2021 Intelligent Transportation Systems Master Plan Update

Executive Summary

SPACE COAST
Transportation Planning Organization

September 2021

Acknowledgements

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Prepared by Atkins North America, Inc.

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Abby Hemenway, Title VI Coordinator
2725 Judge Fran Jamieson Way Building B, Room 105
Melbourne, FL 32940
Phone: 321-690-6890
abby.hemenway@brevardfl.gov

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2021 Space Coast ITS Master Plan

About the plan

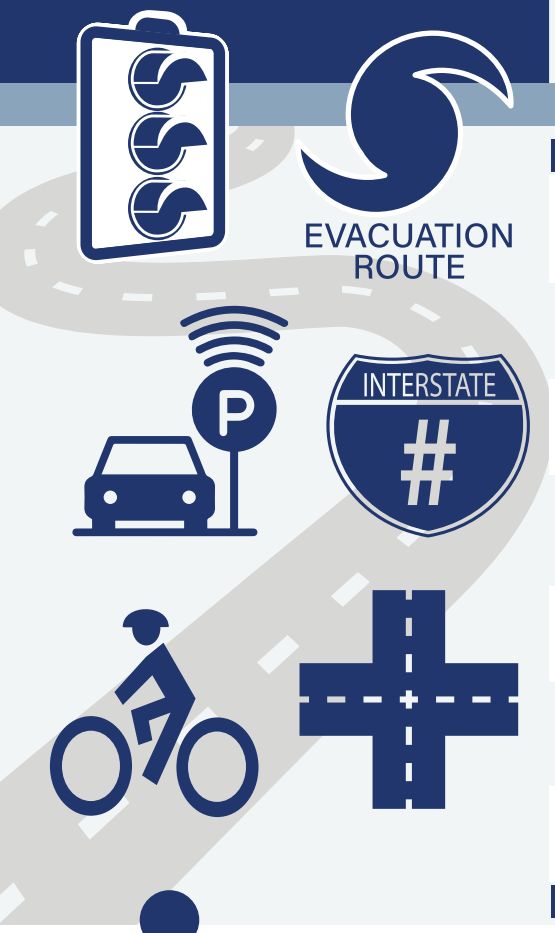
The Space Coast Transportation Planning Organization (TPO) regularly evaluates the area's intelligent transportation system, developing projects that will improve the transportation network and prepare for the future. The master plan considers safety, congestion management, economic significance, system reliability, system performance resiliency as well as timeframe, project cost and long-term maintenance costs.

Cost Benefit: 7:1

This plan proposes:

A total investment of	$95M
A Return of investment of	$655M
Over	10 years

Preparing for the Future:



126 Projects

25	Advanced Traffic Management System projects
8	Evacuation projects
7	Event management projects
24	Parking management projects
16	Interstate projects
34	Intersection safety projects
12	Bicycle and pedestrian projects

Pedestrian Crash Avoidance/Mitigation Systems can reduce up to 24% of annual vehicle-pedestrian crashes where fatalities are involved.

Source: Pedestrian Crash Avoidance/Mitigation Systems can reduce up to 24 percent of annual vehicle-pedestrian crashes where fatalities are involved. | U.S. Department of Transportation (dot.gov)

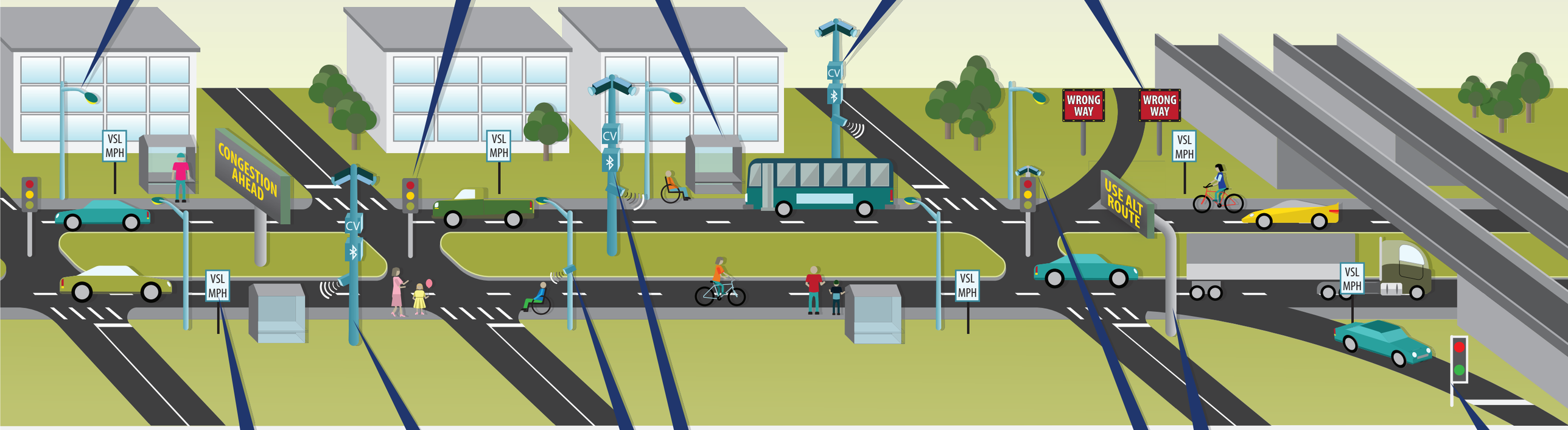
Adaptive lighting can be dimmed to prevent overlighting. When vehicles or pedestrians are detected light levels increase.

Traffic signals utilize ATSPM, adaptive traffic signal timing, transit priority, CV SPAT messages

Smart bus stations can provide arrival and travel times and public WiFi

Connected vehicle roadside units share traffic and safety information directly to cars and smartphone apps.

Wrong Way Detection: Alerts driver entering the freeway in the wrong direction



Variable speed limit signs change speed limits based on current traffic or weather conditions to optimize traffic flow and safety

ITS poles throughout corridor to mount: CCTV cameras, MVDS, BlueTooth, CV RSU

Passive pedestrian/cyclist detection automatically extend walk phase protection for crosswalk

Smart monitoring devices such as BlueTooth detectors identify vehicles and users passing through the corridor analyzing origin-destination data to be used for travel times and future planning decisions.

Near-miss Incident Detection at intersections helps to identify potentially dangerous conditions

Arterial DMS located at regular intervals to inform drivers of enhanced route options or incidents ahead.

Ramp Meter: Improves traffic flow for vehicles entering the freeway

Illustration of ITS Technologies

Figure 1: Arterial Smart Corridor Conceptual Layout

Acronyms:

AID: Automated Incident Detection
ATSPM: Automated Traffic Signal Performance Measures
CCTV: Closed Circuit TV Camera
CV RSU: Connected Vehicle Roadside Unit
DMS: Dynamic Message Sign
MVDS: Microwave Vehicle Detection System
SPAT: Signal Phase and Timing
WWD: Wrong-Way Driver Detection System
VSL: Variable Speed Limit

Introduction

The Space Coast Transportation Planning Organization (SCTPO) is shaping the future of mobility in the region by collaborating with local agencies and the Florida Department of Transportation (FDOT) to develop an Intelligent Transportation Systems (ITS) Master Plan. This Master Plan carries out reliable and forward-looking ITS infrastructure to build a strong foundation that responds to key goals such as safety, system resiliency, and congestion management. This effort is even more important when looking at the speed of advancing technology, making a responsive and flexible systems approach paramount.

