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# Identifying Secondary Crashes on Freeways Using Real-Time Traffic Data



**Angela Kitali**, Graduate Research Assistant  
**Priyanka Alluri**, Assistant Professor  
Florida International University

**Thobias Sando**, Associate Professor  
University of North Florida

**Project Manager:**  
**Pete Vega**, P.E.  
Florida Department of Transportation

# Presentation Overview

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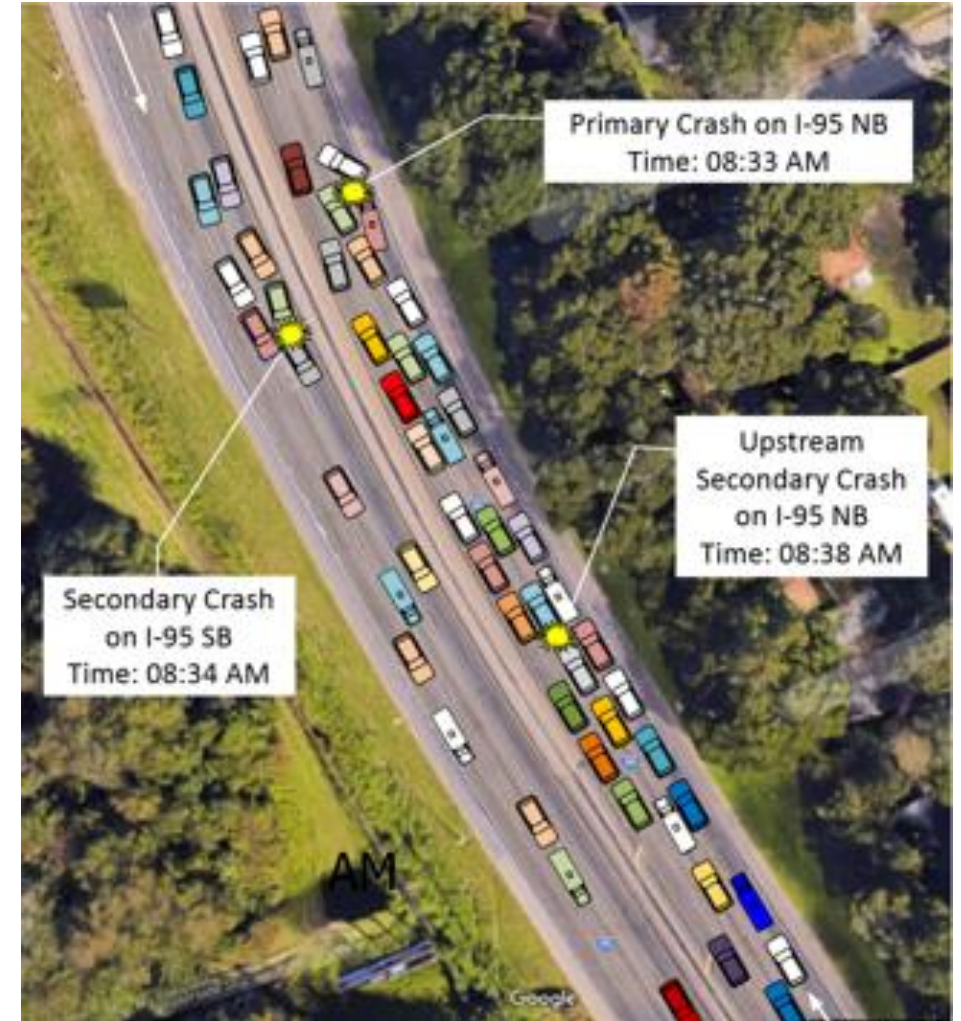
- Background
- Research Objective
- Data Sources
- Methodology
- Results
- Conclusion

# Secondary Crash

A traffic incident is considered a secondary crash if it occurred as a result of a prior incident.

Secondary crashes occur:

- At the scene of the primary incident
- Within the queue
  - Upstream of the primary incident
  - In the opposite direction of the primary incident due to driver distraction



# Challenges with Identifying Secondary Crashes

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- No specific definition of secondary crashes
- No consistent approach to identify secondary crashes
- Identification of secondary crashes is a function of several variables
  - Traffic flow parameters, i.e., speed, flow, density
  - Spatio-temporal relationship with the primary incident

