NYC Central Transit Signal Priority Expansion, Operations & Maintenance

Presented by:

Mohamad Talas, P.E., PTOE, Ph.D.
Emad Makarious, P.E., PTOE, RSP1

Overview

- NYC Central Transit Signal Priority

- Expansion, Operations and Maintenance

- Data and Database

- Reports and Dashboards
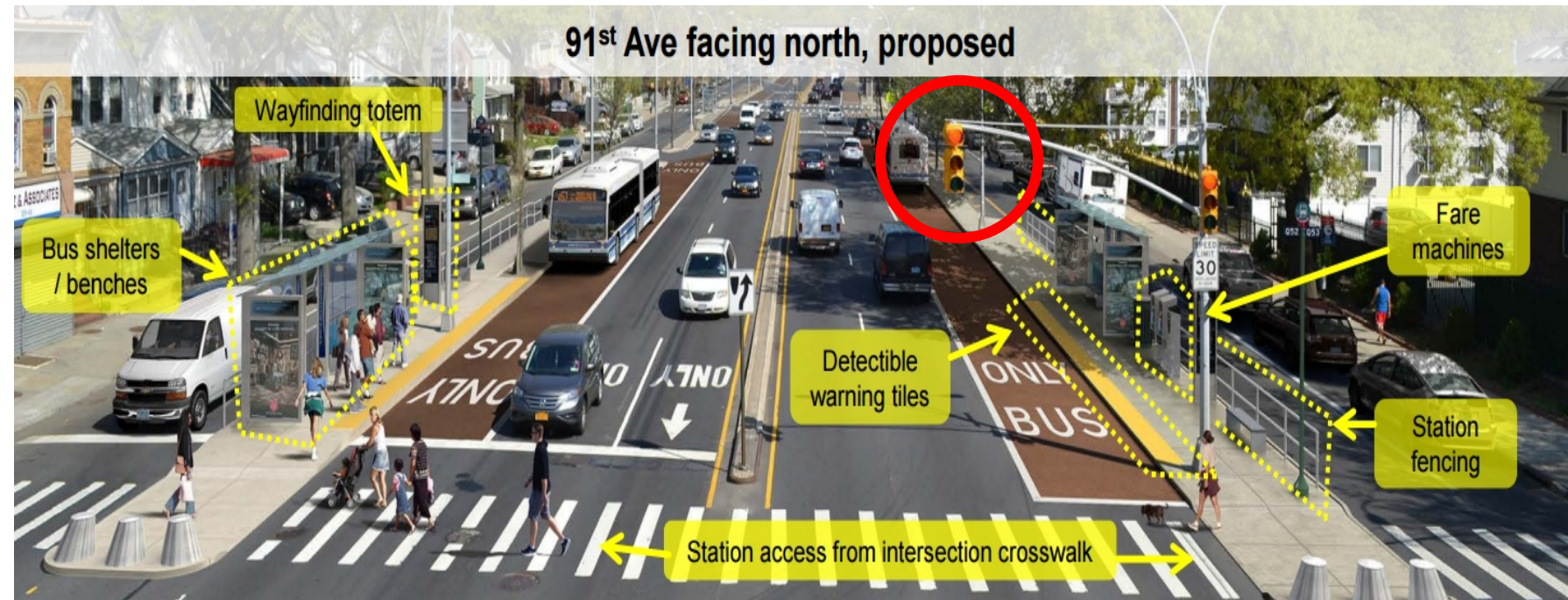
- Future Plans

- Lessons Learned

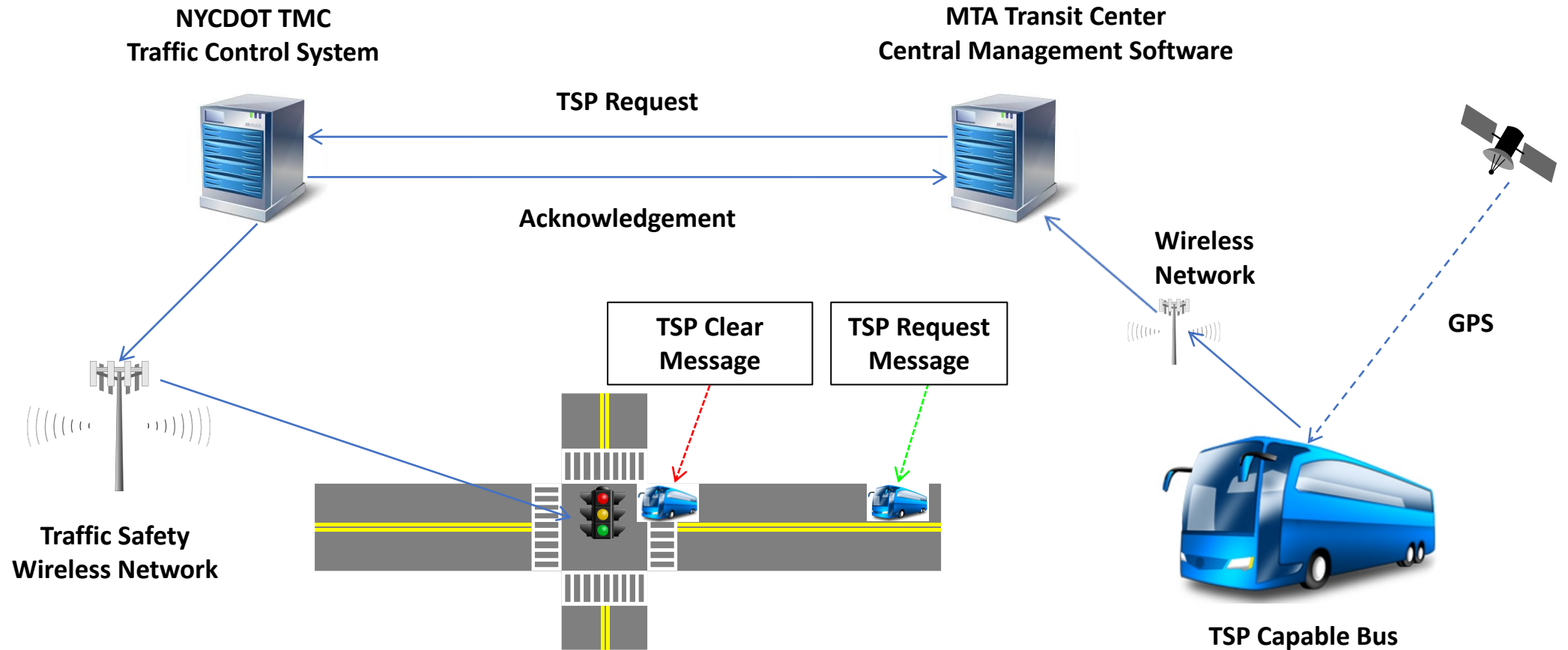# Q52/Q53 **+selectbusservice** Features Along Woodhaven Blvd., Queens

