Phase 1 Integrated Complete Trip Deployment Plan

Heart of Iowa Regional Transit Agency ITS4US Deployment Project

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Final Report — March 11, 2022
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COMPLETE TRIP
ITS4US

U.S. Department of Transportation

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16. Abstract

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 for the Most Vulnerable: An Inclusive Mobility Experience from Beginning to End"*** (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 the discussions from Tasks 2-12 of Phase 1 to provide a summary of how, in Phase 2, the Health Connector system will be further designed, developed, procured, configured, and deployed. Deployment will include installation, testing and training. Further, the ICTDP, describes the plan for Phase 3, in which the Health Connector system will be operated, maintained and evaluated. This document also provides a tentative schedule and a summary of the budget needed for Phase 2 and 3.

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Santosh Mishra, IBI Group; Heidi Guenin, IBI Group	11 March, 2022	2.0	Revised to address USDOT comments	Brooke Ramsey

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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 refences to relevant documents listed in Appendix B is provided within parentheses.

1.2 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 for the Most Vulnerable: An Inclusive Mobility Experience from Beginning to End"*** (Health Connector) by the United States Department of Transportation (USDOT).

1.2.1 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.

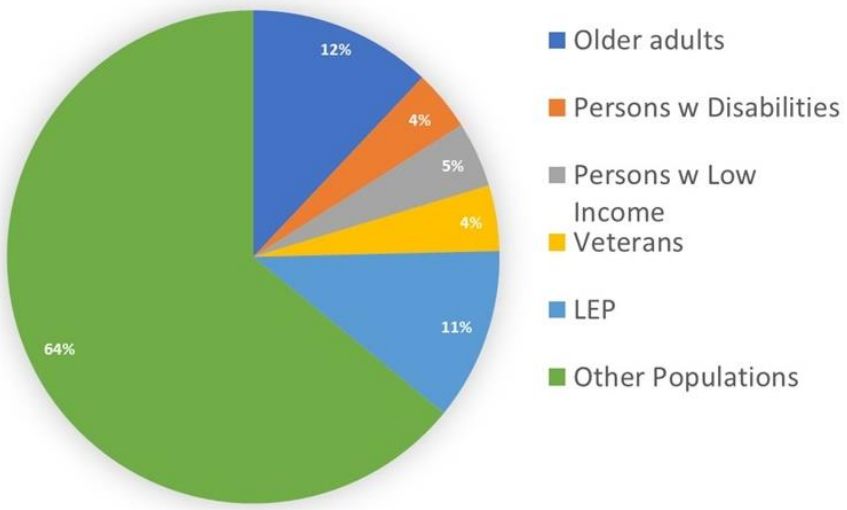


Figure 1. Dallas County, Iowa (Source: HIRTA)

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 2 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 inequities between the affluent eastern side of the county and the rural and ethnically diverse 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.

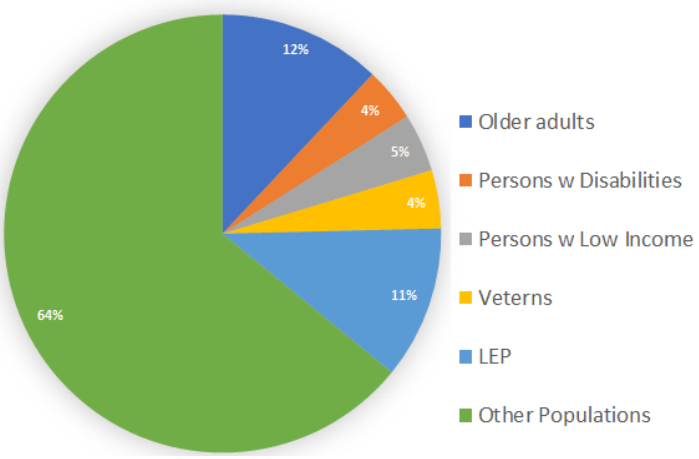


Figure 2. Population Breakdown in Dallas County (Source: HIRTA)

1.2.2 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. Services under discussion in this project are demand response only and not complementary ADA paratransit. HIRTA provides demand response 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. Medical transportation services in the context of this project refer to trips provided to the residents of Dallas County looking for medical transportation services to the four major healthcare facilities in the area: Dallas County Hospital, Broadlawns Clinic, Unity Point Health, and Mercy One Hospital.

1.2.3 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 **Error! Reference source not found.**. 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 patient 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.

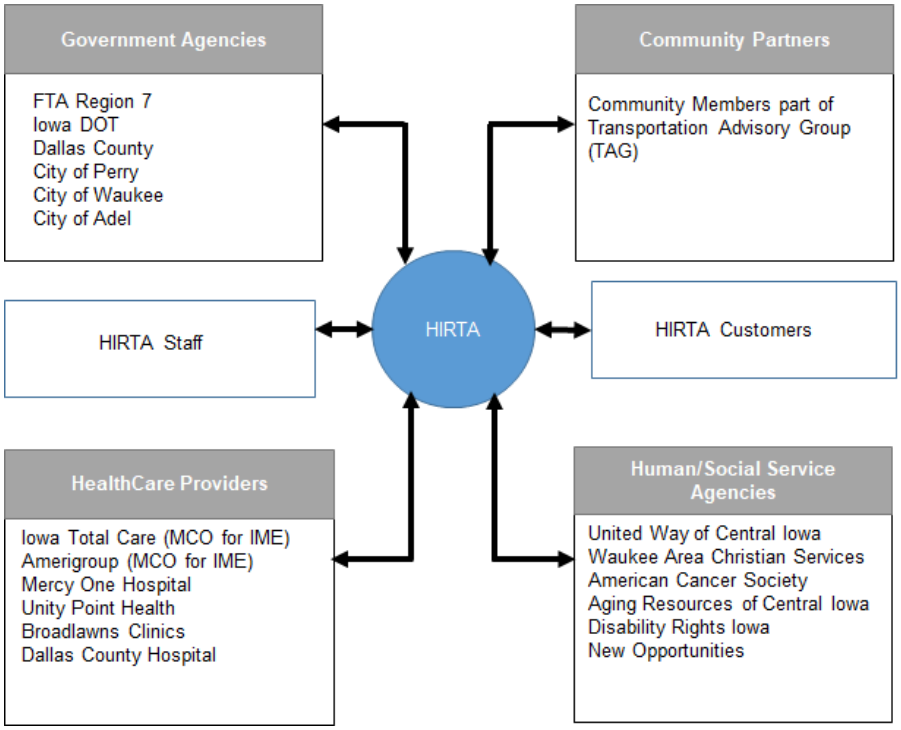


Figure 3. HIRTA Stakeholders (source: HIRTA Team)

Phase 1 ConOps [3] provides a detailed list of users and actors and how they will interface with the system.

1.2.4 Stakeholder Needs

As discussed in the Phase 1 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 (see **Error! Reference source not found.**), 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.

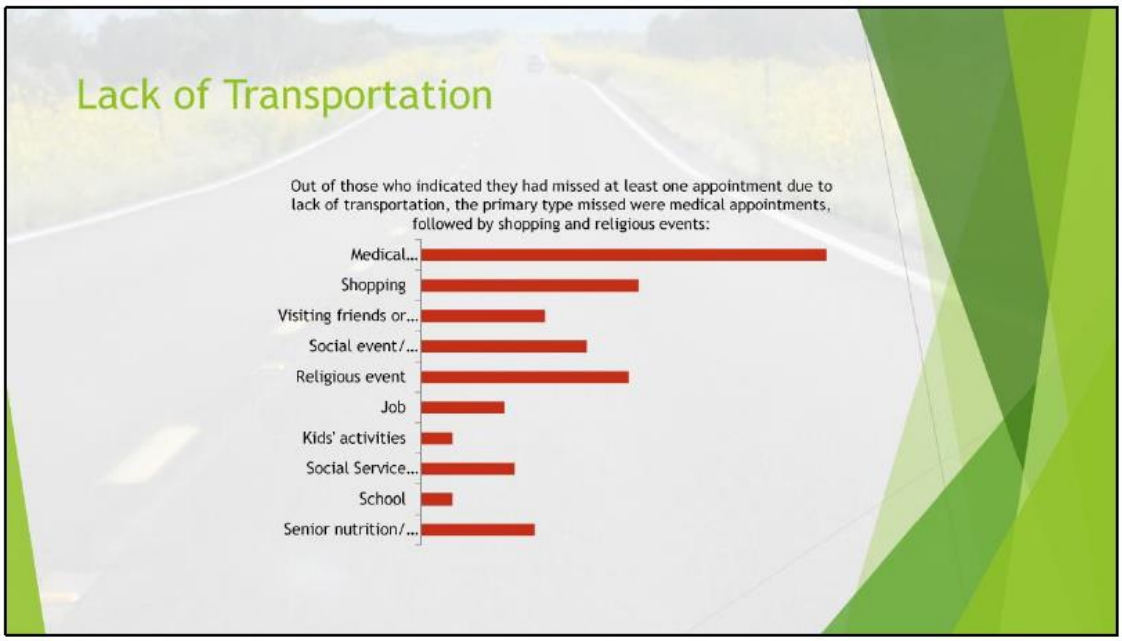


Figure 4. Excerpt of Survey Response from 2014 NLAPH Survey of Dallas County Residents (Source: DCHD)

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, service management, payment, and information and wayfinding to solve the challenges faced by underserved populations in Dallas County, Iowa for transportations services as needed for medical appointments.