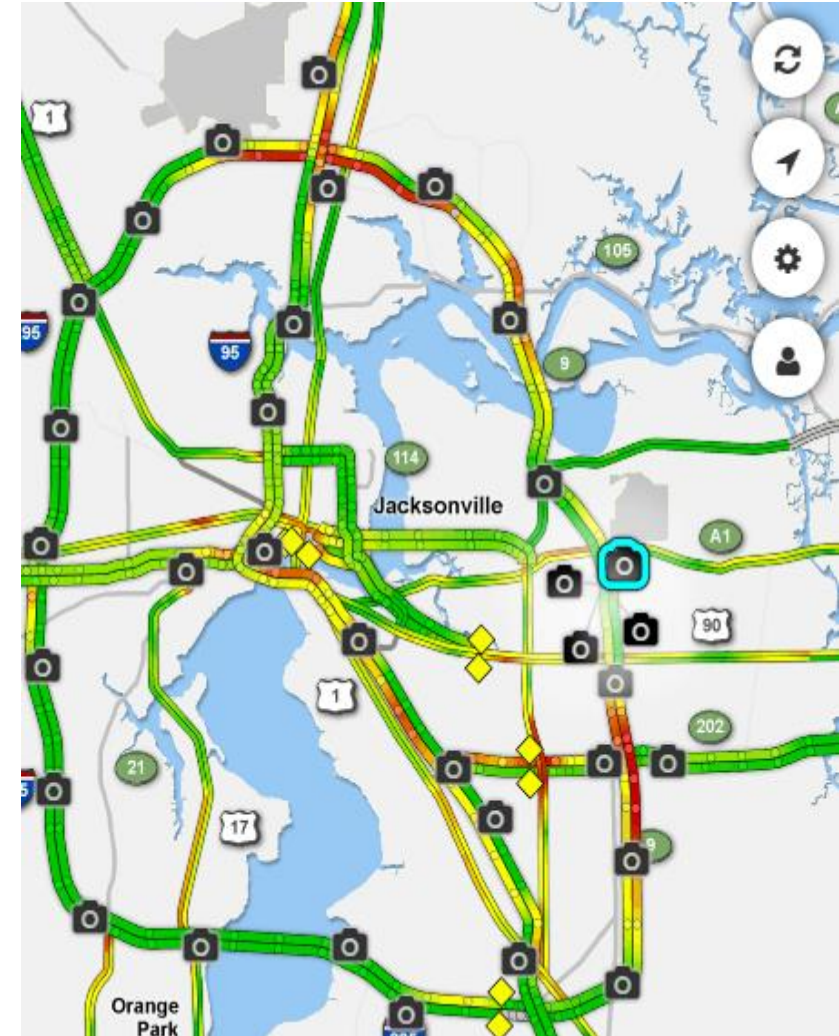
# Manual Method

## Identify secondary crashes:

- Onsite
- Offsite
- based on experience

## Limitations

- Subjective
- Random
- Inconsistent
- Unreliable
- Inefficient



# Static Method

Determine secondary crashes based on fixed spatio-temporal thresholds

## Limitations

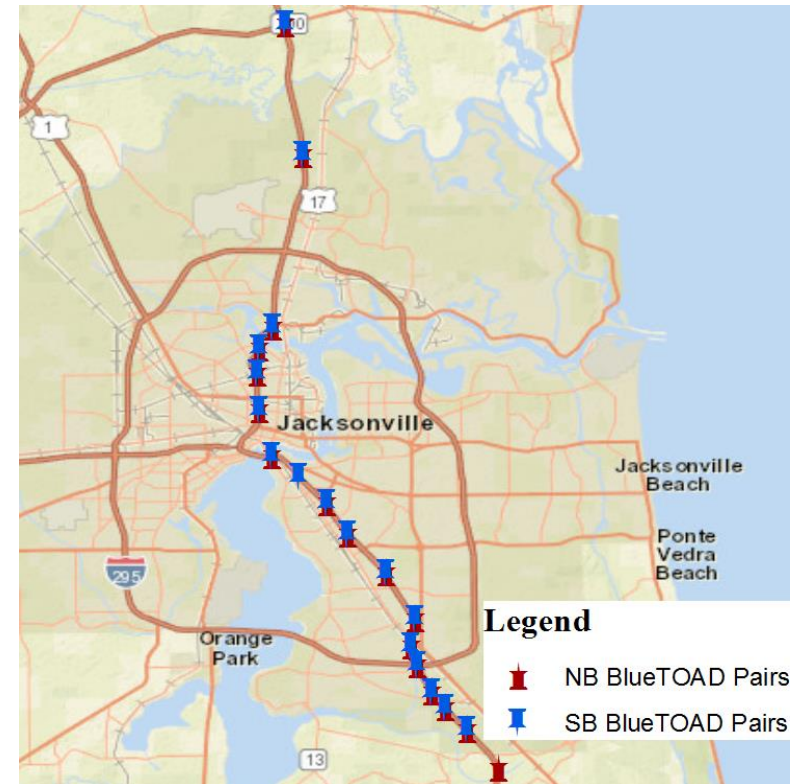
- Does not consider queue length
- Subjective assumptions on fixed spatio-temporal parameters.
- Incidents with incorrect/missing location information are excluded.
- Cannot capture incidents unreported in the database.



