The RM3P Journey: Innovation Concept to Real World Implementation

NOVEMBER 12, 2020

Regional Multi-Modal Mobility Program

VDOT

DRPT

The Mission

Leverage the collaborative use of

real-time data

by Virginia's public and private sectors

to improve travel safety, reliability, and mobility,

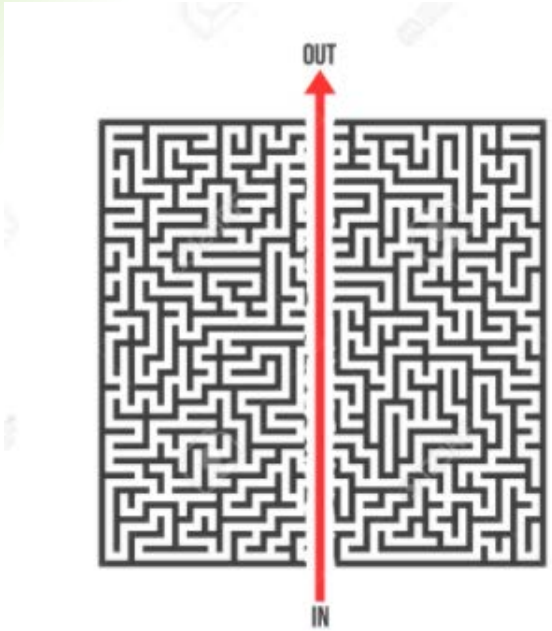
and

to give the public the tools

to make more informed travel choices.

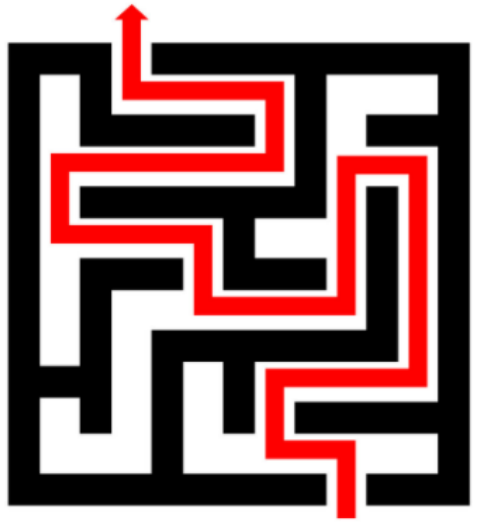
Evolution of the RM3P Effort

The Plan



Develop - Apply For Funding - Get Funding - Build

The Reality



Develop - Apply for Funding - Seek Grants - Redesign Effort - Seek Alternative Funding - Get Funding - Build

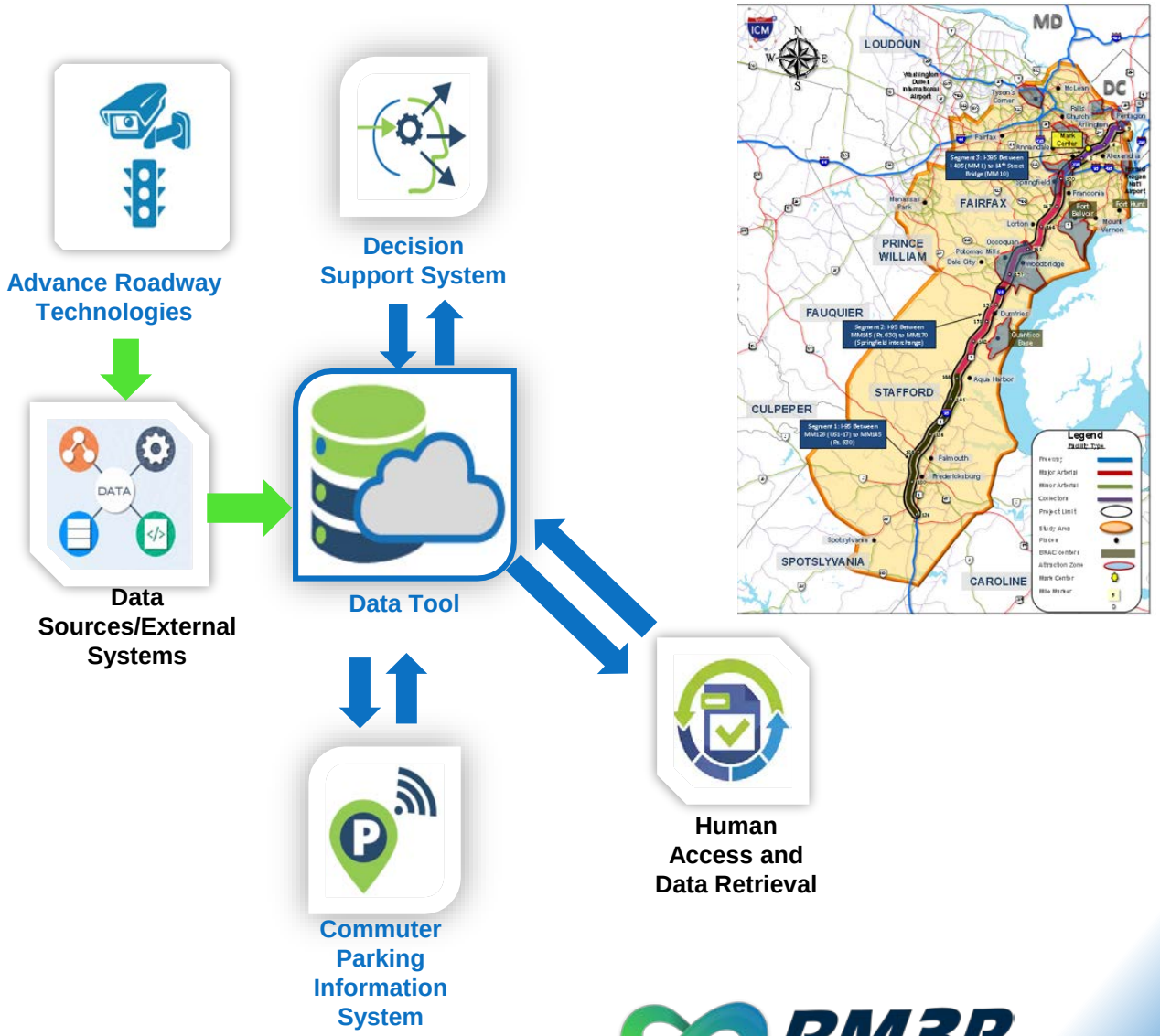
Evolution of the RM3P Effort

2012 I-95/I-395 CONOPS

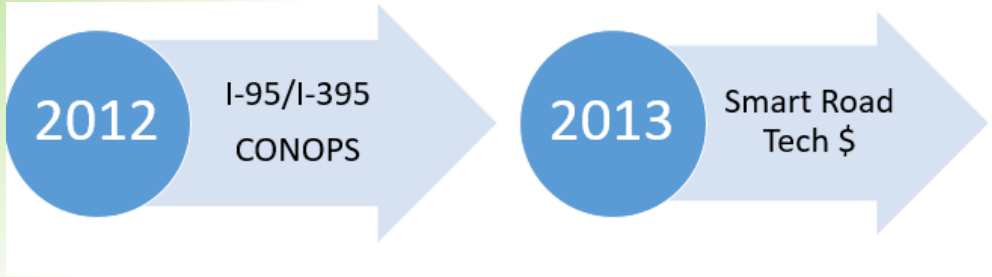
- Advance ICM using 3 project bundles;
  - Traveler Information
  - Operations
  - Decision Support System

- Operations includes advanced roadway technologies such as ramp metering, adaptive signals, parking information systems, freeway active traffic management, etc.

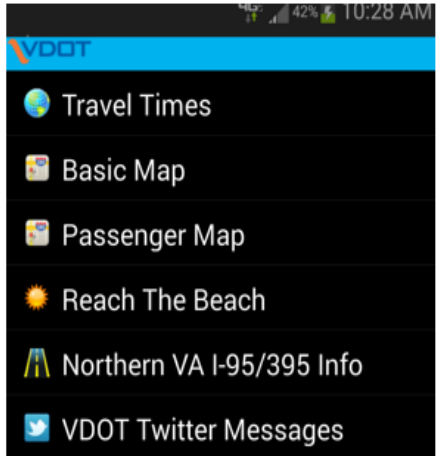
- Stakeholders included Counties, NVTA, MWCOG, VDOT, DRPT, VRE, etc.

