

# On Board and Fixed End System

Metrobus Data Systems

Raphael Alfred  
Michael Karpouzie  
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# MetroBus Fleet

- 1583 transit bus fleet (CNG, Hybrid and Clean Diesel)
  - Majority New Flyer fleet
  - Average age of 7.5 years
  - Replace buses at 15 years
- 
- Variety of Preventive Maintenance programs in place to achieve operational performance



# Consolidation of On Board Systems

- CoABE and FeS project competitively awarded in June 2011
- Combined on board communication and monitoring systems
- Includes AVL, APC, AVA, AVM and several integrations
  - Fixed End System Computer Assisted Dispatch/Automatic Vehicle Location (CAD/AVL);
  - Bus Radios for Voice & Data Communications;
  - On-board Automatic Vehicle Location (AVL);
  - Automated Voice Annunciation (AVA);
  - Automated Passenger Counting (APC);
  - Automated Vehicle Health Monitoring (AVHM)
- Vehicle mileage data recorders and fluid management system in place

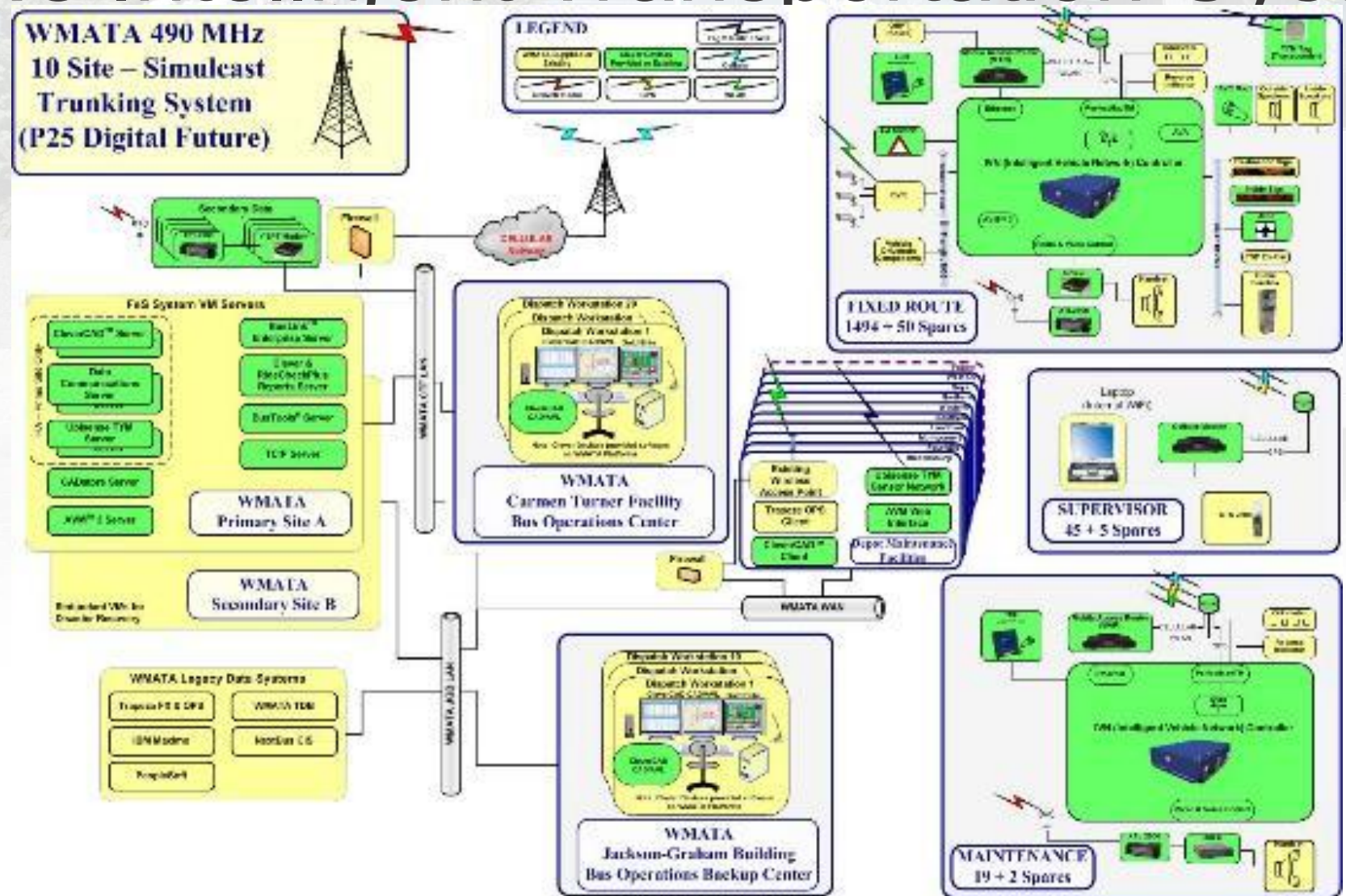


# Wireless at Metrobus

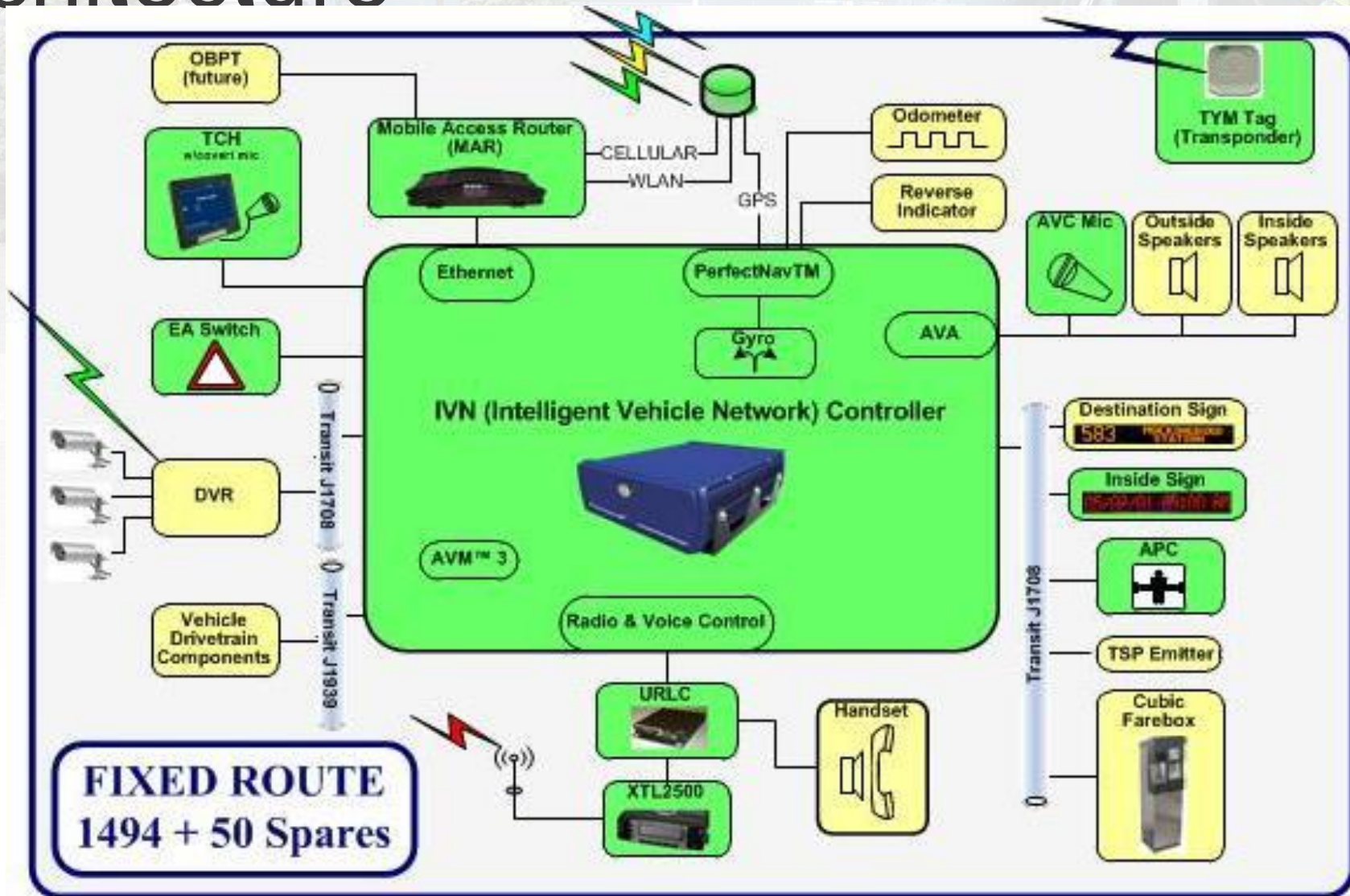
- System comprised of...
  - Cellular wireless provided by AT&T
  - 490 MHz trunked radio for voice and backup data
  - Real Time Location Services at garages
  - GPS for AVL
  - Wireless recordation of mileage (J1708)