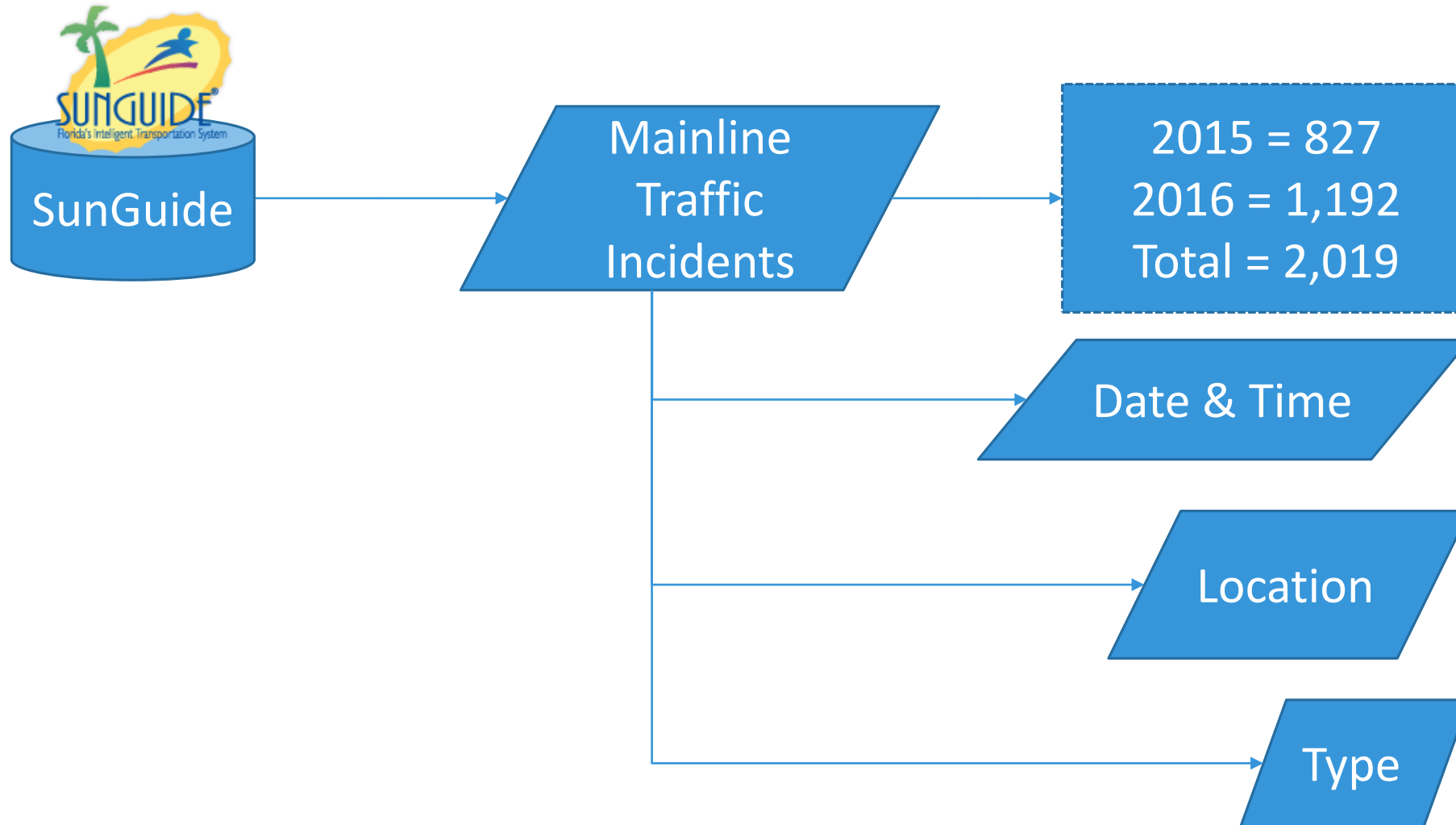
# Research Objective and Study Location

**Objective: Explore the feasibility of using real-time traffic data to identify secondary crashes on freeways**

- 25-mile section on I-95, Jacksonville
- 31 active BlueToad pairs (16 NB & 15 SB)
- Average spacing ~ 1.7 miles
- 55-70 mph speed limit

