Phase 2 Interface Control Document (ICD)

HIRTA ITS4US Deployment Project

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16. Abstract

Heart of Iowa Regional Transit Agency (HIRTA) is one of four awardees for Phase 2 of the ITS4US program for its proposed concept ***"Health Connector: Bridging the Gap Between Healthcare and Transportation"*** (Health Connector) by the United States Department of Transportation (USDOT). Per the goals of the program, Health Connector project is focused on improving transportation access to healthcare for underserved groups in Dallas County, Iowa. This document serves as the Interface Control Document (ICD) for HIRTA. The ICD serves as a companion document to the System Architecture Document (SAD) and provides a detailed description of the internal and external interfaces for the HIRTA ITS4US Deployment Project and the data, information and messages that are transcribed across those interfaces. It also details and related hardware and software components for each interface. The ICD provides traceability of requirements tied to each interface from user needs through design for Phase 2 of the project. The ICD is supported by the companion HIRTA ITS4US Deployment Project System Design Document (SDD) which provides a detailed description of the overall system for Health Connector's mobility on demand solution, followed by a detailed description of each of the system application components.

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1 Introduction

1.1 Document Overview

The Interface Control Document (ICD) describes the purpose of each interface between system entities within the system of interest. This document is organized by the following sections:

1. **Section 1. Introduction** describes the purpose of the ICD and provides an overview of the system and subsystem interfaces, including assumptions made and constraints and risks associated with the development and deployment of the system interfaces.

2. **Section 2. Definition of Terms and Acronyms** defines the system architecture elements, including sub-system components, third-party systems, databases, and key system users mentioned throughout the ICD.

3. **Section 3. Systems Overview** provides a high -level description of the proposed system of interest (SOI) touching on the major aspects of the system. The interactions between systems of interest are defined and the interfaces between the system and within subsystems shown in this diagram are explored in further detail in the Interfaces section.

4. **Section 4. Standards** provides a summary of the data standards referenced in the ICD and Phase 2 Data Management Plan [3]. These standards govern the exchange of data and are developed with input from the MOD vendor, Via.

5. **Section 5. Interfaces** describes the architecture of the interfacing systems as they relate to the proposed interface. This details interfaces between the primary system of interest and sub-systems as well as interfaces between subsystems. Included for each interface is the identification of software and hardware components, message protocols, and communications protocols.

1.2 Purpose of the Interface Control Document

This document serves as the Interface Control Document (ICD) for the Heart of Iowa Regional Transit Agency (HIRTA) ***"Health Connector: Bridging the Gap Between Healthcare and Transportation"*** (Health Connector) solution for the United States Department of Transportation (USDOT) ITS4US program. The ICD specifies the interface requirements and defines the message structure and protocols that govern the interchange of data between the system and subsystems and between the subsystems themselves and identifies communication paths along which the project team expects data to flow. The ICD describes in detail the interfaces and data flows previously developed in the System Architecture Document (SAD) [1]. All data flows that appear in the SAD appear in Section 5 Interfaces. This document covers interfaces and data flows between systems within the scope of design for Health Connector, described in the System Design Document (SDD) [2], as well as external systems. External systems are not defined with extensive detail in this ICD.

1.3 Intended Audience

The intended audience for this document is the HIRTA project team, the United States Department of Transportation (USDOT), vendor teams, as well as project stakeholders. This audience also includes future deployers and developers who might learn or build upon the development work described in this document for future deployments of a similar nature. This document aims to maintain a record of the interfaces between system entities within the system of interest and communicate the inputs and outputs of each interface for the Health Connector project.

1.4 Project Background

The Heart of Iowa Regional Transit Agency (HIRTA) provides over 300,000 customer rides and operates 95,000 hours (2019 estimates; pre-pandemic) along with 1.3 million miles of service within the seven-county region encircling the Des Moines urban area. HIRTA provides demand response 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.

HIRTA was awarded a Phase 2 agreement of the Complete Trip – ITS4US contract for its proposed concept *"Health Connector: Bridging the Gap Between Healthcare and Transportation"* (Health Connector) by the United States Department of Transportation (USDOT).

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

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

Figure 1 provides an overview of the Health Connector concept.

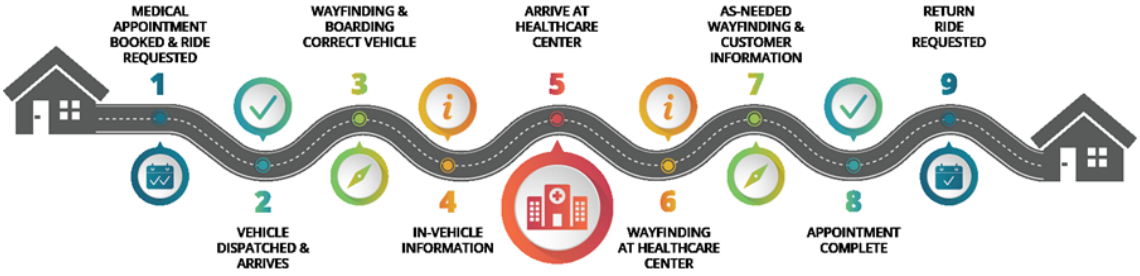

Figure 1. Overview of Health Connector System Concept (Source: HIRTA team)

For more information about the key capabilities of the proposed Health Connector technology, refer to the Concept of Operations (ConOps) and System Requirements Specifications (SyRS) documents [4] [5].

There are five main goals for the Health Connector Concept, which include:

- Improved health outcomes through increased access to medical transportation for Dallas County residents
- Self-reliance and spontaneity for underserved groups
- Efficient transportation management capabilities for medical transportation services
- Financial sustainability of medical transportation programs
- Safe medical transportation services

For more information regarding these goals and more detailed objectives and performance measures, please refer to the Performance Measurement and Evaluation Support Plan (PMESP) [6]. Throughout, 'Traveler' refers to those individuals who will use Health Connector services to access healthcare appointments.

1.5 Assumptions

Key assumptions pertaining to external components for the implementation of Health Connector include:

Current system environment: The current system, as configured, is not optimized to be used for same day response trips. Also, some of the other capabilities needed for Health Connector, for example, engaging third party providers, are currently not configured. Further, Traveler access to real-time information is available through limited channels.

Complexity of Medicaid program: Medicaid trips are booked using systems provided by Access2Care, and the system determines the appropriate transportation mode, which may or may not be HIRTA. Also, given Travelers will be using two separate applications, the experience may not be seamless.

Smart device and data plans: Health Connector provides alternate methods but assumes that Travelers will be able to utilize smart devices using internet data plans to get the most benefit out of the proposed solution. Based on stakeholder discussions, while smartphone penetration is high

(85%+), the senior population may not be comfortable with small devices, and some may not have data plans that allow them to benefit from all of the features provided.

Fragmented nature of electronic health record (EHR) platforms: The heterogeneous nature of EHR platforms used by the Dallas County healthcare community may present a challenge in developing an interface to better coordinate transportation booking and medical appointment booking.

Partnership with third party/non-dedicated service providers (NDSP): HIRTA will have to rely on NDSP vehicles (e.g., TNCs, taxis) if same day demand grows after the launch of the Health Connector. However, there is a limited pool of such providers in rural areas.

Training customers to use non-HIRTA vehicles: It was identified in stakeholder discussions that some customers (e.g., refugee population) may not be comfortable with vehicles that do not have the HIRTA logo. The training and outreach programs will have to address such concerns.

Wayfinding: Most wayfinding systems require a companion smart device. However, some of the underserved population (e.g., senior, LEP) may not be comfortable with that approach. Also, most wayfinding solutions require extensive installation of infrastructure (e.g., beacons or visual markers), which will require approval from healthcare partners.

1.6 Constraints

Anticipated constraints and changes in operational policies for HIRTA, DCHD, and healthcare partners are listed below.

1.6.1 HIRTA

Operational polices and constraints for HIRTA as anticipated in the context of Health Connector are as follows:

- **Hours of operation:** Currently, HIRTA's services are available 7AM-5PM Monday through Friday. Given HIRTA is planning to provide after-hours services through Health Connector, new policies will have to be developed and published by HIRTA.

  A key factor for finalizing hours of operation will be healthcare facility hours. Our understanding is that most trips will be covered during HIRTA service hours. Only under rare circumstances will trips be requested during care facility hours outside of HIRTA service hours. On such occasions, HIRTA will also have to consider third-party service providers that may be available in the area to provide after-hours services. Also, HIRTA will have to determine the need for having at least one HIRTA dispatch staff on standby to assist in the event of delays or incidents. All these factors will drive the determination of hours of operation.

  Any future changes in service hours must be automatically communicated to appropriate parties (e.g., healthcare providers, DCHD) and communicated to customers through appropriate channels.

- **Third-party service providers:** With the deployment of Health Connector, HIRTA will have the capability to partner with third-party providers to provide services after office hours. However, detailed policies and procedures will have to be developed with third-party providers when third-party agreements are finalized.

- **IT-related policies:** No major IT infrastructure-related changes are anticipated as part of this project, but partners will have to be provided access to Health Connector, and HIRTA will be responsible for providing access and maintaining appropriate security and access levels for those partners. Security and access restrictions are discussed in the Data Privacy Plan [4].
- **Staffing:** The project will not result in increased staffing levels, but roles may have to be adjusted given efficiency gains observed due to the reduced level of coordination per trip.
- **Budget/financial constraints:** Budgeting as determined during Phase 2/3 proposal development will be used for deployment and long-term operations.
- **Definition of standard operating procedures** (**SOPs) for Health Connector:** While Health Connector will be part of HIRTA's demand response service, detailed SOPs will have to be developed, describing roles and responsibilities and organizational structure prior to the system launch during Phase 2**.** This process will begin in Task 2-B during system design and will be finalized during Task 2-L.
- **Service level agreements (SLAs):** The following types of SLAs will have to be developed:
    - SLAs with vendors will have to be made available for providing Health Connector service to meet the required system performance needs. ConOps [5] will be updated once these are finalized during Phase 2.
    - Partnership agreements will have to be made with healthcare partners for certain business functions (e.g., exchange of medical appointment data), and appropriate SLAs will be developed and agreed upon.
    - Also, once third-party contractors are determined, additional SLAs will have to be established for the provision of services through them, as well as volunteer drivers.

1.6.2 Healthcare Providers

Constraints and changes to operational policies as applicable to healthcare providers are listed below:

- **Access to Health Connector:** As discussed earlier, HIRTA will have to provide an appropriate level of access to the Health Connector system to authorized staff at healthcare providers for management of healthcare appointments and monitoring of transportation services for those appointments.

- **Access to appointment data:** Through an EHR API, healthcare providers will have to provide access to medical appointment data which will at least include 1) customer identifier; 2) customer/caregiver contact; 3) time of appointment; 4) day of appointment; 5) location of appointment.

  HIRTA has been including healthcare providers as part of stakeholder engagement sessions (e.g., ConOps [5] walkthrough, SyRS [6] walkthrough), so they are aware of the data needed for coordinating medical and transportation appointments. Travelers enrolling in Health Connector during the project period will agree to share their appointment details through the informed consent form that is signed during registration. Stakeholder input from healthcare providers is being documented in meeting minutes, and any online meetings are recorded. Also, the HIRTA team will

closely follow the currently established terms used by the healthcare partners to share data with caregivers to avoid any deviations from the currently established practices.

- **Funding source definition and billing:** Most healthcare providers have mentioned that they have access to funds which can be used towards covering the transportation cost for persons with low income. HIRTA has the capability to define funding sources in its system, and healthcare providers can be listed as a funding source. For eligible trips, such funds will be used, and the healthcare providers will be billed per agreed upon terms and conditions. Accounting for such funding sources will follow the same tools and established processes used by HIRTA for other funds in use today.

- **Coordination on hours of operation:** When there is a change in healthcare provider service hours for non-emergency visits, the Health Connector system will be updated and HIRTA will be notified. This would not impact Health Connector service but may impact which vehicles provide that service, between HIRTA or a third party, which are available for service outside of HIRTA service hours.

- **Staffing:** HIRTA already coordinates with dedicated social workers and health navigator staff at healthcare providers. However, this process will have to be finalized, and enhanced communication access through Heath Connector solution will be made available to minimize any manual coordination.

- **Tracking transportation access and missed appointments:** Currently, there is limited capability to link missed appointments with transportation access and subsequent impact to the healthcare facility and patient health. With access to Health Connector, missed appointments due to lack of transportation at participating facilities can be monitored through the MOD-EHR middleware. In addition, surveys are being conducted triennially to evaluate the impact of Health Connector and missed appointments due to lack of transportation in Dallas County relative to other nearby counties.

1.6.3 DCHD

Constraints and changes to operational policies as applicable to DCHD are listed below:

- **Access to Health Connector:** As discussed earlier, HIRTA will have to provide an appropriate level of access to DCHD to authorized staff for management of healthcare appointments and monitoring of transportation services for those appointments, as authorized by their customers.
- **Access to data and reporting as relevant to measuring health outcomes:** DCHD currently relies on data in their information and referral system for measuring the success of efforts in linking Dallas County residents with resources. Health Connector will provide the ability to track not just successful connections but will also allow DCHD to follow up after appointments are complete and take any subsequent actions if necessary (such as scheduling a subsequent appointment and transportation). However, policies for such additional efforts will have to be defined by DCHD as conversations between the HIRTA team and DCHD continue.

1.7 Risks

Risks that relate to interfaces and their associated mitigation strategies can be found in the table below.

Table 1. Risks

Risk	Mitigation Strategy
Third party vehicle subsystems cannot be integrated with MOD platform	System will be designed such that no integration is required; the MOD platform driver app will be available to any third-party driver who can download it on their own personal device.
Wayfinding technology cannot be deployed at facilities given a lack of participation	The HIRTA team has held meetings with NaviLens and facilities to demonstrate functionality and will continue to hold meetings and encourage adoption. The team has also established contingency plans for exclusive use onboard HIRTA vehicles to deliver wayfinding functionality.
Middleware cannot receive data from Epic EHR	The team will attempt to receive data from alternative EHRs at partner clinics. If that is also unavailable, the team will proceed with a second set of middleware requirements that do not involve EHR data. These contingency requirements are oriented towards creating an alternate middleware webpage to assist more with medical appointment booking requests.
Middleware cannot receive data from Access2Care	Medicaid integration would be implemented for MTM fee-for-service trips to demonstrate functionality. MTM is Iowa Medicaid's non-emergency medical transportation (NEMT) broker.
Incomplete integration of different modules	Integration concerns will be addressed in the System Test Plan (STP), and several rounds of testing will be conducted as defined in the Systems Engineering Management Plan (SEMP).

2 Definition of Terms and Acronyms

Table 2. Definition of Terms and Acronyms

Name	Description
Electronic Health Record Subsystem	This 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 will develop a new interface with at least one healthcare partner's EHR system.
Eligibility Management System	List that regulates who is eligible for Health Connector rides.
Medicaid Broker	Refers to the State of Iowa Medicaid Broker's system used for booking and managing Medicaid trips. Access2Care is currently the Medicaid broker, but this may expand to include others in the future. Medicaid trips will be booked by the broker when requested by Travelers and will be ingested in the HIRTA system when assigned to HIRTA. At that point, Traveler using Medicaid benefits will be able to use Traveler tools provided by Health Connector.
Traveler-End System	System that allows Travelers to book transportation via the Health Connector Traveler mobile application or web application; handles traveler information, service requests, trip feedback, and user account settings.
MOD-EHR Middleware	This open-source middleware product allows data exchange between the MOD platform and the EHR system.
MOD-Medicaid Middleware	This open-source middleware product allows data exchange between the MOD platform and the Medicaid broker system.

