Phase 2 Integrated Complete Trip Deployment Plan (ICTDP)

Heart of Iowa Regional Transit Agency ITS4US Deployment Project

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ITS4US

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U.S. Department of Transportation

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16. Abstract

The Heart of Iowa Regional Transit Agency (HIRTA) is one of the 4 awardees for Phase 2 of the ITS4US contract for its proposed concept ***"Health Connector: Bridging the Gap Between Healthcare and Transportation"*** (Health Connector) by the United States Department of Transportation (USDOT). The Health Connector solution intends to demonstrate an innovative concept that will address various bottlenecks associated with healthcare access for HIRTA communities. The Integrated Complete Trip Deployment Plan (ICTDP) builds upon stakeholder discussions to provide a summary of how the Health Connector system is designed, developed, procured, configured, and deployed. Deployment includes installation, testing and training. Further, the ICTDP, describes the plan for future operations, maintenance and evaluation. This document also provides a tentative schedule and a summary of the budget needs for Phases 2 and 3.

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Table of Contents

List of Tables

List of Figures

1 Refined Phase 2 Deployment Concept

1.1 Introduction

1.1.1 Document Purpose

The Integrated Complete Trip Deployment Plan (ICTDP) serves as the detailed action plan for deployment efforts in Phases 2 and 3 after the approval of Phase 1 deliverables. This document has been developed using the structured concept identified in Phase 1 as the foundation to the activities, tasks, and deliverables under the design, testing, and launch in Phases 2 and 3. Moreover, the ICTDP specifies the steps to collect operational data and monitor key performance measures to evaluate impacts of this deployment.

1.1.2 Organization of this Document

The ICTDP document is organized in four sections. Section 1 introduces the ICTDP and summarizes the overarching deployment concept, element estimates for at-scale deployment, and team organizational structure. Section 2 delineates the details of activities, tasks, and deliverables for deployment Phases 2 and 3. Section 3 provides a summary of the schedule, with key milestones identified along with anticipated risks. Section 4 provides a cost estimate and cost uncertainties of deployment Phases 2 and 3. Also, any references to relevant documents listed in Appendix B are provided within parentheses.

1.2 Summary of Changes Since Phase 1

The HIRTA team has updated this document to reflect the new expectations and most current understanding around design and testing activities, subsequent Phase 3 deployment, operations, and evaluation activities, and future operations and maintenance (O&M) activities.

Below you will find a summary of the key changes made to the document since Phase 1:

1. The technologies used to assist customer care and operations staff with Traveler registration, eligibility management, reservations, scheduling, dispatching, billing, and administration activities will be referred to as the MOD Platform TMS in this document and future documents. As part of Phase 2, Via was selected as the MOD platform TMS provider for the Health Connector project. HIRTA currently uses Via's technology to support their existing on-demand service. The term "MOD Platform TMS" will continue to be used throughout the report (as opposed to referring to Via's system) when appropriate to serve as a vendor neutral resource for peer agencies considering the adoption of a

similar system, but any references to a pending selection of an MOD vendor have been updated.

2. NaviLens was named as a project partner in Phase 1. NaviLens wayfinding solutions will include NaviLens codes at common locations in Dallas County Hospital and on HIRTA vehicles.

3. Since Phase 1, the Health Connector system has been modified in design and will no longer be provided as a unified application but rather a suite of services. This was due to limited willingness to fully integrate applications from third-party providers.

4. For this proposed deployment, the HIRTA project team will first work with the following healthcare service providers to test MOD-Electronic Health Record (EHR) middleware products and for wayfinding and other demonstration testing:

    a. Dallas County Hospital

Other healthcare partners may still participate but will not be involved in testing and have not been as engaged with the project, and therefore have been removed:

    a. Broadlawns Clinic

    b. Unity Point Health

    c. Mercy One Care Facility Network

5. Data needs were deleted or updated as they were no longer applicable to the current state of the Health Connector project. These changes are shown in the system of interest diagram shown in Figure 5 and the user needs table shown in Table 2. A summary of the changes includes:

    a. Data ID 30 was removed because it was determined that trip history can be reviewed within the MOD Platform TMS. However, the replay of trip events and location train cannot be exported for sharing between subsystems.

    b. Data ID 42 was removed as it was determined to be best fit under Data ID 32. A detailed view of Data ID 32 can be viewed in the Performance Measurement and Evaluation Support Plan (PMESP) [6].

    c. Data ID 44 was removed as traveler wayfinding ratings are not a part of the wayfinding application capabilities. Instead, evaluations of the wayfinding app with be collected through separate surveys that are defined in Data ID 34.

1.3 Deployment Concept

The Heart of Iowa Regional Transit Agency (HIRTA) is one of the 5 awardees for Phase 1 of the Complete Trip – ITS4US contract for its proposed concept ***"Health Connector: Bridging the Gap Between Healthcare and Transportation"*** (Health Connector) by the United States Department of Transportation (USDOT).

1.3.1 Service Area

Health Connector will be deployed in Dallas County, Iowa. Dallas County comprises 18 municipalities, with the largest being West Des Moines (population 66,641), and the smallest being Bouton (population 119). Portions of Dallas County are located in the Des Moines – West Des Moines Metropolitan Statistical Area and the county features a mixture of suburban and rural densities.

Dallas County is one of the fastest growing counties in terms of population in the United States, with an increase of 36.4% since 2010 focused largely on the southeastern portion of the county in the western Des Moines suburbs. Dallas County was selected as a service area for this project since population growth, proximity to the Des Moines Metro, and unique public health program services available in Dallas County stood out as key determining factors. Figure 1 shows a map of population distribution and location of healthcare facilities.

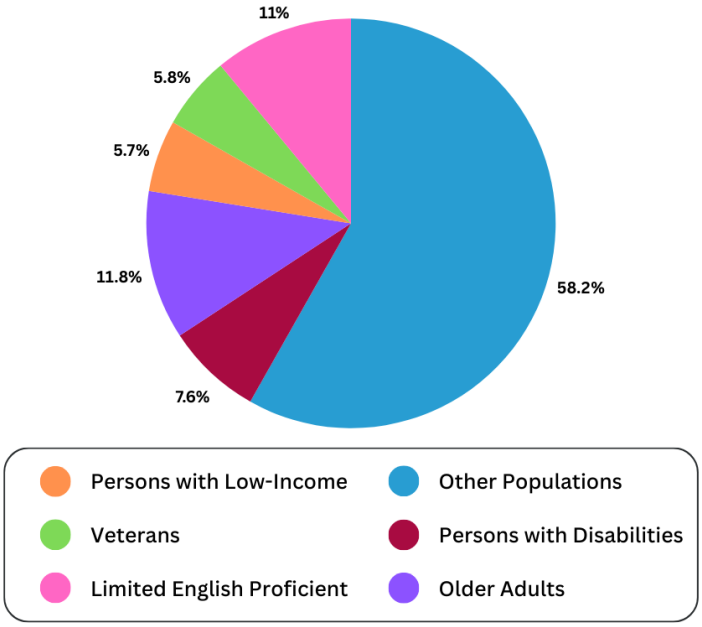

Figure 1. Dallas County, Iowa Demographics (Source: HIRTA)

In 2019, out of a total population of 93,000, the county was home to approximately 3,700 persons with disabilities, 11,200 older adults, 4,000 low-income individuals, 4,000 veterans, and 10,500 people speaking a language other than English (Figure 1 shows the distribution of underserved populations in Dallas County). Dallas County's older adult population grew 12% from 2000 to 2010 and is expected to double by 2030. The overall growth represents a shift from an agricultural to a suburban commuter community. Such challenges require HIRTA to utilize the available driver and vehicle resources in the most efficient manner. The change in population brings opportunity and access to health care services for many residents but also exacerbates differences between the affluent eastern side of the county and the rural and other communities to the north and west. Older adults make up a larger portion of rural populations (17%) than urban populations (13%), and rural residents with disabilities rely on public transit and take about 50% more public transit trips than those who do not have disabilities.

1.3.2 HIRTA Services

HIRTA provides 300,000 customer rides and operates 95,000 hours (2019 estimates; pre-pandemic) along with 1.3 million miles of service within the seven-county region encircling the Des Moines urban area. HIRTA provides demand response (DR) services to customers for all trips booked from 24 hours to up to 14 days in advance. If capacity is available, HIRTA also provides trips to meet same day requests. HIRTA also acts as a service provider for the State of Iowa Medicaid broker, Access2Care.

1.3.3 Stakeholders

Primary stakeholders for this project are:

- Customers seeking HIRTA services for medical appointments.
- Call center and operations staff (e.g., customer care, drivers, dispatchers) at HIRTA responsible for using the system for reservations, scheduling, dispatching, and administrative needs, including performance measurement.
- Community health partners, call center and reservations staff, and other relevant staff at healthcare facilities using the system for coordinating medical and transportation appointments and performance measurement.
- Referral entities and health navigators, who connect customers with potential healthcare providers and transportation providers.

A full list of HIRTA/Dallas County Stakeholders (also part of the proposed deployment) are shown in Figure 2.

Note that while HIRTA directly engages with customers, underserved population groups are also represented by Human/Social Service Groups. Also, note that healthcare customers are referred as patients and HIRTA customers are Travelers. Sometimes these terms may have been used interchangeability in the document. HIRTA staff (e.g., call center, operations) are listed they will be the users of the system.

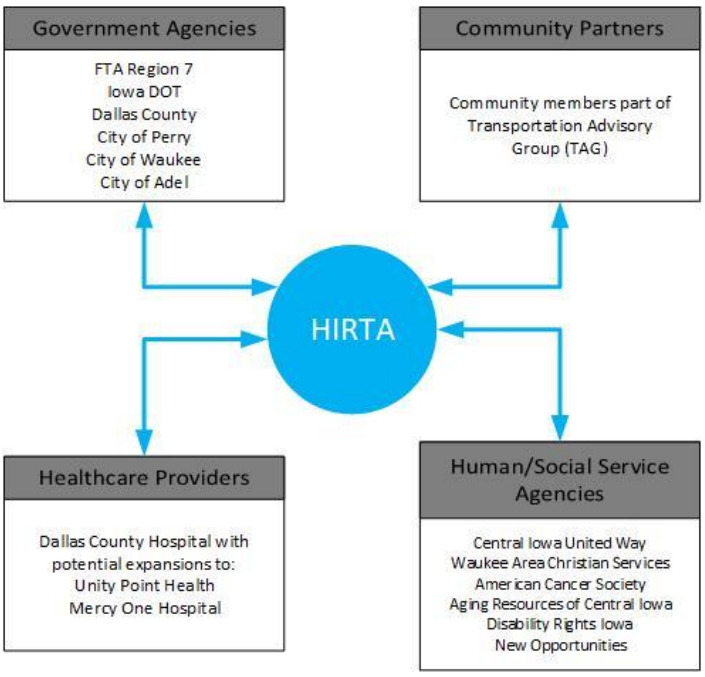

Figure 2. HIRTA Stakeholders (Source: HIRTA)

The ConOps [3] provides a detailed list of users and actors and how they will interface with the system.

1.3.4 Stakeholder Needs

As discussed in the Concept of Operations (ConOps) [3], underserved populations in Dallas County, Iowa often experience challenges accessing medical care due to a lack of transportation, including information and services. In fact, according to a 2014 National Leadership Academy for the Public's Health (NLAPH) survey of Dallas County residents, approximately 39% of respondents (out of a total of 144 Dallas County respondents) cited missing at least one healthcare appointment due to lack of available transportation options. Further, it is noteworthy that approximately 70% of total respondents relied on either HIRTA or family/friends for their transportation needs.

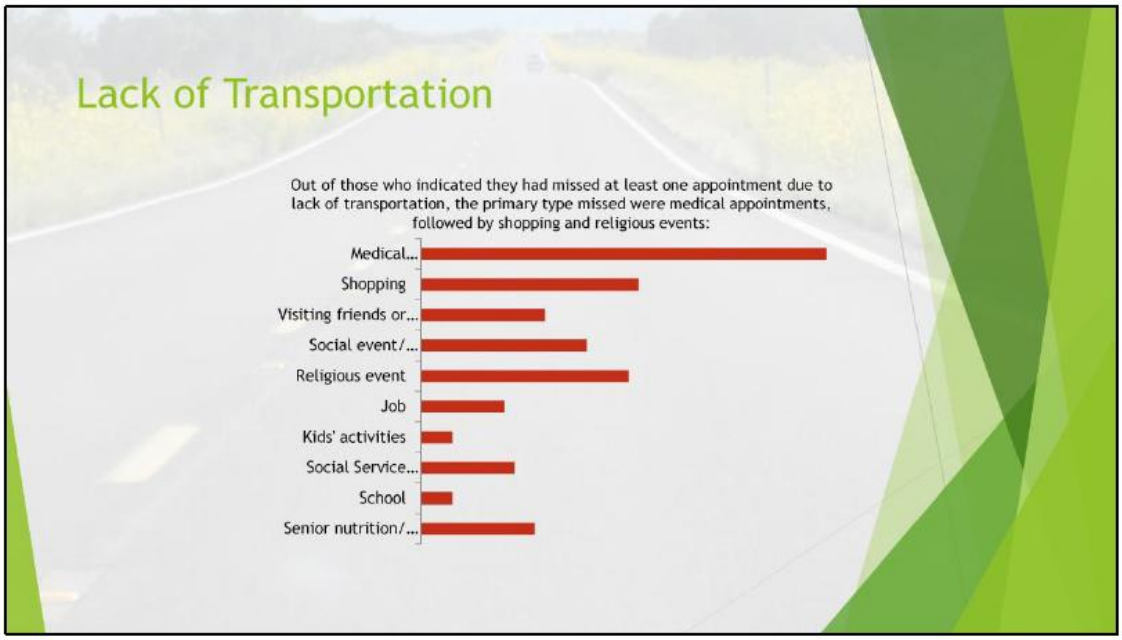

Figure 3. Excerpt of Survey Response from 2014 NLAPH Survey of Dallas County Residents (Source: DCHD)

Further challenges faced by Dallas County residents, and identified during stakeholder discussions, are discussed in detail in the ConOps report. Health Connector is intended to utilize advanced technologies for planning, booking, payment of transportation, as well as information and wayfinding services.

Based on stakeholder discussions, a summary of the unmet needs and associated population groups, as originally discussed in the ConOps document [3], are shown in Table 1.

Table 1: Challenges Faced by Underserved Population Group

Population Group	Topics
Persons with Disabilities (Mobility/Wheelchair User, Vision, Hearing, Cognitive/Developmental)	(1) Wayfinding services (provided in both audio and visual modes) to the transit vehicle, into the healthcare facility, and to their specific appointment location; (2) Smart device accommodations for blind and deaf/hard of hearing persons; (3) Smart device – user-based settings for ease of use and services preferences;
Older Adults	(1) Smart device - larger screen setting; (2) Smart Device – user-based settings for ease of use and services preferences; (3) Telephone number to call for services; (4) Maintains independence; (5) Solution/service ease of use

Population Group	Topics
Low Income	(1) Contactless Payments: unbanked/underbanked customers; (2) Alternate modes needed due to limited number of personal vehicles per household.
Rural	(1) Limited access to healthcare appointments due to long distance travel; (2) Challenges in coordinating appointment times with availability of transportation; (3) Cost effective transportation solutions; (4) Maintaining independence; (5) Solution/service ease of use; (6) Long distance travel may present stamina challenges.
Veterans	(1) Access to veterans' hospitals and other veteran support services; (2) Same challenges as all above subgroups.
Persons with LEP	(1) Technology system and services enabling the use of Spanish and other languages; (2) Support to understand all services and technology system developed (e.g., HIRTA travel trainers, DCHD, etc.); (3) Generally rely on human assistance even if tools (e.g., translation service) available to help with the appointment

A detailed needs assessment is also provided in the ConOps document [3].

1.3.5 Health Connector Background and Key Capabilities

Health Connector is an innovative solution that will address various bottlenecks associated with transportation access to healthcare for HIRTA communities. Some of these challenges are key reasons behind missed appointments or the unacceptable level of preventive or as-needed healthcare in the HIRTA service area. For this deployment, the HIRTA team plans to implement a scalable and replicable solution that enables access to non-emergency medical transportation for all underserved populations and their caregivers by resolving transportation access barriers with the use of advanced technologies. This solution will allow Dallas County residents without access to transportation who may be seeking a medical appointment to explore their transportation alternatives and book both medical and transportation appointments at the same time through a smart device (e.g., smartphone) application or equally effective alternate method. Further, this solution will include information and wayfinding services to guide them at every step of their trip.

This deployment will provide enhanced transportation access to healthcare options for all travelers in Dallas County with a specific focus on underserved communities, including rural travelers, older adults, and veterans. In addition to addressing mobility needs, the proposed deployment will recognize the net impact that access to health services has on patient healthcare outcomes as well as both the financial and health outcomes from the perspective of the healthcare community/Dallas County Health Department (DCHD).

Figure 4 provides an overview of the Health Connector concept.

Figure 4. Overview of Health Connector System Concept (Source: HIRTA team)

Key capabilities of the proposed technology solution are as follows:

- Enable the customer to use a smart device (e.g., smartphone, smartwatch) application or equally effective alternate methods to schedule and manage transportation services through the Health Connector Traveler app.
- Provide customers options to choose from available providers. Provide same day response if needed by customers.
- Send customers an alert before arrival and again when the vehicle is approaching.
- Keep customers informed on trip progress.
- Provide directions (audible and visual) on where to meet the vehicle/driver. On arrival, drivers should have the ability to automatically confirm customer identity.
- NaviLens wayfinding app will provide the customer with wayfinding solutions. This will include:
    - Locating healthcare facility when dropped off by vehicles
    - Locating healthcare facility lobbies and bathrooms
- Customers will be able to use Health Connector for any contactless payment needs at any point for transportation-related payments.
- If customers or their caregivers desire to book and pay for another local trip as an additional leg along with the medical trip they will be able to do that using Health Connector.
- Healthcare staff will be able to book transportation for patients at the same time that medical appointments are made, by using the Health Connector online trip request portal.
- HIRTA staff will have access, through Health Connector middleware, to a webpage to track the status of linked transportation and healthcare appointments to ensure that any changes to medical appointments include an accompanying change to transportation services.

1.3.6 Subsystems and Applications

Figure 5 provides the Health Connector context diagram with flows for each type of data, which includes the following major system and subsystems:

- **Traveler-end Subsystem**: includes the tools and technologies (phone/interactive voice response (IVR), mobile/smart devices, web-based tools) to be used by Travelers seeking transportation services for their healthcare appointments as part of their pre-trip, during trip, on arrival, and return trip activities. This includes both a mobility-on-demand (MOD)

application for planning, booking, and payment, as well as a wayfinding application for more detailed guidance within care facilities.

This application, provided by Via, also provides real-time status of trips on demand and through push notification services and allows Travelers to discover options and plans trips. Mobile/smart devices will be used as part of the Traveler-end subsystem but are not a part of this procurement.

- **HIRTA Transportation Management System (TMS):** A TMS refers to any systems related to the operational backend functions involved in service delivery. HIRTA's TMS includes the Mobility-on-Demand TMS in addition to other functions that support Health Connector from outside of the MOD platform such as the call center software. The MOD Platform TMS will also host two interfaces (middleware products) being developed by the HIRTA team and made freely, publicly available on GitHub under a permissive license to support interfacing with State of Iowa Medicaid transportation broker(s) and the EHR system.
    - **MOD Platform TMS (also referred to as "VOC"):** Provided by Via and includes the technologies used to assist customer care and operations staff with Traveler registration, eligibility management, reservations, scheduling, dispatching, billing, and administration activities.
- **Vehicle Subsystem**: refers to the technologies deployed on vehicles to support driver-end functions for driver-dispatch communications, manifest management, support just-in-time dispatching, turn-by-turn navigation and outdoor wayfinding (e.g., to locate Travelers at the time of pick up), on-board information and fare payments. On all HIRTA-owned vehicles, drivers will use tablets running the driver app. On other vehicles, drivers may use the driver app on their tablet or their phone.
- **Wayfinding Subsystem:** refers to the technologies and infrastructure to be used for providing outdoor wayfinding, indoor positioning, orientation, and navigation on request to Travelers. It may also assist with translation functionality. NaviLens is the commercially available wayfinding system that will be used to support this project.
- **External Systems:** These systems, external to Health Connector, have been identified for close coordination among HIRTA and partners for providing efficient transportation services for medical trips or for collecting data for performance measurement needs.
    - **Medicaid Transportation Broker**: refers to the State of Iowa Medicaid broker. Currently, Access2Care's system is used for booking and managing Medicaid trips. HIRTA is one of the providers used by Access2Care. Medicaid trips will continue to be booked by Access2Care when requested by Travelers. Medicaid trips will be ingested in the HIRTA system when assigned to HIRTA. At that point, a Traveler using Medicaid benefits will be able to use Health Connector Traveler tools.
    - **Health Navigator- and Healthcare-end Subsystem**: refers to the limited access MOD platform TMS that will be available to health navigators and healthcare customer care staff to request trips, modify trip requests, and check on trip status

on behalf of Travelers. Additionally, health navigators and the health administrator at the Dallas County Health Department (DCHD) use a Microsoft Access-based information and referral product to track the status of referral activities and for coordination with Dallas County residents' health navigation/social care services.

- **EHR/Medical Record Subsystem**: refers to the systems used by partner hospitals and clinics for booking medical appointments and maintaining their appointments, including discharge and any subsequent referral activities. Participating Healthcare partners currently use different EHR services The following bullet points outline participating healthcare partners and the EHR systems they currently employ. Health Connector will develop a new interface with at least one healthcare partner's EHR system.
  - Mercy One Hospital – Epic EHR, Epic EHR provides a publicly available API
  - Dallas County Hospital – Transitioning to Epic EHR
  - Other regional clinics – Veradigm EHR

- **Other**: Additional relevant details for the system to be deployed are as follows:
  - **Supporting systems**: These are existing systems and are not part of Health Connector. However, the TMS will exchange data with these systems or HIRTA staff may interact with these systems for certain operational functions, as needed. Specifically, this refers to the phone system, payroll, driver or vehicle information management, vehicle maintenance management, customer service management, safety event reporting, and other systems and processes for data collection and reporting.

Figure 5 provides a system context diagram for HIRTA Health Connector along with data flows. Data flows are labeled according to the data ID used in Table 2.