This ITS Master Plan Update identifies projects that, when complete, allow the SCTPO area's transportation system to support user needs such as reliability, safety, economic prosperity, and disaster response.

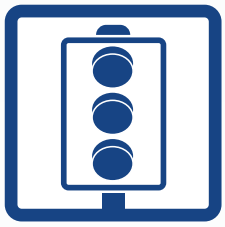
Additionally, the plan makes recommendations to meet some key needs identified by staff and stakeholders. Those agency needs include ensuring that member agencies can better leverage ITS investments by expanding the ITS program, and that the program continues to address the basics, while also laying the groundwork to support future technology. Perhaps most importantly, none of the recommended projects can move forward without resources to properly maintain the existing system.

Since the last plan, a great deal has been accomplished:

- Equipment upgrades, Detection, controllers, wireless, etc.
- ATSPM (FDOT initiative),
- iWorQ,
- TMC upgrades, Melbourne projects moving to construction,
- SR-3, and
- Design started on TMC

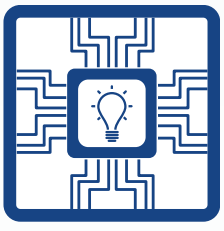
This plan builds on the previous ITS Master Plan by capitalizing on work that has already been done. It also responds to the changing emphasis and needs of the region by laying out a more-strategic approach and ensuring the projects built today are in keeping with the SCTPO's Strategic Plan Emphasis Areas and the 2060 Vision that was developed during the development of the 2045 Long Range Transportation Plan (LRTP). Projects are organized in alignment with the following LRTP goals:

SAFETY
LRTP GOAL 1

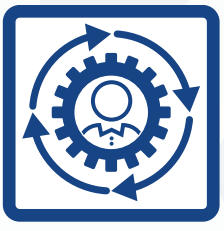


CONGESTION MANAGEMENT
LRTP GOAL 1, 4

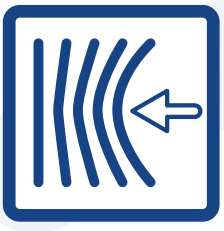
ECONOMIC SIGNIFICANCE
LRTP GOAL 2, 3



SYSTEM RELIABILITY
LRTP GOAL 3

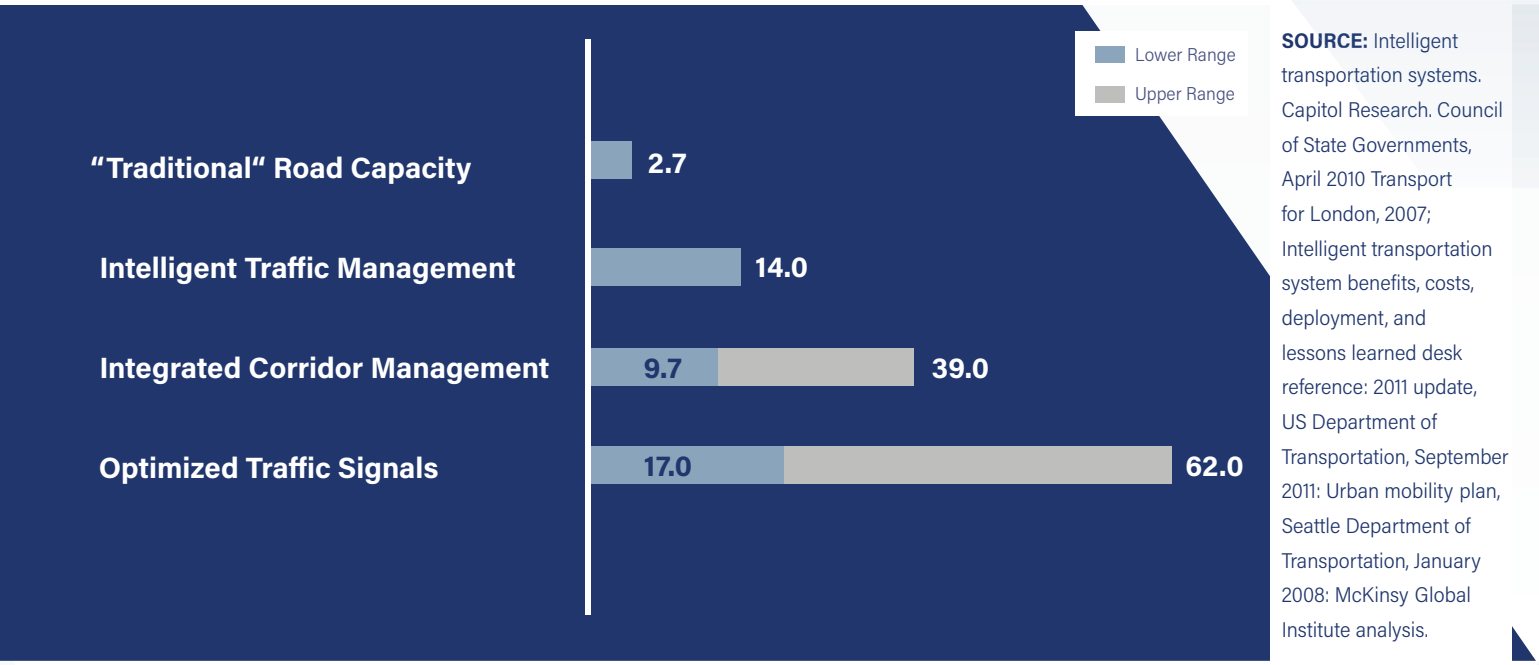


SYSTEM PERFORMANCE
LRTP GOAL 3



RESILIENCY
LRTP GOAL 4

Figure 2: Timing strategy/optimization benefit/cost ratios



Source: ARC TSMO Local Agency Deployment Guide

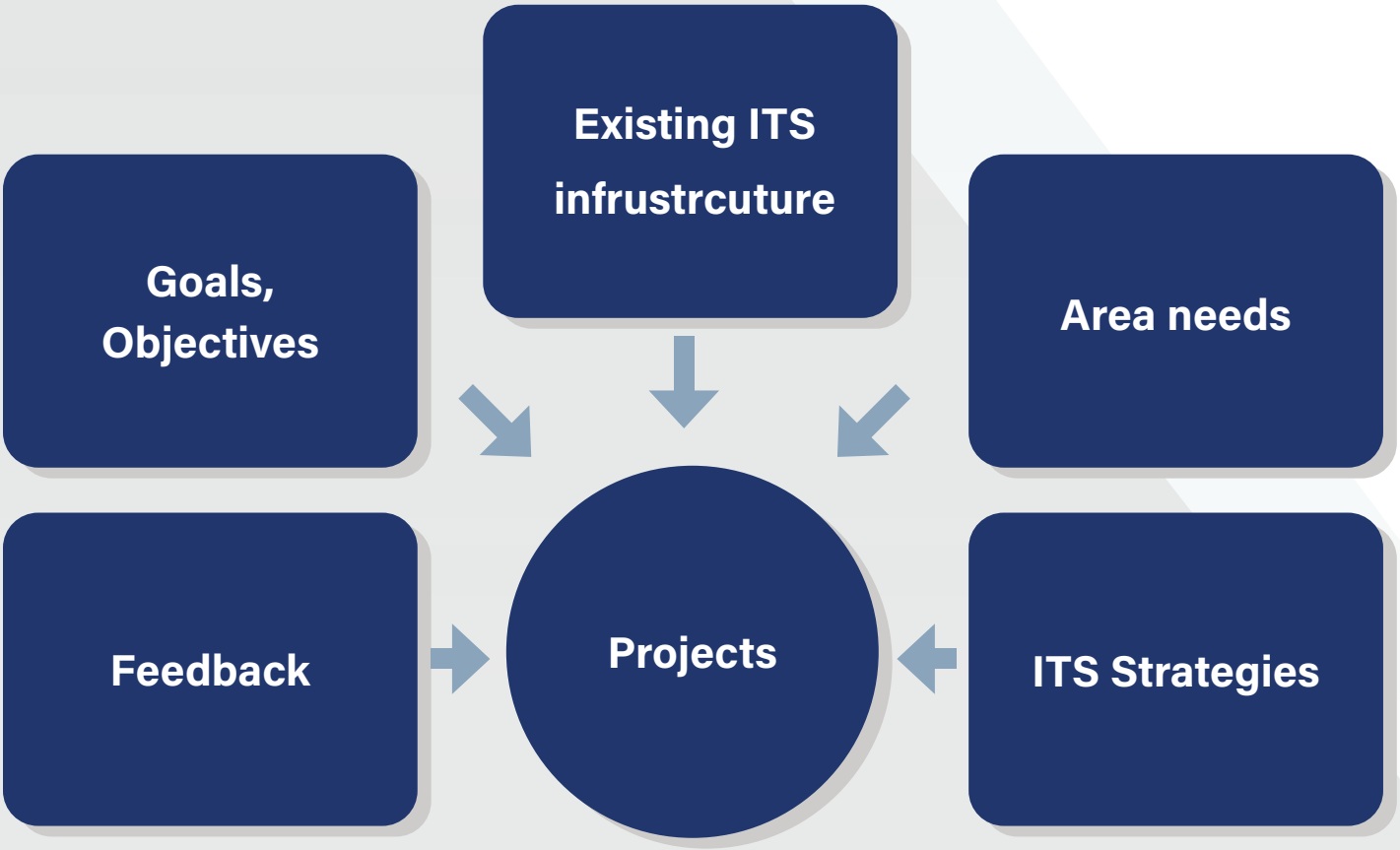
There are many benefits to deploying ITS technologies to manage and operate transportation networks more effectively. ITS deployments can have measurable impacts throughout Brevard County, both in the short term and in the long term, by improving safety, addressing air quality, reducing congestion, increasing economic vitality, and providing for a more efficient use of resources. The investment in ITS technology works together with the investment in infrastructure, often improving that return-on-investment by creating low-cost, flexible solutions to allow agencies to make better use of limited resources. Figure 1 illustrates the anticipated benefit-to-cost ratios for signal timing strategies versus the traditional approach of adding lanes.

This Master Plan Update has a systematic focus using a Transportation Systems Management and Operations (TSMO) lens, as well as a project approach. TSMO is defined as:

> An integrated set of strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system.

As noted by the Federal Highway Administration (FHWA), the goal is to get the most performance out of the transportation system the agency has. By viewing the network as a unified whole, making the various transportation modes and facilities work together, they ultimately perform better. TSMO requires agencies to look beyond a project or a corridor and consider the impacts to the entire transportation system. This involves coordination and collaboration among multiple stakeholders—including federal, state, and local agencies, the first responder community, and the private sector—to achieve seamless interoperability.

Figure 3: Project selection process



The Process of Developing this Plan

This Master Plan Update was a collaborative effort led by the SCTPO. Stakeholders included the Cities of Melbourne, Titusville, and Palm Bay; FDOT; Space Coast Area Transit; and Space Florida. To lay the foundation for understanding the needs and developing projects in response to those needs of the stakeholders, the process, illustrated in Figure 2, above, began with developing goals and objectives and analyzing the existing conditions.

The memos and project recommendations developed for this plan can be found on the SCTPO website at *https://spacecoasttpo.com/plans-programs/intelligent-transportation-system-its-master-plan/*:

- Goals and Objectives
- Existing Conditions
- Needs Identification
- Regional ITS Architecture
- Concept of Operations
- Master Plan

Figure 4: Feedback from the stakeholder group about future ITS needs

Stakeholders met throughout the plan development process to offer input and review materials. Their feedback was critical to creating the concepts and projects in this plan. They provided valuable insight at the following points:

- **Understand Existing Conditions.** A workshop was held to kick off the project, discuss existing conditions, and discuss possible service packages and technology.
- **Identify Needs.** At this workshop, stakeholders were asked to weigh in on identified needs and discuss future needs based on technology, staffing, funding, etc.
- **Review Projects and Evaluation Criteria.** During this workshop, possible projects and solutions were discussed with stakeholders. Maps and project descriptions were presented by the consultant team for review and comment. Follow up discussions to refine the projects were held with staff and the stakeholders.
- **Finalize the plan.** At the final meeting, the group reviewed the evaluated projects and weighed on the initiatives and priority actions.

Vision and Goals

To ensure unity in the SCTPO planning process, the ITS Master Plan used the 2045 LRTP goals as the foundation and developed specific ITS plan objectives. The vision and objectives reflect extensive discussion among stakeholders and directly reflect SCTPO goals. The rationale for each objective is described below.

Use cost-effective transportation technology to increase the accessibility, reliability, and safety of the Space Coast transportation system as part of a fully integrated multimodal experience.

1. **Improve traffic mobility (e.g., reduce travel time, improve travel time reliability, reduce traffic congestion)**
2. **Increase the ITS footprint on critical corridors**
3. **Improve the ease of using multimodal transportation options**
4. **Improve bicycle and pedestrian safety**
5. **Reduce the number of automobile crashes**
6. **Improve transportation operation strategies**

1. Improve traffic mobility (e.g., reduce travel time, improve travel time reliability, reduce traffic congestion): This objective influences several LRTP objectives. Initiatives supporting this objective would include projects to modernize traffic signal controller equipment, execute traffic signal retiming, deploy automated traffic signal performance measures (ATSPM), and deploy advanced traffic signal timing methodologies.

2. Increase the ITS footprint on critical corridors: This objective is a direct output of Objective 3.1, which involves improving the mobility of people and freight by increasing the use of emerging technologies such as ITS. Projects supporting this objective would include installing new fiber optic or wireless communication along corridors and deploying ITS equipment such as cameras, dynamic message signs, Bluetooth data collection equipment, and connected vehicle roadside units.

3. Improve the ease of using multimodal transportation options: ITS projects that support this objective would work to make transit ridership easier and more attractive to potential riders. These projects could include arrival countdown boards at bus stops, infrastructure to support seamless payment systems, automated vehicle location (AVL) systems for buses, transit signal priority, and bus occupancy detectors.