- Branding

- Bus-only Lanes

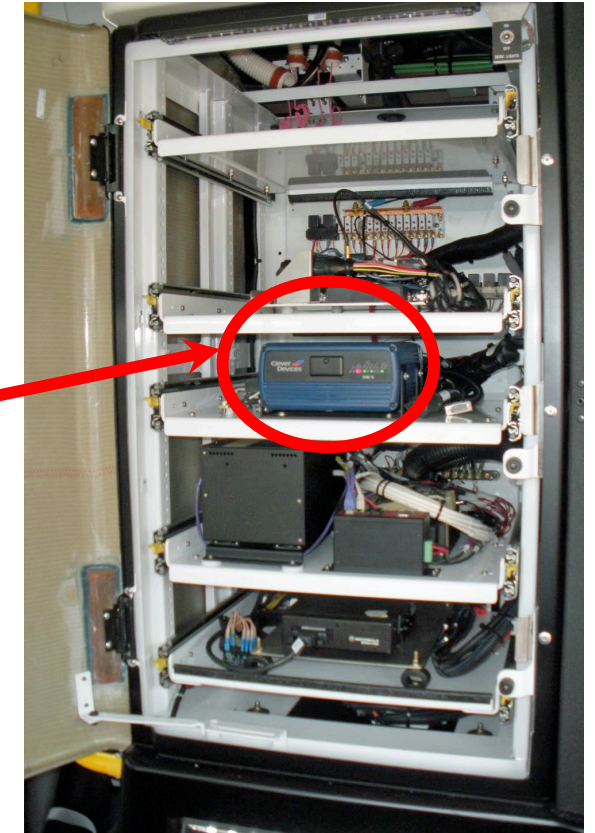- Median Bus Stations

- Pedestrian Safety Enhancements
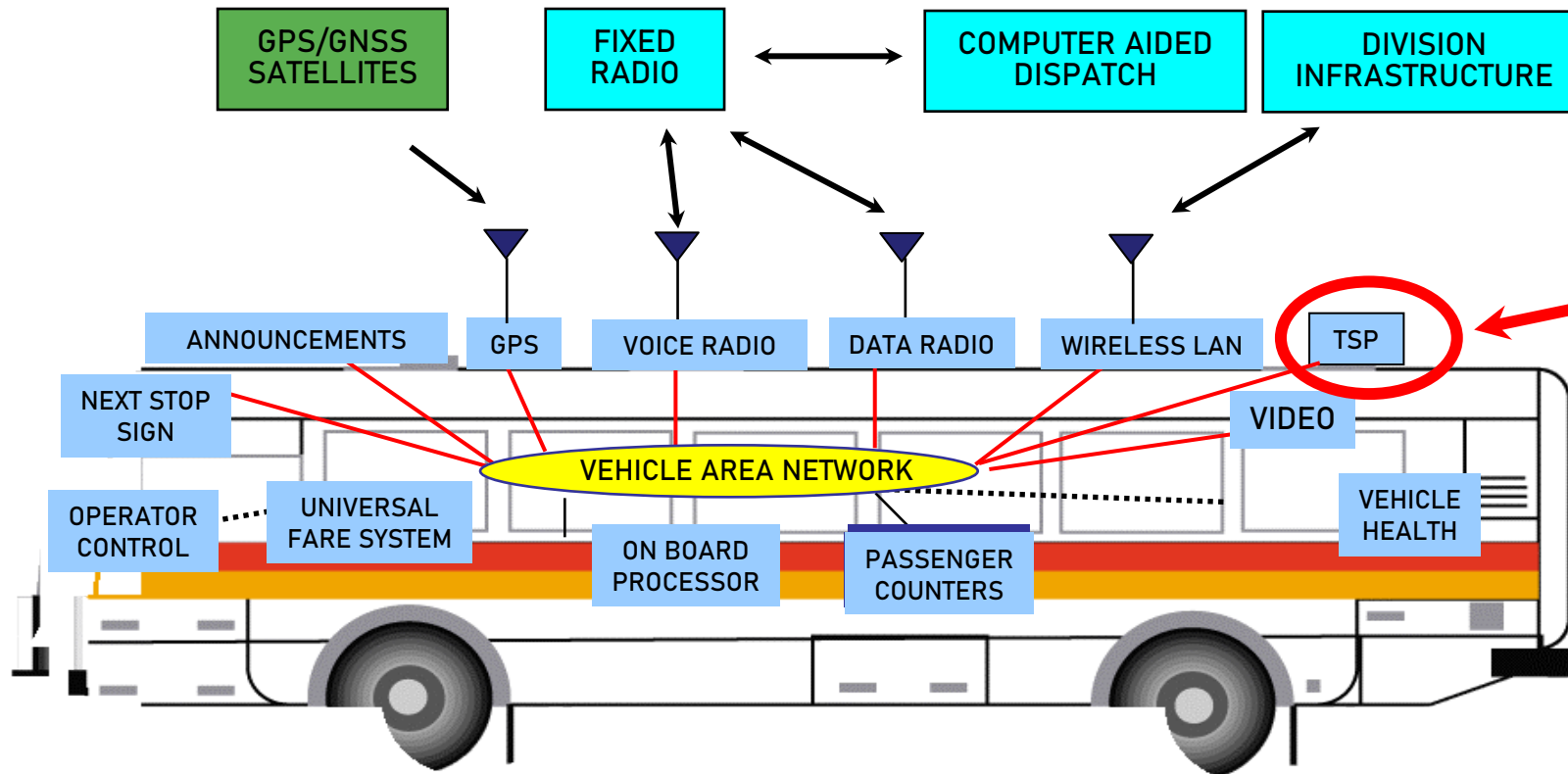

91st Ave facing north, proposed

Wayfinding totem

Bus shelters / benches

Detectible warning tiles

Station access from intersection crosswalk

Fare machines

Station fencing

Source: NYCDOT

Central Transit Signal Priority (CTSP)

Central Transit Signal Priority (CTSP)

NYCDOT TMC
Traffic Control System

MTA Transit Center
Central Management Software

TSP Request

Acknowledgement

Wireless Network

GPS

TSP Clear Message

TSP Request Message

Traffic Safety Wireless Network

TSP Capable Bus

Integrated Bus Model and Bus ITS Cabinet

Source: MTA

Statistics as of October 2021

Statistic	Number
Bus Routes with CTSP	94
Intersections Studied for CTSP	2,165
Intersections Providing CTSP	1,593
Weekday Daily CTSP Messages	~375,860
Weekend Daily CTSP Messages	~73,000
Weekday Number of Buses	~2,478
Weekend Number of Buses	~562

Source: NYCDOT

Expansion: Recent and Future

Completed Recent Years	Studied Intersections Yearly Total	Intersections Cumulative Total
2011 - 2018	597	597
2019	324	921
2020	648	1,569
2021 to Date	596	2,165

Planned Future Years	Studied Intersections Yearly Total	Intersections Cumulative Total
2022	750	2,915
2023	1,000	3,915
2024	1,000	4,915
2025	1,000	5,915
2026	1,000	6,915