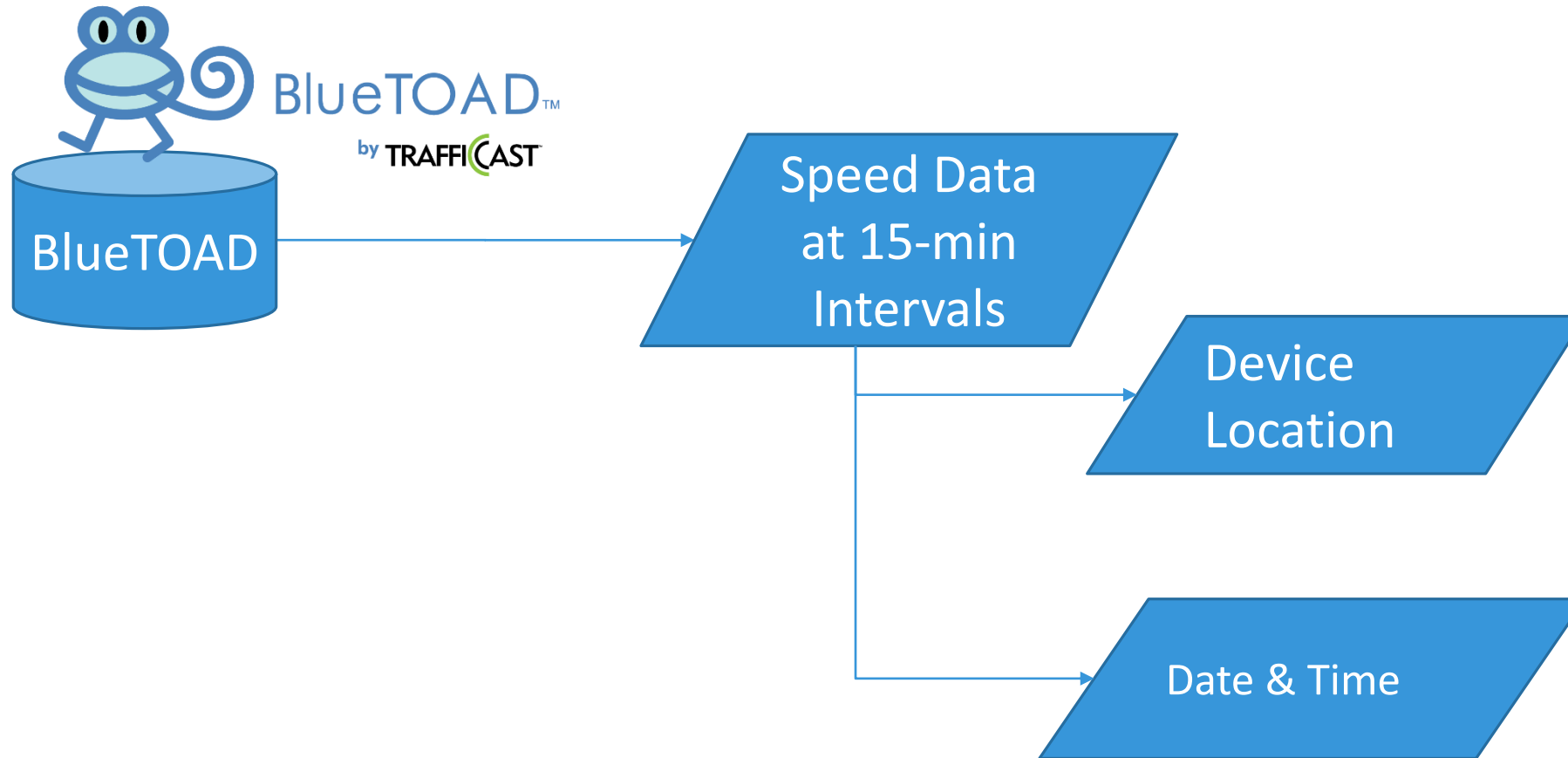


# Data Source for Incidents

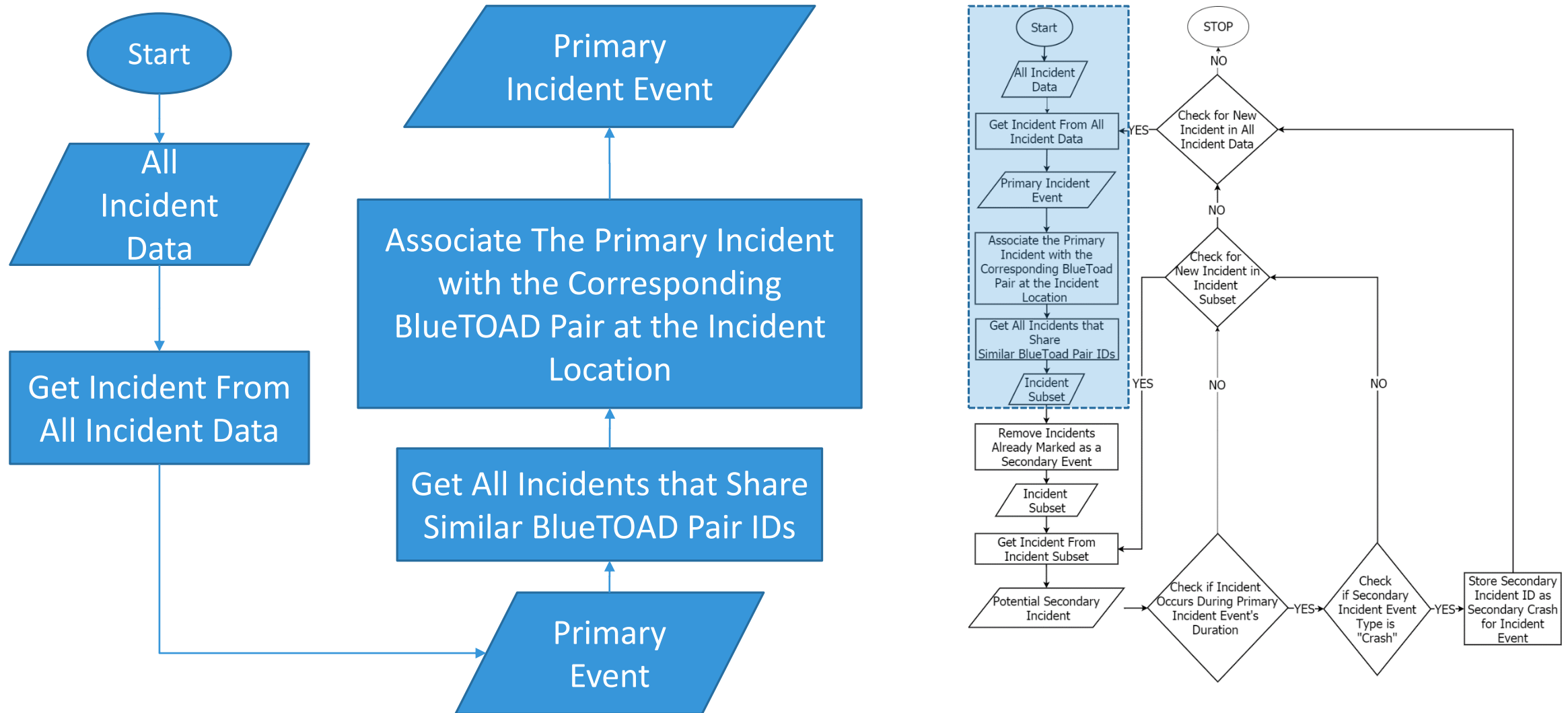