Based on stakeholder discussions, a summary of the unmet needs, as originally discussed in the ConOps document [3], are as follows:

- **Lack of Awareness About Available Transportation Options:** One of the major factors limiting access to transportation is Travelers having limited information on options beyond personal (or arranged via family/friends) transportation for medical trips. Health Connector will provide a platform that will allow customers to explore availability of HIRTA and its partner vehicles through a “trip planning/discovery” feature within Health Connector.
- **Lack of Integrated Booking and Trip Management Experience**: The planned Health Connector deployment concept seeks to address a longstanding need to integrate transportation and healthcare scheduling, management, and day-of services monitoring functions for ultimate “one stop” experience for all Travelers for their mobility needs, with specific focus on underserved populations. This solution will help Dallas County residents who are not able to make their medical appointments due to lack of access to transportation; they will be able to explore their options and book and manage a ride at the schedule of their choice.
- **Challenges in Meeting the Needs of Underserved Groups:** The key challenges relevant to transportation access to healthcare services in the context of HIRTA services are as follows:

- Return trip is a major issue for all groups, since end-time for appointments cannot be accurately determined ahead of time. HIRTA tries to accommodate customers' requests for same day service, particularly for return trips, but due to limited driver/vehicle and financial resources, it is not possible to address the needs of all customers. Sometimes customers do not want to be on the same vehicle with others, which creates additional burden on resources and capacity to provide single ride transportation.
- DCHD Health Navigators spend a lot of time and resources, often arranging multi-party calls, given the lack of access to consolidated information (funding eligibility, transportation availability, healthcare service availability) from a single tool. While most underserved groups are affected due to this limitation, persons with LEP need the most assistance and are severally impacted.
- HIRTA currently offers services in limited hours, which does not meet the needs of many Travelers who may be interested in using HIRTA vehicles but are unable to use HIRTA to make their appointments. HIRTA has plans for providing services through third-party service providers for Travelers' after-hours needs.
- Some people are not aware of HIRTA, or they do not take it because of the fee (e.g., $5.00 one way).
- Most of the customers that Iowa Health and Human Services (HHS) works with are on Medicaid or Medicare. Also, the elderly groups are on Supplementary Security Income (SSI) and getting Medicaid, which covers some part of the transportation. However, Medicaid has very strict requirements as what qualifies, and if a trip does not qualify for coverage, that could be a barrier that prevents the customer from making the trip. When customers are not eligible for Medicaid, HIRTA coordinates with funding partners and health navigators to determine if other funding sources are available for healthcare trips.
- Older adults have identified lack of comfort with the use of smart devices as a major issue and have expressed a preference for devices with larger font specifically designed for older adults (e.g., Grand Pad). However, those devices have limited functions. Applications to be used by older adults must have the ability to adjust user experience by utilizing accessibility functions either available in the operating system or supplemented by built-in advanced capabilities within the application. Also, extensive training will be required so older adults are self-reliant in using the capabilities offered by the Health Connector solution. To increase usability for populations that are not tech-savvy, it will be most helpful to make the system design as simple as possible and with larger fonts.
- Persons with disabilities have limited mobility options when booking transportation, due to lack of accessible vehicles or those that can accommodate mobility needs such as walkers, oxygen tank, service animals, and others. All HIRTA vehicles are accessible, but commercial vehicles (e.g., taxis or TNCs) provide limited fleet of accessible vehicles.
- Even at smaller facilities, wayfinding is an issue. Customers may have their first appointment on one side of facility and a second on another side, but they may not

remember to share this information when booking a trip. Drivers typically must coordinate with Dispatchers to find out exact pick-up location/spot.

- Customer experience during initial trips is critical. If a customer has a long wait or services were not available when needed for an appointment, customers are likely to prefer other transportation options. Most trips are on time, but when there are delays, the experience may prevent customers from trying the service again.
- The customer's ability to pay for trips is a major barrier. While HIRTA services are offered at a fixed low fare for customers that are covered by external funding sources, many low-income customers may still not be eligible for those services, due to the income criteria established by those programs (e.g., Medicaid). Also, low-income populations may rely on cash if they do not use banking and financial institutions.
- Persons with LEP may prefer to have someone accompany them for medical appointments so they can be helped. They may not use the tools and services available (e.g., translation service) as may not feel comfortable.
- Helping customers get where they need to, creates an additional cost to hospitals at times. While hospitals may have affiliated Social Workers and Health Navigators who help customers find transportation services, the process of registering and booking trips creates an administrative burden, due to a largely manual process. Also, healthcare providers have only limited funds available to help customers who may not have funds to pay for services arranged. One healthcare provider mentioned that coordination for follow-up care, coordinating the time and availability for the patients and the provider, educating the patient on their options, and communicating with the provider ends up being a time-consuming process for healthcare professionals.
- Healthcare customer coordinators currently rely on manual methods (e.g., phone calls, emails, in-person coordination, spreadsheets) to assist customers who may be looking for transportation services. They would prefer electronic capabilities as conceived within Health Connector, particularly real-time information on transportation services.
- Many customers live in rural areas where broadband access is lacking, unreliable, or insufficient. Also, the expense of data plans may limit the ability of low-income populations to use applications that may require extensive data bandwidth (e.g., feature-rich map interface).

- **Limited Capabilities with Current Transportation Modes**: Apart from HIRTA vehicles, there are limited modes that can meet the needs of underserved groups related to visual, hearing and learning disabilities, language barriers, and other limitations. The proposed project deployment will be universally designed to meet the needs of all Dallas County's underserved population, including persons with disabilities, low income, rural, older adults, veterans, and persons with limited English proficiency. As needs vary by the individual, underserved citizens may qualify for one or more these subgroups (i.e., the person may be an older adult, a veteran, a person with a disability and lives in a rural area).
- **Limited Wayfinding Capabilities:** Another missing link in medical transportation has been wayfinding both for locating the vehicle on arrival or wayfinding/navigating to the correct

destination inside a facility upon arrival. The Health Connector solution will provide a seamless wayfinding experience from the same application.

- **Same Day Reservation and Service Capacity Issues:** HIRTA typically does not provide same day reservations. Uncertainty with return trips may often generate a need for same day booking or modifications, creating capacity challenges in meeting customer demand. Health Connector will augment capacity through a seamless integration with taxi, TNC, and other NDSPs. Please note that these services are expensive and will have to be subsidized so the Traveler share is comparable to the use of other HIRTA services. HIRTA will be invoiced by NDSPs on a monthly basis for trips successfully performed.
- **Limited Coordination Among Different Organizations:** The proposed deployment seeks to further integrate the operations and services provided by HIRTA, DCHD, and the Dallas County healthcare community by providing them access to the transportation booking and real-time service information tools to maximize outcomes for the community and reduce the level of manual coordination by phone calls and emails. Access to these tools will also allow tracking of any missed medical appointments caused by lack of access to transportation.
- **Data Sharing and Reporting:** Currently, healthcare providers, DCHD, and HIRTA do not have any ability to share data or report on booking and delivery of medical trips. HIRTA has those trips captured within the Routematch by Uber software, but there is not enough data to analyze health outcomes of those trips. Health Connector will allow tracking of medical and transportation appointment related data (e.g., appointment date, time and location by a customer identifier) by healthcare partners so DCHD, HIRTA, community partners, funding entities, and government partner agencies are able to monitor the impact of improved transportation access while protecting the privacy of individuals requesting trips. All data collection and sharing will be conducted per the approved process from the Institutional Review Board (IRB) at the Iowa State University (ISU) as documented in the DMP.

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

1.2.5 Health Connector Background and Key Capabilities

The Health Connector solution intends to demonstrate an innovative concept that will address various bottlenecks associated with healthcare access for HIRTA communities. Some of these challenges are the key reasons behind missed appointments or unacceptable levels of preventive or as-needed healthcare in HIRTA service area. For this deployment, the HIRTA team plans to implement a scalable and replicable solution that enables inclusive access to non-emergency medical transportation for all underserved populations and their caregivers by resolving access barriers through 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. Further, this solution will include information and wayfinding services to guide them at every step of their trip.

The referenced underserved populations' mobility needs vary based on the individual. This deployment will provide enhanced access to healthcare options for "all travelers" in Dallas County with a specific focus on underserved communities, including persons with disabilities, low income, rural, older adults, veterans, and persons with limited English proficiency (LEP). In addition to addressing mobility needs, the proposed deployment will recognize the net impact that access to

health services has on patient health care outcomes as well as both the financial and health outcomes from the perspective of the health care community/Dallas County Health Department (DCHD).

Figure 5 provides an overview of the Health Connector concept.

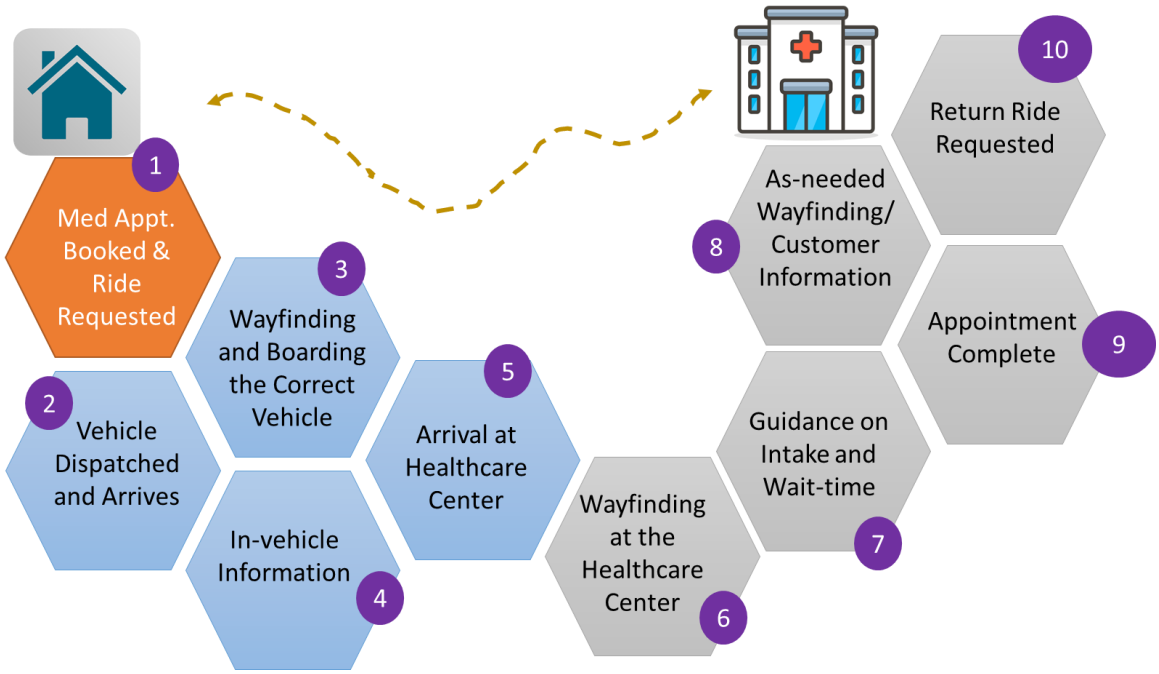


Figure 5. Overview of Health Connector System Concept (Source: HIRTA team)

Every step of the trip shown in Figure 5, utilizes tools that require good quality data to function as follows:

- At pre-trip, the trip planning function will require access to appointment details to find out applicable transportation alternatives. The booking function will require access to a customer profile with details on customer mobility needs and eligibility for a funding source, vehicle and driver availability, estimated arrival time, travel time, and more. The traveler may also coordinate with Health Navigators or caregivers who will have access to the data to provide help related to medical appointments or required transportation.

- During each step of their trip, the Traveler, through their own (or caregiver's) personal mobile device, will need to be notified about estimated pick-up time and estimated travel time. This information will be provided using trip performance (e.g., actual time of arrival or trip status) data generated by the system in real-time. Travelers will also be able to use the outdoor wayfinding function, which will provide information related to localization and orientation (e.g., locating the vehicle at the pickup spot).