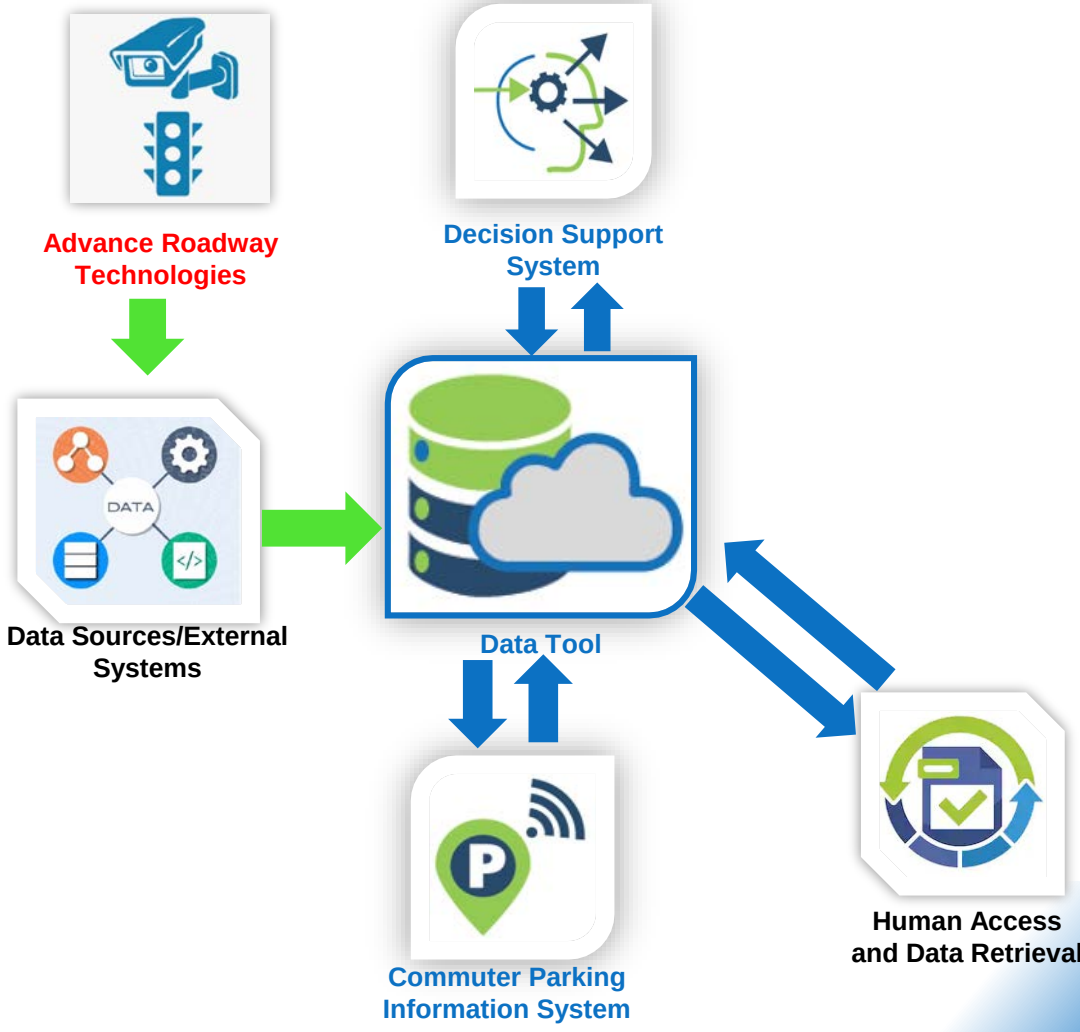


Evolution of the RM3P Effort



- Received Smart Road Technology funding
- Began signal upgrades
- Installed Travel Time signs
- Added travel time & transit information to 511

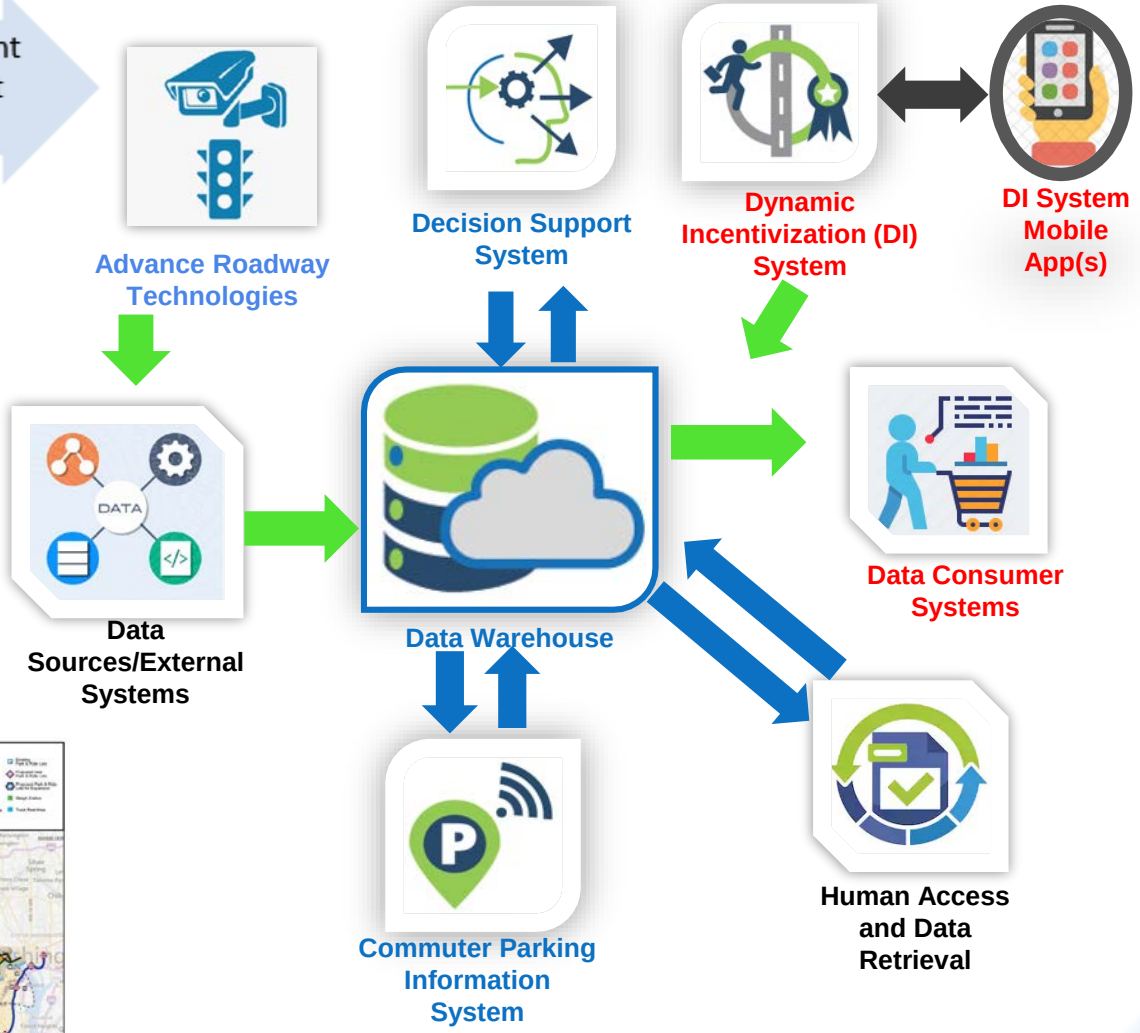


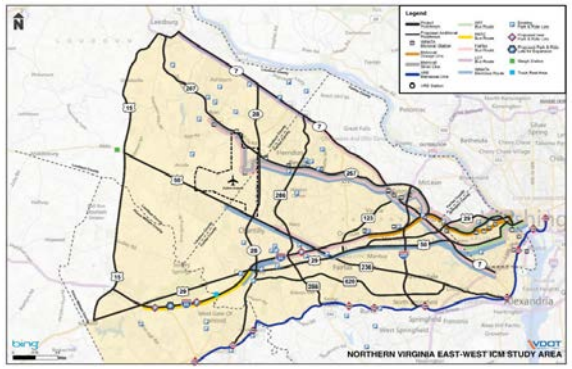


Regional Multi-Modal Mobility Program

Evolution of the RM3P Effort

- Received a FHWA planning grant
- Develop a Region ICM approach
- Focus on five areas; real-time monitoring, data warehouse, decision support, travel information and advanced incentivization
- Stakeholders included Counties, NVTA, MWCOG, VDOT, DRPT, VRE, etc.





