New Jersey Department of Transportation

ITS-NY
Intelligent Transportation Society of New York

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2026
ITSNY Annual Meeting

Quantifying the Impacts of AMC Interventions For NJDOT

Concurrent Technical Session: Technology Innovations

Thursday, June 18th , 2026

Introductions

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Acknowledgement

NJDOT Team:

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- Parth Oza
- Jaime Oplinger
- Kelly McVeigh
- Syed Kazmi
- John Fam
- Felipe Hernandez
- Sanjaykumar Patel
- Zahin Rabbi
- Mohamed Elhefnawi
- Roseann DiBenedetto
- Bashar Hadi
- Brendan Rahl

AMC Team:

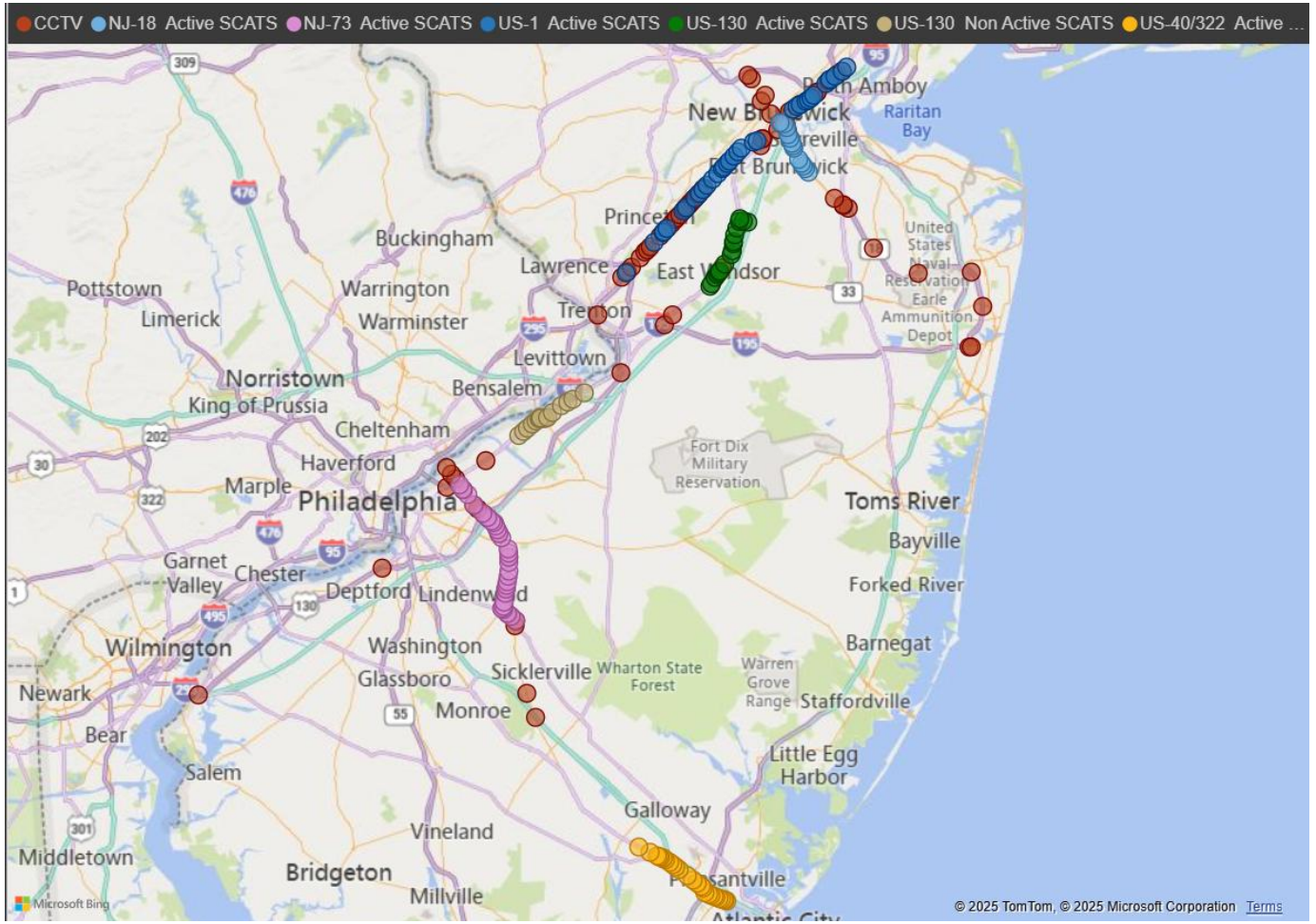
- AtkinsRéalis Team
- TechniQuest Corporation Team
- Colliers Engineering & Design Team