1.3.7 Expected Outcomes

Health Connector solution is expected to provide operational and organizational benefits and impacts to each user group. This section currently provides information based on preliminary assessments and will be updated as further details emerge about how healthcare operations will interact with this new system. Health Connector will enhance the mobility of Travelers in Dallas County by making affordable transportation services available to all underserved groups. Health Connector will also enhance the accessibility, reliability, spontaneity, safety, and security of available transportation options, so Travelers can become self-reliant. Service will also be made available outside HIRTA's regular service hours. These anticipated outcomes are going to be measured through the identified performance measures (see section 1.3.11). Further, Health Connector will enable enhanced collaboration for transportation needs among HIRTA staff, DCHD, and healthcare providers

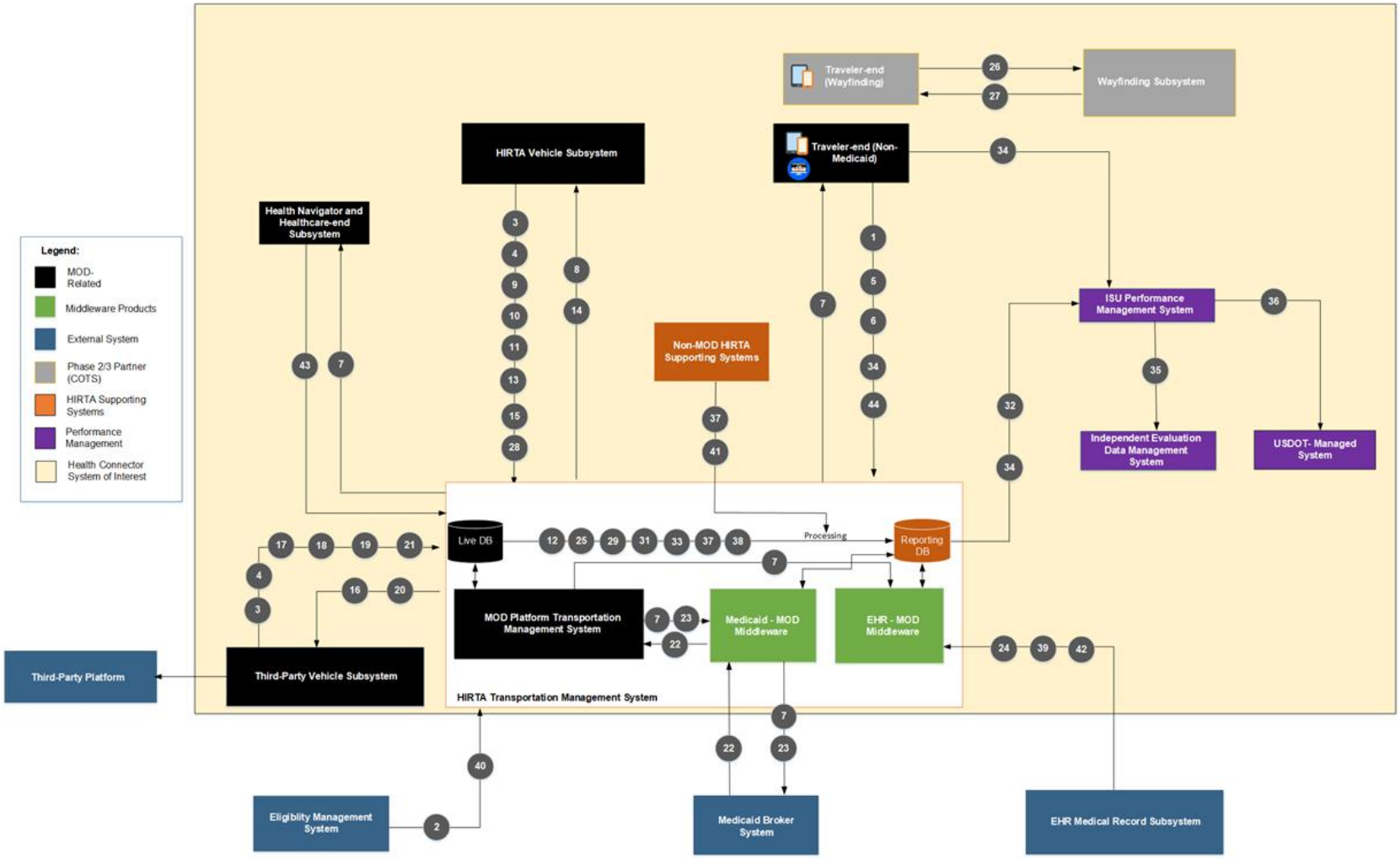

Figure 5. Health Connector System Components along with Data Flow (Source: HIRTA team)

1.3.8 Goals and Objectives

Figure 6 provides a list of ITS4US program goals that primarily focus on identifying needs and challenges for populations so appropriate tools can be identified for enhanced mobility. Also, a key goal is to measure the outcomes of the deployed applications/systems. Further, a key goal of the program is to identify solutions which are scalable and replicable so similar solutions/systems can be deployed nationwide in other communities.

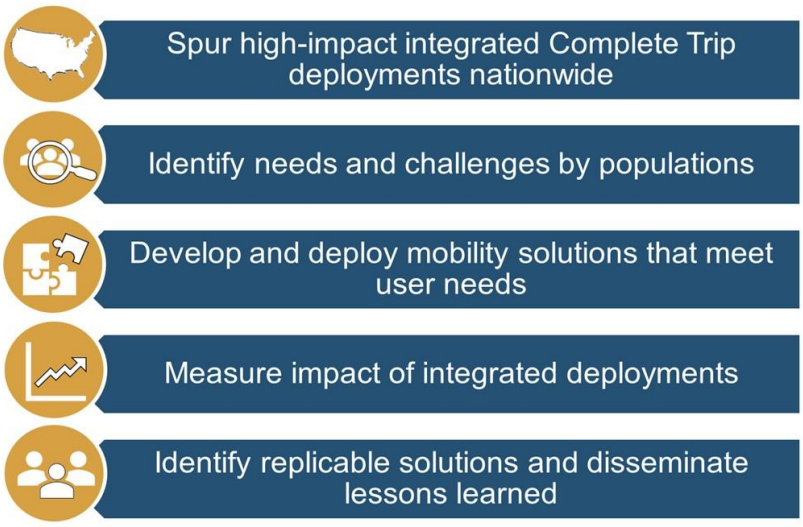

Figure 6. ITS4US Project Goals (Source: USDOT)

Health Connector goals and objectives based on user needs, and using the USDOT and ITS4US program goals as the context, are provided below:

- **Goal G1. Improved health outcomes through increased access to medical transportation for Dallas County residents:** Reduction in the number of no-shows for medical appointments due to increased access to transportation will help Dallas County residents, particularly underserved populations, make their appointments in a timely manner. This increased access to medical services will result in measurable positive health outcomes. Relevant objectives are:
    - G101. Reduce number of no-shows for medical appointments with availability of increased access to transportation options in Dallas County.
    - G102. Increase access to follow-up care options through availability of transportation services.
    - G103. Track of measurable positive impacts of transportation access on healthcare outcomes for Dallas County residents.
- **Goal G2. Self-reliance and spontaneity for underserved groups:** Health Connector will provide tools to access safe, affordable, and reliable transportation services and relevant information/wayfinding as and when needed by underserved groups. Relevant objectives are:

  - G201: Access to safe transportation services for underserved groups through the availability of secure and reliable tools and services for planning, booking, payment, and customer information.
  - G202. Ability to safely assist underserved Travelers in locating vehicles and/or facilities at destinations through the availability of secure and reliable outdoor and indoor way-finding tools.
  - G203. Availability of safe and reliable transportation services when needed by underserved groups for their medical appointments, return trip, and follow-up care.

- **Goal G3. Efficient transportation management capabilities for medical transportation services:** HIRTA and its contractors, Access2Care, DCHD, healthcare providers, and funding agencies will have access to tools and services for coordinating booking, management, completion, billing, and payments for medical transportation in Dallas County requested by underserved Travelers. Relevant objectives are:
  - G301. Ability to manage transportation services from multiple service providers from a centralized Health Connector system, along with enabling as-needed transportation capacity at all times.
  - G302. Ability to provide reliable transportation for requested trips using tools and procedures as necessary.
  - G303. Provision of affordable transportation through coordination with funding entities for subsidizing transportation for the underserved.
  - G304. Reduction in time needed by involved staff and HIRTA partners in trip coordination through the implementation of automation.
- **Goal G4. Financial sustainability of medical transportation programs:** Availability of tools to efficiently coordinate booking and manage delivery of transportation services through optimal use of resources will help in cost-reduction of medical transportation and will help with maintaining long term sustainability of funding programs. Relevant objectives are:
  - G401. Ability to analyze the total cost of delivering medical transportation services for HIRTA and partners through the availability of tools to track cost and revenue measures along with applicable subsidies.
  - G402. Reduction in resources spent in delivering and administering trips funded by various programs through implementation and coordination.
- **Goal G5. Safe medical transportation services:** Availability of advanced tools to provide trip information and wayfinding services customized per the needs underserved groups will help provide safe transportation options to Travelers who may lack those. Relevant objectives are:
  - G501.Enhance perceived safety through timely and reliable delivery of required information on vehicle and trip status.
  - G502. The mitigation of risks related to accidents, incidents, injuries, and severe consequences associated with trips to medical facilities, outdoor/indoor wayfinding, and return trips through the implementation of required safety measures.

1.3.9 Use Cases/Scenarios

As explained in the ConOps document, Health Connector system will interact with at least 4 distinct operational environments: HIRTA, third-party service providers, healthcare providers, and health navigation/social care providers. Therefore, the HIRTA project team has developed scenarios considering situations faced by specific user groups pertaining to those operational environments.

For Travelers, scenarios play out differently if their healthcare is paid through Iowa's Medicaid program. For Medicaid participants, whether enrolled in traditional (fee-for-service) or managed care, transportation is centralized through the State's broker, Access2Care. There are specific practices and procedures that will need to be followed, and there can be issues around the need to ensure that an eligible person is receiving allowable care or services from an approved provider (see Scenario 5, as an example), and challenges around what to do if proper procedures are not followed, even if the transportation would otherwise be eligible. For persons not covered by Medicaid, the scenarios are more complex, and include the risk that needed medical transportation might not be available, accessible, affordable, or appropriate. The five scenarios below (Scenarios 3 – 6) illustrate a few of these complexities.

Scenarios 1-2 describe how system will perform in normal and degraded/failure modes as part of overarching discussion of system operations.

Degraded or System Failure Scenarios

1. **Scenario 1**: A Traveler has requested a trip for a routine exam at a hospital. The system is operating in degraded mode, since the MOD Platform TMS server is down due to an unexpected maintenance issue during the Traveler's return trip.
2. **Scenario 2**: A Traveler has an appointment scheduled for a routine exam at a hospital. The trip is taking place during a complete system failure caused by communication outage after a severe weather event.

Travelers (Non-Medicaid)

3. **Scenario 3**: A Traveler is looking for transportation for a recurring medical appointment (e.g., dialysis) scheduled with a hospital/clinic.
4. **Scenario 4**: A Traveler is looking for a prenatal appointment and will need transportation. It is recurring but not on a fixed schedule.
5. **Scenario 5**: A Traveler is looking for a preventive care appointment.
6. **Scenario 6**: A Traveler is looking for a medical appointment for a one-off procedure. They will not be able to take taxi/TNC home and will need someone to accompany them.

Travelers (Medicaid/MCO)

7. **Scenario 7:** A Traveler is approved to take a Medicaid-eligible trip, but they would like family to accompany them to provide assistance. The outbound trip is 45 mins long, so they may be looking to be dropped off at a friend's house so they can rest and arrange their own transportation later for ride home. Medicaid will pay for only eligible portion of the trip.

DCHD/Health Navigators

8. **Scenario 8**: A Traveler just moved to Dallas County and needs to schedule a medical appointment but does not know doctors in the area and does not have transportation.

Hospital/Clinic

9. **Scenario 9**: A blind Traveler was dropped off by a friend for a routine medical appointment but does not have return transportation. The Traveler is not comfortable with a taxi or TNC and prefers HIRTA service. Hospital customer care staff requested to book directly using the HIRTA system.
10. **Scenario 10**: A Traveler has a planned discharge, based on the progression of their recovery, for the next day. The discharge planner will set up transportation to the Traveler's residence or skilled care facility.

HIRTA

11. **Scenario 11**: HIRTA is not able to find out if a Traveler who was dropped off for a medical appointment has already been discharged. The Traveler had booked the return trip, and the driver is waiting at the medical facility to pick up the Traveler. The Traveler does not use the Health Connector app and is relying on HIRTA service for coordination.
12. **Scenario 12**: A Traveler was a no-show for their outbound trip to a medical appointment (or cancelled without providing a reason), but the Traveler had also booked a return trip, and HIRTA has to follow up with both customer and the hospital to find out if the Traveler needs the return trip before their trip back to home can be cancelled.

Third party Service Providers

13. **Scenario 13:** A third-party service provider (taxi/volunteer or another agency in the region such as DART) would like to be part of this solution, particularly when trips are outside of the HIRTA service area. The third-party service provider would like to be integrated so their services are available to Travelers per terms and conditions agreeable to HIRTA.

1.3.10 Data Needs

The following types of datasets are expected to be collected by the system:

- **Admin:** includes data that is required for administrative needs prior to a trip can be provided (e.g., customer registration, eligibility management, fleet management/ maintenance). It also refers to any data that is part of routine process (e.g., safety management, complaints).
- **Driver:** includes driver-level details on name, vehicle used, and their service performance (revenue miles, revenue hour, on-time performance).
- **Trip:** includes trip-level data for Travelers and Drivers on location (pickup, dropoff), time, fare payment. Traveler, Driver and Trip identifiers are anonymized.
- **Aggregated:** refers to aggregated summary for a chosen time interval. Summary available at Traveler, Driver /Vehicle, Provider and Trip level.
- **Survey:** refers to survey data and results. Details regarding survey data will be provided after the full IRB process is complete in Phase 2.
- **Health**: refers to medical appointment time and location data, and any data collected by Dallas County Health Department for Health Navigation purposes (may or may not be shared publicly).
- **System Log:** refers to data logged in the system to assess system performance and reliability. Also, may include supportive information (e.g., communication log indicating traffic delay)**.**
- **Wayfinding**: refers to log of requests and pathways directions provided at device level**.**

The Phase 2 Data Management Plan (DMP) [4] provides details on how individual datasets within these categories will be collected, managed, and shared. Some private data, as described in the DMP, will be made available in aggregate form with metadata for research purposes. Data will be anonymized to protect any PII, confidential business information (CBI) and electronic personal health information (ePHI) as defined under the HIPAA in accordance with all applicable state and federal laws.

A summary of data needs is identified in Table 2

Table 2. Data Needs Summary

ID	Data	High-level Description	System(s) of Interest Involved
1	Traveler profile	Traveler's personal details as provided as part of registration.	MOD Platform TMS
2	Traveler eligibility	Traveler's eligibility for a funding source or program; also verified with funding entities (e.g., Medicaid).	Eligibility management system/funding source
3	Fleet information	Details on HIRTA's vehicles; also, details on third-party vehicles.	MOD Platform TMS; third-party platform
4	Driver information	Details on HIRTA's drivers; also, details on third-party vehicles.	MOD Platform TMS; third-party platform
5	Trip request	Traveler request for a trip from a web or mobile device; some Travelers may request over phone and use concierge/ customer care service.	MOD Platform TMS
6	Trip modification or cancellation	Traveler's request to cancel an existing scheduled trip. To modify an existing trip, Travelers will cancel existing reservations and submit new booking requests.	MOD Platform TMS
7	Trip status	Current information on upcoming trip.	MOD Platform TMS
8	Manifest	Time and location details on Travelers to be picked up and dropped off by a driver during a shift.	MOD Platform TMS
9	Vehicle location	Location and heading along with other details for a vehicle in service.	MOD Platform TMS
10	Trip performance	Trip-level log of actual time and location for trips on the manifest along with any no-shows and cancellation events.	MOD Platform TMS
11	Driver performance	Driver-level log of operational performance on log on, on-time performance, manifests completed.	MOD platform TMS
12	Travel time	Time needed to perform on-board component of a trip.	MOD Platform TMS
13	Driver messages	Messages sent by drivers to dispatchers.	MOD Platform TMS
14	Dispatcher messages	Messages sent by dispatchers to drivers.	MOD Platform TMS

ID	Data	High-level Description	System(s) of Interest Involved
15	Fare payment log	Log of amount paid for a trip and method of payment.	MOD Platform TMS
16	Request for third-party trips	Time and location details on Travelers to be picked up and dropped off by a third-party driver during a shift.	MOD Platform TMS
17	Trip performance (third party)	Trip-level log of actual time and location for trips on the manifest along with any no-shows and cancellation events for trips delivered by a third-party provider.	Third-party platform
18	Vehicle location (third party)	Location and heading for a vehicle in service along with other details for a third-party provider.	Third-party platform
19	Driver messages (third party)	Messages sent by drivers to HIRTA dispatchers.	MOD Platform TMS
20	Dispatcher messages (third party)	Messages sent by HIRTA dispatchers to drivers.	MOD Platform TMS
21	Fare payment log (third party)	Log of amount paid for a trip and method of payment.	Third-party platform
22	Medicaid trip requests	HIRTA-accepted request for Medicaid-funded trips through Medicaid broker platform.	Medicaid broker system
23	Medicaid trip performance	Trip-level log of actual time and location for trips on the manifest along with any no-shows and cancellation events for trips delivered for Medicaid-funded trips.	MOD Platform TMS
24	Medical appointment details	Consists of medical appointment date, time, and location (facility address and doctor's office) for a particular Traveler.	EHR
25	Aggregated summary	Aggregated data on driver, vehicle, and trip performance.	MOD Platform TMS
26	Traveler wayfinding request	Requests initiated by Travelers to the wayfinding system.	Wayfinding Subsystem
27	Traveler wayfinding guidance	Log of wayfinding information provided to Travelers.	Wayfinding Subsystem
28	Safety event	Log of incidents and accidents by vehicle/driver/trip.	MOD Platform TMS
29	Safety event report	Detailed reports by a safety event (incident, accident) with response.	MOD Platform TMS
31	System performance	Log of system performance, including any failures.	MOD Platform TMS; HIRTA supporting systems

ID	Data	High-level Description	System(s) of Interest Involved
32	Anonymized and/or aggregated data for performance evaluation	Anonymized/aggregated Traveler, trip, and operations data (as described in Table 3. Scope and Availability of Private Data in the Data Privacy Plan 15) to support Health Connector performance evaluation.	MOD Platform TMS
33	Traveler complaints log	Log of Traveler complaints received and actions taken.	MOD Platform TMS
34	Traveler survey results	Customer data and survey conducted by ISU (including through the MOD platform) of human use participants and control group.	MOD Platform TMS; local data system at ISU
35	Processed data for controlled sharing	Controlled-access data available to researchers and the Independent Evaluation team.	Local data system at ISU
36	Data for public access	Aggregated trip summary at Census tract and/or traffic analysis zone (TAZ) level as defined in DMP (or another unit as refined in Phase 2) will be provided. Other data such as fleet, vehicle, and safety event (incident/accident) will also be provided.	Local data system at ISU
37	Cost and revenue data	Cost and revenue data by trip, including actual cost, fare paid, funding source share.	MOD Platform TMS
38	Wheelchair failure log	Summary of events referring to situations when wheelchair lift could not function at the time of pickup or drop-off.	HIRTA
39	Medical appointment status	Real-time status of progress on a medical appointment resulting in an impact on the pick-up time.	EHR
40	Discount coupon/credit	Discount coupons or credits applied by trip.	Eligibility management system/funding source
41	Call center log	HIRTA call center statistics available from phone systems or manual logs.	HIRTA supporting systems
43	Trip request (partners)	Trips requested by DCHD and healthcare providers using MOD platform. To be tracked separately to assess the benefit of such capability.	MOD Platform TMS

1.3.11 Performance Measures

The performance measures are mapped to Mobility Performance Metrics (MPM) [13], and they are identified under the following high-level categories, also illustrated in Figure 7 below.

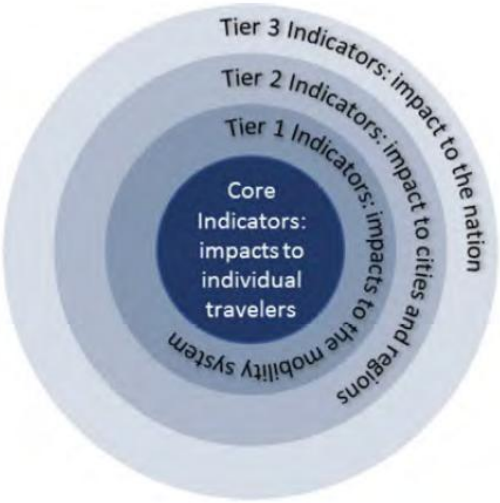

Figure 7. Tiered Framework for Metrics in MPM Report (Source: FTA)

- **Core Measures**: This category includes Traveler-centric measures and those related to the following key aspects associated with a trip: availability of services; reliability of available services; budget needed/affordability; travel time; and safety.
- **Tier 1 Measures**: This category indicates system's ability to deliver on the required goals and objectives and refers to system capacity; system efficiency, effectiveness, and cost; utilization; safety; and reliability.
- **Tier 2 Measures**: This category refers to system's availability to deliver on the broader goals of the local community. The measures are related to overall mobility and safety/health of the members of the community; and financial performance of the systems and organizations involved.
- **Tier 3 Measures**: This category refers to system's ability to contribute to trends nationally and identifies measures related to financial performance of organizations delivering services; and safety/health of communities.

For each of these categories, the HIRTA team has defined measures for the 3 stages of a Complete Trip that include pre-trip, trip/en-route, and post-trip. The Performance Measurement and Evaluation Support Plan (PMESP) [6] provides details on identified performance measures, data needs, and an approach for analysis and reporting by each measure. A summary of performance measures is provided in Table 3.

Table 3. Performance Measures by Goals and Objectives and Relevance to Use Cases

MPM Tier	Goal	Objective	Performance Measure Type	U1	U2	U3	U4	U5	U6	U7
Core	G3	G301, G302	**Ability to dynamically reassign vehicles to address service disruption**	X	X	X	X	X	X	X
Core	G2	G201, G102	**Availability of transportation alternatives**	X	X	X	X	X	X	X
Core	G3	G302	**Trips unfulfilled due to system unreliability**	X	X	X	X	X	X	X
Core	G3	G302	**Estimated time of arrival (ETA) prediction accuracy**	X	X	X	X	X	X	X
Core	G3	G302	**On-time performance**	X	X	X	X	X	X	X
Core	G3	G302	**On-board travel time prediction accuracy**	X	X	X	X	X	X	X
Core	G2	G202	**Reliability of the system in assisting with non-vehicle component of the complete trip**	X	X	X	X	X	X	X
Core	G2	G201	**Traveler perception of privacy**	X	X	X	X	X	X	X
Core	G2	G201	**System ability to meet accessibility needs of Travelers**	X	X	X				

MPM Tier	Goal	Objective	Performance Measure Type	U1	U2	U3	U4	U5	U6	U7
Core	G2	G201, G202	**Self-reliance**	X	X	X	X	X	X	X
Core	G2, G5	G201, G202, G203, G501	**Complaints and customer satisfaction**	X	X	X	X	X	X	X
Tier 1	G3	G301	**System productivity**	X	X	X	X	X	X	X
Tier 2	G4	G401, G402	**Increased cost efficiency**	X	X	X	X	X	X	X
Tier 2	G3	G301	**Improved coordination among HIRTA, healthcare providers, health navigators**		X			X	X	
Tier 2	G5	G501, G502	**Delivery of safe healthcare transportation**	X	X	X	X	X	X	X
Tier 2	G1	G101	**Reduction in medical appointment deferment due to lack of transportation**	X	X	X	X	X	X	X
Tier 3	G1, G4	G101, G401	**Savings due to reduction in the number of missed medical appointments**	X	X	X	X	X	X	X

1.3.12 Data Analysis and Performance Reporting

The following types of data will be collected for use in the various analyses:

- Trip performance variables (i.e., number of trips, trip length, number of safety events) will be reported by HIRTA. They may be provided in raw or reduced format. If needed, a unique user ID may be assigned. However, any PII will be stripped before the data are provided to Iowa State researchers.

- Participant and control survey variables: this includes all data reported and reduced from any survey instrument used to question users of the Health Connector app and individuals in the control group. Data will be collected by researchers at ISU. As a result, both raw and reduced data will be stored at ISU. Some extra information may be collected to identify duplicate responses, but no PII will be collected.

