

Phase 1 Safety Management Plan (SMP)

Heart of Iowa Regional Transit Agency ITS4US Deployment Project

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16. Abstract The Safety Management Plan will guide the HIRTA team with safety planning for the Health Connector system. This document provides HIRTA Team's safety management framework built on top of HIRTA's already adopted Public Transit Agency Safety Plan (PTASP). This document identifies safety needs and safety scenarios based on ConOps. Further the document conducts safety risk assessment for identified hazards/scenarios and identifies operational strategies to address risks.					
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1 Introduction

The Heart of Iowa Regional Transit Agency (HIRTA) is one of the 5 awardees for Phase 1 of the Complete Trip – ITS4US contract for its proposed concept **“Health Connector for the Most Vulnerable: An Inclusive Mobility Experience from Beginning to End”** (Health Connector) by the United States Department of Transportation (USDOT). The Health Connector solution will offer a collection of electronic applications and interfaces designed to improve the experience of Dallas County residents looking for transportation services for their medical appointments.

Broadly, safety risks associated with the use of Health Connector are anticipated to be at the same level as assessed with the current demand response service operated by HIRTA since new infrastructure or vehicle types will not be involved. However, new capabilities such as wayfinding will be introduced in the current system and new interfaces will be deployed. So, any associated safety risks must be assessed, and a plan should be developed to address those risks.

HIRTA has adopted Federal Transit Administration’s Public Transportation Agency Safety Plan (PTASP) framework for safety management, as mandated by PTASP regulation at 49 U.S.C. § 5329 and 49 CFR Part 673. The HIRTA PTASP was developed and adopted in November 2020.

This Safety Management Plan (SMP) builds upon the SMS developed as part of the current PTASP at HIRTA, adopted in November 2020 (document available at the following link: <https://irp.cdn-website.com/bdcffb01/files/uploaded/Safety%20Plan%20-%20HIRTA%20Approved%202020.pdf>).

1.1 Project Background

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

Key capabilities of the proposed technology solution are as follows:

- Enable the customer to use a smart device (e.g., smartphone, smartwatch) application or equally effective alternate methods to schedule and manage medical appointments and transportation services all in one location (Unified Health Connector App). Provide customers options to choose from available providers. Provide same day response if needed by customers.

- Send customers alert before arrival and again when the vehicle is approaching.
- Keep customers informed on trip progress.
- Provide directions (audible and visual) on where to meet the vehicle/driver. On arrival, drivers should have the ability to automatically confirm customer identity and assist with boarding as needed.
- Provide drivers the capability to request turn-by-turn navigation to a desired destination.
- The Health Connector App will enable the customer to utilize advanced wayfinding solutions with the help of indoor and outdoor navigation technologies to provide personal concierge-style travel from origin to destination. This will include:
 - Locating the vehicle outside origin and destination locations
 - Locating healthcare facility when dropped off by vehicles
 - Locating desired floor/room when inside the healthcare facility
- Customers will be able to use the Health Connector solution for any contactless payment needs at any point for transportation-related payments.
- Customers can initiate return trip when the appointment is complete and follow the similar process as the inbound trip to medical facility to locate and board the vehicle for the return trip.

If customers or their caregivers desire to book and pay for another local trip as an additional leg along with the medical trip they will be able to do that using Health Connector solution.

Figure 1 provides an overview of the Health Connector concept.

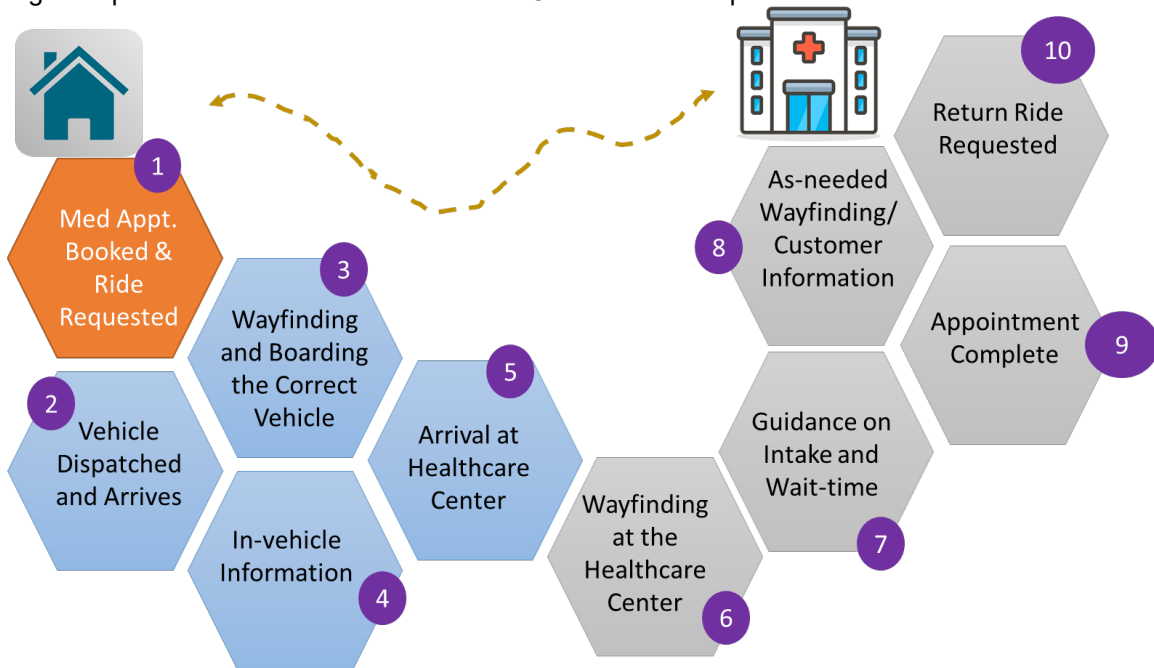


Figure 1. Health Connector Overview (Source: HIRTA Team)

The systems and interfaces involved in the context of Health Connector can be defined as follows:

- **Traveler-end Subsystem:** this subsystem includes the tools and technologies to be used by travelers or patients seeking transportation services for their medical appointments as part of pre-trip, en-route trip, on arrival and return trip activities.
- **Transportation Management Subsystem:** this subsystem includes the tools and technologies used to assist customer care and operations staff with reservations, scheduling, dispatching and administration activities. This subsystem refers to both the system Routematch currently utilized by HIRTA and Access2Care and Uber software that will be utilized to provide the planned capabilities for the Health Connector solution.
- **Vehicle Subsystem:** this subsystem refers to the technologies deployed on vehicles to support Driver-end functions for manifest management, on-board customer information and customer payments.
- **Wayfinding Subsystem:** this subsystem refers to the technologies and infrastructure to be used for providing indoor positioning, orientation and step-by-step guidance on request to travelers.
- **Interfaces:**
 - **Access2Care:** this subsystem refers to State of Iowa Medicaid Brooker's system used for booking and managing Medicaid trips. HIRTA is one of the providers used by Access2Care.
 - **Health Navigator-end Subsystem:** this subsystem refers to the information and referral system used by Dallas County Health Department. This subsystem will be used to obtain medical and transportation appointment details or availability for a Dallas County resident health navigation/social care services.
 - **EHR/Medical 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.

Figure 2 provides a generic system context diagram for HIRTA Health Connector.