Name	Description
Health Connector Survey Subsystem	Relates to surveys and data analysis related to project KPIs. This is led by the performance management team.
Health Navigator and Healthcare End Subsystem	Used by health navigators to assist Travelers with care visits. Health navigators can assist with return trips as well as monitor Traveler trips to appointments.
HIRTA Drivers	Vehicle operators for HIRTA owned and operated vehicles.
Non-MOD HIRTA Supporting Systems	Existing systems are not a part of the Health Connector project, however, they exchange data with the TMS, and HIRTA staff may interact with these systems for operational functions, as needed.
HIRTA Operations Staff	Responsible for operations related to Health Connector, including scheduling rides and blocking drivers.
HIRTA Transportation Management System	Software that is tailored to the planning, execution, and optimization of transportation processes. This system collects trip data and helps evaluate system performance. This system will include both the MOD platform as well as the Health Connector middleware.
HIRTA Vehicle System	Any Health Connector vehicle, directly managed by HIRTA, carrying Travelers.
MOD Platform Transportation Management System (TMS)	Central software for the MOD platform, which includes the set of tools that allows for booking on-demand trips and assignment of drivers and vehicles in real time. For the purposes of the Health Connector project, the specific MOD platform being used is Via; the Via TMS is also known as the Via Operations Center (VOC).
Third-Party Vehicle Subsystem	Any vehicle or vehicle-end systems, not directly managed by HIRTA carrying Travelers as part of Health Connector.
Third-Party Platform	Any external platform that accesses data or interfaces with the Health Connector system. This includes vendor-supplied platforms such as TNCs, taxi services, or volunteer driver network platforms. Note that third-party platforms are not required to operate the service as drivers will use the Via driver application, however these external platforms may be used to manage drivers or monitor records.
Independent Evaluation Data Management System	External data center which stores data sent from ISU's performance management system to USDOT; will be accessible by the general public.

Name	Description
USDOT Managed System	Refers to the network and structure HIRTA shall use for government data reporting; includes USDOT data hub.
Traveler-End Wayfinding System	Application that assists in orientation, location of objects, and step-by-step navigation to destinations, including navigation to and from pickup location, healthcare facility, and drop-off location. Accessible via an advanced kind of QR code that can be scanned up to 12 meters away without focusing a camera on it.
Wayfinding Subsystem	System that handles Traveler wayfinding requests and Traveler-end wayfinding guidance. Includes wayfinding kiosks, QR codes, servers, and central software.
Live Database	Database containing current operational performance data and metrics that can be viewed directly within TMS or TMS products. For this project, this includes data pulled from Via's VOC KPI interface as well as Direct Data Access (DDA).
Reporting Database	Database which stores historical operations and performance data, that can be further anonymized and/or organized as needed before being accessed by ISU for performance measurement and evaluation. Data in the reporting database is static and stored within a secure file sharing platform, CyBox.
ATIS	Advanced Traveler Information Systems (ATIS) is used within the U.S. It combines standards associated with US: ATIS with those for I-M: Secure Wireless Internet (ITS). The US: ATIS standards include upper-layer standards required to implement traveler information communications. The I-M: Secure Wireless Internet (ITS) standards include lower-layer standards that support secure communications between two entities, either or both of which may be mobile devices, but they must be stationary or only moving within wireless range of a single wireless access point (e.g., a parked car). Security is based on X.509 or IEEE 1609.2 certificates. A non-mobile (if any) endpoint may connect to the service provider using any Internet connection method.
TCIP	Transit Communications Interface Profiles (TCIP) is used within the U.S. It combines standards associated with US: TCIP with those for I–M: Secure Wireless Internet (ITS). The US: TCIP standards include upper–layer standards required to implement transit–related communications. The I–M: Secure Wireless Internet (ITS) standards include lower–layer standards that support secure communications between two entities, either or both of which may be mobile devices, but they must be stationary or only moving within wireless range of a single wireless access point (e.g., a parked car). Security is based on X.509 or IEEE 1609.2 certificates. A non–mobile (if any) endpoint may connect to the service provider using any Internet connection method.
TPEG	The Transport Protocol Experts Group (TPEG) is a data protocol for traffic and travel related information. It can be carried over different digital broadcast or cellular networks (i.e., wireless Internet).

3 System Overview

3.1 Physical System Overview

Figure 2 displays the system of interest (SOI) diagram and outlines the data that will pass between systems as part of Health Connector. Keeping the replicability of Health Connector in mind, these datasets and terms used are common in paratransit/demand response industry and are applicable to most commercially available platforms/solutions.

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

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

- **HIRTA Transportation Management Subsystem (TMS):** A TMS refers to any systems related to the operational backend functions involved in service delivery. HIRTA's TMS includes the Mobility-on-Demand TMS in addition to other functions that support Health Connector from outside if the MOD platform such as the call center software. The MOD Platform TMS will also host two interfaces (middleware products) being developed by the HIRTA team and made freely and publicly available on GitHub under a permissive license to support interfacing with State of Iowa Medicaid transportation broker(s) and the EHR system.

  - **MOD Platform TMS (also referred to as "VOC"):** Provided by Via and includes the technologies used to assist customer care and operations staff with Traveler registration, eligibility management, reservations, scheduling, dispatching, billing, and administration activities.

-

  Vehicle Subsystem: refers to the technologies deployed on vehicles to support driver-end functions for driver-dispatch communications, manifest management, support just-in-time dispatching, turn-by-turn navigation and outdoor wayfinding (e.g., to locate Travelers at the time of pick up), on-board information and fare payments. On all HIRTA-owned vehicles, drivers will use tablets running the driver app. On other vehicles, drivers may use the driver app on their tablet or their phone.

- **Wayfinding Subsystem:** refers to the technologies and infrastructure to be used for providing outdoor wayfinding, indoor positioning, orientation, and navigation on request to Travelers. It may also assist with translation functionality. One or more commercially available wayfinding system providers may be used. One of those providers will be 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.

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

    - **Health Navigator- and Healthcare-end Subsystem**: refers to the limited access MOD platform TMS that will be available to health navigators and healthcare customer care staff to request trips, cancel and rebook trips, and check on trip status on behalf of Travelers. Additionally, health navigators and the health administrator at the Dallas County Health Department (DCHD) use a Microsoft Access-based information and referral (I&R) product to track the status of referral activities and for coordination with Dallas County residents' health navigation/social care services.

    - **EHR/Medical Record Subsystem**: refers to the systems used by partner hospitals and clinics for booking medical appointments and maintaining their appointments, including discharge and any subsequent referral activities. Participating healthcare partners use different EHR services.. The following bullet points outline participating healthcare partners and the EHR systems they currently employ. Health Connector will develop a new interface with at least one healthcare partner's EHR system.

        - Mercy One Hospital – Transitioning to Epic EHR, in the near future

        - Dallas County Hospital – Veradigm HER until at least 2026, then transitioning to Epic EHR

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

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

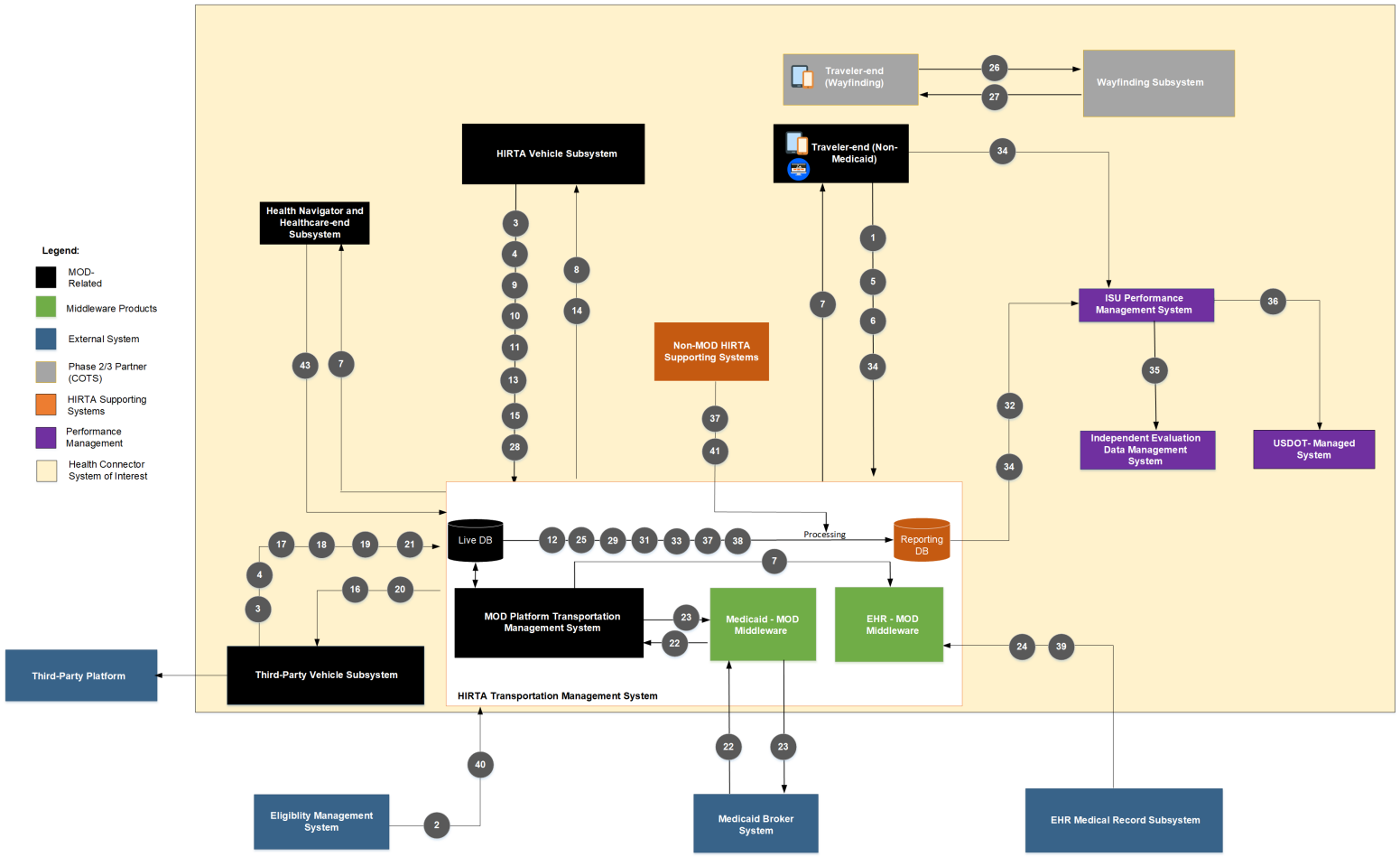

Figure 2. Detailed System of Interest Diagram (Source: HIRTA team)

Table 3. Data Needs Summary

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

ID	Data	High-level Description	System(s) of Interest Involved
17	Trip performance (third party)	Trip-level log of actual time and location for trips on the manifest along with any no-shows and cancellation events for trips delivered by a third-party provider.	Third-party platform
18	Vehicle location (third party)	Location and heading for a vehicle in service along with other details for a third-party provider.	Third-party platform
19	Driver messages (third party)	Log of messages sent by drivers to HIRTA dispatchers.	MOD Platform TMS
20	Dispatcher messages (third party)	Log of messages sent by HIRTA dispatchers to drivers.	MOD Platform TMS
21	Fare payment log (third party)	Log of amount paid for a trip and method of payment.	Third-party platform
22	Medicaid trip requests	HIRTA-accepted request for Medicaid-funded trips through Medicaid broker platform.	Medicaid broker system
23	Medicaid trip performance	Trip-level log of actual time and location for trips on the manifest along with any no-shows and cancellation events for trips delivered for Medicaid-funded trips.	MOD Platform TMS
24	Medical appointment details	Consists of medical appointment date, time, and location (facility address and doctor's office) for a particular Traveler.	EHR
25	Aggregated summary	Aggregated data on driver, vehicle, and trip performance.	MOD Platform TMS
26	Traveler wayfinding request	Requests initiated by Travelers to the wayfinding system.	Wayfinding subsystem
27	Traveler wayfinding guidance	Log of wayfinding information provided to Travelers.	Wayfinding subsystem
28	Safety event	Log of incidents and accidents by vehicle/driver/trip.	MOD Platform TMS
29	Safety event report	Detailed reports by a safety event (incident, accident) with response.	MOD Platform TMS
31	System performance	Log of system performance, including any failures.	MOD Platform; HIRTA supporting systems
32	Anonymized and/or aggregated data for performance evaluation	Anonymized/aggregated Traveler, trip, and operations data (as described in Table 3. Scope and Availability of Private Data in the Data Privacy Plan [5]) to support Health Connector performance evaluation.	MOD Platform TMS
33	Traveler complaints log	Log of Traveler complaints received and actions taken.	MOD Platform TMS

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

3.2 List of Interfaces

This section lists the interfaces that are being defined in Section 5, considering all the interfaces within the SAD [1], along with the unique identifiers. The subsystems referenced in Table 4 further defined in the SDD [2].

Table 4. List of Interfaces

Interface Number	Source Element	Destination Element	Data Needs
HC1	MOD Platform TMS	HIRTA Vehicle Subsystem	8, 14
HC1	HIRTA Vehicle Subsystem	MOD Platform TMS	3, 4, 9, 10, 11, 13, 15, 28
HC2	MOD Platform TMS	Traveler-end Subsystem	7

Interface Number	Source Element	Destination Element	Data Needs
HC2	Traveler-end Subsystem	MOD Platform TMS	1, 5, 6, 34
HC3	MOD Platform TMS	Health Navigator & Healthcare-end Subsystem	7
HC3	Health Navigator & Healthcare-end Subsystem	MOD Platform TMS	5, 6, 43
HC4	Eligibility Management System	HIRTA TMS (Via Central Software)	2, 40
HC5	MOD Platform TMS	Third-Party Vehicle Subsystem	16, 20
HC5	Third-Party Vehicle Subsystem	MOD Platform TMS	3, 4, 17, 18, 19, 21
HC6	MOD Platform TMS	Medicaid – MOD Middleware	23A
HC6	Medicaid – MOD Middleware	MOD Platform TMS	22A
HC6	Medicaid – MOD Middleware	Medicaid Broker System	23
HC6	Medicaid Broker System	Medicaid – MOD Middleware	22
HC7	MOD Platform TMS	EHR – MOD Middleware	7A
HC7	EHR – MOD Middleware	MOD Platform TMS	24A, 39A, 42A
HC7	EHR – MOD Middleware	EHR Medical Record Subsystem	7
HC7	EHR Medical Record Subsystem	EHR – MOD Middleware	24, 39
HC8	MOD Platform TMS	Reporting Database via Live Database	12, 25, 30, 31, 33, 37
HC9	Non-MOD HIRTA Supporting Systems	Reporting Database	29, 31, 33, 37, 38, 41
HC10	Reporting Database	ISU Performance Management System	32, 34
HC11	ISU Performance Management System	Independent Evaluation Data Management System	35
HC12	ISU Performance Management System	USDOT Managed System	36
HC13	Wayfinding Subsystem	Traveler-end (Wayfinding)	26
HC13	Traveler-end (Wayfinding)	Wayfinding Subsystem	27

4 Standards

The following data standards were identified during Phase 1 and continue to govern data in Phase 2/3. Development of these standards was continued with input from Via, the MOD vendor, during the system design portion of Task 2-B.