- Driver/medical facility survey: this includes any data requested or collected through a survey of transportation drivers or medical facilities. This may include information such as number of drivers who report participants having issues finding the pick-up point or number of missed medical appointments. Data may be collected by HIRTA or the ISU research team. As a result, both raw and reduced data will be stored at ISU. No PII will be collected.

Data for analyzing and reporting performance measures will be stored at ISU. All of the team members who will have access to the data, including IT, have IRB training. Data will be stored on CyBox which is a FERPA- and HIPAA-compliant file storage system. All access to CyBox is password controlled with encryption. Data are stored in user created files and only authorized users can access files. Most of the anticipated data will be gathered and stored in databases. Although no PII information will be collected, any PII that is discovered will be cleansed from the data using automated and/or manual steps. For instance, a user may list their name in a question that allows text entry.

Some of the measures will require data collected by the external systems owned by healthcare partners and DCHD. The purpose of those datasets is to primarily help determine the impact of increased transportation access on missed medical appointments and subsequently measured net financial outcomes. This data will include:

- Missed appointments linked to lack of transportation access (this information will be obtained from surveys of health care providers)

- Resources spent in number of person-minutes in scheduling a transportation service from HIRTA for a medical appointment

- Data on referral and tracking of results as managed by health navigators at the DCHD

Travel performance metrics (i.e., availability of transportation option, ETA prediction accuracy, number trips) will be regularly calculated and reported once per quarter. This information will be provided in the regular project progress reports to USDOT. This information will be presented in a dashboard which shows an aggregate summary of each metric. Information may be displayed

using bar charts, summary tables, pie charts, etc. The team has access to and expertise with Tableau (data visualization software), which can be used to prepare dashboards.

Survey statistics will be evaluated. The methodology for collecting, reducing, and analyzing data will be provided in a report format. Summary information will also be presented using charts or tables so the information can be understood. It is expected this information will be provided to USDOT in annual reports (as available) as well as interim and final reports.

Survey work will be performed by InTrans and will be conducted in full accordance with ISU practices, guidelines and requirements concerning surveys of human subjects. In Phase 2, InTrans will consult with its sibling institution with Iowa State University, the ISU Center for Survey Statistics and Methodology, to determine the most suitable array of methodologies to employ in surveying Health Connector participants and other HIRTA customers. The expectation is that surveys will be administered online, through telephone interviews, and possibly through paper surveys or other media. In any event, it will be important to ensure that all users groups of the Health Connector are able to be represented proportionately in this survey work, regardless of potential barriers that could be associated with income, language, disability or other factors.

Surveyors will be exposed to personal information tied to the respondent such as their name, phone number, and survey responses. The conduct of telephone surveys will be carefully scripted to assure that no information is collected from participants until they've been able to give informed and voluntary content to participate in the survey. The scripting will assure that InTrans interviewers do not ask any leading questions, do not pressure or influence responses to individual survey questions, accept "decline to answer" as a valid response to any and all survey questions without prejudice, and fully and immediately respect any requests from participants to keep their survey response information anonymous.

HIRTA team will also support Independent Evaluation (IE) team with Phase 1-3 documentation review as needed, and provide any input as requested. Also, the team will provide baseline and required data for analysis of identified performance measures. Finally, the team will participate in interviews to answer any questions, as submitted by the IE team through an interview questionnaire.

1.3.13 System Safety

As described in the Safety Management Plan (SMP), Health Connector service is not an entirely new service or system. It will be built on top of current operations HIRTA already provides and systems HIRTA already uses. However, there will be various changes brought by Health Connector (e.g., new applications for managing the transportation service, new tools for underserved populations such as LEP, use of third-party vehicles, a wayfinding app to locate vehicle/facility and navigate inside the indoor environment) to HIRTA's existing SOPs given the critical nature of healthcare trips and functionalities envisioned. Any safety-related items in SOPs will be reviewed by the Accountable Executive, Safety Program Manager, and the Safety Committee to recommend changes to the Public Transportation Agency Safety Plan (PTASP) as necessary, particularly any actions related to Safety Assurance and Safety Promotion. The current PTASP framework was reviewed in Phase 2 and is still relevant to health connector operations. If changes to the PTASP are necessary, the document will be adjusted to ensure that the current Policy, Management, Assurance, and Promotion-based SMS is able to help HIRTA ensure the safety of all users of the Health Connector system. All users of the system are being trained and retrained to ensure that all of them have the desired level of comfort.

Due to various components outside HIRTA's control that may impact HIRTA operations (e.g., communications) a fully fail-safe system will be difficult. However, safety risk assessment conducted in SMP will be used as the guide to prioritize actions per anticipated safety risk index of safety scenarios identified. When system is in 'failure' mode of operations, paper manifests and two-way radios will be the tools that will be used to serve the riders. Where possible, mitigation actions will be taken as described in the initial control strategies identified in the SMP.

When necessary, the current framework as established in the HIRTA PTASP will be updated based on detailed actions to be identified in the Health Connector SOP for expected risks. Preliminary response actions included in the Control Strategies identified in the SMP will form the basis for responses that will be included in the SOP and the revised PTASP. If an event occurs, an appropriate response plan will be executed. Further details on safety are available in the SMP.

1.3.14 System Security

HIRTA collects (similar to other providers of para/demand response services in the US) most of the data under discussion for its demand response service to provide Medicaid and ADA-compliant services, including some data that may be covered under HIPAA (e.g., name, age, SSN, disability type, mobility needs, addresses). Per the HIRTA team's current understanding, Health Insurance Portability and Accountability Act (HIPAA) does not apply to paratransit/DR service per FTA guidance as far as it is being used to provide transportation services by agencies. Also, per TCRP Legal Research Digest (TCRP Project J-5): **"In brief, this digest concludes that a transit agency is not subject to HIPAA's privacy and security rules because of the need to have health information provided by patrons (or an entity covered by HIPAA that patrons authorize to provide to the agency) to qualify for paratransit services."**

However, any data collected by HIRTA will be shared with external entities in compliance with HIPAA and privacy regulations, as defined in the DMP [4]. Also, Traveler-end and Wayfinding applications provided by Health Connector will disclose all the data that may be requested by the application and how that will be secured. As required in the Systems Requirements Specifications document (SyRS), data will be accessible only via system shall be made available to external users using secure and encrypted data exchange with cloud-based servers using standards such as Secure Sockets Layer (SSL) or Transport Layer Security (TLS) and shall avoid any exposure to Personally Identifiable Information (PII) for Travelers. The HIRTA team also developed a detailed Data Privacy Plan (DPP) [15] in Phase 2.

1.3.15 Post-Deployment Process

Upon completion of activities and tasks for all phases, HIRTA plans to continue operating and maintaining the Health Connector solution with the following post-deployment tasks:

- **System Expansion to other Counties**: HIRTA plans to expand Health Connector beyond Dallas County and implement in the rest of its service area. Plan for this expansion will be developed based on performance of Health Connector and any impact brought to the system to better estimate the demand (e.g., new riders gained due to improved level of service for same day response).

- **Support Replication at other Iowa Agencies in coordination with Iowa DOT**: HIRTA plans to coordinate with Iowa DOT and other agencies in the State of Iowa for deployment of similar capability solution for other regions. In particular, this solution will be applicable to many other agencies in Iowa that work with Access2Care and provide medical transportation since open-source middleware to be developed for this project can be configured to work for those agency environments. Agencies can utilize their existing MOD platform or will have to procure an MOD platform to meet their needs.

- **System Operations and Maintenance**: HIRTA plans to continue to operate the system for at least 5 years beyond Phase 3 using operating funds which are a mix of federal, state and local funds, and other sources discussed in Section 1.5.3.

- **System Use Assessment**: HIRTA will conduct periodic “system use” assessments so targeted improvements can be planned and executed for the system (e.g., system enhancement, training, configuration changes).

- **Data Validation and Sharing**: HIRTA will continue to partner with researchers beyond Phase 3 for evaluating the benefits of Health Connector or similar systems on improved health outcomes.

- **System Enhancements**: HIRTA will continue to work with deployment partners on adding new system functionalities and add additional capabilities as they become available in the future.

- **System Upgrade and/or Replacement**: HIRTA will continue to monitor the industry and plan for implementing new trends and opportunities as they become available (e.g., connected and autonomous shuttles, V2X-based guidance to pedestrians to assist with intersection crossings, V2X technologies to provide priority to transit vehicles at intersections and smart corridors, Blockchain-based distributed identity and distributed ledger) for providing improved access to healthcare.

1.4 At-Scale Deployment Summary

Table 4 provides a summary of planned scale of the Health Connector deployment for full operations and evaluation in Phase 3. For indoor/outdoor wayfinding and kiosks, the HIRTA team currently has interest from only Dallas County Hospital. However, number of trips and wayfinding markers are projected based on the demand for the four healthcare facilities identified in the Phase 1 documents.

Table 4. Planned At-Scale 100% Deployment for Phase 3

Line Item	20% At-Scale Deployment	50% At-Scale Deployment	100% At-Scale Deployment
Service Area	Within 5 miles of City of Perry, Dallas County	Cities of Waukee, Adel and Perry, Dallas County	Entire Dallas County
Number of Healthcare Facilities	1	2	2
Max number of HIRTA Vehicles	2	5	10
Number of Contractor Vehicles	1	2	5

Line Item	20% At-Scale Deployment	50% At-Scale Deployment	100% At-Scale Deployment
Max Number of Trips (HIRTA vehicles)	20	50	100
Max Number of Trips (Contractor vehicles)	5	10	20
Vehicle Infotainment Devices	2	5	10
Number of Kiosks	1	1	1
Visual Markers for Wayfinding	24	70	170
Vehicles (inside and outside)	4	20	20
Healthcare Facility (indoor and outdoor)	20	50	150

'Contractor' refers to providers that HIRTA will use for added capacity to meet its demand. HIRTA team anticipates that the future growth in the post deployment years will met by brokered trips to third party providers, particularly for same day response trips.

An overall growth of 20% is expected year over year (YoY) in the post deployment period, starting in mid-2025. Also, based on the success, HIRTA plans to roll out the Health Connector service to other counties in its service area. Demand estimation and system expansion planning beyond HIRTA is currently in preliminary stage and will be finalized once details on operations and maintenance become clear in Phase 2 and 3.

1.5 Team Organizational Structure

1.5.1 Team Organization

Throughout Phase 2, the project team has been working closely with the Agreement Officer's Representative (AOR) and the USDOT team for meeting project requirements and finalization of deliverables. This project is being led by HIRTA and project partner team's key personnel designated leadership include HIRTA, Arcadis IBI Group, and Community Transportation Association of America (CTAA). Additional partners include the Iowa State University (ISU), Dallas County Health Department (DCHD), and Capture Management Solutions.

1.5.2 Key Personnel

Figure 8 provides the planned organizational chart of the HIRTA project team for Phase 2/3. It continues the involvement of Phase 1 staff and identifies roles and responsibilities as relevant to managing the systems engineering process in Phase 2/3 for deployment, operations, and maintenance.

- **Brooke Ramsey from HIRTA, Project Management Lead (PML)**: Brooke has been the designated PML for Phase 2 and will continue to serve in that role. Also, she will be the primary point of contact (POC) for the USDOT for Phase 2/3.

- **Santosh Mishra from Flexlynqs, Systems Engineering Lead (SEL)**: Santosh has been leading all systems engineering activities in Phase 2 and will continue in that role in Phase 2/3. He will lead all systems engineering deliverables and provide oversight for systems engineering process in coordination with the Deployment Lead.

- **Chris Zeilinger from CTAA, Deployment Lead (DL)**: Chris has been leading stakeholder engagement, human use approval, and training efforts in Phase 2 and will lead the deployment team in Phase 2.

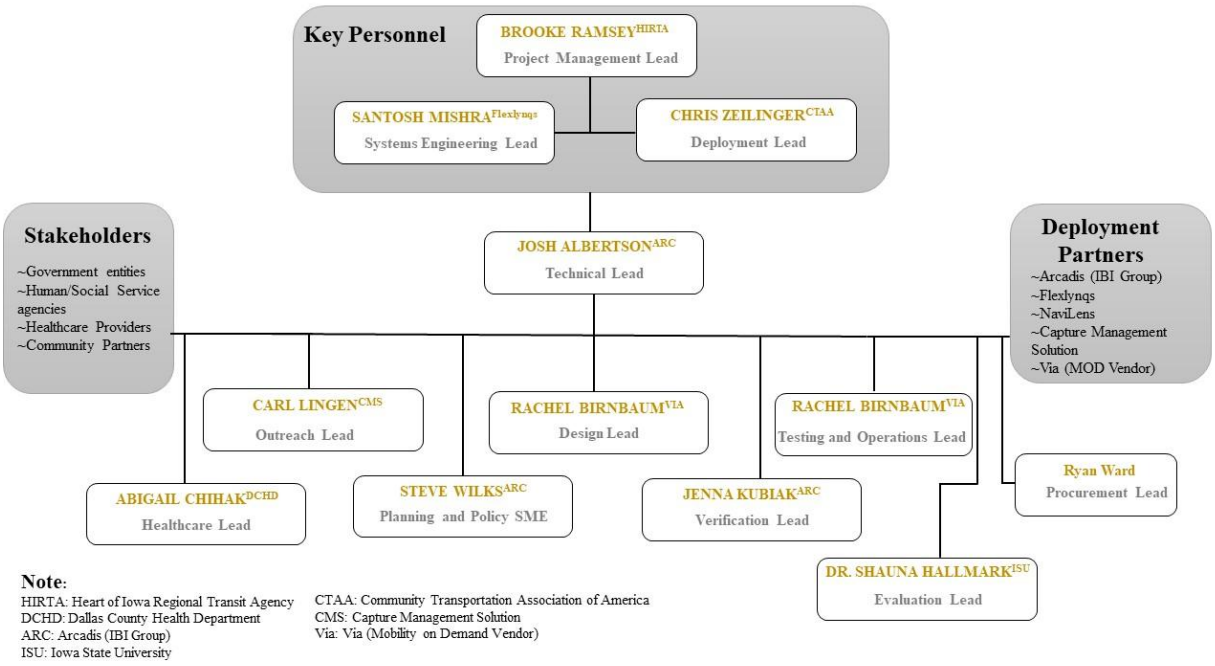

Figure 8. Organizational Chart

Finally, the following individuals will support the key staff:

- **Steve Wilks** from Arcadis IBI Group served as the CDL in Phase 1 and will provide planning and policy related guidance to the team in Phase 2/3.

- **Josh Albertson** from Arcadis IBI Group will serve as the Technical Lead (TL), Josh will work closely with the core leadership of PML, SEL and DL and coordinate activities with all other key members of the team, deployment partners, stakeholders and other staff.

- **Carl Lingen** from Capture Management Solution will lead the outreach and marketing efforts.

- **Abigail Chihak** from DCHD has been acting as the liaison with healthcare partners and will continue to serve in that role in Phase 2 and 3.

- **Dr. Shauna Hallmark** from ISU has been serving as the Advisor on performance management, data collection, and human use approval tasks in Phase 2. She will lead the finalization of DMP and PMESP in Phase 2 and will lead evaluation effort in Phase 3.

- **Ryan Ward:** will serve as the Procurement Lead, bringing his many years of experience working at the Procurement Administrator the Iowa DOT and full familiarly of open and competitive procurement regulations.

As a part of Phase 2, Via was selected MOD Platform TMS provider for the Health Connector project. Via will provide the core capabilities needed for riders, drivers, and dispatchers for trip planning, booking and management. Via staff will lead the initial and at-scale deployment of the MOD Platform TMS in coordination with the Technical Lead (TL) and Verification Lead (VL) and serve as the single point of contact for resolving any reported issues with the MOD Platform TMS in Phase 3.

1.5.3 Governance

All partners will provide their services per scope and budget as included in the fully executed contracts for each partner. Contracts will also incorporate by reference the terms and conditions of the USDOT agreement signed by HIRTA for Phase 2/3. PML will serve as the contract administrator and will verify deliverables before invoices are paid. A detailed approach for regular partner engagement and coordination of deliverables will be included in the project management plan (PMP). Also, as part of PMP development process, HIRTA will develop a roles and responsibilities matrix.

HIRTA has been conducting bi-weekly meetings internally with all partners in Phase 2 and plans to continue that in Phase 3. If necessary, meetings are conducted weekly or on ad-hoc basis as well. Also, HIRTA partners regularly use cloud-based tools such as Slack (for instant messaging), Asana (for project action item coordination) and Zoom/Teams (for video chat) for staying connected. Further, HIRTA team has been using virtual engagement software, Miro, for conducting remote workshops. These tools will allow HIRTA partners to stay connected and collaboratively work on successfully delivering on project milestones.

1.5.4 Summary of Financial and Organizational Models for Sustained Operations

HIRTA plans to utilize its current process of allocating operating funds and existing funding sources for delivering transportation services to manage the sustained operation of Health Connector beyond Phase 2/3. The Federal Transit Administration (FTA) formula grants for rural areas program provides operating assistance to states to support public transportation in rural areas having populations under 50,000. As a rural transit system, HIRTA's 5311 federal transit assistance comes through the Iowa DOT. Unlike 5307 urbanized funding, 5311 non-urbanized operating funds are required to have a 50/50 match. Matching funds come from a variety of sources, as discussed below:

- HIRTA receives State Transit Assistance from the Iowa DOT in addition to our federal funding. Local sources of revenue include County General Fund dollars, City general funds, economic development funds, local sales tax option, and health and human service funds.

- Contract services like the mental health regions, Iowa Medicaid Enterprise Non-Emergency Medical Transportation (NEMT) and Health and Community Based Services (HCBS), nursing homes, the local Area Agency on Aging, and CyRide's ADA paratransit service.

- Grant revenues come from a variety of sources which include entities such as United Ways, and local community foundations.

- Some funds are raised through HIRTA's stand-alone 501c3, Heart of Transit, which solicits donations, bestow, and endowments.

- Passenger revenues are a small portion of HIRTA's overall revenue streams, comprising only 2% of revenues in FY2021.

- HIRTA can use FTA 5311 funding to provide services for the Health Connector project and will match those funds through a variety of local sources. FTA 5311 funds eligible expenses, include operating and the acquisition of public transportation services.

- Some additional funds could be raised through advertising appearing on the health connector kiosk and infotainment devices. Any such funds should comply with any regulations stipulated by the ITS4US grant opportunity.

Year 1 (post deployment) operating expenses for the Health Connector are anticipated in the range of $150,000-$175,000. This includes the direct operation (trips performed by HIRTA on the HIRTA fleet), trips provided by a third-party provider (local taxi, private accessible transportation providers), and local volunteer networks. This also includes the cost of system operation and maintenance which will be billed by the vendors (MOD and Navi Lens) monthly for their software as a service (SaaS) platform. This also includes the cost of hosting the middleware application on Amazon Web Service (AWS).

Through Phase 2 of the Health Connector concept and design, reimbursement for third party providers was found to be less per trip than HIRTA's current average operating expenses, providing an opportunity for HIRTA to reduce overall operating expenses while diversifying the way service is delivered and enhancing the rider experience. During the COVID-19 Pandemic, ridership has been at a historic low, and expenses have increased dramatically, which has increased HIRTA's cost per trip from $16.67 to $26.64. Volunteer transportation will be donation-based for the riders, and volunteers will be eligible for reimbursement at 35¢ per mile. Trips provided under the volunteer network will also reduce the cost of providing trips for the Health Connector, helping to ensure long term sustainability.

1.5.5 Organizational Risks

HIRTA team has carefully planned the organizational chart based on lessons learned from Phase 2 and other similar projects in the past. However, uncontrollable events may still occur.

Table 5 provides a list of key anticipated risks and planned mitigation strategies.

Table 5. Organizational Risks and Mitigation Strategies

Risk	Probability	Impact	Mitigation Strategy	Resolution (if applicable)
Staffing commitment from deployment partners may wane if not fully engaged in the process	Low	High	Senior management from all partners have provided commitment letters. PML will continue to engage with partners on at least a monthly basis to keep them apprised of progress. Bi-weekly calls with key members of the organizational chart will be held.	Staffing from deployment partners has been engaged. Additional engagement with stakeholders will be required beyond Phase 2.
Operational issues at HIRTA may impact commitment of HIRTA staff	Medium	High	HIRTA's Executive Director is fully committed to the project as the "project champion" and will be kept in loop to notify of any impacts of anticipated operational changes on the project.	

Risk	Probability	Impact	Mitigation Strategy	Resolution (if applicable)
Vendors are not able to commit a dedicated staff for the length of the project	Medium	Medium	HIRTA will require vendors to make a commitment to provide one or two dedicated staff. If that is not possible due to the length of the project, HIRTA will negotiate with the vendor on commitment of staff time for specific deliverables when their involvement is needed (design, training, testing).	Both Via and NaviLens have provided dedicated staff for the duration of the project. Additional resources to coordinate with hardware vendors present some risk in moving to Phase 3 but can be mitigated by allowing for longer response times.
Staff departure	Medium	Low	While probability is low, such events are possible. However, current organizational structure provides enough redundancy in skillsets that impact is anticipated to be low.	

2 Phase 2 and Phase 3 Technical Approach

2.1 Introduction

The following sections describe our approach for conducting Phases 2 and 3 activities and providing deliverables for Tasks 2-A through 3-F. Throughout the project, we will work closely with the Agreement Officer's Representative (AOR) for meeting project requirements and finalization of deliverables. Any further updates to the Phase 2 and 3 technical approach are defined in the Project Management Plan (PMP) [14].

Figure 9 provides a typical V-diagram that is being applied to this project. The left half of the V diagram describes the process of concept development and design, most of which has been already conducted as part of Phase 2. The right half of the V diagram includes installation, configuration and testing activities that will be completed as part of Phase 2 and 3.

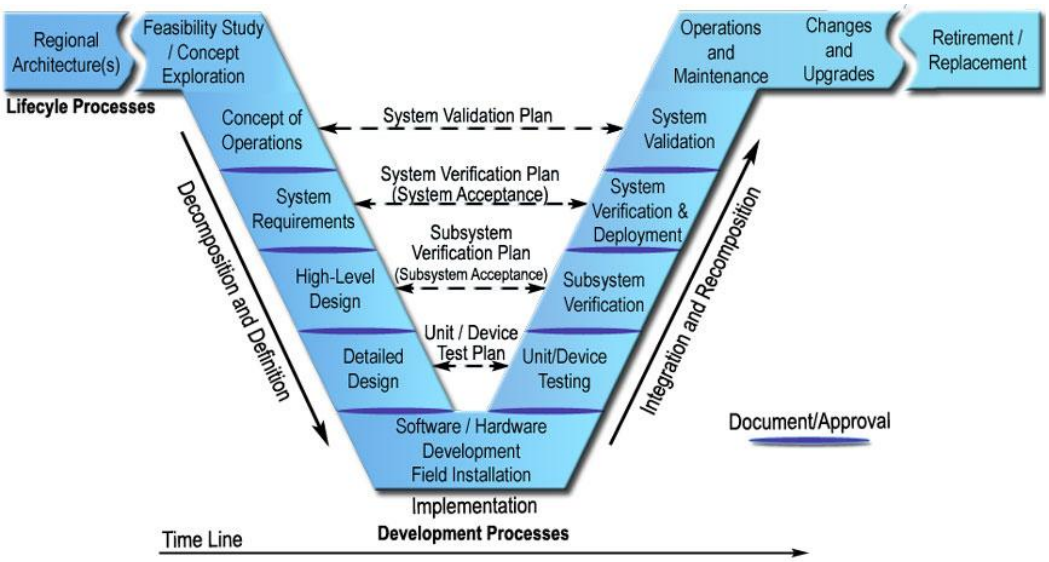

Figure 9. Systems Engineering "V " Diagram (Source: FHWA)

2.2 Phase 2 Technical Approach

2.2.1 Task 2-A: Program Management

Deployment of a successful ITS4US Deployment concept will require a disciplined approach to manage the execution of the work and make sure the team responsible for deployment delivers

the highest quality products on time and within budget. Our project team has decades of experience in deploying highly complex systems worldwide and plans to bring this knowledge and practice to this project. Also, the team will apply lessons learned while coordinating with the same set of partners during Phase 2. Our team's approach to program and project management includes a clear delegation of roles and responsibilities; technology platforms to facilitate remote and in-person engagements and work coordination; and task approaches steeped in systems engineering process to provide organization to our work.