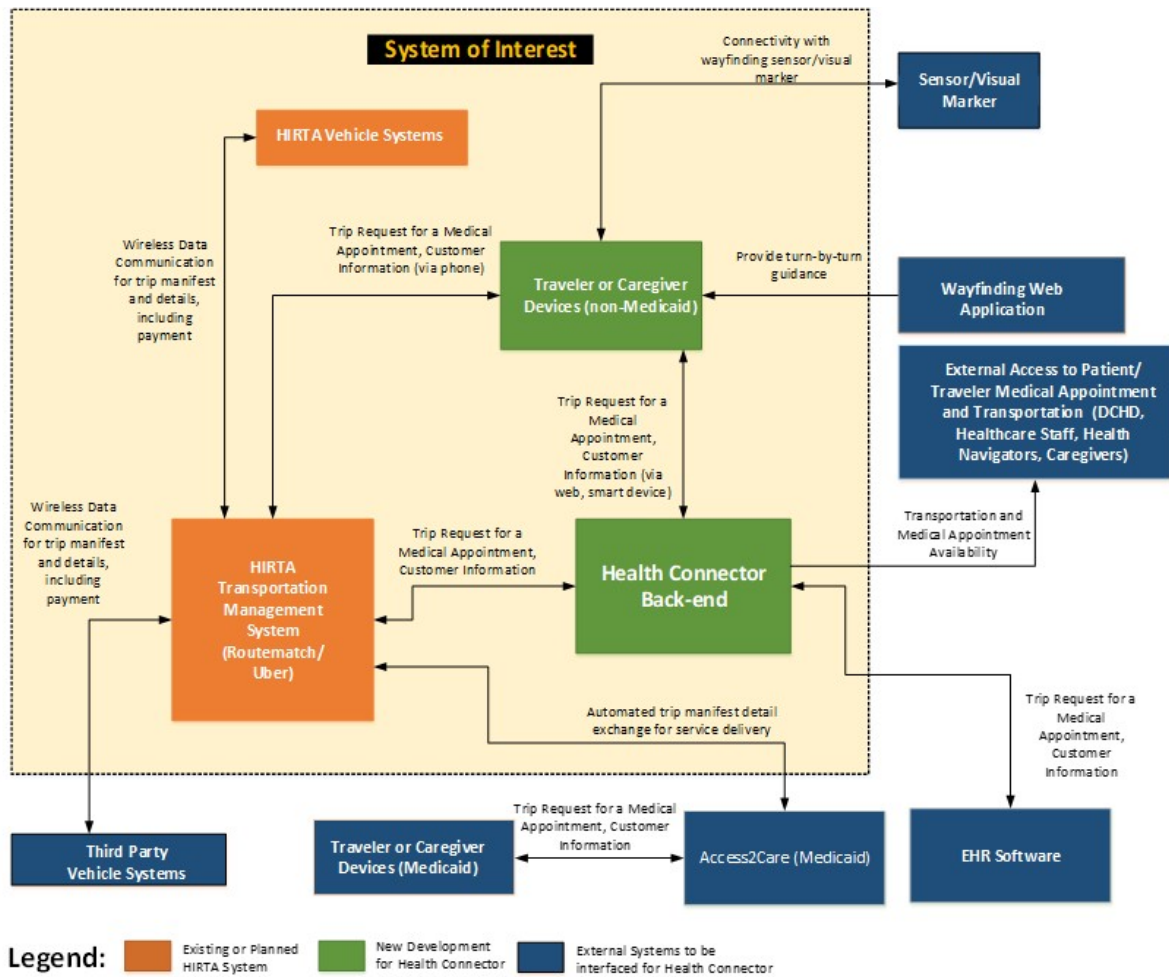


Figure 2. High-level System Context Diagram for Health Connector (Source: HIRTA Team)

1.2 Document Overview

The overall objectives of developing the SMP include:

- Assessment of safety needs and risks in how all user groups interact with the system.
- Development of strategies to minimize risks in system design, development, and operation.
- Development of strategies to respond to any potential risks.
- Communication of safety management efforts to all user groups, stakeholders and partners.

The document is organized as follows:

- Section 2 provides an overview of SMP with other tasks, provides a list of safety stakeholders and summarizes the safety management framework used.
- Section 3 describes safety needs and scenarios building on the scenarios discussed in Concept of Operations (ConOps) document.
- Section 4 provides an assessment of safety risks in the context of Health Connector.
- Section 5 provides an overview of operational concept of safety management.
- Section 6 summarizes the safety management approach.

1.3 References

The following documents were referenced when developing this SMP:

1. Complete Trip- ITS4US Deployment Broad Agency Announcement (693JJ3-20-BAA-0004)
2. HIRTA Proposal for Complete Trip-ITS4US Deployment
3. Task 1 Project Management Plan
4. Task 2- Concept of Operations Report
5. Final HIRTA PTASP, Adopted November 2020 (document available at the following link: <https://irp.cdn-website.com/bdcffb01/files/uploaded/Safety%20Plan%20-%20HIRTA%20Approved%202020.pdf>). The HIRTA Policies webpage is here for any future updates: <https://www.ridehirta.com/policies>.
6. FTA Safety Risk Management Webinar, June 13, 2019 (<https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/public-transportation-agency-safety-program/133001/ptasp-srm-june-13-2019.pdf>)
7. FTA Public Transportation Agency Safety Plan Template for Bus Transit Reference Tool, December 2019 (<https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-programs/safety/public-transportation-agency-safety-program/117306/public-transportation-agency-safety-plan-template-bus-transit-reference-tool.pdf>)
8. FTA Sample Safety Risk Assessment Matrices for Bus Transit Agencies , September 2019 (<https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/public-transportation-agency-safety-program/133711/sample-safety-risk-assessment-matrices-bus-transit-agencies.pdf>)

2 Safety Overview and Relationships

2.1 Related Project Tasks

This section provides an overview of how development of SMP relates to other tasks as illustrated in Figure 3. SMP builds upon the discussion with stakeholders as part of ConOps and safety risks associated with operational scenarios. The analysis of safety needs and risks conducted as part of SMP will provide input for subsequent deliverables. Also, this will provide input to overall project risk management process and risk register maintained as part of Task 1.

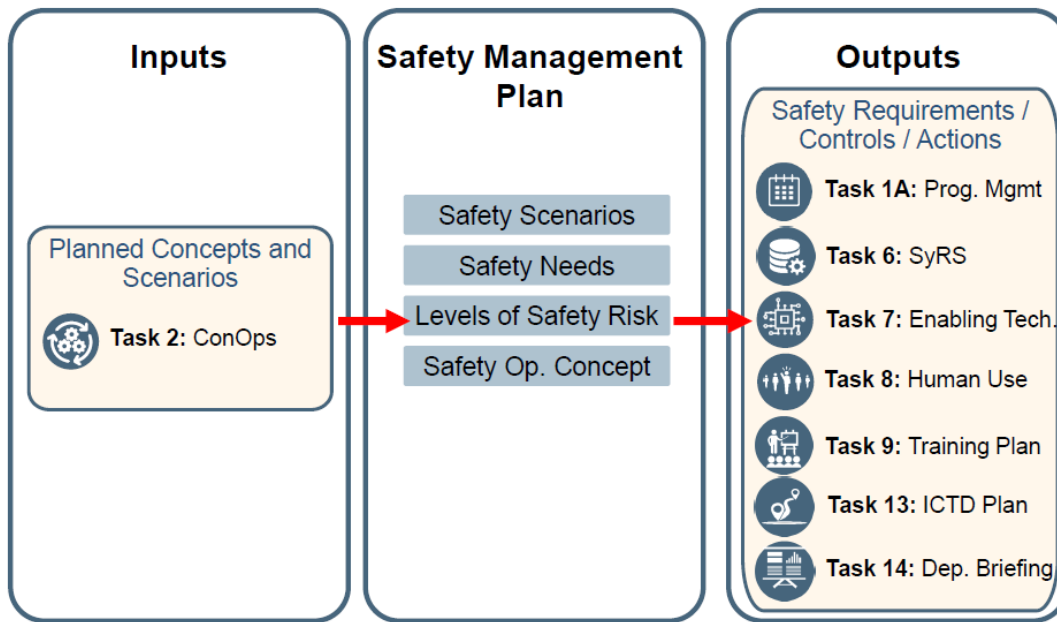


Figure 3. Relationship of SMP with Other Tasks (Source: USDOT)

2.1.1 Task 1A-Program Management

HIRTA Team has developed a risk management approach for Phase 1 as part of Task 1A-Program Management. Given SMP will provide input to many of the subsequent deliverable going forward, it will be critical to ensure that the risks with the process of getting those deliverables complete are addressed promptly (e.g., stakeholder engagement, getting system requirements to address safety risks, getting readiness of technologies evaluated). Also, overall goal of SMP process is to identify additional risks that can be combined with the project-level risks developed in Task 1A.

