## Columbus Division of Fire

## OPTICOM™ Signal Core EVP Pilot



## Agenda

- Introductions
- Project Overview
- Project Timeline
- Results Summary
- Results Presentation
- Usage Statistics
- Travel Time Study
- Speed Study
- Results Summary
- Improvement Suggestions
- $\quad$ Q\&A


## Introductions

## Columbus Division of Fire

Lt. Willie Loper
Research \& Development (Project Lead)

City of Columbus Traffic
Mark Stephenoff
Division of Traffic Management

Ryan Bollo
ITS/Technology Program Manager

## GTT \& PMI

## GTT

Corey Yovich - Technical Project Manager
Shannon Bailey - Strategic Account Director
Allen Sharrer - Client Implementation Engineer

## PMI

Scott Morse - Systems \& Business Development Manager
Kevin Allison - Territory Sales Manager
Dave Palmer - VP Engineering
Matt Adams - Field Service Engineer
Jacob Weber - Field Service Engineer

## What is OPTICOM ${ }^{\text {TM }}$ ?

OPTICOM ${ }^{\top M}$ is a traffic preemption solution that requests green lights in the direction an emergency vehicle is traveling and red lights for all other directions.

Improves first responder SAFETY Improves the SAFETY of the public Improves response time \& efficiency SAVES LIVES!

## Project Overview

OPTICOM ${ }^{\text {TM }}$ Signal Core EVP Pilot

- 11x Intersections
- $5 \times$ Vehicles
- Two-phases, 60-day data collection period
- 30 days of OPTICOM ${ }^{\text {M }}$ Disabled
- 30 days of OPTICOM ${ }^{\top M}$ Enabled
- GTT managed project, supplied OPTICOM ${ }^{\top M}$ hardware \& Cloud Environment
- PMI installed \& configured intersection equipment
- PARR installed \& configured vehicle equipment



## Solution Architecture



## PROJECT OVERVIEW

- 11x Intersections
- East Dublin Granville Road \& Forest Hills Boulevard
- East Dublin Granville Road \& Cleveland Avenue
- East Dublin Granville Road \& Spring Run Drive
- East Dublin Granville Road \& Maple Canyon Avenue
- East Dublin Granville Road \& Beechcroft Road
- East Dublin Granville Road \& Tamarack Boulevard
- East Dublin Granville Road \& Karl Road
- East Dublin Granville Road \& Ambleside Drive
- East Dublin Granville Road \& 71N
- East Dublin Granville Road \& 71S
- East Dublin Granville Road \& Busch Boulevard



## Intersection Hardware

## OPTICOMT ${ }^{\text {™ }}$ Signal Core

- Built-in cellular modem (AT\&T)
- Connects to traffic controller using NTCIP via Ethernet
- Provides preemption pathway for GTT
- Monitors Cabinet Conditions
- Live Telemetry views \& SPaT Data



## Vehicle Units

BAT2 (Battalion Chief 2)<br>E6 (Engine 6)<br>M6 (Medic 6)<br>M806 (Medic 806)<br>EMS12 (EMS Supervisor 12)

## Vehicle Hardware

Sierra Wireless MP-70 Modems (AT\&T)

- Cellular/GPS antenna mounted to roof of vehicles

Connected to several vehicle outputs

- Park Signal/Air Brake (Disable)
- Light Bar Activation (Enable)
- Left/Right Turn Signal

Device always on for shoreline vehicles.

- For standard-chassis vehicles, device goes to sleep after 60 minutes, or low-battery detected



## Project Timeline



## IMPROVED SAFETY

Emergency vehicles are safer going through intersections during green lights.

The public is safer with approaching emergency vehicles when they are stopped at a red light.

## Results

Overview

## TRAVEL TIME SAVINGS

Travel times are improved, and that improvement compounds the more OPTICOM ${ }^{\text {TM }}$ equipped intersections are used during the trip.