4. Improve bicycle and pedestrian safety: ITS projects that support this objective would work to minimize injuries and fatalities involving bicycles and pedestrians. These projects could include using connected vehicle roadside units, adding signals for bike lanes, installing pedestrian detection, and using rapid rectangular flashing beacons (RRFB) at mid-block crosswalks.

5. Reduce the number of automobile crashes: ITS projects that support this objective would work to reduce the number of vehicle-to-vehicle automobile crashes. These can include projects to modernize traffic signal controllers, improve signal timing, and deploy connected vehicle roadside units for use in safety applications.

6. Improve transportation operation strategies: While the previous five objectives were primarily focused on deployment of technology assets, this objective emphasizes changes in business processes to raise the profile of traffic operations. Projects that support this objective could include active corridor management incorporating automated traffic signal performance measures into the signal management workflow and developing a traffic signal program management plan.

Needs

During the development of this plan, both technology needs and system needs were identified. Those needs range from filling gaps in the system and a new TMC to increased coordination on operations and maintenance. Stakeholders confirmed observations from the 2015 Master Plan that insufficient staffing resources and a lack of funding are reasons that current arterial signal/ITS maintenance and operations practices are inconsistent throughout the region. This has resulted in the current infrastructure not being used to its fullest capabilities and has inhibited the ability of the region to use performance measurement for overall maintenance and operations performance improvement.

> FDOT studied areas where ATMS had been implemented and found that on typical sections where 8-10 signals had been coordinated, travel times may improve by as much as 40%.
>
> Impact of Communications/Detection Degradation on Advanced Traffic Management Systems Operations, FDOT (2009)

The importance of adequate resources to maintain the devices cannot be understated. Inadequate staffing and training leads to a system that underperforms and negatively impacts the investment made. In addition to staffing and maintenance, other identified needs are shown below in Table 1.

Table 1: Identified needs

Communications	Expand existing traffic operations communications
Traffic Operations and Management	TMC Operations
	Regular Signal Re-Timing
	Regional Signal Coordination
	Improve Pedestrian/Bicycle Safety
	Expand Video Surveillance
	Automated Traffic Signal Performance Measures (ATSPM)
	Expand Traffic Data Management (Travel Time, Speed and Volume)
	Traffic Signal Control Interoperability
	Reduce Interstate Congestion – Off ramps
	CAV Signal Systems
	Adaptive Signal System
	EV infrastructure
Incident Management	Interagency Incident Management (TIM/RISC)
	Incident Scene Safety
Public Transit Management	TSP Support/ Queue Jumps
	Automatic Vehicle Location (AVL) and Automatic Passenger Counter (APC)
	Passenger Advisory System
Emergency Management	Remote Monitoring/ Information Sharing
	Automatic Incident Detection
	Incident Scene Safety
	Evacuation Planning
Traveler Information	DMS Installation
	Dynamic Detour Route Development and Management
	Parking Management

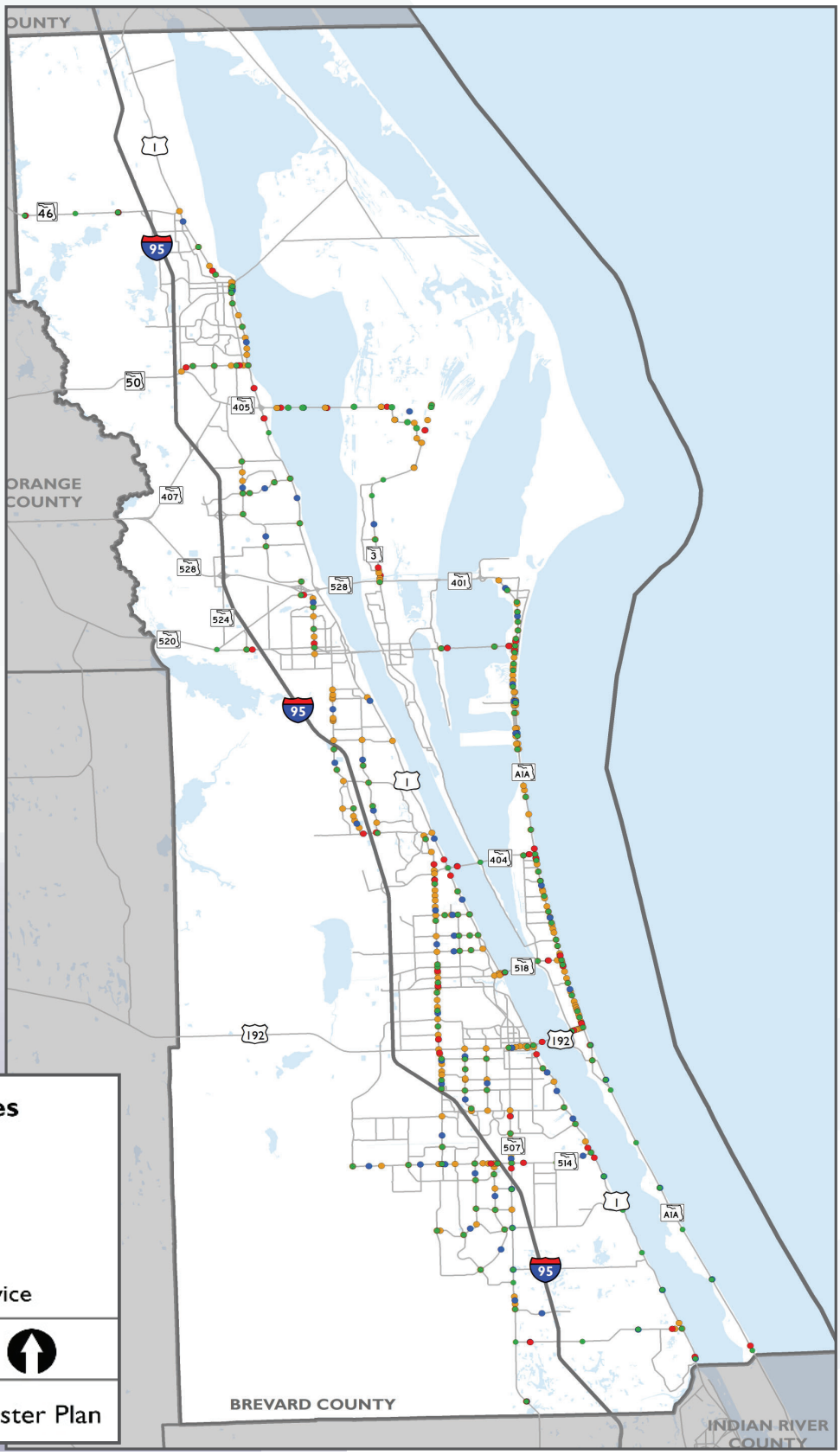
Many of these needs can be addressed with projects on identified corridors. A few of them—for instance, those related to transit—are in progress or will be revisited when volume thresholds are met.

Key to the system is the fiber optic network, which is anticipated to be largely complete by 2045. As the foundation for a reliable and efficient transportation system, this will be an important achievement. Additional opportunities abound to improve traffic flow and safety and provide more cost-effective ways to improve existing infrastructure, as shown on the map of proposed devices in Figure 5.