- On arrival, at the healthcare center, systems will use the data available to guide the Traveler to locate the correct door and entrance and provide step-by-step guidance indoors if necessary, using the mapping and pathways data available from the wayfinding

system. The Traveler will also initiate a return trip based on current availability of driver and vehicle information.

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 medical appointments and transportation services all in one location (Health Connector App). Provide customers with options to choose from, from among 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) for where to meet the vehicle/driver. On arrival, drivers should have the ability to automatically confirm Traveler identity.
- The Health Connector App will provide personal, concierge-style travel from origin to destination, enabling the Traveler to utilize advanced wayfinding solutions with the help of indoor and outdoor navigation technologies. This support will allow the Traveler to:
    - Locate the vehicle outside of origin and destination locations,
    - Locate the healthcare facility after being dropped off by a vehicle.
    - Locate the desired floor/room once inside the healthcare facility.
- Travelers will be able to use the Health Connector solution for any contactless payment needs at any point for transportation-related payments.

If Travelers 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 solution.

1.2.6 Subsystems and Applications

The systems involved in the context of Health Connector, as shown in Figure **6**, can be defined as follows:

- **Traveler-end Subsystem**: includes the tools and technologies (phone/interactive voice response (IVR), mobile/smart devices, web-based tools) to be used by travelers or patients seeking transportation services for their medical appointments as part of their pre-trip, during trip, on arrival, and return trip activities.

  For Health Connector, HIRTA will procure a commercially available off-the-shelf (COTS) application for planning, booking, and payment. Also, this new application will provide real-time status of trips on-demand and through push notification services.

  With COTS, HIRTA team refer to systems that are available from mobility on demand (MOD) vendors (e.g., Via, Rideco, Spare, Uber Transit, Ecolane) and will not be developed from scratch or enhanced for this project. Those systems are configuration driven and will be configured to meet the needs of the HIRTA project based on requirements and design discussions in Phase 2.

- **Transportation Management Subsystem (TMS):** includes the technologies used to assist customer care and operations staff with Traveler registration, eligibility management, reservations, scheduling, dispatching, billing, and administration activities.

Further, this new platform will support utilizing third-party service providers for adding capacity when needed in real-time. Finally, limited access to this platform will be made available to Health Navigators and healthcare providers, so they are able to book trips directly without involvement of HIRTA staff. These products are commercially available from various providers of paratransit/demand response systems (includes both same day and advance booking), referred as MOD vendors in this document. HIRTA will procure the MOD platform in Phase 2 which will also be fully integrated with accompanying Traveler and Driver applications available from the MOD vendor.

- **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 customer 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 step-by-step guidance on request to Travelers**.** One or more commercially available wayfinding system provider may be used, but the current plan is to utilize at least the system provided by HIRTA team partner, NaviLens.

- **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.

    - **Access2Care**: refers to the State of Iowa Medicaid broker's system used for booking and managing Medicaid trips. HIRTA is one of the providers used by Access2Care. Medicaid trips will be booked by Access2Care when requested by Travelers and will be ingested in the HIRTA system when assigned to HIRTA. At that point, a Traveler using Medicaid benefits will be able to use Traveler tools provided by Health Connector.

    - **Health Navigator-end Subsystem**: includes the following components:

        - An Information and referral (I&R) product that is used by Health Navigators and the Health Administrator at the Dallas County Health Department (DCHD) to track the status of referral activities and for coordination with Dallas County residents' health navigation/social care services. Currently, DCHD uses a Microsoft Access-based program that recently replaced the previously-used product from Healthleads. No Health Connector integration is planned with this product. However, access to data may be needed for measuring Health Connector performance.

        - Limited access to TMS components will be provided to Health Navigators to arrange transportation services for the Travelers they may be working with and to coordinate with HIRTA or healthcare staff on the status of a trip. This will also allow Health Navigators to access customer feedback

and trip performance data on transportation services provided by Health Connector.

- **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.

- **Health Connector Middleware:** HIRTA team will build an open-source middleware application to automate the following data exchanges between MOD platform and external systems. The open-source code will be released under MIT License and will be published on GitHub at https://github.com/ibi-group.

  The middleware application between MOD and Access2Care applications will automate the following data flows for Medicaid-funded trips:

  - **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 application will automate the following data exchange between MOD and EHR software to coordinate medical and transportation appointments:

  - **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.

Additional details on Health Connector middleware development approach are provided in Systems Engineering Management Plan (SEMP) [12].

- **Other**: Additional relevant details for the system to be deployed are as follows

  - **Supporting systems**: These are existing systems and are not part of the Health Connector project. 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 driver or vehicle information management, vehicle maintenance management, customer service management, and safety event reporting. HIRTA currently uses capabilities within Routematch Demand application for completing such functions, but other off-the-shelf products are also commercially available.

  - **Data Storage**: Traveler applications will store data locally as allowed by their devices and as authorized by Travelers. Vehicle and TMS subsystems will communicate over cellular data communication for operational data exchange. All data is exchanged in real-time (at a configurable frequency). Data is temporarily stored on the vehicle to support offline operations in the event of communication failures. On the central side, TMS data will be stored in a relational database in the in the cloud storage. Data will be stored in a live database to support real-time operations and then processed and archived for reporting in a historical database.

Figure 6 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 1. Note that the existing system components from Routematch by Uber are listed under System of Interest as some of the registration and eligibility determination processes may still be conducted within that system. However, once the customer profile is created and eligibility is determined, Health Connector will solely rely on the MOD vendor platform for day-to-day operations. At this time, HIRTA team does not see a need for integration between these two systems.

1.2.7 Expected Outcomes

The 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 1.2.11). Further, Health Connector will enable enhanced collaboration for transportation needs among HIRTA staff, DCHD, and healthcare providers

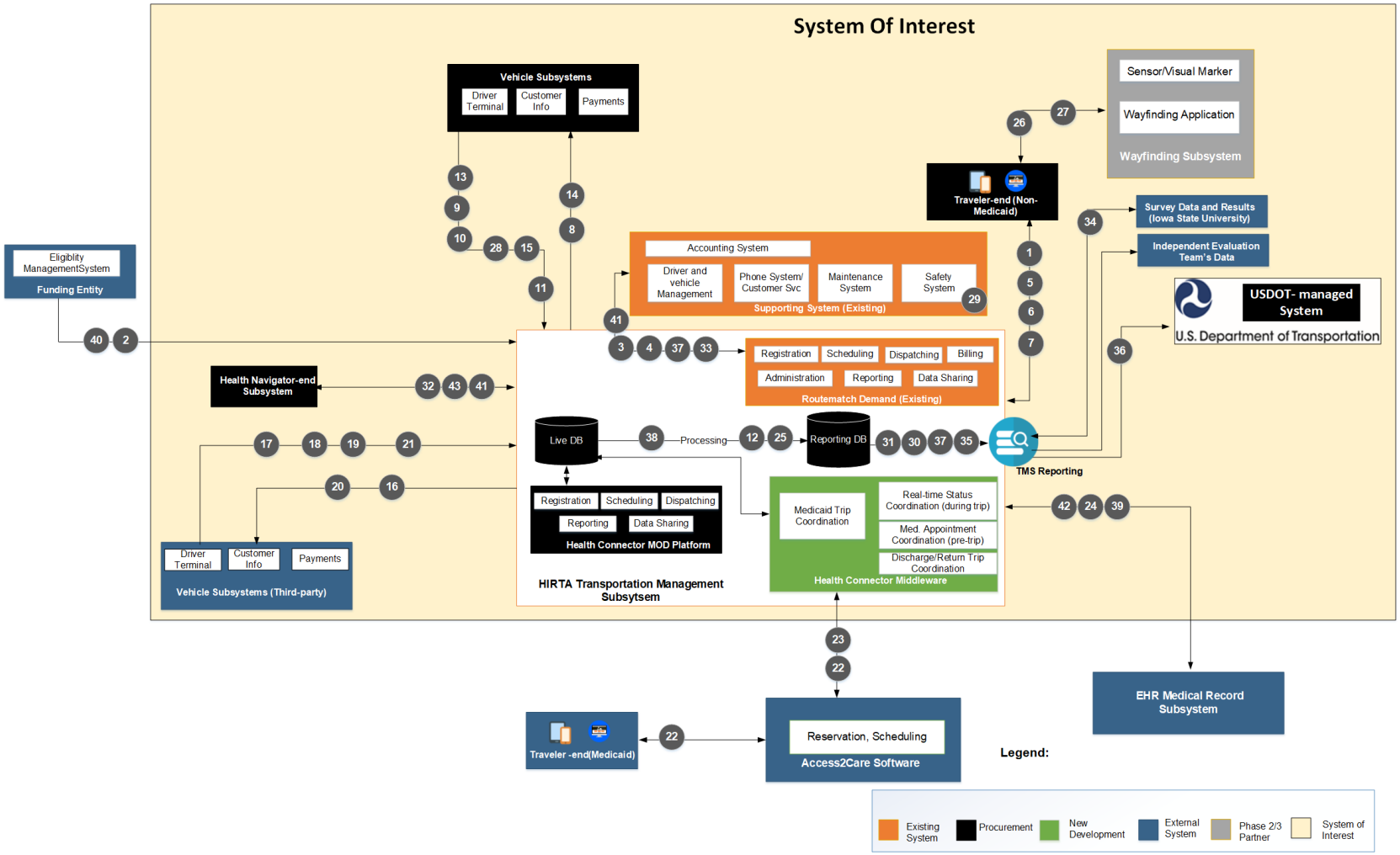


Figure 6. Health Connector System Components along with Data Flow (Source: HIRTA team)

1.2.8 Goals and Objectives

Health Connector goals and objectives based on user needs and using the USDOT and Complete Trip 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 as those relate to healthcare trips. Relevant objectives are:
    - G201: Provide 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. Safely assist under-served travelers in locating vehicles and/or facilities at destinations through the availability of secure and reliable outdoor and indoor way-finding tools.
    - G203. Provide 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. Manage transportation services from multiple service providers from a centralized Health Connector system and enable as-needed transportation capacity.
    - G302. Provide reliable transportation for requested trips using tools and procedures as necessary.
    - G303. Provide affordable transportation through coordination with funding entities for subsidizing transportation for the underserved.
    - G304. Reduce trip coordination time needed by staff and HIRTA partners 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. 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. Reduce 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. Mitigate risks related to accidents, incidents, injuries, and severe consequences associated with trips to medical facilities, outdoor/indoor wayfinding and return trips.