4.1 Data Standards

A list of standards, as applicable to vehicle, central environment, and data access and sharing are discussed in the following subsections.

4.1.1 Vehicle Data Standards

Vehicle equipment consists primarily of a tablet or a mobile device for drivers that will exchange data over cellular data network.

The HIRTA team also plans to implement infotainment services on vehicles to provide information to Travelers (e.g., orientation information upon arrival at the hospital). Implementation of these devices requires a monitor connected a media player onboard and cellular data connection to upload and change content that is displayed.

None of the planned features require a vehicle area network (VAN) except obtaining real-time status on wheelchair availability. Fault codes can be received over Society of Automobile Engineers (SAE) J1939 network if a wheelchair lift interlock module is available on a vehicle. Based on system requirements discussion, the need for real-time monitoring of such failure is not considered essential.

4.1.2 Data Communication Standards

Vehicle-to-central communication will be accomplished using Internet Protocol (IP)-based transport protocols, Transmission Control protocol (TCP) or User datagram Protocol (UDP). Data transport will occur over a 4G or 5G network with a carrier-level encryption using a private Access Point Name (APN). Details on communications solutions/standards referenced in Section 5 of this document can also be found in the System Architecture Document (SAD) [1].

4.1.3 Data Access Protocols

At least the following protocols will be used:

- HTTPS: Hypertext Transfer Protocol Secure (HTTPS) will be used for accessing data over the web or mobile browsers.
- Secure Socket Layer (SSL)-based security as provided at OS-level will be used by mobile apps.

- SFTP: Secure file transfer protocol (SFTP) will be used to provide access to open data from HIRTA's local data center.

4.1.4 Data Sharing Standards

Data will be shared using the following standard formats:

- CSV: Non-spatial data will be shared using text-based files using CSV format. Files will include a header and data. Details on the header fields will be available in the metadata.
- JSON: The TMS reporting portal currently makes spatial data available over JSON, and the same practice will be used for sharing spatial data.
- KML: File format may be used for sharing geographical data to designate service zones.

Data sharing in this document is separated into automatic and manual processes. Data sharing that occurs through automated integration is referred to as being "pulled", in which data is shared upon a request from one subsystem to another, or "pushed" in which data is automatically shared at a configurable interval from one subsystem to another. All data exchange within the MOD Platform TMS and Central Application, Driver Application and Traveler Application will be conducted over a secure network. Data exchange between HIRTA & ISU will be conducted over SFTP. The method of data sharing that occurs through manual processes, such as direct download, is specified for each interface.

4.1.5 Open Data Standards for Transactional Data

Overall, open data-based exchange is not applicable to this project, since there is currently no transactional data standard for functions such as booking, service management, or payment in use for demand response services in the industry. The Transactional Data Standard (TDS) governing transactional data will be used where appropriate for middleware products. This approach may differ for other agencies looking to replicate the Health Connector concept, since MOD vendors may be different, and other providers or subsystems could be included. Nevertheless, the core of HIRTA's system architecture will still be replicable for other sites, even if specific standards or approaches differ.

The HIRTA team originally considered step-by-step navigation support through NaviLens using GTFS Pathways, however wayfinding code use cases no longer include step-by-step navigation due to facility limitations.

4.1.6 Open API

Health Connector middleware will interface with Access2Care and Epic EHR through APIs.

Epic's open API will be needed to access medical appointment data. Details of the API are available at https://open.epic.com/ (accessed Aug 2021). Epic APIs are also compliant with Fast Health Interoperability Record (FHIR) and use extensible markup language (XML) or JSON for data exchange.

4.2 Versioning

Datasets released at a particular interval (e.g., daily, monthly) will follow a naming convention so they are easily identifiable by users. Also, datasets will be accompanied by metadata, so users are able to determine information on what is included. If there are any changes in the data structure between versions, these will be identified in the metadata. The DMP will be updated accordingly. Further details on metadata update process are described in the Data Management Plan.

Change management processes during software development reflect an iterative process of coding, testing, and sharing with members of the Change Control Board (CCB) for feedback. Beyond Phase 2, changes to middleware would be discussed by the CCB and Arcadis and, depending on the feasibility of changes to code or data structure relative to APIs, approved formally in line with the process established in the PMP [9]. This process will also be outlined in the HIRTA team's software development documentation.

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5 Interfaces

This part of the ICD includes all the separate sub-system to sub-system flows shown in the SAD [1]. Each interface identified includes a description of the interface, associated hardware and software components, descriptions of the data elements exchanged, requirements traceability, and communication methods between systems/subsystems. This section also references information available in other documents, whose references can be found in Section 8.

5.1 HC1: MOD Platform TMS <-> HIRTA Vehicle Subsystem

This section describes the MOD Platform TMS-to-HIRTA Vehicle Subsystem interface, which details communication between the MOD Platform TMS and technologies deployed on HIRTA-owned vehicles to support driver-end functions for driver dispatch, manifest management, just-in-time dispatching, turn-by-turn navigation and outdoor wayfinding (e.g., to locate Travelers at the time of pick up), on-board information, and fare payments. On all HIRTA-owned vehicles, drivers will use on-board tablets running the driver application, provided by Via.

5.1.1 Covered Information Flows

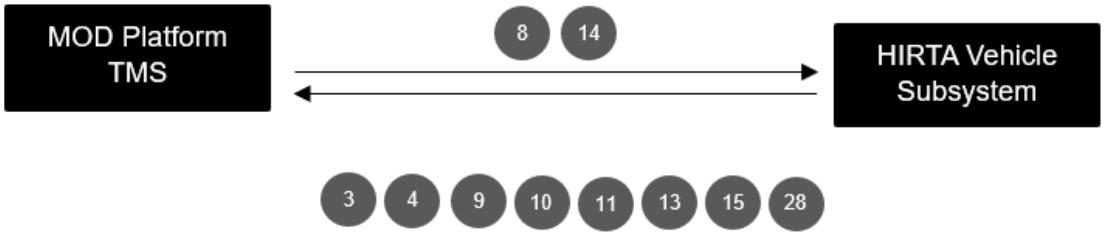

Figure 3. MOD Platform TMS - HIRTA Vehicle Subsystem (Source: HIRTA Team)

Table 5. Flows: MOD Platform TMS to HIRTA Vehicle Subsystem

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
3	Fleet Information	Details on HIRTA's vehicles. Consists of information on fleet (e.g., age, number of seats, accessibility).	CSV, JSON	Make & Model, Age, Color, Last Service Date, Plate Number, Capacity
4	Driver Information	Details on HIRTA's drivers. Consists of information about driver identifier and their status (e.g., experience, part time, full time, contract, shift).	CSV, JSON	Driver Name, Driver ID, Driver Email, Vendor, Driver status, Driver availability
8	Trip Manifest	Time and location details of Travelers to be picked up and dropped off by a driver during a shift. Consists of all trips to be performed by a driver on a particular shift. Trip details provide necessary information needed for a driver to perform a trip (e.g., trip identifier, customer info, pickup and drop-off locations and times, fare to be paid, mobility aid needed).	CSV (unformatted) / PDF (unformatted), JSON	Time of pickup, Location of Pickup, Location of Drop-off, Mobility needs, Passenger Information, Guest Information
9	Vehicle Location	Location and heading of vehicle details along with time, speed, and vehicle identifier.	CSV, JSON	Vehicle Information, GPS Location of Vehicle, Vehicle, Heading/Direction
10	Trip Performance	Log of actual time and location for trips on the manifest along with any no-shows and cancellation events. Includes reasons for no-shows and cancellations if available.	CSV, JSON	Vehicle Information, Actual Pick-up/Drop-off Location, Actual Pick-up/Drop-off Time, No-Show/Cancellation Details
11	Driver Performance	Driver level log of operational performance on log on, on-time performance, manifests complete at trip or aggregated level.	CSV, JSON	Driver Information, Log-on Time, Performance, Information, On-time Trip Performance Information

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
13	Driver Messages	Log of messages sent by drivers to dispatchers. Includes vehicle and driver identifier.	CSV, JSON	Message Content, Message Timestamp, Driver information
14	Dispatcher Messages	Log of messages sent by dispatchers to drivers. Includes vehicle and driver identifier.	CSV, JSON	Destination, Driver/Vehicle Information, Message Content, Message Timestamp
15	Fare Payment Log	Log of fare paid for a trip by Traveler and method of payment. Includes trip identifier and customer identifier.	CSV, JSON	Traveler Information, Trip Cost, Payment Method, Payment Timestamp
28	Safety Event	Consists of any incident or accident event reported by driver; trip, vehicle, and driver identifier included for internal analysis.	CSV, JSON	Trip Information, Driver Information, Vehicle Information, Incident/Accident Details

5.1.2 Associated Hardware/Software

All HIRTA vehicles will be equipped with the following on-board equipment (OBE):

1. *On-board Mobile Tablets:* Drivers of HIRTA-owned vehicles will utilize touchscreen, on-board tablets to deploy the Vehicle Subsystem driver application. Drivers will also be able to contact dispatchers and Travelers via phone calls and text message using cellular devices. This also includes a built-in *Driver Terminal GPS Receiver & Magnetometer (and/or gyroscope and accelerometer)*, which allows vehicle tracking and reporting at a predefined interval on vehicle latitude, longitude, and heading.

2. *Two-way Radio:* All HIRTA vehicles will be equipped with a two-way radio that operates independent of the driver terminal.

The Vehicle-end Subsystem driver application can be downloaded for free to any commercially available, GPS-enabled iOS or Android mobile device, including tablets and smartphones that meet the following minimum requirements:

1. *Android*
    a. RAM: 4 GB+
    b. OS version: Android 9+
    c. Year of device release: 2019+
    d. Screen size: 5.8inches+
    e. Play Services Available
2. *iOS*
    a. OS version: iOS 13+
    b. Device model: iPhone 6 and later

These devices will communicate with the MOD Platform TMS, which is operated on HIRTA-owned phones, tablets, and computers, via cellular data. The MOD Platform TMS software will be provided by Via.

The specific models of phones and computers cannot be outlined in this document for cybersecurity reasons.

Further details regarding the design and functionalities of these devices can be found in the SDD [2].

5.1.3 Dialogues

[3] Fleet information pushed from Vehicle Subsystem to MOD Platform TMS

Upon logging into the HIRTA Vehicle subsystem driver application, HIRTA operations staff will enter or confirm vehicle information (including vehicle ID, age, number of seats, accessibility) through the driver application at the beginning of their shift. Upon submission, this information is pushed to the MOD Platform TMS to be used by the MOD platform and HIRTA administration.

[4] Driver information pushed from Vehicle Subsystem to MOD Platform TMS

Upon logging into the HIRTA Vehicle Subsystem driver application, HIRTA drivers will input or confirm driver information (including driver ID, experience, part time, full time, contract, shift) through the application. Upon submission, this information is pushed to the MOD Platform TMS to be used by the MOD platform and HIRTA administration.

[8] Trip manifest pushed from MOD Platform TMS to Vehicle Subsystem

Upon logging into the HIRTA Vehicle Subsystem driver application at the beginning of a shift, drivers will receive trip manifest details, including time and location details of Travelers to be picked up and dropped off during a shift. Trip manifests are system-generated, using confirmed trips after run cutting and driver assignment is complete. Real-time updates are made to the trips if there are any changes through automated data transmission by the MOD Platform TMS communicating to the HIRTA Vehicle Subsystem using cellular communications.

[9] Vehicle location pushed from Vehicle Subsystem to MOD Platform TMS

The HIRTA Vehicle Subsystem driver application records and shares vehicle location and heading for a vehicle in service with the MOD Platform TMS. This information is automatically transmitted at a configurable interval over cellular communication.

[10] Trip performance pushed from Vehicle Subsystem to MOD Platform TMS

For both when a passenger is picked up and dropped off, drivers input confirmation of pickup time and location as well as drop-off time and location to the HIRTA Vehicle Subsystem driver application in real time. The driver will also indicate rides as no-shows or cancellations if applicable. This information is automatically transmitted over cellular communications upon submission to the application.

[11] Driver performance pushed from Vehicle Subsystem to MOD Platform TMS

Throughout the course of a shift, driver performance information, including log-on time, pickup and drop-off times for determining on-time performance, and mileage for determining miles driven as revenue versus deadhead will be automatically collected by the HIRTA Vehicle Subsystem driver application and pushed to the MOD Platform TMS. This information exchange will occur automatically upon logging in and completion of trip manifests through the driver application.

[13] Driver messages pushed from Vehicle Subsystem to MOD Platform TMS dispatchers

Drivers input messages directly through the HIRTA Vehicle Subsystem driver application on on-board terminals. These messages are automatically pushed and displayed to dispatchers within the MOD Platform TMS upon submission.

[14] Dispatcher messages pushed from MOD Platform TMS to Vehicle Subsystem

Dispatchers input messages for a designated driver directly through the MOD Platform TMS. Messages are automatically pushed to the HIRTA Vehicle Subsystem and displayed through the driver application for the specified driver/vehicle identifier.

[15] Fare payment log pushed from Vehicle Subsystem to MOD Platform TMS

Trip fare amount and payment method are automatically populated in the Driver application through the MOD Platform TMS backend. Validation of payment by the driver will require configuration of the application by Via. The data is automatically transmitted over cellular communications to the MOD Platform TMS upon submission.

[28] Safety event information reported by Drivers of Vehicle Subsystem for input in the MOD Platform TMS by HIRTA Operations staff.

Incident information is input directly into the VOC through the incident reporting module. As such, Drivers will be required to report incident information to HIRTA operations staff, who will then input the information into an incident report in the VOC. This information will include information such as event type/description, trip ID, vehicle ID, and driver ID.

5.1.4 Data Elements

The data elements described in Table 5 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.1.5 Requirement Traceability

The following requirements can be traced to the components and functions described for interface HC1. A full list of references can be found in the Requirements Traceability Matrix [8].