# WMATA's Intelligent Transportation System

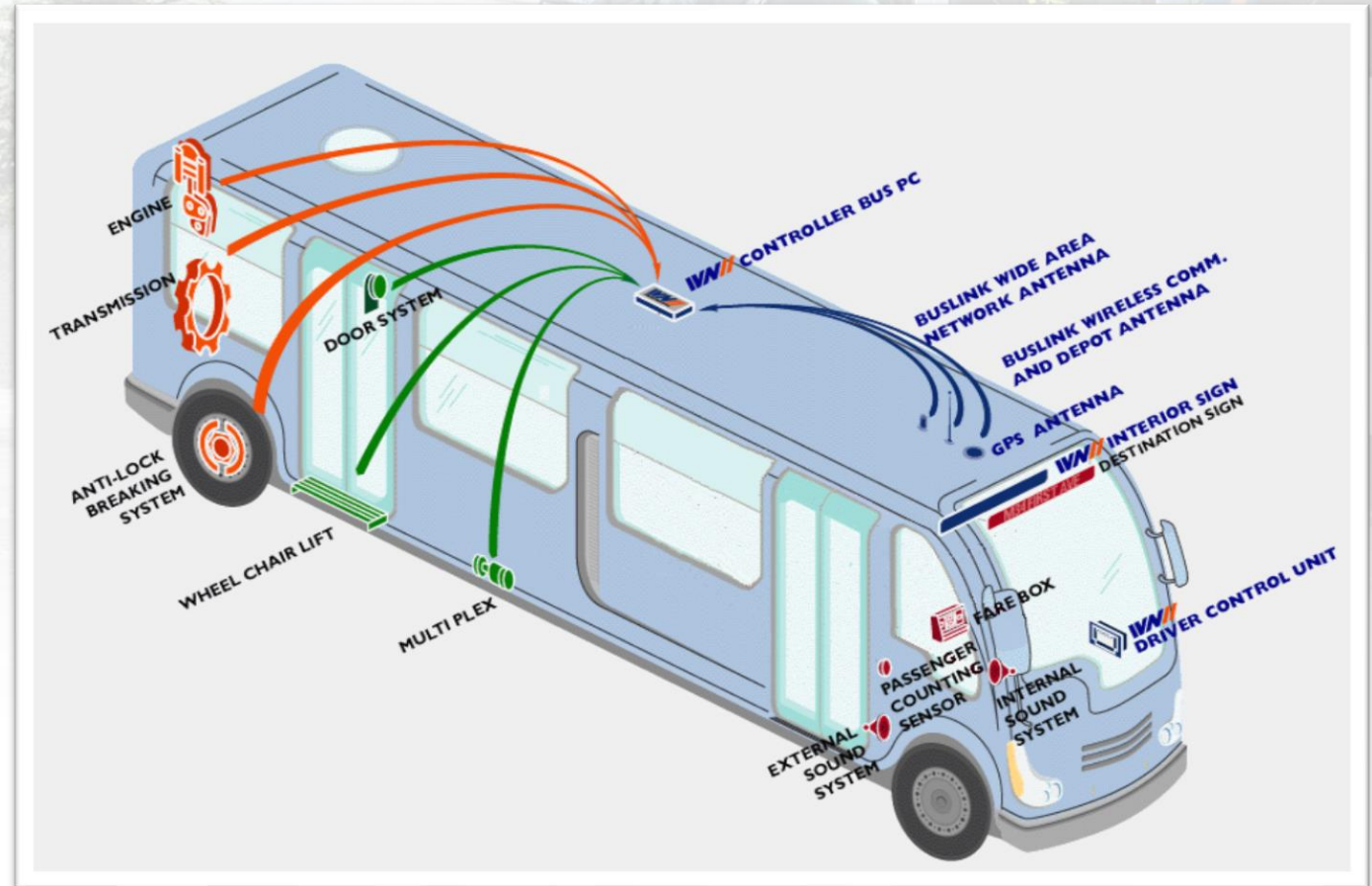


# Bus Architecture



# Vehicle Health Monitoring

- AVM™ is a decision support system that provides simple, accurate, and timely vehicle performance information
- Monitors and collects fault and operational performance data from on-board systems
- Automatic wireless transfer of information to maintenance and operations personnel
- Will be integrated with WMATA maintenance management information systems



# Vehicle Health Monitoring

## Radio Garage Summary Report

This report provides defect counts for radio faults.

### Filters

Date Between Last 24 Hours

Garage	% Of Fleet Affected	Buses Affected	Fleet Size
BLADENSBURG BUS DIVISION	1%	2	242
FOUR MILE BUS DIVISION	0%	1	215
LANDOVER BUS DIVISION	1%	2	173
MONTGOMERY BUS DIVISION	1%	2	214
NORTHERN BUS DIVISION	3%	4	159
SHEPHERD PARKWAY BUS DIVISION	1%	2	213
SOUTHERN AVE BUS DIVISION	0%		87
WEST OX BUS DIVISION	0%		95
WESTERN BUS DIVISION	1%	1	116
[Unassigned]	0%		41
			1,555



06 Mar 2016 6:01 AM

## Distribution Status Report

Name 150817\_S505 NON BST\_sa  
 Description Correction for files of August Distribution  
