

# CTA Innovation Studio Update

New Right-of-Way (ROW) Intrusion Pilot with Sensonic

June 2025



Chicago Transit Authority

# 2024 Innovation Studio Problem Statements



## Customer Experience

How can CTA expand real-time arrival and alert signage to bus stops?



### Two Digital Signage Pilots

- Push to speech functionality
- Awaiting delivery of hardware
- CTA finalizing installation plan based on solar surveys
- Anticipate installation beginning late July 2025



## Safety

How can CTA automatically detect people or large objects on the tracks to enable swift intervention?



- Seeking Board approval this month for stipend for fiber -optic detection pilot (discussing today)
- Installation for camera -based pilot with STV expected July



## Process

How can CTA automatically monitor the condition of physical assets at bus stops or their use over time?



- No-Cost Pilot leveraging bus camera video anticipated to kick off in July 2025

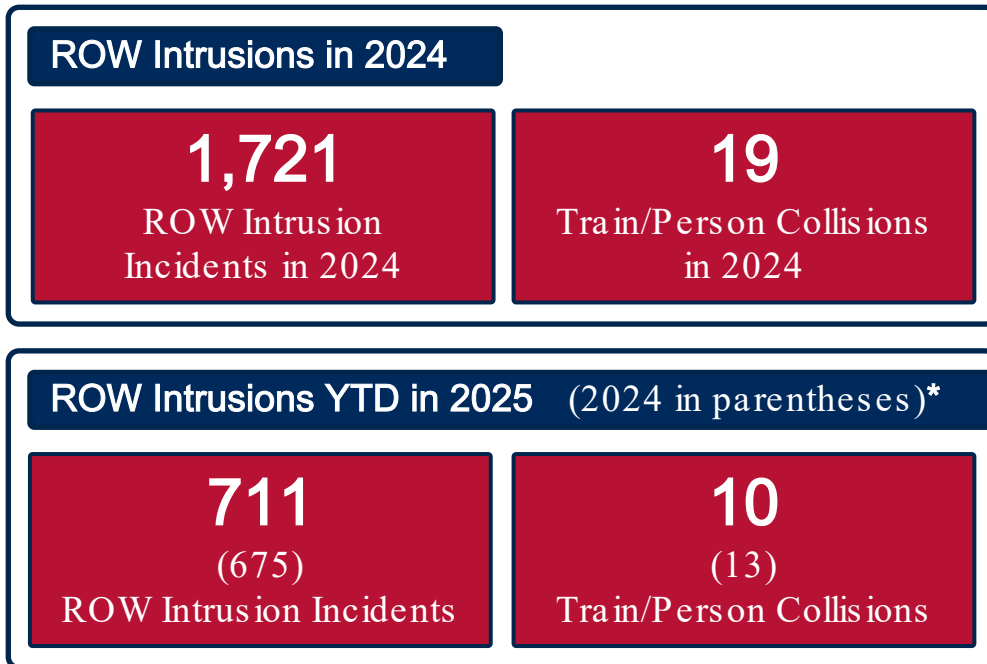
# Additional ROW Intrusion Pilot

Sensonic Fiber Optic Proposal

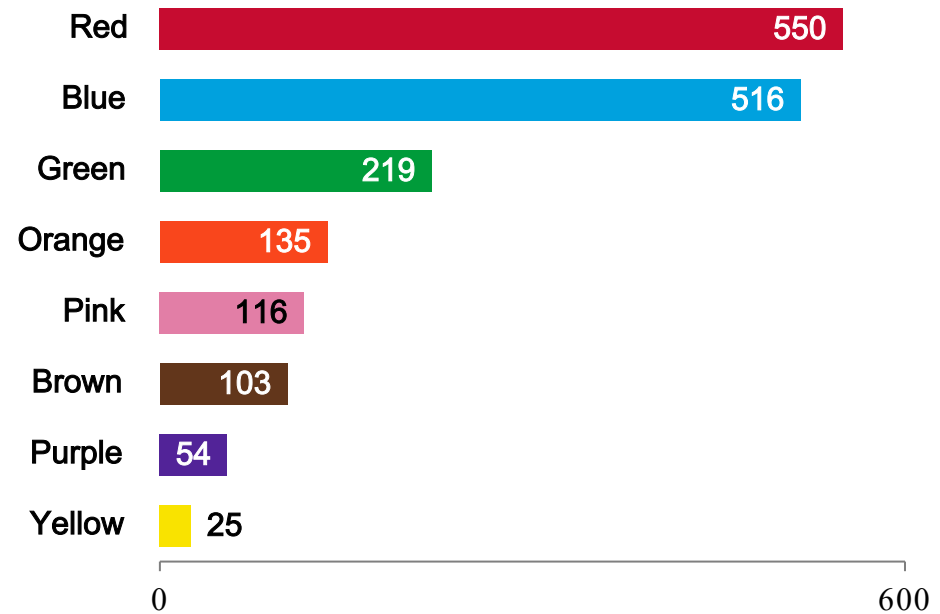


# Right-of-Way Intrusion Impacts

- A Right-of-Way (ROW) Intrusion occurs when a person or object enters/occupies space on the track.
- ROW Intrusion Incidents up 5% YTD in 2025 compared to same time in 2024.
- Advanced warning allows CTA to cut power, notify train operators to slow down/stop



ROW Intrusion Incidents by Line in 2024



\*Includes data from Jan 1<sup>st</sup> through May 31<sup>st</sup> in 2024 and 2025.

# Pilot Proposal

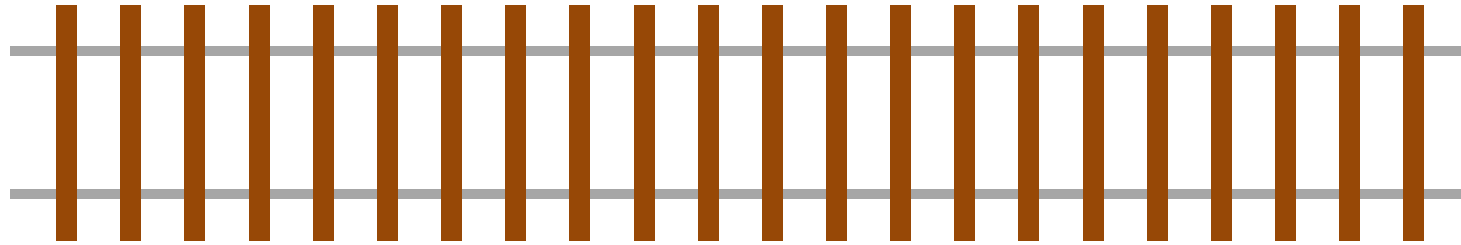
Staff recommends approval of an additional ROW intrusion pilot with Sensonic:

- 14 proposals were received in this category under Innovation Studio