Current Scope of Arterial Management Center (AMC) Operation

<u>NJ Corridors (~150 signals)</u>

- US 1
- NJ 18
- NJ 73
- US 130
- US 40/322

Hours of Operation:
Monday – Friday
AM Shift: 6 AM – 2 PM
PM Shift: 12N – 8 PM
Supervisor: 8AM – 4 PM
Supported by: Colliers & TechniQuest



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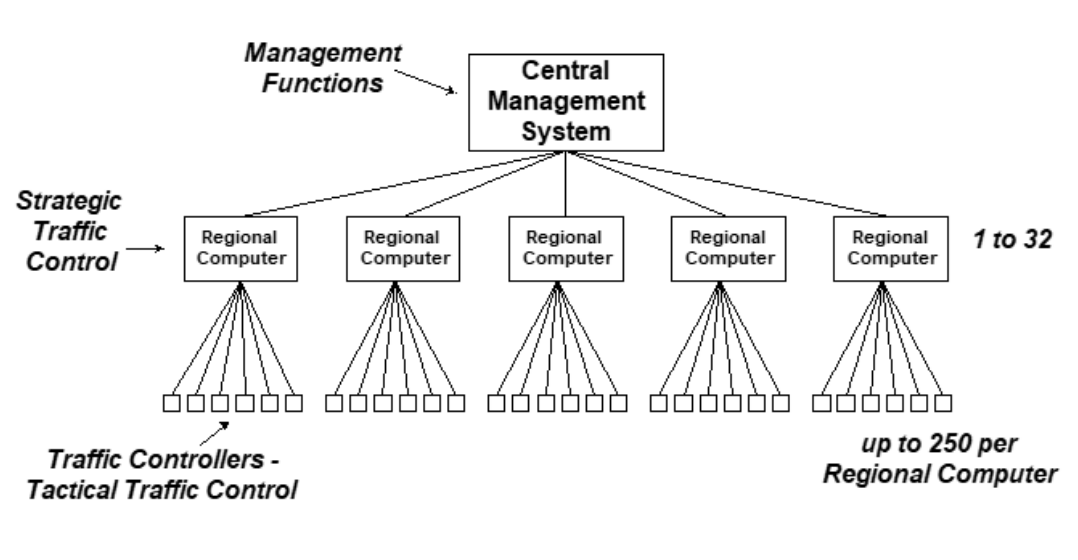
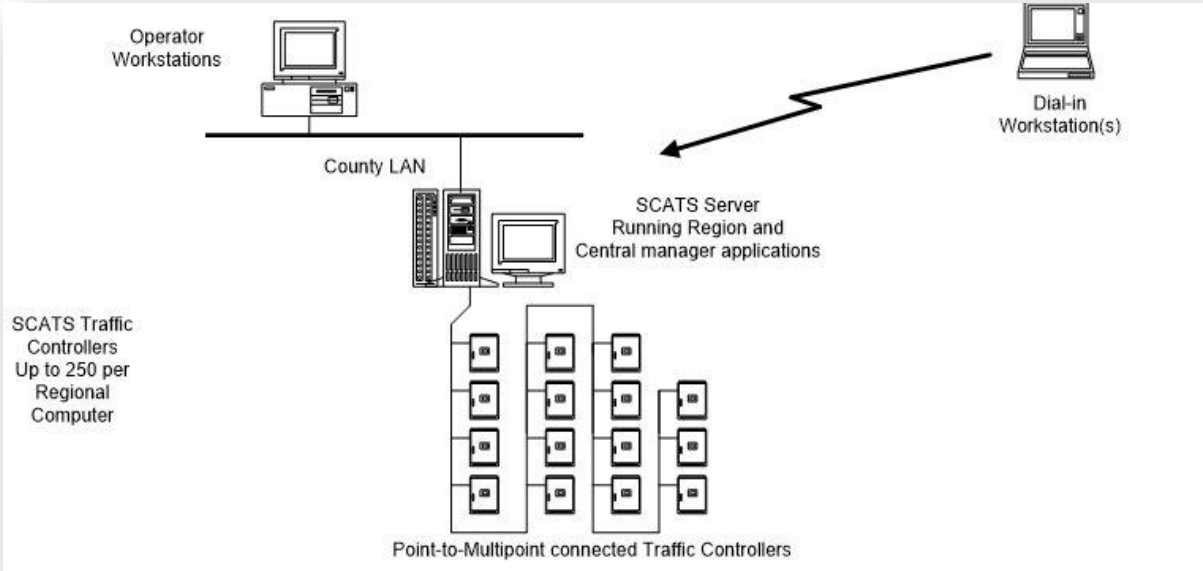
Sydney Coordinated Adaptive Traffic System (SCATS) System Architecture

How does it work?

- Range of strategies to manage the dynamic timing of traffic signals
- Collects real-time data from detectors as a measure of current traffic conditions and uses this to determine the optimum combination of cycle length, phase splits, and offsets, for each site across a corridor.