2.2.1.1 Kick-off Meeting

Within 15 business days of contract award (or as directed by the USDOT) the project team will participate in a kick-off meeting either in Washington DC at a USDOT-designated location or via a webinar. In addition to allowing the AOR to describe the government's requirements and expectations, the kick-off meeting will allow the project team to:

- Introduce project partners and their proposed roles.
- Provide background on project and proposed approach.
- Discuss the Stakeholder engagement strategy.
- Identify key schedule drivers and project risks.
- Discuss the performed communication approach. This includes identifying the point of contact; agreeing on the platform and time for bi-weekly status meetings; and approach to document sharing.

The kick-off meeting with the AOR will be followed by an internal team kick-off meeting. This meeting will ensure all team members know each other; outline roles, responsibilities, and expectations; and agree on project goals and objectives.

2.2.1.2 Project Management Plan

The Project Management Plan (PMP) will be a living document that will form the framework for the project work describing the work breakdown structure (WBS) and resource needs. Based on past system deployments, we understand that a thorough PMP with a project schedule acts as a planning tool that reduces delays and supports the mitigation of risks. The PMP will detail the approach including tasks and responsibilities, quality assurance measures, and Stakeholders. The PMP will specifically address the following requirements listed in NOFO, building on the same process adopted for Phase 2 of the project:

- **Scope Management:** The HIRTA Project Team is committed to delivering on the scope as proposed for Phase 2/3. We will develop a detailed WBS that provides a list of all activities to be included on this project. We will be tracking our project progress per this WBS. While the list of activities is defined, we understand that there may be disconnects among different parties related to the actual work to be completed within a WBS item. Also, we may discover unexpected issues during the project that may require a change in scope. Any such items, or for requests received from the USDOT project team or partners that were not planned for, will be identified as out of scope. The PML will document any such changes in writing and will formally write to the AOR explaining why the changes to the scope and budget are necessary (if acceptable) or cannot be accommodated (if unacceptable).

  Regarding scope verification, as stated earlier, deliverables will be approved by the AOR before a task can be considered complete. Also, all WBS items must be marked as complete.

Further, the PML will forward all approved deliverables for a task to the required USDOT email repository as part of the scope verification process.

- **Schedule Management:** A Gantt chart and deliverables table will be created and maintained using Microsoft Project, and it will be used to monitor the project schedule. During bi-weekly project meetings (see 2.2.1.3), HIRTA team members will review the schedule status, and discuss actions/directions required to resolve schedule issues, if any. Minor schedule adjustments – those that do not affect the overall project schedule/timeframe – may be approved by the project team lead in consultation with the AOR. Significant schedule changes will be decided by the project team and then elevated to the AOR for review and approval. The AOR must request approval from the AO on any schedule changes that would affect the overall PMP.

  The HIRTA project team will review the schedule during the bi-weekly meetings with the AOR to assess task completion by WBS and take any corrective actions based on this.

  Any delays in the schedule will be flagged, and an assessment of delay on the overall task/project completion will be assessed. The team will take any corrective measure to avoid delays. This may involve conducting activities in parallel, assigning more resources, or similar steps.

- **Communications Management:** Given a large list of deployment partners and a various groups of stakeholders, communication management will be absolutely critical to the success of the project. Communication management will be led by the PML for the HIRTA project team. The PML will be supported by the Deployment Lead, Technical Lead and Outreach Lead. This section provides the following details:

  - Managing communication among internal HIRTA team members;
  - Managing communication with the AOR and the USDOT team; and
  - Managing communications with the stakeholders.

- **Cost Management:** The HIRTA team is cognizant of the fact that the federal share of the project is a not-to-exceed (NTE) amount. Given a large list of partners and the extensive list of activities under each task, cost management will be extremely critical to avoid cost overruns. All partners will be bound to provide deliverables per scope of work and budget as identified in their contracts. HIRTA PML will track the overall budget and be responsible for notifying contractors/subrecipients on any inconsistencies with billings and cost management. Contractors will be paid monthly only according to the approved billing rates and hours as justified for their work on the deliverables. Invoices will be approved only when the deliverables are submitted or expected progress on deliverables is documented in the progress report submitted along with their invoices.

- **Quality Management:** The quality management approach will include quality planning, quality control, quality assurance, and configuration management processes. The following subsections describe how the roles and responsibilities for quality management will include the project leadership and technical staff/team members, quality objectives, quality verification, and quality improvement process.

The focus will be on ensuring how the quality of the documents is up to the standards acceptable by the USDOT, particularly per guidance provided in templates or clarifications, as applicable. This also includes the ability to share those documents publicly for all users (e.g., section 508 compliance).

- **Risk Management:** Risk management approach will follow the standard process of risk identification, analysis, response planning, and control. The following subsections describe our approach to managing the risks on this project. As part of the ongoing Risk Management Plan, we will also develop and maintain a project risk register with mitigation strategies that will guide the project team during Phase 2 when navigating unforeseen challenges.

- **Configuration Management:** HIRTA team has established a change control board (CCB), comprising key members of the project team. The CCB controls any changes in the project direction. The same CCB will act in configuration management capacity and will approve or disapprove any changes in Phase 2. Configuration management approach based on Systems Engineering Management (SEM) will also apply to source code management for the open-source middleware. Further details on this are provided in the SEMP [13]

- **Verification:** As an extension to configuration management, HIRTA team will methodically verify system design, development, and deployment through proven standard systems engineering-based approach. Throughout Phase 2, HIRTA team will track the compliance of each design and testing/verification activity as part of milestones against systems requirements developed in Phase 2. Via and Navi Lens will be engaged in design and test planning discussions to identify the traceability of design intent and test plan with system requirements. Verification will be done by visual inspection, demonstration, analysis, and test results. Results will be recorded as Pass, Fail, Partial Pass, Partial Fail, or Inconclusive in a Test Results Document (TRD). Items in the TRD that require tracking will be logged in an actions items log (AIL) to determine resolution with appropriate responsible party. RVTM will be used in a Microsoft Excel-based file format.

2.2.1.3 Bi-weekly and Monthly Status Meetings and Project Reporting

The kick-off meetings will transition into bi-weekly status meetings occurring both internally and with the AOR. The bi-weekly status meetings with the AOR will be led by the project team and focus on providing status updates, tracking on-going action items, and identifying and mitigating project risks. The project team will provide an updated action items list before the meeting and notes after the meeting to clearly document decisions and required actions. In addition to bi-weekly status meetings, the project team will provide monthly progress reports, as required per NOFO Section, F Part 3 of the NOFO document using the templates provided by the USDOT in Phase 2. This exercise will serve both a reflection on progress from previous months as well as a forward look of upcoming work and will provide the AOR and team with a clear snapshot of the project's status. In addition, we understand that we may have to participate in Cohort Roundtable events per AOR's direction related to some of the tasks. We will coordinate on the schedule and agenda of these events and will provide an appropriate representation to participate in the discussions.

2.2.1.4 Lessons Learned Logbook (LLL)

As required in the NOFO, the HIRTA team will maintain a record of lessons learned throughout Phase 2. For each lesson: the details will include lesson title, relevant agreement, a summary of

the issue identified, the realized/potential impacts, mitigating action(s) taken, and results identified (to date). The LLL will be updated monthly, and a summary of new or updated entries incorporated into the Monthly Reporting.

2.2.1.5 Deliverables

The following deliverables will be provided for Task 2-A:

- Phase 2 Kick-off Meeting
- Draft Project Management Plan (PMP)
- Revised PMP (as required)
- Monthly Progress Report Part I: Technical Progress and Status Summary
    - Includes: Project Milestone Schedule, Updated Task Schedules, Project and Task Detailed Risk Register, and Lessons Learned Logbook (LLL).
- Monthly Progress Report Part II: Detailed Financial Summary
- Participation in site-specific bi-weekly coordination teleconferences
- Participation monthly all-site coordination teleconferences
- Participation in periodic roundtable teleconferences

2.2.2 Task 2-B: System Architecture and Design

2.2.2.1 System Architecture and Interface Development

Using input from ConOps, Systems Requirements Specification (SyRS), Systems Engineering Management Plan (SEMP), and Technology Readiness & Deployment Plan (TRDP), HIRTA team will develop a Systems Architecture Document (SAD) for the Health Connector project. The team will develop systems architecture using the framework defined as part of *The Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT)* under National ITS Reference Architecture, as well as IEEE Standard 42010-2011 (IEEE Recommended Practice for Software Architecture Descriptions), which includes guidelines for format and content to develop a SAD. The team will use SET-IT tool for developing the project level architecture. Per ARC-IT, the following viewpoints will be developed for the architecture:

- **Enterprise View**: refers to relationship between organizations and stakeholders involved.

- **Functional View**: refers to relationship between different functional elements or processes involved in the project and their data flows.

- **Physical View**: refers to physical objects (systems and devices) that operate in the field or central locations, and interactions between those physical objects.

- **Communication View:** refers to communication flows needed for connectivity between physical objects.

Applicable service packages will be identified for the project to develop the architecture and document flows between objects. Based on current understanding, applicable service packages are:

- PT01: Transit Vehicle Tracking
- PT03: Dynamic Transit Operations
- PT05: Transit Security
- PT06: Transit Fleet Management
- PT08: Transit Traveler Information
- DM01: ITS Datawarehouse
- DM02: Performance Monitoring
- TI01: Broadcast Traveler Information
- TI02: Personalized Traveler Information
- TI03: Dynamic Route Guidance
- TI05: Travel Services Information and Reservation
- TI06: Dynamic Ridesharing and Shared Use Transportation
- TI07: In-vehicle Signage

Interfaces between objects, as applicable, will be identified and documented in the Interface Control Document (ICD). Per ConOps and SyRS, required system-level interfaces are:

- Vehicle to Center
- HIRTA TMS to Medicaid Brokerage Software Provider (Access2Care)
- HIRTA TMS to Healthcare Provider

Another potential interface, currently not planned, is the interface between TMS and third-party transportation management systems.

While standardized protocols (UDP/TCP, HTTP) will be used for communication between subsystems, none of these interfaces are fully supported by fully developed data standards, except for the interface with Healthcare Provider, which is supported by Fast Healthcare Interoperability Resource, developed by Health Level Seven International (HL7).

The Standards Plan and ICD within SAD will fully document all existing and new standards used and the reasoning if any new standard is used. The HIRTA team will use existing standards, architectures, and certification processes whenever viable, and document those cases where such use is not viable. HIRTA team is also monitoring development of data standards and specifications targeted to promote an open data exchange among demand response service providers. Given the need to engage with third party service providers, HIRTA team will document any approved standards at the time of system implementation.

Given HIRTA team is planning to develop and implement the two middleware interfaces, to ensure replicability, HIRTA team will research and document any applicable standards for creating a standardized schema for both interfaces as part of this task. For example, HL7 format discussed earlier has applicability to interface between MOD and EHR Software. Similarly, for MOD-Acces2Care interface, transactional data specification, as defined in TCRP report 210 (https://www.trb.org/Main/Blurbs/180593.aspx) can be applied for standardized exchange of customer and trip data.

Once the SAD and ICD are put together, HIRTA team will coordinate with the AOR to schedule a walkthrough with the USDOT team. HIRTA team will create a walkthrough workbook which will be used to guide the discussions during a 3-day in-person meeting in Washington DC. It will be attended by PML, SEL, DL and TL from the HIRTA team. In addition, HIRTA team will invite SDL,

VL, Via representative, Navi Lens representative, DCHD representative and Dallas County Hospital representative for relevant sessions. Comments from review of the draft SAD and walkthrough will be addressed, and the HIRTA team will submit a revised SAD document to AOR.

2.2.2.2 System Design Processes

At the beginning of the design process, HIRTA team will develop a baseline Requirements Verification and Traceability matrix (RVTM) using the requirements created in SyRS. Also, the stakeholder group will be consulted to verify the needs classifications as currently in ConOps and SyRS (e.g., essential, desirable, and optional) to ensure the current priorities are reflected in the baseline RVTM.

Once baseline requirements are established in the RVTM, the HIRTA team will use the inputs from SAD and SyRS to decompose further and define in detail ***how the system will be implemented to meet the requirements***. Details of hardware, software, interfaces, user interfaces, data, and reporting will be further defined. These details will be documented in the draft System Design Document (SDD). HIRTA team will use the RVTM as the tool for tracking traceability of design with requirements to ensure the design intent of each requirement is fully established.

HIRTA team will conduct an internal meeting (for 2 days) to conduct preliminary design review (PDR) to consult with partners on design details prior to submitting the draft SDD to the USDOT. PDR will allow deployment partners to have a detailed discussion on their design approach to meet requirements relevant to their systems. PDR will also allow the development partner (Arcadis IBI Group) to have detailed discussions regarding with MOD platform TMS, Access2Care and EHR provider to determine data needs, API requirements, data translation needs, data formats, PII/HIPAA concerns related to the two middleware interfaces. Also, PDR will help identify detailed system parameters and operational configurations for the MOD platform for vehicle, central and traveler components. Stakeholder groups included for ConOps and SyRS will be included in the PDR, as needed, to verify design details, user interface details and other items relevant to the system components of their interest. Feedback from PDR will be used to modify the draft SDD prior to the submission to the USDOT.

Along with the draft SDD, HIRTA will also submit a walkthrough workbook and will coordinate with the AOR and the USDOT team to conduct the walkthrough meeting. This meeting will be attended by HIRTA PML, SEL, DL and TL in person at HIRTA offices for 3 or more days. Stakeholders who attended ConOps and SyRS meetings will also be invited along with the USDOT team. The meeting will also be attended by vendor partners (Via and Navi Lens representatives). After the walkthrough, HIRTA team will address the comments received on the Draft SDD from the USDOT team along with any additional comments received during walkthrough meetings.

After the walkthrough, HIRTA team will conduct a critical design review (CDR) meeting (1-2 days) with deployment partners to finalize any design details. Once the CDR is concluded, HIRTA team will update the SDD and submit a final version along with the walkthrough comments resolution report.

RVTM will be updated at PDR, CDR and SDD walkthrough stages. The project schedule provided in Section 3 shows the sequence of these three walkthrough meetings, as discussed above.

2.2.2.3 Deliverables

The following deliverables will be provided for Task 2-B:

- Draft Systems Architecture Document (SAD)
- Systems Architecture Walkthrough and Workbook (Held in DC metro area)
- Revised SAD with Comment Resolution Report
- Final Systems Architecture Document
- Draft Systems Design Document (SDD)
- Systems Design Walkthrough and Workbook (Held at HIRTA offices)
- Revised SDD with Comment Resolution Report
- Final Systems Design Document
- Updated Phase 2 Deliverables, at a minimum:
    - Revised Concept of Operations
    - Revised Systems Requirements
    - Revised Integrated Complete Trip Deployment Plan

2.2.3 Task 2-C: Data Management Planning

This task will build on the Data Management Plan (DMP) [4] and will update to establish a comprehensive plan for securely collecting, managing, sharing data as part of the Health Connector project. Privacy related requirements will be identified in the Data Privacy Plan (DPP). When developing the DPP and DMP, HIRTA team will incorporate the guidance provided in the USDOT's current Privacy Policy and Public Access Plan to ensure information in both reports is included where appropriate in the DPP and DMP.

2.2.3.1 Data Privacy Plan (DPP)

HIRTA team understand that PII, ePHI and other sensitive data (e.g., payments) must be protected. HIRTA currently does not have a privacy plan and will develop one as part of this task. The privacy plan will also identify the need for vendors to comply with HIRTA's policies. The DPP will build upon on the PII and other privacy concerns as identified in the DMP [4] and HUAS [8] documents. HIRTA team will also consult with the ISU's IRB to identify any privacy concerns associated with the Traveler data to be collected, stored and shared as part of MOD and wayfinding applications.

2.2.3.2 Phase 2 Data Management Plan

As mentioned earlier, DMP will be updated as necessary, to reflect additional findings as part of discussions under Task 2-B. As DMP notes, most of the data planned for collection as part of Health Connector for delivering transportation services is already collected by HIRTA. However, this data is currently not shared in raw form with external entities. HIRTA uses the data to analyze and report on trip performance to funding entities. However, additional data is planned to be collected by the system as new systems/components such as wayfinding system and Health Connector middleware are planned.

As a requirement for this Health Connector project, HIRTA will build on the privacy framework developed in DPP to identify Data Sharing Framework, also briefly discussed in Phase 2 DMP.

DMP identifies what data can be shared publicly, with researchers (with or without PII) or with third parties after anonymizing PII information. Expanding on Phase 2 DMP, the data sharing framework will identify the terms and conditions, and the protocols for sharing data with external entities. Key objectives for sharing data will be allow researchers to assess the impact of implementing Health Connector system. Phase 2 DMP will clarify both data sharing and data access protocols.

Overall, the Phase 2 DMP will build upon the information included in the Phase 1 DMP to provide any additional information as needed (e.g., as determined or discovered during design discussion sin Task 2-B):

- Data sources and destinations
- Ownership/stewardship
- Metadata/Data structure definition (e.g., fields and data types)
- Frequency of data flow
- Volume of data flow (e.g., size of data),
- Contents of data flow
- Cybersecurity policy
- Data security policy
- Privacy policy
- Communications medium involved
- Long term storage plans

Also, as stated earlier, the plan will be updated to reflect any updated guidance available from the IRB after submitting the application for the full IRB approval in Phase 2.

2.2.3.3 Privacy Management Plan

As stated earlier, HIRTA doesn't have a privacy management plan. However, HIRTA is fully committed to protecting the privacy of its users when collecting their data for the needs of the system. A notice of statement will be developed and shared with USDOT as part of this task to notify on our plans for complying with applicable federal, state, and local laws for privacy protection.

2.2.3.4 Deliverables

- The following deliverables will be provided for Task 2-C: Draft Data Privacy Plan (DPP)
- Revised DPP with Comment Resolution Report
- Final Data Privacy Plan (DPP)
- Notice of Privacy Management Consistency
- Draft Phase 2 Data Management Plan (DMP)
- Revised Phase 2 DMP with Comment Resolution Report
- Final Phase 2 Data Management Plan (DMP)

2.2.4 Task 2-D: Acquisition and Installation Planning

This section describes the approach HIRTA team will take for procurement, installation and configuration of the systems and system components.

2.2.4.1 MOD Vendor Procurement

MOD procurement will include the following components:

- Traveler Application.
- MOD platform- central and vehicle components.

Via was selected as the MOD Vendor in phase 2. HIRTA currently uses Via's technology to support their existing on-demand service and plans to expand it further with Health Connector.

2.2.4.2 Other System Procurement

HIRTA team is planning to deploy other COTS systems for its needs as indicated in Section 1.2.1. The COTS systems that will be deployed include:

- Wayfinding solution.
- Indoor kiosks at one of the healthcare facilities.

Navi Lens is a named deployment partner and any relevant procurement methods will be utilized to procure software, hardware, and services from them. Navi Lens has been part of ConOps and SyRS discussions and is aware of the requirements.

A separate procurement will be conducted for Kiosk hardware and necessary software based on the design outcomes.

2.2.4.3 Comprehensive Acquisition Plan (CAP)

Apart from the MOD procurement, for which approach is described in 2.2.4.1, HIRTA team will prepare a Comprehensive Acquisition Plan (CAP) for other components to be procured and will identify the details of wayfinding software, field hardware (e.g., wayfinding visual marker/sensor; and kiosk), and services. The CAP will reference relevant requirements and specifications derived from the SDD developed under sections 2.2.2 for these components. CAP will define the relationship of COS hardware/software with requirements and a list of potential vendors/suppliers of such hardware/software. Certification requirements will also be described in the CAP. As required in the NOFO, the CAP will include the following elements:

- A description of the item
- Reference(s) to relevant requirements and specifications derived from the SDD
- Any/all certification requirements
- A description of the method of acquisition
- Potential vendors/suppliers

HIRTA will submit draft CAP for AOR to review and will address any comments to submit a final version of CAP.

2.2.4.4 Comprehensive Installation Plan (CIP)

HIRTA team will also develop a Comprehensive Installation Plan (CIP) which will define hardware installation design, quality control process, and pre/post-install checklist. Scope of hardware installation is limited as only tablets need to be installed for MOD platform, and visual markers need to be installed for wayfinding system. Inside hospitals, two kiosks are planned, however, details for those will be clarified as part of the design discussions. HIRTA team will be including installation and implementation services in all procurement packages.

Installation will follow all state and federal regulations. For software, details on installation and configuration will also be documented in the CIP. A checklist will be developed to check component functionality post-install. As required in the NOFO, CIP will include the following elements:

- Supplier(s)
- Installers
- installation requirements, including any permits or certifications needed
- Inventory control method(s)
- Required configuration or pre-installation modifications
- Pre- and post-installation inspection procedures
- Detailed installation procedures
- QA/QC and maintenance processes (with identified responsible parties)
- A preliminary, high-level installation schedule
- Hardware/software configuration control processes
- Spare parts/warranty contingency plans.

2.2.4.5 Deliverables

The following deliverables will be provided for Task 2-D:

- Draft Comprehensive Acquisition Plan (CAP)
- Revised CAP with Comment Resolution Report
- Final Comprehensive Acquisition Plan
- Draft Comprehensive Installation Plan (CIP)
- Revised CIP with Comment Resolution Report
- Final Comprehensive Installation Plan

2.2.5 Task 2-E: Software Development and Integration

The HIRTA team has decided to develop open-source middleware (e.g., to enable data exchange between EHR and MOD software; and data exchange between the Medicaid broker (Access2Care) and MOD software. Software development and source code management will be done by HIRTA partner, Arcadis IBI Group.

The following subsections provide a high-level overview of middleware concept which will be further refined in the Phase 2 as part of design discussions.

2.2.5.1 MOD Software and Medicaid Broker Software Interface Middleware

Figure 10 provides a conceptual overview of the middleware application. It will facilitate the exchange of the following data messages:

- **Service request from Medicaid broker**: this message will send a request to the MOD software asking to confirm availability of a vehicle/driver to meet the trip request.
- **Service confirmation from MOD software to Medicaid broker**: MOD software will respond to the Medicaid Broker message with details of the driver, vehicle and expected fare.
- **Trip status**: MOD software will provide status of trip to Medicaid broker at a configurable interval or on-demand.
- **Trip performance**: MOD software will provide end of trip completion report to the Medicaid broker along with mileage and amount due.

The middleware will use the existing bi-directional APIs provided by MOD vendor and Medicaid broker to implement the above data flows so no software development will be needed by those entities. A translation engine will be used at both API-end points to translate data available from APIs to a standardized data schema (to be developed in Phase 2) to enable the data exchange by the middleware application.