2.1.2 Task 2-Concept of Operations (ConOps)

The ConOps includes a detailed list of needs statements that were developed based on a series of stakeholder discussions conducted over a period of 4 months, from April to July 2021. Needs statements formed the basis of operational scenarios which in turn are used in the SMP to develop safety scenarios. Mapping of needs statements to specific underserved groups will help with thinking through of safety situations that may vary across underserved groups (e.g., inability to read/hear or interpret signs not in English; not able to read signs at all due to being blind; not able to read signs at a distance if inappropriate font size; and choice of poor color contrast making signs illegible if older adult).

2.1.3 Task 6-Deployment System Requirements

The safety scenarios identified in the SMP will provide input to Task-6 where HIRTA team is defining functional, performance (including reliability), data, security and interface requirements for the Health Connector system. The requirements for each of the major components (e.g., vehicle, central, customer information, wayfinding) that present a risk at any level to customers, agency staff or partners will incorporate necessary details in their language.

2.1.4 Task 7-Technology Readiness and Deployment Plan

Safety risks will be critical to determining Technology Readiness Level (TRL) for all enabling technologies involved. Most of the technologies involved in the HIRTA deployment (e.g., reservations, scheduling, dispatching, customer information) are well established and address the needs of specific underserved groups well. However, there are limitations and SMP safety scenarios will help with identification of any potential safety concerns. Also, outdoor and indoor wayfinding subsystem of Health Connector is a relatively new concept for transit users and appropriate TRL assessment based on relevant safety risks will help determine appropriate strategies for deployments.

2.1.5 Task 8-Human Use Approval

Human use summary will identify risks for the participants in the Health Connector planning and demonstration program. This may include safety risks associated with use of the actual system. The HIRTA team will take these safety risks into account when seeking approval from our designated Institutional Review Board (IRB) at the Iowa State University (ISU).

2.1.6 Task 9-Participant Training and Education Plan

As explained later in the document, HIRTA already has an established Safety Communication approach, developed per the guidance in PTASP. The SMP will list safety risks associated with specific hazards which will be used to develop the Participant Training and Education Plan which will also closely follow the outcome of Task 8. This plan will be developed for both operations and evaluation phase of this project (Phase 3) and subsequent operations and maintenance of the system.

2.1.7 Task 13- Integrated Complete Trip Deployment Plan (ICTDP)

The ICTDP builds upon the input from Tasks 2-12 and will follow the same approach as described above for other tasks. ICTDP will take into account any discussions in safety risks in the SMP when summarizing the deployment plan.

2.1.8 Task 14- Deployment Readiness Summary

Task 14 is a summary of Tasks 1-13 and will incorporate any input as necessary from SMP as described for the earlier tasks.

2.2 Safety Stakeholders

Table 1 provides a list of stakeholders that are involved in the Health Connector safety management planning and will also be involved in the implementation of the plan during the design, development, deployment and operation stages of the system.

Table 1. Safety Stakeholders List

Name	Organization	Expertise / Roles	Responsibilities
Julia Castillo	HIRTA	Executive Director/ Accountable Executive	Overall, in-charge of implementing the SMP
Brooke Ramsey	HIRTA	Project Manager	Appropriate functioning of Health Connector for all components, including vehicle, infrastructure, systems and human resources
Erin Newbury	HIRTA	Safety Program Manager	Execution of SMP
Abigail Chihak	Dallas County Health Department (DCHD)	Healthcare Lead	In-charge of tracking physical wellbeing of Dallas County residents
Tom Coogan	Routematch by Uber	Technology Lead	Appropriate functioning of all systems provided by Routematch by Uber
Chris McCarthy	Unity Point Hospital	Community Health Project Manager	Safety of persons visiting Unity Point Hospital
Tira Mays	Broadlawns Clinic	Government Program Coordinator	Safety of persons visiting Broadlawns Clinic
Jacqueline Easley	Mercy Medical Center	Director	Safety of persons visiting Mercy Hospital
Cathy Wolf	Iowa Total Care	Manager, Vendor Contracting	Representing persons using Medicaid benefits
Scott Anderson	Access2Care	Regional Director	Provider of Medicaid booking system for all MCOs in the State of Iowa
Angela Mortoza	Dallas County Hospital	CEO	Safety of persons visiting Dallas County Hospital

Name	Organization	Expertise / Roles	Responsibilities
Deb Anderson	Aging Resources of Central Iowa	Specialist	Representing Older Adults
Nick Praska	Dallas County VA	Veterans Affairs Officer	Representing Veterans
Rasheed Ebrahim	Iowa Department of Human Services / refugee Services	Refugee Specialist	Representing persons with LEP
Brooke Lovelace	Iowa Developmental Disabilities Council	Executive Director	Representing persons with disabilities
Darci Alt	Heart of Iowa (Dallas Co Mental Health Region)	CEO	Representing persons with disabilities
Mokhtee Ahmad	FTA Region 7	Regional Administrator	FTA Perspective
Stu Anderson	Iowa DOT	PE Director	State DOT Perspective

Additionally, HIRTA will contract with third-party service providers in the future (e.g., taxis, TNCs, volunteer drivers) to meet the additional capacity needed, particularly for same-day service requests. Those providers will be added to the list of stakeholders when determined.

2.3 Safety Risk Process and Approach

While vehicle safety is a major aspect of the HIRTA service, ISO 26262 framework is not followed for this SMP development given limited applicability of this standard to HIRTA's vehicles, on-board electrical and electronic systems, and service environment. Instead, HIRTA team has developed an approach based on our adopted Safety Management System (SMS). This SMS was developed using PTASP framework from Federal Transit Administration (FTA) which follows the PTASP regulation at 49 U.S.C. § 5329 and 49 CFR Part 673. The HIRTA PTASP was developed and adopted by HIRTA in November 2020.

This HIRTA Safety Management System (SMS) is based on the following 4 components, as illustrated in the PTASP safety management framework in Figure 4:

- **Safety Management Policy:** defines the policies, organizational structure and tools to support the safety management. This also serves as the structural framework for identifying safety needs and scenarios in 3 of this document.
- **Safety Risk Management (SRM):** defines the framework for conducting safety risk assessment. The SRM approach is developed per 49 CFR Part 673.25 and refers to identifying events and related hazards along with identifying, assessing and mitigating safety risks
- **Safety Assurance (SA):** defines the processes in place to monitor safety and carry out any actions necessary to ensure safety.
- **Safety Promotion (SP):** defines the training and communication plan for creating awareness around safety among HIRTA staff and stakeholders.



Figure 4. Safety Management Framework (Source: FTA)

Further details on these 4 PTASP components are described further in the rest of this section and details are based on regulatory requirements as defined in 49 CFR, Part 673.

2.3.1 Safety Needs and Scenarios

HIRTA PTASP defines HIRTA's policy statement on safety management and the organizational roles and responsibilities. The HIRTA Executive Director serves as the Accountable Executive. HIRTA has also recently hired a Safety Program Manager to serve as the SMS executive. HIRTA has also established a Safety Committee that meets bi-monthly where safety hazards are reported and jointly evaluated. As part of the Employee Safety Reporting Program (ESRP), HIRTA staff is required to report any safety conditions that require immediate actions to any HIRTA supervisor or manager. Conditions can be reported via a variety of methods (e.g., radio, email, in-person or safety reporting forms).