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AMC Operations – Routine Activities

AMC Operations

Monitoring
- Daily Issues Report
- Daily Monitor Log

Incident Management
- Incident Report
- Monitor/Make Recommendations
- Daily Incident Monitoring Log

Signal Timing Improvement
- Investigate Complaints
- Bottleneck Ranking
- Signal Issues Log (SCATS)
- Identify Signal Issues
- Analysis Tools
- Monitor Signal Improvement Impacts
- Before and After Study

System Operations/ Data Analytics
- Dashboards, Decision Support Systems (DSS), AMC LOS
- Corridor System Performance
- Signal Issues
- Equipment Performance
- Volume/Other Anomalies
- Quantifying Performance Impacts

Work Orders
- Submit work orders
- Track work orders progress

Project Management
- Schedule/ Staff Management
- Attendance Records
- Task Assignments
- Conduct Weekly Staff Meetings

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NJDOT Arterial Management Center Performance Dashboards

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Additional Services

- System
- Equipment
- Safety Overview
- Simulation Status
- INRIX Signal Analytics Overview
- Data Collection Status
- Custom Analysis
- CMAQ Analysis
- Rotation
- Green Time Anomaly
- Volume
- Degree of Saturation
- MX
- Time Space Diagrams
- Pedestrian Wait Time
- Longer Split on Side St.
- Impact Analysis
- Detector Performance & Asset Management
- Real Time Alarm Impact

Coming Soon Services

- DSS
- Work Zone
- TSP Candidates
- Air Quality
- Red Light Extension Analysis
- Predictive Asset Maintenance
- AMC Initiated Investigations
- Land Use and Redevelopment Impacts
- Adaptive Corridor Candidate Evaluation
- Latest Corridor SYNCHRO/VISSIM Files
- SCATS Modifications for Weather Impacted Alarms

Daily Monitoring

- Map
- Work Orders
- Incident Management
- Signal Issues
- Operations Overview
- AMC LOS

On all dashboard pages, to export data to CSV/Excel, simply hover on any table or chart, click the three dots on the top right corner, and you'll see the 'Export data' option.

Thank you for visiting AMC Operation Dashboards. On top of each dashboard, menus are provided for your select query. The dashboards are developed according to the needs of AMC Operation and are a work in progress. Please reach out to "Sheida.khademi@atkinsrealis.com" or "Deep.Patel@atkinsrealis.com" for any questions.