1.2.9 Use Cases/Scenarios

The Health Connector system will interact with at least 4 distinct operational environments [3]: 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, but 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, and challenges around what to do if proper procedures aren't followed, even if the transportation would otherwise be eligible. For persons not covered by Medicaid, the scenarios are more diverse and more complex, and include the risk that needed medical transportation might not be available, accessible, affordable, or appropriate.

ConOps [3] identified 14 scenarios. The most applicable scenarios that the Health Connector solution will address and will be referenced for evaluation are as follows. Please note that scenario numbers are the same as in ConOps document for easy reference regarding details.

- **ConOps Scenario 4- Fixed Recurring Appointment (referred in this document as U1)**: A person with disability looking for transportation for a recurring appointment (e.g., dialysis or cancer treatment).

- **ConOps Scenario 5-Recurring but Irregular Appointment (referred in this document as U2)**: A person with limited English proficiency (LEP) looking for a prenatal appointment and

will need transportation. It is recurring but not on a fixed schedule. The person coordinates with a Health Navigator for appointment booking. The person also requests a personal companion so they can be helped during the appointment.

- **ConOps Scenario 6- Medical Transportation Needs for Veterans (referred in this document as U3):** A Traveler, also a veteran, looking for a preventive care appointment. They need to change the return trip appointment to another leg to pick up medicines from a pharmacy on the way to home.

- **ConOps Scenario 8-An Older Adult using Medicaid Benefits (referred in this document as U4):** An older adult is approved to take a Medicaid eligible trip, but they would like family to accompany them so they can be helped. Only the eligible portion of the trip will be billed to Medicaid. Traveler books a return trip home at later time/day.

- **ConOps Scenario 11-Return Trip Depends on Planned Discharge Per Progression of Recovery (referred in this document as U5)**: Customer has a planned discharge based on progression of recovery for next day. Discharge Planner will set up transportation to residence and/or skilled care facility.
- **ConOps Scenario 13-No-show for Inbound Transportation but Return Trip Needed (referred in this document as U6**: Customer was a no-show for outbound trip to medical appointment (or cancelled without providing a reason), but the customer had also booked a return trip. HIRTA has to follow-up with both customer and the hospital to find out if the customer needs the return trip before their trip back to home can be cancelled.
- **ConOps Scenario 14- After-hours Service Needed for Urgent Care (referred in this document as U7):** A Traveler, living in a rural area, is looking for an after-hours appointment for urgent care treatment. Given HIRTA vehicles are not available, a third-party service must be used.

These seven scenarios have been selected for performance management out of the total of 14 scenarios as they cover most of the operational complexities and Traveler needs as follows:

- **Needs for Underserved Groups**: Needs for all underserved groups, as applicable to Health Connector (e.g., persons with disabilities, older adults, persons in rural areas, veterans, persons with low income, persons with limited LEP).
- **Schedule type:** Recurring on fixed schedule, recurring on irregular schedule, ad-hoc.
- **Timing:** Trips may be scheduled in advance or same day/on-demand, including during after-hours.
- **Types of vehicles/drivers**: HIRTA-owned, taxi/TNC, or other NDSP.
- **Service anomalies**: no-shows, missed trips, delays, disabled vehicle, incidents/accident, and other operational events that create service anomalies.
- **Types of funding sources**: Medicaid and Non-Medicaid.

1.2.10 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**.**

Phase 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 1.

Table 1. Data Needs Summary

ID	Data	High-level Description	Systems Involved
1	Traveler profile	Traveler's personal details as provided as part of registration.	Traveler-end system, HIRTA TMS
2	Traveler eligibility	Traveler's eligibility for a funding source or program; also verified with funding entities (e.g., Medicaid).	HIRTA TMS, Eligibility Management System/Funding Source
3	Fleet information	Details on HIRTA's vehicles; also, details on third-party vehicles.	Supporting System (Driver and vehicle management), HIRTA TMS
4	Driver information	Details on HIRTA's drivers; also, details on third-party vehicles.	Supporting System (Driver and vehicle management), HIRTA TMS
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.	Traveler-end system, HIRTA TMS
6	Trip modification or cancellation	Traveler's request for modification to an existing trip, including cancellation.	Traveler-end system, HIRTA TMS
7	Trip status	Current information on upcoming trip.	Traveler-end system, HIRTA TMS

ID	Data	High-level Description	Systems Involved
8	Manifest	Time and location details on Travelers to be picked up and dropped off by a Driver during a shift.	Vehicle-end system, HIRTA TMS
9	Vehicle location	Location and heading along with other details for a vehicle in service.	Vehicle-end system, HIRTA 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.	Vehicle-end system, HIRTA TMS
11	Driver performance	Driver-level log of operational performance on log on, on-time performance, manifests completed.	Vehicle-end system, HIRTA TMS
12	Travel time	Time needed to perform on-board component of a trip.	Processed using Trip Performance Data
13	Driver Messages	Log of messages sent by Drivers to Dispatchers.	Vehicle-end system, HIRTA TMS
14	Dispatcher Messages	Log of messages sent by Dispatchers to Drivers.	Vehicle-end system, HIRTA TMS
15	Fare Payment Log	Log of amount paid for a trip and method of payment.	Vehicle-end system, HIRTA TMS
16	Manifest (third party)	Time and location details on Travelers to be picked up and dropped off by a third-party Driver during a shift.	Vehicle-end system, HIRTA 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.	Vehicle-end system, HIRTA TMS
18	Vehicle location (third party)	Location and heading for a vehicle in service along with other details for a third-party provider.	Vehicle-end system, HIRTA TMS
19	Driver Messages (third party)	Log of messages sent by Drivers to Dispatchers.	Vehicle-end system, HIRTA TMS
20	Dispatcher Messages (third party)	Log of messages sent by Dispatchers to Drivers.	Vehicle-end system, HIRTA TMS
21	Fare Payment Log (third party)	Log of amount paid for a trip and method of payment.	Vehicle-end system, HIRTA TMS
22	Medicaid trip requests	Traveler request for Medicaid-funded trips from a web or mobile device through Access2Care; some Travelers may request over phone and use concierge service.	Traveler-end system (Medicaid), Access2Care 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.	Access2Care system, HIRTA TMS
24	Medical appointment details	Consists of medical appointment date, time and location (facility address and doctor's office) for a particular Traveler	HIRTA TMS, EHR system
25	Aggregated Summary	Aggregated data on driver, vehicle and trip performance.	TMS Reporting

ID	Data	High-level Description	Systems Involved
26	Traveler wayfinding request	Requests initiated by Travelers to the wayfinding system.	Traveler-end system, Wayfinding system
27	Traveler wayfinding guidance	Log of wayfinding information provided to Travelers.	Traveler-end system, Wayfinding system
28	Safety event	Log of incident and accidents by vehicle/driver/trip.	Vehicle-end system, HIRTA TMS, Supporting System (Safety Management)
29	Safety event report	Detailed reports by a safety event (incident, accident) with response.	Supporting System (Safety Management)
30	Trip history playback	Replay of trip events performed along with location trail during a shift by a driver.	HIRTA TMS
31	System performance	Log of system performance, including any failures.	HIRTA TMS
32	Information/referral (I&R) request	Information and referral request.	DCHD I&R
33	Customer complaints log	Log of customer complaints received and actions taken.	Phone System, Customer Service System
34	Customer survey data and results	Customer data and survey conducted by ISU of human use participants and control group	Local database at ISU
35	Processed data for controlled sharing	Data accessible to researchers, Independent evaluation team and USDOT	TMS Reporting
36	Public data for USDOT-managed System	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, vehicle location, safety event (incident/accident) will also be provided.	USDOT-managed System
37	Cost and revenue data	Cost and revenue data by trip, including actual cost, fare paid, funding source share	HIRTA TMS and Supporting System (Accounting)
38	Wheelchair failure log	Summary of events referring to situations when wheelchair lift could not function at the time of pick-up or drop-off.	HIRTA TMS/ Reporting
39	Medical appointment status	Real-time status of progress on a medical appointment resulting in an impact on the pick-up time.	HIRTA TMS, EHR system
40	Discount coupon/credit	Discount coupons or credits applied by trip	HIRTA TMS, Funding Entity
41	Call center log	Call center statistics available from HIRTA, DCHD and healthcare providers, as available from phone systems or manual logs.	Phone systems at HIRTA, DCHD and healthcare providers
42	Missed medical appointments linked to lack of transportation access	Anonymized missed appointments linked to transportation access	EHR or other systems internal to healthcare providers

ID	Data	High-level Description	Systems Involved
43	Trip request (partners)	Trips manually requested by DCHD and healthcare providers using HIRTA TMS. To be tracked separately to assess the benefit of such capability.	HIRTA TMS

1.2.11 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.

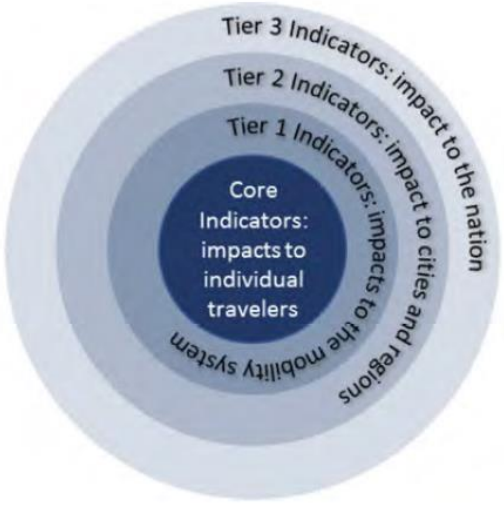


Figure 7. Tiered Framework for Metrics in MPM Report (Source: FTA)

- **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 2

Table 2. Performance Measures

MPM Tier	Goal	Objective	PM#	Performance Measure Type
Core	G3	G301,G302	**1**	**Ability to dynamically reassign vehicles to address service disruption**
Core	G2	G201,G102	**2**	**Availability of transportation alternatives**
Core	G3	G302	**3**	**Trips unfulfilled due to system unreliability**
Core	G3	G302	**4**	**Estimated Time of Arrival (ETA) prediction accuracy**
Core	G3	G302	**5**	**On-time performance**
Core	G3	G302	**6**	**Travel-time prediction accuracy**
Core	G2	G203	**7**	**Spontaneity time**
Core	G2	G202	**8**	**Reliability of the system in assisting with non-vehicle component of the complete trip**
Core	G2	G201	**9**	**Traveler perception of privacy**
Core	G2,G5	G203,G501	**10**	**Traveler safety in healthcare transportation**
Core	G2	G201	**11**	**System's ability to meet accessibility needs of travelers**
Core	G2	G201,G202	**12**	**Self-reliance**
Core	G2,G5	G201,G202,G203,G501,G502	**13**	**Reduced trip anxiety**
Core	G2,G5	G201,G202,G203,G501	**14**	**Complaints and customer satisfaction**
Tier 1	G3	G301	**15**	**System productivity**

MPM Tier	Goal	Objective	PM#	Performance Measure Type
Tier 2	G3	G301,G302	**16**	**Added capacity from third-party providers**
Tier 2	G3	G301,G304	**17**	**Deadhead miles and hours**
Tier 2	G3	G302	**18**	**Wheelchair Accessible Vehicle (WAV) reliability**
Tier 2	G4	G401,G402	**19**	**Increased cost efficiency**
Tier 2	G3	G301	**20**	**Improved coordination among HIRTA, healthcare providers, health navigators**
Tier 2	G5	G501,G502	**21**	**Delivery of safe healthcare transportation**
Tier 2	G1	G101	**22**	**Reduction in medical appointment deferment due to lack of transportation**
Tier 3	G1,G4	G101,G401	**23**	**Savings due to reduction in the number of missed medical appointments**
Tier 3	G1,G5	G101,G502	**24**	**Safe transportation access to healthcare facilities**

1.2.12 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. Performance measures will be calculated from the available data. Performance measures can be presented using simple comparisons or charts. Performance measures can be compared to each other or for before versus after using simple tools such as ANOVA or chi-squared tests. Relationships, including dependencies, between variables will also be explored using statistical methods such as regression analyses. For instance, the relationship between missed appointments and inability to utilize the wayfinding feature of the Health Connector app will be evaluated.