The HIRTA SMS/PTASP provides the structure around how HIRTA's Health Connector safety needs and scenarios are identified in Section 3. Safety needs are defined by user group and relevant Health Connector system component as those relate to the current HIRTA safety management policies in the SMS.

2.3.2 Safety Risk Management (SRM)

Safety risk assessment in Section 4 is conducted following the SRM framework in HIRTA's PTASP/SMS. For carrying out the SRM, HIRTA uses the following terms:

- Event: refers to an accident, incident or occurrence.
- Hazard: any real or potential condition that can cause injury, illness or death.
- Risk: severity and likelihood of an occurrence.

- Risk Mitigation: steps to be taken to mitigate the safety risk.
- Consequence: effect caused by a safety event.

For the purpose of analysis in this document, guidance from the FTA for bus agencies is followed as shown in Figure 5.

RISK ASSESSMENT MATRIX				
SEVERITY LIKELIHOOD	Catastrophic (1)	Critical (2)	Marginal (3)	Negligible (4)
Frequent (A)	High	High	High	Medium
Probable (B)	High	High	Medium	Medium
Occasional (C)	High	Medium	Medium	Low
Remote (D)	Medium	Medium	Low	Low
Improbable (E)	Medium	Low	Low	Low

Figure 5. Safety Risk Assessment Framework (Source: FTA)

Note that the definition in the PTASP guidance for severity in the context of overall safety risks at organizational level are stringent and tied to injury and death. In the context of Health Connector project where trips are provided for Traveler looking for transportation services to medical appointments, definitions are adjusted in consultation with HIRTA Safety Program Manager.

Severity for safety risks in the context of Health Connector can be interpreted as below.

- **Catastrophic (1):** Could result in one or more of the following:
 - Cancelled or missed recurring medical appointment for a healthcare condition (e.g., chemotherapy, dialysis) which could lead to negative long-term effects on Traveler's health due to delayed treatment.
 - A safety event leading to death, involving Traveler, their caregiver or vehicle/driver.
 - Permanent or long-term disability caused by a safety event (e.g., accident/incident).
 - Damage to vehicles or Traveler mobility devices (e.g., wheelchair, walker, oxygen tank, medical device), or HIRTA or partner facility (e.g., third-party service contractor, healthcare partner) over \$5,000 caused by a safety event.
- **Critical (2):** Could result in one or more of the following:

- Postponement or delays to appointments caused by a safety event. Delays and disruption are safety hazards in the context of Health Connector since those may result in postponement of medical care which could be problematic for someone looking for cancer treatment or dialysis if another appointment is not available in a timely manner.
- Safety event leading to injury caused to Traveler, their caregiver or vehicle/driver that requires hospitalization and may cause short-term disability.
- Damage to vehicle or Traveler medical devices, or HIRTA or partner facility (e.g., third-party service contractor, healthcare partner) under \$5,000 due to a safety event.
- **Marginal (3):** Could result in one or more of the following:
 - Change of appointment location, resulting in Traveler visiting an unfamiliar environment, causing them stress, and may result in delays to medical appointment.
 - Small injury to Traveler, their caregiver or vehicle/driver that may require First-Aid treatment, but no medical attention needed.
- **Negligible (4):** Any occurrence that does not impact the Traveler, their caregiver or vehicle/driver (e.g., rerouted trip due to a traffic incident without any delays, hard brake incident at a signal but no harm caused to any parties or objects).

Likelihood measures how often a consequence of a safety event could occur. The likelihood of a consequence occurring can be described as discussed below.

- **Frequent (A):** likely to occur more than 10 times per year, or likely to occur often, also termed as "continuously experienced".
- **Probable (B):** Likely to occur up to 10 times a year, also termed as "frequently experienced".
- **Occasional (C):** Likely to occur sometimes, also termed as "occurs several times;" no more than 5 times in 2 years.
- **Remote (D):** Unlikely but possible; no more than once every 3 years.
- **Improbable (E):** So unlikely it can be assumed it will not happen.

Finally, based on the severity and likelihood, safety risk index per PTASP guidance can be categorized as follows:

- **High:** ratings will be considered unacceptable and require action from HIRTA to mitigate the safety risk.
- **Medium:** ratings will be considered undesirable and require HIRTA's Safety Committee to make a decision if more mitigations need to be taken or if it is reasonably acceptable.

- **Low:** hazard ratings may be accepted by the safety executive without additional review.

2.3.3 Safety Assurance: Operational Concept and Management

As described in 49 CFR Part 673.27, agencies should conduct performance monitoring and measure the effectiveness of its safety management strategies. HIRTA has many processes in place to monitor its entire transit system for compliance with operations and maintenance procedures, including:

- Safety reports.
- Informal inspections.
- Regular review of on-board camera footage to assess drivers and specific incidents.
- Safety surveys.
- ESRP.
- Investigation of safety occurrences.
- Safety review prior to the launch or modification of any facet of service.
- Daily data gathering and monitoring of data related to the delivery of service.
- Regular vehicle inspections and preventative maintenance.

Outcome of these processes are reviewed and compared against the recent trend on a quarterly basis.

HIRTA also reviews mitigation strategies that may not be effective and SMS Executive identifies appropriate actions for managing the safety risk (e.g., modifications to mitigation strategy or taking other actions).

Safety assurance procedures are the basis for safety operational procedures, discussed in Section 5, and safety management summary, discussed in Section 6. As HIRTA continues to implement the adopted PTASP, additional procedures for maintaining safety assurance may be identified and added to the overall PTASP and this SMP.

Given the outdoor and indoor wayfinding component, once Travelers are dropped off, safety measures as relevant to a healthcare partner will come into effect. This SMP will still apply to safety risks caused by the wayfinding technology and associated infrastructure. However, fixing any issues related to physical infrastructure elements that are part of the wayfinding leg of the trip (e.g., broken entrance door impacting appropriate wheelchair movement, structural failure in sidewalk causing safety hazard) will be acknowledged when reported and will be communicated to appropriate parties but resolution is outside the scope of the Health Connector project.

2.3.4 Safety Promotion

As described in 49 CFR Part 673.29, agencies should design and implement training and communication programs to enhance safety within the organization.

HIRTA has established a safety training program that will be modified to involve all employees, third party contractors, HIRTA customers and representatives from healthcare partners. Resources are dedicated to providing skills-based (driving, maintenance) training or another SMS-responsibility.

HIRTA's Accountability Executive (Executive Director) and SMS Executive will be responsible for coordinating safety in the following areas:

- Communicating on safety risks and safety performance throughout the agency.
- Communicating Information on hazard and safety risks as relevant to staff roles and responsibilities.
- Informing staff on safety action taken in response to reports submitted through ESRP
- Informing the users on how to use the system and any relevant safety risks with the use, and consequences of safety event occurrence.

Actions identified as part of Safety Promotion inform some of the discussion related to control strategies as discussed in this document. It will also form the basis of training, education and general communications needs with partners, stakeholders, and users of the system discussion as part of the Task 9- Participant Training and Education Plan.

3 Safety Needs and Scenarios

Building upon the user needs and operational scenarios defined in the ConOps, this section describes safety needs and scenarios associated with the various components of the Health Connector system.

3.1 Safety Needs by Project Component

This section defines safety needs by the following individual project components as described in the ConOps and summarized in Section 1:

- Traveler-end Subsystem.
- Transportation Management Subsystem.
- Vehicle-end Subsystem.