- Sensonic proposal is significantly different in technological approach, leveraging existing fiber optic cable in CTA's right-of-way
- CTA is seeking board approval for a \$110,000 pilot stipend:
  - Award split between two milestones with full value only guaranteed once site specific feasibility has been determined
  - Solution proposal indicated possibility of functionality for up to 50 miles of track segment



# Sensonic Pilot System Architecture

Right-of-Way



Optical Fiber

Equipment Room



Edge Device monitors fiber cable for vibrations

Remote



Server collects data and validates edge device alerts



Control Center staff receive warning of ROW Intrusion



Data available through dashboard for long-term analysis



# Sensonic Pilot Milestones and Deliverables

## Hardware and Software Deliverables

### Hardware

- Edge Device and required hardware installation and fiber connection

### Software

- Calibration of the model for CTA's specific installation relative to the track
- Development of dashboard and analytics from the Artificial Intelligence system

## Pilot Timeline

- Sensonic estimates:
  - 6 weeks for initial planning hardware installation, and calibration
  - 8 weeks for pilot launch and fine-tuning to CTA use cases
- Alerts available to Control Center after 14 weeks
- Duration of pilot will be 12 months

# Ongoing ROW Intrusion Advance Warning Efforts

## Innovation Studio - STV/Derq AI Detection with Cameras



- STV using an AI edge device to monitor 6 cameras per station at Ashland (Green/Pink) and Cicero (Blue)
- AI device will send alerts to Control Center if it detects a right-of-way intrusion.
- Installation estimated July 2025
- Innovation Studio project