 Update S0000505 NON BST  
 Effective 8/23/2015 4:00:00 AM  
 Created By E017046 on 8/18/2015 1:27:10 AM  
 Status Active, 0 of 1614 Complete  
 Server JGAPPBUSLINKPV  
 Comments [none]

## Location Status Summary

Location	Update Successful	Update Failed	Workorder Posted	Workorder Received	Workorder Accepted	Workorder Rejected	Downloading Files	Waiting to Apply	Cancel Posted	Cancel Received	Cancel rejected	Cancelled	Location
[Unassigned]	0	0	109	0	3	0	3	27	0	0	0	1	143
BLADENSBURG BUS DIVISION	0	0	20	0	6	0	6	225	0	0	0	0	257
FOUR MILE BUS DIVISION	0	0	9	0	2	0	0	214	0	0	0	0	225
LANDOVER BUS DIVISION	0	0	23	0	0	0	0	70	0	0	0	0	93
MONTGOMERY BUS DIVISION	0	0	39	0	4	0	5	182	0	0	0	0	230
NORTHERN BUS DIVISION	0	0	12	1	0	0	1	139	0	0	0	0	153
Server Applications	0	0	0	0	0	0	0	1	0	0	0	0	1
SHEPHERD PARKWAY BUS DIVISION	0	0	24	0	2	0	4	197	0	0	0	0	227
SOUTHERN AVE BUS DIVISION	0	0	3	0	0	0	1	75	0	0	0	0	79
WEST OX BUS DIVISION	0	0	1	0	1	0	0	94	0	0	0	0	96
WESTERN BUS DIVISION	0	0	7	0	1	0	1	101	0	0	0	0	110
Total	0	0	247	1	19	0	21	1325	0	0	0	1	1614

1

8



# Maintenance system



Reports

Select a report from the list, or click Create Report to create an ad hoc report.