3.1.1 Traveler-end Subsystem

Table 2 provides a description of safety needs as applicable to Traveler-end subsystem. The table identifies applicable system function and also points out relevant underserved groups that may be impacted by the safety need.

Relevant underserved groups are identified in Table 2 as follows:

- L: Persons with language barrier/limited English proficiency (LEP).
- S: Older adults.
- D: Persons with disabilities.
- I: Persons with low income.
- R: Persons living in rural areas.
- V: Veterans.

When a particular safety need applies to each of the above groups, applicable groups for those needs are identified as “All.”

Table 2. Safety Needs for Traveler-end Subsystem

ID	System Function	Safety Need	Underserved Groups Affected
SN-TRV-1	Information and Referral	Limited or incorrect information in the information and referral (I&R) system as entered by the I&R provider may add to customer anxiety causing health consequences for some Travelers that may be vulnerable due to an underlying illness.	All
SN-TRV-2	Booking	Issues with automated translation service unavailability may cause difficulty for Travelers with LEP, particularly if translation line with human assistance is not available. This may lead to some Travelers with LEP postponing their travel as they may not feel comfortable with the instructions provided in English.	L
SN-TRV-3	Pick-up	Unsafe pick-up spots or pickup spots that require customers to walk without any safe step-by-step guidance may pose safety concerns for Travelers.	All
SN-TRV-4A	Pick-up	If Travelers don't receive appropriate and accurate notification on upcoming vehicle arrival and route, they may miss their trip leaving them stranded and causing a missed appointment and delay in treatment. This is a catastrophic safety event in the context of Health Connector as it may have health consequences for Traveler that may be in need for a regular critical care.	All
SN-TRV-4B	Pick-up	Inability for customers to verify the correct vehicle or correct entrance door to board due to issues in the customer notification or wayfinding system may pose safety risks as they may board an incorrect vehicle or may try entering through an incorrect entrance door (e.g., if blind)..	All
SN-TRV-5	Pick-up	Unmarked vehicles have been mentioned as a safety concern to refugee population from unsafe countries. Absence of a physical or digital signage for vehicle identification will be a safety concern. This may be a major concern particularly when third-party service provider, or volunteer driver, or TNC (e.g., Uber/Lyft) vehicles are used.	L
SN-TRV-6	Customer Information	Unavailability of real-time information or inaccuracies in provided information due to an issue in Transportation Management Subsystem (TMS), Vehicle Subsystem or Communications may cause various safety risks to customers (e.g., requiring waiting outside in unsafe conditions, inability to timely contact healthcare provider during delays).	All
SN-TRV-7A	Drop-off	Unsafe drop-off spots or drop-off spots that require customers to walk without any safe step-by-step guidance may pose safety concerns for Travelers.	All
SN-TRV-7B	Drop-off	Safety considerations for needed step-by-step direction will vary by a Traveler. Detailed verification for guidance provided will be needed, as identified in the Systems Requirements.	All

ID	System Function	Safety Need	Underserved Groups Affected
SN-TRV-8	Outdoor Wayfinding	<p>Malfunction in wayfinding system providing step-by-step guidance may present safety risks to Travelers trying to enter a building through a correct entrance. It will be necessary that the wayfinding hazards are identified by target population groups and the capabilities are added to the wayfinding system to address any barriers caused by those safety hazards. Some examples of safety needs for outdoor wayfinding are as follows:</p> <ul style="list-style-type: none"> • Ability to identify wheelchair ramps for persons with disabilities or for parents with strollers. • Ability to identify safe walk markings for persons who are blind. • Ability to follow messages available for any changes in elevation (e.g., steps). • Communication on any fall hazards due to weather-related or other reasons (e.g., untreated surface during winter, uneven or broken steps). • Availability of instant translation for signage posted outside facilities (e.g., for persons with LEP). • Way to obtain visual communication in the event an audio-based public safety message is broadcast outside a facility due to a safety incident (e.g., a particular entrance blocked due to construction, fire alarm in the building). <p>Other relevant hazards will be assessed further and identified in the System Requirements. Also, it will be part of the standard operating procedure (SOP) to identify safe spots for pick-up and drop-off at the time of customer registration and booking. However, other hazards related to outdoor and indoor wayfinding after drop-off, including identification of any fall hazards are acknowledged.</p>	All

ID	System Function	Safety Need	Underserved Groups Affected
SN-TRV-9	Indoor Wayfinding	<p>Malfunction in wayfinding system providing step-by-step guidance may present safety risks to Travelers if not addressing their disabilities. It will be necessary that the wayfinding hazards are identified by target population groups and the capabilities are added to the wayfinding system to address any barriers caused by those safety hazards. Some examples of safety hazards for indoor wayfinding are as follows:</p> <ul style="list-style-type: none"> • Ability to provide appropriate guidance for persons using wheelchair, walker, stroller or similar items that may prevent them using escalator or inaccessible pathways. • Ability to detect any anomalies with localization and orientation subsystem and warn Travelers. • Ability to identify safe walk markings for persons who are blind. • Ability to follow messages available for any changes in elevation (e.g., steps). • Communication on any fall hazards (e.g., slippery surface). • Availability of instant translation for signage posted (e.g., for persons with LEP). • Way to obtain visual communication in the event an audio-based public safety message is broadcast. 	S,D,I
SN-TRV-12	General Wayfinding	<p>Indoor and outdoor wayfinding if not functional to assist a Traveler to locate other services within the medical facility or the vehicle for return trips, it may present safety risks or anxiety to Travelers, particularly the older adults and persons with disabilities. As stated earlier, any event causing stress or anxiety is a safety hazard in the context of Health Connector due to the nature of Health Connector trips.</p>	S,D

3.1.2 Transportation Management Subsystem

Table 3 provides a description of safety needs as applicable to Transportation Management subsystem. The table identifies applicable system function and also points out relevant underserved groups that may be impacted by the safety need.

Table 3. Safety Needs Applicable to Transportation Management Subsystem

ID	System Function	Safety Need	Underserved Groups Affected
SN-TMS-1	Booking	Inability to properly include a mobility aid detail (e.g., wheelchair, walker, oxygen tank, service animal) or other travel preferences needed for a trip may present a safety risk for Travelers as they rely on those. If mobility aid details are not added, the system will not be able to accommodate the mobility needs and appropriate vehicle will not be assigned causing Travelers to not board the vehicle at the time of pick-up and miss their appointments.	S,D
SN-TMS-2	Scheduling	Incorrect mapping data may cause issues with routing and scheduling and eventually posing a safety risk if real-time information on hazards (e.g., road condition due to weather) were not taken into account.	All
SN-TMS-3	Scheduling	Incorrect geocoding of addresses in the system (e.g., incorrect side of the road, incorrect street/cross street, same street but different town) may let system to schedule trips to incorrect destinations causing safety risks as Travelers may get dropped off at an unfamiliar location and may have to walk or find an alternate way to reach the correct destination. It may be a major issue for persons that are blind or persons with LEP who may not realize until they are dropped off.	All
SN-TMS-4	Scheduling	Inability to book same day return trip due to capacity issues may leave low-income Travelers stranded (or may have to walk in unsafe conditions) if they can't afford to pay for premium modes (e.g., taxis, TNCs).	I
SN-TMS-5	Scheduling	In a shared ride scenario, system identifies trip originating at or destined for co-located addresses and groups them appropriately for efficient use of driver and vehicle resources. Inappropriate grouping of such trips may result in Travelers staying in vehicles longer than anticipated, causing anxiety and in some cases may get delayed for appointments and needed treatments. This is a safety risk since Travelers with underlying health condition may have unintended consequence due to the stress caused. Further, delays for appointments may lead to cancellations causing delays in treatment which may have health impacts.	All
SN-TMS-6	Scheduling	Disruption in cellular communication or in-vehicle electronics (e.g., vehicle tracking hardware) may result in degraded operation relying solely on two-way radios. While operational needs may be met, HIRTA's ability to manage capacity, provide reliable customer information and deliver trips on time reliably will be impacted, posing safety risks for customers.	All
SN-TMS-7	Dispatching	Incorrect or incomplete information from maintenance on vehicle readiness for service prior to assignment may pose safety risk for Travelers. For persons that are not ambulatory, issues such as malfunctioning wheelchair lift may cause delays or missed trips.	All
SN-TMS-8	Dispatching	Not having access to driver and vehicle information in real-time for services operated by third parties is a major safety risk.	All