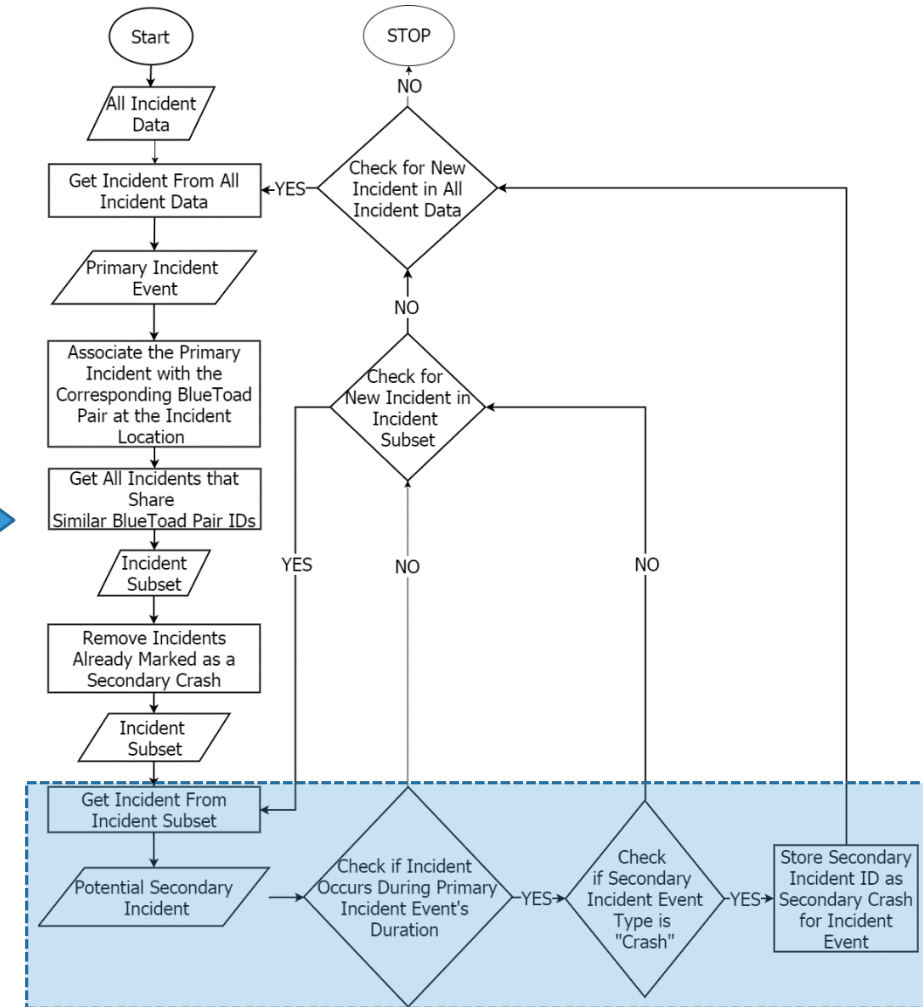
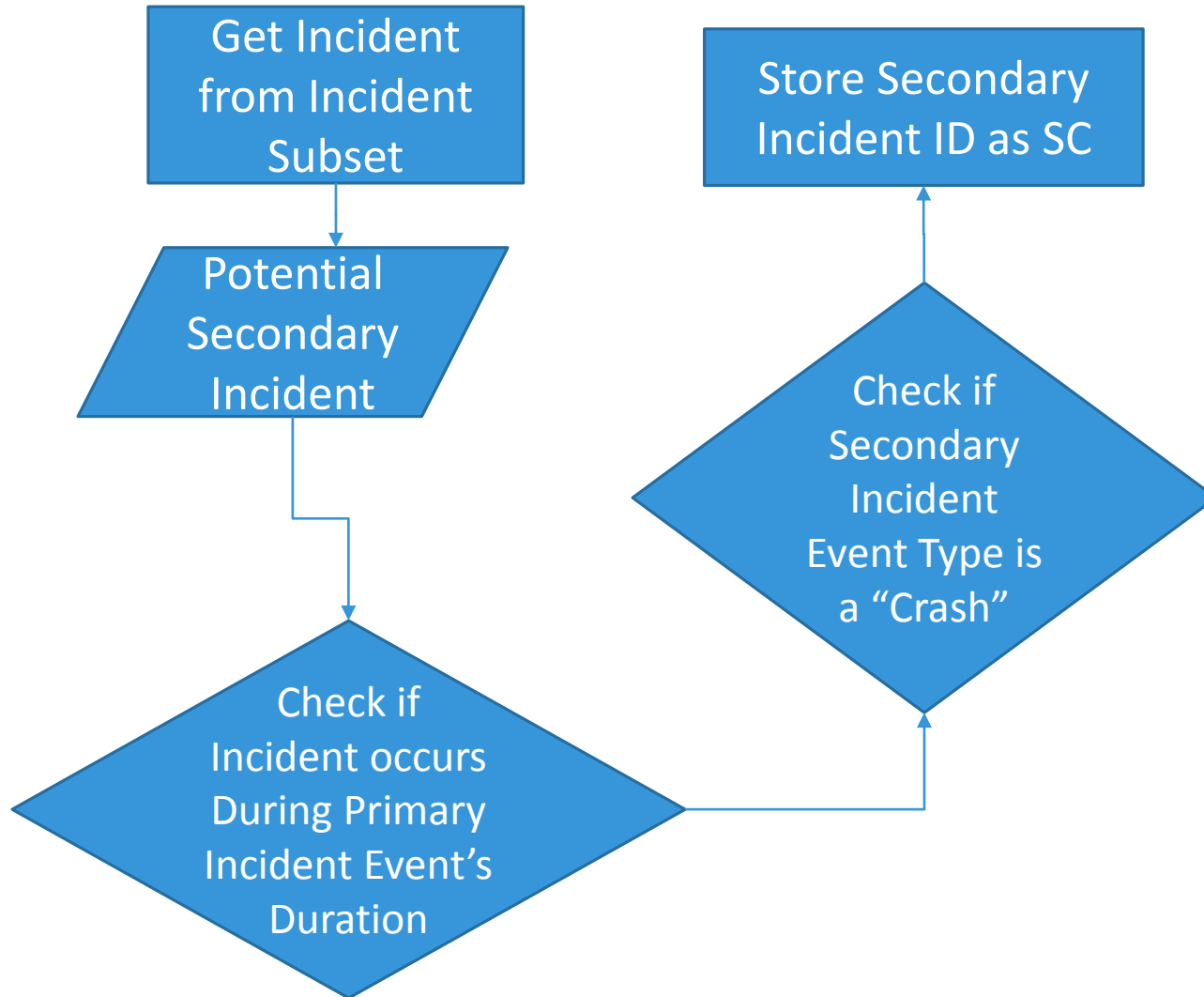
# Data Source for Real-time Traffic Information