Source: NYCDOT

NEW YORK CITY DOT   MTA   U.S. Department of Transportation

Accelerated Deployment

Strategies to determine and configure CTSP parameters and deploy them in buses and controllers:
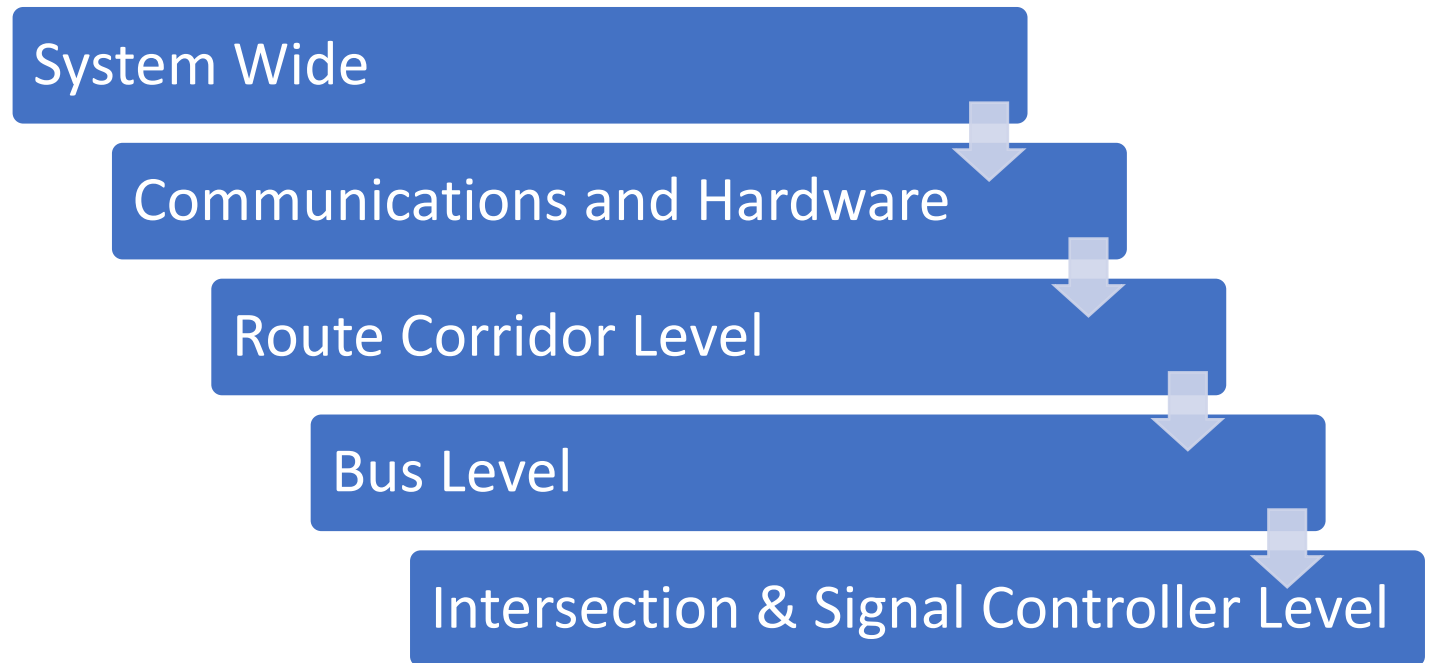
- Full CTSP Analysis
  - Use only with complex bus routes