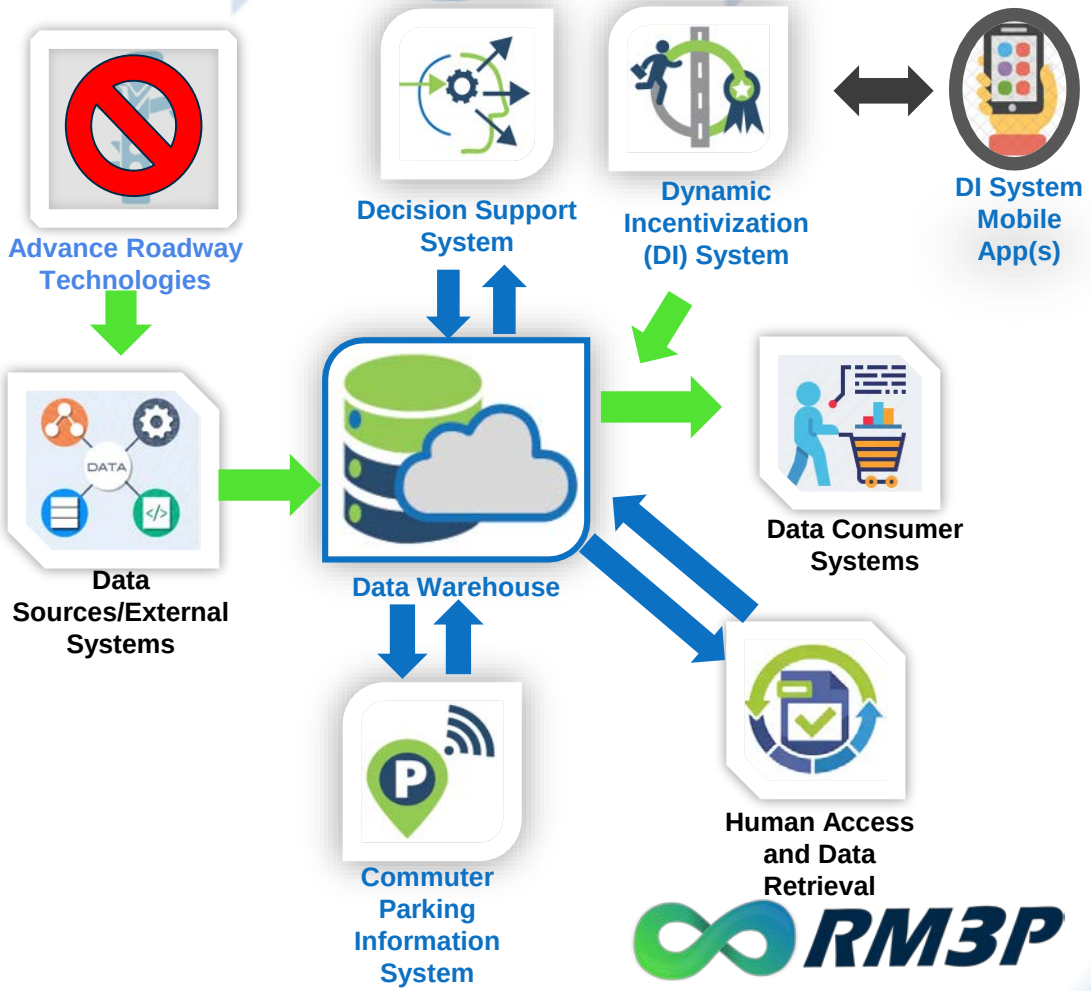
Evolution of the RM3P Effort

- Combined the I-95 / I-395 ICM & East-West Corridor ICM into the RM3P
- Developed a VDOT-DRPT-NVTA partnership

- Applied for a 2016 FHWA ATCMTD grant (**Denied**)
- Requested internal funding to advance a program without the grant (**Denied**)

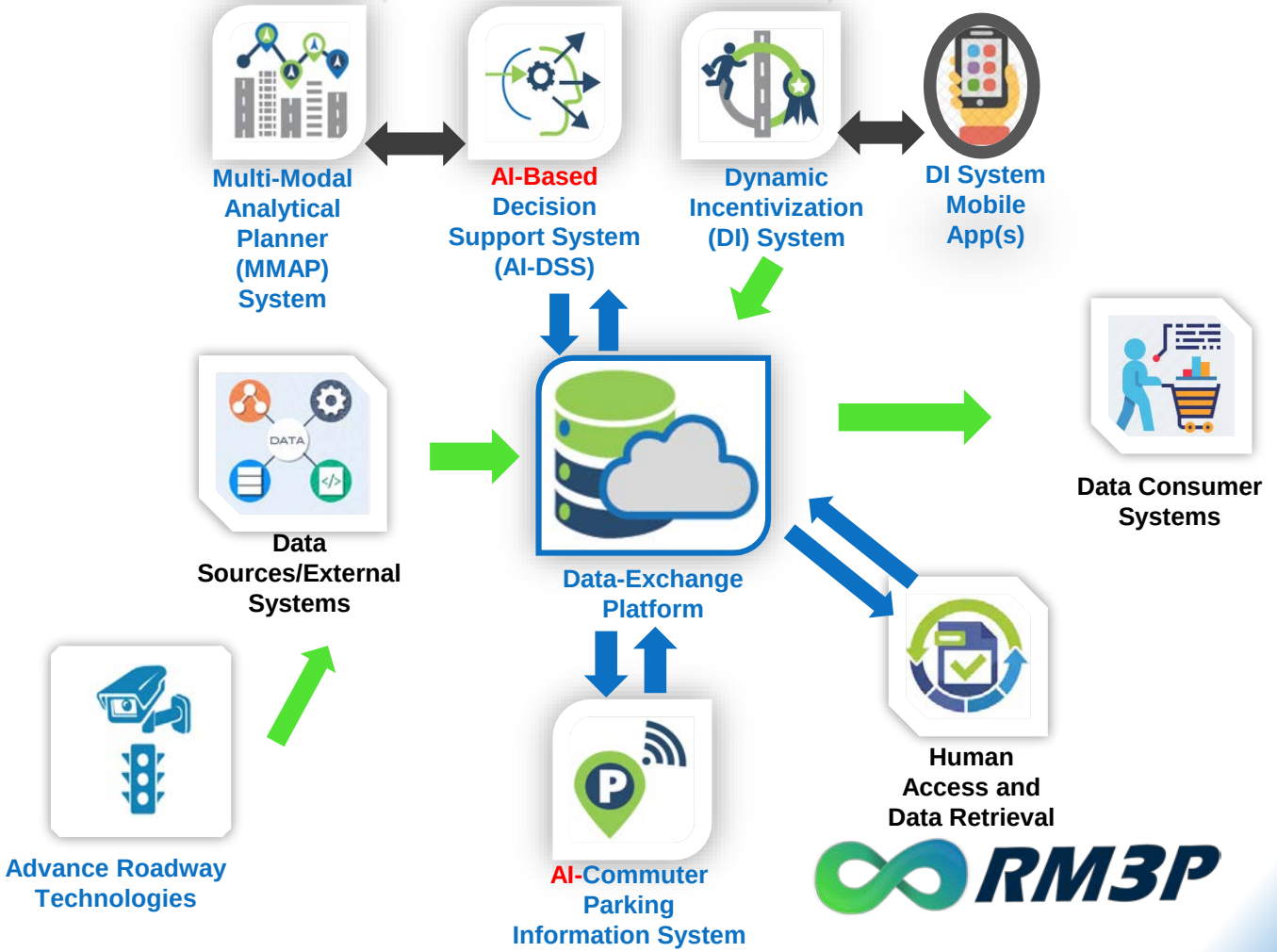
Evolution of the RM3P Effort

- NVTA submitted a Virginia SmartScale application
- The Commonwealth agreed to fund RM3P through the Innovation Transportation Technology Fund, not SmartScale
- Scope reduced to:
  - Include only the Northern Virginia District
  - Not include advanced roadway technologies



Evolution of RM3P

- I-95 Corridor study program includes the Advanced Roadway Technologies
- VDOT applies for an ATCMTD grant
  - Added AI to DSS and parking
  - Partnered with FAMPO
  - Expanded DSS into Fredericksburg



RM3P

Travel Decisions Powered by Data

Virginia Regional Multi-Modal Mobility Program (RM3P)

RM3P is a collaborative program to improve safety, reliability, and mobility for travelers in the Northern Virginia region. Through the RM3P initiative, public and private sector transportation safety and service providers across Northern Virginia will adopt technologies to improve multi-modal travel conditions. Funded under the Commonwealth of Virginia's Innovative Technology and Transportation Fund (ITTF), the RM3P is led by the Virginia Department of Transportation (VDOT), the Northern Virginia Transportation Authority (NVTA), and the Virginia Department of Rail and Public Transportation (DRPT).