## Teleste Camera AI detection Using Built -In Models



- CTA's upgraded Teleste security cameras include ability to run AI models directly on the camera
- Pilot at UIC-Halsted is ongoing, includes flashing light on the track to warn operators of potential intrusion
- Working with vendor to calibrate model to avoid false positives when passengers board the train

## Oakton -Skokie Third Rail Safety Research Demo Project



- Optical sensor technology to be installed on NB track at Oakton-Skokie to detect intrusions
- Will test modifications to traction power systems to remove power when trains are not present
- Procurement underway, installation estimated to be complete April 2026

# Defining Success with Metrics and Internal Stakeholders

## Stakeholders involved in project implementation and evaluation

Safety

Technology

Rail  
Operations

Planning and  
Innovation

Control  
Center

Infrastructure

## Metrics to evaluate pilot performance



### Intrusion detection accuracy

Measure percentage of correct intrusion detections



### Response time

Monitor the time taken from intrusion detection to alert generation



### System uptime

Track the percentage of time the system is operational and monitoring



### False positive rate

Measure the rate of false alarms generated by the system



### Incident reduction

Measure the decrease in right-of-way incidents and accidents post-implementation

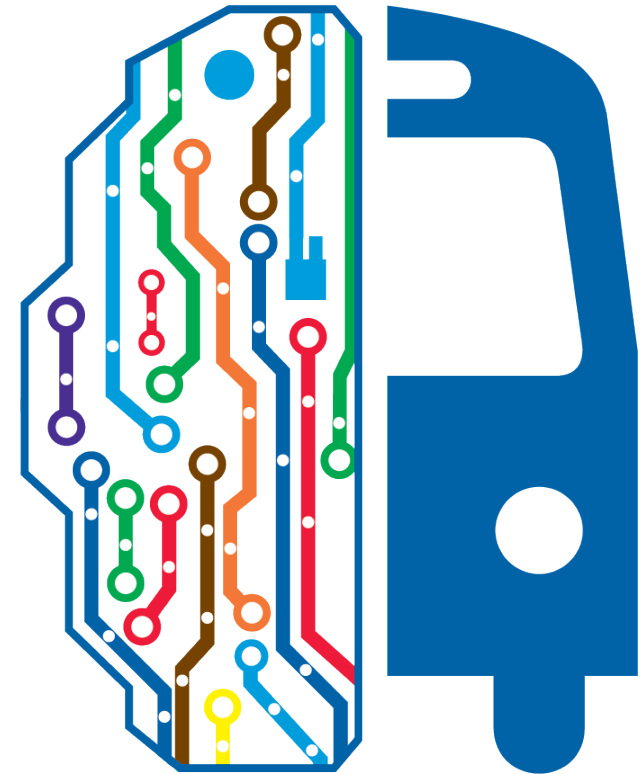
# Appendix



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# What is Innovation Studio?

- The Innovation Studio program allows CTA to pilot solutions and new technologies for some of the agency's biggest challenges
- Problem statement format allows CTA to learn about solutions we may not have otherwise been aware of, especially in the changing technological ecosystem
- After pilots are concluded, CTA to evaluate whether to pursue larger systemwide solution
- Since program initiation in late 2023, released three problem statements, resulting in three in progress pilots to date

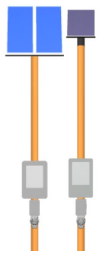


# E-Paper Bus Stop Signs—Progress Update

## Customer Experience – Real-Time Info at Bus Stops

- Executed contracts, totaling \$110,000, for pilots with Global Display Solutions (GDS) and Papercast in January 2025 to provide 20 e-paper bus stop signs
- CTA evaluating locations for signs based on solar viability; signs will be spread across the City, prioritizing equity
- Sign installation anticipated to begin late July 2025, continue through August