- Early-Action CTSP Analysis
  - Based on operational experience
- Application-based CTSP
  - Utilize existing systems on buses and TCS
- Publish CMS parameters electronically to MTA/NYCT
- Before/ After Studies
  - Utilize CTSP system data
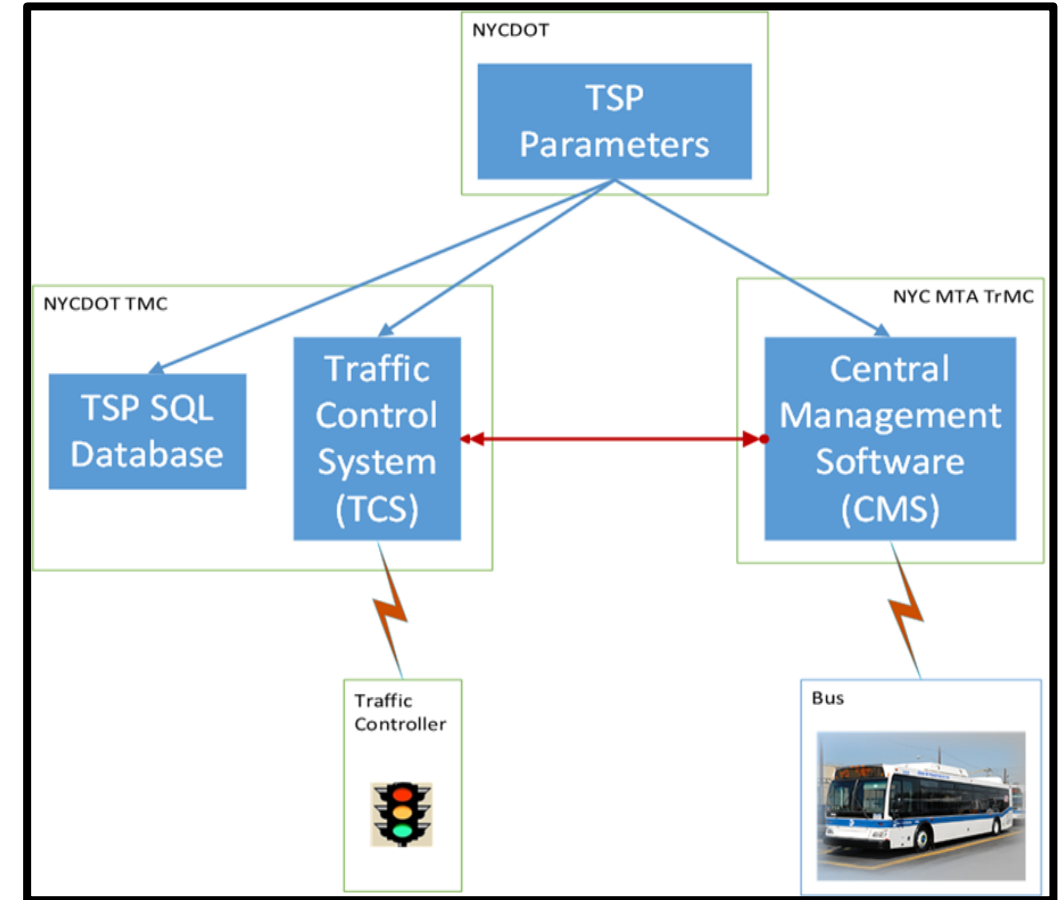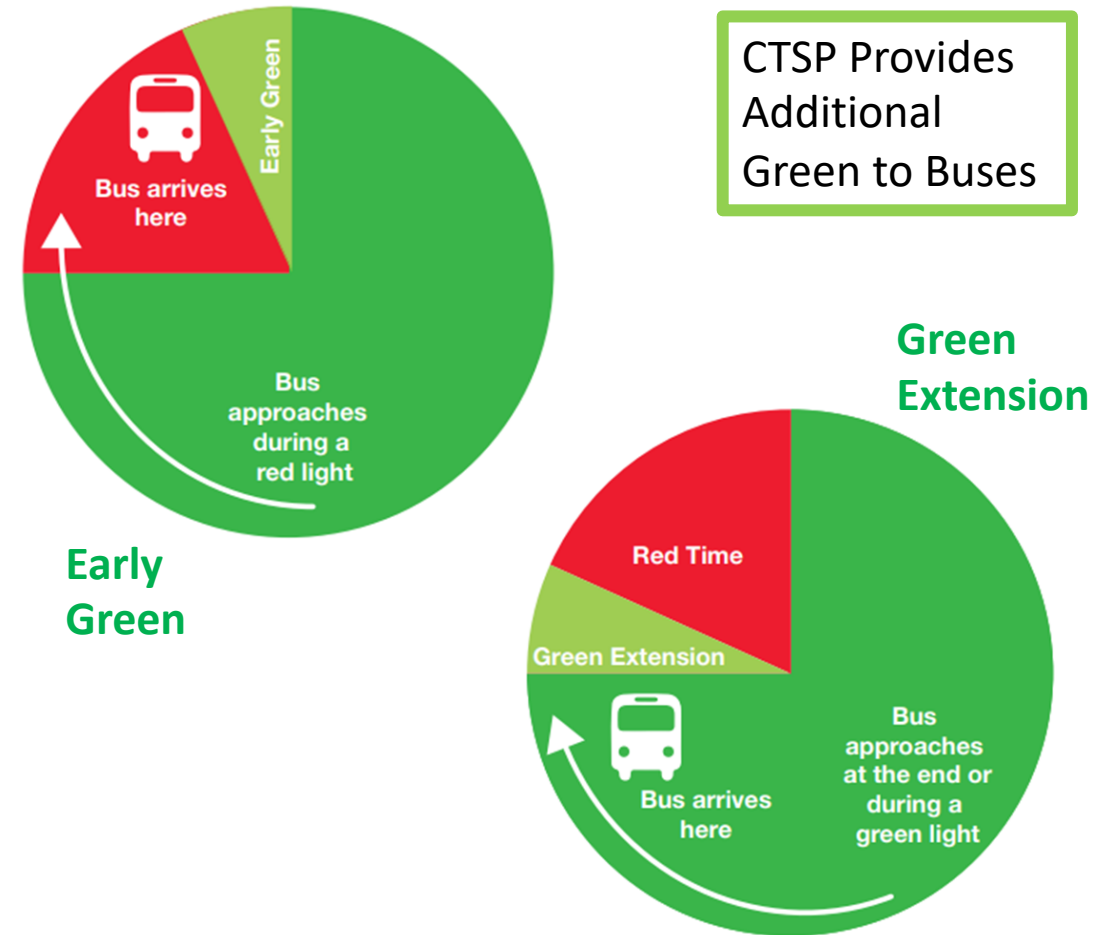