- RC-OPS-3.1
- RC-OPS-3.1.1
- RC-OPS-3.1.2
- RC-OPS-3.1.3
- RC-OPS-3.1.4
- RC-OPS-3.1.5
- RC-OPS-3.1.6
- RC-OPS-6B.3
- RV-DRV-0.7

- RV-DRV-3.2
- RV-DRV-4.1
- RV-DRV-4.2
- RV-DRV-4.5.1
- RV-DRV-4.5.2
- RV-DRV-4.8.1
- RV-DRV-4.8.2
- RV-DRV-4.8.3
- RV-DRV-4.9.1
- RV-DRV-4.9.1.1
- RV-DRV-4.9.1.2
- RV-DRV-4.9.1.3
- RV-DRV-4.9.1.4
- RV-DRV-4.9.1.5
- RV-DRV-4.9.1.6
- RV-DRV-4.9.1.7
- RV-DRV-4.10.2
- RV-DRV-4.11.2
- RC-SYS-2.1
- RC-SYS-2.1.1
- RC-SYS-2.1.2
- RC-SYS-2.1.3
- RC-SYS-9.3
- RC-SYS-9.7
- RC-SYS-9.8
- RC-SYS-10.2
- RC-SYS-10.3
- RC-SYS-10.5
- RC-SYS-10.5.1
- RC-SYS-10.5.2
- RC-SYS-10.5.3
- RC-SYS-10.5.4
- RC-SYS-10.5.5
- RC-SYS-10.5.6
- RC-SYS-10.5.7
- RC-SYS-10.5.8
- RC-SYS-10.5.9
- RC-SYS-10.5.10
- RC-SYS-10.8

5.1.6 Communication Methods

The HIRTA Vehicle Subsystem will remain connected to the MOD Platform TMS in real time using cellular data communication over a 4G or 5G network with a carrier-level encryption using a private Access Point Name (APN).

The flows above will follow the following communications solutions/standards:

- TPEG2 – Wide Area Broadcast
- US: TCIP – Secure Wireless Internet (ITS)
- US: ATIS – Secure Wireless Internet (ITS)
- (None-Data) – Secure Wireless Internet (ITS)

Further information on security management for communication with Via's system is detailed in Section 6.

5.2 HC 2: MOD Platform TMS <-> Traveler-End Subsystem

This section describes the MOD Platform TMS-to-Traveler-End (non-Medicaid) Subsystem interface, which details communication between the TMS and technologies (phone/interactive voice response (IVR), mobile/smart devices, web-based tools) used by Travelers seeking transportation services for their healthcare appointments as part of their pre-trip, during trip, on arrival, and return trip activities. This includes a mobility-on-demand (MOD) application for planning, booking, and payment known as the Traveler application.

5.2.1 Covered Information Flows

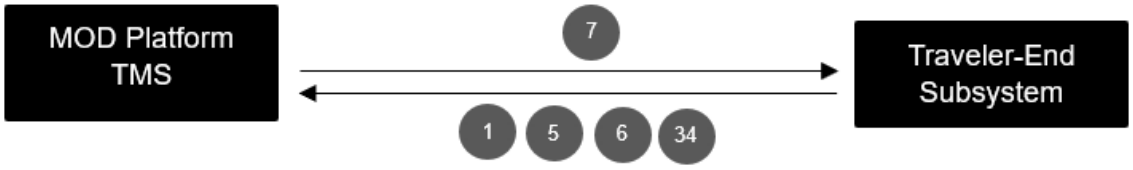

Figure 4. MOD Platform TMS - Traveler-End Subsystem (Source: HIRTA Team)

Table 6. Flows: MOD Platform TMS to Traveler-end Subsystem

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
1	Traveler Profile	Traveler's personal details as provided as part of registration. Consists of personal details (e.g., name, addresses, contact information, eligibility) and travel preferences (e.g., mobility aid, notification) for Travelers stored in Traveler profile.	CSV, JSON	Traveler First & Last Name, Traveler Address, Traveler Contact Information, Traveler Eligibility, Mobility Preferences, Notification Preferences, Traveler's Favorite Locations

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
5	Trip Request	Traveler's request for a trip from a web or mobile device or via phone using concierge/customer care service. Consists of customer identifier, trip identifier, date, time, locations of pickups and drop-offs and any mobility needs.	CSV, JSON	Traveler ID, Trip ID, Trip Pick-up Location, Trip Drop-off Location, Trip Request Date & Time, Mobility Needs
6	Trip Modification or Cancellation	Traveler's request to cancel an existing scheduled trip. To modify the pickup and/or drop off location of an existing trip, Travelers will cancel existing reservations and submit new booking requests. Allowable modifications include number of passengers, trip date/time and associated ride notes.	CSV, JSON	Traveler ID, Trip ID, Trip Cancellation Request, Number of Passenger Modifications, Trip Date/Time Modifications, Trip Note Modifications
7	Trip Status	Current information on upcoming trip. Consists of estimated time of arrival and/or delay status, as applicable, along with pickup location.	CSV, JSON	Trip ID, Traveler Name, Trip Date/Time, Trip Pick-up Location, Trip Drop-off Location
34	Traveler Survey Results	Customer data and survey conducted by ISU (including through the MOD platform) of human use participants.	CSV (non-spatial), SHP format (spatial), charts	Survey Results to be determined upon development of Traveler Survey

5.2.2 Associated Hardware/Software

The Traveler-end Subsystem consists of the Traveler application, which can be downloaded to a Traveler's personal mobile smart device or is accessible by web.

The Traveler-end Subsystem Traveler app can be downloaded for free to any commercially available, GPS-enabled iOS or Android mobile device, including tablets and smartphones that meet the following minimum requirements:

3. *Android*
    a. RAM: 4 GB+
    b. OS version: Android 9+
    c. Year of device release: 2019+
    d. Screen size: 5.8# +

e. Play Services Available

4. *iOS*
    a. OS version: iOS 12+
    b. Device model: iPhone 6 and later

These devices will communicate with the MOD Platform TMS, which is operated on HIRTA-owned phones, tablets, and computers. HIRTA uses a voice over internet protocol (VOIP) phone system to make and receive calls on landline phones as well as on desktops and personal devices. This allows HIRTA dispatchers and customer service staff to communicate with Travelers and book rides or field comments and questions. The specific models of phones and computers cannot be outlined in this document for cybersecurity reasons.

Via's survey platform integrates with third-party software providers Leanplum and SurveyMonkey to host, distribute, and collect survey responses.

5.2.3 Dialogues

[1] Traveler profile information pushed from Traveler-End Subsystem to MOD Platform TMS

Upon entry into the Traveler-end Subsystem Traveler application, traveler profile information is automatically pushed to the MOD Platform TMS. Traveler information can also be submitted by HIRTA or partner staff on behalf of a Traveler. For the duration of the project, the registration process is separate through the HIRTA website where the information is then registered through the MOD Platform TMS by HIRTA Staff. In the future, registration for Health Connector can be implemented in the Traveler app.

[5] Trip request pushed from Traveler-End Subsystem to MOD Platform TMS

Upon submission of a trip request into the Traveler-end Subsystem Traveler application, trip request data is automatically pushed to the MOD Platform TMS for trip planning purposes. This information can also be submitted by HIRTA or partner staff on behalf of a Traveler.

[6] Trip modification/cancellation requests pushed from Traveler-End Subsystem to MOD Platform TMS

After a Traveler has scheduled a trip through the Traveler-end Subsystem Traveler application, they are able to use the same application to submit a request to cancel an existing scheduled trip. Upon submission of this request, the modification/cancellation information will be automatically pushed to the MOD Platform TMS. Modifications to trip date/time, number of passengers and trip notes can be made directly in the Traveler app, however, modifications to trip pickup and/or drop-off locations will require the Traveler to cancel and rebook the trip. This information can also be submitted by HIRTA or partner staff on behalf of a traveler.

[7] Trip status pushed from MOD Platform TMS to Traveler-End Subsystem

Utilizing vehicle location data and driver/performance data received in real time, the MOD Platform TMS will generate trip status information which is pushed to the Traveler-end Subsystem every 5 seconds throughout the course of a trip, including while a Traveler is waiting for a ride and in the vehicle, while cellular data coverage is available. Information on assigned driver and trip status will become available to a Traveler 45 minutes prior to the start of a pickup window if

the assigned driver is already logged into the driver application. If the driver logs in within 45 minutes of the scheduled pickup window, the Traveler will be able to see this information at this time. Trip status information will be available to the Traveler via the Traveler application.

[34] Traveler survey results pushed from Traveler-End Subsystem to MOD Platform TMS.

Travelers will receive a survey link upon trip completion through the Traveler-end Subsystem Traveler application that directs them to a third-party survey platform. Upon completion and submission of the survey, the survey results are automatically pushed to the third-party host. These results will be aggregated and anonymized and can be shared with HIRTA and the research team manually via CSV or can be pulled directly via the 3rd party survey platform. These results will then be uploaded to and stored in the Reporting Database.

5.2.4 Data Elements

The data elements described in Table 6 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.2.5 Requirement Traceability

The following requirements can be traced to the components and functions described for interface HC2. A full list of references can be found in the Requirements Traceability Matrix [8].

- RM-TRV-1.1.2
- RM-TRV-2.2
- RM-TRV-12.4
- RC-SYS-1.2
- RC-SYS-1.2.1
- RC-SYS-1.2.2
- RC-SYS-1.2.3
- RC-SYS-1.2.4
- RC-SYS-1.2.5
- RC-SYS-1.3
- RC-SYS-1.3.1
- RC-SYS-1.3.2
- RC-SYS-1.3.3
- RC-SYS-1.3.4
- RC-SYS-2.1
- RC-SYS-2.1.1
- RC-SYS-2.1.2
- RC-SYS-2.1.3
- RC-SYS-10.1
- RC-SYS-10.5

5.2.6 Communication Methods

The HIRTA Traveler-end Subsystem will remain connected to the MOD Platform TMS in real time using cellular data communication. If cellular data is lost during the course of a trip, trip details will be automatically shared once service is regained.

The flows above will follow the following communications solutions/standards:

- TPEG2 – Wide Area Broadcast
- US: TCIP – Secure Wireless Internet (ITS)
- US: ATIS – Secure Wireless Internet (ITS)
- (None-Data) – Secure Wireless Internet (ITS)

Further information on security management for communication with Via's system is detailed in Section 6.

5.3 HC3: MOD Platform TMS <-> Health Navigator and Healthcare-end Subsystem

This section describes the MOD Platform TMS-to-Health Navigator and Healthcare-end Subsystem interface which details communication between the MOD Platform TMS and the modified MOD platform that will be available to health navigators and healthcare customer care staff to request trips, cancel existing scheduled trips and rebook in the case of requiring trip modification, and check on trip status on behalf of Travelers.

5.3.1 Covered Information Flows

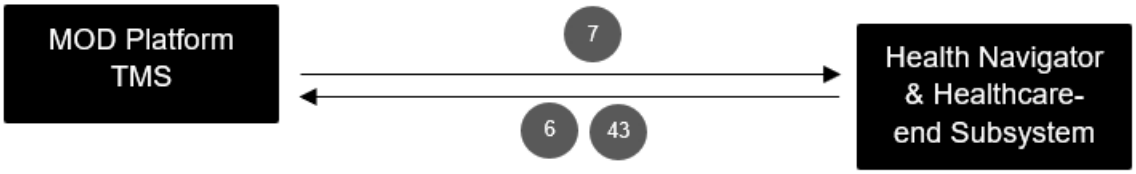

Figure 5. MOD Platform TMS - Health Navigator& Healthcare-end Subsystem (Source: HIRTA Team)

Table 7. Flows: MOD Platform TMS to Health Navigator and Healthcare-end Subsystem

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
6	Trip Modification or Cancellation	Request to cancel an existing scheduled trip by healthcare providers or health navigator personnel on behalf of travelers. To modify the pickup or drop-off location of a traveler's existing trip, healthcare providers or health navigator personnel will cancel existing reservations and submit new booking requests.	CSV, JSON	Trip ID, Traveler Name, Trip Cancellation Request, Trip Date/Time Modifications, Passenger Number Modifications, Trip Notes Modifications
7	Trip Status	Current information about upcoming trip. Consists of estimated time of arrival and/or delay status, as applicable, along with pickup location.	CSV, JSON	Trip ID, Traveler Name, Trip Date/Time, Trip Pick-up Location, Trip Drop-off Location
43	Trip Request (Partners)	Trips requested by DCHD and healthcare providers using MOD platform.	CSV, JSON	Traveler Name, Trip Date/Time, Trip Pick-up Location, Trip Drop-off Location, Payment Method

5.3.2 Associated Hardware/Software

The MOD Platform TMS is operated on HIRTA-owned tablets and computers. Similarly, the modified MOD application that is available, known as the Health Navigator and Healthcare-end Subsystem will also be available on computers operated by health navigators and healthcare partners. The software associated with both systems is a web-based application that will be provided by Via.

Further details regarding the design and functionalities of these devices can be found in the System Design Document [2].

5.3.3 Dialogues

[5, 43] Trip request, including partner requests, pushed from Health Navigator and Healthcare-End Subsystem to MOD Platform TMS

Upon entry into the Health Navigator/Healthcare-End by a healthcare provider or health navigator, trip request data is pushed to the MOD Platform TMS. This same process applies for trip requests submitted by DCHD and healthcare providers through the Traveler-End subsystem.

[6] Trip modification/cancellation requests pushed from Health Navigator and Healthcare-End Subsystem to MOD Platform TMS

Trip cancellation requests are pushed to the MOD Platform TMS upon entry into the Health Navigator and Healthcare-end Subsystem MOD platform by a healthcare provider or health navigator. For trip modifications to trip pickup and/or drop-off locations, healthcare providers and health navigators will submit trip cancellation requests for existing scheduled trips and modifications via new booking requests. Modifications to the number of passengers, trip date/time or trip notes can be made directly through the Health Navigator and Healthcare-End Subsystem.

[7] Trip status pushed from MOD Platform TMS to Health Navigator and Healthcare-End Subsystem

MOD Platform TMS system-generated data generated using vehicle location and driver/performance data received in real time from the Traveler-End Subsystem every 5 seconds throughout the course of a trip, including waiting for a ride and while in the vehicle, are pushed from the MOD Platform TMS to the MOD platform available to healthcare providers and health navigators. Information on assigned driver and trip status will become available 45 minutes prior to the start of a pickup window if the assigned driver is already logged into the driver application. If the driver logs in within 45 minutes of the scheduled pickup window, healthcare providers and health navigators will be able to see this information at this time.

5.3.4 Data Elements

The data elements described in Table 7 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.3.5 Requirement Traceability

The following requirements can be traced to the components and functions described for interface HC3. A full list of references can be found in the Requirements Traceability Matrix [8].

- RC-HCR-1.3
- RC-HCR-1.4
- RC-HCR-1.5
- RC-HCR-1.6
- RC-HCR-2.1
- RC-HCR-2.2
- RC-HCR-3.1
- RC-HCR-4.1
- RC-HCR-5.1

- RC-HCR-5.2
- RC-HCR-6.1
- RC-HCR-6.2
- RC-HCR-7.1
- RC-HCR-7.2
- RC-HCR-8.1
- RC-HCR-8.2
- RC-HCR-8.3
- RC-HCR-8.4
- RC-HCR-8.5
- RC-HCR-8.6
- RC-HCR-9.1
- RC-HCR-9.1.1
- RC-HCR-9.1.2
- RC-HCR-9.1.3
- RC-HCR-9.1.4
- RC-HCR-9.2
- RC-HCR-9.3
- RC-HCR-9.4
- RC-HCR-9.5
- RC-HCR-9.6

5.3.6 Communication Methods

The MOD Platform TMS and Health Navigator and Healthcare-end Subsystem are both built upon Via's central software, with limited access to functionality available in the Health Navigator and Healthcare-end Subsystem.

