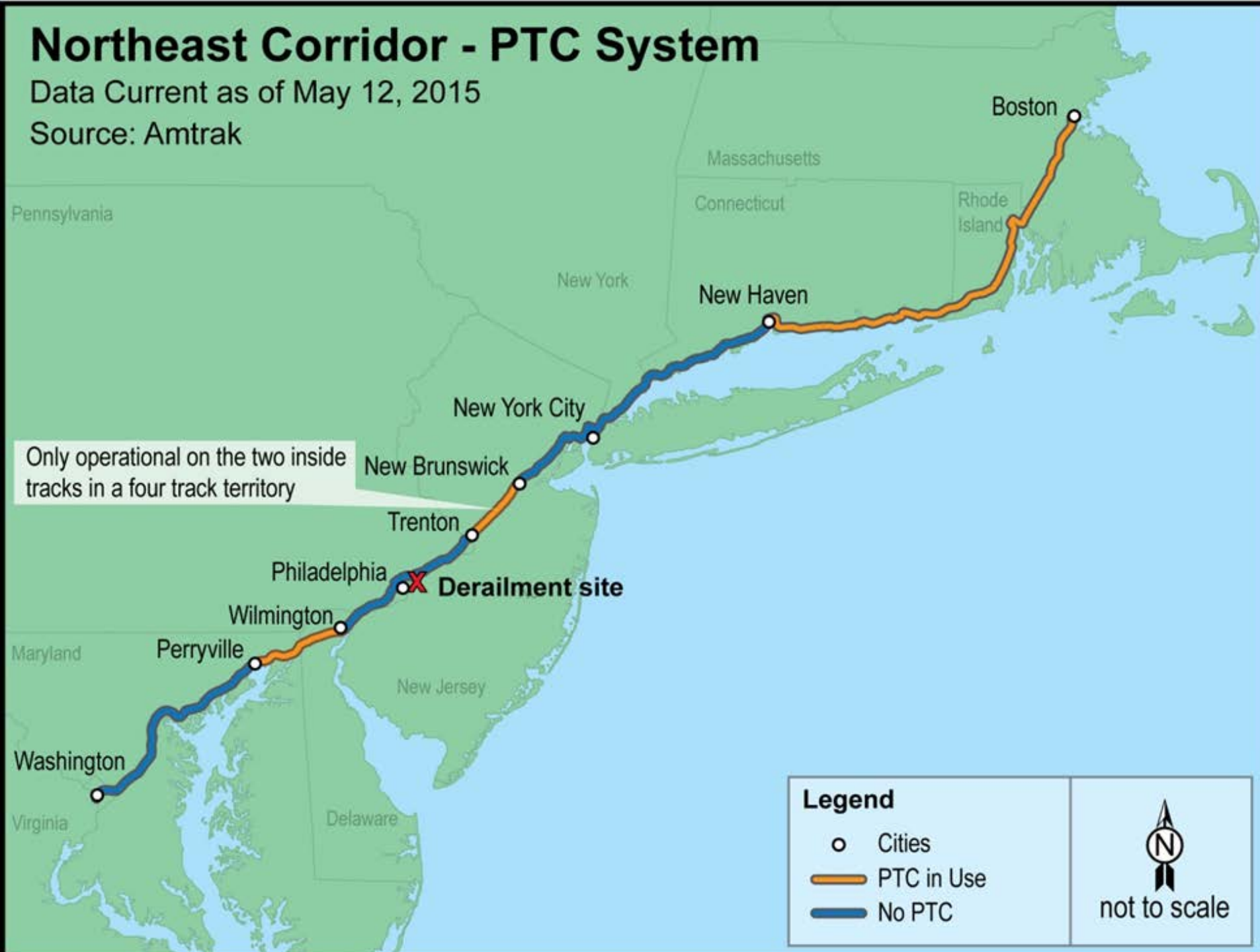
# Non Contributory Factors

- Equipment passed inspections
- Records showed no defects
- No report of the window being struck
- Negative toxicological tests
- No medical condition with engineer
- No evidence of cell phone use
- On/off duty cycle provided adequate time to rest