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.

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.

1.2.13 System Safety

As described in the Phase 1 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, 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 will be adjusted to create and complete a new document during Phase 2 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 will be 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.

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.

1.2.14 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. HIRTA team will develop a detailed Data Privacy Plan (DPP) in Phase 2.

1.2.15 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 1.4.4 .

- **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.

1.3 At-Scale Deployment Summary

Table 3 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 are projected based on the demand for the four healthcare facilities identified in the Phase 1 documents.

Table 3. 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	4
Max number of HIRTA Vehicles	2	5	10
Number of Contractor Vehicles	1	2	5
Max Number of Trips (HIRTA vehicles)	20	50	100
Max Number of Trips (Contractor vehicles)	5	10	20
Vehicle Devices	2	5	10
Number of Kiosks	2	2	2
Visual Markers for Wayfinding			
Vehicles (inside and outside)	4	20	20
Healthcare Facility (indoor and outdoor)	20	50	150
Fixed pickup spots	5	15	30

‘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.

1.4 Team Organizational Structure

1.4.1 Team Organization

Throughout Phase 1, the project team has been working closely with the Contract Office Representative (COR) 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, IBI Group, and Community Transportation Association of

America (CTAA). Additional partners include the Iowa State University (ISU), Dallas County Health Department (DCHD), and Capture Marketing Solutions. HIRTA will procure a new vendor to provide the mobility-on-demand (MOD) technology needed for Health Connector. Also, a wayfinding solution provider (NaviLens) is a designated deployment partner.

1.4.2 Key Personnel

Building on the Phase 1 experience, Figure 2 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 1 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 IBI Group, Systems Engineering Lead (SEL)**: Santosh has been leading all systems engineering activities in Phase 1 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 1 and will lead the deployment team in Phase 2.

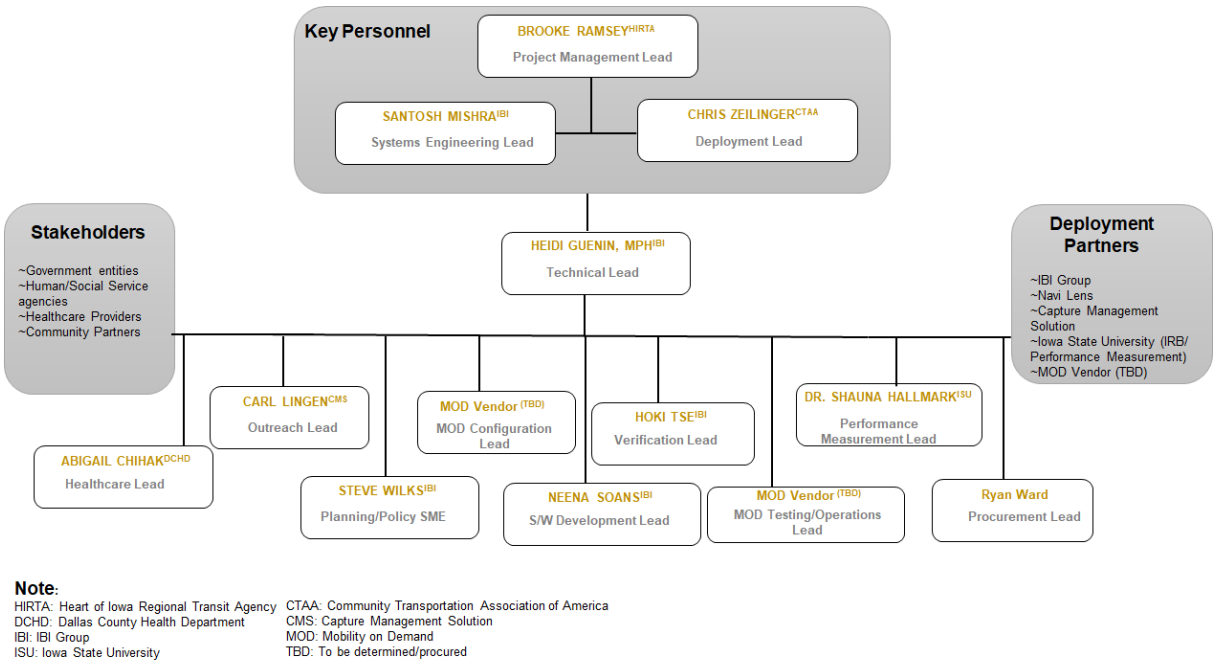


Figure 8. Organizational Chart

Finally, the following individuals will support the key staff:

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

- **Heidi Guenin** from IBI Group will serve as the Technical Lead (TL), Heidi 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.

- **Neena Soans** from IBI Group will serve as Software Development Lead (SDL) and will lead all aspects of Health Connector middleware development.

- **Hoki Tse** from IBI Group will lead system validation and verification efforts in Phase 2 and support development of systems engineering deliverables.

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

- **Abigail Chihak** from DCHD to 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 1. 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.

HIRTA will select a Mobility on Demand (MOD) software vendor through a competitive procurement process in Phase 2. The MOD vendor will provide the core capabilities needed for riders, drivers, and dispatchers for trip planning, booking and management. The procurement will involve both purchasing a COTS product, and system configuration and integration services. Once selected in Phase 2, MOD vendor representatives will provide key support in finalizing design, test plans, training plans and several other Phase 2 deliverables. Also, MOD vendor staff will lead the initial and at-scale deployment of the MOD system in coordination with Technical Lead (TL) and Verification Lead (VL)and will serve as the single point of contact for resolving any reported issues with MOD software components in Phase 3.

1.4.3 Changes in Organizational Chart from Phase 1

The most significant change from Phase 1 team organization is the representation of Routematch/ Uber Technologies from the project due to change in procurement approach. Alongside the addition of Heidi Guenin, Hoki Tse also from IBI, will join the team to lead system validation and verification efforts in Phase 2. Further, Neena Soans from IBI Group will lead the development of Health Connector middleware.

1.4.4 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 1 and plans to continue that in Phase 2/3. 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.

1.4.5 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.

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 1 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.

1.4.6 Organizational Risks

HIRTA team has carefully planned the organizational chart based on lessons learned from Phase 1 and other similar projects in the past. However, uncontrollable events may still occur. Table 4 provides a list of key anticipated risks and planned mitigation strategies.

Table 4. Organizational Risks and Mitigation Strategies

Risk	Probability	Impact	Mitigation Strategy
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.
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.
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).

Risk	Probability	Impact	Mitigation Strategy
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.

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 1. The right half of the V diagram includes installation, configuration and testing activities that will be completed as part of Phase 2 and 3.

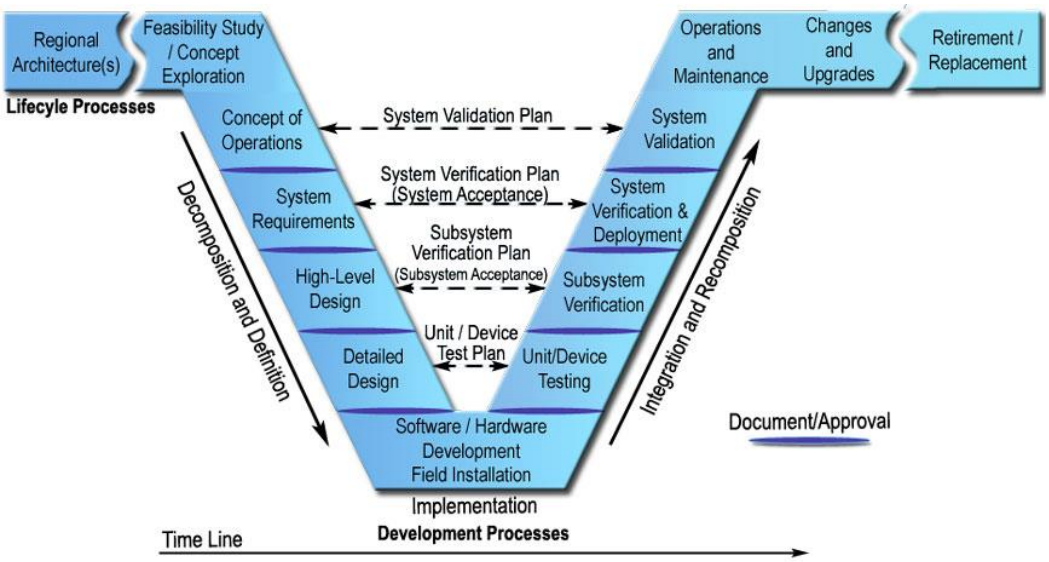


Figure 9. Systems Engineering "V" Diagram (Source: FHWA)

2.2 Phase 2 Technical Approach

2.2.1 Task 2-A: Program Management

Deployment of a successful Complete Trip – 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 1. 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 1 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 diverse group 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 1. MOD Vendor 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, MOD vendor 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 Phase 1 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 (IBI Group) to have detailed discussions regarding with MOD vendor, 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 (MOD vendor 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 1 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 Phase 1 -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 Phase 1 DMP [4] and Phase 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, Phase 1 DMP will be updated as necessary, to reflect additional findings as part of discussions under Task 2-B. As Phase 1 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 1 DMP.

Phase 1 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 1 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. As stated earlier, MOD platform

procurement is a critical path item and will be initiated as soon as the USDOT provides the go-ahead for Phase 2/3.