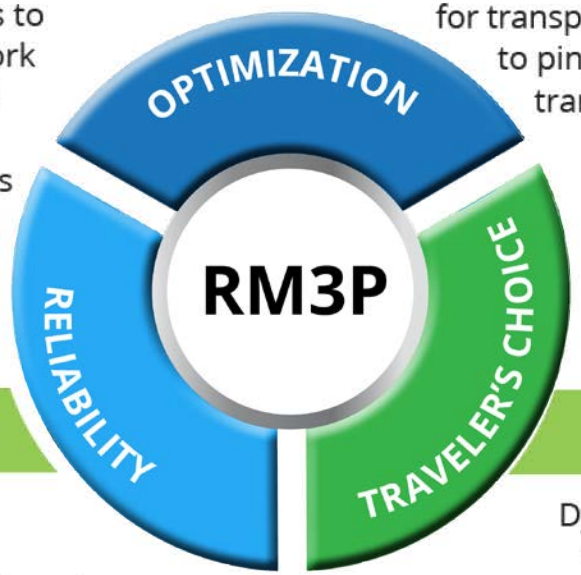
VDOT · NVTA · DRPT

Data-Exchange Platform

The Data-Exchange Platform (DEP) will be a reliable, continuously updated, cloud-based data storage and exchange system. It will be used by regional partners and third-party providers to capture, process, and exchange information on real-time and historic multi-modal travel conditions. This platform will feed necessary data to other RM3P program elements and disseminate value-added and full-grown data produced by these elements.

AI-Based Decision Support System

The AI-Based Decision Support System (AI-DSS) will help predict the impact of disruptions to the transportation network and provide coordinated response options to agencies. The automated tool for operators will use travel data to monitor emerging conditions and recommend plans for coordinated, multi-agency responses to congestion, incidents, and events.



Multi-Modal Analytical Planner

The Multi-Modal Analytical Planner (MMAP) will be a collaboration tool for transportation service providers to pinpoint unmet needs in the transportation network. This highly interactive tool will enable mobility providers to study the impacts of "what-if" scenarios and better plan for travel demand by identifying underserved areas, especially during disruptive events.

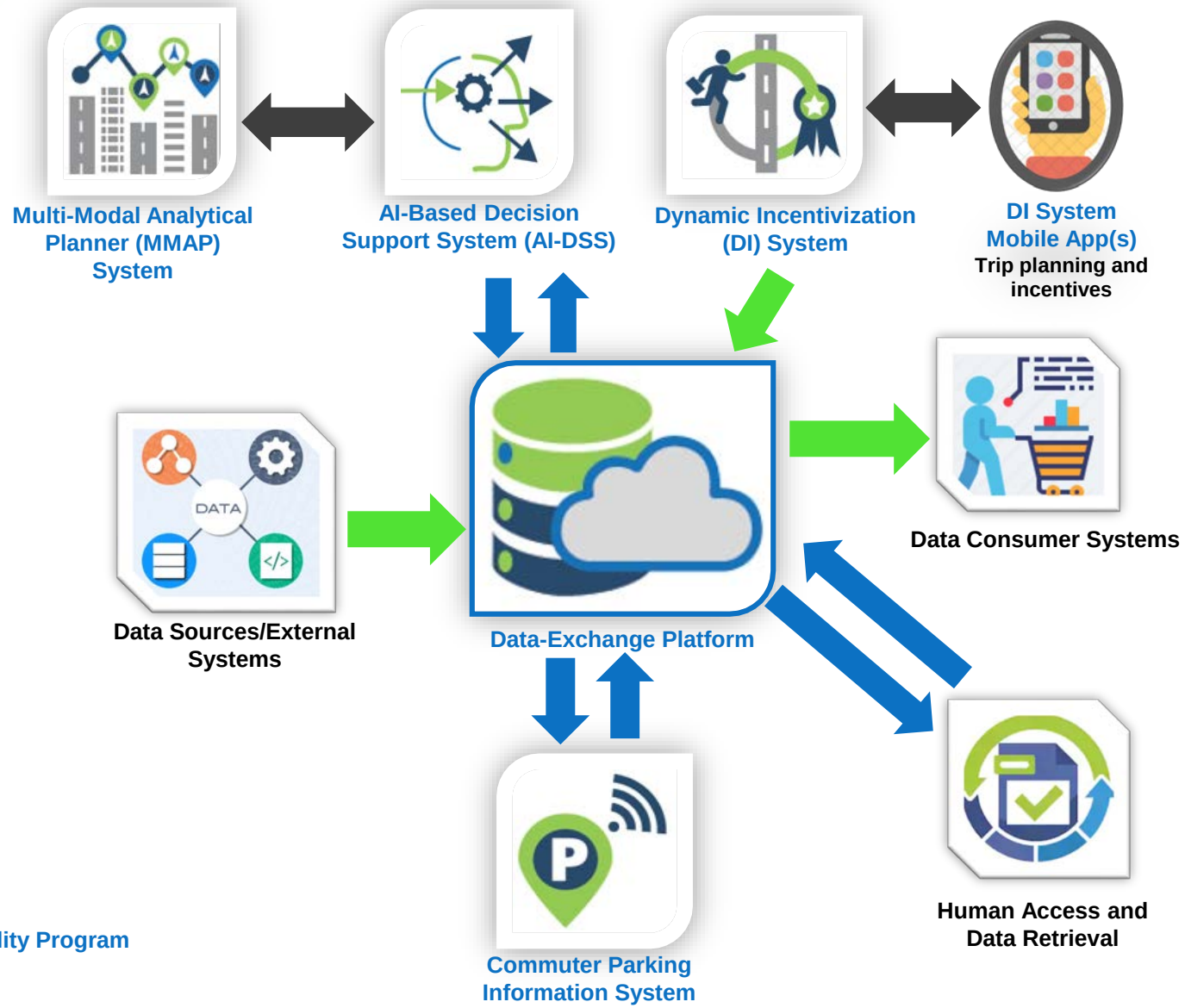
Commuter Parking Information System

The Commuter Parking Information System (CPIS) will entail a real-time, app-based parking availability information system that provides reliable information about parking space availability at lots serving bus, vanpool, and carpool commuters.