# Northeast Corridor - PTC System

Data Current as of May 12, 2015

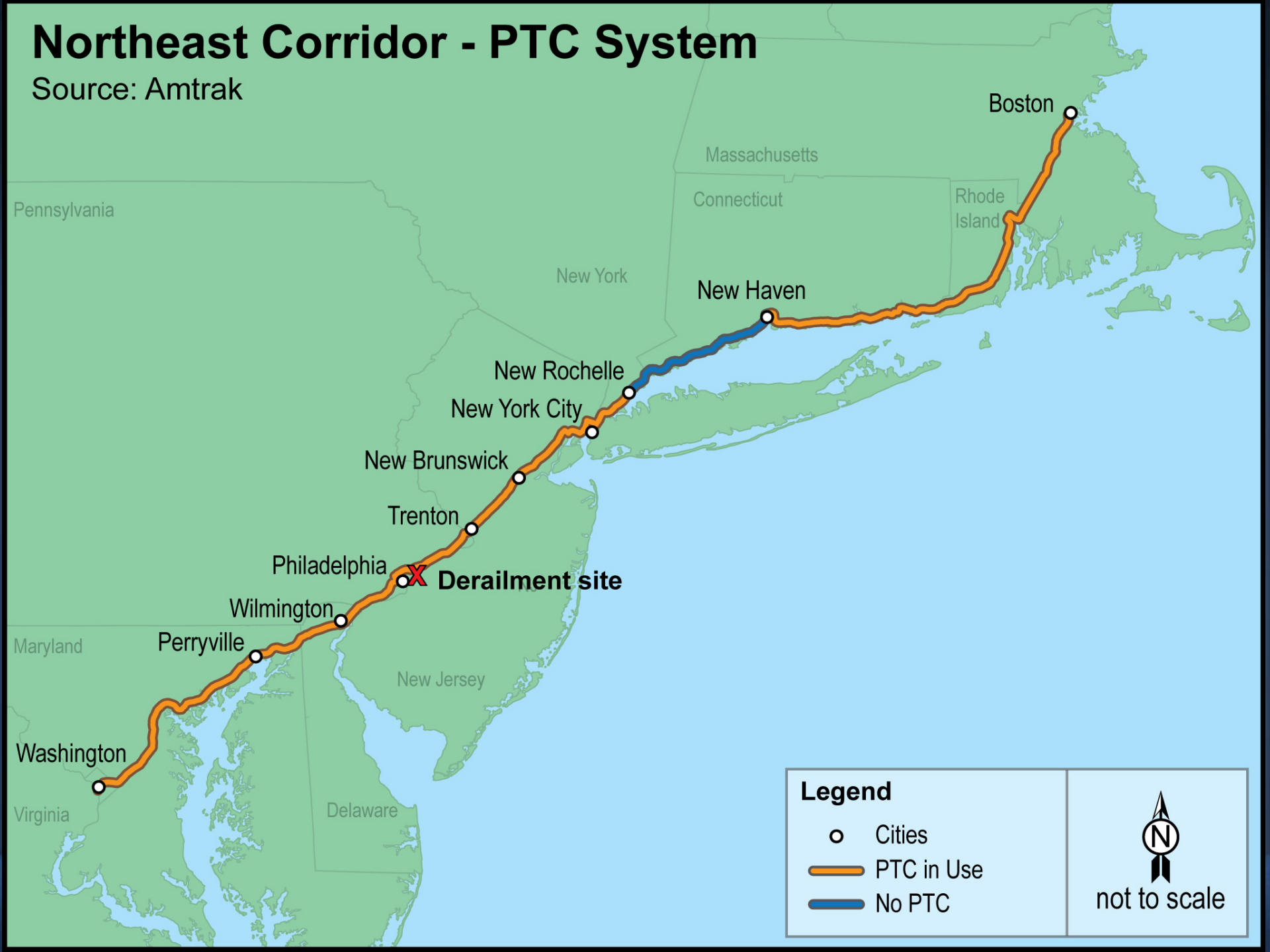
Source: Amtrak





# Northeast Corridor - PTC System

Source: Amtrak



## Legend

- Cities
- Orange line PTC in Use
- Blue line No PTC



not to scale

# Presentation Topics

- Performance of the Amtrak engineer
- Passenger railcar occupant protection
- Emergency medical response



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## Human Performance Investigation

