



Safety and Operations Committee

Board Information Item IV-D

Rail Automation Program Update

Washington Metropolitan Area Transit Authority
Board Action/Information Summary

Action Information

Document
Number:
205564

Resolution:
 Yes No

Presentation Name:

Rail Automation Program Update

Project Manager:

Tiffani Jenkins

Project Department:

Infrastructure

Purpose/Key Highlights:

Update the Board on Metro's progress in restoring best in class technology.

- Metro is accelerating automatic door operations (ADO) ahead of automatic train operations (ATO) to deliver safety and customer experience improvements.
- The ATO schedule is being adjusted to permit learning from testing, training, and procedural documentation, consistent with Metro's Concept of Operations and Readiness Plans.
- Return to Automatic Operations and Auto Door utilization will deliver on service excellence and sustainability goals, saving upwards of 5-10 minutes in travel time and \$10 million annually.

Interested Parties:

NA

Background:

Metro opened its doors in 1976 with ATO. Metro is now restoring automatic train operation, or ATO, functionality systemwide to create another layer of safety and performance to its operations today. This improved system will add technology for our train operators and a better ride for our customers.

Like autopilot in planes, ATO provides energy saving enhancements through optimized acceleration and braking. Additionally, ATO makes the starts and stops of train operations smoother. The technology also helps operator efficiency by helping

customers keep consistent arrival and departure schedules, achieving better on-time performance for the entire system.

Discussion:

As Metro continues to advance its rail automation program, staff concluded the first phase of integrated testing this summer. Based on positive test results, as well as training, and safety certification schedules, Metro will be operationally ready to reintroduce automatic door openings first on the Red Line in October 2023, subject to WMSC concurrence.

In a change to the originally forecasted schedule, Metro has taken more time to internally workshop its Concept of Operations and Readiness plans for automatic train operations, as well as conducting a comprehensive review of system design and operations in sessions with the Washington Metrorail Safety Commission.

Bifurcating the delivery of the program to advance auto doors first enables Metro to deliver safety and service benefits to the customers beginning next month, while continuing to deliberately advance a program driven by industry experts and best practice leaders, which kicked off with an American Public Transportation Association Peer Review giving Metro a green light to restore the safety benefits of the automated rail subsystems.

This sequencing also enables a comprehensive safety certification process that Metro anticipates will result in concurrence from the Washington Metrorail Safety Commission (WMSC). Subject to that concurrence, Metro expects to begin auto doors operation on the Red Line next month, and to begin demonstrating automatic train operations in passenger service on the Red Line early in the new year.

Funding Impact:

No funding impacts result from this information update.

Previous Actions:

Rail Automation presentation to the Board
APTA Peer Review update - March 2023

Next Steps:

Automatic door operations to begin on Red Line in October 2023

Recommendation:

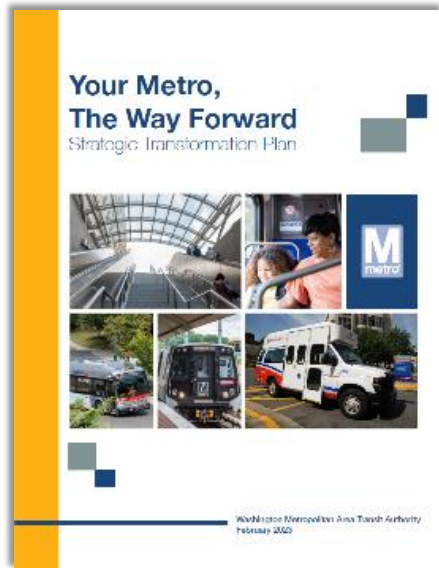
Information Only

Rail Automation Program Update

Safety & Operations Committee
September 14, 2023



Strategic Transformation Plan: Guides long term strategy and day-to-day decision making of Metro over the next five + years



Guiding



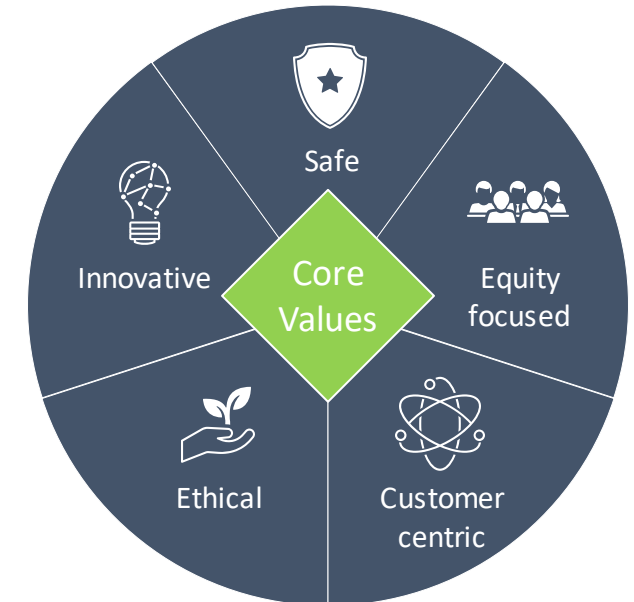
Day-to-day decisions

- Customer interactions
- Service schedules
- Communications



Long-term strategy

- Budget allocation
- Capital improvements
- Priority projects



Return to Automatic Train Operations and Auto Door utilization will have a significant impact on service excellence and sustainability goals.