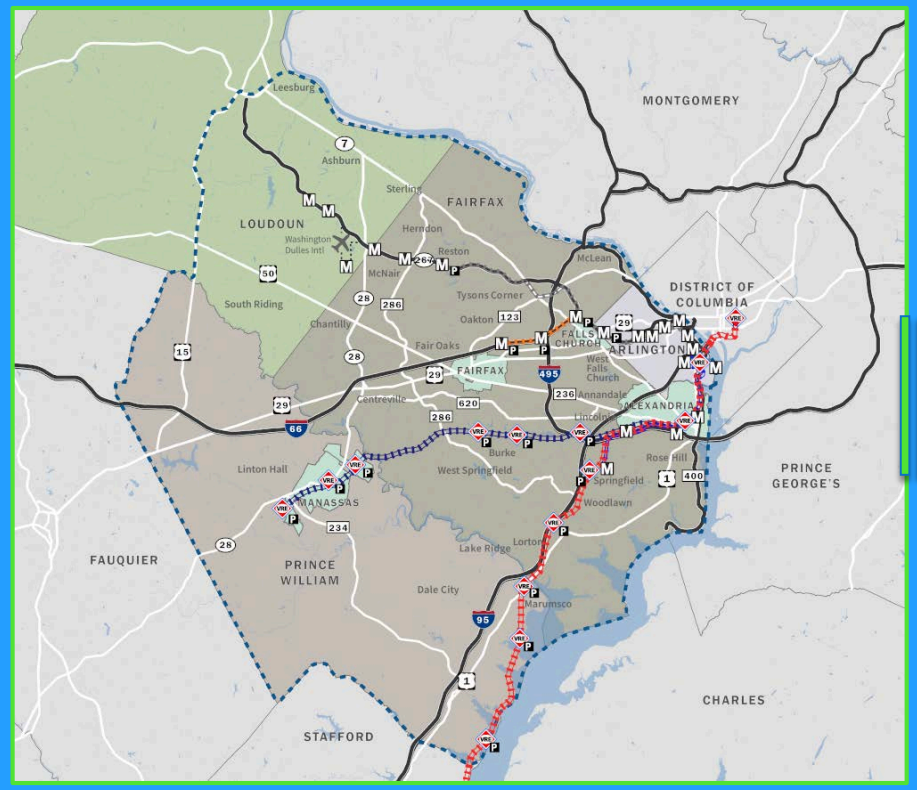
Dynamic Incentivization

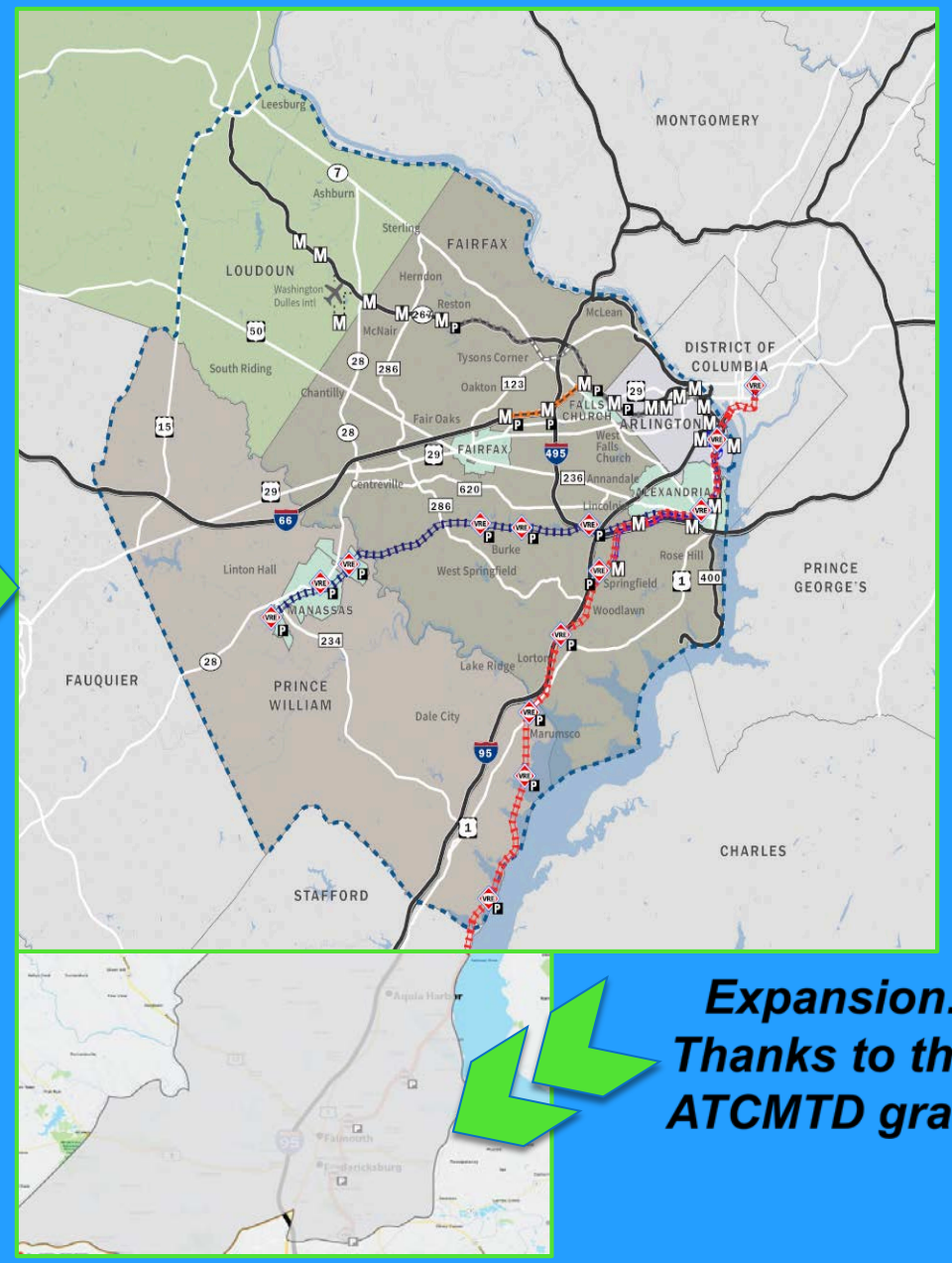
Dynamic Incentivization (DI) will be a data-driven system offering the public incentives to modify their travel choices and behaviors in response to real-time travel conditions. The incentives will be offered by regional agencies and third-party providers.

One Program


Multi-Modal Analytical Planner (MMAP) System
AI-Based Decision Support System (AI-DSS)
Dynamic Incentivization (DI) System
DI System Mobile App(s)
Trip planning and incentives
DATA
Data Sources/External Systems
Data-Exchange Platform
Data Consumer Systems
Commuter Parking Information System
Human Access and Data Retrieval

RM3P Boundary





Expansion. Thanks to the ATCMTD grant

The Team

- Executive Committee
- Program Principal
- PM Support Group
- Program Managers
- Evaluation Team
- Stakeholder Advisory Group (SAG)
  - Focus Groups
- Industry Stakeholders
- Technical Working Group (TWG)
- Communications Working Group (CWG)
- Ad-Hoc Committees
  - Contracts & Agreements Working Group
  - Simulation Panel
  - MOU Negotiation Team
  - Stakeholder Event Planning

Program Element Guidance Teams (PEGT)

Data-Exchange Platform	AI-Based DSS	Commuter Parking	Multi-Modal Analytical Planner	Dynamic Incentivization
Delivery Team	Delivery Team	Delivery Team	Delivery Team	Delivery Team