NJDOT AMC SCATS Corridor

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Start Page

Clear All Filters

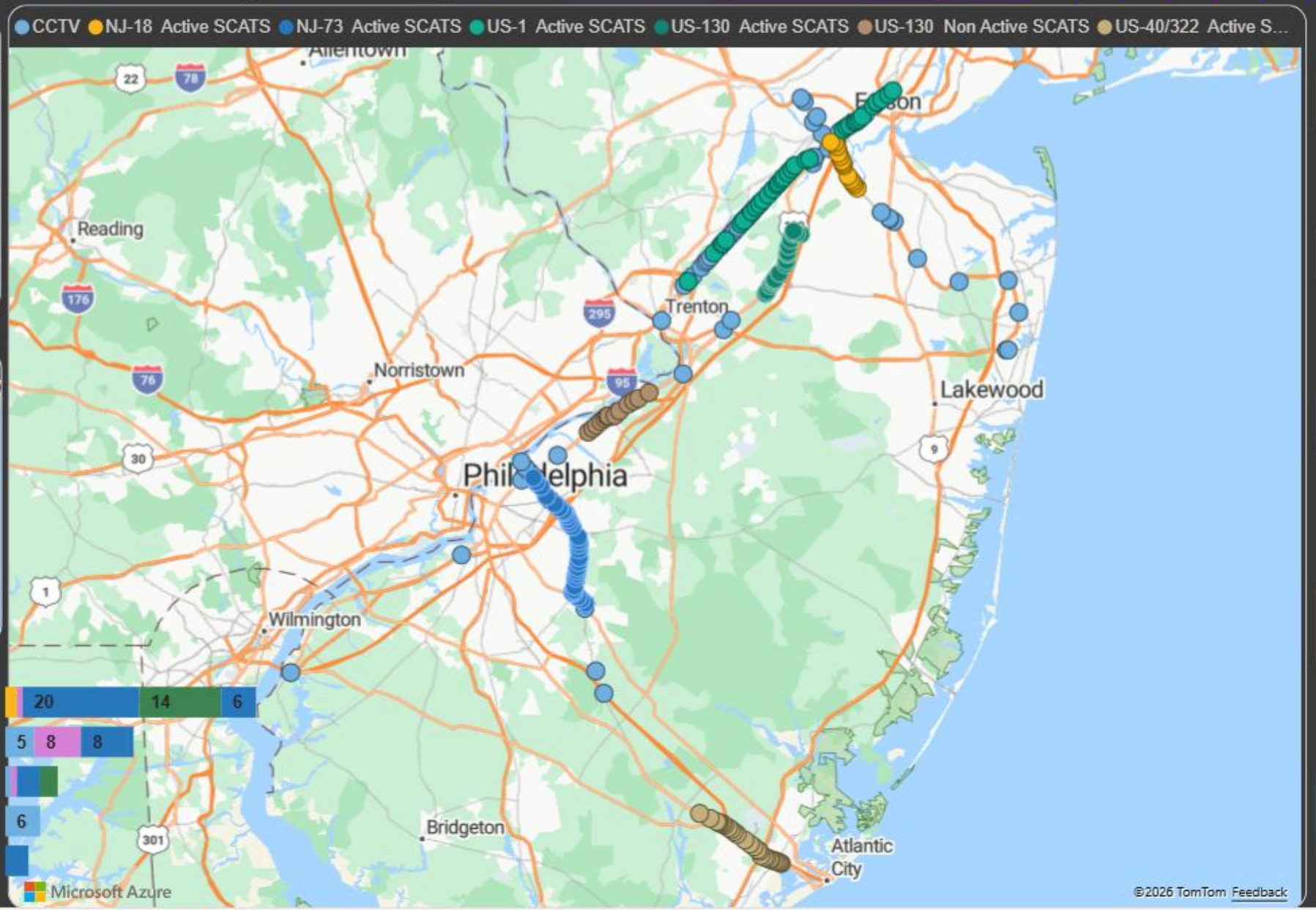
Corridor: All

Device Type: All

Detector Type: All

Site ID: All

Intersection Schema



NJ-18
NJ-322
NJ-73
US-1
US-130
US-40

Camera
98

Non Active SCATS Sites
16

Active SCATS Sites
121

Number of Image Detectors
494

Number of Radar Detectors
126

Incident Management Dashboard

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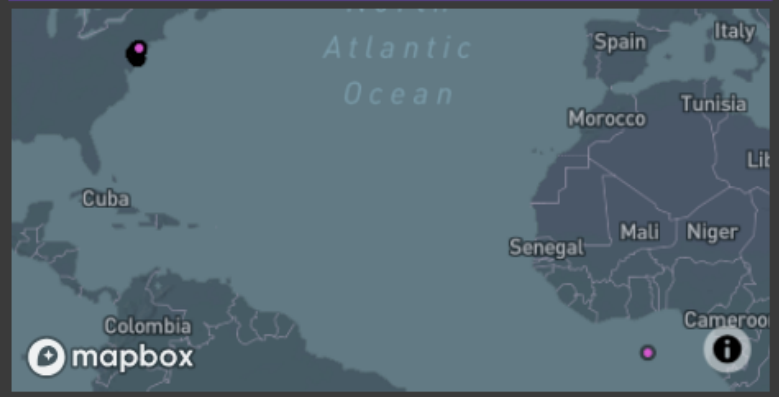
Start Page

Corridor: All | Site ID: All | Year: All | Month: All

Aaron Road



Intersection Schema

Number of Incidents

1512

4/9/2023

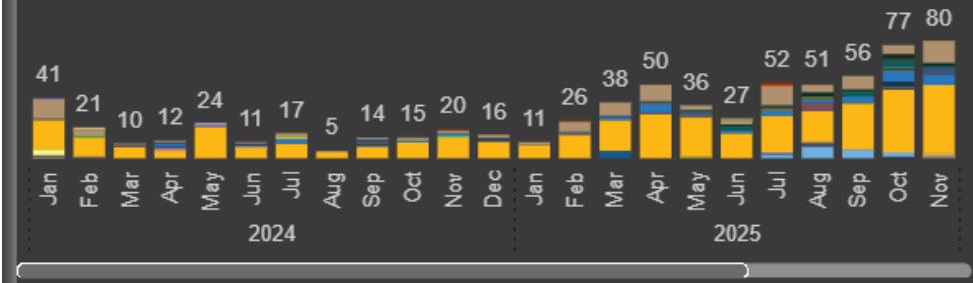
Number of Incidents by Date

Hold Ctrl to select multiple days

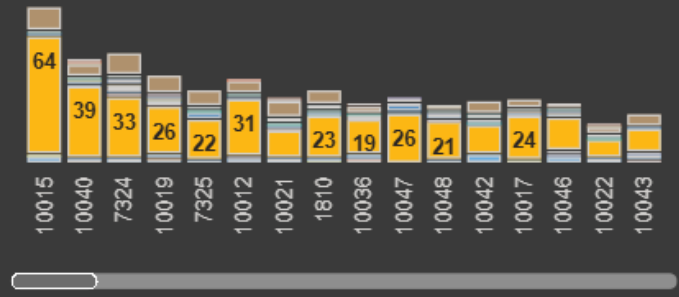
April 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