The flows above will follow the following communications solutions/standards:

- TPEG2 – Wide Area Broadcast
- US: TCIP – Secure Wireless Internet (ITS)
- US: ATIS – Secure Wireless Internet (ITS)
- (None-Data) – Secure Wireless Internet (ITS)

All data exchanged will follow the standards outlined in Section 4. Further information on security management for communication with Via's system is detailed in Section 6.

5.4 HC4: MOD Platform TMS <-> Eligibility Management System

This section describes the MOD Platform TMS-to-Eligibility Management System interface which details the communication of a Traveler's eligibility for payment methods for use of Health Connector during invoicing. The Eligibility Management System refers to all external systems that contain information about what funding riders may or may not be eligible for on Health Connector trips. The MOD Platform TMS will interface with the Eligibility Management System to ensure

eligibility requirements are being met during invoicing for Travelers using Health Connector. The interface between the MOD Platform TMS and the Eligibility Management System allows for data exchange, however, is not an automatic integration.

5.4.1 Covered Information Flows

Figure 6. MOD Platform TMS - Eligibility Management System (Source: HIRTA Team)

Table 8. Flows: MOD Platform TMS to Eligibility Management System

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
2	Traveler Eligibility	Traveler's eligibility for a funding source or program as stored in Traveler profile; also verified with funding entities (e.g., Medicaid).	CSV	Traveler Name, Traveler Eligibility
40	Discount Coupon/Credit	Consists of a log of discount code applied to trips and amount of credit. Available at trip level and will be linked to fare payment log.	CSV	Trip ID, Actual Cost, Fare Required, Fare Paid, Discount Coupon/Code, Payment Method

5.4.2 Associated Hardware/Software

The MOD Platform TMS is operated on HIRTA owned phones, tablets, and computers. The MOD Platform TMS will be provided by Via.

The Eligibility Management System will be hosted on software belonging to the eligibility management entities and data exchange will be through their API.

Further details regarding the design and functionalities of these devices can be found in the System Design Document.

5.4.3 Dialogues

[2] Traveler Eligibility information pulled by MOD Platform TMS

Traveler eligibility may be accessed by HIRTA staff using the MOD platform in the course of providing service, however, it cannot be accessed or used for any purposes outside of required reporting, invoicing, and providing transportation services to the Traveler. Traveler eligibility is collected via traveler input or provided by a funding entity. Health Connector eligibility will be configured in the VOC so as to only allow riders marked as eligible for Health Connector service to book rides. To confirm the eligibility of a Traveler using Health Connector during invoicing, HIRTA operations staff will be able to reference information contained in the Eligibility Management System.

[40] Discount coupon/credit information pulled by HIRTA TMS (Via Central Software)

Discount coupon/credit log can be accessed by HIRTA staff using the MOD platform and relates to data provided to the Traveler and Driver about the required trip fare. This information is entered by Traveler or concierge/customer service staff. To confirm the eligibility of a Traveler requesting service to use a discount or coupon, the MOD Platform TMS will reference Traveler eligibility information from the Eligibility Management System.

5.4.4 Data Elements

The data elements described in Table 8 are further defined in the Data Management Plan (DMP) and Data Privacy Plan (DPP).

5.4.5 Requirement Traceability

The following requirements can be traced to the components and functions described for interface HC4. A full list of references can be found in the Requirements Traceability Matrix [8].

- RC-SYS-1.2
- RC-SYS-1.2.1
- RC-SYS-1.2.2
- RC-SYS-1.2.3
- RC-SYS-1.2.4
- RC-SYS-1.2.5
- RC-CSR-16.1
- RC-CSR-16.3
- RC-ADM-4.1
- RC-ADM-4.2
- RC-FND-1.1
- RC-FND-1.2
- RC-FND-1.3
- RC-FND-1.4
- RC-FND-1.5
- RC-FND-1.6

5.4.6 Communication Methods

The MOD Platform TMS is built upon Via's central software and communicates with external systems.

There are no communications standards/protocols established for this interface at this time.

All data exchanged will follow the standards outlined in Section 4. Further information on security management for communication with Via's system is detailed in Section 6.

5.5 HC5: MOD Platform TMS <-> Third-Party Vehicle Subsystem

This section describes the MOD Platform TMS-to-Third-Party Vehicle Subsystem interface, which details communication between the MOD Platform TMS and the driver application when deployed on third-party vehicles to support driver-end functions for driver-dispatch, manifest management, support just-in-time dispatching, turn-by-turn navigation and outdoor wayfinding (e.g., to locate Travelers at the time of pick up), on-board information and fare payments. Third-party vehicles, and vehicles operated by volunteer drivers, will deploy the same Driver application, provided by Via, as HIRTA-owned vehicles on phones or tablets owned by the third-party drivers. Third-party driver information will be managed by the MOD Platform TMS in the same manner as HIRTA drivers.

5.5.1 Covered Information Flows

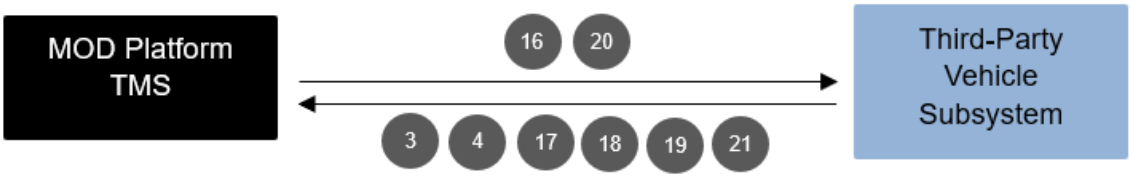

Figure 7. MOD Platform TMS - Third-Party Vehicle Subsystem (Source: HIRTA Team)

Table 9. Flows: MOD Platform TMS to Third-Party-owned vehicles

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
3	Fleet Information	Details on third-party vehicles to help with identification of vehicles.	CSV, JSON	Make & Model, Color, Plate Number, Capacity
4	Driver Information	Details on drivers of third-party vehicles, including driver name, email and associated vendor.	CSV, JSON	Driver Name, Driver ID, Driver Email, Vendor
16	Request for Third-Party Trips	Time and location details of Travelers to be picked up and dropped off by a third-party driver during a shift.	CSV (unformatted) / PDF (Unformatted)	Traveler ID, Trip ID, Trip Pickup Location, Trip Drop-off Location, Trip Request Date & Time, Mobility Needs

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
17	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 by a third-party provider.	CSV, JSON	Vehicle Information, Actual Pick-up/Drop-off Location, Actual Pick-up/Drop-off Time, No-Show/Cancellation Details
18	Vehicle Location (Third-Party)	Location and heading for a vehicle in service along with other details for a third-party provider.	CSV, JSON	Vehicle Information, GPS Location of Vehicle, Vehicle Heading/Direction
19	Driver Messages (Third-Party)	Log of messages sent by drivers to dispatchers.	CSV, JSON	Message Content, Message Timestamp, Driver information
20	Dispatcher Messages (Third-Party)	Log of messages sent by dispatchers to drivers.	CSV, JSON	Destination Driver/Vehicle Information, Message Content Message Timestamp
21	Fare Payment Log (Third-Party)	Log of amount paid for a trip and method of payment.	CSV, JSON	Traveler Information, Trip Cost, Payment Method, Payment Timestamp

5.5.2 Associated Hardware/Software

All Third-Party vehicles will be equipped with the following on-board equipment (OBE):

1. *Mobile GPS Enabled Smart-Device:* Drivers of third-party vehicles will use phones, tablets, and other smart-devices to deploy the driver application provided by Via. This will allow third-party drivers to receive trip manifests and directions, Traveler information, and communicate with HIRTA dispatchers, customer service staff, and Travelers. Third-party vehicle drivers will have access to the same functionality as HIRTA drivers.

Third-party devices will deploy the driver application, provided by Via. Further details on operating system specifications and software versioning will be included upon finalization of design.

These devices will communicate with the MOD Platform TMS which is operated on HIRTA-owned phones, tablets, and computers. The MOD Platform TMS will be provided by Via.

5.5.3 Dialogues

[3] Fleet information pushed from Third-Party Vehicle Subsystem to MOD Platform TMS

Upon logging into the Driver application, third-party transportation providers will enter or confirm vehicle information (including vehicle ID, age, number of seats, accessibility) through the

application at the beginning of their shift. Upon submission, this information is pushed to the MOD Platform TMS to be used by the MOD platform and HIRTA administration.

[4] Driver information pushed from Third-Party Vehicle Subsystem to MOD Platform TMS

Upon logging into the Driver application, third-party transportation providers will enter their driver information. Upon submission of this information in the application, driver information will be automatically pushed to the MOD Platform TMS to associate drivers with trips.

[8] Trip manifest sent from MOD Platform TMS to Third-Party Vehicle Subsystem

Third-party vehicle drivers will receive trip manifest details that are pushed from the MOD Platform TMS upon the beginning of a shift to the driver application, including time and location details of Travelers to be picked up and dropped off during the shift. Trip manifests are system-generated using confirmed trips after run cutting and driver assignment is complete. Real-time updates are made to the trips if there are any changes through automated data transmission by the MOD Platform TMS communicating to the Third-party Vehicle Subsystem using cellular communications.

[16] Trip performance pushed from Third-Party Vehicle Subsystem to MOD Platform TMS

Throughout the course of a shift, driver performance information, including log-on time, pickup and drop-off times for determining on-time performance, and mileage for determining miles driven as revenue versus deadhead will be automatically collected by the Driver application and pushed to the MOD Platform TMS. This information exchange will occur automatically upon logging in and completion of trip manifests through the driver application.

[18] Vehicle location pushed from Third-party Vehicle Subsystem to MOD Platform TMS

The Driver application records and pushes vehicle location and heading for a vehicle in service with the MOD Platform TMS. This information is automatically transmitted at a configurable interval over cellular communication.

[19] Driver messages pushed from Third-Party Vehicle Subsystem to MOD Platform TMS dispatchers

Third-party drivers input messages directly through the Driver application on on-board terminals (phones/tablets). These messages are automatically pushed and displayed to dispatchers within the MOD Platform TMS upon submission.

[20] Dispatcher messages pushed from MOD Platform TMS to Third-Party Vehicle Subsystem

Dispatchers input messages for a designated driver directly through the MOD Platform TMS. Messages are automatically pushed to the Third-party Vehicle Subsystem and displayed through the driver application for the specified driver/vehicle identifier.

[21] Fare payment log pushed from Vehicle Subsystem to MOD Platform TMS

Third-party drivers input the amount paid by a rider and the rider's payment method through the HIRTA Vehicle Subsystem driver application using the same methodology as HIRTA drivers. All electronic payments, including card and electronic vouchers, will be handled in the same manner as payments made on HIRTA owned vehicles. The data is automatically transmitted over cellular communications to the MOD Platform TMS upon submission.

5.5.4 Data Elements

The data elements described in Table 9 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.5.5 Requirement Traceability

The following requirements can be traced to the components and functions described for interface HC5. A full list of references can be found in the Requirements Traceability Matrix [8].

- RC-OPS-3.2
- RC-OPS-3.2.1
- RC-OPS-3.2.2
- RC-OPS-3.2.3
- RC-OPS-3.2.4
- RC-OPS-3.2.5
- RC-OPS-6B.3
- RV-DRV-0.7
- RV-DRV-3.2
- RV-DRV-4.1
- RV-DRV-4.2
- RV-DRV-4.5.1
- RV-DRV-4.5.2
- RV-DRV-4.8.1
- RV-DRV-4.8.2
- RV-DRV-4.8.3
- RV-DRV-4.9.1
- RV-DRV-4.9.1.1
- RV-DRV-4.9.1.2
- RV-DRV-4.9.1.3
- RV-DRV-4.9.1.4
- RV-DRV-4.9.1.5
- RV-DRV-4.9.1.6
- RV-DRV-4.9.1.7
- RV-DRV-4.10.2
- RV-DRV-4.11.2
- RC-SYS-2.1
- RC-SYS-2.1.1
- RC-SYS-2.1.2
- RC-SYS-2.1.3
- RC-SYS-10.2

5.5.6 Communication Methods

The Third-Party Vehicle Subsystem will remain connected to the MOD Platform TMS in real time using cellular data communication. If cellular data is lost during the course of a trip, trip details will be automatically shared once service is regained.

The flows above will follow the following communications solutions/standards:

- TPEG2 – Wide Area Broadcast
- US: TCIP – Secure Wireless Internet (ITS)
- US: ATIS – Secure Wireless Internet (ITS)
- (None-Data) – Secure Wireless Internet (ITS)

All data exchanged will follow the standards outlined in Section 4. Further information on security management for communication with Via's system is detailed in Section 6.

5.6 HC6: MOD Platform TMS <-> MOD – Medicaid Middleware <-> Medicaid Broker System

This section describes the MOD Platform TMS -to-MOD-Medicaid Middleware and Medicaid Broker System Interface. The MOD-Medicaid Middleware is an open-source middleware product that allows data exchange between the MOD Platform TMS provided by Via and the Medicaid Broker System. HIRTA currently uses Access2Care for booking and managing Medicaid trips, requested by Travelers through the Medicaid App or via phone, and will continue to do so for Medicaid trips. Medicaid trips will be assigned by Access2Care to HIRTA, and when a ride is accepted by HIRTA, a Traveler using Medicaid benefits to be able to use Health Connector Traveler tools. The MOD-Medicaid Middleware will interface with Access2Care's API, provided by Lyft, to automate the data exchange and improve coordination for Medicaid-funded trips. Figure 8 shows a high-level overview of the interface related to the MOD-Medicaid Middleware. The interface between the MOD Platform TMS and MOD Traveler Application is described in Section 5.2.

Complete documentation on associated hardware and software, data flows, and data structures will be provided at the completion of development in software development documentation.