Strategic Guidance for RM3P

Cathy McGhee
Director of Research and Innovation, VDOT

Monica Backmon
Executive Director, NVTA

Jennifer DeBruhl
Chief of Public Transportation, DRPT

Bob Osmond
Chief of Tech & Business Strategy, VDOT

Kevin Gregg
Chief of Maintenance & Operations, VDOT

Hari Sripathi
Director of Innovation, VDOT

Bill Cuttler
Construction Manager, VDOT

Marcie Parker
Fredericksburg District Engineer, VDOT

Iris Vaughan
ITS/Operations/LPA Engineer, FHWA

Linda Millsaps
Executive Director, FAMPO

Anticipated Benefits

Coordinated responses to travel disruptions

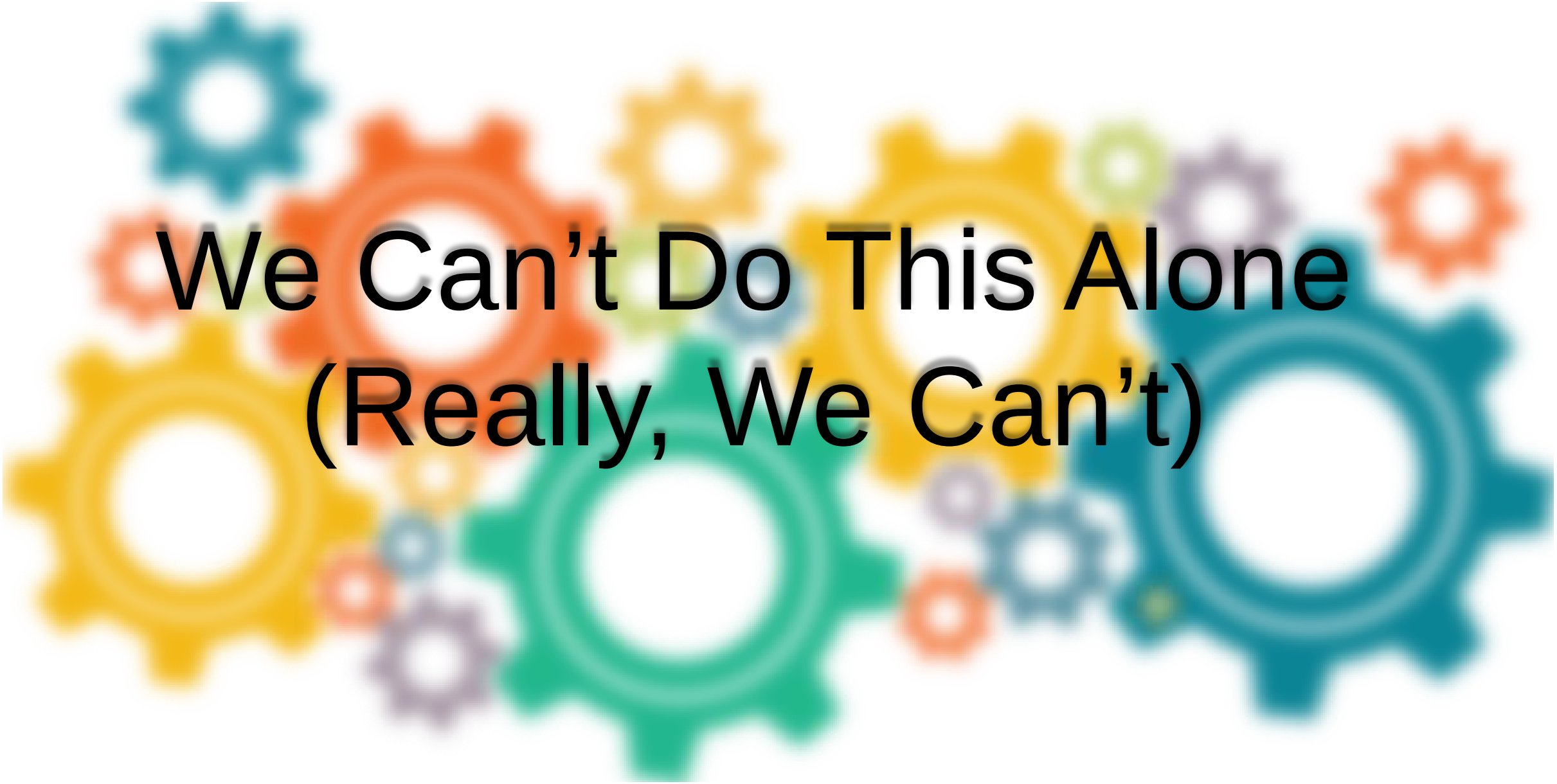
Improved safety

Collaborative planning

More reliable commutes

Enhanced connections

Incentives for individual travelers


We Can’t Do This Alone
(Really, We Can’t)

Listening to the Industry

Summary

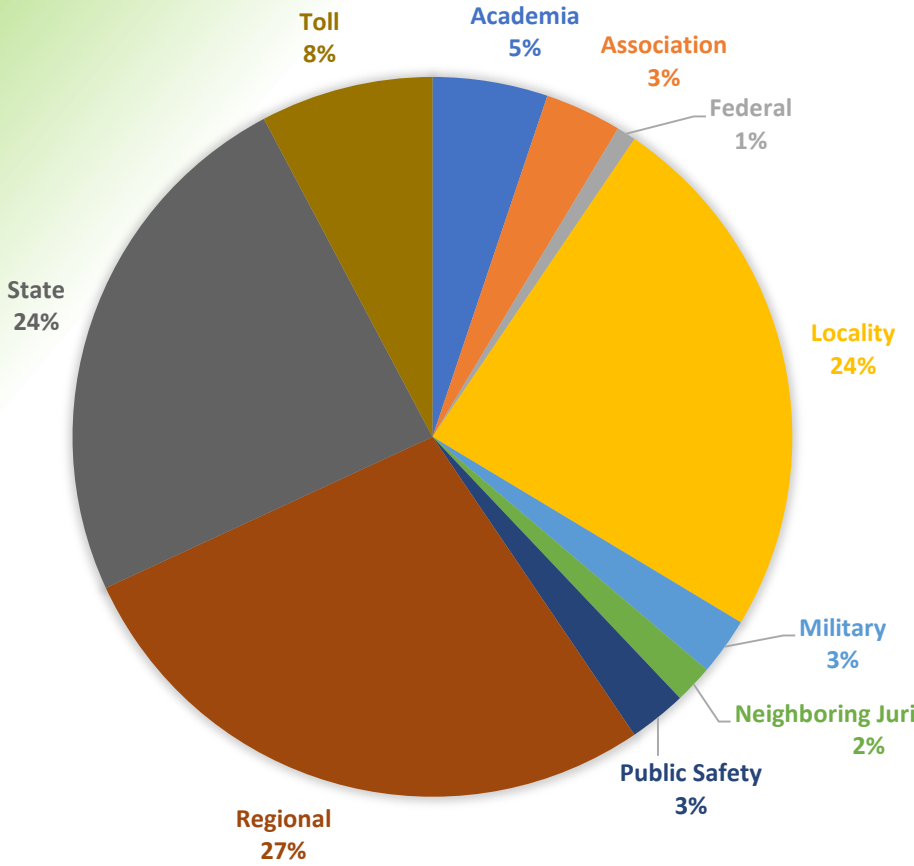
- VDOT received more than 40 responses to an RFI announcement in June/July 2020.
- The RM3P Management Team conducted one-on-one, online discussions with each RFI respondent team.
- During the discussions, respondents described the contributions they could make to RM3P.
- The RM3P Team asked clarifying questions of respondents.

Outcomes

- Learned about the Industry's capabilities to support RM3P.
- Identified key areas where concrete requirements are essential.
- New insights gained into the development & deployment approach.
- New insights gained on structuring the procurement process.
- Name changes needed to several RM3P program elements.

Listening to Public Agency Stakeholders

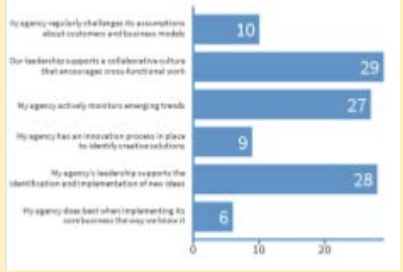
116 SAG SUMMIT AGENCY PARTICIPANTS

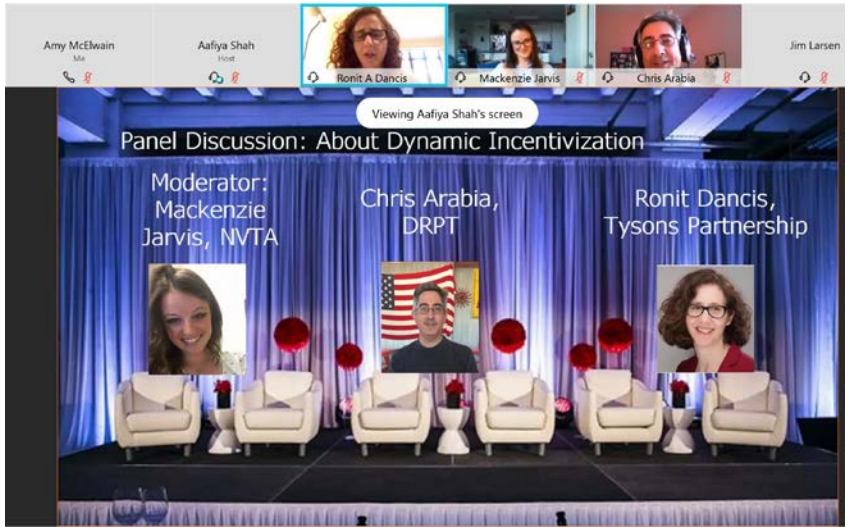


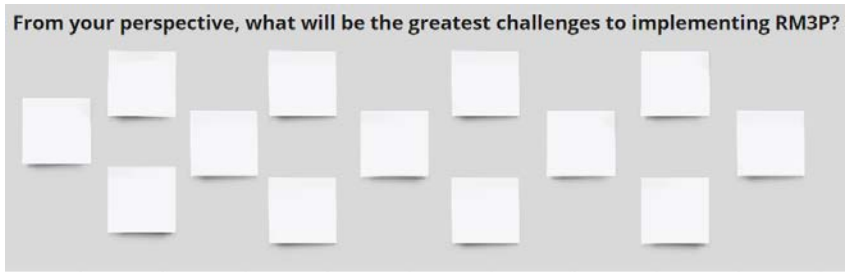
Polling questions throughout

79%
Engagement

109
Responses







What are the organizational/systemic barriers to implementing the AI-BASED DECISION SUPPORT SYSTEM?