Stephen M. Jenner, Ph.D.

# Performance of the Amtrak Engineer

- Engineer could not remember events minutes before the accident
- Investigation focused on factors that may have diverted his attention





# Emergency Situation with Another Train

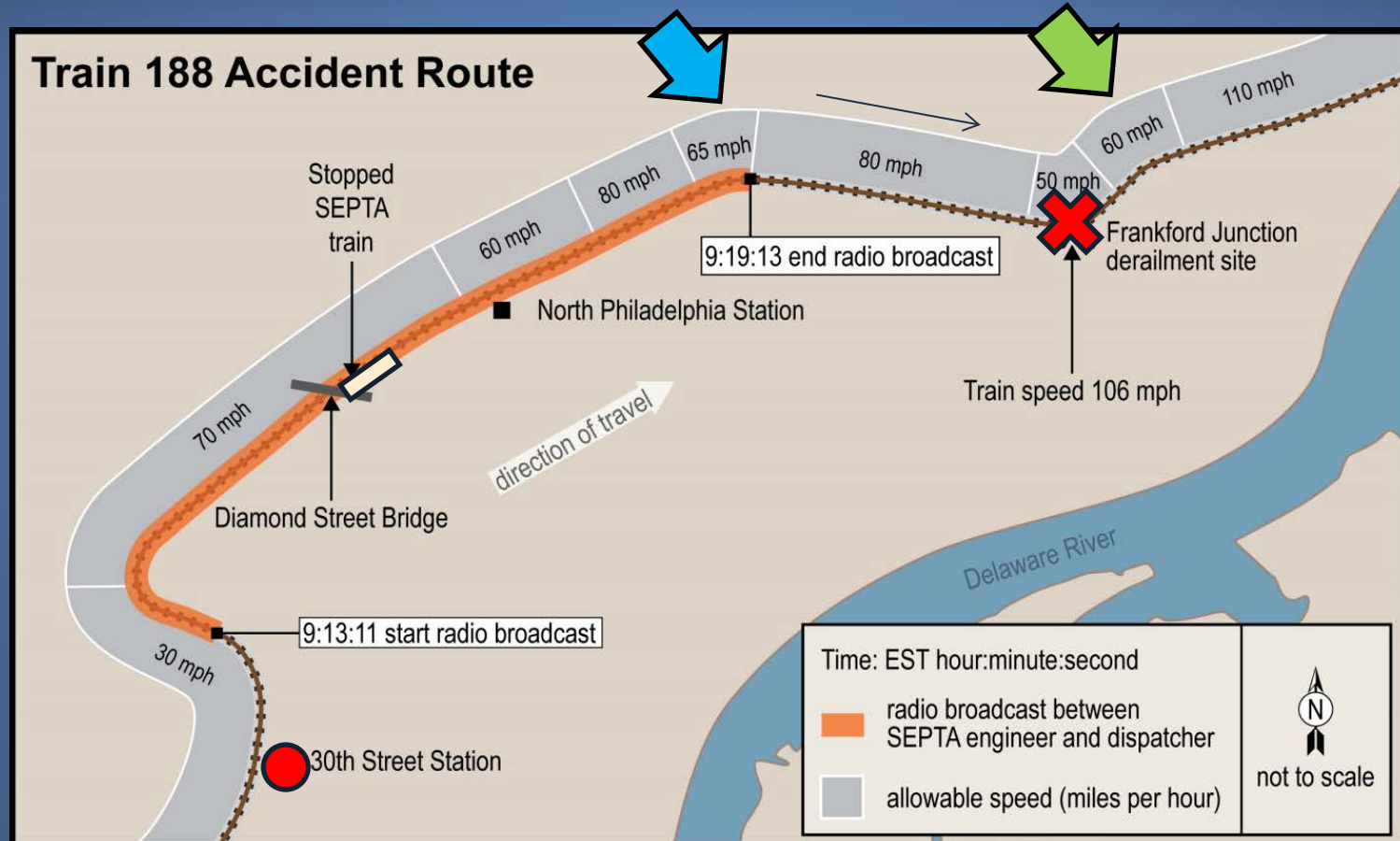
- SEPTA commuter train emergency
- Six-minute radio communication between SEPTA engineer and train dispatcher