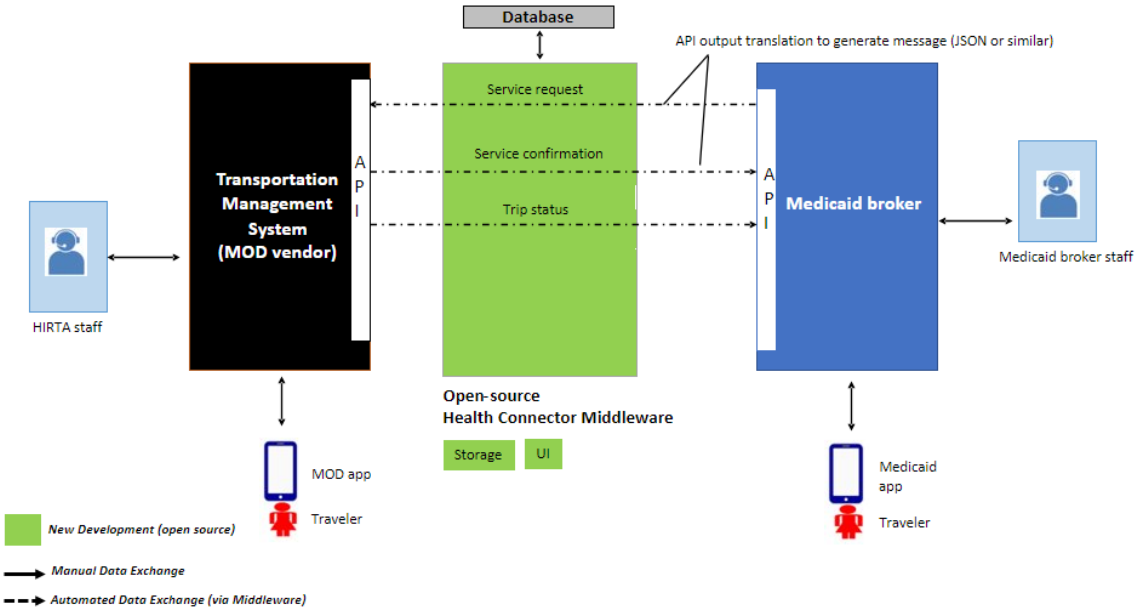

Figure 8. MOD-Medicaid Middleware interface diagram (Source: HIRTA team)

5.6.1 Covered Information Flows

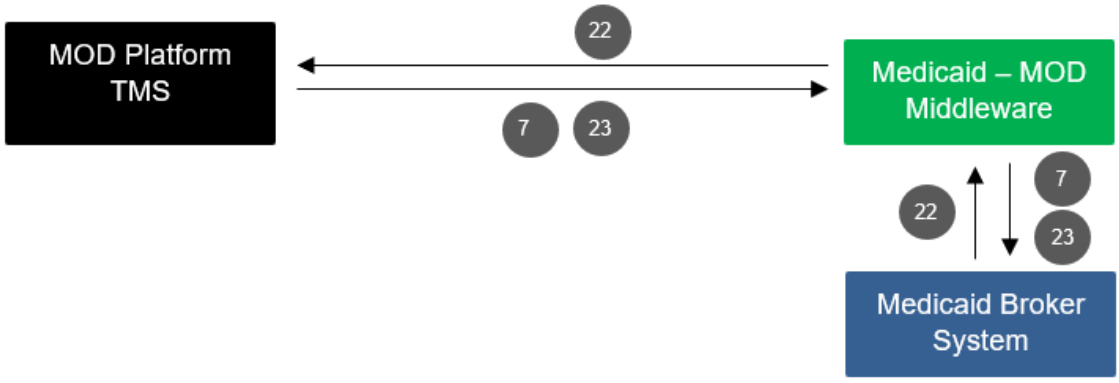

Figure 9. MOD Platform TMS - Medicaid-MOD Middleware - Medicaid Broker System (Source: HIRTA Team)

Table 10. MOD Platform TMS to Medicaid – MOD Middleware and Medicaid Broker System

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
7	Medicaid Trip Status	Current information on upcoming Medicaid trip. Consists of estimated time of arrival and/or delay status, as applicable, along with pickup location.	JSON	Trip ID, Traveler Name, Traveler Email/Phone Trip Date/Time, Trip Pick-up Location, Trip Drop-off Location, Trip Status
22	Medicaid Trip Requests	HIRTA-accepted request for Medicaid-funded trips through Medicaid broker platform.	JSON	Trip ID, Traveler Name, Traveler Email/Phone Trip Pick-up Location, Trip Drop-off Location, Trip Request Date & Time, Mobility Needs
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.	JSON	Vehicle Information, Actual Pickup/Drop-off Location, Actual Pickup/Drop-off Time, No-Show/Cancellation Details, Service Confirmation, Driver Information

5.6.2 Associated Hardware/Software

The MOD Platform TMS is operated on HIRTA-owned phones, tablets, and computers. The specific models of phones and computers cannot be outlined in this document for cybersecurity reasons.

The MOD-Medicaid Middleware will be published as an open-source software built on AWS. This product interfaces with multiple external APIs and software. The Medicaid Broker System for the State of Iowa uses Access2Care for managing transportation to and from Medicaid funded appointments. Medicaid funded trip request data will be made available to the MOD-Medicaid Middleware through an API provided by Lyft. The MOD-Medicaid Middleware will interface with the HIRTA TMS through an API provided by Via.

5.6.3 Dialogues

[7] Medicaid Trip Status pushed to Medicaid Portal via Medicaid-MOD Middleware

The middleware shall retrieve trip status information on active Medicaid trips from the MOD Platform TMS via API get requests posted to Via's API at a configurable interval. Trip status updates will then be transformed in the middleware to an object that can then be pushed back to Lyft's API for ingestion into Access2Care.

Changes made to trip requests in Access2Care will be accommodated by updating the original request, or via cancellation of the original request and resubmission of the new request with updated trip details if modifications are not able to be accommodated.

[22] Transportation requests from Medicaid Broker System pushed to MOD Platform TMS via Medicaid-MOD Middleware

The MOD-Medicaid Middleware will receive Medicaid trip requests from Access2Care posted by Lyft's API. The middleware product will transform the data from Lyft into a format receivable by Via's API. The transformed trip request will then be pushed to Via's API and ingested into the MOD Platform TMS for trip assignment. Transportation requests from the middleware will automatically be entered into the MOD platform's unassigned queue. HIRTA staff will then schedule requests as able using the MOD platform and turn down requests that cannot be accommodated. When a trip request is accepted by HIRTA, the middleware product will transform and return the details of the trip request from Via to Lyft.

[23] Performance data from MOD Platform TMS pushed to Medicaid Portal via Medicaid-MOD Middleware

The MOD-Medicaid Middleware will allow the exchange of performance related information between Lyft (Access2Care) and Via (MOD Platform TMS). Upon the completion of a trip requested by Access2Care and accepted by HIRTA, the middleware will push updated trip information received from Via back to Lyft, which will include details on actual pick-up/drop-off times, locations, fares paid, and no-show information (if applicable). This information can be used to determine performance metrics related to Medicaid funded trips.

5.6.4 Data Elements

The data elements described in Table 10 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.6.5 Requirement Traceability

The following requirements can be traced to the components and functions described for interface HC6. A full list of references can be found in the Requirements Traceability Matrix [8].

- RC-OPS-1A.2
- RC-OPS-1A.5
- RC-OPS-6A.4.1

5.6.6 Communication Methods

The software systems involved in this interface will utilize API calls to communicate following wireless internet protocols.

The flows above will follow the following communications solutions/standards:

- (None-Data) – Secure Wireless Internet (ITS)
- Transport Layer Security (TLS)
- Transactional Data Standard (TDS)

All data exchanged will follow the standards outlined in Section 4. Further information on security management for communication with Via's system is detailed in Section 6.

5.7 HC7: MOD Platform TMS <-> MOD-EHR Middleware <-> EHR Medical Record Subsystem

This section describes the MOD Platform TMS-to-MOD-EHR Middleware and EHR Medical Record Subsystem Interface. The MOD-EHR Middleware is an open-source middleware product that allows data exchange between the MOD Platform TMS and the EHR Medical Record Subsystem. The EHR Medical Record Subsystem refers to the systems, like Epic EHR, used by partner hospitals and clinics for booking and maintaining medical, including discharge and any subsequent referral activities. The MOD-EHR Middleware will interface with the publicly available Epic EHR API or another equivalent API used by Health Connector's healthcare partners. Figure 10 shows a high-level overview of the interface related to the MOD-EHR Middleware. The interface between the MOD Platform TMS and MOD Traveler Application is described in Section 5.2.

Complete documentation on associated hardware and software, data flows, and data structures will be provided at the completion of development in software development documentation.

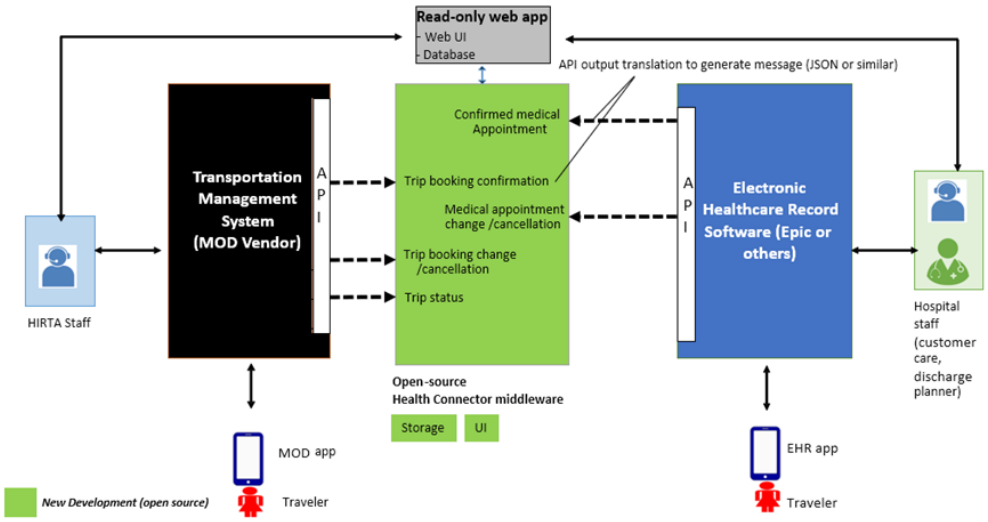

Figure 10. MOD-EHR Middleware interface diagram (Source: HIRTA Team)

5.7.1 Covered Information Flows

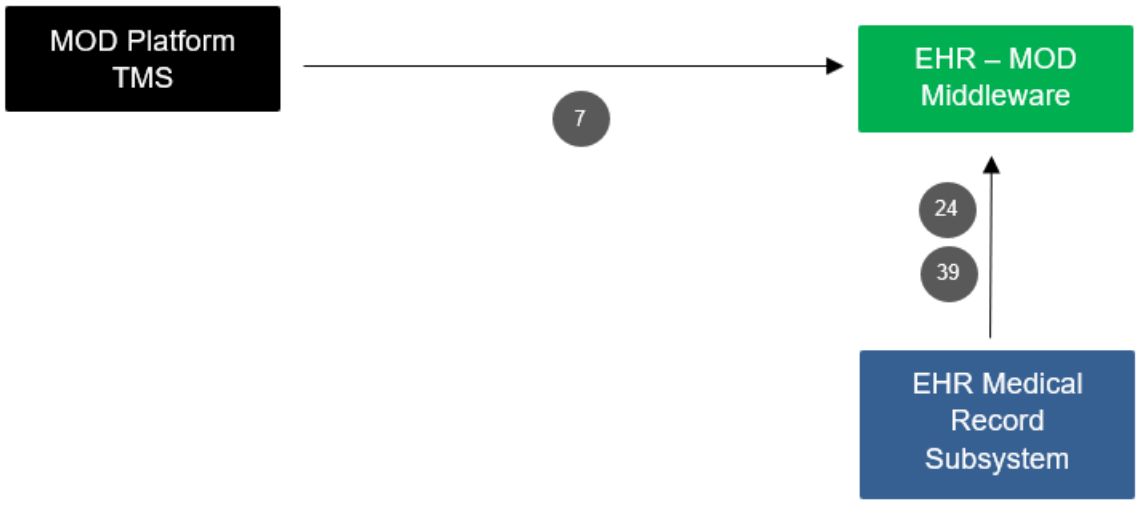

Figure 11. MOD Platform TMS <-> EHR-MOD Middleware - EHR Medical Record Subsystem (Source: HIRTA Team)

Table 11. Flows: MOD Platform TMS to EHR – MOD Middleware and EHR Medical Record Subsystem

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
7	Trip Status	Current information on upcoming trip.	JSON	Trip ID, Traveler Name, Trip Date/Time, Trip Pick-up Location, Trip Drop-off Location, Trip Status
24	Medical Appointment Details	Consists of medical appointment date, time, and location (facility address and doctor's office) for a particular Traveler.	JSON	Appointment Date, Appointment Time, Facility Address, Traveler ID
39	Medical Appointment Status	Updated status of progress on a medical appointment resulting in an impact on the pickup time.	JSON	Trip ID, Traveler Name, Appointment Status

5.7.2 Associated Hardware/Software

The MOD Platform TMS is operated on HIRTA-owned phones, tablets, and computers. The specific models of phones and computers cannot be outlined in this document for cybersecurity reasons.

The MOD-Medicaid Middleware will be published as an open-source software built on AWS. This product interfaces with multiple external APIs and software. HIRTA's partner healthcare facilities utilize Epic EHR and AllScripts/Veradigm EHR systems. Medical appointment data will be made available to the MOD-EHR Middleware through APIs associated with each of these EHR software systems. The MOD-EHR Middleware will interface with the HIRTA TMS through an API provided by Via.

The MOD-EHR Middleware will also provide a read-only webpage, made accessible to designated healthcare providers and/or HIRTA staff, which will display information on trip and appointment status for Health Connector Travelers.

5.7.3 Dialogues

[7] Trip status pulled from MOD Platform TMS by EHR-MOD Middleware

The MOD-EHR Middleware will pull trip status information from the MOD Platform TMS at a configurable interval. For trips that have associated medical appointments, the updated status will be displayed on the read-only webpage.

[24] Middleware webpage call for medical appointment data; medical appointment data pulled from EHR Medical Record Subsystem by EHR-MOD Middleware

The MOD-EHR Middleware will pull medical appointment information from the EHR system's API (Epic or AllScripts/Veradigm), which will include limited traveler information, appointment timing, and appointment locations. This information will be displayed on the read-only webpage for association with transportation appointments.

[39] Middleware alert for change in medical appointment status; medical appointment status pulled from EHR Medical Record Subsystem by EHR-MOD Middleware

Changes to medical appointment status for a customer in the EHR system will be automatically retrieved via configurable API requests by the MOD-EHR Middleware to the EHR Medical Record Subsystem API. Changes to medical appointments, along with alerts if HIRTA is unable to provide transportation for a requested medical appointment, will be displayed on the middleware webpage and monitored by HIRTA staff.

5.7.4 Data Elements

The data elements described in Table 11 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.7.5 Requirement Traceability

The following requirement can be traced to the components and functions described for interface HC7. A full list of references can be found in the Requirements Traceability Matrix [8].

- RC-HCR-1.2

5.7.6 Communication Methods

The software systems involved in this interface will utilize API calls to communicate following wireless internet protocols.

The flows above will follow the following communications solutions/standards:

- (None-Data) – Secure Wireless Internet (ITS)
- Transport Layer Security (TLS)
- Transactional Data Standard (TDS)

All data exchanges will follow the standards outlined in Section 4. Further information on security management for communication with Via's system is detailed in Section 6.

5.8 HC8: MOD Platform TMS <-> Reporting Database

This section describes the MOD Platform TMS to the Reporting Database via the Live Database. The Live Database is built into the MOD Platform TMS and stores operational data (run time, number of trips, etc.) collected directly by the MOD Platform TMS and provided by Via through their Direct Data Access (DDA) service. This data can be directly queried, accessed, and downloaded by HIRTA for further data processing, aggregation, and anonymization. Static historical operations and performance data is stored in the Reporting Database within a secure file sharing platform, CyBox.