In addition to the stakeholder identified needs, the 2045 LRTP also identifies several trends that are either ITS projects or have ITS implications. This plan continues building a foundation that can support these trends.

The trends as a well as an illustration (Figure 1) of the application of the various technologies can be seen on the following pages.

Figure 5: Proposed devices



Mobility as a Service

The Trend: During the past 10 years, transportation network companies (TNCs) have been able to leverage the shared economy, e-commerce, and the proliferation of smartphones to offer customer-focused, demand-responsive passenger services. New rideshare, delivery, microtransit, and micromobility services continue to evolve from this initial concept, offering mobility options using a variety of modes and price points.

The Potential Impact: Mobility as a Service (MaaS) offers the opportunity to transform how public transit may be delivered, especially to lower-density areas that are not cost effective to serve with conventional fixed-route services. The speed with which these services can develop and deploy can disrupt traditional transportation infrastructure, especially as it relates to parking and curb management strategies.

Planning for It: MaaS providers (those currently operating along and outside of the Space Coast) should be actively engaged as stakeholders in the planning process to understand their business model and its potential impact on local and regional transportation infrastructure. Special attention should be paid to how curb management and ITS strategies can evolve to leverage MaaS-generated data to create better real-time mobility management solutions.

Cooperative Intelligent Transportation Systems

The Trend: Vehicle-to-Everything (V2X) technologies are making it possible for fleets of vehicles to collaborate among themselves to optimize the travel times and reliability of passenger and delivery services. Convergences in revenue systems (tolls, transit fares, and parking) are making it possible to cross-subsidize modes of travel, giving agencies and transportation providers better ways of incentivizing optimal travel behavior. At the same time, crowdsourced traveler information and private navigation apps are providing the traveling public with route alternatives that, while faster, may select paths that include signals and facilities not optimized for higher volumes of traffic.

The Potential Impact: Transportation agencies that are able to integrate V2X technologies into their transportation infrastructure will be better able to engage with travelers, inform their travel decisions, and improve the overall safety and efficiency of the transportation network. Transportation agencies that are able to interface with the ITS solutions of private fleets (e.g., rideshares, delivery services, freight systems) will be able to have greater flexibility in how they plan, deliver, and manage new mobility solutions.

Planning for It: The planning process should regularly assess how to integrate V2X-based solutions into the planning, deployment, and operation of the transportation system. Pilot deployments within the Space Coast should be encouraged to learn about the specific impacts of these technologies on the local transportation environment. The regional ITS architecture should consider interfaces with the data generated by both public and private fleets of connected vehicles and services.

Connected Travelers

The Trend: Travelers are already taking advantage of mobile devices, crowdsourced information, and existing MaaS applications to make local, regional, and international trip-making decisions. The expansion of V2X, MaaS, and other Smart City technologies can be expected to enable entirely new business models catered to optimizing individual travel choices.

The Potential Impact: As the ecosystem of interconnected vehicles, devices, and services expands, travelers and citizens will have higher expectations for the speed, agility, and reliability of local transportation services. Regions that engage in larger national (and international) transportation ecosystems will become more attractive to visitors, residents, and employers.

Planning for It: As part of stakeholder outreach, it would be appropriate to engage with citizens and visitors in market research to understand what services they use and what channels of communication they use to plan their trips. This could inform how Space Coast stakeholders engage with private transportation interests, and how ITS infrastructure may need to evolve to interface with onboard systems and personal devices.

Automated Transportation Systems

The Trend: While privately owned vehicles with Advanced Driving Systems (ADS, formerly referred to as autonomous vehicles) may not see large-scale deployments in the near future, low-speed automated shuttles, automated freight systems (including trucking and small-scale delivery drones), and aerial drone systems are seeing larger pilot programs rolled out in Florida and across the United States. It is likely that fleets of these vehicles will become more common over the next decade.

The Potential Impact: Automated freight systems offer the opportunity to improve the efficiency of the freight network; however, it is possible that automated delivery services may pose new localized congestion issues on the sidewalks, curbs, and roadways upon which they operate. Similarly, fleets equipped with ADS may be able to operate on narrower lane widths more safely than human-operated vehicles, reducing construction costs and improving the efficiency of the transportation system. That being said, V2X infrastructure may be needed to manage the interfaces between human-operated vehicles and automated transportation systems, especially in early stages of ADS deployments.

Planning for It: The planning process should regularly assess the readiness of the SCTPO for automated systems from a technology, infrastructure, and policy perspective. Pilot deployments within the Space Coast should be encouraged to learn about the specific impacts of these technologies on the local transportation environment.

Urban Aerial Mobility

The Trend: Trends in automated systems, battery technologies, and aerial drones are making it possible to transport passengers and goods over longer distances. The Federal Aviation Administration (FAA) has recently released its first Concept of Operations for Urban Aerial Mobility (UAM) Corridors that would allow higher volumes of aerial traffic in urbanized areas.

The Potential Impact: UAM may be able to relieve congestion from local streets by allowing passenger and freight services to bypass the road network entirely. UAM corridors would require new systems and facilities to allow urban aerial vehicles to travel and land safely.

Planning for It: Scenario planning may be developed to include the impacts of UAM adoption on the local transportation network. Engagement with potential UAM users (delivery companies, rideshares) would help to clarify the impacts of these vehicles and their supporting infrastructure on long-range planning. Corridor Demand Balancing (CDB) may be required to understand the infrastructure necessary to support different volumes of aerial traffic within the Space Coast.

Electric Vehicles (EV)

The Trend: Advances in battery technologies are making electric and hybrid vehicles more affordable to consumers, while an increasing number of public and private fleet operators are adopting electric vehicles. Recent experiments with electric-powered aircraft (including aerial drones and fixed-wing aircraft) may make these modes more viable options for new passenger and delivery services in urbanized areas in the future.

The Potential Impact: While electric vehicles offer the opportunity to reduce vehicle emissions, they do create new demands for charging infrastructure. The location, availability, and affordability of this infrastructure will affect the adoption rates of these vehicles along the Space Coast.

Planning for It: Scenario planning may be developed to include the impacts of different rates of EV adoption. Engagement with utility companies and EV manufacturers would help to clarify the impacts of these vehicles and their supporting infrastructure on long-range planning. Benchmarking the effectiveness of EVs (range, time necessary to charge) would help to understand the potential right-of-way and facility impacts of new charging infrastructure for land-based and aerial electric vehicles.

Digital Infrastructure

The Trend: As transportation systems become more sophisticated and more connected, they are generating new data needs that were not previously anticipated in the IT plans of local agencies. V2X technologies, automated transportation systems, and new MaaS models are all anticipated to generate massive amounts of data, much of which could offer new insights into how transportation networks are planned, delivered, operated, and maintained.

The Potential Impact: New data sets from public and private transportation sources can create new opportunities in the Space Coast economy; however, the impacts of these data on the digital infrastructure of local agencies (including data storage, security requirements, and transmission) need to be taken into account.

Planning for It: Local agency IT departments should be included in outreach efforts related to long-range planning. IT and ITS Master Plans should be considered as part of long-range planning efforts to understand how new technologies may affect the capacity of these networks to handle them. Data management strategies should be developed to support how data can be captured, stored, analyzed, and disseminated among public and private transportation partners.