To provide flexibility on information available to HIRTA staff and Access2Care staff, Arcadis IBI Group will also develop a web application that will use the data available through the middleware to provide all relevant information for a Medicaid-funded trip in real-time.

All concerns related to Health Information Portability and Account Act (HIPAA) and Personally Identifiable Information (PII) compliance will be addressed as part of Phase 2 design to mask/anonymize (using the translation logic) any confidential or privacy information and not include that as part of data exchange.

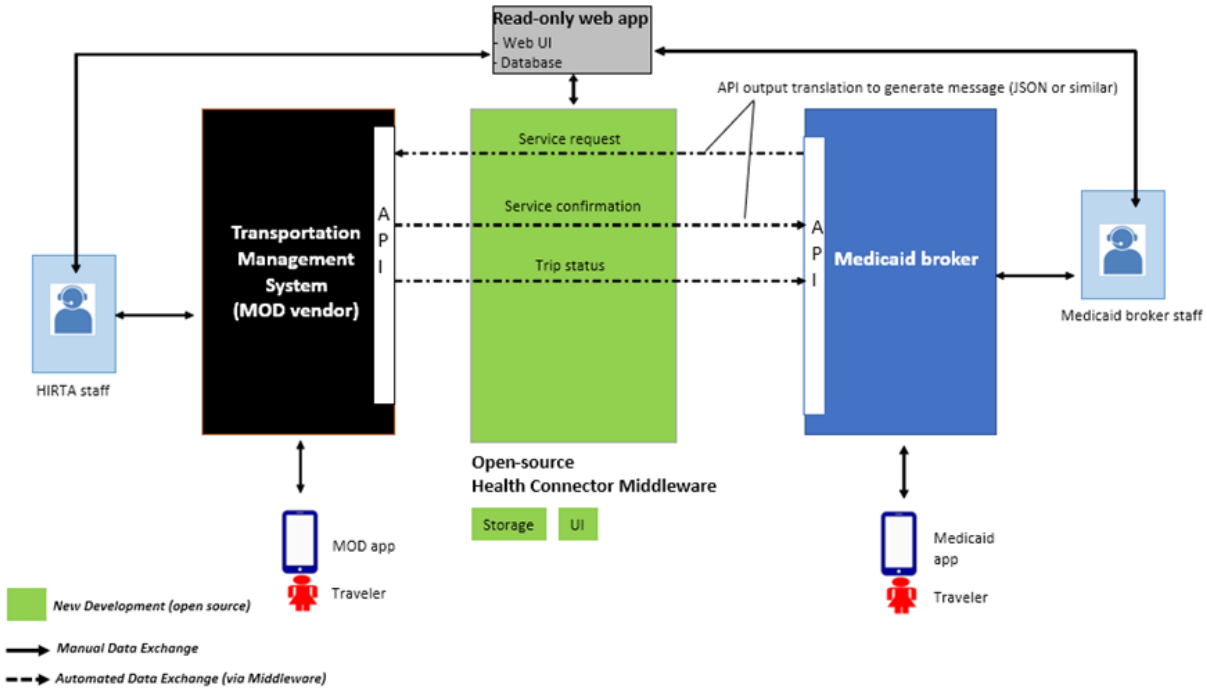

Figure 10. MOD-Medicaid Broker Interface Middleware

2.2.5.2 MOD Software and EHR Software Interface Middleware

Figure 11 provides a conceptual overview of the middleware application. It will facilitate the exchange of the following data messages:

- **Confirmed medical appointment data**: this message will provide the details of the medical appointment data (e.g., date, time, and location).
- **Trip booking confirmation**: MOD software will respond to the EHR software with confirmation of booking according for a medical appointment.
- **Medical appointment change or cancellation**: this message will provide the details of the modified medical appointment data and current status (e.g., active or cancellation requested).
- **Trip appointment change or cancellation:** this message will provide the details of the modified trip details and current status (e.g., scheduled, active, cancellation requested, no-show requested) for a booked trip.
- **Trip status**: MOD software will provide status of trip to EHR software at a configurable interval or on-demand.
- **Trip performance**: MOD software will provide end of trip completion report to the EHR software for their record.

The middleware will use the existing bi-directional APIs provided by MOD vendor and EHR software provider to implement the above data flows so no software development will be needed by those entities. A translation engine will be used at both API-end points to translate data available from APIs to a standardized data schema (to be developed in Phase 2) to enable the data exchange by the middleware application.

To provide flexibility on information available to HIRTA staff and healthcare partner staff, Arcadis IBI Group will also develop a web application that will use the data available through the middleware to provide all relevant information in real-time.

All concerns related to HIPAA and PII compliance will be addressed as part of Phase 2 design to mask/anonymize (using the translation logic) any confidential or privacy information and not include that as part of data exchange.

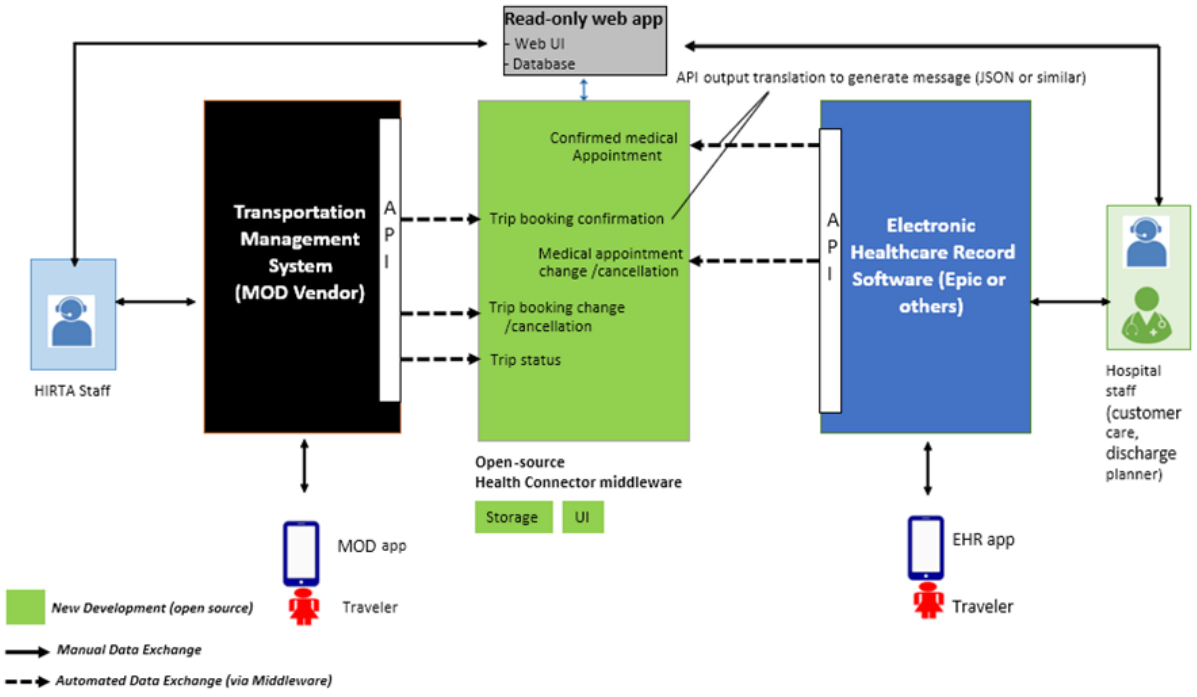

Figure 11. MOD-EHR Software Middleware

2.2.5.3 Release License and Source Code Repository

Arcadis IBI Group will release the source code under MIT License (https://opensource.org/licenses/MIT) and will publish the source code at the Arcadis IBI Group's public GitHub repository page at https://github.com/ibi-group.

2.2.5.4 Development Process

The open-source middleware to be developed by the HIRTA team will follow a well-defined Software Development Lifecycle (SDLC) Quality Assurance Plan to ensure software system

quality. The plan will cover the complete software development lifecycle, including all systems engineering and software development processes, documents and artifacts.

It is Arcadis IBI Group's standard process (please see Figure 12) to begin with a Concept of Operations (ConOps) document and/or a Requirements Specification developed for a project. ConOps documents typically consist of collections of user stories and/or use cases, while Requirements Specifications typically take the form of a functional and performance requirements matrix. The ConOps serves as an invaluable tool for providing the operational context for functional and performance requirements.

Building on Phase 1 concept development effort, in the context of the Systems Engineering Methodology (SEM), the first task will be to review and synthesize the ConOps and SyRS into a RVTM, with explicit traceability to the Requirements Specification. RVTM will be used as the basis for revising the customer developed Requirements Specification, if necessary, and will serve as a separate configuration-controlled software engineering document. Requirements' traceability will be maintained across all formal software engineering documents during Phase 2 design, development, testing and release.

A Software System Design (SSD), will be developed as part of System Design Document (SDD) in Phase 2 and will include necessary details, including (but not limited to) the high-level architecture of the software system, subsystem or design requirements with explicit traceability to the Validated Requirements Specification, mock-ups for all workflow-significant user interface views, and preliminary endpoints and data models for external data interfaces. The SSD is a configuration-controlled software engineering document.

Once SSD is accepted (as part of SDD) by the USDOT team, it will serve as the primary input into the Development Process described in the SEMP [12] document. The SSD, and its subsystem or design requirements in particular will serve as the basis for the development of the formal Acceptance Test Plan and Procedures. The Acceptance Test Plan and Procedures are configuration-controlled software engineering documents. Acceptance tests will be performed by Arcadis IBI Group and will be witnessed by users, stakeholders and the USDOT. The primary purpose of Acceptance testing will be to ensure that the software system fully conforms with the SSD and requirements.

The ConOps and Validated Requirements Specification, which may be revised through the Software System Design and Development Process, will serve as the basis for the development of the Independent Verification and Validation (IV&V) Test Plan and Procedures by the HIRTA team. The IV&V Test Plan and Procedures will also be configuration-controlled software engineering documents.

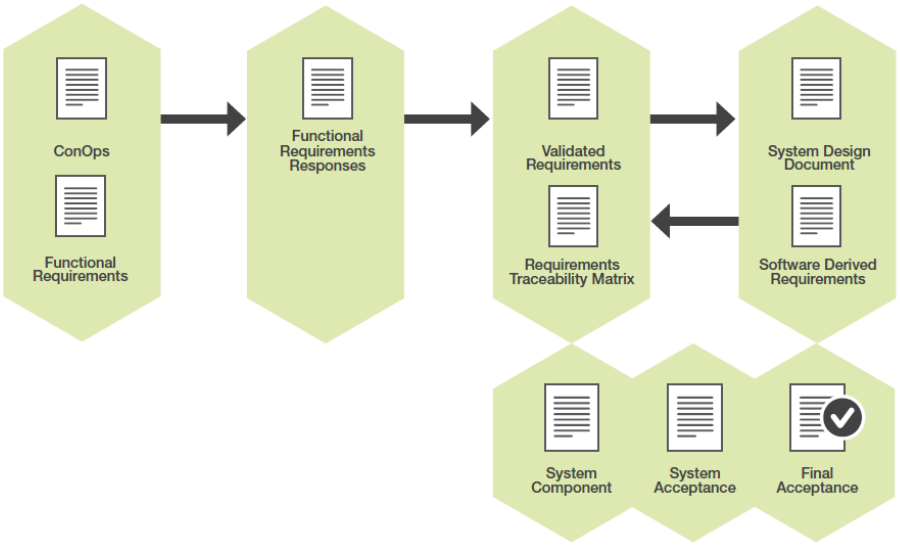

Figure 12. Arcadis IBI Group's Standard Software Development Process (source: Arcadis)

HIRTA team will also develop a Software Development Schedule (SDS) that will provide a detailed breakdown structure of all task activities. A monthly update of all SDS items will be provided to the AOR and USDOT team.

Additional details on how Agile development methodology will be applied along with systems engineering approach is discussed in in the SEMP document [12].

2.2.6 Task 2-F: Participant and Staff Training

In this task, relevant participants, operators, installers, maintenance staff, and other personnel are trained to install, interact with, operate, maintain, and/or repair the deployed system. The HIRTA team will further refine training approach building on the Participant Training and Stakeholder Education Plan (PTSEP) [9] and will prepare the training materials to train all identified groups. Training curriculum will be prepared for the following groups identified in the PTSEP:

- **Participant Group 1- Health Connector Traveler**: refers to subgroups from the 6 underserved population categories that include older adults, persons with disabilities, veterans, persons with LEP, persons with low income, and persons living in rural areas.
- **Participant Group 2-Family Members and Caregivers**: refers to the family members and caregivers assisting Group 1 members.
- **Participant Group 3-Third Party Health Connector Users**: refers to Health Navigators and users at healthcare facilities.
- **Participant Group 4-Transportation Providers:** refers to drivers, call center staff, dispatchers and other transportation staff.
- **Participant Group 5-Technology Developer/ Technology Staff:** refers to HIRTA's own IT or technology support staff, technical staff at partners, installers and other vendor staff.

- **Participant Group 6-Other Core Stakeholders:** refers to other core stakeholders as indicated in the project's stakeholder registry, such as some agency board members, local officials, advocates and community leaders.

HIRTA team is considering the following as participant training and stakeholder education activities are being planned and coordinated.

2.2.6.1 Participant Group 1 – Health Connector Travelers

Training for this participant group is, in some respects, a culmination of the participant recruitment and selection process described earlier. Training is offered after engagement of Travelers and prior to their first use of Health Connector. Therefore, most of this training will be offered in the initial month or two of Phase 3. However, it is possible that additional Travelers begin using Health Connector while Phase 3 is underway, in which case additional training will be offered.

2.2.6.1.1 Key Content Areas/Training Topics

For all the above objectives, the content begins with a brief overview of Health Connector and the services it provides. This orientation and general familiarization then leads to interactive presentation and practice in use of Health Connector and its features. Real-time observation and assessment of Travelers' understanding and mastery of the objectives may lead to continuing, more intensive travel training for some Travelers.

2.2.6.1.2 Training Format and Materials to be Used

Following the format HIRTA uses for training customers of its other transportation services, the primary format of training for new Health Connector Travelers will be individualized or small group sessions, conducted in person by HIRTA's Mobility and Outreach Coordinator, augmented by videos and on-line tutorials to help reinforce knowledge and skills that will help assure safe, satisfactory, and successful use of Health Connector. Print materials are kept limited, as the objectives of this training focus on actual use of Health Connector, the success of which should not depend on Travelers' reading skills, English language proficiency, or disability status. Print materials are kept to a minimum and are used primarily as reference materials Travelers may use following the training. Print materials, videos, and online information are all available in Section 508-compliant accessible digital formats and will be available in languages used by Health Connector Travelers. Video content will include voiceover and captioning to help assure its accessibility to persons with disabilities. Alternative formats of all content, regardless of medium, will be provided upon request as a reasonable accommodation to Travelers with disabilities.

In addition, the app and website will have popup help screens, also accessible and multi-lingual, that will guide Travelers over any critical stumbling blocks they have encountered in their use of the app or website.

2.2.6.2 Participant Group 2 – Family Members & Caregivers

Similar to what is stated above, training for this participant group is also associated with participant recruitment and selection process described earlier. Training is offered after engagement of participants and prior to Travelers' first use of Health Connector. Therefore, most of this training will be offered in the initial month or two of Phase 3. However, it is possible that additional Travelers begin using Health Connector while Phase 3 is underway, in which case additional training will be offered.

2.2.6.2.1 Key Content Areas/Training Topics

For all the above objectives, the content begins with a brief overview of Health Connector and the services it provides. This orientation and general familiarization then leads to interactive presentation and practice in use of Health Connector and its features. Real-time observation and assessment of participants' understanding and mastery of the objectives may lead to continuing, more intensive travel training for some users.

2.2.6.2.2 Training Format and Materials to be Used

The training format and materials used for this group will be the same as for Travelers, as described in 4.1.3, but with a focus on this group ('participants') instead of Travelers themselves. Following the format HIRTA uses for training customers of its other transportation services, the primary format of training for new Health Connector participants will be individualized or small group sessions, conducted in person by HIRTA's Mobility and Outreach Coordinator, augmented by videos and on-line tutorials to help reinforce knowledge and skills that will help assure safe, satisfactory, and successful use of Health Connector. Print materials are kept limited, as the objectives of this training focus on actual use of Health Connector, the success of which should not depend on participants' reading skills, English language proficiency, or disability status. Print materials are kept to a minimum and are used primarily as reference materials participants may use following the training. Print materials, videos, and online information are all available i Section 508-compliant accessible digital formats and will be available in languages used by Health Connector participants, and video content will include voiceover and captioning to help assure its accessibility to persons with disabilities. Alternative formats of all content, regardless of medium, will be provided upon request as a reasonable accommodation to participants with disabilities.

In addition, the app and website will have popup help screens, also accessible and multi-lingual, that will guide participants over any critical stumbling blocks they've encountered in their use of the app or website.

2.2.6.3 Participant Group 3 – Third-Party Health Connector Users

As with training of Travelers and their family members and caregivers, training for this participant group is planned primarily for initial month or two of Phase 3. However, it is possible that additional healthcare personnel will seek to engage with Health Connector as a result of ongoing outreach activities while Phase 3 is underway, in which case additional training will be offered.

2.2.6.3.1 Key Content Areas/Training Topics

For all the above objectives, the content begins with a brief overview of Health Connector and the services it provides. This orientation and general familiarization then leads to interactive presentation and practice in use of the Connector and its features. For this participant group, their training and orientation is likely to include simulated practice in their facilities with accessing and using Health Connector systems to address the objectives listed above.

2.2.6.3.2 Training Format and Materials to be Used

Following the format HIRTA uses for training customers of its other transportation services, the primary format of training for these Health Connector participants will be individualized or small group sessions, conducted in person by HIRTA's Mobility and Outreach Coordinator, augmented by videos and on-line tutorials to help reinforce knowledge and skills that will help assure safe, satisfactory, and successful use of Health Connector. For this participant group, most, if not all,

their training will occur in their own place of work, as the critical element of training success is determined by participants' abilities to incorporate Health Connector into their ongoing practices and routines. Alternative formats of all content, regardless of medium, will be provided upon request as a reasonable accommodation to participants with disabilities.

In addition, the app and website will have popup help screens, also accessible and multi-lingual, that will guide participants over any critical stumbling blocks they've encountered in their use of the app or website.

2.2.6.4 Participant Group 4 – Transportation Providers

Training for this participant group will be planned and developed in close coordination with ongoing training activities HIRTA conducts for its operating personnel. Elements of this training will begin during Phase 2, as HIRTA personnel need to be trained to proficiency prior to any transportation services being provided to Health Connector Travelers.

2.2.6.4.1 Key Content Areas/Training Topics

For this participant group, the content areas focus on the unique features of Health Connector, as differentiated from HIRTA's other services. Content will include a brief overview of Health Connector and the services it provides, emphasizing the fact that Health Connector Travelers are not current users of HIRTA. In addition to a tailored version of how HIRTA trains its staff to understand and assist new Travelers, this training will walk through the passenger-facing aspects of Health Connector and its features and will culminate in detailed training around understanding and following Health Connector policies and procedures that may differ from HIRTA's systemwide operating policies and procedures.

2.2.6.4.2 Training Format and Materials to be Used

Training for this participant group will be aligned and integrated with other internal training HIRTA provides for its operating personnel. This will include short written materials, both to communicate policies and to provide brief overviews of Health Connector, which will be reinforced through classroom-style training, consistent with HIRTA's other staff training formats. Participants will be introduced to, and encouraged to view, Health Connector's app and website, including videos and tutorials that are on these platforms. These participants will learn about the accessibility features of Health Connector's services, systems and information. The extent to which HIRTA's operating personnel require training and training materials to be presented in accessible formats is likely to be more limited than is anticipated for other participant groups; nonetheless, these materials will be provided in accessible formats to HIRTA operating employees with disabilities for which this accessibility of formats is a reasonable accommodation.

2.2.6.5 Participant Group 5 – Technology Personnel

In contrast to training for other participants, training for this participant group will be informal. Because these participants' knowledge and skills are essential to the successful ongoing implementation of Health Connector, their training will take place in Phase 2 of the project.

2.2.6.5.1 Key Content Areas/Training Topics

For this participant group, the content will focus on the technical details of Health Connector, its components and their integration, how this integrated platform is deployed and used, and how to address, repair, and resolve issues that may arise within Health Connector's platform.

2.2.6.5.2 Training Format and Materials to be Used

Training for this participant group will include short written materials and supporting technical documentation, both to communicate policies and to provide brief overviews of Health Connector, which will be reinforced through personalized training, consistent with HIRTA's other IT staff training formats. Participants will be introduced to, and encouraged to view, Health Connector's app and website, including videos and tutorials that are on these platforms. These participants will learn about the accessibility features of Health Connector's services, systems, and information. They will be exposed in greater detail to the inner workings of Health Connector's components and shown how integration of these components is manifested. There will be exercises and practices to simulate the provision of technical support to HIRTA staff and Health Connector Travelers and other participants. The extent to which HIRTA's IT personnel require training and training materials to be presented in accessible formats is likely to be more limited than is anticipated for other participant groups; nonetheless, these materials will be provided in accessible formats to HIRTA IT employees with disabilities for which this accessibility of formats is a reasonable accommodation.

2.2.6.6 Participant Group 6 – Other Core Stakeholders

Training for this participant group is planned, coordinated, and held in conjunction with the schedules, priorities, and activities outlined in the project's Outreach Plan.

As a final note, all currently anticipated participant feedback is planned to be gathered informally, albeit with some internal notes arising from the solicitation of feedback from Health Connector Travelers, family members, and caregivers. All training is optional, and no formal assessments are made to qualify individuals for their use of Health Connector. Therefore, current activities under this plan do not call for any surveys or formal assessments of human subjects. However, this plan's activities will be included in project descriptions as part of annual submissions the Iowa State University IRB in its consideration for review and approval.

2.2.6.6.1 Key Content Areas/Training Topics

For all the above objectives, the content focuses on providing an overview of Health Connector and the services it provides, and then responding to questions, ideas, perceived issues, and information requests from the stakeholders who make up this participant group.

2.2.6.6.2 Training Format and Materials to be Used

To a large degree, the training for this participant group will use the same, or substantially similar, formats and materials as are being developed and deployed under Health Connector's Outreach Plan. Primary formats will be presentations to stakeholders and stakeholder groups, or one-on-one information meetings, in some cases. Materials will be, or will be drawn from, print and online media materials developed in accordance with the Outreach Plan. Print materials, videos, and online information are all available in Section 508-compliant accessible digital formats and will be available in languages used by Health Connector participants, and video content will include voiceover and captioning to help assure its accessibility to persons with disabilities. Alternative

formats of all content, regardless of medium, will be provided upon request as a reasonable accommodation to participants with disabilities.

2.2.6.7 PTSEP Update and Recruitment of Participants

As the first step, HIRTA team will update the PTSEP to reflect any current understanding in Phase 2. We understand that before any participation can commence, IRB approval is necessary. HIRTA team also has plans to reach out to IRB again in Phase 2 to update them on the plans for application use once the MOD vendor is finalized. The Human Use Summary (HUA) document will also be updated based on any new findings from the IRB.

2.2.6.8 Training Schedule

Training will be provided based on Training Implementation Schedule (TIS), which the HIRTA team will prepare for approval by the AOR. The TIS will be developed in a MS Project format with detailed WBS, showing dependencies, start and end dates, and resource needs. Vendor input will also be incorporated in the TIS. Identifying dependencies will be critical, as delivery of training must align with other ongoing activities in Phase 2. For example, training is expected to occur prior to Installation testing for internal users and prior to User Acceptance Testing for Travelers participating (see Task 2.2.7 for testing details). Training materials will be prepared to offer refresher and on-demand training which will be detailed in the PTSEP.