5.8.1 Covered Information Flows

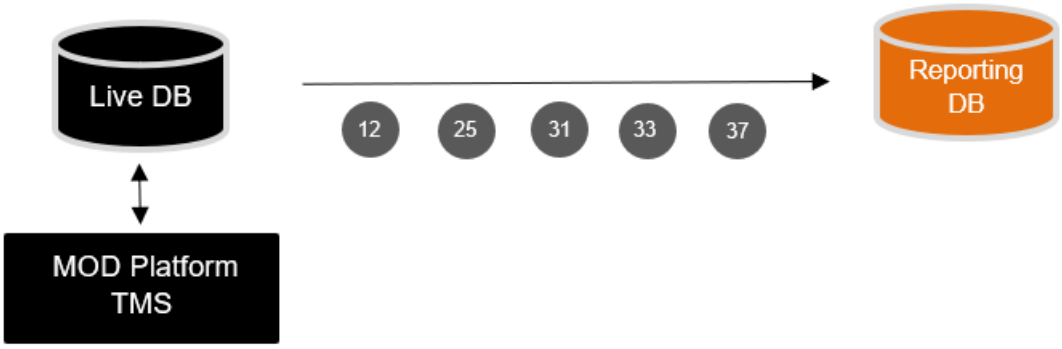

Figure 12. MOD Platform TMS - Reporting Database via Live Database (Source: HIRTA Team)

Table 12. Flows: MOD Platform TMS to Reporting Database via Live Database

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
12	Travel Time	Consists of time taken by driver/vehicle for a particular trip leg, available by origin and destination.	CSV, JSON	Length of Time, Origin location, Destination location
25	Aggregated Summary	Aggregated data on driver, vehicle, and trip performance by different providers.	CSV, JSON	Aggregated Summary: Revenue miles, Fares collected, On-time performance, Travel time, No-shows, Cancellations, Missed Tripe
31	System Performance	Log of system performance including any failures.	CSV, JSON	Successful Trip Performance Data (from Medicaid, Third-Party, HIRTA Vehicle), Trip Failure Log (no-shows, cancellations, delays)
33	Traveler Complaints Log	Log of Traveler complaints received and actions taken	CSV, JSON	Aggregated: Complaint Description, Complaint Date, Resolution Description, Resolution Date
37	Cost and Revenue Data	Cost and revenue data by trip, including actual cost, fare paid, funding source share.	CSV	Aggregated: Trip ID, Actual Cost, Fare Paid, Funding Source

5.8.2 Associated Hardware/Software

The MOD Platform TMS is operated on HIRTA-owned phones, tablets, and computers. The MOD Platform TMS software and Live Database will be provided by Via. The DDA provided by Via within the Live Database is built using a cloud-based server.

The specific models of phones and computers cannot be outlined in this document for cybersecurity reasons.

The Reporting Database consists of a secure file sharing platform, known as CyBox.

5.8.3 Dialogues

[12] Travel time pushed from MOD Platform to Reporting Database

Travel times are calculated in the Live Database using stored performance data, including trip pickup and drop-off time collected by the MOD Platform TMS during a trip. This information can then be pulled and/or downloaded by HIRTA staff for aggregation and storage in the Reporting Database.

[25] Aggregated trip summary data pushed from MOD Platform TMS to Reporting Database

The MOD Platform TMS collects trip information, including fares collected, travel times, etc. as described above and stores this information in the Live Database. This information can then be pulled and/or downloaded by HIRTA staff to create aggregated trip summaries and stored within the Reporting Database.

[31] System performance log pushed from MOD Platform TMS to Reporting Database

The MOD Platform TMS collects information related to trip performance, such as successful trips, no-shows, and cancellations, and stores this information in the Live Database. This information is pulled and/or downloaded by HIRTA staff to create and aggregate a daily log of trip performance data by trip type and is stored within the Reporting Database.

[33] Traveler complaints log pushed from MOD Platform TMS to Reporting Database

Traveler complaints entered HIRTA staff in the incident reporting module of the MOD Platform TMS' VOC will be stored within the Live Database and. HIRTA staff can pull/download this information as a CSV for aggregation with data from HIRTA Supporting Systems by complaint type and provider type at a daily level for tracking of Traveler complaints. This information can then be stored as static data in the Reporting Database and extracted for further aggregation and/or anonymization.

[37] Cost and revenue data pushed from MOD Platform TMS to Reporting Database

Cost and revenue data entered by CSRs in the customer service system in the MOD Platform TMS is stored within the Live Database and can be pulled/downloaded by HIRTA staff to the Reporting Database. The MOD Platform will process and generate an aggregated summary monthly.

5.8.4 Data Elements

The data elements described in Table 12 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.8.5 Requirement Traceability

The following requirements can be traced to the components and functions described for interface HC8. A full list of references can be found in the Requirements Traceability Matrix [8].

- RC-ADM-6.1
- RC-ADM-7.1
- RC-SYS-3.5

5.8.6 Communication Methods

The Live Database (Via's DDA solution) will be accessed by HIRTA staff and partners via a unique URL that will allow queries and API integration using secure wireless internet protocols. Information uploaded to and stored within the Reporting Database will be accessed through CyBox, which is password protected and IRB compliant.

The flows above will follow the following communications solutions/standards:

- (None-Data) – Secure Wireless Internet (ITS)
- Secure File Transfer Protocol (SFTP)

All data exchanges will follow the standards outlined in Section 4.

5.9 HC9: Non-MOD HIRTA Supporting Systems <-> Reporting Database

This section describes the Non-MOD HIRTA Supporting Systems to Reporting Database Interface. The Non-MOD HIRTA Supporting Systems are existing systems and are not a part of the Health Connector project. However, these systems may exchange data with the TMS or HIRTA staff may interact with these systems for certain operational functions, as needed. This includes cost and revenue management and customer service management. This information is stored as static data the Reporting Database, within a secure file sharing platform, CyBox, where it can be extracted for further data processing and reporting.

5.9.1 Covered Information Flows

Figure 13. Non-MOD HIRTA Supporting Systems - Reporting Database (Source: HIRTA Team)

Table 13. Flows: Non-MOD HIRTA Supporting Systems to Reporting Database

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
37	Cost and Revenue Data	Cost and revenue data by trip, including actual cost, fare paid, funding source share.	CSV	Cost and Revenue Log
41	Call Center Log	HIRTA call center statistics available from phone systems or manual logs, including complaints and customer satisfaction logs.	CSV	Call Center Statistic Summary

5.9.2 Associated Hardware/Software

HIRTA uses a voice over internet protocol (VOIP) phone system to make and receive calls on landline phones as well as on desktops and personal devices. This allows HIRTA dispatchers and customer service staff to communicate with Travelers and book rides or field comments and questions. The specific models of phones and computers cannot be outlined in this document for cybersecurity reasons. Currently, HIRTA uses Allworx to store call center logs and Quickbooks to pull together revenue/cost information.

MOD Platform TMS is operated on HIRTA-owned phones, tablets, and computers. The software associated with this system will be provided by Via.

The Reporting Database consists of a secure file sharing platform, known as CyBox.

5.9.3 Dialogues

[37] Cost and revenue log downloaded from Non-MOD HIRTA Supporting Systems into the Reporting Database

Cost and revenue data is entered into the customer service system by a HIRTA CSR. This information is manually downloaded by HIRTA staff for monthly aggregation and will be stored in the Reporting Database.

[41] Call center log downloaded from Non-MOD HIRTA Supporting Systems into the Reporting Database

The Non-MOD HIRTA Supporting Systems tracks phone call data for the HIRTA call center. This information is manually downloaded by HIRTA staff as a system-generated log of HIRTA call center statistics at a configurable interval and will be stored in the Reporting Database.

5.9.4 Data Elements

The data elements described in Table 13 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.9.5 Requirement Traceability

The following requirements can be traced to the components and functions described for interface HC9. A full list of references can be found in the Requirements Traceability Matrix [8].

- RC-SYS-3.5
- RC-SYS-5.2
- RC-SYS-9.2

5.9.6 Communication Methods

Information stored by the Non-MOD HIRTA Supporting Systems will be exchanged with the Reporting Database via direct export of reports from the Non-MOD HIRTA Supporting Systems and import to the Reporting Database. Information uploaded to and stored within the Reporting Database will be accessed through CyBox, which is password protected and IRB compliant.

The flows above will follow the following communications solutions/standards:

- (None-Data) – Secure Wireless Internet (ITS)
- Secure File Transfer Protocol (SFTP)

All data exchanges will follow the standards outlined in Section 4.

5.10 HC10: Reporting Database <-> ISU Performance Management System

This section describes the Reporting Database-to-ISU Performance Management System. The Reporting Database is used for storing and managing processed information received from the MOD Platform TMS and Non-MOD HIRTA Supporting Systems. The ISU Performance Management System is comprised of tools and technologies used on the ISU end for performance measurement and analysis itself, as well as relating to IRB approval and compliance. The ISU Performance Management System will have access to the Reporting Database for retrieval of relevant performance related data.

5.10.1 Covered Information Flows

Figure 14. Reporting Database - ISU Performance Management System (Source: HIRTA Team)

Table 14. Flows: Reporting Database to ISU Performance Management System

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
32	Anonymized and/or Aggregated Data for Performance Evaluation	Anonymized/aggregated Traveler, trip, and operations data (as described in Table 3. Scope and Availability of Private Data in the Data Privacy Plan [5]) to support Health Connector performance evaluation.	CSV, JSON	Aggregated Performance Data
34	Traveler Survey Results	Traveler data and survey conducted by ISU (including through the MOD platform) of human use participants.	CSV (non-spatial)	Traveler Survey Results

5.10.2 Associated Hardware/Software

The Reporting Database consists of a secure file sharing platform, known as CyBox.

The ISU Performance Management Center includes the tools and technologies used on the ISU end for performance measurement and analysis and are outside the scope of this design.

5.10.3 Dialogues

[32] Data for performance evaluation pulled from Reporting Database by ISU Performance Management System

Traveler, trip, and operations data stored in the Reporting Database can be accessed through CyBox and downloaded as a CSV by the ISU Performance Management System, where the data can be processed for further anonymization or aggregation.

[34] Traveler survey results pulled from Reporting Database by ISU Performance Management System

Traveler data and survey results stored in the Reporting Database can be accessed through CyBox and downloaded by ISU Performance Management System, where the data can be processed for further anonymization or aggregation.

5.10.4 Data Elements

The data elements described in Table 14 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.10.5 Requirement Traceability

- RC-SYS-3.5
- RC-ADM-7.1
- RC-GPA-1.2

5.10.6 Communication Methods

Information stored by the Reporting Database will be accessed through CyBox, which is password protected and IRB compliant.

The flows above will follow the following communications solutions/standards:

- (None-Data) – Secure Wireless Internet (ITS)
- Secure File Transfer Protocol (SFTP)

All data exchanges will follow the standards outlined in Section 4.

5.11 HC11: ISU Performance Management System <-> Independent Evaluation Data Management System

This section describes the ISU Performance Management System-to-Independent Evaluation Data Management System, which details the exchange of information processed and stored in the ISU Performance Management System for controlled sharing by the Independent Evaluation Data Management System.

5.11.1 Covered Information Flows

Figure 15. ISU Performance Management System - Independent Evaluation Data Management System (Source: HIRTA Team)

Table 15. Flows: ISU Performance Management System to Independent Evaluation Data Management System

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
35	Processed Data for Controlled Sharing	Controlled-access data available to researchers and the Independent Evaluation team.	CSV, JSON	Processed Data for Controlled Sharing

5.11.2 Associated Hardware/Software

The ISU Performance Management Center includes the tools and technologies used on the ISU end for performance measurement and analysis and are outside the scope of this design.

The software associated with the Independent Evaluation Data Management System is external software that is not within the scope of this design.

5.11.3 Dialogues

[35] Processed data sent from the ISU Performance Management System to the Independent Evaluation Data Management System

Data elements stored in the ISU Performance Management System that are relevant to independent evaluators will be shared with this subsystem as processed data. Data requirements by the Independent Evaluation Data Management System are under design.

5.11.4 Data Elements

The data elements described in Table 15 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.11.5 Requirement Traceability

The following requirements can be traced to the components and functions described for interface HC11. A full list of references can be found in the Requirements Traceability Matrix [8].

- RC-HAD-1.1
- RC-HAD-1.2.1
- RC-HAD-1.2.2
- RC-HAD-1.2.3
- RC-HAD-1.2.4
- RC-GPA-1.1
- RC-SYS-11.1

5.11.6 Communication Methods

Information stored by the Reporting Database will be accessed through CyBox, which is password protected and IRB compliant.

The flows above will follow the following communications solutions/standards:

- (None-Data) – Secure Wireless Internet (ITS)

All data exchanges will follow the standards outlined in Section 4.

5.12 HC12: ISU Performance Management System <-> USDOT Managed System

This section describes the ISU Performance Management System-to-USDOT Managed System interface, which details the communication of performance metrics and data intended for public consumption between the two systems. The USDOT Managed System will receive data from the ISU Performance Management System and will be made available to the public per USDOT standards. The performance measurement dashboard will reside within the ISU Performance Management System and be maintained by ISU.

5.12.1 Covered Information Flows

Figure 16. ISU Performance Management System - USDOT Managed System (Source: HIRTA Team)

Table 16. Flows: ISU Performance Management System to USDOT Managed System

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
36	Data for Public Access	Aggregated trip summary at Census tract and/or traffic analysis zone (TAZ) level as defined in DMP	CSV, JSON	Data for Public Access

5.12.2 Associated Hardware/Software

The ISU Performance Management Center includes the tools and technologies used on the ISU end for performance measurement and analysis and are outside the scope of this design.

The USDOT Managed System utilizes software owned and operated by the USDOT and is not included in the scope for this design.

5.12.3 Dialogues

[36] Data for public access pushed from the ISU Performance Management System to the USDOT Managed System

Data that has been aggregated and anonymized with the intention of sharing with the public is pushed from the ISU Performance Management System to the USDOT Managed System, where it will be processed by the USDOT for public display access.

5.12.4 Data Elements

The data elements described in Table 16 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.12.5 Requirement Traceability

The following requirements can be traced to the components and functions described for interface HC12. A full list of references can be found in the Requirements Traceability Matrix [8].

- RC-GPA-1.1
- RC-GPA-1.2
- RC-CPS-1.1

5.12.6 Communication Methods

Information stored by the Reporting Database will be accessed through CyBox, which is password protected and IRB compliant.

The flows above will follow the following communications solutions/standards:

- (None-Data) – Secure Wireless Internet (ITS)
- US: ADMS – Secure Internet (ITS)

All data exchanges will follow the standards outlined in Section 4.

5.13 HC13: Wayfinding Subsystem <-> Traveler-end (Wayfinding)

This section describes the Wayfinding Subsystem-to-Traveler-end (Wayfinding) Subsystem interface, which details communication between the wayfinding application used by Travelers and the Wayfinding System's cloud-based server. This interface allows Travelers to request and receive wayfinding guidance during the course of a Health Connector trip.