ID	System Function	Safety Need	Underserved Groups Affected
SN-TMS-9	Dispatching	A key objective for Health Connector is to facilitate real-time coordination among HIRTA, Health Navigators and Healthcare providers so they can assist Travelers and their caregivers in real-time. If tools to facilitate such coordination are not functional it may expose Travelers and caregivers to safety risks as timely communication will not be available.	All

3.1.3 Vehicle-end Subsystem

Table 4 provides a description of safety needs as applicable to vehicle-end subsystem. The table identifies applicable system function and also points out relevant underserved groups that may be impacted by the safety need.

Table 4. Safety Needs Applicable to Vehicle Subsystem

ID	System Function	Safety Need	Underserved Groups Affected
SN-VEH-1	Manifest	Notifications on a Driver terminal when a vehicle is in motion may be distracting and may pose safety risks to Drivers and Travelers.	All
SN-VEH-2	Manifest	System's inability to timely and accurately communicate manifest changes may leave Travelers stranded and result in missed trips. As stated earlier, missed trips can lead to missed medical appointments, causing health and safety risks.	All
SN-VEH-3	Communication	Driver must be able to communicate with Dispatcher at all times. In the case of cellular service disruption, unavailability of two-way radio as well is a severe safety risk.	All
SN-VEH-4	Vehicle/ Equipment Condition	Inability to automatically identify wheelchair lift malfunction status in real-time may be a risk for persons that are not ambulatory.	D
SN-VEH-5	Vehicle/ Equipment Condition	Malfunctioning on-board surveillance or Driver behavior monitoring system pose a risk in maintaining Driver safety compliance.	All
SN-VEH-6	Navigation	Malfunctioning turn-by-turn navigation and wayfinding system may pose risk to Driver and Traveler safety as it will impact Driver's ability to safely drive to a pick-up or drop-off spot.	All

3.2 Safety Scenarios by Project Component

This section defines safety scenarios, also referred as hazard in the document, by the following individual project components as described in the ConOps and summarized in Section 1.

- Traveler-end Subsystem

- Transportation Management Subsystem
- Vehicle-end Subsystem

For each scenario, this Section also provides the applicable details necessary to assess safety risk in terms of its severity, likelihood and impact.

3.2.1 Traveler-end Subsystem

Table 5 provides a list of scenarios as applicable to Traveler-end systems and functions.

Table 5. Traveler-focused Safety Scenarios

Scenario ID	Safety Scenario	Description	Safety Need
SC-TRV-1	Traveler device failure	Traveler device may not be functional due to low charge or another reason. This may leave them without any information on their trip or without the ability to use wayfinding system.	All needs in Table 2
SC-TRV-2	Caregiver or Health Navigator not authorized to assist Traveler with their needs	Traveler is authorized to use the Health Connector application, but their caregiver or Health Navigator are not able to access on their behalf. This causes issues with Travelers that rely on such help (e.g., persons with LEP, persons with disabilities, older adults). Lack of such help may leave Travelers in vulnerable situations.	SN-TRV-2
SC-TRV-3	Traveler profile does not have accurate details on mobility needs	Traveler is registered in the system but information within the system on their mobility needs are inaccurate which may include wrong information on the Driver manifest. Also, scheduler and schedule optimizer may use inaccurate approach for scheduling, grouping and vehicle assignment.	SN-TMS-1
SC-TRV-4	Traveler cannot recognize HIRTA vehicle	Traveler may not be able to recognize HIRTA or HIRTA contractor vehicle if appropriate methods for enabling this feature are not used, particularly when services are provided by contractors.	SN-TRV-5
SC-TRV-5	Driver cannot find Traveler waiting to be picked up	If Travelers are not sure about the pick-up spot (front entrance, back entrance, street intersection), particularly when a designated spot with physical signage is not available, it may create delays in pick-up or may result in a missed trip leading to missed appointment and delayed medical care.	SN-TRV-3 and SN-TRV-4

Scenario ID	Safety Scenario	Description	Safety Need
SC-TRV-6	Malfunction in wheelchair lift	Persons with disability will have difficulty in boarding due to malfunctioning wheelchair lift. HIRTA may have to send another vehicle causing delays with the trip. This may be a major or minor delay depending on system capacity to provide another vehicle. Non-HIRTA vehicles may not all be accessible (e.g., TNCs may have limited WAV capacity). This situation may very well lead to a cancelled appointment.	SN-TMS-7
SC-TRV-7	Driver/Traveler Conflict	While not system-related, there may be situations when there is a conflict between Driver and Traveler during boarding or while the trip is in progress. On-board security cameras must be operational for after-the-fact verification of the event. Drivers will have the ability to safely notify Dispatcher about the incident using the Driver terminal.	N/A
SC-TRV-8	Severe weather Event	Highly severe weather impacts Traveler's normal pattern at pick-up. This event may also cause trip delays. The system must be able to communicate any impact to trip status to all parties.	SN-TRV-3
SC-TRV-9	Traffic incident delay	Delay is caused due to a traffic incident or work zone re-routing while the vehicle is en route to a drop-off destination and predicted arrival information is unreliable.	SN-TRV-6
SC-TRV-10	Inaccurate notifications	There may be situations when notifications provided to Travelers the day before and/or same day are not reliable. This could be caused by malfunction in notification delivery system or in the TMS pushing out this information. Inaccurate notifications may cause anxiety and, in some cases, may lead Travelers to cancel their appointments.	SN-TRV-6
SC-TRV-11	Inaccurate real-time information	There may be situations when system is not providing accurate prediction arrival information. This could be caused by lack of reliable vehicle tracking information and manifest progress updates. Incorrect information may leave Travelers with longer wait times and may result in postponement or cancellation of appointments.	SN-TRV-6
SC-TRV-12	Drop-off	Travelers may get dropped off at a different spot than originally intended due to construction or other issues. It may be a safety issue if Travelers are not familiar with the facility and wayfinding direction from the drop-off location is not available.	SN-TRV-7A and SN-TRV-7B

Scenario ID	Safety Scenario	Description	Safety Need
SC-TRV-13	Outdoor wayfinding malfunction	Wayfinding system installed at a medical facility for Travelers to locate the right building and entrance is not functional. This will cause a different level of safety hazard to each Traveler depending on their disabilities.	SN-TRV-8
SC-TRV-14	Indoor wayfinding malfunction-infrastructure	Wayfinding system installed indoors is not functional due to issues with infrastructure (e.g., sensors or visual markers to support indoor positioning) installed within the facility.	SN-TRV-9
SC-TRV-15	Indoor wayfinding malfunction-device	Wayfinding application on the Traveler device is not able to provide the desired step-by-step guidance.	SN-TRV-9
SC-TRV-16	Indoor wayfinding – configurations	Traveler profile for wayfinding application is not accurately configured causing the system to provide incorrect guidance (e.g., elevator vs escalator) and causing a safety risk.	SN-TRV-9
SC-TRV-17	Insufficient data-outdoor wayfinding	Travelers are not dropped off at the facility entrance and have to access sidewalk, but sidewalk data may not be accurate. The system should take into account the accuracy of sidewalk data prior to providing the step-by-step guidance.	SN-TRV-8
SC-TRV-18	Insufficient data-indoor wayfinding	The data needed for the indoor wayfinding may not be sufficient, causing the system to provide incorrect guidance.	SN-TRV-9
SC-TRV-19	Unable to notify healthcare facility regarding arrival	When Travelers need assistance in situations when they are not accompanied by caregivers, system should be able to notify the healthcare staff for such requests as the vehicle is approaching the facility. If this function is not available, Traveler should be notified so they can call to make such arrangements.	SN-TMS-9
SC-TRV-20	Unable to book return trip with HIRTA	Travelers may not be able to book return trip with HIRTA if capacity is not available and Travelers may get stranded at the hospital and may be forced to walk if can't afford for premium mode alternatives. Alternate arrangements through taxis or TNCs should be facilitated via Health Connector in such situations and in partnership with funding entities.	SN-TMS-9

3.2.2 Transportation Management Subsystem

Table 6 provides a list of scenarios as applicable to central system functions.