Source: NYCDOT

Operations and Maintenance

- Check CTSP for correct operation
- Check system performance
- Identify and flag deviations
- Verify operation (Bus, Intersection, TSP settings)
- Make necessary adjustments
  - Bus detection zone
  - Extension /Early Green
  - Device hardware
  - Bus heading/Direction
  - Operation and schedule (i.e. AM/MD/PM/AOT)

System Wide

Communications and Hardware

Route Corridor Level

Bus Level

Intersection & Signal Controller Level

CTSP Transaction Classifications

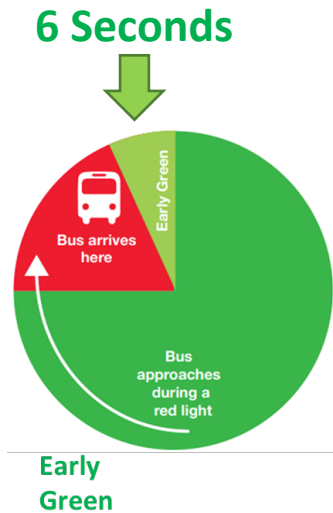1. **TSP – Full Benefit:** **Additional Green** is granted and bus **clears** the intersection.

2. **Normal:** Bus **clears** the intersection during normal cycle green phase. **Bus does not need additional green.**

3. **TSP – Partial Benefit:** **Additional Green** is granted and bus **does not clear** the intersection.