- Trust in decision making process of DSS, especially if a black box approach like machine learning is used.
- Institutional buy-in
- Procurement of the Decision Support System, challenging to integrate into the budget (for localities)
- Private sector participation & level of incentive to participate (e.g., Uber/TNCs, private transit services)
- Time of day variations in signal timing - many considerations
- Transit response capability varies - ability to respond depends on location and availability of drivers and fleet (+ level coordination between providers?)
- Data sharing? Agencies need to share response plans
- Security (concern of IT stakeholders) - access/sharing challenge
- Control of operations/ systems between participants (maintain local control if locality isn't available to authorize response)
- Lack of resources - Many localities would need personnel and additional resources to purchase by all (e.g., Vienna, Herndon)
- Private sector (toll authority) - need for coordination
- Legacy signal system - makes integration with new technology very difficult (e.g., City of Fairfax)
- Patchwork of different systems, each operates differently (requires understanding of multiple systems, consistent terminology)

SOLUTIONS

- MOUs to institutionalize
- Challenge: achieve buy-in to decision-making process - establish upfront
- Changing mindset about types of traffic - traffic affects everyone
- Statewide or regional procurement?
- Build on existing trust/ relationships
- Operators need authority to implement changes
- Institutionalize - continuity in process/ leadership to maintain trust
- Collaborative exercises to iron out challenges - better preparation, build relationships
- Documentation for machine learning - improvement through experience
- Sharing result… of DSS to h… trust… confi… its…

What are the organizational/systemic barriers to implementing the COMMUTER…

- Disseminating data
- Economies of scale for smaller organizations - esp. if small # of spaces manged
- Funding for sensors (expensive)
- Level of detail needed about parking availability (ROI for #s/detail vs. red/yellow/green)
- Margin of error associated with some technologies
- Lack of incentives for non-driving trips
- Many lots are leased, not owned
- Lack of information about alternative parking options (e.g., if a garage is full)
- Many different sources (apps, websites, etc.) of parking info (makes it harder to find info)
- Lack of data standards for parking data (makes aggregation harder)

SOLUTIONS

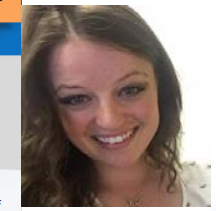
- Joint procurement
- Incorporate parking info. technology cost into cost of a larger (parking) project
- Pricing to manage demand by location/ proximity
- Law enforcement may have technology that could be used for CPIS
- Reservation system? (requires more detailed info about # of spots available)
- Dynamic Incentivization (RM3P element)
- becoming … advanced (e.g., on I-95)
- Communicate need for parking as strategy for enhancing transit ridership
- Provide information on other modes/options available from parking locations
- Transit stop and service change to accommodate demand (spillover solution)
- Static data may also inform CPIS
- Infrastructure-free solutions (opportunity to pilot)
- Centralized data exchange platform (RM3P element)
- Guidelines for sharing data with RM3P

What are the organizational/systemic barriers to implementing the MULTI-MODAL ANALYTICAL PLANNER?

- Data
- Merging/ conflation of different data sources (related to data standards)
- Need for tool to have visualization capabilities
- Transit agencies can't currently access Streetlight data - can for data be cost prohibitive
- Fast pace of responding to incidents
- Library of key contacts - would need to be kept up to date
- Staff availability to focus on responses/ response planning
- Lack of data - data may not even exist
- Data standards lacking for some modes/ services
- Data quality (and need to define quality thresholds)
- Data on equity (e.g., disability status, ramp locations)
- TNC (Uber/Lyft) data not always available
- Not knowing who has the needed information
- Needs vary by agency and practitioner

SOLUTIONS

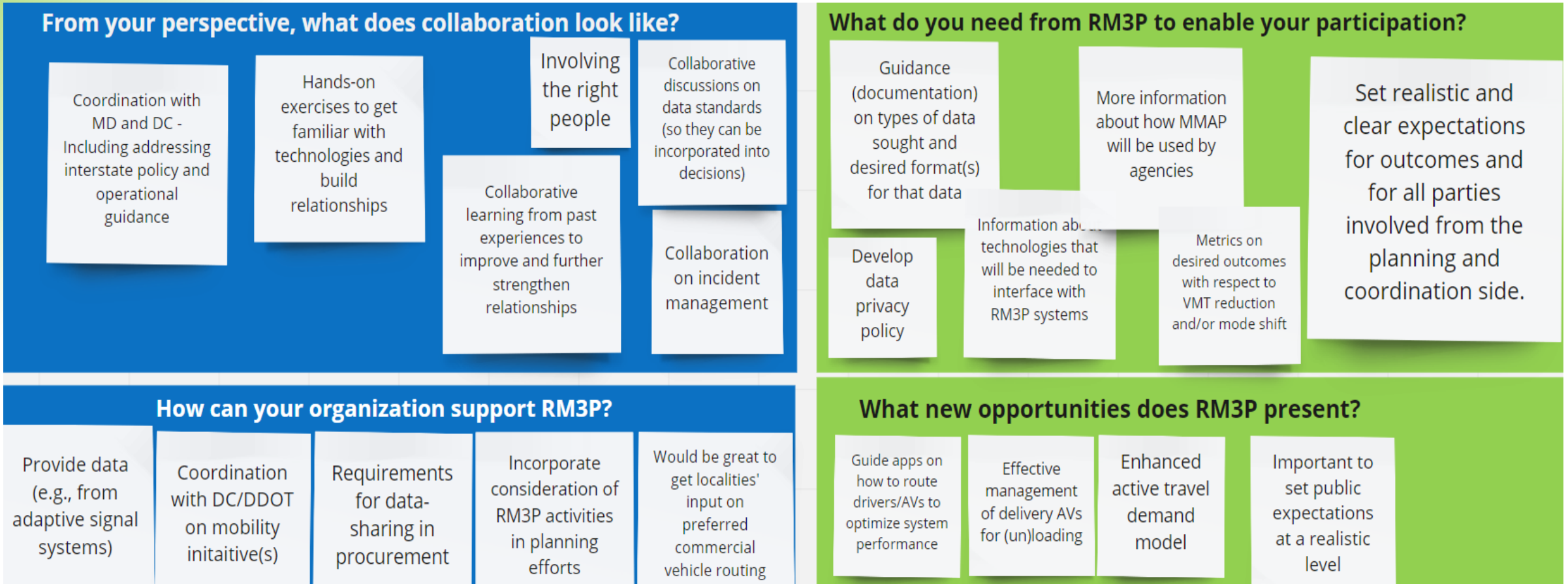
- Sharing Streetlight data (MPOs and local planners can …ccess
- Policy changes to require TNCs to share data
- MCDOT's flex service (Via) - opportunity to use data from this service/pilot to inform planning
- Opportunity to obtain and use data from private sources (such as navigation apps/ roadway data collection systems). E.g., how are they routing drivers?
- Build on relationships and existing collaboration to ensure institutional supports are in place for MMAP
- …te universe …ble data …and …ata
- Potential data sources: Streetlight, TNCs, Inrix/HERE, TomTom, Wejo, GBFS, MDS (micromobility), open route service data (Evaluate which ones are already available, which are still needed)
- Engage additional interested parties
- Library of key contacts for data/ information