Strategies

Each stakeholder need was evaluated and classified under one of two categories: technology deployment or programmatic/operational policy. In many cases, both categories apply. The recommendations in response to the needs may be either. Technology includes deployments of hardware-based strategies, devices, or systems to accomplish a particular function or achieve a specified solution. These strategies rely on the physical manifestation of an installation to achieve the objective and typically require capital costs for construction, as well as continuing maintenance and operations costs. One example is the installation of closed-circuit television (CCTV) cameras deployed to monitor real-time traffic and roadway conditions. Conversely, programmatic strategies do not rely solely on the physical implementation of a solution, but involve procedural, policy, or back-end development support (e.g., software solutions) that are necessary for successful program management. Programmatic solutions cannot be readily purchased as off-the-shelf offerings. Examples of programmatic strategies include the development of Standard Operating Guidelines (SOG) for signal retiming or the development of a customized data dashboard for arterial roadway traveler information. The approach taken as part of this Master Plan Update includes projects and strategies identified in both categories.

The recommendations in response to the needs may be technology, operational or policy.

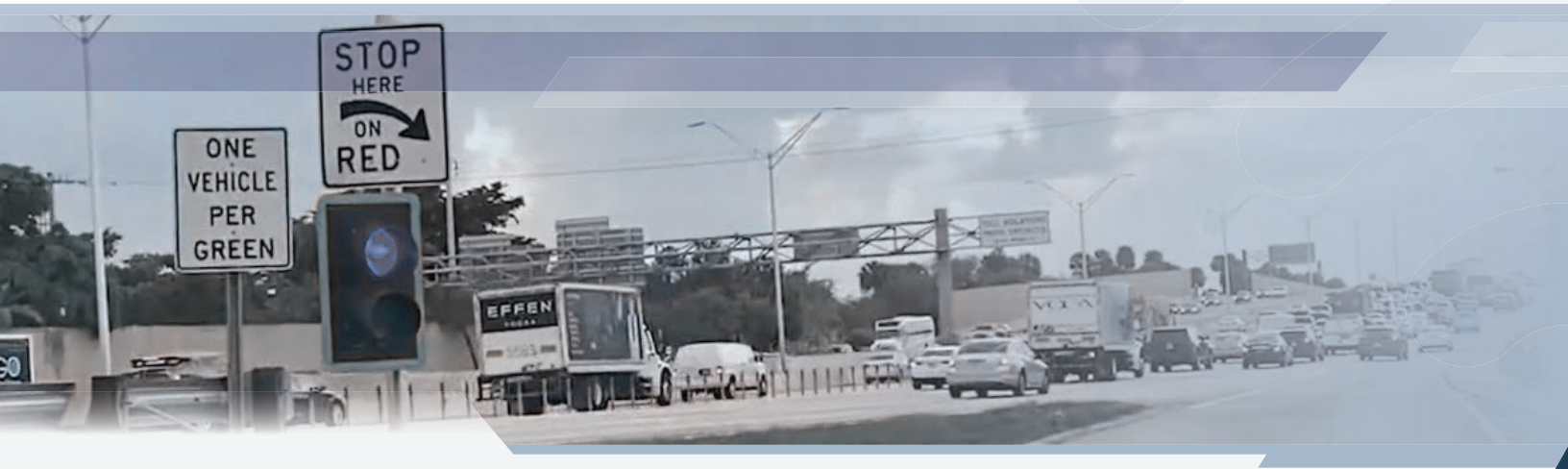
Proposed Projects

Technology Deployments

The identified stakeholder needs were further analyzed and categorized into eight unique project types. Projects then were proposed for each category. To apply any of these categories requires additional analysis, outreach, and coordination. The map shown in Figure 6 illustrates all of the identified projects. Descriptions of the categories are included below.

ATMS—Advanced Traffic Management System (ATMS) type projects will leverage multiple technology strategies to improve the overall operational capabilities of a corridor. ATMS projects will provide the foundational framework for subsequent deployments to leverage, including a robust Ethernet-based communications network providing scalability and redundancy between field devices and the appropriate Traffic Management Center(s).

Interstate—Interstate projects will use technology to alleviate congestion on either the mainline or arterial corridors because of queuing or "spillback." All strategies are not applicable at every interchange; therefore, each location will need to be analyzed for roadway geometrics, historic traffic volume and crash data, and real-time traffic pattern observations to determine the appropriate technologies to be developed for optimal benefit.



Event Management—Event Management projects will implement technology to aid in monitoring, management, and operation of traffic during both planned and unplanned events. Examples of planned events include recurring weekday congestion, scheduled roadway construction, preventative maintenance activities, and special events (e.g., parades, space launches, sporting events). Conversely, unplanned events are occurrences without warning or planning, including traffic incidents, non-recurring congestion, emergency maintenance, natural disasters, and more. Various technologies will be deployed along corridors with high traffic volumes resulting from special events, with a focus on providing origin-destination wayfinding to and from Interstate 95. Corridors will be analyzed to provide motorists with wayfinding information via programmable blank-out signs for event arrivals and departures, as well as detour routes.

Parking Management—Parking Management projects will deploy various technologies to determine the number of available stalls in parking facilities and provide the information to travelers in real time. This technology may be deployed on a variety of parking facilities, including garages, surface lots, and on-street parking. Providing this information to motorists ahead of key decision points will allow drivers to make alternative plans and avoid queues on arterial corridors. Notable parking facilities may include beach access, space launch viewing, downtown, sporting and entertainment venues, and more.