2.2.4.1 MOD Vendor Procurement

MOD procurement will include the following components:

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

Requirement for these components were developed in Phase 1 SyRS which will be included in the procurement instrument (an RFP). Vendors will be required to indicate their compliance with requirements as part of their proposal response. Procurement will follow an open procurement process as mandated for using federal funds per 2 CFR 200 Subpart D, Procurement Standards (2 CFR 200.317-327). This procurement will include both systems (e.g., software, hardware) and services (e.g., implementation, configuration, test planning, verification, launch support). Services are included since HIRTA team has planned for involvement of MOD vendor representatives in the design and other Phase 2 tasks.

Prior to initiating this procurement, HIRTA team will prepare a memo for review by the AOR to validate the procurement approach. HIRTA team will proceed once the approach is approved.

HIRTA team has planned for a 90-day procurement based on team members' experience with similar procurements for other agencies across North America. Also, based on team's understanding of the vendor marketplace, 3-4 proposals are anticipated, and appropriate evaluation period and process is planned (e.g., shortlist interviews, best and final offer). A 90-day timeframe will allow vendor to be on-board by the time of system architecture walkthrough meetings. However, it will be critical to have the vendor onboard before design is finalized.

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

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

2.2.5.1.1 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, 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.

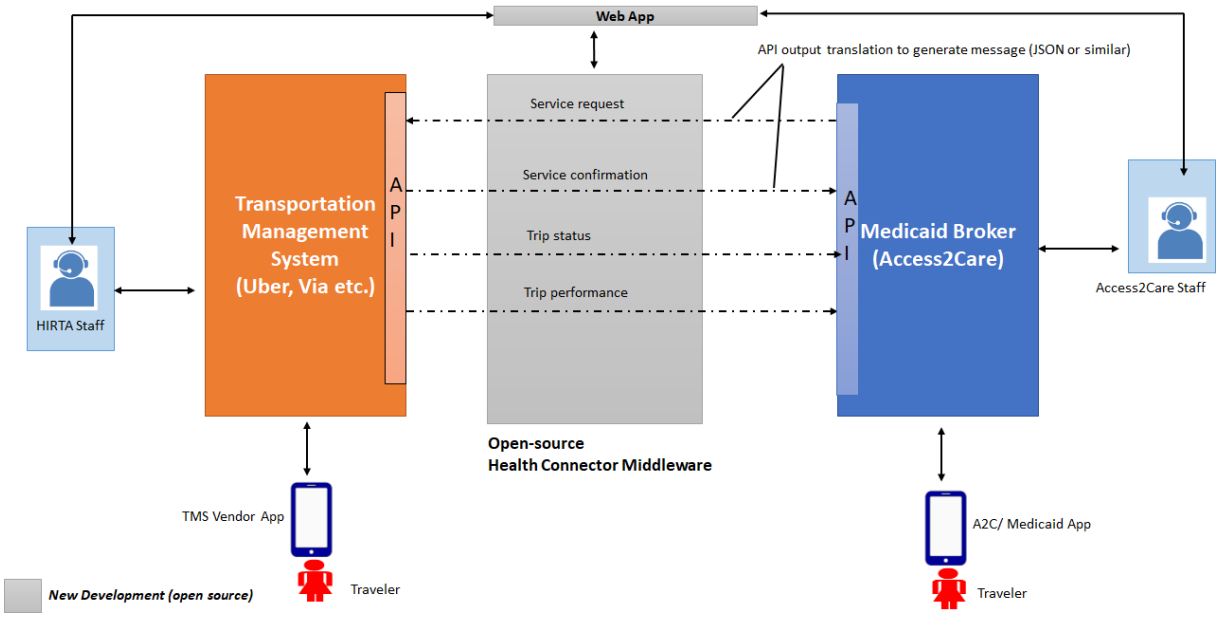


Figure 10. MOD-Medicaid Broker Interface Middleware (Source: HIRTA Team)

2.2.5.1.2 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, 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.

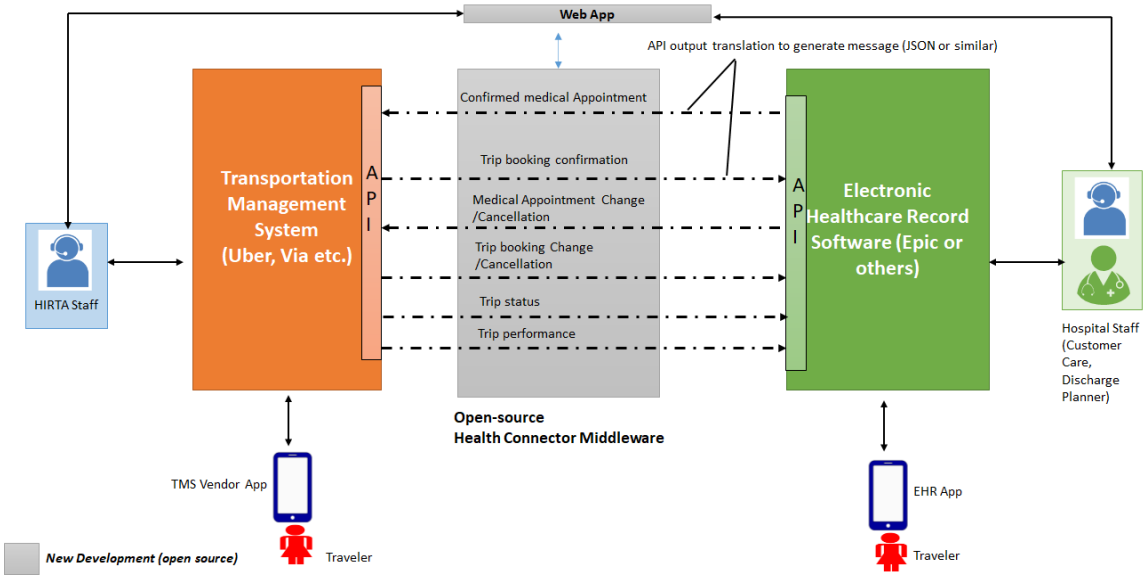


Figure 11. MOD-EHR Software Middleware (Source: HIRTA Team)

2.2.5.1.3 Release License and Source Code Repository

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

2.2.5.1.4 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.

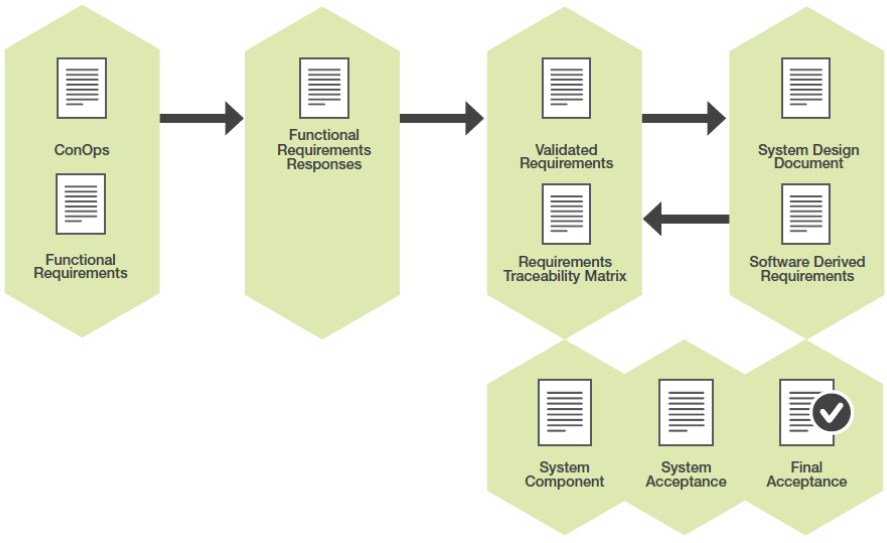
It is IBI Group's standard process (please see **Error! Reference source not found.**) to begin with a Concept of Operations (ConOps) document and/or a Requirements Specification developed for a project. ConOps documents typically consist of collections of user stories and/or use cases, while Requirements 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 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.



(source: IBI Group)

Figure 12. IBI Group's Standard Software Development Process

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 Phase 1 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 Phase 1 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 User Acceptance Testing is 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. Once the revenue testing is concluded, the system will be ready for at least 20% at-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. Figure 13 provides a visual overview of how test and demonstration activities will be conducted in Phase 2.

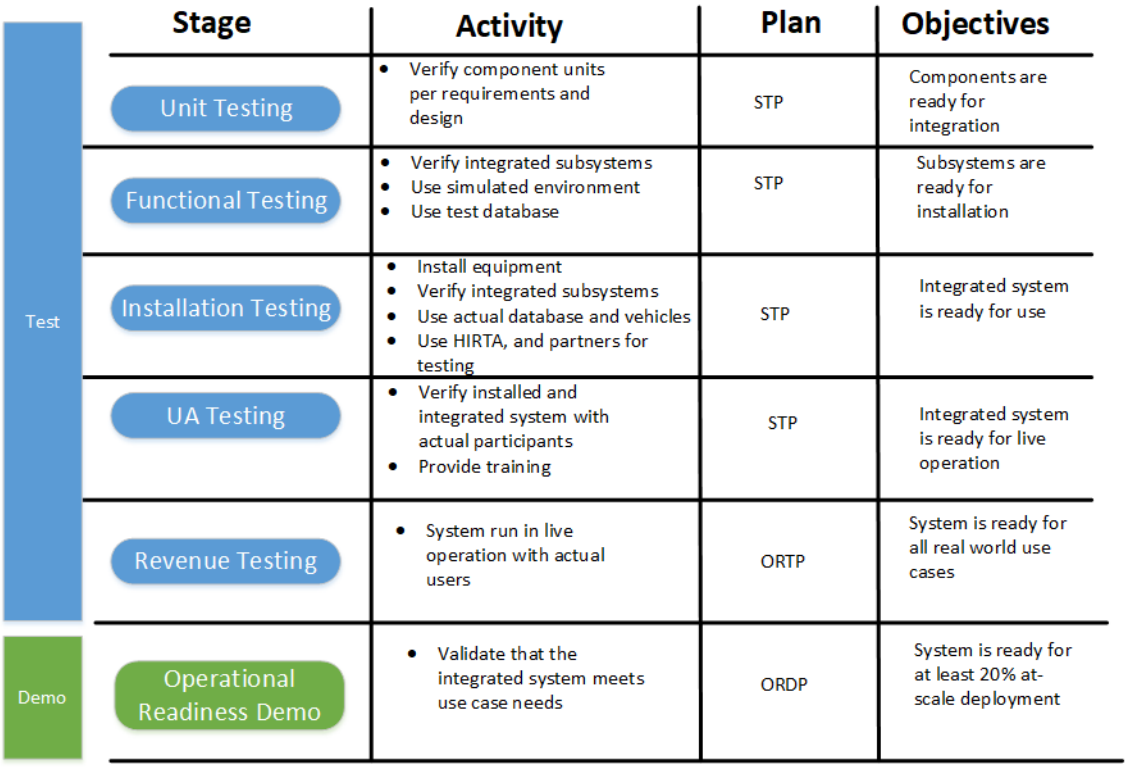


Figure 13. Testing and Demonstration (Source: HIRTA Team)

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 Phase 1 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 13, 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 1.3). 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 Phase 1 Outreach Plan, as needed, to reflect any changes since Phase 1. Phase 1 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 Phase 1 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 1.4.4 of this document. As explained in Section 1.4.4, 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

Figure 14**,**Figure 15**,** and Figure 16 provide a visual overview of the interrelationship among tasks and the sequence of subtask activities for Phase 2 and 3. Items marked in red font depict key milestones or critical path items that will be required to be completed in a timely manner for ensuring success of the project.