Table 6. TMS-focused Safety Scenarios

ID	Safety Scenario	Description	Safety Need
SC-TMS-1	Health Navigator/Caregiver are not able to access TMS	Health Navigators/Caregivers will have access to TMS in limited capacity to help Travelers they are working with to provide them a status on appointment booking (medical or transportation) and trip progress. Not having this access will disrupt Travelers' trips in situations where they are fully reliable on Caregivers and Health Navigators, leaving them vulnerable to safety risks.	SN-TMS-9
SC-TMS-2	TMS Server Failure	Failure in TMS server will disrupt HIRTA's ability to book trips and manage trips in real-time. HIRTA will have to fall back on two-way radio and Drivers will have to turn to paper manifests. This will cause severe disruption to the standard operations. In the absence of operational tools Dispatchers' capability to ensure safe operations will be severely impacted.	SN-TRV-6, SN-VEH-2, SN-VEH-3
SC-TMS-3	Cellular communication disruption or loss of data connectivity between vehicle and TMS subsystems.	In the event of data communication failure, HIRTA vehicles will not be able to communicate with TMS and real-time operations will be impacted. HIRTA will have to fall back on two-way radio and Drivers will have to turn to paper manifests. In the absence of operational tools Dispatchers' capability to ensure safe operations will be severely impacted	SN-TRV-6, SN-VEH-2, SN-VEH-3
SC-TMS-4	HIRTA is not able to connect to Access2Care	HIRTA's inability to connect to Access2Care will limit its ability to deliver Medicaid trips unless those manifests are made available in another format (e.g., email, fax). While not a direct safety risk, inability to timely and correctly process details may cause delays and missed trips for Medicaid customers.	SN-TMS-8
SC-TMS-5	Incorrect geocoding of addresses	Incorrect geocoding of addresses, caused by a variety of issues, may impact scheduling and service delivery. Drivers may get sent to wrong location or wrong side of the road causing delays in pick-up and drop-off of Travelers.	SN-TMS-3
SC-TMS-6	Obsolete basemap data used for scheduling	Obsolete basemap data may not have current data on road network, barriers and other pertinent details resulting in inefficient and in some cases unsafe schedules and runs.	SN-TMS-3
SC-TMS-7	Customer profile details incomplete or have changed but not adjusted in the system	In some cases, Travelers may not update their details (e.g., mobility needs, eligibility, contact, and address) when booking trips leaving the system to schedule trips with incorrect details. It may result in both inefficient schedule and cause safety risks.	SN-TMS-1

ID	Safety Scenario	Description	Safety Need
SC-TMS-8	TMS does not have access to real-time information on third party service providers	Not having access to Driver/Vehicle resources and information on the status of trips may cause severe safety risks.	SN-TMS-8
SC-TMS-9	Inability to communicate with Drivers	HIRTA must be able to communicate with Drivers at all times via data or voice communications. If neither of these options are available that will be a severe safety risk.	SN-TMS-6
SC-TMS-10	Issues with timely update of manifest details	System may behave erratically when it is not able to timely send out new trips, changes to existing trips or cancellation requests in real-time. This may result in Driver's trip performance and may result in missed trips for customers.	SN-TMS-6, SN-VEH-2
SC-TMS-11	Maintenance issues with assigned vehicle	There may be issues with vehicle assignment if TMS does not have accurate information from maintenance department. It may impact vehicle's ability to pull out or there may be some issues that occur while the vehicle is still in revenue service causing vehicle breakdown and trip reassignments.	SN-TMS-7
SC-TMS-12	System not having capability to accommodate all members of the group in the same vehicle	There may be situations where in shared ride scenario when more than one person is traveling as part of a group, not all people can be accommodated on the same vehicle. Alternate assignments methods (e.g., assigning another vehicle, taxi service) may be needed for Traveler's safety.	SN-TMS-5

3.2.3 Vehicle Subsystem

Table 7 provides a list of scenarios as applicable to vehicle-end systems and functions.

Table 7. Vehicle-focused Safety Scenarios

ID	Safety Scenario	Description	Safety Need
SC-VEH-1	Data communication system failure	As discussed earlier in the case of TMS, data communication failure (on the carrier or network side) will disrupt any communication between vehicle and central systems and therefore severely impacting Health Connector operations.	SN-TMS-6, SN-VEH-2, SN-VEH-3
SC-VEH-2	Voice communications system failure	HIRTA's voice and data communications systems use separate infrastructure. In some cases, voice communication system may go down while data communications are still operational. This may be a moderate risk but voice communication going down at the same time as cellular system (e.g., in the event of a storm/lightning or faulty modem/radios on vehicle) the vehicle may not be operational unless communications are stored.	SN-VEH-3

ID	Safety Scenario	Description	Safety Need
SC-VEH-3	Surveillance and driver behavior monitoring system not operational	While not part of Health Connector system, on-board surveillance and driver behavior monitoring systems will be supporting technologies for ensuring Driver and Traveler safety. This may cause trip delays and missed trips.	SN-VEH-5
SC-VEH-4	Driver not able to log on	Inability of Drivers to log on to their devices will disrupt the electronic manifest management. If situation cannot be resolved, Drivers will have to utilize paper manifests and two-way radios. This may cause trip delays and missed trips.	SN-VEH-2
SC-VEH-5	Delivery of changes to Driver manifests do not occur timely	For various reasons, sometimes data transmission may be slow causing delays in messages. This will, however, disrupt the operations causing delays in trip delivery and may also cause missed trips.	SN-VEH-2
SC-VEH-6	Manifest details are inaccurate	Manifest details may be inaccurate due to data entry error during booking or incorrect field mapping between vehicle and central subsystems during system configuration. This may impact trip delivery.	SN-VEH-2
SC-VEH-7	Turn-by-turn navigation not sending to correct destinations	Incorrect geocoding or issues in the turn-by-turn navigation software may provide incorrect guidance.	SN-TMS-3, SN-VEH-6
SC-VEH-8	Wheelchair lift non-operational	Due to unexpected issues wheelchair lift may not be operational and the built-in function to automatically notify such failure may not be available. This is a severe issue and may require sending another vehicle causing trip delays.	SN-VEH-5, SN-TMS-7

4 Assessment of Safety Risks

Section 2.3 describes our approach for safety management based on PTASP guidance which is further elaborated in this section. As mentioned earlier, Severity for safety risks in the context of Health Connector can be interpreted as below.

Severity for safety risks in the context of Health Connector can be interpreted as below.