Number of Incidents by Month



Number of Incidents near SCATS Sites



Incident Summary

All

Click to see Action details

AMC Operator	AMC Supervisor	NJDOT Staff
	Deep Patel	

No	Action	Action Time	Action
0	Start	4/9/2023 4:23:00 PM	Incident Observed
0	Start	5/7/2023 4:18:00 PM	Incident Observed
0	Start	11/27/2023 3:21:00 PM	Incident Observed
0	Start	12/6/2023 7:07:00 AM	Incident Observed
0	Start	12/6/2023 3:11:00 PM	Incident Observed
0	Start	12/11/2023 6:43:00 AM	Incident Observed
0	Start	12/11/2023 10:59:00 AM	Incident Observed
0	Start	12/11/2023 4:43:00 PM	Incident Observed
0	Start	12/13/2023 11:36:00 AM	Incident Observed
0	Start	12/14/2023 7:53:00 PM	Incident Observed
0	Start	12/18/2023 2:34:00 AM	Incident Observed
0	Start	12/18/2023 7:32:00 AM	Incident Observed
0	Start	12/18/2023 11:32:00 AM	Incident Observed
0	Start	12/18/2023 6:17:00 PM	Incident Observed
0	Start	12/19/2023 8:41:00 AM	Incident Observed
0	Start	12/19/2023 10:28:00 AM	Incident Observed
0	Start	12/19/2023 1:02:00 PM	Incident Observed
0	Start	12/19/2023 3:34:00 PM	Incident Observed
0	Start	12/19/2023 6:55:00 PM	Incident Observed
0	Start	12/20/2023 6:29:00 PM	Incident Observed

Duration in Minutes for Incident per Street and Date

AMC Impacts and Predictive Maintenance

📊 **Total Incidents Analyzed:**

- **58** incidents from **January 2024 to March 2026** where AMC interventions were applied

🛣️ **Corridors with AMC Intervention:**

- **US-1**: 43 incidents
- **NJ-18**: 8 incidents
- **NJ-73**: 7 incident

📍 **Corridor Characteristics:**

- **Corridor lengths** range from **~1.16 mi to ~12.3 mi**
- **Approach directions** include **Southbound (SB)**, **Northbound (NB)**, and **All Directions**
- Interventions varied by location and included **signal timing adjustments**

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Stepwise Analysis Approach

Incident Identification

- Extracted incident start/end times Based on SCATS logs and NJDOT AMC logs
- Included both: 58 incidents with AMC interventions ~550+ incidents without interventions where AMC was notified (clean dataset)
- Classified by type of incident, lane closure, and corridor location

Travel Time Extraction

- Used RITIS to define impacted segments
- Extracted travel time data:
  - For each incident period
  - For full-years 2025 and 2026 — used in ML prediction model development and comparisons

Data Integration & Scenario Definition

- Merged SCATS minute-level volume data with incident timelines
- Integrated historical travel time models (no-intervention baseline)

Stepwise Analysis Approach

Scenario Definition

Scenario 1: Travel time for segments during incidents without AMC interventions
Scenario 2: Travel time for segments during incidents with AMC interventions
Scenario 3: Travel time for same segments during non-incident days (baseline conditions)

Predictive Modeling for Counterfactual Scenario

To estimate **what the travel time would have been** if **AMC interventions were not applied** in