## INCREASED SPEED

With OPTICOM ${ }^{\text {TM }}$ enabled, emergency vehicles are more likely to safely travel through intersections without being impeded by traffic.

## Usage Statistics

Total Preemption Requests Per Vehicle


## Usage Statistics

Vehicle Preemption Requests Per Week


## Usage Statistics

Total Preemption Requests Per Intersection


## Usage Statistics

Instersection Preemption Requests Per Week


## Usage Statistics Intersection Usage (Per Week, By approach)



Busch Blvd Preemptions By Approach Per Week


71 Preemptions By Approach Per Week


## Usage Statistics Intersection Usage (Per Week, By approach)



Ambleside Dr Preemptions By Approach Per Week


Usage Statistics Intersection Usage (Per Week, By approach)


Karl Rd Preemptions By Approach Per Week


Tamarack Blvd Preemptions By Approach Per Week


## Usage Statistics Intersection Usage (Per Week, By approach)



Beechcroft Rd Preemptions By Approach Per Week


## Usage Statistics Intersection Usage (Per Week, By approach)



Spring Run Dr Preemptions By Approach Per Week


Cleveland Ave Preemptions By Approach Per Week


## Usage Statistics Intersection Usage (Per Week, By approach)



Forest Hills Blvd Preemptions By Approach Per Week


## Travel time study

GTT used the data collected from both Phase \#1 and Phase \#2 as well as call data provided by CFD to create a call study that represents the average estimated saved time per call. Only 3 trips were identified that matched the below criteria and were included in the study:

- Repetitive destinations (10+ runs during Phase \#1/Phase \#2)
- Matching Time of Day
- Trips were started from Station \#6
- Traveled through 4 or more OPTICOM ${ }^{\top M}$ equipped intersections to reach the destination
- Using the same unit type (M6, M806)
- Could assume remainder of route after OPTICOM ${ }^{\top M}$ equipped intersections
- Time of Day Groupings:
- Morning Peak - 0600-1100
- Afternoon-1100-1600
- Afternoon Peak-1600-2000
- Night - 2000-0600


## Trip \#1 Travel Time Study

## CFD Station \#6 to 1001 Schrock Rd WB

## Average Estimated Time Savings

Night - 42 seconds (-11\%)
12 validated runs
Afternoon - 20 seconds (-6\%)
Afternoon Peak - 89 seconds (-24\%)

- 9 runs - Phase \#1
- 3 runs - Phase \#2


## Average Travel Time (Phase \#1)

Night-7:06
Morning Peak-7:38
Afternoon-6:32
Afternoon Peak - 7:38

## Average Travel Time (Phase \#2)

Night-6:24
Morning Peak - Not enough data
Afternoon-6:12
Afternoon Peak - 6:09


## Trip \#2 Travel Time Study

## CFPD Station \#6 to 5800 Forest Hills Blvd EB

- 12 validated runs
- 5 runs - Phase \#1
- 5 runs - Phase \#2

```
Average Estimated Time Savings
Night - 72 seconds (-25\%)
Afternoon - 37 seconds (-12\%)
Afternoon Peak - 35 seconds (-11\%)
```


## Average Travel Time (Phase \#1)

 Night-5:57Morning Peak - Not enough data Afternoon - 4:55
Afternoon Peak - 5:41

## Average Travel Time (Phase \#2)

Night-4:45
Morning Peak - 5:06
Afternoon - 4:59
Afternoon Peak- 5:06


## Trip \#3 Travel Time Study

## CFPD Station \#6 to 111 Mediterranean

## Ave WB

- 12 validated runs
- 7 runs - Phase \#1
- 6 runs - Phase \#2

Average Estimated Time Savings
Night - 71 seconds (-21\%)
Morning Peak - 26 seconds (-8\%)
Afternoon Peak - 33 seconds (-10\%)