HIRTA team has planned for 18 months for Phase 2 activities. Key milestones include: Final SAD, Final SDD, MOD RFP release and vendor selection, 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, 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.

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.

ID	WBS	Task Name	Start
1	**1**	**Phase 2: Design and Development**	**Mon 22-05-16**
2	**1.1**	**Task 2-A: Program Management**	**Mon 22-05-16**
3	1.1.1	Kickoff Meeting	Wed 22-06-15
4	1.1.2	Project Management Plan	Wed 22-06-01
5	1.1.3	Bi-weekly meetings and roundtables	Mon 22-05-16
6	1.1.4	Monthly Progress Report	Mon 22-05-16
7	**1.2**	**Task 2-B: System Arch and Design**	**Wed 22-06-01**
8	1.2.1	Draft System Arch. Document	Wed 22-06-01
9	1.2.2	Systems Arch. Walkthrough	Fri 22-09-02
10	1.2.3	***Final System Arch. Document***	***Wed 22-09-07***
11	1.2.4	Prelim Design review	Mon 23-01-16
12	1.2.5	Draft System Des. Document	Wed 22-11-23
13	1.2.6	System Des. Walkthrough	Tue 23-02-21
14	1.2.7	Critcal Des. Review	Wed 23-02-08
15	1.2.8	***Final System Des. Document***	***Fri 23-02-24***
16	1.2.9	Phase 1 Doc update	Fri 23-02-24
17	**1.3**	**Task 2-C: Data Management Planning**	**Wed 22-06-01**
18	1.3.1	Draft Data Privacy Plan	Wed 22-06-01
19	1.3.2	Final Data Privacy Plan	Tue 22-08-16
20	1.3.3	Privacy Management Plan	Wed 22-06-01
21	1.3.4	Draft Phase 2 DMP	Wed 22-06-01
22	1.3.5	Final Phase 2 DMP	Tue 22-11-08
23	**1.4**	**Task 2-D: Acquisition and Installation Planning**	**Mon 22-05-16**
24	1.4.1	***MOD RFP Release***	Mon 22-05-16
25	1.4.2	***MOD Procurement***	Wed 22-06-01
26	1.4.1	Draft CAP	Mon 22-09-05
27	1.4.4	Final CAP	Mon 23-02-06
28	1.4.5	Draft CIP	Mon 22-09-05
29	1.4.6	Final CIP	Tue 23-05-02
30	**1.5**	**Task 2-E: Software Development and Integration**	**Mon 22-05-16**
31	1.5.1	Initial SDS	Mon 22-05-16
32	1.5.2	Monthly SDS Update	Tue 22-10-04
33	1.5.3	Open source software documentation	Tue 22-10-04

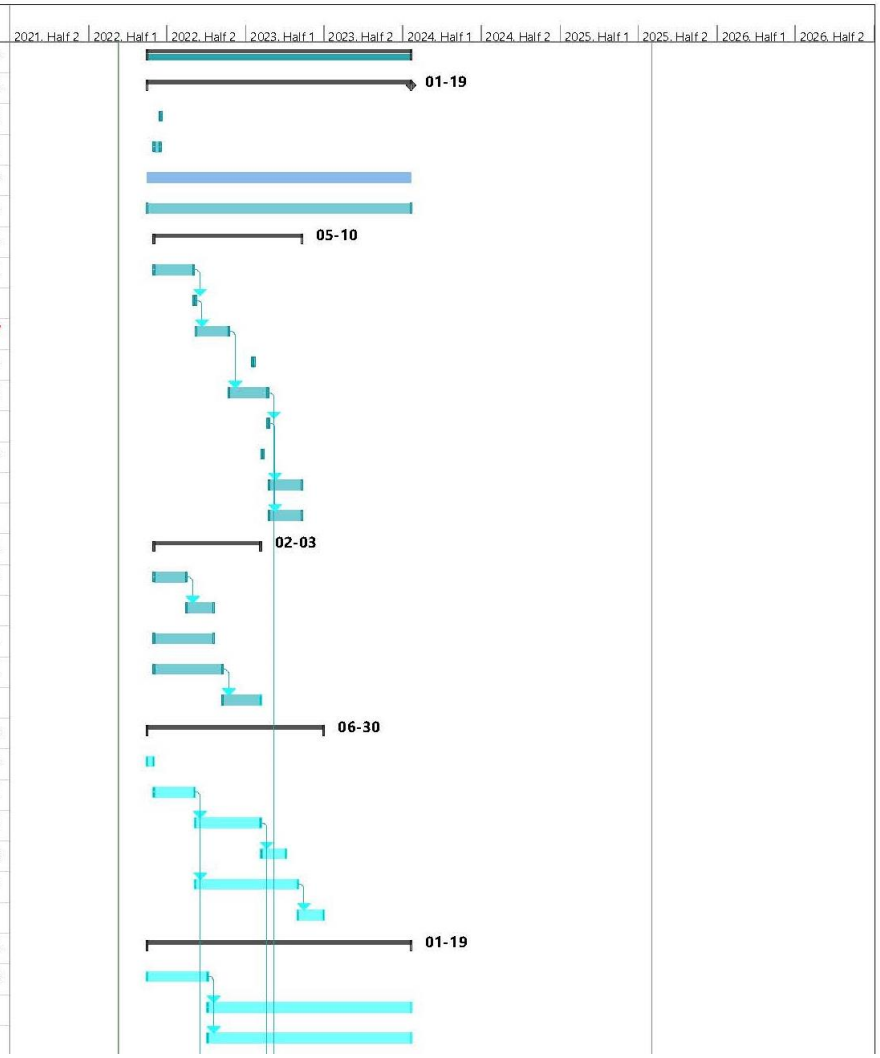


Figure 14. Schedule -Part 1 (Source: HIRTA team)

ID	WBS	Task Name	Start
34	1.5.4	*Agile dev, testing and release*	*Tue 23-02-21*
35	**1.6**	**Task 2-F: Partcipant and Staff Training**	**Mon 22-09-05**
36	1.6.1	Initial TIS	Mon 22-09-05
37	1.6.2	Monthly TIS Updates	Mon 23-02-06
38	1.6.3	*IRB Approval*	*Tue 23-02-21*
39	1.6.3	Training Materials	Tue 23-05-30
40	1.6.5	*Participant Recruitment and Training*	*Tue 23-08-22*
41	**1.7**	**Task 2-G: System Test Planning**	**Wed 22-06-01**
42	1.7.1	Draft STP	Wed 22-06-01
43	1.7.2	*Final STP*	Tue 23-04-04
44	1.7.3	*Operational Readiness Concept Briefing (Washington DC)*	*Tue 22-12-06*
45	1.7.4	Draft ORP	Fri 22-12-09
46	1.7.5	*ORP Walkthrough (Washington DC)*	*Mon 23-05-01*
47	1.7.6	*Final ORP*	Thu 23-05-04
48	**1.8**	**Task 2-H: Installation and Operational Readiness Testing**	**Mon 23-02-06**
49	1.8.1	IORS	Mon 23-02-06
50	1.8.2	Monthy IORS Update	Tue 23-05-16
51	1.8.3	*System testing (HIRTA)*	*Tue 23-07-04*
52	1.8.4	System Test Result Summary (STRS; per STP)	Mon 23-10-16
53	1.8.5	*Operational Readiness testing (per ORP; HIRTA)*	*Tue 23-10-31*
54	1.8.6	Test result Summary Documentation (per ORP)	Fri 23-12-01
55	1.8.7	*Operational Readiness Demonstration (live)*	*Mon 23-12-18*
56	1.8.8	*Operational Readiness Documentation (per ORP)*	*Mon 23-12-18*
57	**1.9**	**Task 2-I: Maintenance and Operations Planning**	**Tue 23-07-04**
58	1.9.1	Draft CMOP	Tue 23-07-04
59	1.9.2	Final CMOP	Tue 23-09-05
60	**1.10**	**Task 2-J Stakeholder Outreach**	**Wed 22-06-01**
61	1.10.1	Draft Phase 2 Outreach Plan	Wed 22-06-01
62	1.10.2	Final Phase 2 Outreach Plan	Tue 22-08-02
63	1.10.3	Initial Outreach Imp. Sched. (OIS)	Tue 22-08-02
64	1.10.4	Monthly updates to OIS	Mon 22-10-17
65	1.10.5	Outreach Materials	Tue 22-10-04
66	**1.11**	**Task 2-K: Performance Management and IE Support**	**Wed 22-06-01**