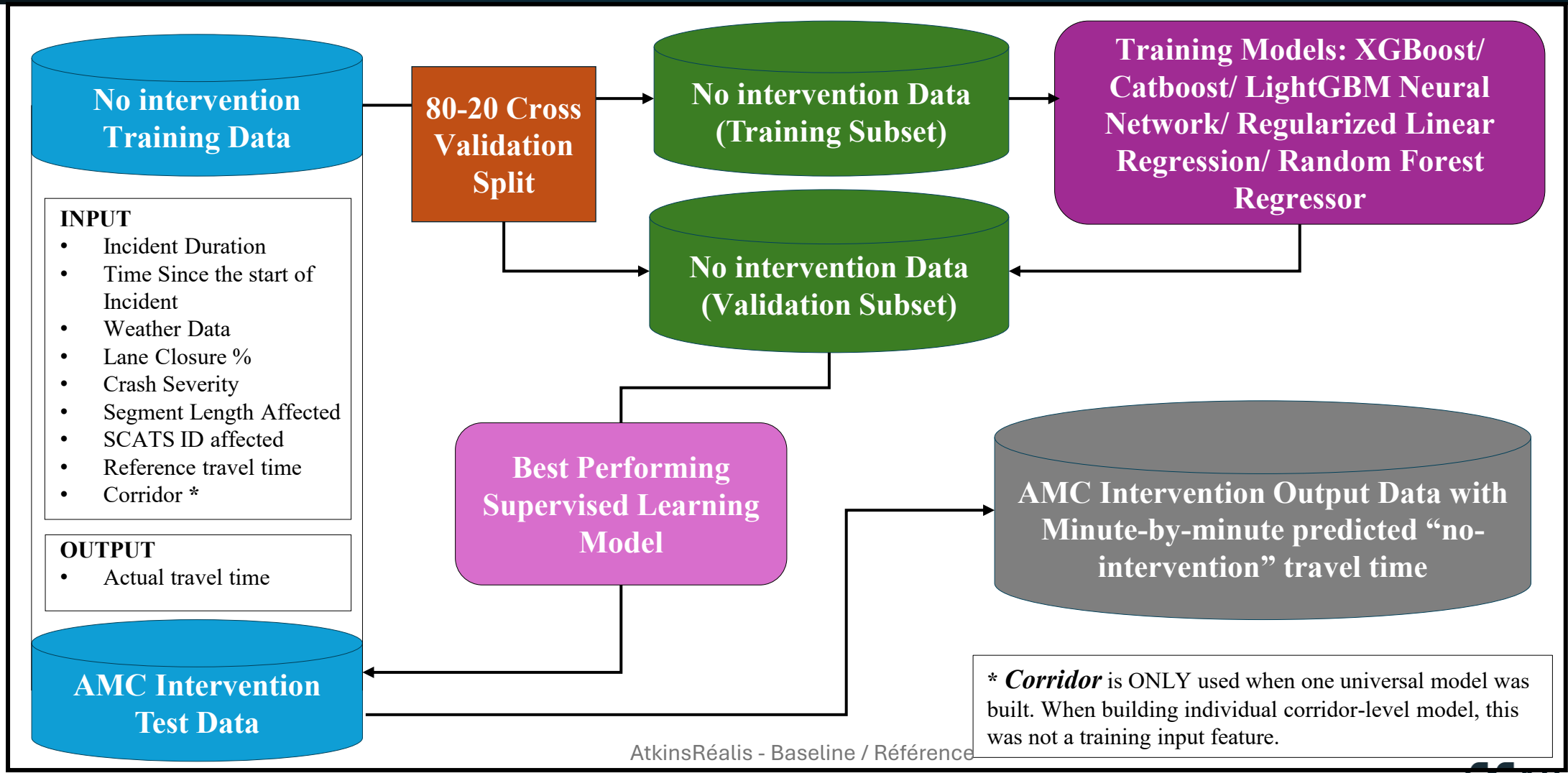
🧠 **Model Inputs:**

- Day of week
- Time of day
- Scats ID and direction
- Historical traffic volume
- Lane closure info
- Weather conditions
- Comparable incident profiles without intervention