## Average Travel Time (Phase \#1)

Night - 6:51
Morning Peak - 5:40
Afternoon - Not enough data Afternoon Peak - 6:10

Average Travel Time (Phase \#2)
Night-5:41
Morning Peak - 5:14


Afternoon - Not enough data
Afternoon Peak - 5:37

## Travel Time Study

$6 \%$ to $15 \%$ of travel time saving per intersection

|  | Segment | Travel time (sec) when Preemption Disabled | Travel time (sec) when Preemption Enabled | \% of Travel Time Saving |
| :---: | :---: | :---: | :---: | :---: |
| WB | $10->11$ | 18 | 17 | 6\% |
|  | $9->10$ | 14 | 12 | 11\% |
|  | 8 -> 9 | 20 | 18 | 10\% |
|  | 7 -> 8 | 26 | 24 | 8\% |
|  | $6->7$ | 25 | 23 | 8\% (1)匋 |
|  | 5 -> 6 | 21 | 19 | 10\% 國 |
|  | 4 -> 5 | 24 | 24 | - |
| EB | 4 -> 3 | 23 | 23 | - |
|  | $3->2$ | 25 | 23 | 8\% |
|  | 2 -> 1 | 27 | 23 | 15\% |



## Speed Study

Median Travel Speed (MPH)

## OPTICOM OPTICOM Disabled Enabled

## Change

## 29

43
$+48 \%$

## Speed study

Travel speed Varies by Intersection

| Intersection Name | Median Speed OPTICOM Disabled (mph) | Median Speed OPTICOM Enabled (mph) | \% of Travel Speed |
| :---: | :---: | :---: | :---: |
| Busch Boulevard | 17.5 | 18 | 3\% |
| 715 | 47.5 | 49.1 | 3\% |
| 71 N | 42.6 | 50.3 | 18\% |
| Ambleside Drive | 33.1 | 46.4 | $40 \%$ |
| Karl Road | 21.4 | 30.5 | $42 \%$ |
| Tamarack Boulevard | 38.1 | 50.3 | $32 \%$ |
| Beechcroft Road | 46.4 | 46.6 | 0\% |
| Maple Canyon Avenue | 14.7 | 14.3 | $-2 \% \text { 目罪 }$ |
| Spring Run Drive | 46.2 | 46.2 | 0\% |
| Cleveland Avenue | 20.2 | 39.2 | $94 \%$ |
| Forest Hills Boulevard | 39.4 | 44.3 | 13\% |

## Speed study

Westbound - Full Segment

- Each dot represents "breadcrumb" data collected during the trip
- Red indicates slower speeds
- Green indicates faster speeds



## Speed Study

Eastbound - Full Segment

- Each dot represents "breadcrumb" data collected during the trip
- Red indicates slower speeds
- Green indicates faster speeds



## How can the OPTICOM ${ }^{\top}{ }^{\text {M }}$ Preemption system be improved?

- Add preemption button to Station \#6
- Adjust OPTICOM ${ }^{\top M}$ approach zones to enhance preemption recognition
- Observe possible "backed-up" intersections
- Intersection timing \& fine tuning
- Max signal times
- Pedestrian timings
- Allow pedestrian signal truncation
- Add additional OPTICOM ${ }^{\text {TM }}$ equipped intersections to compound travel time improvements


## Results Summary

## : 1 B

## Improved Safety

## Travel Time Savings

## Speed Improvements

Emergency vehicles are SAFER going through intersections during green lights.

The public is SAFER with approaching emergency vehicles when they are stopped at a red light.

Travel times are improved, and that improvement compounds the more Opticom ${ }^{\text {TM }}$ equipped intersections are used during the
trip.

With Opticom ${ }^{\text {TM }}$ enabled intersections, emergency vehicles are more likely to travel through
intersections without being impeded by traffic.

## GLOBAL TRAFFIC TECHNOLOGIES

MAKERS OF OPTICOM ${ }^{\text {TM }}$