Service Excellence

Talented Teams

Regional
Opportunity and
Partnership

Sustainability

Purpose

Update Board on Metro's progress in returning the rail system to automatic door and train operations.

Key Program Benefits



Safety

- Eliminate red signal overruns
- Eliminate wrong side door operations
- Eliminate door opening off the platform
- Enforce speed commands



Customer Experience

- Reduce end-to-end trip time on the Red Line of 5 – 7 minutes, a 10% savings
- Improve passenger ride quality



Fiscal Stewardship

- Save approximately \$10M annually in operating costs



Sustainability

- Reduce energy consumption and reduced wear on equipment

What is Train Control?

A Railcar and Track integrated system that delivers proper train separation

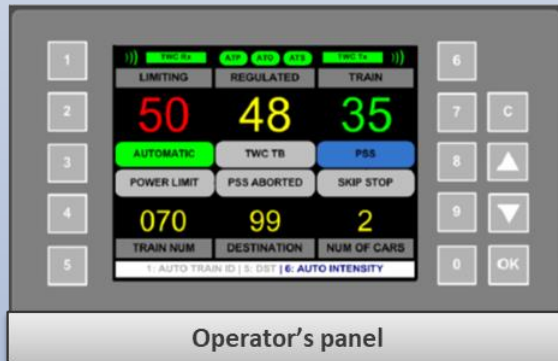


165 Train Control Rooms

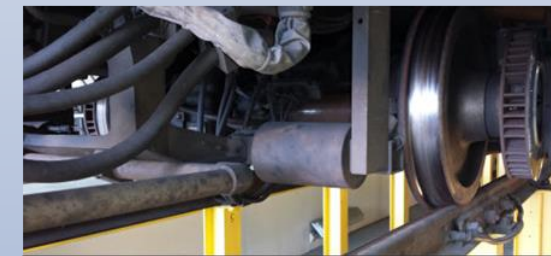
700+ miles of cable



3225 HF Track Circuits /
161 PF Track Circuits

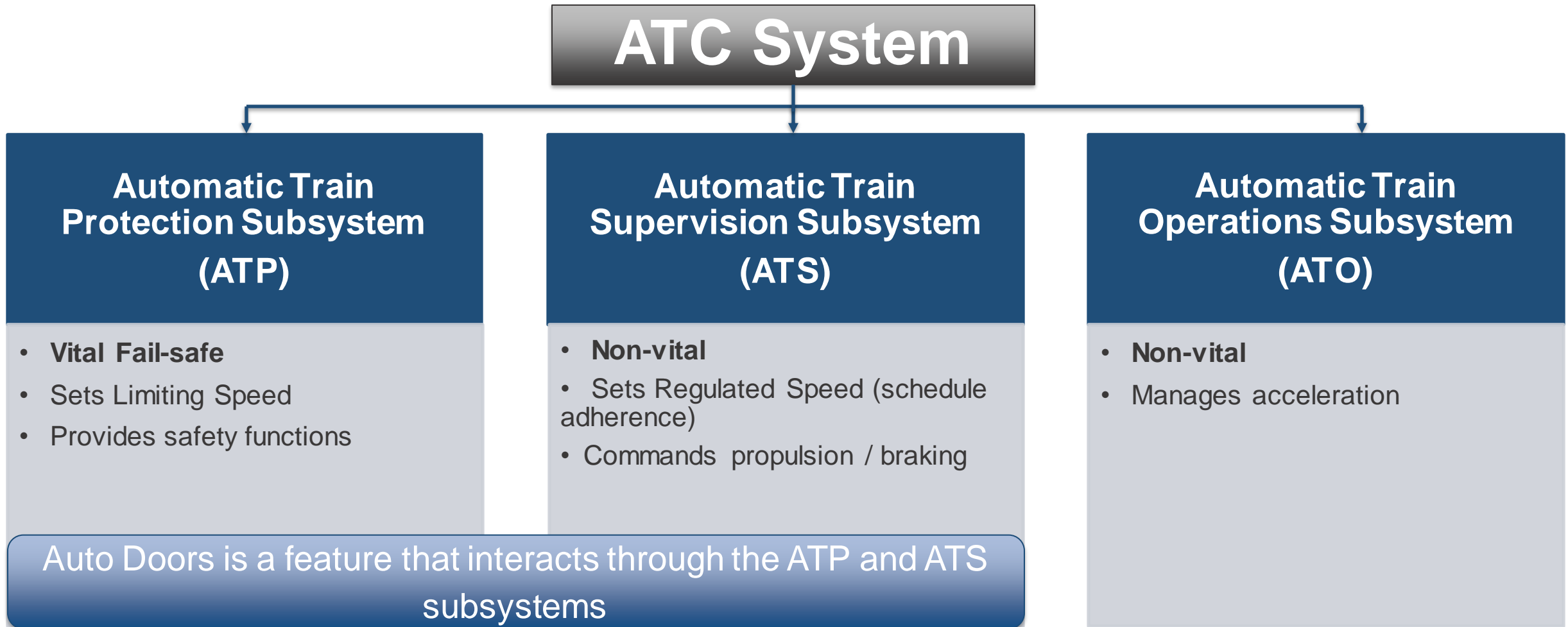


Operator's panel



Rail Car Antenna

Automatic Train Control System



Door and Train Operation Safer through Automation

Red Signal Overrun Manual vs ATO

Signal Overrun Comparison: Manual

- Performed on in-house 7000-series simulator
- Signal can be overrun in manual mode

Manual Mode Wrong Side Door Opening

Manual Door Operation Opens on Wrong Side

- Performed on in-house 7000-series simulator
- All people on track and platform are simulated