The draft TIS will be provided to AOR for review and updates will be made to the initial draft, Thereafter, the TIS will be updated monthly to reflect the current state of the project.

2.2.6.9 Training Materials

Training materials as identified in the PTSEP will be developed in Phase 2 for delivery of training per the TIS. The PTSEP also defines evaluation methods to assess the comfort level of users with the system. Targeted training will be scheduled to ensure users and participants are comfortable with the system prior to use.

2.2.6.10 Deliverables

The following deliverables will be provided for Task 2-F

- Initial Training Implementation Schedule (TIS)
- TIS Update with Progress/Risk Summary
- Training Materials (Initial and Updates, as specified in the PTSEP and TIS)
- Human Use Approval Confirmation Materials (per the HUAS)

2.2.7 Task 2-G: System Test Planning

Thorough testing will be performed before the system can be approved for use in operational environment with users. The process outlined in the NOFO will be followed for testing the Health Connector system.

2.2.7.1 Test Stages

The following subsystems will need to be verified in parallel during system testing:

- MOD platform (includes Traveler and Vehicle-end subsystems)
- Wayfinding
- Health Connector middleware

For the MOD platform, primary responsibility of testing will be on the MOD vendor as they will be required per their contract with HIRTA to demonstrate that their system meets the Health Connector requirements for vehicle, central and Traveler-centric needs. However, MOD vendor representative will coordinate with HIRTA team VL while preparing their test plans and conducting tests. VL will witness all testing conducted by the MOD vendor.

For Navi Lens subsystem, HIRTA team VL will take the lead in planning and execution of testing.

For Health Connector middleware, the VL will coordinate with the SDL since the software development team will use agile development approach and will be conducting some tests independently until the product is ready for installation and integration testing (discussed below).

HIRTA team anticipates that the following testing stages will occur as part of system testing and operational readiness testing:

- **Unit Testing**: Once the system components are configured per design, component-level testing will be performed to verify if unit-level functions can be verified. Any issues that are identified (e.g., design, configuration, feature deficiency, malfunction) will be addressed prior to proceeding with subsystem-level integration. For MOD platform, this test stage will involve verifying functionalities at unit level of a vehicle, Traveler or central component to ensure component units are configured as designed. In particular, the emphasis will be on addressing any usability concerns at unit level to meet the needs of underserved groups (e.g., Traveler app). Also, this refers to any testing conducted for the new middleware at unit level.

- **Functional Testing**: Subsystem-level verification will be performed, and once successful, system level integration will be conducted in controlled environment (e.g., test database, simulations instead of real riders) to ensure requirements can be met. Once the functional testing is complete, system will be considered ready for verification in real environment. At this stage, MOD platform components, and the middleware application will be tested together. For Navi Lens, system test cases will be designed to verify the wayfinding functionalities in the context of MOD functions (e.g., before pick-up and after drop-off).

- **Installation Testing**: Once the integration/functional testing is successful, system will be installed for testing in real environment with a test database on limited set of vehicles and limited wayside infrastructure (e.g., wayfinding sensor/visual markers). While no real user will be used, system will be tested for end-to-end functionality demonstration for all system components. HIRTA vehicles and Drivers will be used to test end-to-end functionality with dummy users and test trips/runs. Drivers, Dispatchers and other users (e.g., healthcare

providers, Health Navigators) as necessary will be trained prior to conducting Installation Testing.

- **User Acceptance Testing**: Once the installation testing is successful, HIRTA team will test the system with a select group of Travelers from HIRTA's customer database. Before participants can be engaged, HIRTA team will ensure human use approval from the Institutional Review Board is granted. Also, training plan per PTSEP will be executed. Traveler feedback will be documented, and all findings will be resolved before moving to the next stage. This testing will prove that the system is ready for revenue operations. At this stage, initial data will also become available for validation for the USDOT and performance management team. Also, given it will be live operation at this stage, the system will be available to be witnessed by the USDOT team.

- **Revenue testing**: Once Operational Readiness Demonstrations are successful, the system will be tested in revenue operations for 30-days to assess the operational readiness. If any critical issues (defined in Test Plan) are encountered during revenue testing, the 30-days clock will be reset. Revenue testing occurs at a 20% scale deployment.

Once the revenue testing concludes, the system will be ready for end-to-end demonstration to the USDOT team for real-life use cases as shortlisted from ConOps. **Error! Reference source not found.** Figure 13 provides a visual overview of how test and demonstration activities will be conducted in Phase 2.

	Stage	Activity	Plan	Objectives
Test	Document Testing Approach	• Outline system testing stages, schedules, and dependencies	STP	Describe approach in more detail
	Unit Testing	• Verify component units per requirements and design	ORTP	Components are ready for integration
	Functional Testing	• Verify integrated subsystems • Use simulated environment • Use test database	ORTP	Subsystems are ready for installation
	Installation Testing	• Install equipment • Verify integrated subsystems • Use actual database and vehicles • Use HIRTA, and partners for testing	ORTP	Integrated system is ready for use
	UA Testing	• Verify installed and integrated system with actual participants • Provide training	ORTP	Integrated system is ready for live operation
	Revenue Testing	• System run in live operation • Punchlist of issues is maintained and addressed as they arise	ORTP	System is ready for all real world use cases
Demo	Operational Readiness Demo	• Demonstrate and validate that the integrated system meets use case needs	ORDP	System is ready for at least 20% at-scale deployment

Figure 13. Testing and Demonstration

2.2.7.2 System Test Plan

A System Test plan (STP) and test cases will be prepared once the SDD is complete to define how each requirement will be demonstrated. It includes the testing to be conducted at unit, functional, installation and user acceptance levels as discussed earlier. Requirements could be demonstrated by visual inspection, demonstration, analysis, and test results. Some requirements will likely be verified at multiple stages while others could be validated only when the system is fully integrated. These details will be identified in the RVTM at CDR.

Findings from each test stage will be documented in the TRD, and the RVTM will be updated with test results for each stage. Also, the critical nature of issues identified in the TRD will be assessed based on the impact caused by those issues on HIRTA and partner operations and on Traveler experience. This methodology will be outlined in the Test Plan.

Further, RVTM will indicate how a particular system requirement will be verified (e.g., test case results, demonstration, visual inspection, data analysis, manufacturer spec review). Also, test cases will be referenced as applicable for the requirements. Test cases will be developed separately as part of operational readiness planning.

2.2.7.3 Operational Readiness Briefing

The HIRTA team will develop an operational readiness briefing for AOR and the USDOT team. This briefing will conduct a thorough assessment of the system for its readiness to be deployed in the field. It will involve ensuring process for testing per STP, human use approval, participant training, finalization of institutional and financial arrangements, and availability of data and viability of performance measures to calculate the impacts.

The briefing will be held with the AOR and USDOT team in Washington DC and will be attended by the key staff. This demonstration will cover the following elements as required:

- Key use cases illustrating the capability of the system to perform in accordance with the ConOps.
- Safety-focused demonstration elements.
- Privacy-focused demonstration elements.
- Performance measurement and evaluation support demonstration elements.
- Institutional coordination and successful execution of governance frameworks, management processes, and financial arrangements.
- Maintenance-oriented demonstration elements.

2.2.7.4 Operational Readiness Plan

The HIRTA team will prepare the Operational Readiness Plan (ORP) incorporating input from the USDOT team on the deployment briefing. The ORP will include one section regarding tests (ORTP) and a second section describing demonstrations (ORDP).

As explained earlier and indicated in Figure 12, ORTP will be used for revenue testing and will be critical to ensure that all issues identified until UAT stage are resolved by the teams responsible for their subsystems. The key objective of the ORT will be to ensure that the system is ready for live operations, and demonstrations for real-life use cases can be conducted.

The ORTP will include the following:

- **Test Descriptions**: provide details on individual verification processes for testing the Health Connector system components.
- **Test Cases**: include detailed steps for performing a test with along with required test environment, expected input and output and other details.
- **Test Procedures**: clarify how verification will be done for a system component to ensure the system performs as intended.
- **Test Data**: include scripts to provide data for executing a test case.
- **Test Results**: describe how the results of each test will be documented.
- **Test Failure Remediation**: describe the actions to be taken in the event of a failed test.
- **Schedule**: describe the schedule for conducting the operational readiness tests and provide any dependencies.

Once ORTP is successful, the system will be ready for live demonstration for end-to-end operation for real-life use cases as defined in the ConOps. The demonstration will be conducted per ORDP. The key objective of the ORD will be to ensure the system is ready for at least 20% at-

scale deployment and ready to move to Phase 3 (and to meet the criteria as listed in Section 6 of NOFO). The ORDP will include the following details

- **Demonstration Descriptions:** identify the objective, general location, participants, equipment, and actions to be taken within the demonstration to illustrate the successful deployment of key use cases.
- **Demonstration Procedures:** describe the sequence of events expected to be demonstrated and observable validation criteria associated with the overall purpose of the demonstration.
- **Demonstration Data:** are collected before, during, or after the demonstration to support the observable demonstration validation criteria related to demonstration success (e.g., pass or fail**).**
- **Demonstration Results:** capture the results of each demonstration conducted. The ORDP will also describe how demonstration results will be summarized and documented across all demonstrations and delivered to DOT in Task 2-H.

The HIRTA team will submit the ORP for AOR's review and approval. HIRTA team will update the document based on comments and provide the final version.

2.2.7.5 Operational Readiness Plan Walkthrough

Once the ORP is approved, the HIRTA team will prepare a walkthrough workbook and schedule a meeting with the USDOT for operational readiness walkthrough. ORP will updated to reflect walkthrough comments and a comments resolution will be provided.

2.2.7.6 Deliverables

The following deliverables will be provided for Task 2-F

- Draft System Test Plan
- Revised System Test Plan with Comment Resolution Report
- Final System Test Plan
- Operational Readiness Concept Briefing (Held in DC metro area)
- Draft Operational Readiness Plan (ORP)
- ORP Walkthrough and Workbook (Held in DC metro area)
- Revised ORP with Comment Resolution Report
- Final Operational Readiness Plan (ORP)

2.2.8 Task 2-H: Installation and Operational Readiness Testing

Once the ORP is approved and operational readiness is proved in Task 2-G, the HIRTA team will install system as described in the CIP. As required in the NOFO, the HIRTA team will complete the following activities under Task 2-H.

2.2.8.1 Installation and Operational Readiness Schedule (IORS)

A detailed project schedule (IORS) with defined WBS will be prepared to track installation and testing activities per CIP and ORP. An initial IORS will be submitted to the AOR for review and will be updated to reflect the feedback. The IORS will help HIRTA team track installation of tablet equipment on vehicles, configuration of cellular connectivity and any coordination with cellular

carriers, installation of wayfinding visual markers on vehicles and outside/inside facilities, installation of kiosks and any required power/connectivity for the kiosk equipment.

Once functional, the IORS will also help track the status of readiness of the system to go-live per the planned level of operational stage.

Initial IORS is provided to AOR for review and will be updated based on feedback to create a baseline schedule.

2.2.8.2 Monthly Updates to IORS

Once the baseline IORS is approved, the HIRTA team will update the schedule monthly until the Phase 2 is complete. In the updates, the team will also provide details on the current status of at-scale deployment (e.g., number of vehicles installed, functionalities tested and test stage). at-scale deployment.

HIRTA team is planning to operate system at 20%, 50% and 100% at-scale levels (see Section 1.4). The IORS will help track the status of availability of vehicles, vehicle equipment, training of participants, any required outreach activities, engagement/contracting with third party contractors, engagement with stakeholders, engagement with healthcare providers and any other relevant activities

2.2.8.3 System Test Results Summary (STRS)

Prior to the start of operational readiness testing, the HIRTA team will deliver the STRS, which will document the findings per STP along with pass/fail status. STRS will be accompanied by updated RVTM as well to update on the verification status of each requirement.

For any defects that are identified, an action items list will be created to indicate the severity, resolution timeframe and current status for each item.

2.2.8.4 Test Results Summary Documentation and Operational Readiness Demonstrations.

After completion of the Operational Readiness Tests, the test results will be documented and reported according to the processes identified in the ORP. Demonstrations will be scheduled in conjunction with the AOR and key federal staff. Demonstrations will be conducted and documented per the processes identified in the ORP.

2.2.8.5 Deliverables

The following deliverables will be provided for Task 2-H:

- Installation and Operational Readiness Testing Schedule (IORS)
- IORS Updated with Progress/Risk Summary
- System Test Results Summary (STRS) (per the STP)
- Test Results Summary Documentation (per the ORP)
- Operational Readiness Demonstrations (per the ORP)

2.2.9 Task 2-I: Maintenance and Operations Planning

2.2.9.1 System Maintenance

HIRTA team will develop a Comprehensive Maintenance and Operations Plan (CMOP) for supporting all in-vehicle, central, wayside (e.g., wayfinding) equipment, and supporting functions. The document will define in detail the process to be followed to operate the system per established SLAs in Phase 2. CMOP will be reviewed and approved by the AOR.

System Maintenance process will document the following:

- Continuous system monitoring provisions
- Support and escalation protocols
- Hardware warranty/replacement management
- Schedule and process for software maintenance updates
- Process for data center and database maintenance
- Schedule and process for upgrade of software
- Schedule and process for hardware upgrade/replacement
- Service level agreements for continued operations of the system

2.2.9.2 Standard Operating Procedures

While not identified in the NOFO, the HIRTA team plans to develop detailed standard operating procedures for the users focusing on the following system functions in the context of operational changes brought by Health Connector:

- Registration and Eligibility Management
- Reservations
- Scheduling
- Dispatching
- Driver Functions
- Billing
- Reporting
- DCHD/Health Navigator Coordination
- Healthcare Partner Coordination
- Safety Management
- Customer Service
- Call Center Management
- Vehicle Maintenance/Availability

2.2.9.3 Deliverables

The following deliverables will be provided for Task 2-I:

- Draft Comprehensive Maintenance and Operations Plan (CMOP)
- Revised CMOP with Comment Resolution Report
- Final CMOP
- SOP

2.2.10 Task 2-J: Stakeholder Outreach

2.2.10.1 Phase 2 Outreach Plan

Marketing and outreach activities will be conducted according to the Outreach Plan. As the first step in Task 2-J, the HIRTA team will update the Outreach Plan, as needed, to reflect any changes since Phase 1. The Outreach plan already identifies a detailed list of activities and outreach channels to be utilized by the HIRTA team. In Phase 2, the team will explore any synergies between participant recruitment activities and outreach activities, and document those in the Plan. Also, attendance at conferences, media events, webinars and other industry outreach events were marked tentative in Phase 1. Therefore revised information on outreach on those fronts will be included, as they becomes available. Once the Phase 2 Outreach Plan is approved by the USDOT team, HIRTA team will start working on the outreach materials as needed for activities in Phase 2 per the Outreach Implementation Schedule (OIS). HIRTA team will get approval from the AOR before any materials are produced.

As discussed in Phase 1, HIRTA team is planning to develop an update to the video that was produced for stakeholder engagements in Phase 1. Also, HIRTA team will keep the project website updated. For outreach, HIRTA team will also coordinate with any participant training materials, so any synergies between those parallel efforts are utilized.

2.2.10.2 Outreach implementation Schedule

HIRTA team will develop an Outreach Implementation Schedule (OIS) with detailed list of activities which will be reviewed and approved by the AOR.

2.2.10.3 Monthly OIS update

HIRTA team will update the OIS on a monthly basis and provide a report to the AOR. The OIS will provide an update on activities that are completed, in progress, and planned.

2.2.10.4 Deliverables

The following deliverables will be provided for Task 2-J:

- Draft Phase 2 Outreach Plan
- Revised Phase 2 Outreach Plan with Comment Resolution Report
- Final Phase 2 Outreach Plan
- Initial Outreach Implementation Schedule (OIS)
- OIS Updated with Progress/Risk Summary:
- Outreach Materials (as specified in the Phase 2 Outreach Plan and OIS)

2.2.11 Task 2-K: Performance Measurement and Independent Evaluation Support

2.2.11.1 PMESP update

The HIRTA team will update the PMESP to include further details on some of the performance measures per observations during testing. Also, any outstanding details (e.g., Tier 2 and Tier 3 measures) will be updated. Also, PMESP will be updated to provide further details on surveys. Survey questions will be validated by the IRB.

2.2.11.2 Establishing Data Collection, Analysis and Reporting Capabilities

HIRTA team under the leadership of ISU will collect, process, and distribute data and performance reports according to the Performance Measurement and Evaluation Support Plan (PMESP). The collection, processing, quality control, and transfer of data from the deployment site in support of performance measurement and evaluation is documented within the DMP. One of the key efforts will also be to establish baseline for some of the measures using data from the existing HIRTA system, as defined in the PMESP. Any data quality issues noted with either baseline data or with test data from the new system will be immediately identified and communicated to the SEL so further testing can be performed.

Also, HIRTA team will support any discussions or data collection efforts as needed by the USDOT independent evaluation team.

2.2.11.3 Performance Measurement and Evaluation Support Schedule (PMESS)

HIRTA team will prepare a Performance Measurement and Evaluation Support Schedule (PMESS) that will include a work breakdown structure of activities and dependencies required to implement the PMESP for the specific purposes of the performance measurement and evaluation support. In particular, the PMESS will identify milestones, performance summary reports, and pre-deployment (“before”) data for coordination with USDOT.

2.2.11.4 Monthly Updates

PMESS will be updated monthly, and updates will be provided on identified activities.

2.2.11.5 Deliverables

The following deliverables will be provided for Task 2-K:

- Initial Performance Measurement and Evaluation Support Schedule (PMESS)
- PMESS Updated with Progress/Risk Summary (monthly)
- Updated PMESP (minimum one update)
- Revised Human Use Approval Summary (updated as necessary with IRB approval)
- Performance Measurement Materials identified in the PMESP and PMESS (e.g., Pre-Deployment Performance Data, System Performance Reports) and other supporting information

2.2.12 Task 2-L: Participation in Standards Development

2.2.12.1 SDO-specific Technical Memo

As identified in the SAD, the team will develop a memo describing the needs for updates to the National ITS Architecture. This will be based on lessons learned from the Phase 2 activities, in particular discussions at the SAD walkthrough and other meetings related to design discussions as those related to the middleware development. HIRTA team has taken the approach for developing an open-source middleware and will be developing a standard data exchange schema for that middleware. The team will also contribute through general understanding of the SEL and other SMEs engaged in the project as those related to standards development. As identified in Phase 1 documents, demand response transportation lacks any standards for system interfaces or data exchange. HIRTA team is planning to take this opportunity to identify any such improvements, as part of middleware development, particularly building on the work already done as part of TCRP Report 210-Development of Transactional Data Specifications for Demand-Responsive Transportation.

2.2.12.2 Participation in SDO Working Group Meetings

As directed by AOR, HIRTA team will be prepared to participate in SDO meetings and provide relevant input where applicable.

2.2.12.3 Deliverables

The following deliverables will be provided for Task 2-L:

- SDO-specific Technical Memoranda (as defined in the Standards Plan within the SAD)
- Participation in SDO working group or committee meetings/activities (as required)

2.3 Phase 3 Technical Approach

The HIRTA team understands that Phase 3 activities cannot be performed until Phase 2 is fully approved by the AO and the USDOT team.

2.3.1 Task 3-A: Project Management

HIRTA team will use the same approach as described for Task 2-A to develop a detailed PMP, conduct bi-weekly discussions, and participate in all-site meetings and roundtable meetings when scheduled. The focus of the PMP however, will be on the Phase 3 activities, which include operation and evaluation of the system.

2.3.1.1 Deliverables

The following deliverables will be provided for Task 3-A:

- Phase 3 Kick-off Meeting
- Project Management Plan (PMP)
- Revised PMP (as required)

- Monthly Progress Report Part I: Technical Progress and Status Summary
    - Includes: Project Milestone Schedule, Updated Task Schedules, Project and Task Detailed Risk Register, and Lessons Learned Logbook (LLL)
- Monthly Progress Report Part II: Detailed Financial Summary
- Participation in site-specific bi-weekly coordination teleconferences
- Participation in monthly all-site coordination teleconferences
- Participation in periodic roundtable teleconferences

2.3.2 Task 3-B: System Operations and Maintenance

Task 3-B will execute the activities as outlined in the CMOP and SOP. As required, the team will develop the following deliverables.

2.3.2.1 System Operations and Maintenance Schedule (SOMS)

The team will develop a SOMS with a detailed list of activities as defined in the CMOP and SOP. SOP will be driven by the needs identified in the ConOps and Safety Management Plan (SMP), and all relevant activities will be included.

SOMS will be provided to AOR for review. Any comments received will be addressed to create a baseline SOMS that will be followed for the rest of the Phase 3.

2.3.2.2 Monthly SOMS Update

HIRTA team will make monthly updates to the SOMS in response to DOT comments on format and content, as well as to document progress against plan and track risks/issues. The updated SOMS will include a concise summary of activities underway, progress made since the last update, and all technical issues/risks/incidents with mitigation actions taken since the last update.

2.3.2.3 Deliverables

The following deliverables will be provided for Task 3-B:

- Initial System Operations and Maintenance Schedule (SOMS)
- Updated SOMS with Progress/Risk Summary (monthly)

2.3.3 Task 3-C: Stakeholder Outreach

As part of this task, the HIRTA team will execute the Phase 2 Outreach Plan per the OIS that will be developed by the team and will be approved by the AOR. OIS will be updated on a monthly basis to track progress.

Phase 3 activities will include events such as development and/or acquisition of outreach materials, web/social media content, trade show and conference materials, and other supporting materials intended to inform and engage stakeholders and the general public.

Phase 2 outreach also involves planning and execution of an operational capability showcase within the first 12 months of Phase 3 start date. The purpose of this showcase will be to demonstrate at-scale capabilities of the Health Connector system to the media.

As acknowledged earlier, HIRTA team understands that any outreach activity will be closely coordinated with the USDOT team, and any marketing materials will be fully vetted by the USDOT team prior to sharing with external entities outside the project team.

The team will coordinate with the USDOT team to attend any conferences or trade show events.

2.3.3.1 Deliverables

The following deliverables will be provided for Task 3-C:

- Initial Outreach Implementation Schedule (OIS)
- Outreach Materials (as specified in the Outreach Plan and OIS)
- Updated OIS with Progress/Risk Summary (monthly)
- Draft Operational Capability Showcase Plan (OCSP)
- Revised OCSP with Comment Resolution Report
- Final Operational Capability Showcase Plan (OCSP)
- Operational Capability Showcase
- Draft Operational Capability Showcase Summary (OCSS)
- Revised OCSS with Comment Resolution Report
- Final Operational Capability Showcase Summary

2.3.4 Task 3-D: Performance Measurement and Independent Evaluation Support

This task involves executing the performance measurement plan identified in the PMESP. ISU will lead this task and as the first step will update the PMESS to indicate any changes since Phase 2. One key step for the start of this process is to ensure the approval of the IRB, as discussed in Phase 2. The PMESS update will identify milestones, performance summary reports, and the delivery of post-deployment (“after”) data for coordination with DOT. Also, since there is a plan for using control treatment method for several performance measures, the “without” data and performance reports for the same post-deployment time period will be delivered as well.

Monthly updates will be provided to the AOR on the progress of data collection and calculation of measures.

