



2024 VASITE Annual  
Meeting and Technical  
Conference

# Outsourcing TMSO: Arterial Operations

*Anam Ardeshiri, PE, PTOE; Keith Riniker, PE, PTOE*

***Mead & Hunt***

***Columbia, MD***



# Transportation Systems Evolution

- Transportation systems have been increasing in complexity over the years
  1. Design, build and (mostly) forget. Only the maintenance staff was involved in operations.
  2. Start of operations in the form of Intelligent Transportation Systems (ITS).
    - IT and telecom professionals entered our civil engineering world.
  3. Tech companies and big data entered this world
- Congestion has gotten worse due to more personal and freight trips,
- Safety implications in design & operations
- Multimodal approach: ped, bike, TSP, bus/bike only lanes

# Where DOTs Are Heading To?

- Operate a bigger system in size with various ITS components
  - Need to keep up with evolving technologies
- Are hiring less
- Need to outsource more
  - Engineering firms
  - Technology vendors
  - Contractors (for installations, repairs/replacements)

# ATMS

- A platform to manage, not just to monitor the system:  
Maintain signal communication; maintain coordination operations; check alarms, troubleshoot,..

Controller List																							
<a href="#">Setup</a> <a href="#">Preview</a> <a href="#">Print</a> <a href="#">Export</a> <a href="#">Reset Column Order</a>																							
Alar	Statu	ID	Name	Not	Doc	Drop	Port	Flex Group	Type	IP Address	Free	Coord Stat	Pattern	TBC	Local Counter	Cycle	Seq	Prog Split 1	Prog Split 2	Prog Split 3	Prog Split 4	Last Date/Time	
●		1367	GAY & BIDDLE & BROADWAY	<input type="checkbox"/>	<input type="checkbox"/>	94	E-NET-5094	Belair	NTCIP 76.x ATC Ethernet	010.200.000.09	COORD	SYNC	6 PM	107	60	110	1	11	55	0	44	9/4/2020 3:27 P	
●		1405	BELAIR & PARKMONT	<input type="checkbox"/>	<input type="checkbox"/>	114	E-NET-5114	Belair	NTCIP 76.x ATC Ethernet	010.200.000.11	COORD	SYNC	6 PM	69	40	110	1	0	76	0	34	9/4/2020 3:27 P	
●		1505	LIBERTY HEIGHTS & MONDAW	<input type="checkbox"/>	<input type="checkbox"/>	120	E-NET-5120	Liberty Heights	NTCIP 76.x ATC Ethernet	010.200.000.12	COORD	SYNC	6 PM	59	53	120	1	0	88	0	32	9/4/2020 3:27 P	
●		1529	YORK & GLENWOOD	<input type="checkbox"/>	<input type="checkbox"/>	28	E-NET-5028	Greenmount/York	NTCIP 76.x ATC Ethernet	010.200.000.01	COORD	SYNC	6 PM	68	65	110	1	0	78	0	32	9/4/2020 3:27 P	
●		1602	NORTH & ACCESS	<input type="checkbox"/>	<input type="checkbox"/>	78	E-NET-5078	North	NTCIP 76.x ATC Ethernet	010.200.000.07	COORD	SYNC	6 PM	119	19	150	1	0	80	30	40	9/4/2020 3:27 P	
●		1659	LIBERTY HEIGHTS & AYRDALE	<input type="checkbox"/>	<input type="checkbox"/>	127	E-NET-5127	Liberty Heights	NTCIP 76.x ATC Ethernet	010.200.000.12	COORD	SYNC	6 PM	59	24	120	1	0	89	0	31	9/4/2020 3:27 P	
●		1663	BELAIR & BIRITE	<input type="checkbox"/>	<input type="checkbox"/>	113	E-NET-5113	Belair	NTCIP 76.x ATC Ethernet	010.200.000.11	COORD	SYNC	6 PM	70	44	110	1	0	83	0	27	9/4/2020 3:27 P	
●		1669	LIBERTY HEIGHTS & BERWYN &	<input type="checkbox"/>	<input type="checkbox"/>	129	E-NET-5129	Liberty Heights	NTCIP 76.x ATC Ethernet	010.200.000.12	COORD	LONG -8	6 PM	40	12	120	1	0	86	0	34	9/4/2020 3:27 P	