On Demand Reports    Scheduling Status

Reports to Run    Filter >    6 - 10 of 37    Download

Description

- BMNT Component Char
- BMNT Component Chang
- BMNT License Plate Expi
- Bus Latest Mileage by Bu
- Bus Latest Mileage by Da

Select Records

Bus Availability Report

Find:    Select Action

List    Man

TOTAL BUSES		BUS RUN SCHEDULED		EXTRA SERVICE		TOTAL AVAILABLE		SUMMARY		
		SCHEDULED AM	SCHEDULED PM	EXTRA SERV. AM	EXTRA SERV. PM	AVAILABLE AM	AVAILABLE PM	TOTAL OOS	% AVAILABLE	ARTIC OOO
WEST OX	96	82	82	1	1	11	11	2	98	0
BLADENSBURG	255	210	210	7	6	24	25	14	95	5
FOUR MILE	221	184	183	6	7	26	26	5	98	0
MONTGOMERY	213	162	171	5	6	31	21	15	93	2
NORTHERN	153	125	116	8	10	10	17	10	93	0
SHEPHERD PKWY	234	184	182	3	4	16	17	31	87	0
SOUTHERN AVE	79	65	65	0	1	13	12	1	99	0
WESTERN	117	100	96	1	1	14	18	2	98	0
LANDOVER	170	131	141	5	6	23	12	11	94	0
<b>TOTALS</b>	<b>1,538</b>	<b>1,243</b>	<b>1,246</b>	<b>36</b>	<b>42</b>	<b>168</b>	<b>159</b>	<b>91</b>	<b>94</b>	<b>7</b>

Maintenance Office	Work Order	Asset	Created Date	OOS Date/Time	Status	Operational Status	Status Reason	QOS Reason	Failure Description	Problem Description	Part Number	Rel Exp
BMNT-DVSN-NOMT	T12167544	B2108	12/10/15 10:49	12/13/15 9:42	BMNTDEF	REM FR SER	IN SHOP	MECHANICAL FAILURE	ENGINE	CUTS OFF		N
BMNT-BMNT-BMNT	T11834712	B2110	10/23/15 10:01	10/26/15 7:28	BMNTDEF	OPERATING	GAR CRIP	MECHANICAL FAILURE	FRONT BRAKES AND HUBS	SAFETY INSPECTION		N
BMNT-BMNT-BMNT	T10178131	B2118	2/25/15 21:49	3/13/15 12:11	BMNTDEF	REM FR SER	GAR CRIP	MECHANICAL FAILURE	ENGINE	CHECK ENGINE LIGHT		N
BMNT-DVSN-NOMT	T12663228	B2119	2/17/16 5:25	2/17/16 9:35	INPRG	OPERATING	GAR CRIP	MECHANICAL FAILURE	ENGINE	FLUID CHECK		N
BMNT-BMNT-BMNT	T11148587	B2146	7/17/15 15:15	8/26/15 5:54	BMNTDEF	REM FR SER	GAR CRIP	MECHANICAL FAILURE	SUSPENSION	SAGGING		N