Customer Experience Enhancement through Automation



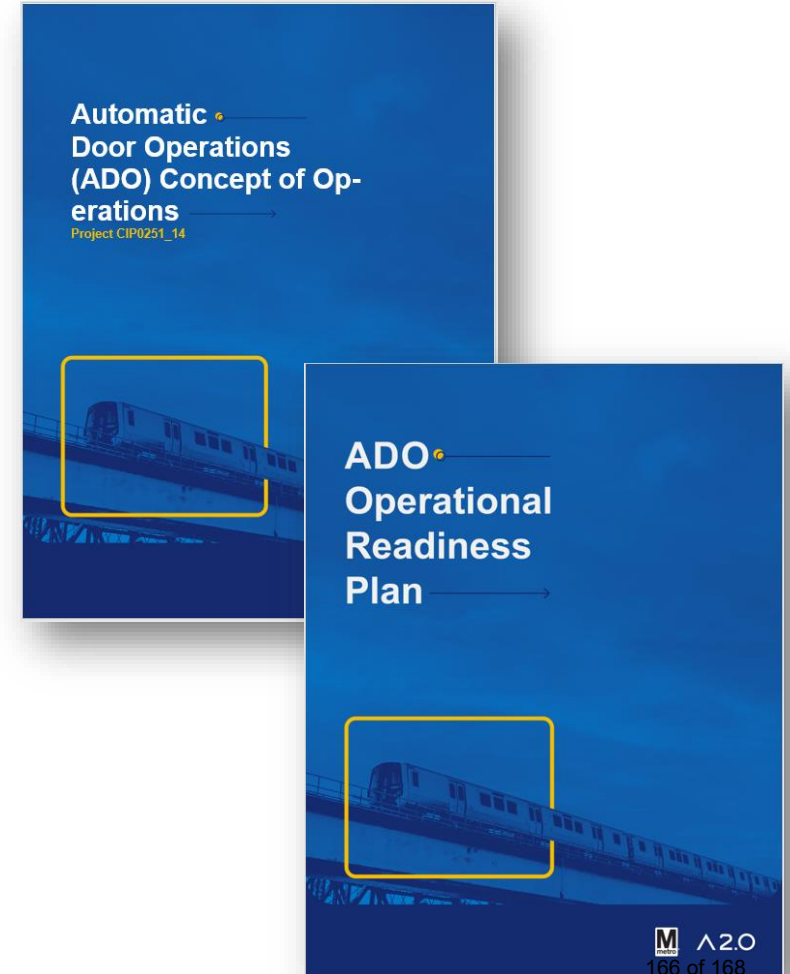
Leveraging team expertise to deliver a connected program

Team strengthened with technical professionals and leadership additions

- Nearly 200 years of signal system design, policy, and operating experience
- Industry-leading experts in signaling systems design & commissioning
- American Public Transportation Association (APTA) peer review participants for international transit agencies
- Mechanical system designs
- Operational policy
- Safety oversight and change management
- Project management and program
- Integrated Control Center management

Rigor through the Safety Certification Process

- Maintaining Safety Certification Compliance
- Continual WMSC Engagement
- Submittal of Key Program Documents
 - Operational Concepts
 - Plans
 - Procedures
 - Testing
 - Training



Path to Safety Certification



Testing and Readiness for Auto Doors



Testing

- > 2,500 door operations performed during testing on the Red Line
- **No** Wrong Side Door Opening
- **No** Doors Opened off platform



Training

- Auto Doors Training initiated in September
 - Rail Operators
 - Signaling teams
 - Vehicle teams
 - Rail Traffic Controllers



System Readiness

- Conducted systemwide door operation inspection during passenger service
 - No safety failure observed
- Performance demonstration testing anticipated in September with WMSC