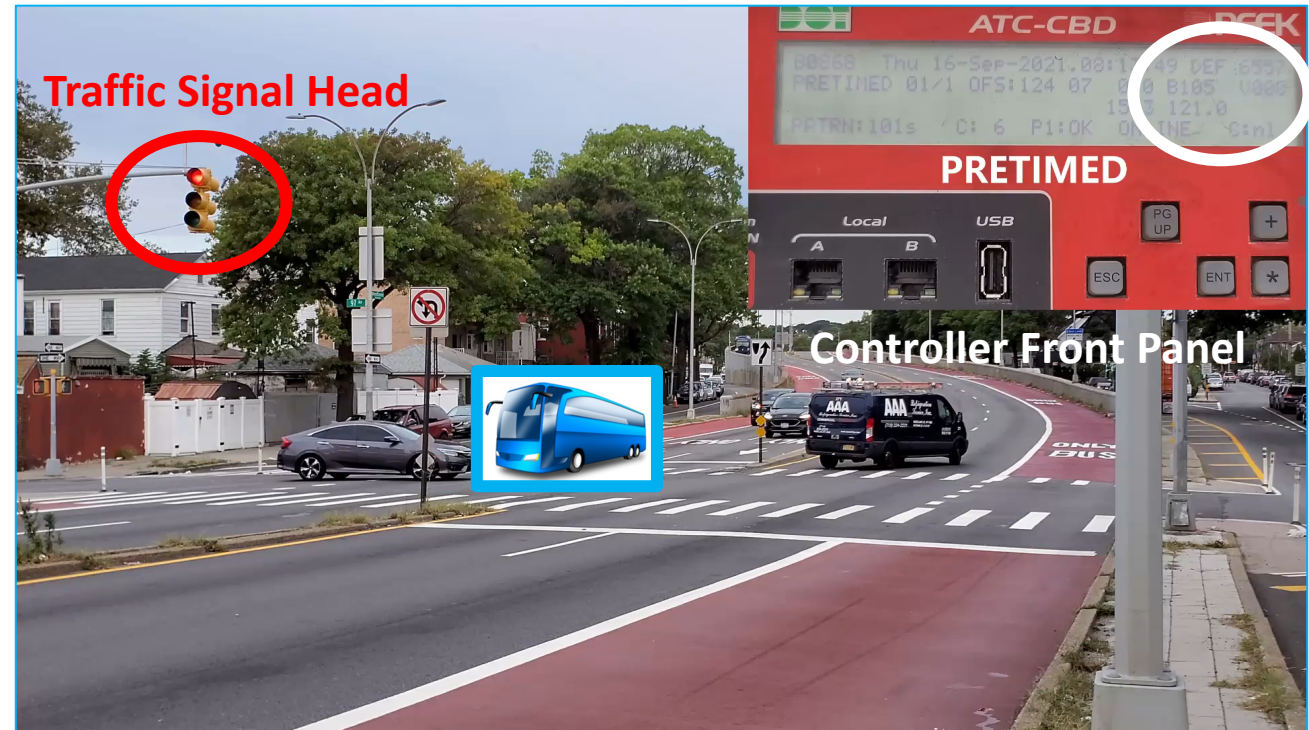4. **Exclude:** Data cannot be used for various reasons.

CTSP Provides Additional Green to Buses

Early Green

Green Extension

Source: NYCDOT

Early Green Video: Field View Q52/Q53 Woodhaven Blvd. and 97 Ave.