# Yard Management

SmartYard Welcome, Raphael Alfred Clever Dev

Home Depots Reports Pullout Mechanic Admin Log Out

Bladensburg Bus Division

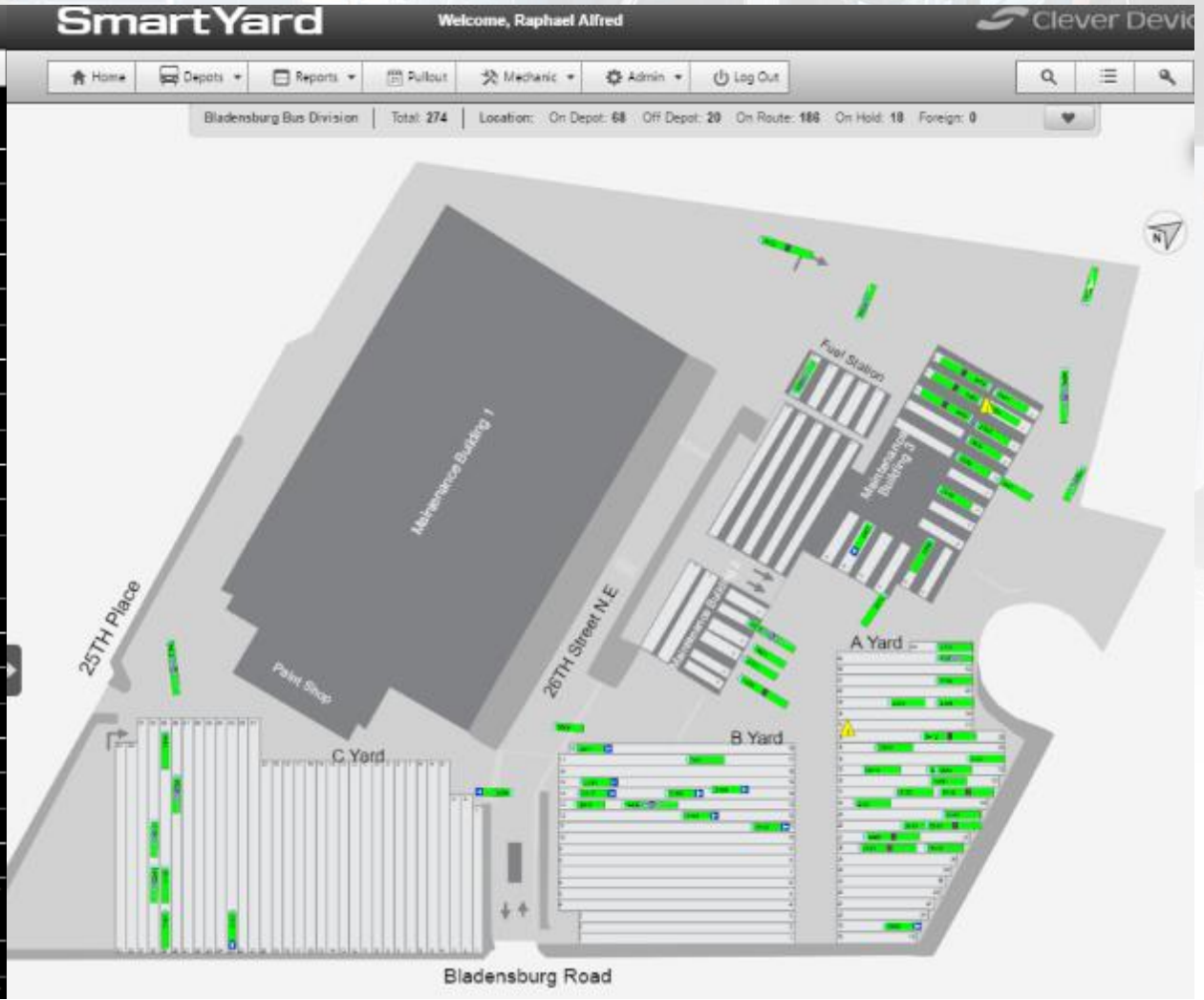
Save Grid Settings Pulled Out

1 2 3 4 5 6 7 8 9 10 - 460 items

Login Time	Start Time	End Time	Route	Bus Code	Block	Recommended	Alternate	Remark
15:31:00	16:01:00	22:31:00	BLADNSBRG RD-ANAC B2	L	+ 27226			
15:33:00	16:03:00	18:28:00	RHODE ISLAND AVE G8	L	+ 27759			
15:39:00	16:09:00	19:43:00	PENNSYLVANIA AVE LTD 39	EXTRA	+ 20394			
15:39:00	16:09:00	19:34:00	COLLEGE PARK 81 82 83 86	L	+ 20819			
15:44:00	16:14:00	21:59:00	COLLEGE PARK 81 82 83 86	L	+ 20820			
15:45:00	16:15:00	18:20:00	IVY CITY-DUPONT CIRC D3	L	+ 27454			
15:49:00	16:19:00	21:23:00	COLLEGE PARK 81 82 83 86	L	+ 20821			
15:50:00	16:20:00	23:08:00	HOSPITAL CENTER D8	L	+ 20882			
15:51:00	16:21:00	19:25:00	RIGGS ROAD R1 R2	K	+ 28813			
15:55:00	16:25:00	20:02:00	MOUNT PLEASANT 42 43	L	+ 20446			
15:55:00	16:25:00	23:17:00	QUEENS CHAPEL RD R4	L/M	+ 28847			
15:56:00	16:26:00	19:57:00	PENNSYLVANIA AVE LTD 39	EXTRA	+ 20395			