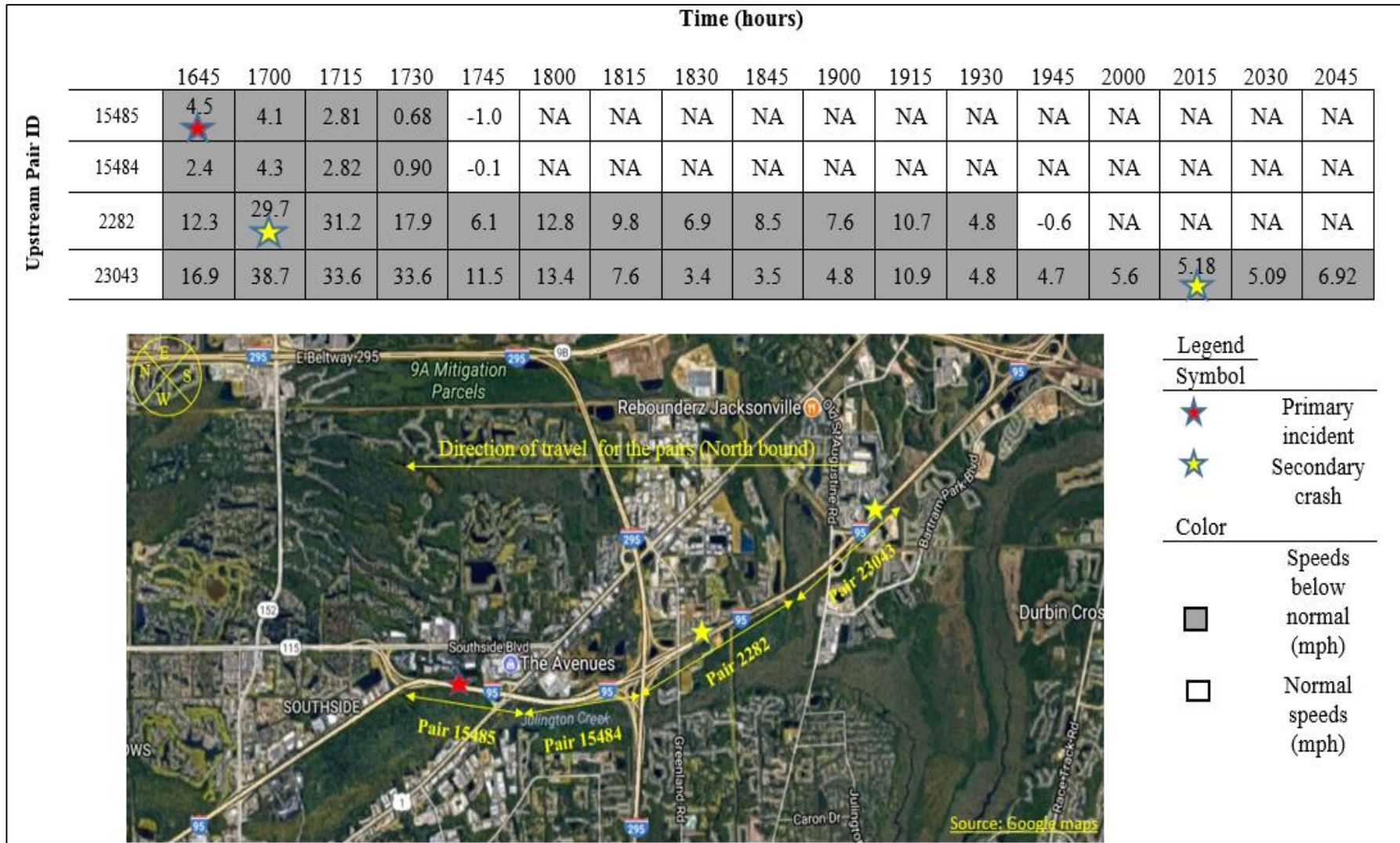
# Step 1: Create Incident Subset



# Step 2: Identify Secondary Crashes

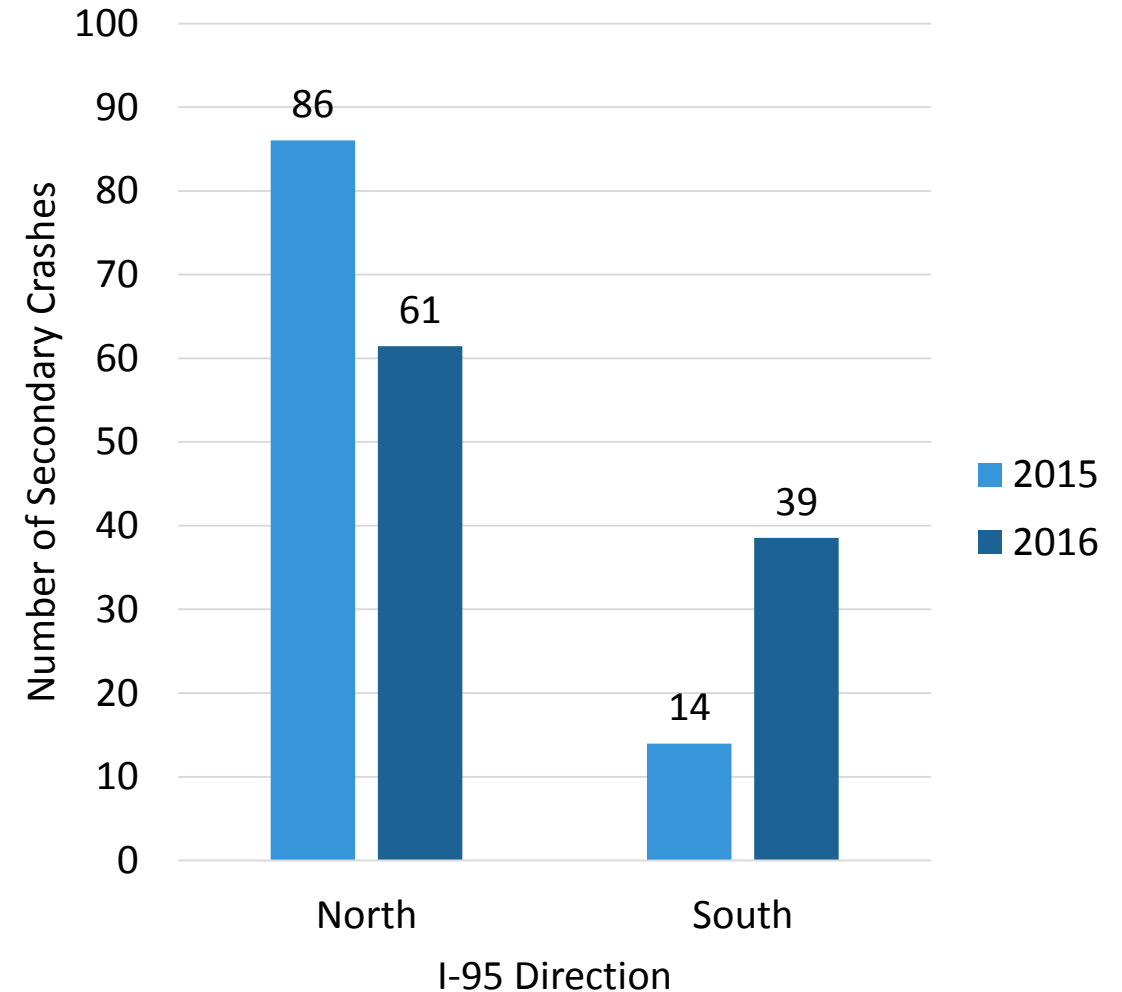


# An Example



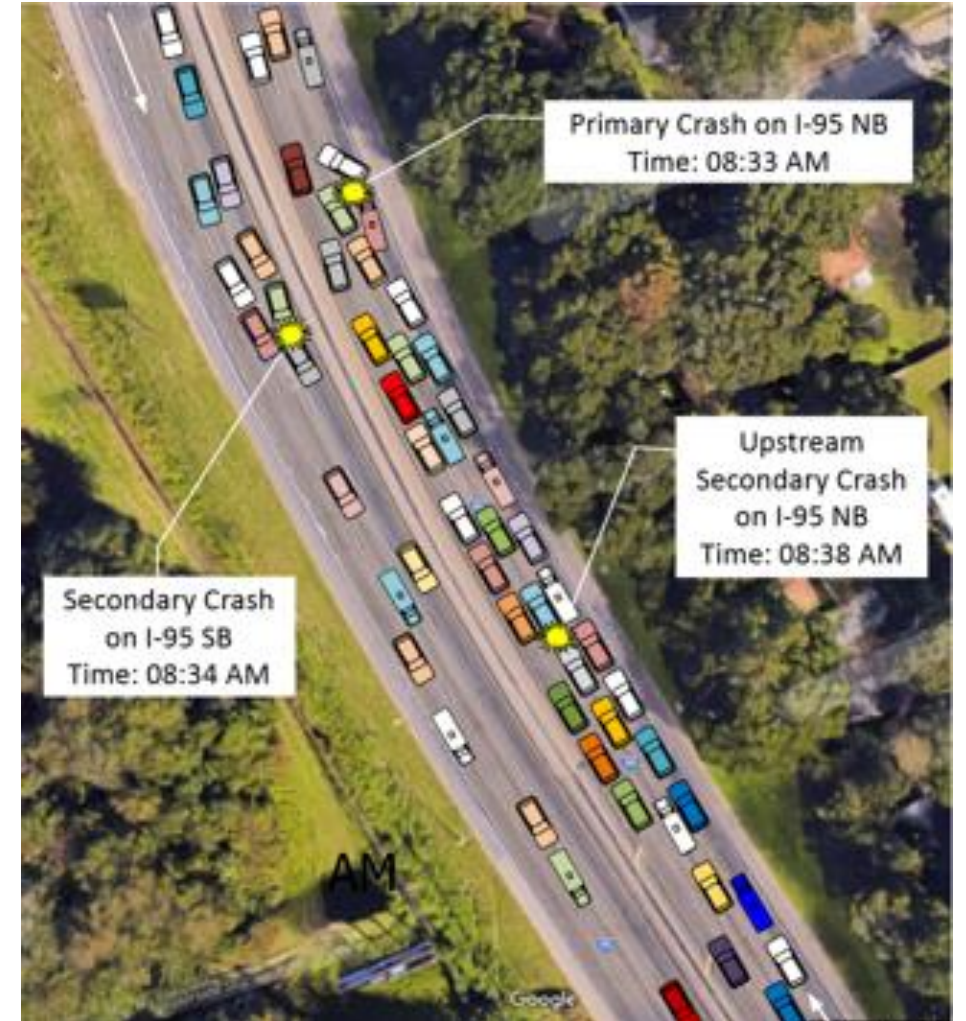
# Results

- 2,019 traffic incidents were used to identify secondary crashes
- 8% of incidents that occurred along I-95, Jacksonville are secondary crashes
- 11% occurred in the opposite direction
- 89% occurred in the upstream direction of the primary incident



# Limitations of Dynamic Method

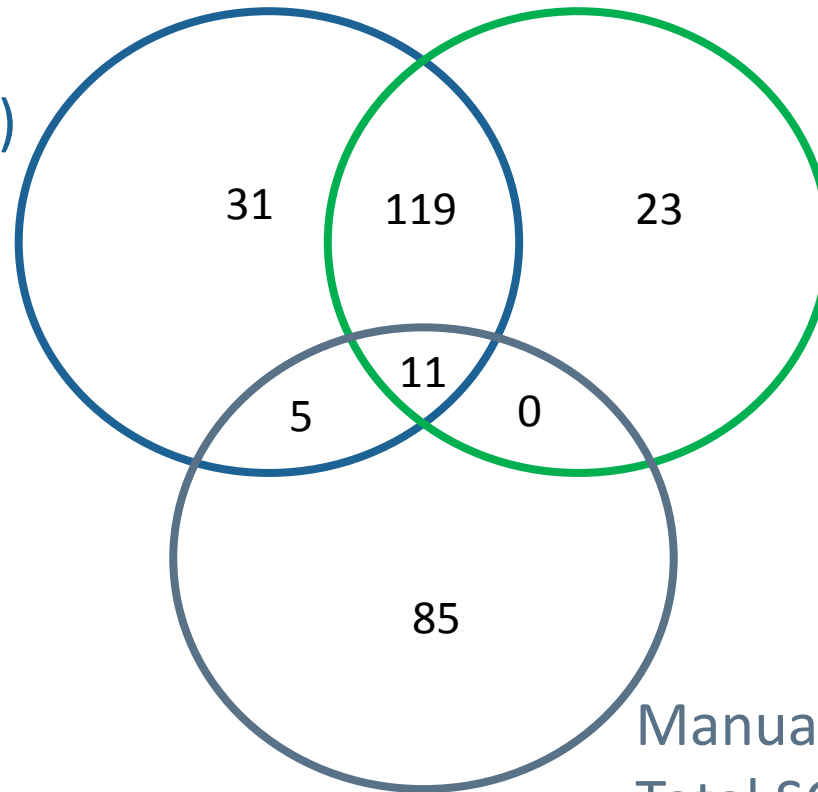
- Resource intensive
- Data intensive
- Incidents with incorrect/missing location information are excluded
- Cannot capture incidents not reported in the database
- Not applicable to arterials



# Static vs. Dynamic vs. Manual Methods

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Static Method  
(2 miles, 120 min)  
Total SCs: 166



Dynamic Method  
Total SCs: 153

Manual Method  
Total SCs: 101

# Conclusions

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- Proper identification of SCs is pivotal to accurate reporting of the effectiveness of the programs in reducing SCs.
- Manual method is unreliable and inefficient.
- Identifying SCs using static method with fixed spatio-temporal thresholds is not the most accurate approach.
- Dynamic method using real-time traffic information is recommended; however, it is resource intensive.
- A combination of static and dynamic approaches might be more feasible.



# Thank You!

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**Angela Kitali**

Florida International University

(904) 514-5980

[akita002@fiu.edu](mailto:akita002@fiu.edu)

**Priyanka Alluri, Ph.D., P.E.**

Florida International University

(305) 348-3485

[palluri@fiu.edu](mailto:palluri@fiu.edu)

**Thobias Sando, Ph.D., P.E., P.T.O.E.,**

University of North Florida

(904) 620-1142

[t.sando@unf.edu](mailto:t.sando@unf.edu)