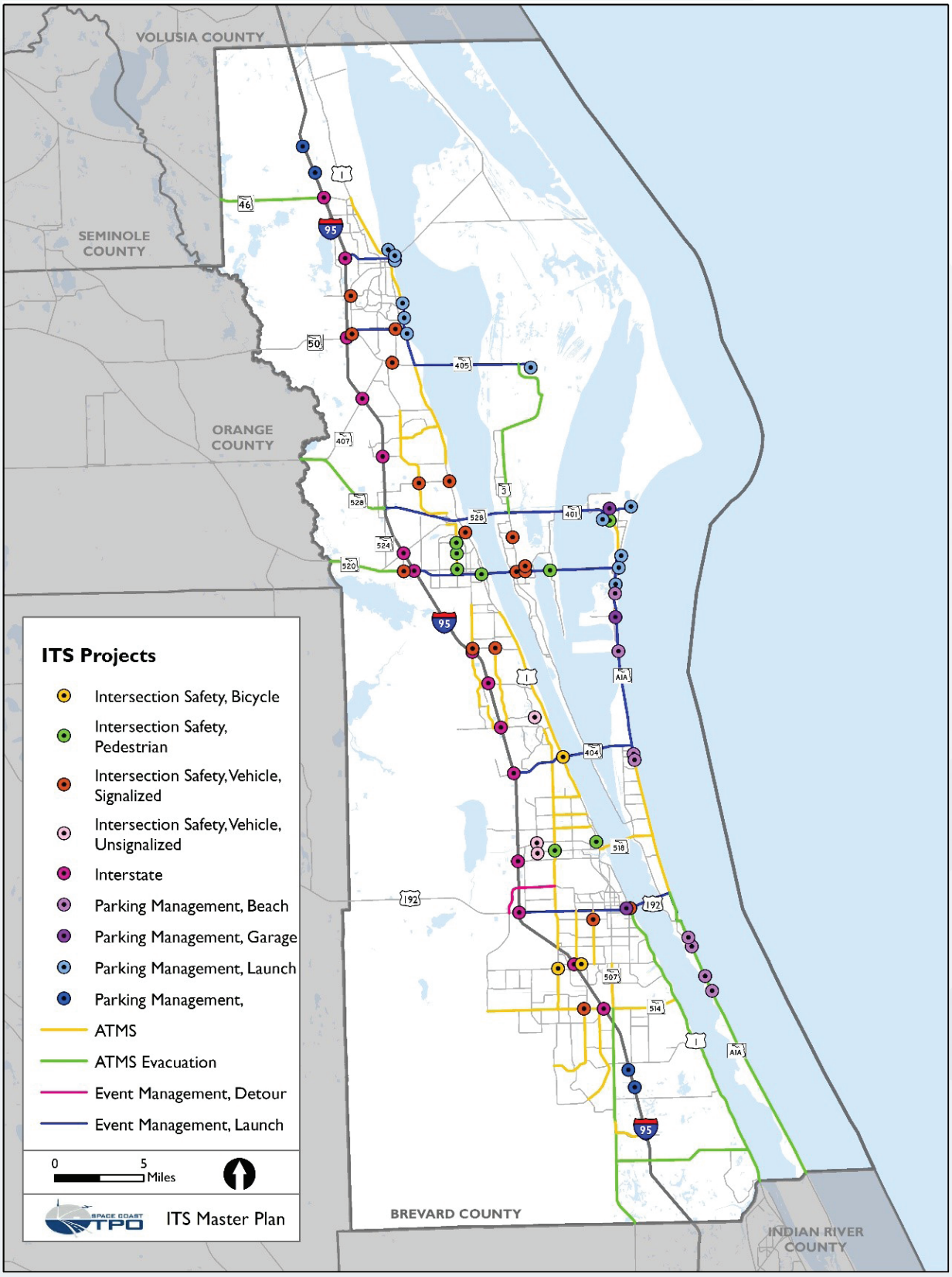
Intersection Safety—Intersection Safety projects will focus on improving road user safety at isolated locations that experience high vehicle, pedestrian, and bicycle crash rates through the deployment of various technology kits.

Transit—Transit projects will implement technologies to improve the operational efficiency and user experience through the deployment of both in-vehicle and infrastructure solutions.

Automatic Incident Detection—Automatic Incident Detection (AID) projects leverage the ability to fuse hardware (e.g., CCTV cameras, vehicle detection systems) and machine-learning software to identify potential events without manual intervention. Events are identified based on customizable business logic and may include crashes, stalled vehicles, debris on roadways, pedestrian on limited-access freeway, wrong way driving, and more. Typical AID systems are software-based solutions built on the capabilities of other hardware systems (e.g., video imaging feeds) with the intent of improving the operational staff's ability to identify safety concerns and possible disruptions to traffic patterns quickly and efficiently. This technology can be deployed on either limited-access freeway or arterial corridors.

Bicycle/Pedestrian—There may be additional opportunities to implement projects at specific high-crash locations that leverage the FDOT District Five PedSafe pilot project. Applicable technology might include LiDAR/Connected Vehicle technology and alternative detection systems (e.g., video analytics).

Figure 6: All proposed ITS master plan projects



Operational Strategies and Policies

Operational strategies and policies were developed to support the overall system functionality and vision. The strategies were grouped into four categories summarized below.

- Operations strategies include Active Arterial Management and Automated Signal Performance Measures.
- Maintenance is recognized as a critical component in this overall ITS program. As such, recommendations include the development of a policy for the recruitment, retention, and development of staff, the implementation of a preventative maintenance program, and creation of an asset management and maintenance ticketing system to help streamline the maintenance of the system.
- Incident Management and Response allows for the minimization of delay by facilitating efficient response to both planned and unplanned events. The TMC is the "brain" of the operation, allowing for system monitoring. As the new Space Coast TMC comes on line, agenncy collaboration will enable the system to work to maximum benefit. This new facility will faciliate increased commmunication and collaboration by all county, city, TPO and other Data and Information Management is critical to keeping the system flowing.
- Data collection and data sharing will ensure that the information collected can be used to develop solutions. Development of policies and approaches to using "big data" and cyber security will protect data integrity and allow for its use as a trusted resource.

Evaluation Process

Projects were evaluated to ensure they meet the vision and goals of the plan. The evaluation criteria were developed by staff with feedback from stakeholders, identifying those that best evaluate the projects to ensure they meet the vision, goals, and objectives of this plan as well as the strategic goals of the SCTPO. Each project was evaluated against the criteria shown below and then grouped by timing. Timing was determined by highest priority, to take advantage of building on the existing system investments and then expanding outward. In this way, projects take advantage of prior investments. This approach improves network coverage and allows for smart investments that take advantage of work already done. Projects also were evaluated for the overall cost of the project and the level of ongoing maintenance required. The TMC is still considered one of the highest priority project for the TPO.

The evaluation criteria shown in Figure 7 was used to analyze how projects would meet the identified criteria. In addition to the LRTP criteria, it was important to factor in timing, deployment cost and maintenance and operation costs.

Figure 7: Evaluation criteria

SAFETY
LRTP Goal 1

Level project may impact corridor identified in VZ HIN

CONGESTION MANAGEMENT
LRTP Goal 1, 4

Targets high congested corridors

ECONOMIC SIGNIFICANCE
LRTP Goal 2,3

Provides improved access to high tourism/high employment zones

SYSTEM RELIABILITY
LRTP Goal 3

Improves travel time reliability

SYSTEM PERFORMANCE
LRTP Goal 3

Improves ability to monitor performance of system

RESILIENCY
LRTP Goal 4

Promotes redundancy/sustainability of infrastructure to withstand shocks/ stressors

TIME FRAME

0-5 Years
5-10 Years
10+ years

COST OF PROJECT

Low = < $4M
Medium = $4M - $7M
High = > $8M

OPERATIONS & MAINTENANCE

Level of maintenance
Low = no additional staff anticipated
Medium = 1-2 additional staff anticipated
High = 4-6 additional staff anticipated

Benefit/Cost Ratio

Benefit/Cost ratio is a measure to determine the viability of any effort when using public funding. It quantifies the public benefit, in dollars, that the public receives for every public dollar spent. Therefore, any value greater than 1 indicates a value to the public. The corresponding benefit/cost ratio for Brevard County is the ratio of the total opportunity cost and the cost to implement the ITS Master Plan. This only includes the benefit/cost of ATMS and evacuation projects. The probable benefit is likely higher when safety and parking improvement projects are factored in but those benefits are harder to quantify.

The benefit/cost ratio based on a 10-year plan is: $655,344,018/$95,077,080 = ~ 7/1

Initiatives

Projects identified through this planning process may be included in the LRTP and/or prioritized for funding in future project prioritization cycles. As important as physical projects are, it also is important to identify initiatives that could move the program forward. The following initiatives and actions have been identified to help reach the plan and SCTPO goals.