●		1703	NORTH & BOND	<input type="checkbox"/>	<input type="checkbox"/>	88	E-NET-5088	North	NTCIP 76.x ATC Ethernet	010.200.000.08	COORD	SYNC	6 PM	69	109	110	1	0	80	0	30	9/4/2020 3:27 P	
●		1727	YORK & NOTRE DAME	<input type="checkbox"/>	<input type="checkbox"/>	27	E-NET-5027	Greenmount/York	NTCIP 76.x ATC Ethernet	010.200.000.01	COORD	SYNC	6 PM	71	91	110	1	0	79	0	31	9/4/2020 3:27 P	
●		1732	NORTH & CHESTER	<input type="checkbox"/>	<input type="checkbox"/>	92	E-NET-5092	North	NTCIP 76.x ATC Ethernet	010.200.000.08	COORD	SYNC	6 PM	71	64	110	1	0	75	0	35	9/4/2020 3:27 P	
●		1744	LIBERTY HEIGHTS & MONDAW	<input type="checkbox"/>	<input type="checkbox"/>	121	E-NET-5121	Liberty Heights	NTCIP 76.x ATC Ethernet	010.200.000.12	COORD	SYNC	6 PM	61	55	120	1	20	65	0	35	9/4/2020 3:27 P	
●		1754	NORTH & THOMAS	<input type="checkbox"/>	<input type="checkbox"/>	63	E-NET-5063	North	NTCIP 76.x ATC Ethernet	010.200.000.05	COORD	SYNC	6 PM	72	63	110	1	0	75	0	35	9/4/2020 3:27 P	
●		1763	LIBERTY HEIGHTS & HOWARD P	<input type="checkbox"/>	<input type="checkbox"/>	134	E-NET-5134	Liberty Heights	NTCIP 76.x ATC Ethernet	010.200.000.13	COORD	SYNC	6 PM	62	102	120	1	0	100	0	20	9/4/2020 3:27 P	
●		1764	YORK & ORKNEY	<input type="checkbox"/>	<input type="checkbox"/>	33	E-NET-5033	Greenmount/York	NTCIP 76.x ATC Ethernet	010.200.000.02	COORD	SYNC	6 PM	62	45	120	1	0	80	0	40	9/4/2020 3:27 P	
●		1765	LOCH RAVEN & LOCHNER	<input type="checkbox"/>	<input type="checkbox"/>	41	E-NET-5041	Loch Raven	NTCIP 76.x ATC Ethernet	010.200.000.03	COORD	SYNC	6 PM	62	50	120	1	17	61	0	42	9/4/2020 3:27 P	
●		1793	ALAMEDA & 32ND	<input type="checkbox"/>	<input type="checkbox"/>	49	E-NET-5049	Loch Raven	NTCIP 76.x ATC Ethernet	010.200.000.04	COORD	SYNC	6 PM	63	7	120	1	0	82	0	38	9/4/2020 3:27 P	
●		1820	NORTH & PULASKI	<input type="checkbox"/>	<input type="checkbox"/>	67	E-NET-5067	North	NTCIP 76.x ATC Ethernet	010.200.000.05	COORD	SYNC	6 PM	73	67	110	1	0	74	0	36	9/4/2020 3:27 P	
●		2	Test-SAI	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	E-NET-5001		NTCIP 76.x ATC Ethernet	010.200.000.04				0	0			0	0	0	0	1/1/1970 12:00 A	
●		3	Test-Jacobs	<input type="checkbox"/>	<input type="checkbox"/>	1	E-NET-5001		NTCIP 76.x ATC Ethernet	010.200.000.14				0	0			0	0	0	0	1/1/1970 12:00 A	
●		1055	NORTH & POPLAR GROVE	<input type="checkbox"/>	<input type="checkbox"/>	60	E-NET-5060	North	NTCIP 76.x ATC Ethernet	010.200.000.05				0	0			0	0	0	0	1/1/1970 12:00 A	
●		1573	NORTH & DUKELAND	<input type="checkbox"/>	<input type="checkbox"/>	61	E-NET-5061	North	NTCIP 76.x ATC Ethernet	010.200.000.05				0	0			0	0	0	0	1/1/1970 12:00 A	
●		1225	BELAIR & OVERLEA	<input type="checkbox"/>	<input type="checkbox"/>	119	E-NET-5119	Belair	NTCIP 76.x ATC Ethernet	010.200.000.11	FREE	FREE	6 PM	74	94			1	0	80	0	30	9/4/2020 3:27 P
●		745	YORK & OLD COLD SPRING	<input type="checkbox"/>	<input type="checkbox"/>	24	E-NET-5024	Greenmount/York	NTCIP 76.x ATC Ethernet	010.200.000.01	FREE	FREE	6 PM	74	39			1	0	75	0	35	9/4/2020 3:27 P