5.13.1 Covered Information Flows

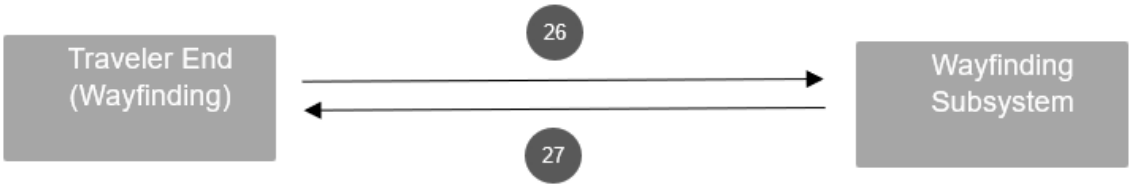

Figure 17. Wayfinding Subsystem - Traveler-end (Wayfinding) (Source: HIRTA Team)

Table 17. Flows: Wayfinding Subsystem to Traveler-end (Wayfinding)

Flow ID	Flow Name	Flow Description	Format	High Level Sub-Flow Contents
26	Traveler Wayfinding Request	Requests initiated by Travelers to the wayfinding system for guidance using NaviLens, infotainment devices or the wayfinding kiosk.	CSV, JSON	Time of Request, Anonymized Device ID
27	Traveler Wayfinding Guidance	Wayfinding information provided to Travelers, including data transmitted.	CSV, JSON	Wayfinding guidance, Time of delivery, Anonymized Device ID

5.13.2 Associated Hardware/Software

Travelers/caregivers can deploy the wayfinding application, provided by NaviLens, on a web-accessible personal device. If implemented, the NaviLens Go Application will be version NVGO 1.3.30. Further specifications on operating systems and software versioning will be clarified as design is finalized. The wayfinding application is supported by a cloud-based wayfinding server provided by NaviLens. Travelers can also make requests or receive wayfinding guidance and information on the wayfinding kiosk or infotainment devices onboard HIRTA vehicles.

5.13.3 Dialogues

[26] Traveler wayfinding request pushed from Traveler-end (Wayfinding) subsystem to Wayfinding Subsystem

A Traveler will make a request using the Traveler-end (Wayfinding) Subsystem / wayfinding application by scanning a NaviLens code which pushes the request from the Traveler-end (Wayfinding) Subsystem to the Wayfinding Subsystem. For infotainment no request is necessary; for the wayfinding kiosks, information requests (i.e., trip status) would be made by selecting the 'check status' option on the kiosk webpage.

[27] Traveler wayfinding guidance pushed from Wayfinding Subsystem to Traveler-end (Wayfinding) System

Upon receiving a Traveler wayfinding request, the Wayfinding Subsystem will provide instructions or translation services depending on the needs of the Traveler. This information will be pushed to the Traveler-end (Wayfinding) Subsystem and will be accessible to the Traveler via the wayfinding application or wayfinding kiosk. Information will then be returned to the Wayfinding Subsystem indicating whether the provided guidance was actually used by the Traveler.

5.13.4 Data Elements

The data elements described in Table 17 are further defined in the Data Management Plan (DMP) [3] and Data Privacy Plan (DPP) [4].

5.13.5 Requirement Traceability

The following requirements can be traced to the components and functions described for interface HC14. A full list of references can be found in the Requirements Traceability Matrix [8].

- RC-SYS-10.6
- RC-SYS-10.7

5.13.6 Communication Methods

Specifications on communication methods for this interface will be established upon finalization of design. No communications solutions/standards have been established for this interface at this stage of design.

All data exchanges will follow the standards outlined in Section 4.

6 Security Integration

This section provides security considerations for interfaces discussed in this document. The discussion is categorized by vendor that currently provides the system component.

6.1 MOD

All data exchanges are informed by Via's Information Security Management System ("ISMS"), whose policies were developed in accordance with ISO 27001 and have received full ISO 27001 certification.

All data in the Via system is collected and uploaded to the Via system automatically. Format validation is utilized to validate certain rider personal information, and identity verification is achieved by a 2-factor authentication through SMS and email.

Further details are found in Via's HIRTA Health Connector Security Management Plan [7] which cannot be published for security purposes.

6.2 Middleware

Both middleware solutions will use Transport Layer Security (TLS) protocols to ensure data security while data is in transit between systems.

Further, the HIRTA team is utilizing AWS Cloud Development Kit (CDK) for implementing both middleware products and will be using natively available authentication and information security within AWS Infrastructure-as-a-Service (IaaS).

Access to data from Via while applying security considerations as discussed in Section 6.1.

Access to Lyft will be governed by security built into data access enabled through their public APIs.

Access to Epic and Veradigm EHR products will follow the API guidelines from those providers. Both APIs enable data access according to Fast Health Interoperability Resources (FHIR) standards.

6.3 Kiosk

Kiosks are going to be isolated from the hospital network and configured in a Virtual Local Area Network (VLAN). Access to data from Via will be enabled using TLS protocols via an Internet web browser while applying security considerations as discussed in Section 6.1.

6.4 Data Access

All data exchange outside of vendor-provided applications will be conducted over SFTP. Further information on security measures can be found in the Data Privacy Plan [4].

7 Requirements Traceability Table

The table below summarizes each interface and the associated requirements and communications protocols for each. Requirements listed can be found in the System Requirements Matrix [8].

Table 18. Traceability Table

Interface ID	Element #1	Element #2	Element #3	Description of Interface	Requirements	Protocol(s)
HC1	MOD Platform TMS	HIRTA Vehicle-end Subsystem		Data being passed between HIRTA vehicle on-board systems (driver app) and MOD platform TMS (Via central software)	RC-OPS-3.1, RC-OPS-3.1.1, RC-OPS-3.1.2, RC-OPS-3.1.3, RC-OPS-3.1.4, RC-OPS-3.1.5, RC-OPS-3.1.6, RC-OPS-6B.3, RV-DRV-0.7, RV-DRV-3, RV-DRV-4.1, RV-DRV-4.2, RV-DRV-4.5.1, RV-DRV-4.5.2, RV-DRV-4.8.1, RV-DRV-4.8.2, RV-DRV-4.8.3, RV-DRV-4.9.1, RV-DRV-4.9.1.1, RV-DRV-4.9.1.2, RV-DRV-4.9.1.3, RV-DRV-4.9.1.4, RV-DRV-4.9.1.5, RV-DRV-4.9.1.6, RV-DRV-4.9.1.7, RV-DRV-4.10.2, RV-DRV-4.11.2, RC-SYS-2.1, RC-SYS-2.1.1, RC-SYS-2.1.2, RC-SYS-2.1.3, RC-SYS-9.3, RC-SYS-9.7, RC-SYS-9.8, RC-SYS-10.2, RC-SYS-10.3, RC-SYS-10.5, RC-SYS-10.5.1, RC-SYS-10.5.2, RC-SYS-10.5.3, RC-SYS-10.5.4, RC-SYS-10.5.5, RC-SYS-10.5.6, RC-SYS-10.5.7, RC-SYS-10.5.8, RC-SYS-10.5.9, RC-SYS-10.5.10, RC-SYS-10.8	TPEG2 – Wide Area Broadcast US: TCIP – Secure Wireless Internet (ITS) US: ATIS – Secure Wireless Internet (ITS) (None-Data) – Secure Wireless Internet (ITS)

Interface ID	Element #1	Element #2	Element #3	Description of Interface	Requirements	Protocol(s)
HC2	MOD Platform TMS	Traveler-end Subsystem		Data being passed between Health Connector Travelers via web or Traveler application and the MOD platform TMS (Via central software)	RM-TRV-1.1.2, RM-TRV-2.2, RM-TRV-12.4, RC-SYS-1.2, RC-SYS-1.2.1, RC-SYS-1.2.2, RC-SYS-1.2.3, RC-SYS-1.2.4, RC-SYS-1.2.5, RC-SYS-1.3, RC-SYS-1.3.1, RC-SYS-1.3.2, RC-SYS-1.3.3, RC-SYS-1.3.4, RC-SYS-2.1, RC-SYS-2.1.1, RC-SYS-2.1.2, RC-SYS-2.1.3, RC-SYS-10.1, RC-SYS-10.5	TPEG2 – Wide Area Broadcast US: TCIP – Secure Wireless Internet (ITS) US: ATIS – Secure Wireless Internet (ITS) (None-Data) – Secure Wireless Internet (ITS)
HC3	MOD Platform TMS	Health Navigator and Healthcare-end Subsystem		Data being passed between health navigator and care provider systems as well as healthcare-end modified VOC, and the MOD platform TMS (Via central software) and HIRTA staff	RC-HCR-1.3, RC-HCR-1.4, RC-HCR-1.5, RC-HCR-1.6, RC-HCR-2.1, RC-HCR-2.2, RC-HCR-3.1, RC-HCR-4.1, RC-HCR-5.1, RC-HCR-5.2, RC-HCR-6.1, RC-HCR-6.2, RC-HCR-7.1, RC-HCR-7.2, RC-HCR-8.1, RC-HCR-8.2, RC-HCR-8.3, RC-HCR-8.4, RC-HCR-8.5, RC-HCR-8.6, RC-HCR-9.1, RC-HCR-9.1.1, RC-HCR-9.1.2, RC-HCR-9.1.3, RC-HCR-9.1.4, RC-HCR-9.2, RC-HCR-9.3, RC-HCR-9.4, RC-HCR-9.5, RC-HCR-9.6	TPEG2 – Wide Area Broadcast US: TCIP – Secure Wireless Internet (ITS) US: ATIS – Secure Wireless Internet (ITS) (None-Data) – Secure Wireless Internet (ITS)
HC4	MOD Platform TMS	Eligibility Management Subsystem		Data being passed between funding partners and MOD platform TMS (Via central software)	RC-SYS-1.2, RC-SYS-1.2.1, RC-SYS-1.2.2, RC-SYS-1.2.3, RC-SYS-1.2.4, RC-SYS-1.2.5, RC-CSR-16.1, RC-CSR-16.3, RC-ADM-4.1, RC-ADM-4.2, RC-FND-1.1, RC-FND-1.2, RC-FND-1.3, RC-FND-1.4, RC-FND-1.5, RC-FND-1.6	

Interface ID	Element #1	Element #2	Element #3	Description of Interface	Requirements	Protocol(s)
HC5	MOD Platform TMS	Third-Party Vehicle Subsystem		Data being passed between third-party vehicle subsystems (such as volunteer driver network vehicles, or TNCs) and MOD platform TMS (Via central software)	RC-OPS-3.2, RC-OPS-3.2.1, RC-OPS-3.2.2, RC-OPS-3.2.3, RC-OPS-3.2.4, RC-OPS-3.2.5, RC-OPS-6B.3, RV-DRV-0.7, RV-DRV-3.2, RV-DRV-4.1, RV-DRV-4.2, RV-DRV-4.5.1, RV-DRV-4.5.2, RV-DRV-4.8.1, RV-DRV-4.8.2, RV-DRV-4.8.3, RV-DRV-4.9.1, RV-DRV-4.9.1.1, RV-DRV-4.9.1.2, RV-DRV-4.9.1.3, RV-DRV-4.9.1.4, RV-DRV-4.9.1.5, RV-DRV-4.9.1.6, RV-DRV-4.9.1.7, RV-DRV-4.10.2, RV-DRV-4.11.2, RC-SYS-2.1, RC-SYS-2.1.1, RC-SYS-2.1.2, RC-SYS-2.1.3, RC-SYS-10.2	TPEG2 – Wide Area Broadcast US: TCIP – Secure Wireless Internet (ITS) US: ATIS – Secure Wireless Internet (ITS) (None-Data) – Secure Wireless Internet (ITS)
HC6	MOD Platform TMS	MOD-Medicaid Middleware	Medicaid Broker System	Data being passed between the MOD Platform TMS (Via central software), the Medicaid Broker System (Access2Care) and the MOD-Medicaid Middleware that translates and displays both sets of data for operational use.	RC-OPS-1A.2, RC-OPS-1A.5, RC-OPS-6A.4.1	(None-Data) – Secure Wireless Internet (ITS) Transport Layer Security (TLS) Transactional Data Standard (TDS)

Interface ID	Element #1	Element #2	Element #3	Description of Interface	Requirements	Protocol(s)
HC7	MOD Platform TMS	MOD-EHR Middleware	Electronic Health Record	Data being passed between the MOD platform TMS (Via central software), the electronic health record (e.g. Epic) and the MOD-EHR Middleware product that translates and displays both sets of data for operational use.	RC-HCR-1.2	(None-Data) – Secure Wireless Internet (ITS) Transport Layer Security (TLS) Transactional Data Standard (TDS)
HC8	MOD Platform TMS	Live Database	Reporting Database	Live Database is a part of the MOD Platform TMS that is broken out for diagrammatic purposes. Operational data gets entered or calculated in the live database and can be pulled to the reporting database for further organization, anonymization, or cleaning prior to KPI analysis.	RC-ADM-6.1, RC-ADM-7.1, RC-SYS-3.5	(None-Data) – Secure Wireless Internet (ITS) Secure File Transfer Protocol (SFTP)

Interface ID	Element #1	Element #2	Element #3	Description of Interface	Requirements	Protocol(s)
HC9	Non-MOD HIRTA Supporting Systems	Reporting Database		Data being passed between other HIRTA datasets such as (phone systems and billing systems) and the Reporting Database to support program evaluation.	RC-SYS-3.5, RC-SYS-5.2, RC-SYS-9.2	(None-Data) – Secure Wireless Internet (ITS) Secure File Transfer Protocol (SFTP)
HC10	Reporting Database	ISU Performance Management System		All compiled files for performance measurement that have been organized and anonymized, passed to ISU via file share for performance evaluation.	RC-SYS-3.5, RC-ADM-7.1, RC-GPA-1.2	(None-Data) – Secure Wireless Internet (ITS)
HC11	ISU Performance Management System	Independent Evaluation Data Management System		A subset of the program and evaluation data that uses CyBox software built for file storage and management	RC-HAD-1.1, RC-HAD-1.2.1, RC-HAD-1.2.2, RC-HAD-1.2.3, RC-HAD-1.2.4, RC-GPA-1.1, RC-SYS-11.1	(None-Data) – Secure Wireless Internet (ITS) Secure File Transfer Protocol (SFTP)

Interface ID	Element #1	Element #2	Element #3	Description of Interface	Requirements	Protocol(s)
HC12	ISU Performance Management System	USDOT Managed System		Data that has been aggregated and anonymized with the intention of sharing with the public is pushed from the ISU Performance Management System to the USDOT Managed System, where it will be processed by the USDOT for public display access.	RC-GPA-1.1, RC-CPS-1.1	(None-Data) – Secure Wireless Internet (ITS) US: ADMS – Secure Internet (ITS)
HC13	Wayfinding Subsystem	Traveler-End (Wayfinding)		Communication between the wayfinding application used by Travelers and the Wayfinding System's cloud-based server	RC-SYS-10.6, RC-SYS-10.7	

8 References

[1] System Architecture Document (SAD): Heart of Iowa Regional Transit Agency ITS4US Deployment Project (FHWA-JPO-22-983) https://rosap.ntl.bts.gov/view/dot/68863

[2] Systems Design Document, to be published

[3] Data Management Plan (DMP): Heart of Iowa Regional Transit Agency ITS4US Deployment Project (FHWA-JPO-22-975) https://rosap.ntl.bts.gov/view/dot/61727

[4] Data Privacy Plan (FHWA-JPO-22-971), to be published

[5] Concept of Operations (ConOps): Heart of Iowa Regional Transit Agency ITS4US Deployment Project (FHWA-JPO-21-859) https://rosap.ntl.bts.gov/view/dot/57469

[6] System Requirements Specification (SyRS) — Heart of Iowa Regional Transit Agency ITS4US Deployment Project (FHWA-JPO-21-882) https://rosap.ntl.bts.gov/view/dot/61724

[7] Via's HIRTA Health Connector Security Management Plan, available upon request and approval

[8] System Requirements Matrix (attached)

[9] Project Management Plan

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