# Yard Management

Run	Operator Name	Bus	Location	Pullout	Route
300572	Johnny Anderson Keyes	2815	A Yard, A-24	03:51	BENNING RD-H ST LIMITED X9
300515	Marcellus Brundage	2448	B Yard, B-11	04:01	BLADNSBRG RD-ANAC B2
300577	Temia L Thomas	2384	B Yard, B-14	04:03	RHODE ISLAND AVE G8
300307	Quentin D Simms	2813	Off Depot	04:09	PENNSYLVANIA AVE LTD 39
302022	William W Braddon	2455	B Yard, B-14	04:09	COLLEGE PARK 81 82 83 86
300580	Reginald Dunlap	2411	B Yard, B-18	04:14	COLLEGE PARK 81 82 83 86
300579	Eric E Kamara	2386	B Yard, B-10	04:14	RHODE ISLAND AVE G8
302023	Mark Garner	2315	B Yard, B-14	04:15	IVY CITY-DUPONT CIRC D3
300582	Roy David Free	2163	B Yard, B-12	04:19	COLLEGE PARK 81 82 83 86
300252	Marlin J Smith	2322	C Yard, C-23	04:20	HOSPITAL CENTER D8
302024	Mulai Bradford-El	2326	C Yard, C-22	04:21	PENNSYLVANIA AVE 32 34 36
300309	Wesley P Holmes			04:21	RIGGS ROAD R1 R2
302025	Damell Anthony Washington			04:25	MOUNT PLEASANT 42 43
300585	Dominique Sean Fox			04:25	QUEENS CHAPEL RD R4
302026	Vincent A. Smalls	2809	A Yard, A-19	04:26	PENNSYLVANIA AVE LTD 39
300545	Torreano K Gladden			04:54	COLLEGE PARK 81 82 83 86
300554	Kemba Colvin			05:56	PENNSYLVANIA AVE 32 34 36
300546	Christopher E Isaacs			06:09	COLLEGE PARK 81 82 83 86
300524	Michael A Gilliam			06:14	COLLEGE PARK 81 82 83 86
300550	Michael T Silva			06:49	COLLEGE PARK 81 82 83 86
300558	Earl R. Riley			06:54	PENNSYLVANIA AVE 32 34 36
300567	Carrington Smith			06:54	CNVNTN CNTR-SW WTRFRNT 74
300577	Temia L Thomas			07:02	PENNSYLVANIA AVE 32 34 36
	Sandra De L Munoz				CNVNTN CNTR-SW WTRFRNT



# What about the Users

- Customers
  - Trip Planner
    - <https://www.wmata.com/schedules/trip-planner>
  - Real Time Arrival Information
    - <https://busETA.wmata.com>
  - Active developer community
  - Information Displays at stops



# Customer information



buseta.wmata.com/#d6

Washington Metropolitan Area Transit Authority

Home Rail Bus Accessibility Getting Around Fares Rider Tools About Metro

Text / Mobile About Contact Developers Help

d6

TIP: Enter an intersection, bus route or bus stop code.