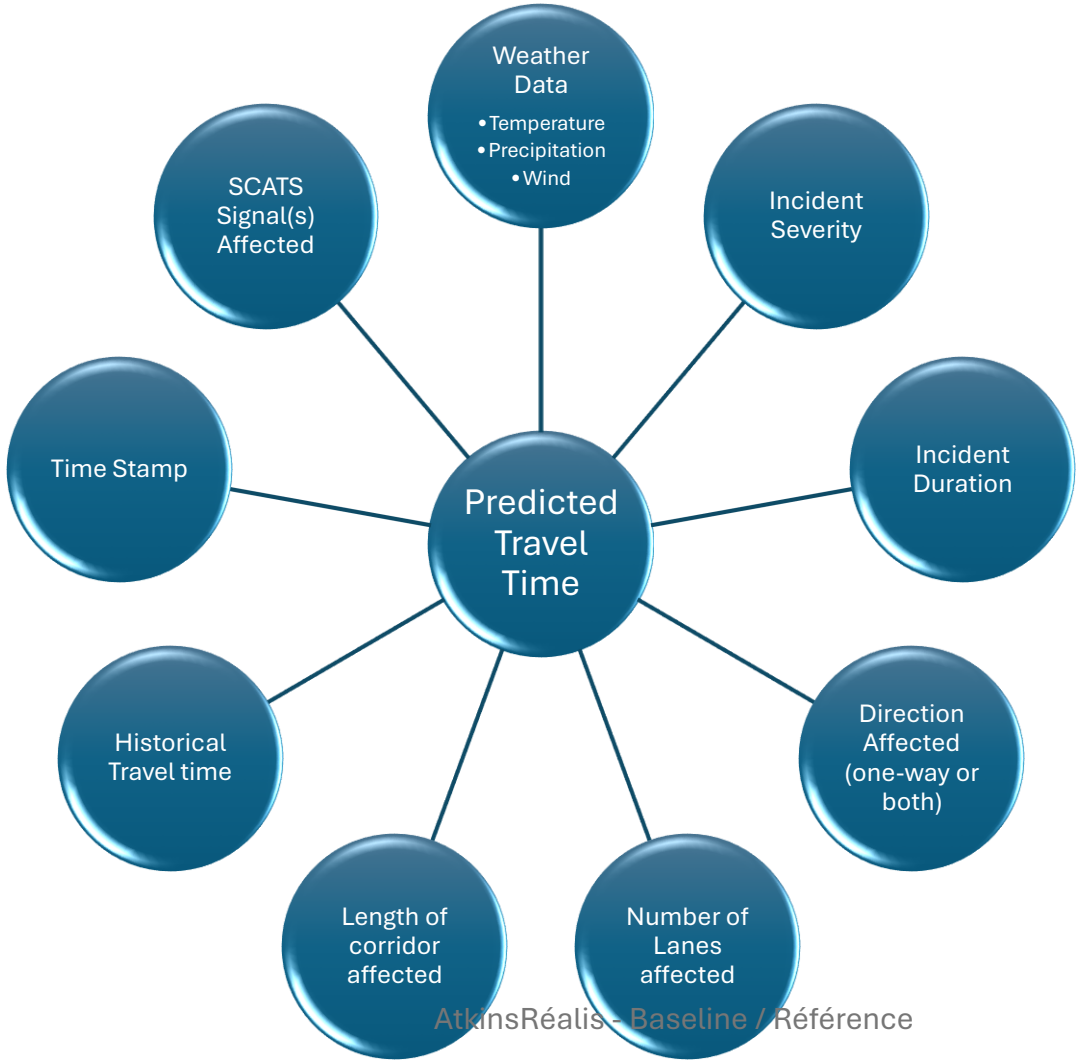
⚒️ **Model Output:**

- Predicted Travel Time (No Intervention)
- Used to compare against observed time to estimate