# The Effect of the SEPTA Situation on the Amtrak Engineer

- Amtrak engineer's attention to SEPTA situation
- Engineer's loss of Situational Awareness

# Loss of Situational Awareness



# Forgetting about Future Operations

- Prospective memory
- Interruptions and forgetting
- Engineer may have forgotten his next task: To operate at 80 mph and slow for curve at Frankford Jct.



# Summary

- Engineer's loss of situational awareness, likely due to his attention being diverted to a SEPTA train emergency
- Positive Train Control
- Proposed Recommendations
  - Education
  - Simulator Training
  - Technology





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# Survival Factors

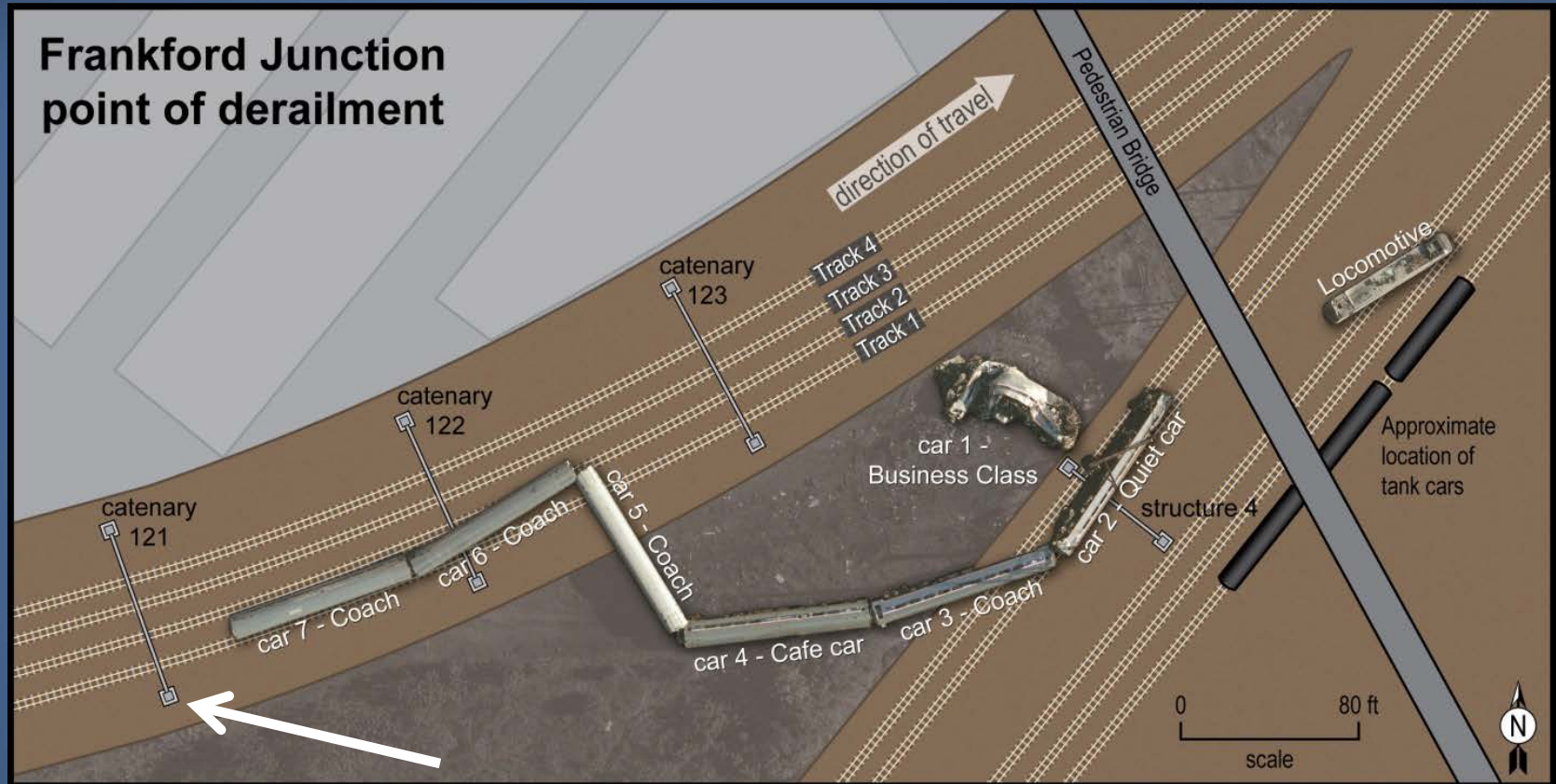
Dana Sanzo

Survival Factors Investigator

# Overview

- Derailment sequence
- Passenger railcar windows
- Occupant protection

# Derailment Sequence





# Derailment Sequence



# Derailment Sequence





# Passenger Car Four



# December 2013





# Previous NTSB Recommendation

## R-14-74 to FRA

- Develop a window performance standard to ensure that windows are retained
- Require that passenger railcars meet this standard

# Serious Injuries

- Forty-six people were seriously injured
- The majority sustained torso or chest injuries

# Occupant Protection

## Current requirements

- 49 CFR 238
- Minimize collision force effects
- Preserve occupant space
- Secure interior fittings

# Occupant Protection

Standards should:

- Protect occupants from lateral motion
- Prevent occupants from being struck by loose objects



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# Emergency Medical Response

Mary Pat McKay, MD, MPH

# Mass Casualty Incident (MCI)

- Number and severity of injuries overwhelm available medical resources
- Philadelphia Fire Department
  - Level I Mass Casualty Disaster
    - 253 occupants; 186 transported

# Ten Area Hospitals

## Six Level I/II Trauma Centers

- Staffing
- Resources
- Expertise
- Treat complex life threatening injuries

# Patient Priority (Triage) in an MCI

Separate injured survivors

- Emergent (red)
  - Urgent (yellow)
  - Less injured (green)
- Trauma Center**

Indicates:

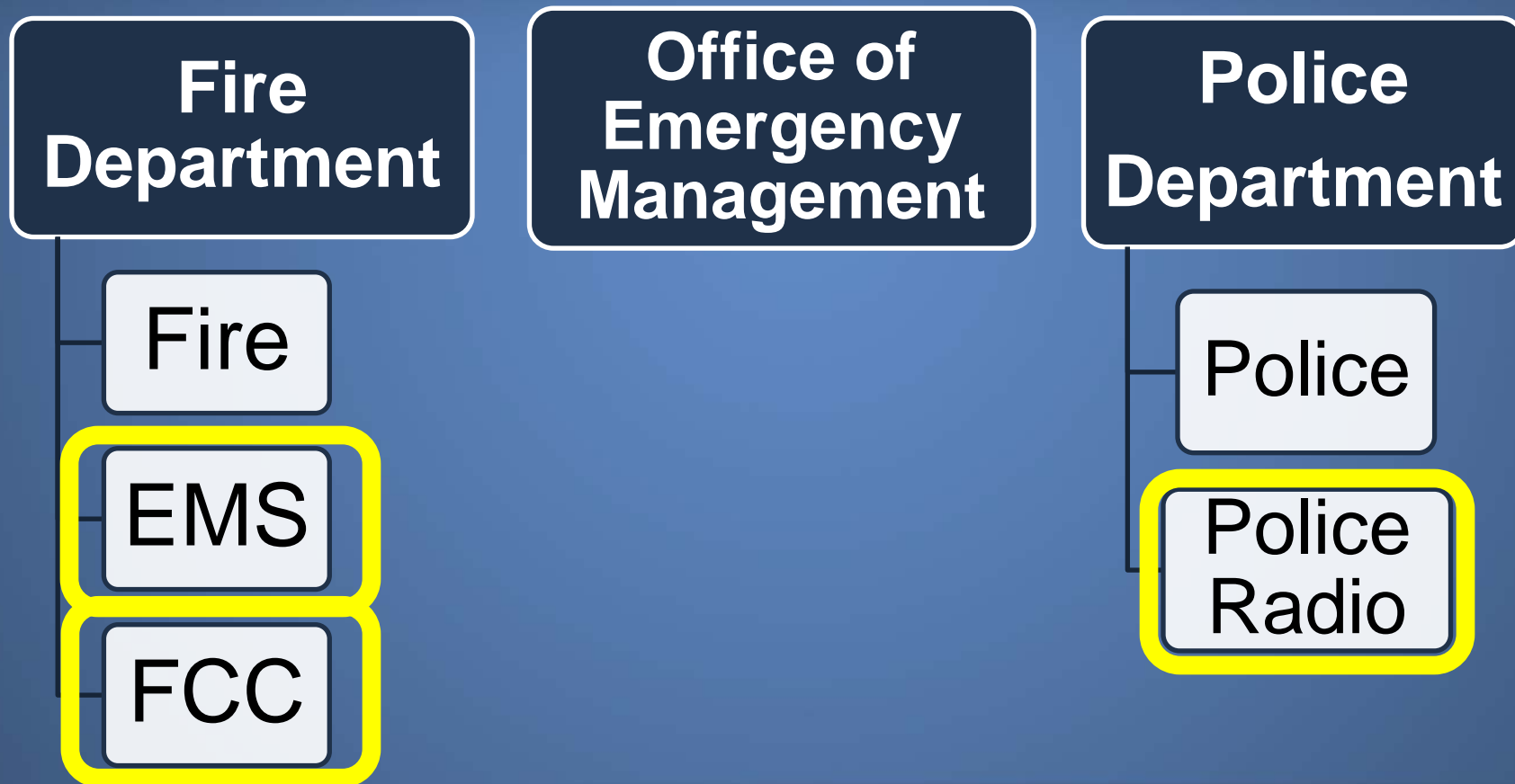
- Transport priority, type of hospital, and hospital resources

# EMS Transport Coordinator

- Identified within incident command structure
- Coordinates with hospitals to distribute injured without overwhelming hospital resources