# ATMS, another more modern example



- Home
- Admin
- Dashboard
- Editor
- Support

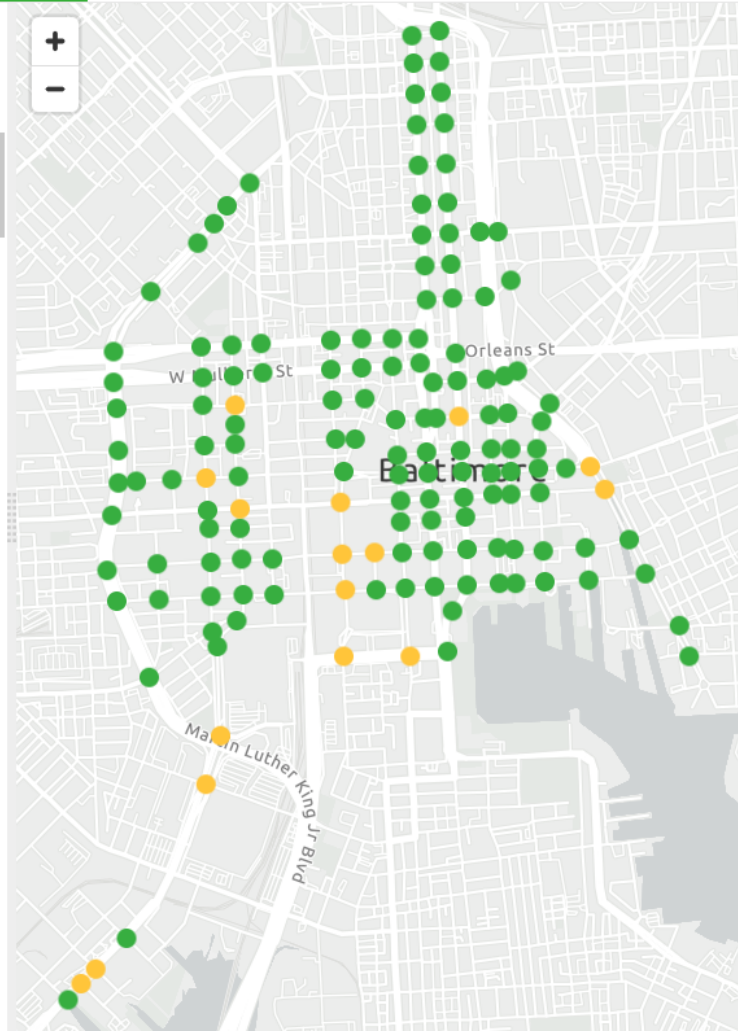
Search

Warning 16

14 • DB Editor

2 • Coord Alerts

- 87 Baltimore St & Paca...
- 132 Paca St & Saratog...
- 150 Baltimore St & Lib...
- 168 Hanover St & Lom...
- 192 Hopkins Pl & Lom...
- 297 Bayard St & Russel...
- 518 Calvert St & Sarato...
- 540 Fayette St & Green...
- 577 Pratt St & Sharp St...
- 1027 Hamburg St & Ru...
- 1340 Charles St & Con...
- 1417 Lee St & Russell St
- 1515 Conway St & Sha...
- 1584 Fayette St & Presi...
- 1597 Baltimore St & Pr...



