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MOBILITY SERVICES FOR ALL AMERICANS (MSAA)

Tackling the Technology



SAFETY



MOBILITY



ENVIRONMENT

Many Americans have mobility challenges and poor access to transportation choices that keep them from fully participating in and contributing to their communities. This is particularly true of older adults, persons with disabilities, and the economically disadvantaged. These groups often rely on human service transportation services that are fragmented, unreliable, and inefficiently operated. These challenges are tied to lack of coordination among human service transportation systems.

Supported by the U.S. Department of Transportation (USDOT) Intelligent Transportation Systems (ITS) Joint Program Office, the MSAA initiative aims to improve transportation services and access to employment, healthcare, education, and other social activities through coordination supported by various ITS technologies and applications.

Why Technology?

Technology can help overcome mobility barriers for older adults, persons with disabilities, and others with mobility challenges. Technology can address challenges with customer information, service availability, accessibility, reliability, safety, and flexibility by coordinating demand-response services, integrating disparate systems, and providing greater visibility and situational awareness of both travelers and vehicles.

Understanding available technologies is the first step in determining whether and how the solutions can address an agency's or community's needs.¹

Next, one must know what the customer needs and how the planned system must perform. This requires identifying user needs and the external factors that will influence technology deployment. "User" refers to anyone who will interact with the new system: a customer traveling using an agency's transportation services, agency staff who will be using the new technology, or others who will interact with the new system (e.g., caregivers, social service agency staff, medical office staff).

Once we know the user needs to be addressed, we must determine the functionalities required to meet those needs. Here, an agency defines what the technology is required to do (as opposed to how it will work). These functional requirements are often used in procurement as specifications for the procured software and hardware.

The next several steps include studying various system alternatives and determining a preferred solution. The final step includes verifying the solution through a rigorous process that ensures it will meet the previously identified user needs and functional requirements.

MSAA Technologies

The most prevalent technologies in human service transportation are:

- Customer access mechanisms, including telephone, smartphone apps, interactive voice response (IVR), internet, etc.
- Traveler information and trip planning systems, particularly for customers with accessibility challenges
- Trip scheduling and routing systems
- Trip booking, revision, and confirmation systems
- Dispatching and vehicle communications such as on-board mobile devices (e.g., smartphones, tablet computers)
- Fleet, vehicle management, tracking systems that assist the operations of demand-response service (e.g., computer-assisted dispatch, automatic vehicle location systems)
- Fare management and integrated payment systems (payment, collection, and processing)
- Data management technologies for data sharing, storage, synthesis, and performance measurement
- Eligibility certification and reporting/billing systems.



U.S. Department of Transportation

¹ See Module 7 of the ITS ePrimer at <https://www.pcb.its.dot.gov/eprimer/module7.aspx>.

Keys to Successful Technology Deployment

With all the news about technology—such as tools to make it easier for persons with disabilities to travel, self-driving cars, and smartphone apps to show when the next bus is coming—agencies may wonder how to approach a technology project. Using a process that identifies user needs, defines what the technology should do to satisfy those needs, and follows a rigorous testing process to verify and validate the system is critical to successful technology implementation.

There are four basic steps to ensure a successful technology project:

- 1. Requirements Analysis and Baselineing:** Know what the users need and how the system must perform
- 2. Functional Analysis and Decomposition:** Determine the desired functionality and the requirements of the system to meet user needs
- 3. Alternatives Analysis:** Study various system options to determine a preferred solution that would address the identified needs
- 4. System Validation and Verification:** Verify the preferred solution. This step helps ensure that the system has been built as intended and meets the needs as designed.

Needs can be a problem to be solved, process to be improved, or new capability to be implemented. It is critical that the system users define the needs, explained in Step 1 above, because they can articulate better what they feel is necessary for the system to function effectively. For example, users may describe needs that reflect how they envision interacting with the system. When documenting the needs, a rationale should be used to determine whether a specific need is essential, justified, and directly relevant.

Next, these needs are used to determine the system requirements—what the system must do or deliver (Step 2). Once system requirements are developed, the project team must keep track of each requirement as the system is developed, tested, and deployed. This is called “traceability” and is necessary for two reasons: (1) to confirm that all requirements are derived directly from user needs and (2) to log any changes to ensure they are traced to identified user needs throughout the process, because requirements may change over the life of the project.

At this stage, the agency will determine the technology alternatives that could meet the system requirements (Step 3). After identification of the alternatives, evaluate and select the

most feasible alternative that best meets the requirements. Finally, validate that the system functions as intended and verify that the system functionality addresses the identified needs (Step 4).

Technology Deployment Process

The adjacent figure illustrates a simple way to think about the process.



A variety of factors contribute to choosing the right alternative. These factors include cost, ease of use, and maturity of the considered technology.

Most likely, the envisioned system will be developed by a vendor. To develop the necessary procurement and resulting contract, it is important to understand the system requirements and ensure that the proposed product can meet those requirements. It is also important to define a process that the vendor must use throughout the project to ensure delivery of a system that meets user needs, is completed on time, and stays within budget.

After the procurement and during the system development and implementation process, the following are suggested to track the project progress and ensure a successful implementation:

- Document the project implementation process
- Maintain a system requirements and traceability matrix
- Maintain a log of the status of each requirement throughout the project for traceability
- Conduct biweekly conference calls or meetings with the vendor to discuss project status and action items
- Define and execute iterative testing processes to ensure that:
 - The system components or sub-systems work as they were intended
 - The system works as a whole
- All requirements are met and can be accepted by the agency/organization.

Three concepts to keep in mind during navigation through this structured process are: (1) use a combined top-down and bottom-up approach (as shown in the figure above); (2) focus on stakeholders’ and user needs, not the technology; and (3) scale the process to the size and complexity of the project.

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