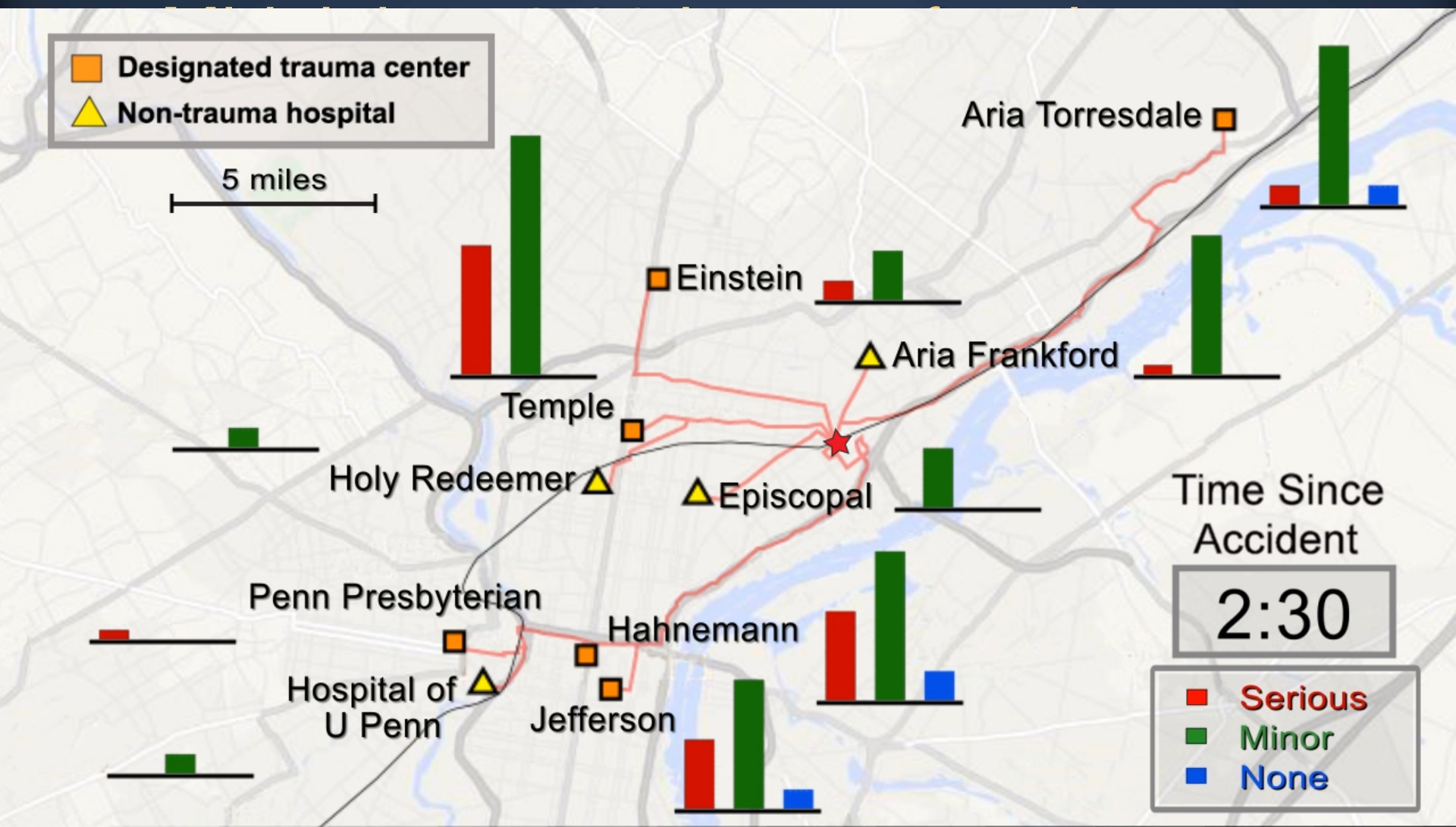


# Philadelphia Emergency Responders



# Philadelphia Police Department

- Routinely transports injured patients to hospitals in police vehicles
  - Penetrating trauma
  - Police choose destination
- Equivalent survival rates



# Following the Accident

- New Fire Dept. Procedure
  - No victim will be transported by police unless OK'd by the transport coordinator
- Draft Citywide Mass Casualty Plan
- No Police Dept. Procedure changes

# Novel Emergency Medical Response Issues

- Non-ambulance transportation
- Coordination and integration
- May be a reasonable use of resources in an MCI





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Mandatory  
Directions

Cancel

Warn 1

POWER