## Alerts

- Coordination  
Coordination Active  
Controller - 6 months ago

## Quick Links

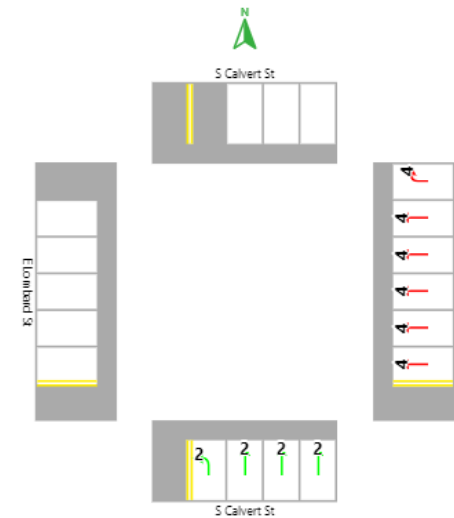
- Intersection Asset Information
- Edit Intersection Settings
- Edit Controller Database
- View Historical Alerts

## 563 Calvert St & Lombard St

06/12/2024 06:18:38 (UTC-04:00)

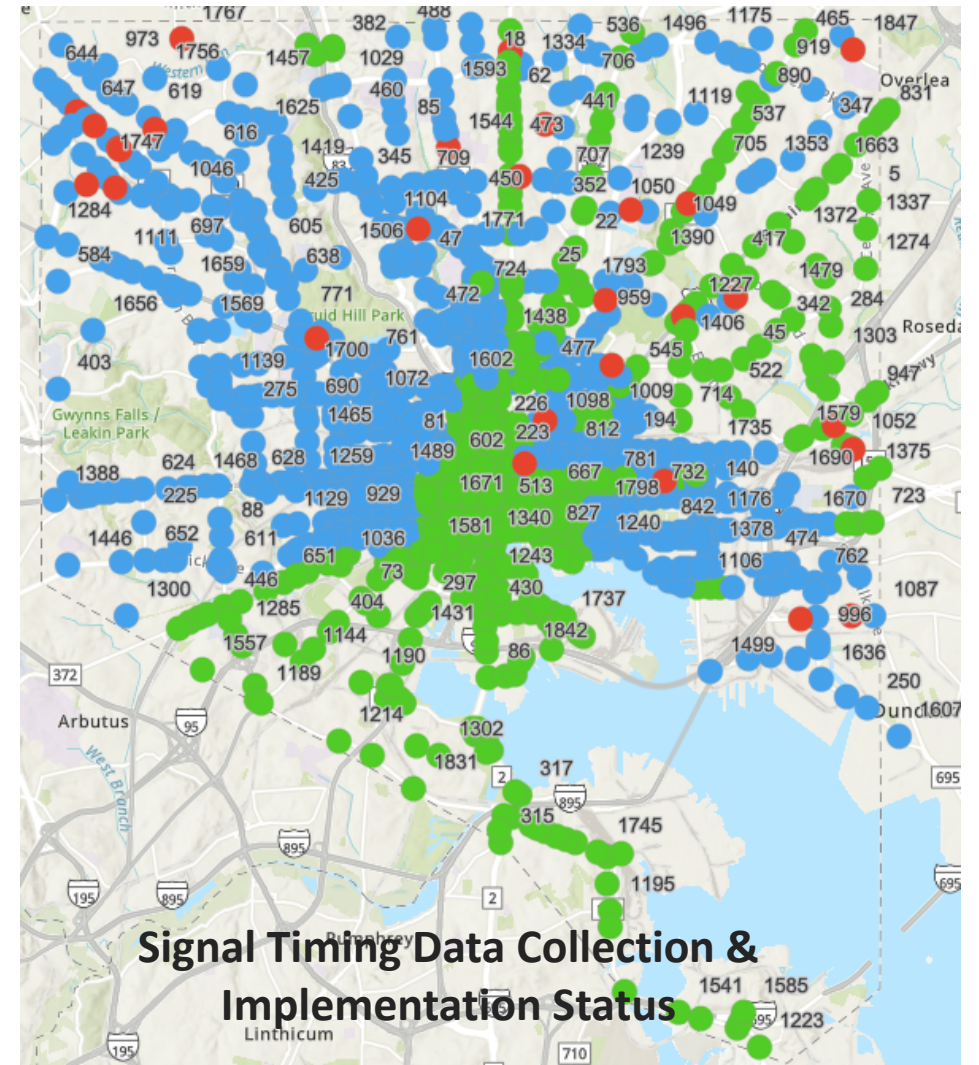
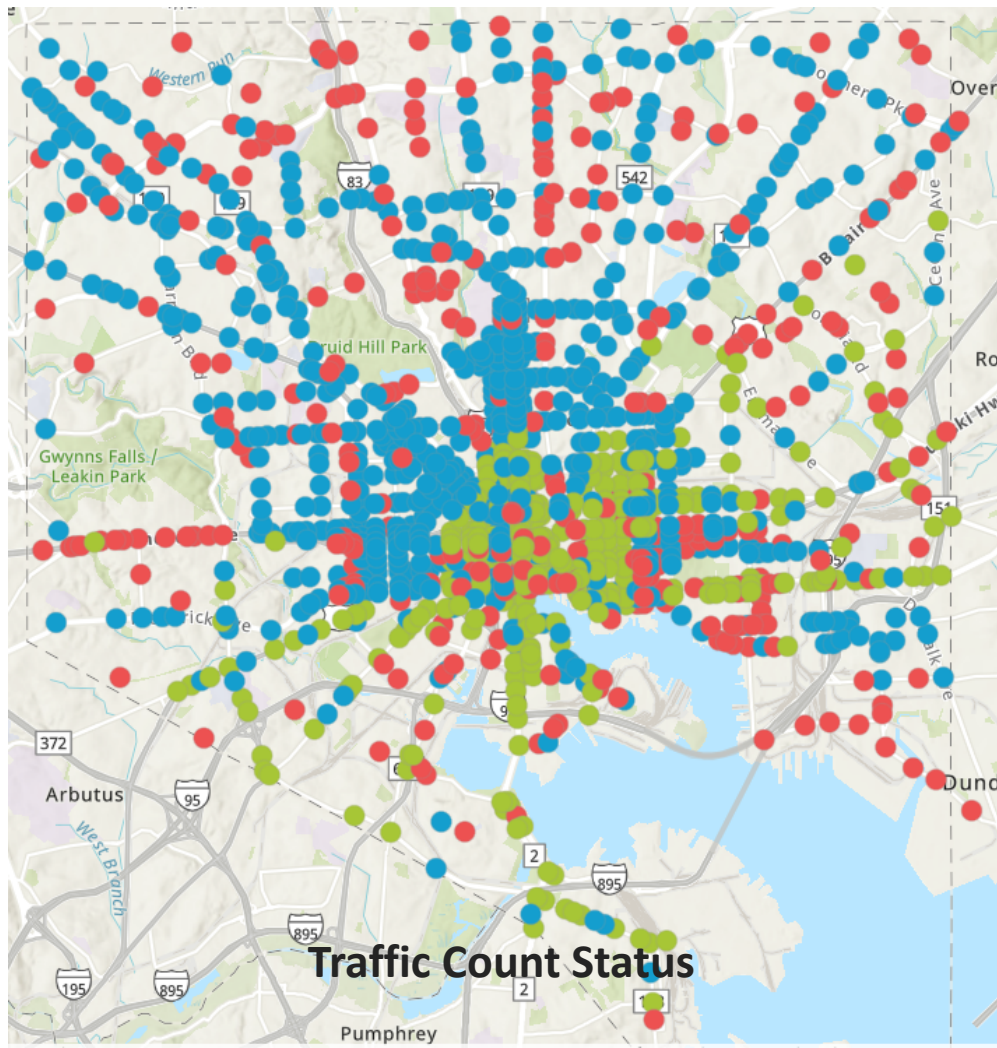
No Drift