- **TSP – Full Benefit**

6 Seconds

Early Green

Bus arrives here

Bus approaches during a red light

Early Green

Cycles:
- Normal = 150 Seconds
- TSP = 144 Seconds
- Balance = 156 Seconds

Traffic Signal Head

Controller Front Panel

PRETIMED

Early Green Videos: TMC View 1 Woodhaven Blvd. and 97 Ave., Queens

6 Seconds

Early Green

Cycles:
- Normal = 150 Seconds
- TSP = 144 Seconds
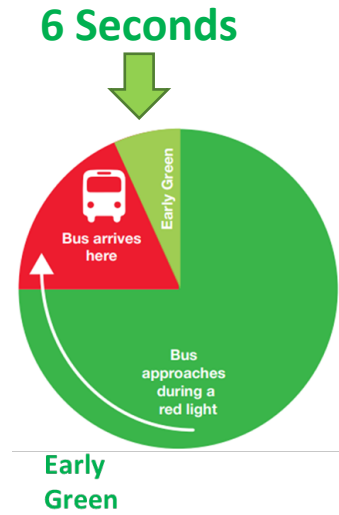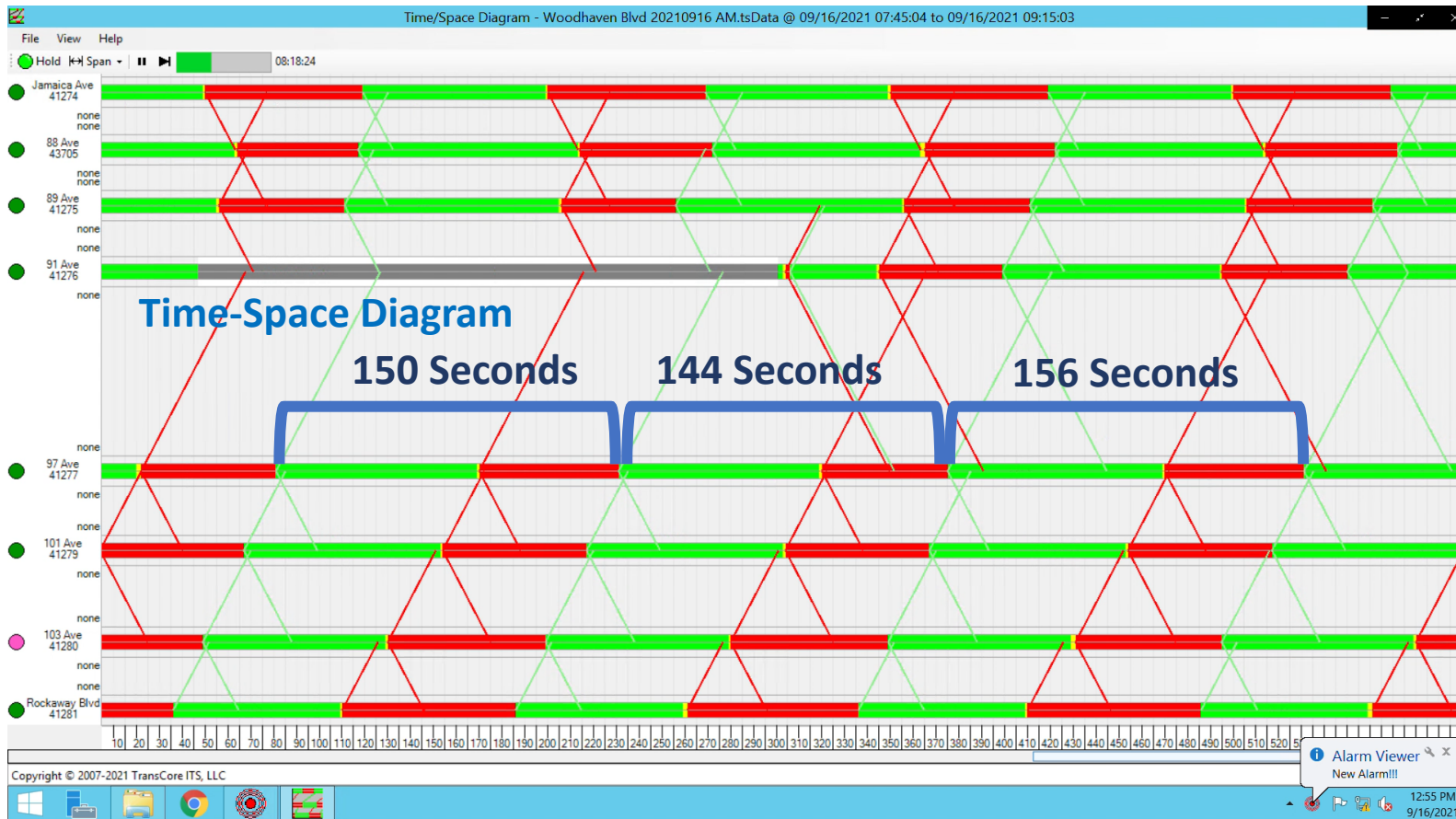- Balance = 156 Seconds

Early Green Videos: TMC View 2 Woodhaven Blvd. and 97 Ave., Queens

6 Seconds
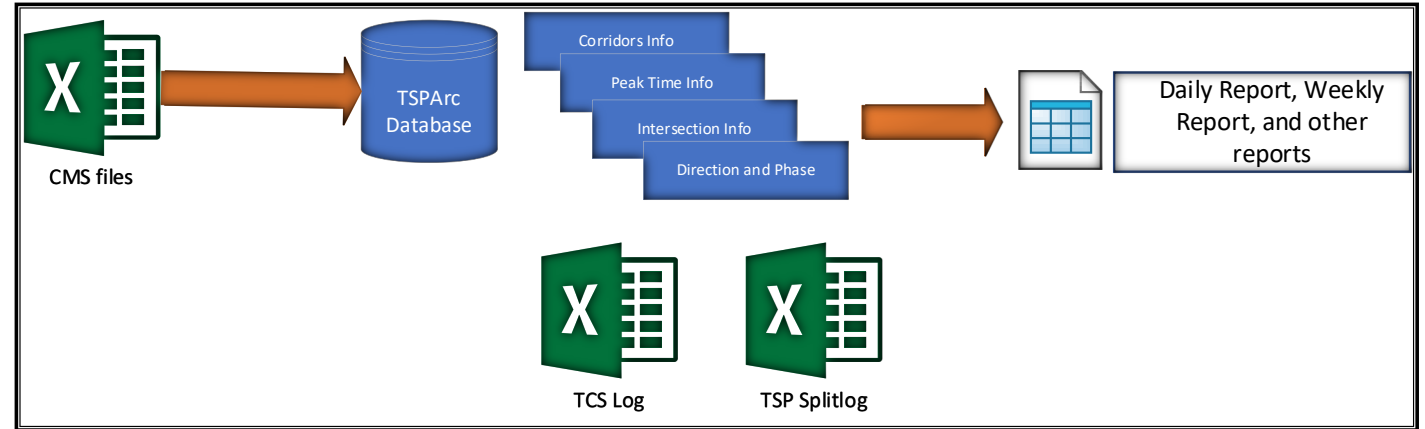
Early Green

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CTSP Data and Database

Data:

- Bus CTSP Information
  - TCS & MTA CTSP Message Logs
- Traffic Controller Information
  - TCS Phase Split Logs
- CTSP Parameters Information
  - Traffic Controller Database
  - CMS File
- Other Information

CMS files → TSPArc Database → Corridors Info / Peak Time Info / Intersection Info / Direction and Phase → Daily Report, Weekly Report, and other reports