As required, the team will develop and share a performance dashboard with the USDOT team per the details identified in the PMESP. The dashboards developed as part of the project will be used by HIRTA and the stakeholders (e.g., DCHD and healthcare partners) for tracking the performance measures during the long-term operation beyond Phase 2 as well.

PMESP and DMP will be updated as the team learns about any deviations from the plan identified in those documents. All changes will be sent to AOR for approval.

2.3.4.1 Deliverables

The following deliverables will be provided for Task 3-D:

- Updated Performance Measurement and Evaluation Support Schedule (PMESS), (monthly):

- Updated PMESP (minimum one update)
- Updated DMP (minimum one update)
- Performance Measurement Materials identified in the PMESP and PMESS (e.g., Post-Deployment Performance Data, System Performance Reports, Performance Measurement Results) and other supporting information
- Site Performance Measurement Dashboard
- Public-facing Data (Regular updates as documented in the DMP and PMESS)

2.3.5 Task 3-E: Post-Deployment Transition Planning.

The Institutional Partnership and Financial Plan (IPFP) outlines HIRTA's approach to sustained operation of the system beyond Phase 3, and a brief overview is provided in Section 1.5.3 of this document. As explained in Section 1.5.3, HIRTA utilizes a combination of fares, and funds from state and local entities to for operating expenses. HIRTA's plan is to continue to use the same approach for funding the sustained operation beyond Phase 3 and has provided letters of support from these entities.

As a major deliverable of this task, the HIRTA team will develop a Comprehensive Transition Plan (CTP). Building on the IPFP, the CTP will identify the concepts, applications, governance framework, agreements, key documents, and equipment to be maintained as elements of routine operational practice after the completion of Phase 3. The CTP will identify a framework for selecting applications for continued operation, improvement, or removal/replacement. The CTP will also include a financial model for continued operation and will document the funding entities that will subside the delivery of trips, where applicable. If any public private partnership opportunities are identified by the team the by the time of transition (e.g., long term partnership with a healthcare provider for trip delivery) those will be documented as well. The CTP will also explicitly identify contingency plans with respect to identified uncertainties and other potential post-deployment issues posing a risk to successful post-deployment operations.

As with the other documents, the draft CTP will be submitted to AOR for review. The CTP will be updated to address any comments and a final CTP will be provided.

2.3.5.1 Deliverables

The following deliverables will be provided for Task 3-E:

- Draft Comprehensive Transition Plan (CTP)
- Revised CTP with Comment Resolution Report
- Final Comprehensive Transition Plan (CTP)

2.3.6 Task 3-F: Participation in Standards Development

As described for Phase 2- Task 2-L, HIRTA team will prepare a technical memo to share with the SDO team and will participate in any meetings per the guidance from AOR.

2.3.6.1 Deliverables

The following deliverables will be provided for Task 3-F:

- SDO-specific Technical Memoranda (as defined in the Standards Plan within the SAD)
- Participation in SDO working group or committee meetings/activities (as required)

3 Phase 2 and 3 Deployment Schedule

This section provides a high-level deployment schedule and some supporting information regarding the capability to acquire, configure, install, and test key elements of the proposed system.

3.1 Schedule Summary

Table 6 provides an overview of the interrelationship among tasks and the sequence of subtask activities for Phase 2. Items in **bold** depict key milestones or critical path items that will be required to be completed in a timely manner for ensuring success of the project.

The HIRTA team had originally planned for Phase 2 to last 18 months but extended that window to 24 months. Key milestones in Phase 2 include: Final SAD, Final SDD, agile development for new middleware, operational readiness briefing and operational readiness plan, Final STP, IRB approval, participant recruitment and training, Final ORP, system testing and operational readiness demonstration.

Further, the HIRTA team has planned for 18 months for Phase 3 activities. Key milestones include: 20% at-scale deployment operational, 50% at-scale deployment operational, 100% at-scale, deployment operational, operational capability showcase hosted, Final CTP completed and, system performance dashboard go-live with at-scale operational data.

The HIRTA team has reserved contingency funds and has plans for extending Phase 3 for additional 6 months, if needed, to collect sufficient data for certain performance measures (Tier 2 and Tier 3). If such funds are needed, HIRTA will request AOR and AO for authorization of use of these reserve funds. These funds will cover operation of system at 100% at-scale deployment for 6 more months for the same configuration as defined earlier in the document. This request will not impact any deliverables' schedule and will be needed only for collecting additional data for some of the performance measures.

Table 6. Phase 2 Project Schedule

WBS	Task Name	Date
2.A	**2-A Project Management**	June 14, 2024
2.A.1	Phase 2 Kick-off Meeting	June 15, 2022
2.A.2	Project Management Plan	July 13, 2022
2.A.3	**Updated Project Management Plan**	June 10, 2024
2.A.3.a	USDOT Review and Comment Period	July 26, 2022
2.A.3.b	August 2022 Update	August 10, 2022

WBS	Task Name	Date
2.A.3.c	December 2022 Update	December 30, 2022
2.A.3.d	March 2023 Update	April 10, 2023
2.A.3.e	June 2023 Update	July 7, 2023
2.A.3.f	September 2023 Update	October 10, 2023
2.A.3.g	December 2023 Update	January 10, 2024
2.A.3.h	March 2024 Update	April 10, 2024
2.A.3.i	June 2024 Update	June 10, 2024
2.A.4	**Monthly Progress Reports**	June 10, 2024
2.A.4.a	August 2022 Progress Report	August 10, 2022
2.A.4.b	September 2022 Progress Report	September 9, 2022
2.A.4.c	October 2022 Progress Report	October 10, 2022
2.A.4.d	November 2022 Progress Report	November 10, 2022
2.A.4.e	December 2022 Progress Report	December 9, 2022
2.A.4.f	January 2023 Progress Report	January 10, 2023
2.A.4.g	February 2023 Progress Report	February 10, 2023
2.A.4.h	March 2023 Progress Report	March 10, 2023
2.A.4.i	April 2023 Progress Report	April 10, 2023
2.A.4.j	May 2023 Progress Report	May 10, 2023
2.A.4.k	June 2023 Progress Report	June 9, 2023
2.A.4.l	July 2023 Progress Report	July 10, 2023
2.A.4.m	August 2023 Progress Report	August 10, 2023
2.A.4.n	September 2023 Progress Report	September 11, 2023
2.A.4.o	October 2023 Progress Report	October 10, 2023
2.A.4.p	November 2023 Progress Report	November 10, 2023
2.A.4.q	December 2023 Progress Report	December 11, 2023
2.A.4.r	January 2024 Progress Report	January 9, 2024
2.A.4.s	February 2024 Progress Report	February 9, 2024
2.A.4.t	March 2024 Progress Report	March 11, 2024
2.A.4.u	April 2024 Progress Report	April 10, 2024
2.A.4.v	May 2024 Progress Report	May 10, 2024
2.A.4.w	June 2024 Progress Report	June 10, 2024
2.A.5	Participation in teleconferences	June 14, 2024
2.B	**2-B System Architecture and Design**	June 14, 2024
2.B.1	**Systems Architecture Document (SAD)**	June 14, 2024
2.B.1.a	Draft Systems Architecture Document (SAD)	September 30, 2022
2.B.1.b	USDOT Review and Comment Period	October 14, 2022
2.B.1.c	Revised SAD with Comment Resolution Report	October 31, 2022
2.B.1.d	USDOT Review and Comment Period	November 30, 2022
2.B.1.e	Systems Architecture Document for Publication	December 30, 2022
2.B.1.f	USDOT Approval of Systems Architecture Document for Publication	January 6, 2023
2.B.1.g	508 Version of Systems Architecture Document	January 13, 2023
2.B.1.h	On-going Phase 2 Edits as Needed	May 17, 2024
2.B.1.i	USDOT Review and Comment Period	May 24, 2024

WBS	Task Name	Date
2.B.1.j	Phase 2 Final Systems Architecture Document for Publication	May 31, 2024
2.B.1.k	USDOT Approval of Phase 2 Final Systems Architecture Design Document	June 7, 2024
2.B.1.l	508 Version of Phase 2 Final Systems Architecture Document	June 14, 2024
2.B.2	Systems Architecture Walkthrough and Workbook (virtual)	October 28, 2022
2.B.3	**Systems Design Document (SDD)**	April 19, 2024
2.B.3.a	Via System Configuration	May 19, 2023
2.B.3.b	Wayfinding Vendor Workshop	August 1, 2023
2.B.3.c	Data and Performance Management Workshop	May 10, 2023
2.B.3.d	Hosting, Security, and Data Access Workshop	August 9, 2023
2.B.3.e	MOD Vendor EHR Middleware Workshop	June 22, 2023
2.B.3.f	MOD Vendor Medicaid Middleware Workshop	June 22, 2023
2.B.3.g	Software Development Approach	July 12, 2023
2.B.3.h	Test Plan	August 22, 2023
2.B.3.i	Facility Survey - Healthcare	May 31, 2023
2.B.3.j	Draft Systems Design Document (SDD)	August 18, 2023
2.B.3.k	Preliminary Design review (Internal)	August 18, 2023
2.B.3.l	USDOT Review and Comment Period	September 1, 2023
2.B.3.m	Revised SDD with Comment Resolution Report	September 15, 2023
2.B.3.n	USDOT Review and Comment Period	September 22, 2023
2.B.3.o	On-going Phase 2 Edits as Needed	May 17, 2024
2.B.3.p	Phase 2 Final Systems Design Document for Publication	March 8, 2024
2.B.3.q	USDOT Approval of Phase 2 Final Systems Design Document	March 29, 2024
2.B.3.r	508 Version of Phase 2 Final Systems Document	April 19, 2024
2.B.4	**Interface Control Document (ICD)**	May 17, 2024
2.B.4.a	Draft Interface Control Document (ICD)	August 11, 2023
2.B.4.b	USDOT Review and Comment Period	August 29, 2023
2.B.4.c	Revised ICD with Comment Resolution Report	September 12, 2023
2.B.4.i	On-going Phase 2 Edits as Needed	May 17, 2024
2.B.4.d	USDOT Review and Comment Period	September 19, 2023

WBS	Task Name	Date
2.B.4.f	Final Interface Control Document for Publication	March 8, 2024
2.B.4.g	USDOT Approval of Final Interface Control Document	April 5, 2024
2.B.4.h	508 Version of Final Interface Control Document	April 12, 2024
2.B.5	Systems Design Walkthrough and Workbook	October 6, 2023
2.B.6	**Updated Phase 1 Deliverables**	June 7, 2024
2.B.6.a	Final Phase 2 ConOps for Publication	January 26, 2024
2.B.6.b	USDOT Approval of Final Phase 2 ConOps	March 1, 2024
2.B.6.c	508 Version of Final Phase 2 ConOps	March 15, 2024
2.B.6.d	Final Phase 2 SyRS for Publication	May 24, 2024
2.B.6.e	USDOT Approval of Final Phase 2 SyRS	May 31, 2024
2.B.6.f	508 Version of Final Phase 2 SyRS	June 7, 2024
2.B.6.g	Final Phase 2 ICTDP for Publication	May 17, 2024
2.B.6.h	USDOT Approval of Final Phase 2 ICTDP	May 24, 2024
2.B.6.i	508 Version of Final Phase 2 ICTDP	May 31, 2024
2.C	**2-C Data Management Planning**	May 27, 2024
2.C.1	**Phase 2 Data Privacy Plan (DPP)**	February 23, 2024
2.C.1.a	Draft Data Privacy Plan (DPP)	September 26, 2022
2.C.1.b	USDOT Review and Comment Period	October 11, 2022
2.C.1.c	Revised DPP with Comment Resolution Report	October 13, 2023
2.C.1.i	On-going Phase 2 Edits as Needed	February 2, 2024
2.C.1.d	USDOT Review and Comment Period	October 20, 2023
2.C.1.f	Final Data Privacy Plan for Publication	February 9, 2024
2.C.1.g	USDOT Approval of Data Privacy Plan	February 16, 2024
2.C.1.h	508 Version of Final Data Privacy Plan	February 23, 2024
2.C.2	Notice of Privacy Management Consistency	December 15, 2022
2.C.3	**Phase 2 Data Management Plan (DMP)**	May 27, 2024
2.C.3.a	Draft Phase 2 Data Management Plan (DMP)	November 15, 2022
2.C.3.b	USDOT Review and Comment Period	December 2, 2022
2.C.3.c	Revised Phase 2 DMP with Comment Resolution Report	September 20, 2023
2.C.3.i	On-going Phase 2 Edits as Needed	January 12, 2024

WBS	Task Name	Date
2.C.3.d	USDOT Review and Comment Period	September 27, 2023
2.C.3.f	Phase 2 Final Data Management Plan for Publication	May 17, 2024
2.C.3.g	USDOT Approval of Phase 2 Data Management Plan	May 24, 2024
2.C.3.h	508 Version of Phase 2 Final Data Management Plan	May 27, 2024
2.D	**2-D Acquisition and Installation Planning**	May 6, 2024
2.D.1	**Mobility-On-Demand (MOD) Procurement**	April 7, 2023
2.D.1.a	Finalize Scope of Work (SOW)	July 22, 2022
2.D.1.b	Review SOW and Prepare RFP	July 29, 2022
2.D.1.c	Finalize Evaluation Committee	July 29, 2022
2.D.1.d	MOD RFP Release	August 3, 2022
2.D.1.e	Pre-Proposal Meeting	August 8, 2022
2.D.1.f	Vendors Questions Submission Period	August 15, 2022
2.D.1.g	HIRTA Q&A Response	August 22, 2022
2.D.1.h	Vendors Proposal Submissions Period	September 16, 2022
2.D.1.i	Initial Proposal Evaluation	October 7, 2022
2.D.1.j	Invites Sent to Shortlisted Vendors for Presentation	October 10, 2022
2.D.1.k	Shortlisted Vendors Presentation and Evaluation Scoring	October 28, 2022
2.D.1.l	Best and Final Offer Period	November 9, 2022
2.D.1.m	Select Final Vendor and Issue Notice of Intent to Award	March 31, 2023
2.D.1.n	HIRTA Board Approval	April 7, 2023
2.D.1.o	Notice to Proceed	April 7, 2023
2.D.2	**Wayfinding Procurement**	October 4, 2023
2.D.2.a	Wayfinding Vendor Under Contract	October 4, 2023
2.D.3	**Comprehensive Acquisition Plan (CAP)**	May 3, 2024
2.D.3.a	Draft Comprehensive Acquisition Plan (CAP)	August 2, 2023
2.D.3.b	USDOT Review and Comment Period	September 1, 2023
2.D.3.c	Revised CAP with Comment Resolution Report	September 22, 2023
2.D.3.i	On-going Phase 2 Edits as Needed	April 12, 2024
2.D.3.d	USDOT Review and Comment Period	September 29, 2023
2.D.3.f	Final Comprehensive Acquisition Plan	April 19, 2024
2.D.3.g	USDOT Approval of Comprehensive Acquisition Plan	April 26, 2024
2.D.3.h	508 Version of Comprehensive Acquisition Plan	May 3, 2024

WBS	Task Name	Date
2.D.4	**Comprehensive Installation Plan (CIP)**	May 6, 2024
2.D.4.a	Draft Comprehensive Installation Plan (CIP)	December 1, 2023
2.D.4.b	USDOT Review and Comment Period	January 8, 2024
2.D.4.c	Revised CIP with Comment Resolution Report	March 1, 2024
2.D.4.i	On-going Phase 2 Edits as Needed	April 22, 2024
2.D.4.d	USDOT Review and Comment Period	March 8, 2024
2.D.4.f	Phase 2 Final Comprehensive Installation Plan	April 26, 2024
2.D.4.g	USDOT Approval of Final Comprehensive Installation Plan	May 3, 2024
2.D.4.h	508 Version of Final Comprehensive Installation Plan	May 6, 2024
2.E	**2-E Software Development and Integration**	June 14, 2024
2.E.1	Initial Software Development Schedule (SDS)	October 20, 2023
2.E.2	Monthly SDS Updates	June 14, 2024
2.E.3	Draft Middleware Requirements	June 5, 2023
2.E.4	Revised Middleware Requirements	November 24, 2023
2.E.5	Draft Middleware Design Document	October 13, 2023
2.E.6	Revised Middleware Design Document	April 12, 2024
2.E.7	Via Sandbox Kickoff Meeting	September 18, 2023
2.E.8	Via Software Development Communications Channel Setup	September 29, 2023
2.E.9	Develop Via Service Interface	February 2, 2024
2.E.10	**MOD - EHR Middleware Development**	May 3, 2024
2.E.10.a	EHR Authorization Key Approval	September 4, 2023
2.E.10.b	Develop interface prototypes	October 27, 2023
2.E.10.c	**Software product development**	April 19, 2024
2.E.10.c.1	**Develop EHR Service Interfaces**	April 19, 2024
2.E.10.c.1.1	Confirm Authentication and Connectivity with EHR	January 15, 2024
2.E.10.c.1.2	Identify and Develop Scripts for Calling Data	April 19, 2024
2.E.10.c.2	Create MOD-EHR Database	April 19, 2024
2.E.10.c.3	Create MOD-EHR Webpage	March 1, 2024
2.E.10.d	Unit testing	March 28, 2024
2.E.10.e	Functional testing	April 19, 2024
2.E.10.f	Installation testing	May 3, 2024
2.E.11	**MOD - Medicaid Middleware Development**	April 26, 2024
2.E.11.a	LYFT TAPI Kickoff Meeting	October 18, 2023

WBS	Task Name	Date
2.E.11.b	LYFT TAPI Communications Channel Setup	October 23, 2023
2.E.11.c	Design specifications and interface prototypes	October 27, 2023
2.E.11.d	**Software product development**	April 19, 2024
2.E.11.d .1	**Develop Medicaid Service Interface**	March 1, 2024
2.E.11.d .1.1	Confirm Authentication and Connectivity with Lyft	January 15, 2024
2.E.11.d .1.2	Identify and Develop Scripts for Calling Data	March 1, 2024
2.E.11.d .2	Create MOD-Medicaid Database	April 19, 2024
2.E.11.e	Unit Testing	March 29, 2024
2.E.11.f	Functional Testing	March 29, 2024
2.E.11.g	Installation Testing	April 26, 2024
2.E.12	Develop Via Webpage Booking and Trip Monitoring Webpage for Kiosk	April 19, 2024
2.E.13	Open Source Software and Supporting Documentation	June 7, 2024
2.F	**2-F Participant and Staff Training**	June 21, 2024
2.F.1	**Phase 2 PTSEP**	June 7, 2024
2.F.1.a	Updated Participant Training and Stakeholder Education Plan	October 28, 2022
2.F.1.b	USDOT Review and Comment Period	November 4, 2022
2.F.1.c	Revised Participant Training and Stakeholder Education Plan with Comment Resolution Report	November 3, 2023
2.F.1.i	On-going Phase 2 Edits as Needed	May 20, 2024
2.F.1.d	USDOT Review and Comment Period	November 10, 2023
2.F.1.f	Phase 2 Final Participant Training and Stakeholder Education Plan for Publication	May 24, 2024
2.F.1.g	USDOT Approval of Final Phase 2 Participant Training and Stakeholder Education Plan	May 31, 2024
2.F.1.h	508 Version of Final Phase 2 Participant Training and Stakeholder Education Plan	June 7, 2024
2.F.2	**Training Implementation Schedule**	June 13, 2024
2.F.2.a	Initial Training Implementation Schedule (TIS)	February 14, 2023
2.F.2.b	Monthly updates to TIS	June 13, 2024
	Follow-up and On-going Updates for Traveler Recruitment Community Partners	January 8, 2024
2.F.6	Traveler/Stakeholder Recruitment	February 23, 2024
2.F.4	**Participant and Partner Training Materials**	June 21, 2024

WBS	Task Name	Date
2.F.4.a	Initial training materials	April 5, 2024
2.F.4.b	Traveler/Stakeholder Recruitment - Batch 1	April 12, 2024
2.F.4.c	Participant and Partner Training (initial group)	May 3, 2024
2.F.4.d	Revised training materials (as needed)	May 31, 2024
2.F.4.e	Traveler/Stakeholder Recruitment - Batch 2	June 14, 2024
2.F.4.f	Participant and Partner Training (second group)	June 21, 2024
2.F.5	IRB Human Use Approval Confirmation Materials	March 15, 2024
2.G	**2-G System Test Planning**	May 17, 2024
2.G.1	**System Test Plan (STP)**	January 26, 2024
2.G.1.a	Draft System Test Plan	September 1, 2023
2.G.1.b	USDOT Review and Comment Period	October 19, 2023
2.G.1.c	Revised System Test Plan with Comment Resolution Report	November 16, 2023
2.G.1.i	On-going Phase 2 Edits as Needed	January 4, 2024
2.G.1.d	USDOT Review and Comment Period	November 23, 2023
2.G.1.f	Final System Test Plan	January 12, 2024
2.G.1.g	USDOT Approval of Final System Test Plan for Publication	January 19, 2024
2.G.1.h	508 Version of Final Phase 2 Final System Test Plan	January 26, 2024
2.G.2	Operational Readiness Concept Briefing (remote)	July 14, 2023
2.G.3	**Operational Readiness Plan (ORP)**	May 17, 2024
2.G.3.a	Draft Operational Readiness Plan (ORP)	December 29, 2023
2.G.3.b	USDOT Review and Comment Period	January 22, 2024
2.G.3.c	Revised ORP with Comment Resolution Report	February 16, 2024
2.G.3.i	On-going Phase 2 Edits as Needed	April 26, 2024
2.G.3.d	USDOT Review and Comment Period	February 23, 2024
2.G.3.f	Final Operational Readiness Plan	May 3, 2024
2.G.3.g	USDOT Approval of Final Operational Readiness Plan	May 10, 2024
2.G.3.h	508 Version of Final Phase 2 Operational Readiness Plan	May 17, 2024
2.G.4	ORP Walkthrough and Workbook (remote)	February 2, 2024
2.H	**2-H Installation and Operational Readiness Testing**	June 28, 2024
2.H.1	Initial Installation and Operational Readiness Schedule (IORS)	December 13, 2023
2.H.2	Monthly Updates to IORS	June 14, 2024

WBS	Task Name	Date
2.H.4	**Operational Readiness Testing**	June 14, 2024
2.H.4.a	Test Readiness Review	February 2, 2024
2.H.4.b	Wayfinding and MOD Platform Unit Testing	February 19, 2024
2.H.4.c	Wayfinding and MOD Platform Functional Testing	March 8, 2024
2.H.4.d	Wayfinding and MOD Platform Installation Testing (HIRTA on-site)	March 22, 2024
2.H.4.e	**User Acceptance Testing**	May 10, 2024
2.H.4.e.1	Rollout Via VOC access for Healthcare-end Users	May 6, 2024
2.H.4.e.2	Guide Users through NaviLens and Via Application Downloads	May 3, 2024
2.H.4.e.3	Perform User Acceptance Tests	May 10, 2024
2.H.4.f	Revenue Testing	August 15, 2024
2.H.5	System Test Results Summary	April 26, 2024
2.H.6	Test Results Summary Documentation	May 20, 2024
2.H.7	Operational Readiness Demonstrations (HIRTA on-site)	June 28, 2024
2.H.8	**CIP Installations**	May 13, 2024
2.H.8.e	Wayfinding codes - HIRTA Vehicles	May 13, 2024
2.H.8.f	Wayfinding codes- Dallas County Hospital	May 13, 2024
2.H.8.g	Wayfinding Kiosk Installation	May 13, 2024
2.H.8.h	Infotainment Device Installation	May 13, 2024
2.I	**2-I Maintenance and Operations Planning**	May 31, 2024
2.I.1	**Comprehensive Maintenance and Operations Plan (CMOP)**	May 31, 2024
2.I.1.a	Draft Comprehensive Maintenance and Operations Plan (CMOP)	March 22, 2024
2.I.1.b	USDOT Review and Comment Period	April 5, 2024
2.I.1.c	Revised CMOP with Comment Resolution Report	April 19, 2024
2.I.1.i	On-going Phase 2 Edits as Needed	May 10, 2024
2.I.1.d	USDOT Review and Comment Period	April 26, 2024
2.I.1.f	Final Comprehensive Maintenance and Operations Plan (CMOP)	May 17, 2024
2.I.1.g	USDOT Approval of Final Comprehensive Maintenance and Operations Plan (CMOP)	May 24, 2024
2.I.1.h	508 Version of Final Comprehensive Maintenance and Operations Plan (CMOP)	May 31, 2024
2.I.2	Standard Operating Procedures (SOP)	March 15, 2024
2.J	**2-J Stakeholder Outreach**	June 28, 2024