Pattern: 23  
Local Free: Coord  
Cycle: 39  
Sync: 58



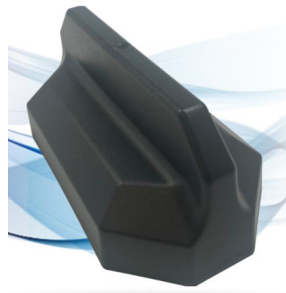
# Signal Timing Optimization

Need new tools to do the job

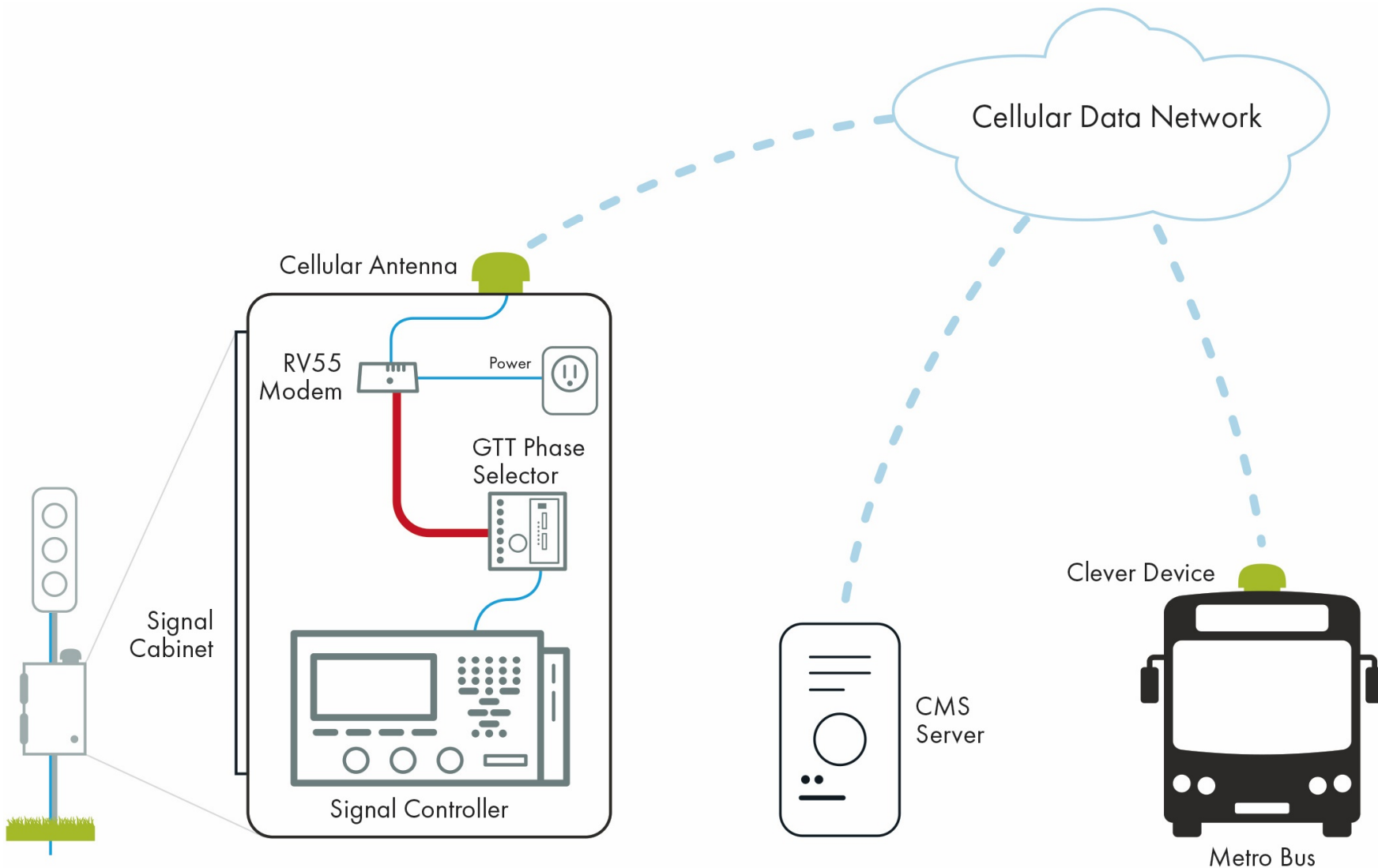


# Transit Signal Priority (TSP) Implementation

- TSP is a system made of other systems and components
  - AVL System
  - TSP Technology Type
- All parts should work independently and in coordination with other parts
- Running a TSP program requires inter-agency coordination
  - Transit Agency
  - Traffic Agency(s)