TCS Log   TSP Splitlog

Source: NYCDOT

CTSP SQL Database:

- Bus and Traffic Controller information is automatically imported daily into the database
- Includes CTSP data since Oct,2015

Near Real-Time TCS Dashboards

Near Real-Time Dashboards: Visualizing Data

- Native to the Traffic Control System

- Will show operational status of each corridor

- Will display corridors on a GIS map

- Will allow quicker troubleshooting of issues
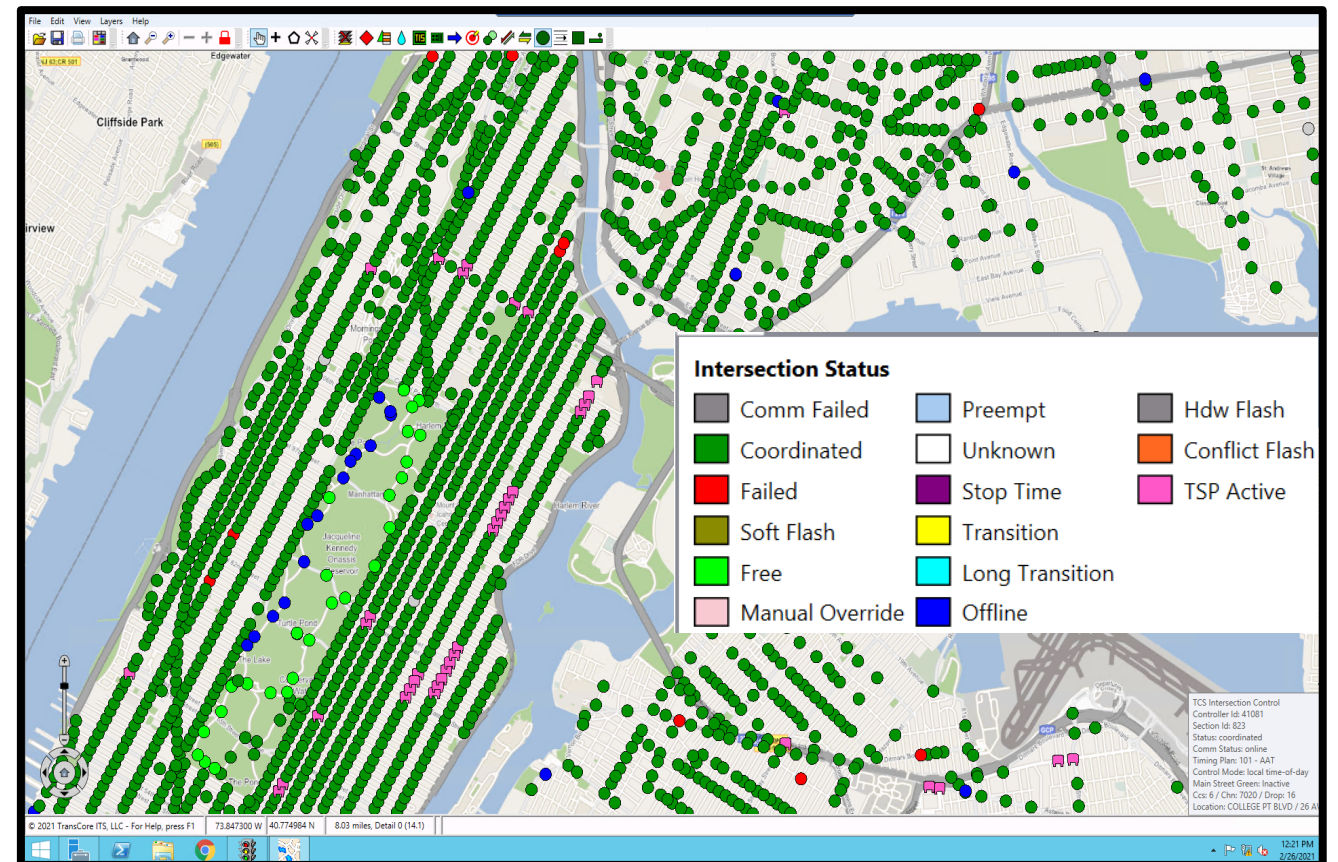
Source: NYCDOT

Future Plans

Study 750-1000 intersections for CTSP a year in the next five years	Identify opportunities to extend green time granted at each intersection
Develop near real-time dashboards	Look at including CTSP at intersections that are currently excluded with the current evaluation process
Select whole routes rather than short corridors	Consider allowing buses to send request signals only during peak direction
Explore allowing CTSP at near-side stops	

Lessons Learned

There is No Replacement for Observing Operations in the Field	Elaborate Processes Manually and Automate Them Once Understood
Quality Data Reflects Reality – What Is Actually Happening	Querying a TSP Database is Powerful to Generate Dashboards, Reports for Analysis and Troubleshooting
All TSP Bus Routes/Corridors Are Not the Same	DOT and Transit Agencies Must Collaborate – Some Challenges Require Joint Resolution
Define the Expansion, Operations and Maintenance Strategies	

Thank You

Mohamad Talas: *mtalas@dot.nyc.gov*

Emad Makarious: *emakarious@dot.nyc.gov*