1. Strengthen ITS Planning and Integration into the Regional Planning Process. This needs to be considered in all projects and modes.

   a. Hold local agency LRTP follow-up meetings; use access to ATMS data for planning

   b. Consider ITS solutions in all planning activities

   c. Continue involvement in regional FDOT and MPO ITS and TSMO groups

2. Advance County-Wide Coordination. This needs to be done for event management, among first responders, among cities, and between maintaining agencies.

   a. Create a county-wide coalition

   b. Construct a new Traffic Management Center

   c. Increase public awareness

3. Strengthen/Improve Event Management for Evacuations and Launches. Increased space launches and regional events draw large crowds.

   a. Improve coordination of special event activities

   b. Create better communication and preparation across local agencies, emergency operations, and FDOT

4. Funding for Maintenance and Operations. More equipment means more maintenance and higher costs.

   a. Create a yearly priority list for upgrades

   b. Update signal maintenance agreements

   c. Transmit operational priorities to FDOT to see how they might be able to help

   d. County-wide operations contract

   e. Celebrate successes publicly—let the public know what their funding is going toward

   f. Explore public-private funding opportunities

5. Update/Establish Policies

   a. Staffing

   b. Funding

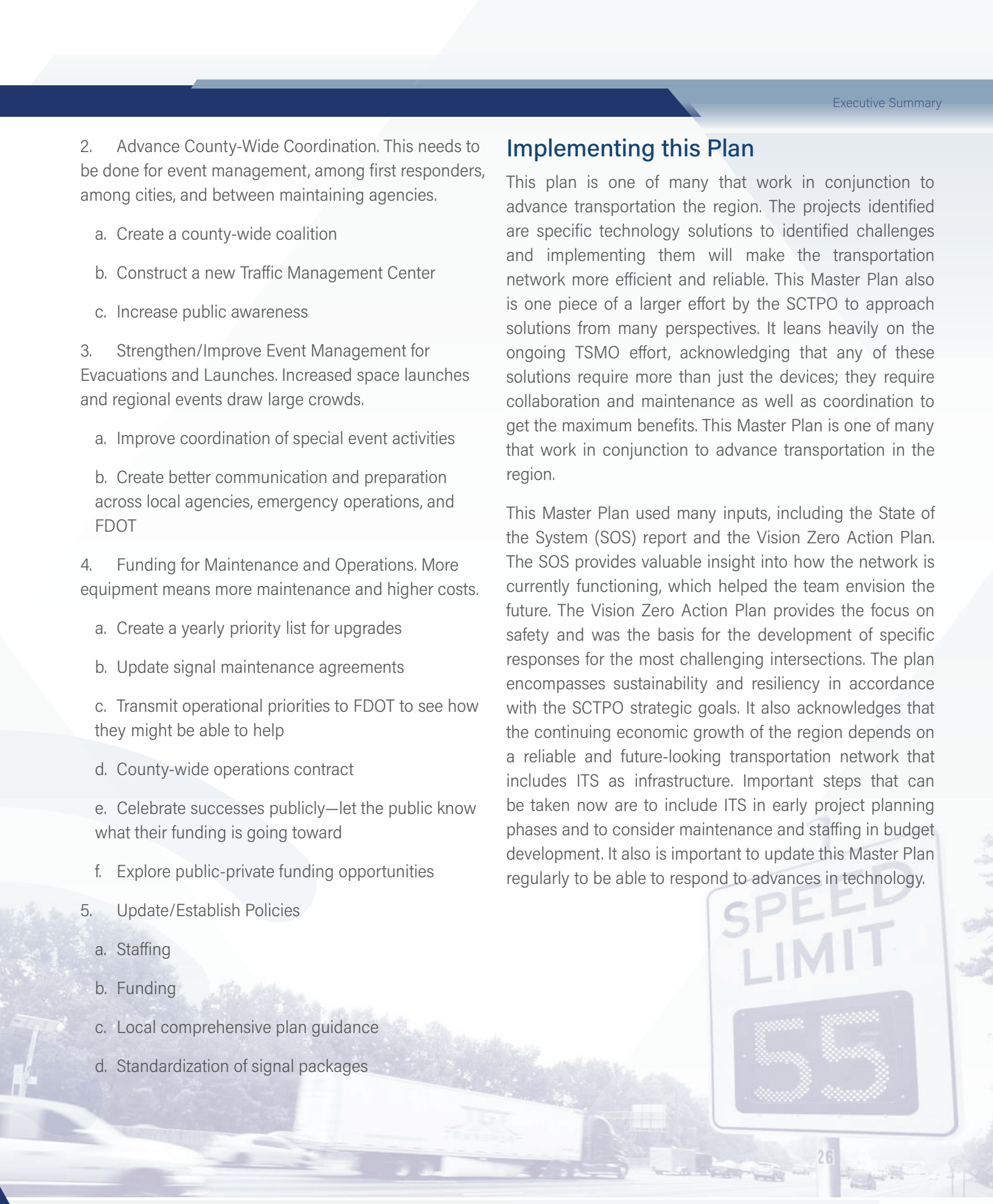
   c. Local comprehensive plan guidance

   d. Standardization of signal packages

Implementing this Plan

This plan is one of many that work in conjunction to advance transportation the region. The projects identified are specific technology solutions to identified challenges and implementing them will make the transportation network more efficient and reliable. This Master Plan also is one piece of a larger effort by the SCTPO to approach solutions from many perspectives. It leans heavily on the ongoing TSMO effort, acknowledging that any of these solutions require more than just the devices; they require collaboration and maintenance as well as coordination to get the maximum benefits. This Master Plan is one of many that work in conjunction to advance transportation in the region.

This Master Plan used many inputs, including the State of the System (SOS) report and the Vision Zero Action Plan. The SOS provides valuable insight into how the network is currently functioning, which helped the team envision the future. The Vision Zero Action Plan provides the focus on safety and was the basis for the development of specific responses for the most challenging intersections. The plan encompasses sustainability and resiliency in accordance with the SCTPO strategic goals. It also acknowledges that the continuing economic growth of the region depends on a reliable and future-looking transportation network that includes ITS as infrastructure. Important steps that can be taken now are to include ITS in early project planning phases and to consider maintenance and staffing in budget development. It also is important to update this Master Plan regularly to be able to respond to advances in technology.



ITS and TSMO provide both the technology and the approach to develop short- and long-term solutions. Identifying challenges allows for the development of solutions, including Action Programs. Using this framework allows for the verification of problems, the development of solutions, and, importantly, the communication to decision makers and to the public who need to know that proactive measures are being taken.

Recommended future actions include:

- Identify opportunities for deployments. These may be stand alone or in conjunction with other projects. To maximize available resources, it will be critical to identify opportunities to combine projects and coordinate with local agencies and FDOT.
- Identify local champions. These individuals can help with public awareness and garner support for sustainable funding for operations and maintenance and to continue to build out the system.
- Instill close coordination between the SCTPO, the cities, Brevard County, and FDOT District Five. Funds will need to be programmed and the projects will need to be included in the SCTPO's LRTP and Program Priorities.
- Create a local consortium.
- Work with FDOT to identify pilot project opportunities.

Any amendments to this plan must be submitted to the SCTPO and will be included by reference.