# WMATA TSP System



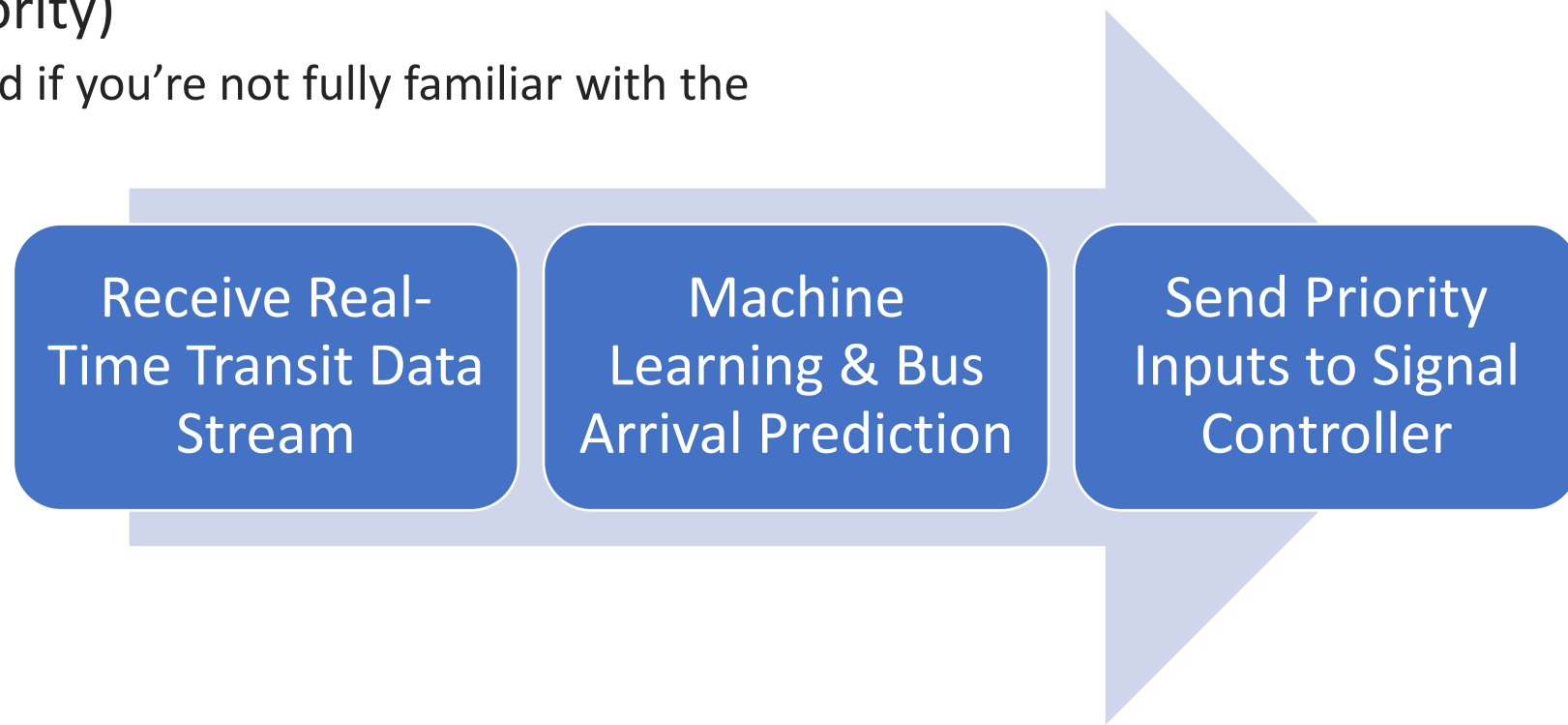
**Key**

- = Wireless Connection
- = Wired Connection
- = Ethernet Connection



# Cloud-Based Priority/Preemption Systems

- Another layer of complexity that makes it harder for the government agency to efficiently operate, troubleshoot, evaluate, and constantly improve the system.
- Requires a lot of collaboration between vendors (Signal Controller, ATMS, AVL, Priority)
  - Makes troubleshooting hard if you're not fully familiar with the system
- IT & Cybersecurity



# Connected Vehicles/Infrastructures Addition

- Not in the-too-far future!
- Another layer of complexity
- Arterial TSMO