**Routes:**

**D6 SIBLEY-STAD ARM**

- ▶ to EAST to STADIUM - ARMORY
- ▶ to WEST to SIBLEY HOSPITAL

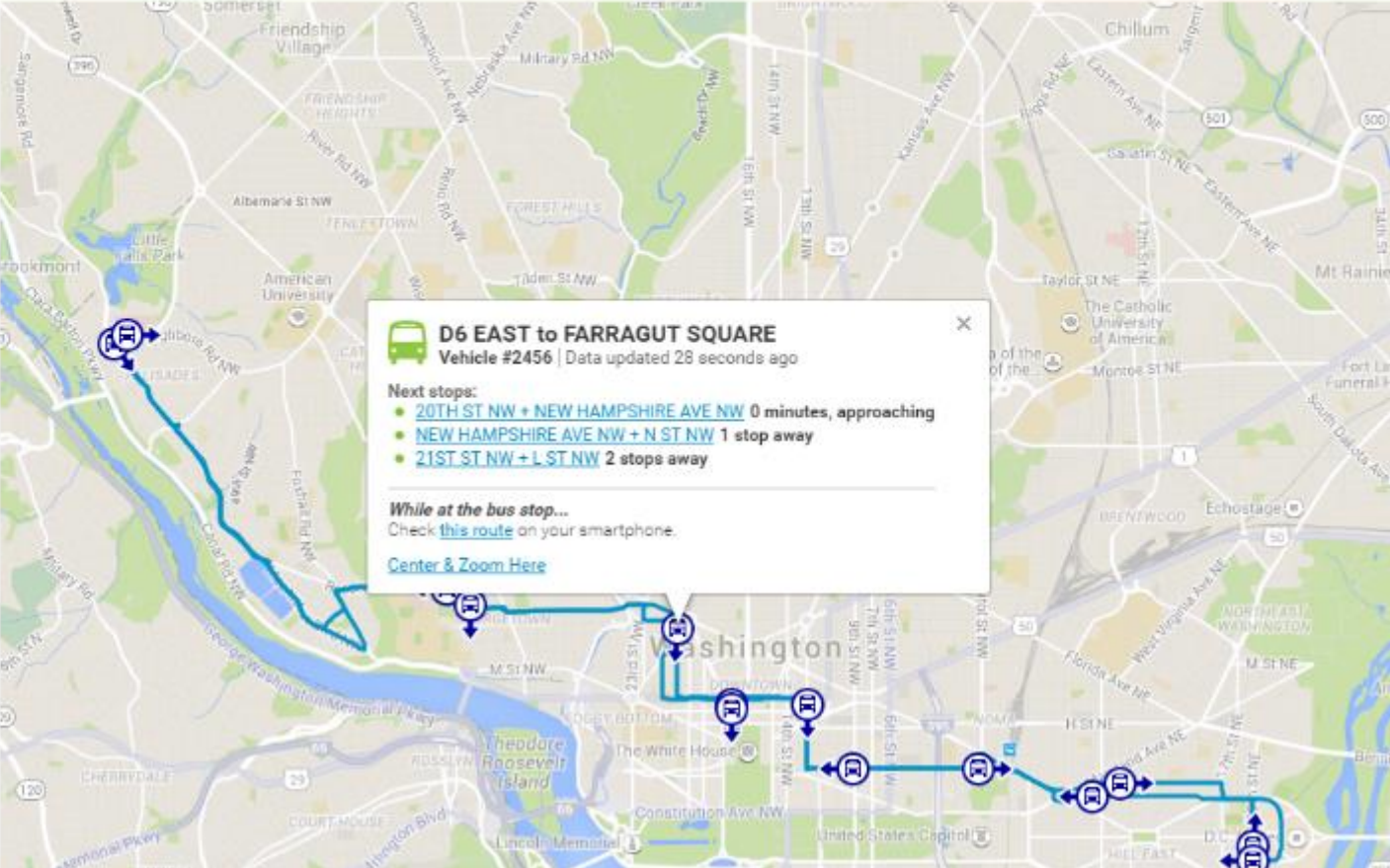
**D6 EAST TO FARRAGUT SQUARE**  
Vehicle #2456 | Data updated 28 seconds ago

**Next stops:**

- 20TH ST NW + NEW HAMPSHIRE AVE NW 0 minutes, approaching
- NEW HAMPSHIRE AVE NW + N ST NW 1 stop away
- 21ST ST NW + L ST NW 2 stops away

**While at the bus stop...**  
Check [this route](#) on your smartphone.

[Center & Zoom Here](#)



# What about the Users

- Operators
  - Communications
    - Voice and Text Messaging
  - Emergency messaging
  - Security
  - Traffic Signal Prioritization

# On Going Challenges

- More real time information
  - Costs/Bandwidth are a concern
- Open payments
  - No standard platform in transit
- Customer Expectations
  - Up time/Reliability
- Customer Experience (WiFi / Infotainment)
  - Up time/Reliability
  - Costs vs Potential