Stepwise Analysis Approach

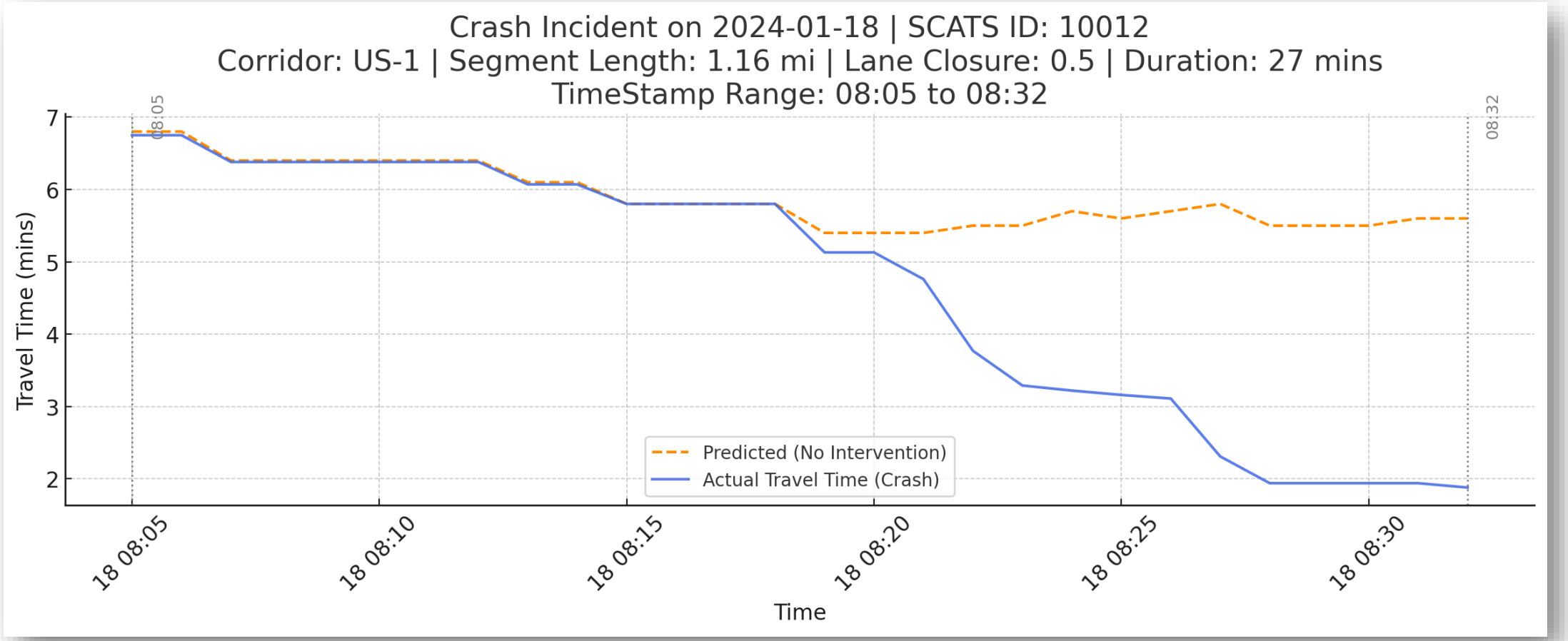


Stepwise Analysis Approach



Stepwise Analysis Approach

Preliminary Results



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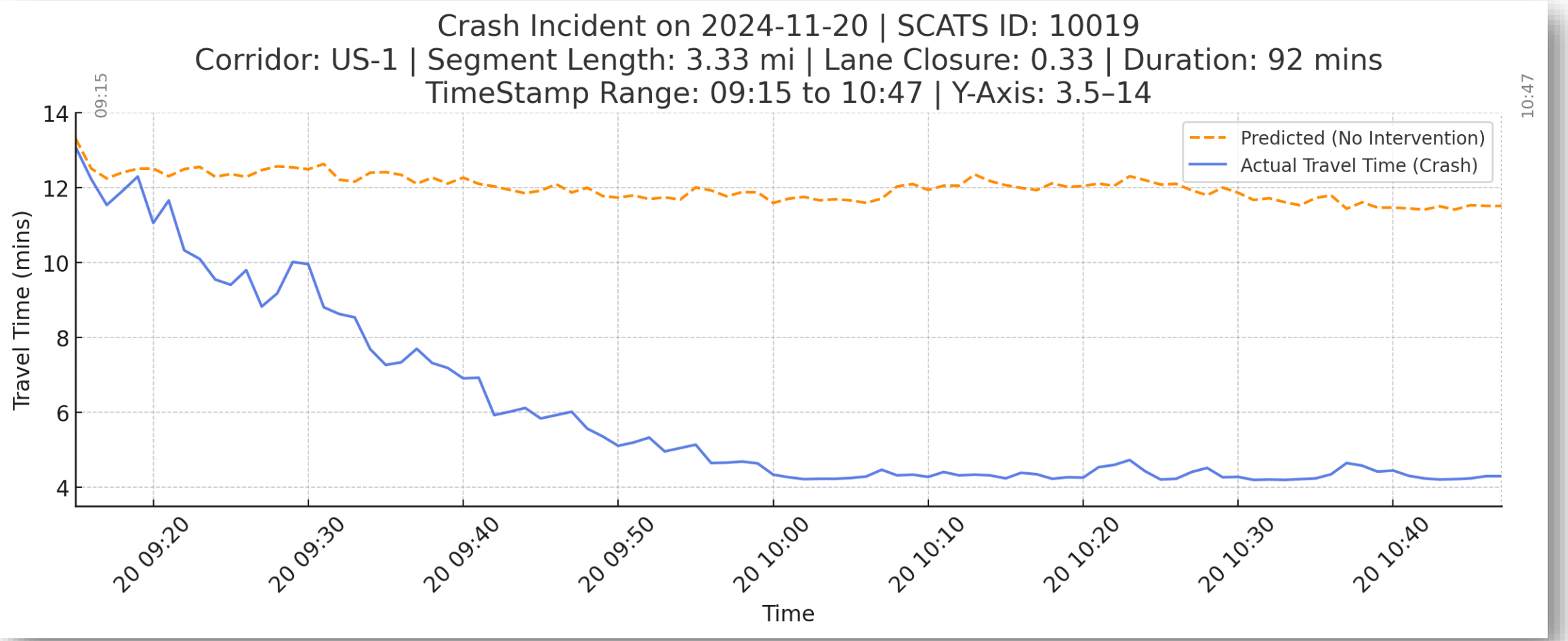
Preliminary Results



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Preliminary Summary

🔍 Impact Summary from 58 Incident Response Interventions

- 💰 **Total Dollar Savings**
  - Volume-based savings: $316,482.94
- ⏱️ **Travel Time Efficiency**
  - Total Minutes of Travel Time Saved: 21,614 mins
- 🚙 **Beneficiaries**
  - 205,539 vehicles
  - ~238,400+ people

Other Impacts that will be quantified:

- Travel Time Reliability
- Signal Timing Improvements
- Equipment Uptime
- Incident Monitoring Value
- Environmental Benefits

PDH Questions

Q: How many signals are included in AMC operations?

Q: What corridors are included?

Q: How does SCATS work?

Q: What scenarios were analyzed?

Q: How does SCATS work?

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PDH Questions

Q: How many signals are included in AMC operations?

A: *About 150 signals across NJ corridors*.

Q: What corridors are included?

A: *US-1, NJ-18, NJ-73, US-130, and US-40/322*.

Q: How does SCATS work?

A: *It uses real-time traffic data to optimize signal timing (cycle length, splits, and offsets)*.

Q: What scenarios were analyzed?

A: *With AMC intervention, without intervention, and normal conditions*.

Q: How does SCATS work?

A: *It uses real-time traffic data to optimize signal timing (cycle length, splits, and offsets)*.

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Thank you