### Global Display Solutions

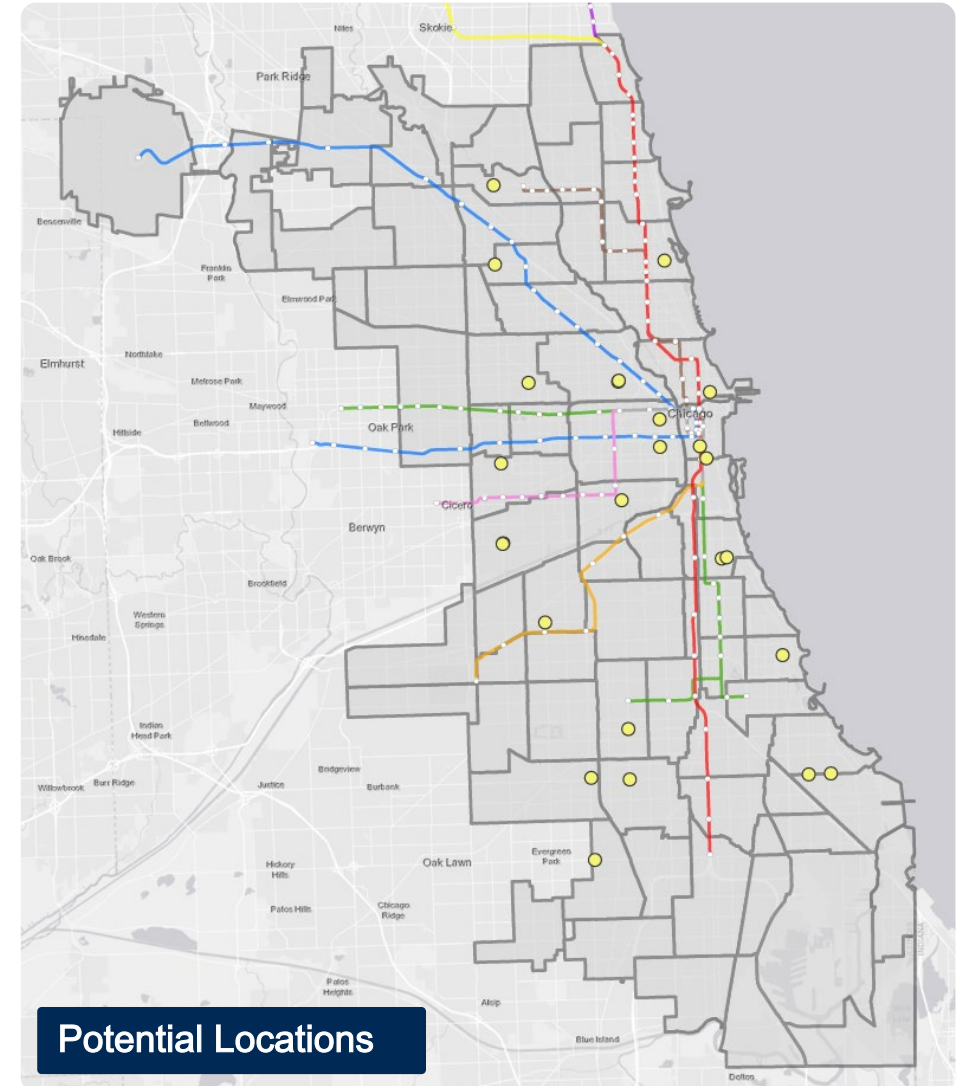


- 5 Flex Displays (13"), Requiring > 4 hours sun exposure
- 5 Low-Power (13"), Requiring >1 hour sun exposure

### Papercast



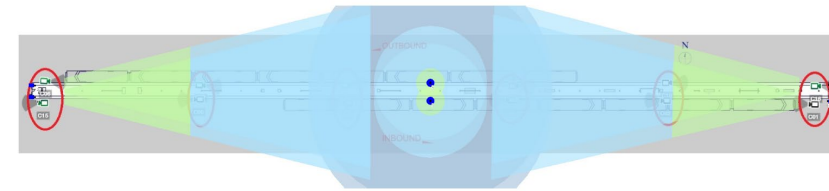
- 5 Large Displays (23"), Requiring > 4 hours sun exposure
- 5 Battery-Powered (13"), Battery life lasting 3-5 years.



# STV ROW Intrusion Status Update

- Proposal now includes 6 cameras per station at no additional cost to CTA:
  - 4 zoom cameras at each end of the platform
  - 2 optional fisheyes in the middle to better triangulate objects/people
- Pilot will be at two stations in the system, Ashland (Green/Pink) and Cicero (Blue)
- Working with Technology on installation time line, expected late June/Early July 2025

Proposed Cicero Camera Layout



Proposed Ashland Camera Layout