WBS	Task Name	Date
2.J.1	**Phase 2 Outreach Plan**	June 7, 2024
2.J.1.a	Draft Phase 2 Outreach Plan	September 26, 2022
2.J.1.b	USDOT Review and Comment Period	October 12, 2022
2.J.1.c	Revised Phase 2 Outreach Plan with Comment Resolution Report	October 27, 2022
2.J.1.d	USDOT Review and Comment Period	November 10, 2022
2.J.1.e	Final Phase 2 Outreach Plan for Publication	November 24, 2022
2.J.1.f	USDOT Approval of Phase 2 Outreach Plan for Publication	December 1, 2022
2.J.1.g	508 Version of Phase 2 Outreach Plan for Publication	December 16, 2022
2.J.1.h	On-going Phase 2 Edits as Needed	May 16, 2024
2.J.1.I	USDOT Review and Comment Period	May 3, 2024
2.J.1.i	Phase 2 Final Outreach Plan	May 17, 2024
2.J.1.j	USDOT Approval of Phase 2 Final Outreach Plan	May 24, 2024
2.J.1.k	508 Version of Phase 2 Final Outreach Plan	June 7, 2024
2.J.2	**Initial Outreach Implementation Schedule (OIS)**	June 14, 2024
2.J.2.a	Draft OIS	December 26, 2022
2.J.2.b	Revised OIS	February 10, 2023
2.J.2.c	Monthly Updates to OIS	June 14, 2024
2.J.3	**Outreach Activities**	June 14, 2024
2.J.3.a	Public Meeting: Iowa DHS coordination meeting	November 10, 2022
2.J.3.b	Public Meeting: Iowa Transportation Coordinating Council	March 8, 2023
2.J.3.c	Public Meeting: Participant Recruitment and Training	April 3, 2024
2.J.3.d	Public Meeting: Iowa Transportation Coordinating Council	May 1, 2023
2.J.3.e	Public Meeting: Media Event	June 14, 2024
2.J.3.f	Conference: TRANSED	September 15, 2022
2.J.3.g	Conference: AMPO	October 25, 2022
2.J.3.h	Conference: TRB Annual meeting and exhibition	April 12, 2023
2.J.3.i	Conference: CTAA	June 1, 2023
2.J.3.j	Conference: Iowa Public Transit Association	June 9, 2023
2.J.3.k	Conference: Midwest Transit Conference	August 8, 2023
2.J.3.l	Conference: ITE Annual Meeting & Exhibition	August 16, 2023
2.J.3.m	Conference: RTAP	December 6, 2023
2.J.3.n	Conference: Iowa Public Transit Association	June 7, 2024

WBS	Task Name	Date
2.J.3.o	Webinar: Stakeholder and Partner Engagement - Successes and Challenges	May 3, 2023
2.J.3.p	Webinar: SAD/SDD	September 19, 2023
2.J.3.q	Webinar: Performance Measurement/SOPs	January 26, 2024
2.J.3.r	Webinar: Participant Recruitment and Training	April 29, 2024
2.J.3.s	Journal: Healthcare end focus	April 19, 2024
2.J.3.t	Journal: Iowa Cancer Consortium blog	February 8, 2023
2.J.3.u	Journal: Project Overview and High-Level System Design; Early Partner Recruitment	August 29, 2023
2.J.3.v	Journal: Project Overview and High-Level System Design	August 29, 2023
2.J.3.w	Journal: Complete Trip Approach	January 19, 2024
2.J.3.x	Journal: HIRTA stakeholders/community outreach	May 17, 2024
2.J.3.y	Workshop: Stakeholder Feedback on Current System Design	November 14, 2023
2.J.3.z	Workshop: Wayfinding design review with users/stakeholders/healthcare partners	March 22, 2024
2.J.3.aa	Workshop: Integration Meeting with Healthcare Partners	July 12, 2023
2.J.4	**Outreach Materials**	June 28, 2024
2.J.4.a	Phase 2 30-second video	January 4, 2023
2.J.4.b	Promotion video (social media optimized)	March 29, 2024
2.J.4.c	Outreach Toolkit	May 31, 2024
2.J.4.d	**Conference Materials**	June 8, 2023
2.J.4.d.1	Conference Preparation (PPT, etc) - Updated Phase 2 Materials	May 25, 2023
2.J.4.d.2	USDOT Review of Conference Materials	June 1, 2023
2.J.4.d.3	Finalization of Conference Materials	June 8, 2023
2.J.4.e	Social Media Graphics and Posting	June 28, 2024
2.J.4.f	Marketing Fact Sheet Leave-Behind	June 28, 2024
2.J.4.g	Healthcare Partnership Brochure	January 19, 2023
2.K	**2-K Performance Measurement and IE Support**	August 15, 2024
2.K.1	**Performance Measurement and Evaluation Support Schedule (PMESS)**	June 14, 2024
2.K.1.a	Initial Performance Measurement and Evaluation Support Schedule (PMESS)	February 10, 2023
2.K.1.b	Monthly Updates to PMESS	June 14, 2024

WBS	Task Name	Date
2.K.2	**Draft Data Analysis Plan**	May 10, 2024
2.K.2.a	Data Analysis Plan	August 10, 2023
2.K.2.b	Revised Data Analysis Plan	September 8, 2023
2.K.2.c	Final Data Analysis Plan	December 29, 2023
2.K.2.d	Develop Data Dashboard	May 10, 2024
2.K.3	**Revised Human Use Approval Summary**	March 15, 2024
2.K.3.a	Submit initial IRB for app and participant selection data	September 22, 2023
2.K.3.b	Approval of IRB for app based data	November 3, 2023
2.K.3.c	Submit 2nd IRB Application for survey questions	January 19, 2024
2.K.3.d	Approval of IRB for survey questions	March 15, 2024
2.K.4	**Phase 2 PMESP**	May 10, 2024
2.K.4.a	Updated Phase 1 Performance Measurement and Evaluation Support Plan (PMESP)	August 16, 2023
2.K.4.b	USDOT Review and Comment Period	August 30, 2023
2.K.4.c	Revised Phase 2 PMESP with Comment Resolution Report	September 27, 2023
2.K.4.d	USDOT Review and Comment Period	October 4, 2023
2.K.4.e	On-going Phase 2 Edits as Needed	April 19, 2024
2.K.4.f	Final Phase 2 PMESP	April 26, 2024
2.K.4.g	USDOT Approval of Phase 2 PMESP	May 3, 2024
2.K.4.h	508 Version of Phase 2 PMESP	May 10, 2024
2.K.5	**Performance Measurement Materials**	August 15, 2024
2.K.5.a	Update data elements needed for performance measures	December 13, 2023
2.K.5.b	Collect baseline data	February 2, 2024
2.K.5.c	Identify issues with available data	June 14, 2024
2.K.5.d	Update performance measure metrics based on likely available data	January 23, 2024
2.K.5.e	Initial upload of Health Connector data collected during testing	August 15, 2024
2.K.5.f	Performance data from testing provided to USDOT and IE	April 26, 2024
2.L	**2-L Participation in Standards Development**	April 26, 2024
2.L.1	SDO-Specific Technical Memoranda	April 26, 2024
2.L.2	Participation in SDO working group or committee meetings/activities (as required)	April 26, 2024

3.2 Schedule Risks

Table 7 provides a list of key anticipated risks and planned mitigation strategies.

Table 7. Schedule Risks and Mitigation Strategies

Risk	Probability	Impact	Mitigation Strategy	Resolution (if applicable)
MOD vendor procurement may delay certain activities in Phase 2	Low	Medium	While participation of MOD vendor will help with activities such as SAD and SDD development, it is not necessary. However, HIRTA prefers to have a vendor on-board within the first 3 months. As stated earlier, HIRTA team will prioritize this procurement as soon as the Phase 2 is awarded	MOD vendor procurement did delay certain activities in Phase 2, however participation was not required for deliverables. Via was selected as the MOD Vendor in phase 2.
Certain system components require extended testing and may delay the project	Medium	High	It will be critical to identify at-risk system components during the design stage. Team may also identify if those features will be available at 20%, 50%, or 100% at-scale deployment. Such risks will be identified at the time of STP development while mapping test cases to requirements in the TVTM.	The HIRTA project team identified what system components would be needed for testing. Test procedures were planned around these features being available, and will be tested accordingly.

Risk	Probability	Impact	Mitigation Strategy	Resolution (if applicable)
Quality of data is unacceptable	Medium	High	Testing will start at least 6 months before the start of Phase 3. Also, root cause will be identified when such issues occur, and relevant action items will be marked high severity so those are immediately fixed by vendors. Also, vendors will be asked to provide reliability reports on data from their previous deployments as part of procurement.	A punchlist was created in the RTM for each phase of testing to identify and resolve issues.
System unreliability prevents scalability to full capacity	Low	Impact	ORP will focus heavily on system reliability.	
Data not sufficient to calculate some performance measures with statistical significance	Medium	High	Execute the extended operation for additional 6 months as planned.	

4 Phase 2 and 3 Deployment Cost Estimate

4.1 Cost Summary

Figure 14 provides a summary of costs by category as follows:

- **Total labor and other direct cost (ODC):** provides the cost associated with labor hours for meeting the deliverables requirements for Phase 2 and 3 systems engineering activities along with any expenses for project needs (e.g., virtual collaboration software, outreach materials).
- **Vendor Cost:** includes the cost of hardware and software to be procured.
- **Development Labor Budget:** refers to the labor budget to be used for middleware development.
- **Travel budget:** includes the cost of travel for meetings and conferences/events.
- **Contingency funds**: reserved for extended operation of Phase 3. If needed, a request will be made to AO/AOR to authorize.

Category	Phase 2	Phase 3
Phase 2 and 3 SE Deliverables (Labor + ODC)	$ 1,371,261	$ 1,003,011
Labor	$ 1,331,261	$ 903,011
ODC (materials and tools)	$ 40,000	$ 100,000
Vendor Cost (Hardware, Software, Services)	$ 185,000	$ 140,000
Extended Phase 3 Operation Cost - 6 months (Optional, if needed)		$ 122,839
Software Development Labor Budget	$ 675,000	$ -
Travel Budget (not assigned to partner)		
Project Needs	$ 33,200	$ 8,400
Conferences	$ 17,325	$ 34,650
Total	**$ 2,281,786**	**$ 1,308,899**
Federal Share	$ 1,825,428	$ 1,047,120
Non-federal Cost-share	$ 456,357	$ 261,780

Figure 14. Phase 2 and 3 Cost Summary

4.2 Cost Risks

Table 8 provides a list of anticipated risks with proposed costs

Table 8. Cost Risks

Risk	Probability	Impact	Mitigation Strategy
Vendors may request additional funds to meet requirements as intended after selection	Medium	Medium	Procurement process will be designed to avoid such issues. Vendor contracts will be fixed price and contract terms and conditions will be defined such that cost overruns are not allowed.
Planned budget not sufficient for making required updates to documents	Low	Low	Based on lessons learned from Phase 1, the team has identified required hours for meeting deliverable needs.
Outreach materials may need more funds	Low	Low	Non-federal funds may be pursued.

4.3 Estimated Phase 2-3 Costs

Figure 15 provides a breakdown of cost by task. Also, a breakdown of federal and non-federal cost share is provided.

Task		Cost Share			Federal Share			Total		
		Budget	Cost to Date	Remaining	Budget	Cost to Date	Remaining	Budget	Cost to Date	Remaining
2-A	Program Management	$ 38,545.99			$ 154,183.97			$ 192,729.96		
2-B	System Architecture and Design	$ 49,499.09			$ 197,996.37			$ 247,495.47		
2-C	Data Management Planning	$ 21,578.04			$ 86,312.15			$ 107,890.19		
2-D	Acquisition and Installation Planning	$ 56,120.67			$ 224,482.66			$ 280,603.33		
2-E	Software Development and Integration	$ 146,801.48			$ 587,205.94			$ 734,007.42		
2-F	Participant and Staff Training	$ 18,446.10			$ 73,784.41			$ 92,230.51		
2-G	System Test Planning	$ 34,521.76			$ 138,087.03			$ 172,608.79		
2-H	Installation and Operational Readiness Testing	$ 20,645.74			$ 82,582.97			$ 103,228.71		
2-I	Maintenance and Operations Planning	$ 11,987.65			$ 47,950.61			$ 59,938.26		
2-J	Stakeholder Outreach	$ 27,187.89			$ 108,751.57			$ 135,939.46		
2-K	Performance Measurement and Independent Evaluation Support	$ 21,792.72			$ 87,170.86			$ 108,963.58		
2-L	Participation in Standards Development	$ 9,229.98			$ 36,919.92			$ 46,149.90		
Phase 2 Subtotal		$ 456,357.12			$ 1,825,428.46			$2,281,785.58		
3-A	Program Management	$ 38,243.75			$ 152,974.99			$ 191,218.74		
3-B	System Operations and Maintenance	$ 61,350.50			$ 245,401.98			$ 306,752.48		
3-C	Stakeholder Outreach	$ 46,331.05			$ 185,324.21			$ 231,655.26		
3-D	Performance Measurement and Independent Evaluation Support	$ 90,703.38			$ 362,813.54			$ 453,516.92		
3-E	Post-Deployment Transition Planning	$ 15,763.05			$ 63,052.19			$ 78,815.24		
3-F	Participation in Standards Development	$ 9,388.16			$ 37,552.63			$ 46,940.79		
Phase 3 Subtotal		$ 261,779.89			$ 1,047,119.54			$1,308,899.43		
Total		$ 718,137.00			$ 2,872,548.00			$3,590,685.00		

Figure 15. Phase 2-3 Costs by Task

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Appendix A. Acronyms and Glossary

AO- Agreement Officer

USDOT procurement officer serving as the contact person for Phase 2/3 cooperative purchasing agreement.

AOR- Agreement officer's Representative

USDOT officer acting as the representative of AO on a day-to-day basis on a project.

Access2Care

A transportation broker for State of Iowa Medicaid program that performs booking and scheduling and works with service providers such as HIRTA for successful delivery of Medicaid-eligible trips.

ADA – Americans with Disabilities Act

Refers to the civil rights legislation passed and signed into law in 1990 to prevent discrimination against people with disabilities.

Billing

Refers to the process of invoicing third-party funding sources (e.g., Medicaid) after a successful delivery of a trip. Billing is typically done on a monthly basis.

CAP- Comprehensive Acquisition Plan

Provides a document with details on what needs to be procured and what procurement methods will be used.

CHNA - Community Health Needs Assessment

Refers to the Community Health Needs Assessment Report developed by Dallas County in 2019.

CIP- Comprehensive Installation Plan

Provides details on installation regarding equipment to be installed, inventory control, quality control, schedule and other pertinent details.

CO: Contract Officer

The CO will serve as the USDOT point of contact for any concerns related to the contracts.

COR - Contract Office Representative

The Contract Office Representative will serve as the USDOT representative for this project and is responsible for coordination and review of the proposer's work.

Cost Allocation

Refers to the process of associating a funding source that should be billed for a trip in a shared ride scenario when riders covered by separate funding sources share the vehicle for their trips and trip purposes at the same time.

CTAA – Community Transportation Association of America

One of the project Partners who will lead stakeholder engagement on this project.

DCHD – Dallas County Health Department

One of the project Partners who will lead integration with health care services.

Demonstration

Verification/validation of a system for a given list of use cases for end-to-end operation

DR-Demand Response

Refers to a service that is not run on a fixed route or a schedule (e.g., dial-a-ride, vanpool etc). This requires making trip booking by contacting the service provider (e.g., HIRTA). However, DR is different than an ADA Paratransit service which is provided as a complement to a fixed route and is governed by specific requirements provided in 49 CFR- Part F. HIRTA operates only DR Service in Dallas County and all discussion in this document is related to DR Service.

Dispatching

Refers to an operations management function which involves assigning vehicle, tracking fleet location, managing schedule adherence, managing trip manifests and other operational functions.

DMP – Data Management Plan

The Data Management Plan is Task 3 of Phase 1 and will describe the approach for data collection, processing, storage and utilization.

DOT – Department of Transportation

The government department responsible for transportation. In this report, this generally refers to either the State of Iowa's DOT or the United States DOT referred to as Iowa DOT and USDOT, respectively.

EDI – Electronic Data Interchange

In this context, refers to the electronic data interchange (EDI) format messages developed by HIPAA following American National Standards Institute (ANSI) X12 standard for electronic data

exchange and are used to communicate with third-party health care provider systems (e.g., Medicaid).

her – Electronic Healthcare Record

Refers to the healthcare information management system used by hospitals for patients' healthcare-related appointments, transactions, and records management.

GTFS – General Transit Feeds Specification

GTFS is a standard to provide static public transportation schedule information. The standard has been expanded to include real-time passenger information (GTFS-real-time), flexible services (GTFS-flex) and accessible routing within stations (GTFS-pathways).

HIPAA – Health Insurance Portability and Accountability Act of 1996

Provides guidelines for data protection of sensitive patient health information.

HIR–A - Heart of Iowa Regional Transit Agency

Rural, regional public transit agency in central Iowa. HIRTA will serve as Proposer/Applicant for the Complete Tr–p - ITS4US project.

HL7 – Health Level Seven International

A not-for-profit, standards developing organization focused on electronic health information.

HN-Health Navigator

Refers to services provided by Dallas County Health Department to Dallas County residents in identifying resources as necessary for improving social determinants of health.

ICTDP – Integrated Complete Trip Deployment Plan

The Integrated Complete Trip Deployment Plan is a deliverable of Task 13 under Phase 1.

Information and Referral

Refers to public and private entities that help their customers in identifying resources for health and human services and other needs.

IP–P - Institution, Partnership, and Financial Plan

The Institution, Partnership and Financial Plan is a deliverable of Task 10 under Phase 1.

ISU– Iowa State University

Iowa State University is a public research university with multiple campuses in the State of Iowa and will be engaged as the research and evaluation partner in Phases 2 and 3.

KPI – Key Performance Indicators

Represents primary metrics used to assess the success of a project or operations.

LEP – Limited English Proficiency

Refers to individuals who have a limited ability to read, speak, write, or understand English.

MOD- Mobility on Demand

Refers to a concept of a trip fulfillment platform designed to dynamically assess and allocate resources based on current level of supply and demand.

Middleware

Refers to an interface application that enables data exchange between two disparate system or applications using API endpoints offered by those applications.

NDSP- Non-Dedicated Service Provider

NDSP refers to operators providing service under contract (e.g., taxis) to an agency (e.g., HIRTA).

NEMT – Non-emergency Medical Transportation

The provision of transportation to patients for medical appointments, lab visits, and other routine care. Generally, used in the context of Medicaid service only.

Outreach Plan

Describes the approach to engage with stakeholders and industry partners along with communication methods and outreach execution strategies.

Operational Readiness

Readiness of a system to go-live for at-scale operation.

PII – Personally Identifiable Information

Refers to any data that can distinguish an individual, either alone or when linked with other available data.

Provider

Provider in this context mainly refers to an entity performing service delivery for requested trips, sometimes also referred as service provider. The HIRTA team has also used healthcare partners as providers in some cases but referred as ‘healthcare providers.’

Reservation

Refers to the act of booking a trip based on a request from a customer. Reservation is available to only registered customers.

Scheduling

Refers to the process of identifying driver and vehicle resources and their runs/shifts for a given workday. Scheduling is typically performed for all requests received until 24 hours in advance. Booking within 24-hour notice and on-demand is offered but not encouraged due to limited system capacity and resources.

SAD- System Architecture Document

Refers to the systems engineering concept that allows planners, engineers and other professionals to design systems using a common language for delivering intelligent transportation solutions.

SDD- System Design Document

A system engineering document that build upon ConOps and SyRS to decompose requirements further into design elements so system can be configured and built.

SDS- Software Development Schedule

Provides a detailed list of activities to be followed for developing a software product.

SEMP – System Engineering Management Plan

A System Engineering Management Plan describes how systems engineering process of planning, design, and deployment is applied to a project.

SMP – Safety Management Plan

A Safety Management Plan describes the steps to be taken to ensure the safety of the project stakeholders and beneficiaries.

STP- System Test Plan

STP documents a the overall strategy for testing a system from unit level to integrated operational environment.

Smart Device

Refers to smartphone, smartwatch and similar personal devices that may be internet enabled and are equipped with sensors.

TAG – Transportation Advisory Group

The TAG is a varied group of community stakeholders and business representatives interested in the advancement and improvement of public transportation in the HIRTA service area.

Test

Verification of a system against a list of test cases developed to ensure compliance and traceability with requirements and design.

TNC – Transportation Network Company

Encompasses a group of companies that provide on-demand Ridehailing services.

TDS- Transactional Data Specification

Refers to a preliminary set of specifications developed for enabling data exchange between demand response systems in real-time.

Wayfinding

Refers to the tools and technologies that assist in orientation, locating objects, and step-by-step navigation to destinations in outdoor and indoor environments using visual markers, sensors or physical signage.

Appendix B. References

The following documents were referenced when preparing this ICTDP:

1. USDOT, “Complete Trip- ITS4US Deployment Broad Agency Announcement (693JJ3-20-BAA-0004)”

2. HIRTA, “HIRTA - USDOT Complete Trip - final Proposal - v1.0 2020-07-31 (Volume 1),” July 2020.

3. Concept of Operations (ConOps): Heart of Iowa Regional Transit Agency ITS4US Deployment Project (FHWA-JPO-21-859) https://rosap.ntl.bts.gov/view/dot/57469
4. Data Management Plan (DMP): Heart of Iowa Regional Transit Agency ITS4US Deployment Project (FHWA-JPO-21-867) https://rosap.ntl.bts.gov/view/dot/61727
5. Safety Management Plan (SMP): Heart of Iowa Regional Transit Agency ITS4US Deployment Project (FHWA-JPO-21-872) https://rosap.ntl.bts.gov/view/dot/58323
6. Performance Measurement and Evaluation Support Plan (PMESP): Heart of Iowa Regional Transit Agency ITS4US Deployment Project (FHWA-JPO-21-877) https://rosap.ntl.bts.gov/view/dot/60580

7. Systems Requirements Specifications (SyRS) Document, Heart of Iowa Regional Transit Agency ITS4US Deployment Project (FHWA-JPO-21-882) https://rosap.ntl.bts.gov/view/dot/61724

8. Human Use Approval Summary (HUAS): Heart of Iowa Regional Transit Agency ITS4US Deployment Project (FHWA-JPO-21-897) https://rosap.ntl.bts.gov/view/dot/61191

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