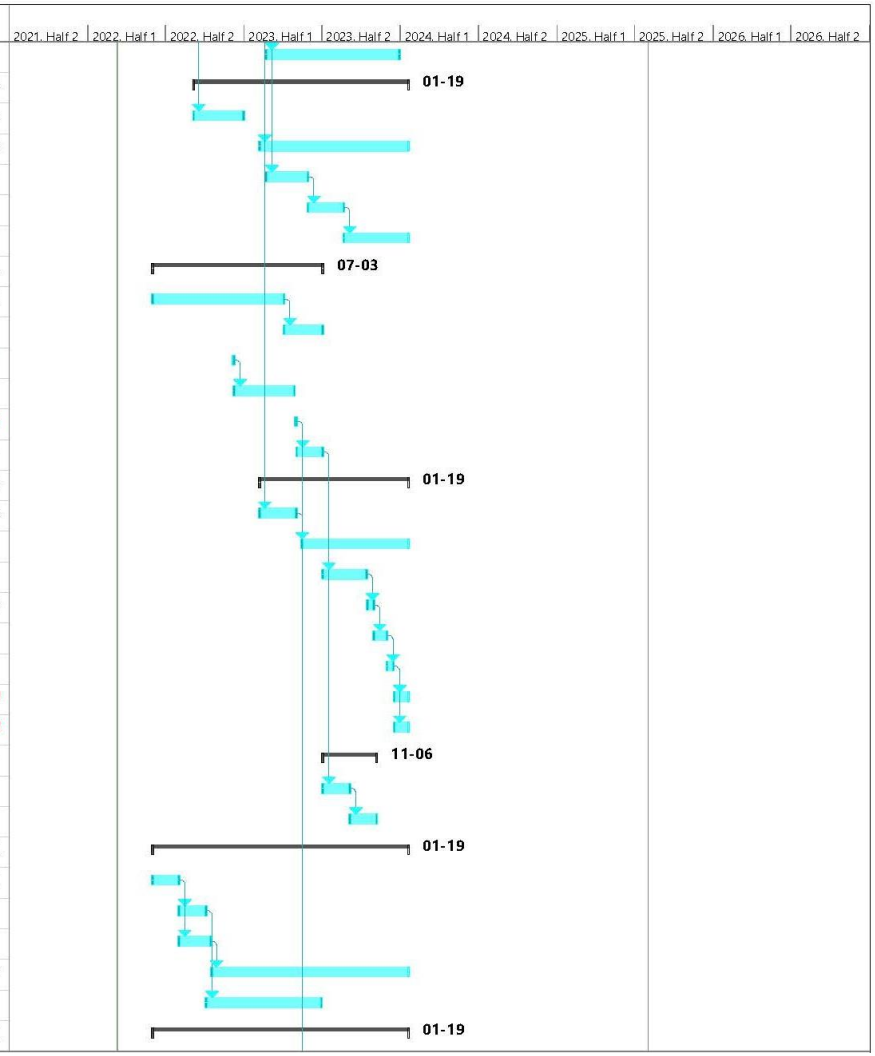


Figure 15. Schedule- Part 2 (Source: HIRTA team)

ID	WBS	Task Name	Start
67	1.11.1	Intial Schedule (PMESS)	Wed 22-06-01
68	1.11.2	Monthly Updates to PMESS	Fri 22-12-02
69	1.11.3	*PM Materials*	*Thu 23-05-04*
70	**1.12**	**Task 2-L: Participation in Std. Dev**	**Thu 23-05-04**
71	1.12.1	Meetings	Thu 23-05-04
72	1.12.2	Memo	Thu 23-05-04
73	**2**	**Phase 3: Operations and Maintenance**	**Mon 24-02-05**
74	**2.1**	**Task 3A: Program Management**	**Mon 24-02-05**
75	2.1.1	Kickoff Meeting	Wed 24-02-07
76	2.1.2	Project Management Plan	Mon 24-02-05
77	2.1.3	Bi-weekly meetings and Roundtables	Mon 24-02-12
78	2.1.4	Monthly Progress Report	Mon 24-02-12
79	**2.2**	**Task 3B: System operations and Maintenance**	**Mon 24-02-12**
80	2.2.1	Initial System operations and Maint. Schedule (SOMS)	Mon 24-02-12
81	2.2.2	Monthly reports	Mon 24-02-12
82	2.2.3	*20% at-scale operation*	*Fri 24-02-23*
83	2.2.4	*50% at-scale operation*	*Fri 24-03-22*
84	2.2.5	*100% at-scale operation*	*Fri 24-04-26*
85	**2.3**	**Task 3C: Stakeholder Outreach**	**Mon 24-02-12**
86	2.3.1	Initial OIS	Mon 24-02-12
87	2.3.2	Monthly OIS Update	Mon 24-02-12
88	2.3.3	Final OCSP	Mon 24-02-26
89	2.3.4	Operational Capability Materials	Tue 24-05-07
90	2.3.5	*Operational Capablity Showcase*	*Tue 25-02-04*
91	2.3.6	Final Showcase summary	Tue 25-02-04
92	**2.4**	**Task 3D: PM & IE Support**	**Fri 24-02-23**
93	2.4.1	Monthly updates to PMESS	Fri 24-02-23
94	2.4.2	*Site performance dashboard*	*Fri 24-02-23*
95	2.4.3	Updated DMP and PMESP	Fri 24-02-23
96	**2.5**	**Task 3E: Post Deployment Transition Planning**	**Wed 25-01-01**
97	2.5.1	Draft CTP	Wed 25-01-01
98	2.5.2	*Final CTP*	*Mon 25-02-24*

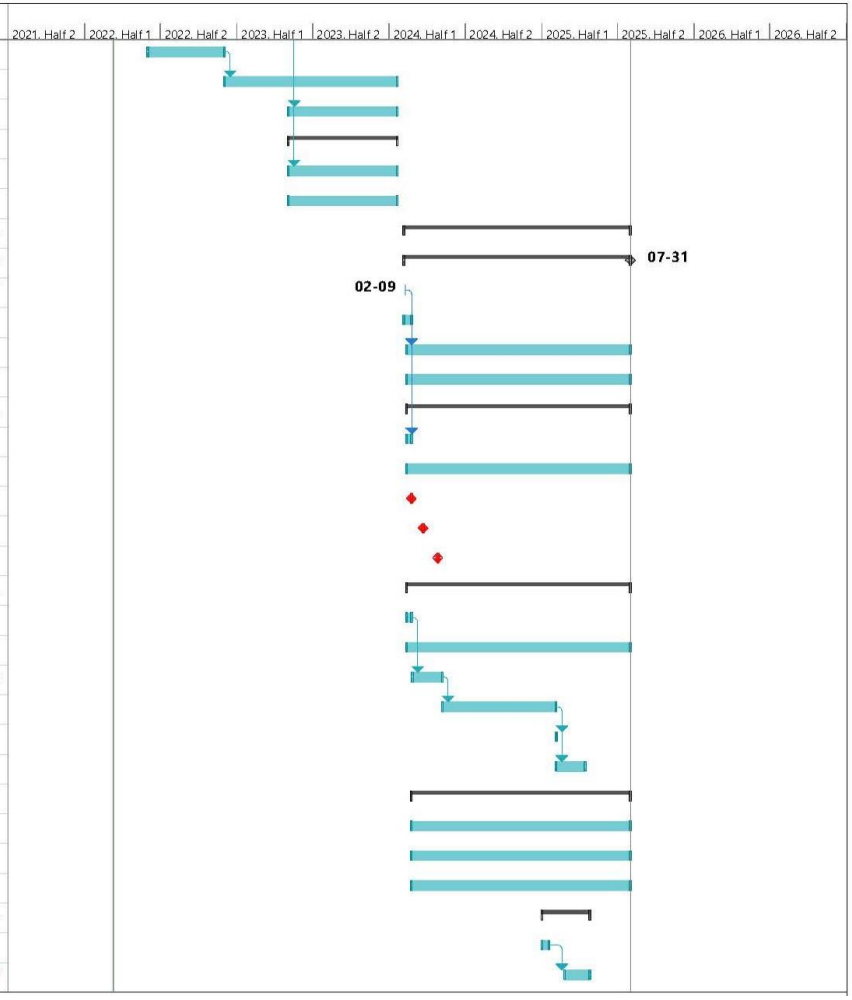


Figure 16. Schedule -Part 3 (Source: HIRTA team)

3.2 Schedule Risks

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

Table 5. Schedule Risks and Mitigation Strategies

Risk	Probability	Impact	Mitigation Strategy
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
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.
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.
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

Table 6 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.

Table 6. Phase 2 and 3 Cost Summary

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

4.2 Cost Risks

Table 7 provides a list of anticipated risks with proposed costs

Table 7. 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

Table 8 provides a breakdown of cost by task. Also, a breakdown of federal and non-federal cost share is provided.

Table 8. Phase 2-3 Costs by Task

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		

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 serves as the USDOT point of contact for any concerns related to the Phase 1 contract.

COR - Contract Office Representative

The Contract Office Representative serves as the USDOT representative for Phase 1 of 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).

EHR – 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.

IPFP - 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 diverse 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. Santosh Mishra et al., “Phase 1 Concept of Operations (ConOps), Heart of Iowa Regional Transit Agency ITS4US Deployment Project,” August 2021, US Department of Transportation. Publication Number: FHWA-JPO-21-859

4. Santosh Mishra et al., “Phase 1 Data Management Plan (DMP), Heart of Iowa Regional Transit Agency ITS4US Deployment Project,” January 2022, US Department of Transportation. Publication Number: FHWA-JPO-21-867 (Upcoming).

5. Santosh Mishra et al., “Phase 1 Safety Management Plan (DMP), Heart of Iowa Regional Transit Agency ITS4US Deployment Project,” October 2021, US Department of Transportation. Publication Number: FHWA-JPO-21-872

6. Santosh Mishra et al., “Phase 1 Performance Management and Evaluation Support Plan (PMESP), Heart of Iowa Regional Transit Agency ITS4US Deployment Project,” February 2022 (expected), US Department of Transportation. Publication Number: FHWA-JPO-21-877

7. Santosh Mishra et al., “Phase 1 Systems Requirements Specifications (SyRS) Document, Heart of Iowa Regional Transit Agency ITS4US Deployment Project,” January 2022, US Department of Transportation. Publication Number: FHWA-JPO-21-882 (upcoming)

8. Chris Zeilinger et al., “Phase 1 Human Use Approval (HUA) Summary (HUA), Heart of Iowa Regional Transit Agency ITS4US Deployment Project,” February 2022 (expected), US Department of Transportation. Publication Number: FHWA-JPO-21-897

9. Chris Zeilinger et al., “Phase 1 Participant Training and Stakeholder Education Plan (PTSEP) Summary (HUA), Heart of Iowa Regional Transit Agency ITS4US Deployment Project,” February 2022 (expected), US Department of Transportation. Publication Number: FHWA-JPO-21-902

10. Brooke Ramsey et al., “Phase 1 Institutional Partnership and Financial Plan (IPFP), Heart of Iowa Regional Transit Agency ITS4US Deployment Project,” February 2022 (expected), US Department of Transportation. Publication Number: FHWA-JPO-21-907

11. Carl Lingen et al., “Phase 1 Outreach Plan, Heart of Iowa Regional Transit Agency ITS4US Deployment Project,” February 2022 (expected), US Department of Transportation. Publication Number: FHWA-JPO-21-912

12. Santosh Mishra et al., “Phase 1 Systems Engineering Management Plan (SEMP), Heart of Iowa Regional Transit Agency ITS4US Deployment Project,” February 2022 (expected), US Department of Transportation. Publication Number: FHWA-JPO-21-917.

13. Transit Center, “Mobility Performance Metrics (MPM),” February 2020, Federal Transit Administration, FTA Report No. 0152 (https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/147791/mobility-performance-metrics-integrated-mobility-and-beyond-fta-report-no-0152.pdf)

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