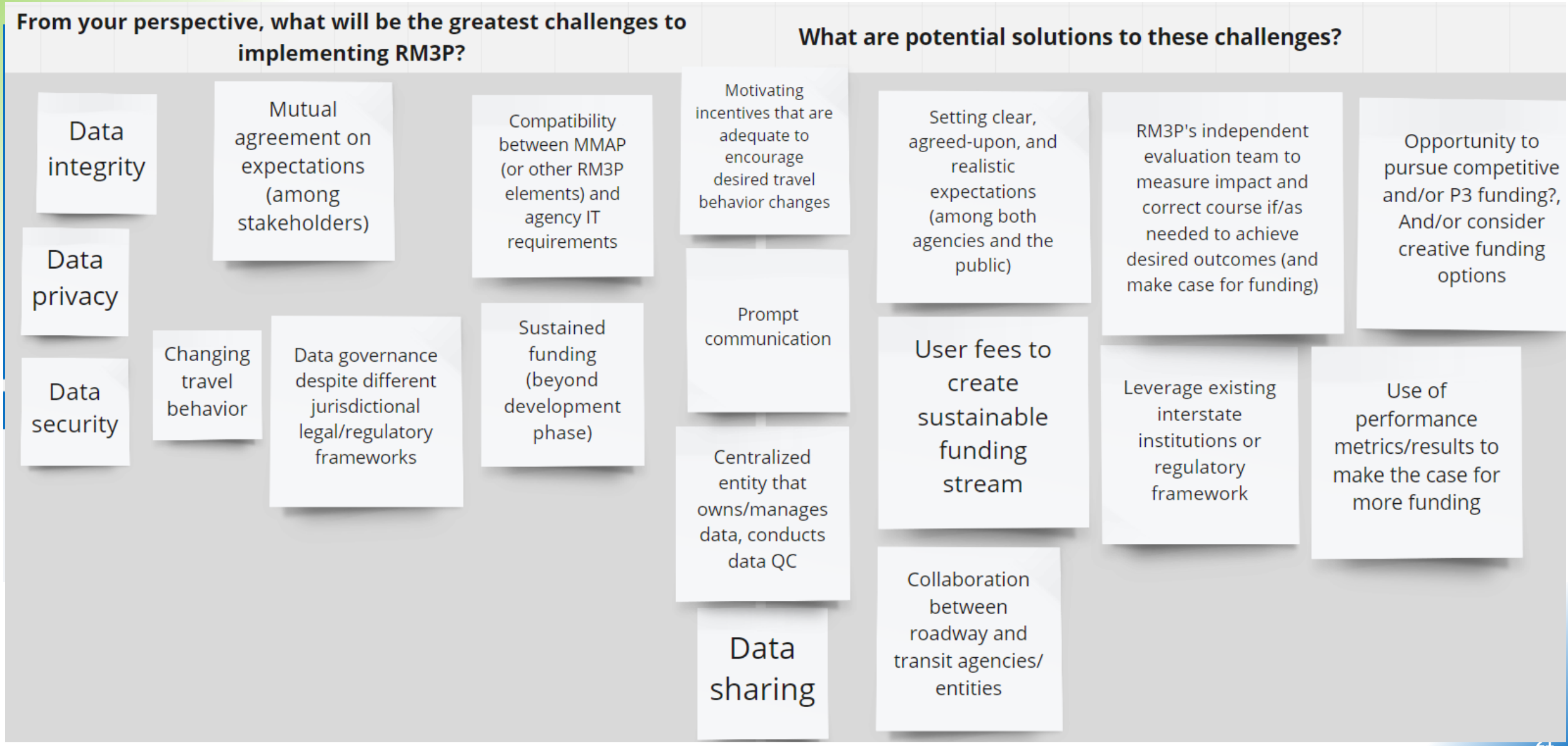
…ic barriers to implementing DYNAMIC

- Logistics/ effort of establishing a vanpool
- Capacity & crowding on transit (influencing travel choices, esp. with COVID-19)
- Data availability
- Difficulty quantifying benefits makes obtaining funding more difficult
- Funding availability for motivating incentives
- Uncertainty related to pandemic trajectory
- Concerns with transit safety due to pandemic
- Data availability or willingness to share data (e.g., from private sector)
- Funding due to budget constraints
- Concerns about local impacts? (e.g., arterial impacts from redirecting traffic)
- Large employers (e.g., military) are not in transit-accessible locations - also privacy concerns
- …esence
- Provide an array of options to motivate participation
- Build on/ take advantage of behavioral science research
- Partnerships with organizations that help travelers and/or private sector
- Multi-Modal Analytical Planner (RM3P component) may help with cross-jurisdictional service coordination
- App needs to be easy to use, not too overwhelming
- Development-related TDM requirements to fund incentives?
- Campaign must focus on messages that resonate, benefits to user
- Campaign working with existing TDM programs
- Market app as "one-stop shop" - make sure people understand app's flexibility
- Marketing information itself as the incentive - something a user can't obtain him/herself
- Pandemic presents an opportunity to roll out DI (before everyone goes back to driving)
- Identify funding stream/ creative funding solution (challenging now due to economic climate)
- Build on expertise of TDM coordinators in the region
- Sell advertising on app to generate revenue?

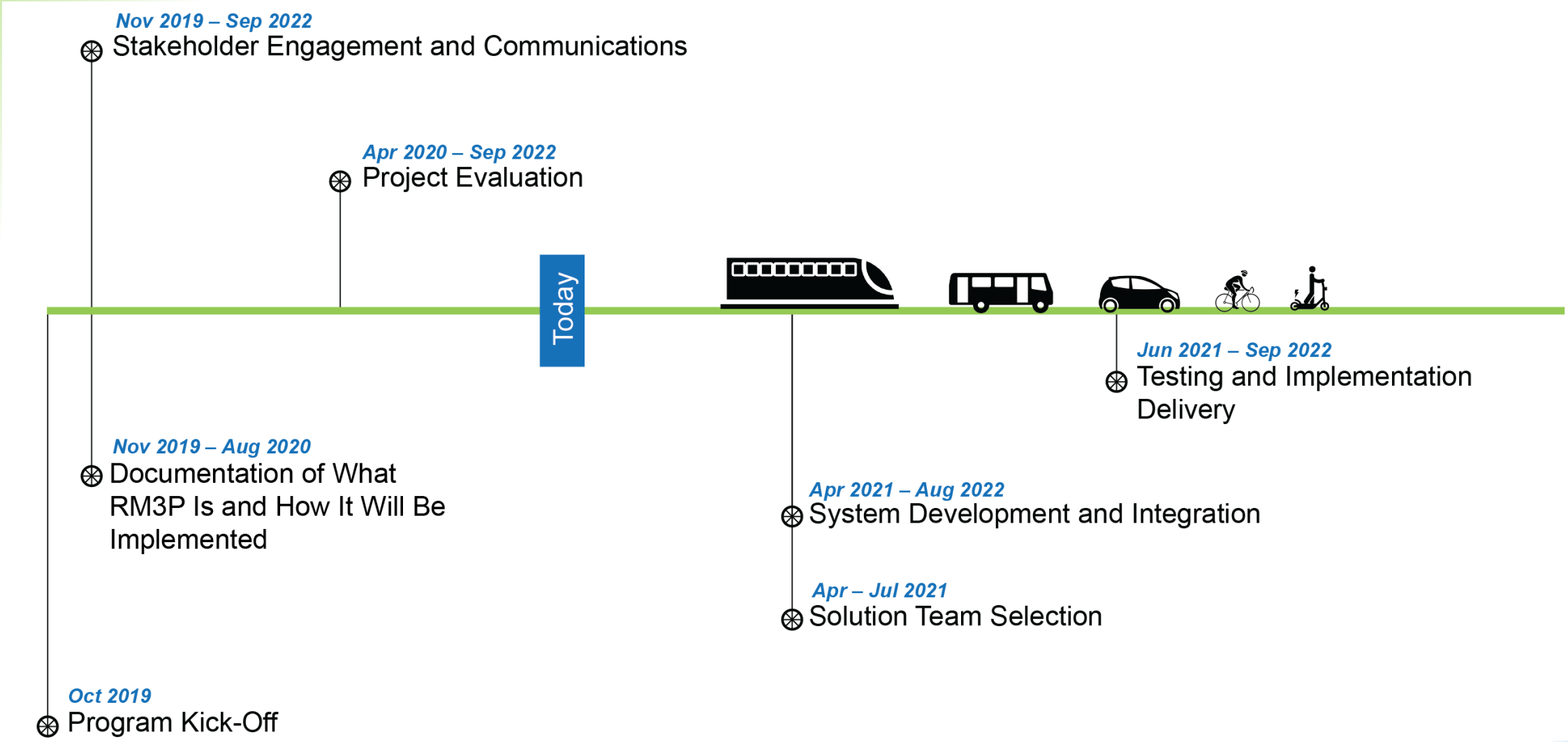
Engaged Conversations



Engaged Conversations



Where We Are on our Journey



RM3P

Travel Decisions Powered by Data

Thank You!

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