- **Catastrophic (1):** Could result in one or more of the following:
 - Cancelled or missed recurring medical appointment for a healthcare condition (e.g., chemotherapy, dialysis) which could lead to negative long-term effects on Traveler's health due to delayed treatment.
 - A safety event leading to death, involving Traveler, their caregiver or vehicle/driver.
 - Permanent or long-term disability caused by a safety event (e.g., accident/incident).
 - Damage to vehicles or Traveler mobility devices (e.g., wheelchair, walker, oxygen tank, medical device), or HIRTA or partner facility (e.g., third-party service contractor, healthcare partner) over \$5,000 caused by a safety event.
- **Critical (2):** Could result in one or more of the following:
 - Postponement or delays to appointments caused by a safety event. Delays and disruption are safety hazards in the context of Health Connector since those may result in postponement of medical care which could be problematic for someone looking for cancer treatment or dialysis if another appointment is not available in a timely manner.
 - Safety event leading to injury caused to Traveler, their caregiver or vehicle/driver that requires hospitalization and may cause short-term disability.
 - Damage to vehicle or Traveler medical devices, or HIRTA or partner facility (e.g., third-party service contractor, healthcare partner) under \$5,000 due to a safety event.
- **Marginal (3):** Could result in one or more of the following:
 - Change of appointment location, resulting in Traveler visiting an unfamiliar environment, causing them stress, and may result in delays to medical appointment.

- Small injury to Traveler, their caregiver or vehicle/driver that may require First-Aid treatment, but no medical attention needed.
- **Negligible (4):** Any occurrence that does not impact the Traveler, their caregiver or vehicle/driver (e.g., rerouted trip due to a traffic incident without any delays, hard brake incident at a signal but no harm caused to any parties or objects).

Likelihood measures how often a consequence of a safety event could occur. The likelihood of a consequence occurring can be described as discussed below.

- **Frequent (A):** likely to occur more than 10 times per year, or likely to occur often, also termed as "continuously experienced".
- **Probable (B):** Likely to occur up to 10 times a year, also termed as "frequently experienced".
- **Occasional (C):** Likely to occur sometimes, also termed as "occurs several times;" no more than 5 times in 2 years.
- **Remote (D):** Unlikely but possible; no more than once every 3 years.
- **Improbable (E):** So unlikely it can be assumed it will not happen.

Finally, based on the severity and likelihood, safety risk index per PTASP guidance can be categorized as follows:

- **High:** ratings will be considered unacceptable and require action from HIRTA to mitigate the safety risk.
- **Medium:** ratings will be considered undesirable and require HIRTA's Safety Committee to make a decision if more mitigations need to be taken or if it is reasonably acceptable.

Low: hazard ratings may be accepted by the safety executive without additional review.

Since each of the safety scenarios identified in Section 3 will provide valuable insight for Tasks 6, 7 and 8, current analysis as shown in Table 8 is conducted for all scenarios.

Table 8. Safety Risk Assessment

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-TRV-1	Traveler device failure	Traveler device may not be functional due to low charge or another reason. This may leave them without any information on their trip or without the ability to use wayfinding system.	2	D	Medium	<p>Traveler may contact HIRTA customer service using another phone or via email if at home/origin location or may contact Driver if en route. HIRTA vehicles could also carry portable chargers as a customer amenity which could be made available by Drivers.</p> <p>If such situation occurs after drop-off, Travelers may coordinate with the healthcare coordinator to assist with any transportation or wayfinding needs.</p>
SC-TRV-2	Caregiver or Health Navigator not authorized to assist Traveler with their needs	Traveler is authorized to use the Health Connector application, but their caregiver or Health Navigator are not able to access on their behalf. This causes issues with Travelers that rely on such help (e.g., persons with LEP, persons with disabilities, older adults). Lack of such help may leave Travelers in vulnerable situations.	2	C	Medium	<p>While it may be of concern to some Travelers, they will still be able to contact HIRTA customer service and potentially a multi-party call could be arranged so caregivers or Health Navigators can help coordinate any needs. Alternatively, caregivers can contact HIRTA customer service to request authorization, or Travelers may pre-authorize certain known caregivers at initial registration if limited/non-health information can be support by their system. A temporary issue may be fixed immediately through the system administrator. If caregiver/Health Navigator need to go through consent release process, that may take longer.</p>

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-TRV-3	Traveler profile does not have accurate details on mobility needs	Traveler is registered in the system but information within the system on their mobility needs are inaccurate which may include wrong information on the Driver manifest. Also, scheduler and schedule optimizer may use inaccurate approach for scheduling, grouping and vehicle assignment.	2	E	Low	Chances are low for such error, but such details will be verified by HIRTA during booking.
SC-TRV-4	Traveler cannot recognize HIRTA vehicle	Traveler may not be able to recognize HIRTA or HIRTA contractor vehicle if appropriate methods for enabling this feature are not used, particularly when services are provided by contractors.	2	D	Medium	Identification methods will be designed and tested to be reliable. A HIRTA/Health Connector logo will be designed which third party contractors will be required to display on their windshield from where it could easily be read by the wayfinding application. Health Navigators will work with LEP Travelers so they are aware about tools for identifying the right vehicle.
SC-TRV-5	Driver cannot find Traveler waiting to be picked up	If Travelers are not sure about the pick-up spot (front entrance, back entrance, street intersection), particularly when a designated spot with physical signage is not available, it may create delays in pick-up or may result in a missed trip leading to missed appointment and delayed medical care.	2	D	Medium	Identification methods will be designed and tested to be reliable. A HIRTA/Health Connector logo will be designed which third party contractors will be required to display on their windshield from where it could easily be read by the wayfinding application. Health Navigators will work with LEP Travelers so they are aware about tools for identifying the right vehicle. Also, Drivers will be trained to assist in such situations.

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-TRV-6	Malfunction in wheelchair lift	Persons with disability will have difficulty in boarding due to malfunctioning wheelchair lift. HIRTA may have to send another vehicle causing delays with the trip. This may be a major or minor delay depending on system capacity to provide another vehicle. Non-HIRTA vehicles may not all be accessible (e.g., TNCs may have limited WAV capacity). This situation may very well lead to a cancelled appointment.	1	D	Medium	<p>Wheelchair lift cycle test is performed at every pull however, mechanical failures may occur during the driver shift. In the event this happens, HIRTA will have to swap vehicle as soon as the issue is discovered.</p> <p>Real-time monitoring of wheelchair's functional status will also be included in the requirements so Drivers and Dispatchers can be alerted prior to the pick-up.</p>
SC-TRV-7	Driver/Traveler Conflict	While not system-related, there may be situations when there is a conflict between Driver and Traveler during boarding or while the trip is in progress. On-board security cameras must be operational for after-the-fact verification of the event. Drivers will have the ability to safely notify Dispatcher about the incident using the Driver terminal.	3	D	Low	<p>As part of HIRTA's Safety Promotion component of SMS, Driver education and training is required. One of the focuses of this training will be to train Drivers on any expected conflicts and resolution protocols to avoid any safety risks for themselves or for Travelers. Any reported incidents or complaints from Travelers and Drivers will be logged in the ESRP so a focused training can be provided.</p>

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-TRV-8	Severe weather Event	Highly severe weather impacts Traveler's normal pattern at pick-up. This event may also cause trip delays. The system must be able to communicate any impact to trip status to all parties.	1	C	High	Actions will be driven by HIRTA SOP. For highly severe weather, when services cannot be operated, trips may get cancelled in advance of a pick-up and Travelers will be notified accordingly. Travelers will be able to book an alternate appointment for both medical care and transportation using Health Connector. For other situations when trip is not cancelled, appropriate information will be communicated to Travelers per the stage of their trip. Focus will be on minimizing the consequence of delays and patients with recurring appointments in the system, typically meant for critical care, may be prioritized.
SC-TRV-9	Traffic incident delay	Delay is caused due to a traffic incident while the vehicle is en route to a drop-off destination and predicted arrival information is unreliable. Delay may cause postponement or cancellation of appointment. Depending on the nature of medical care, this may be consequential for some Travelers.	1	C	High	System will automatically notify all concerned parties about the delay and appropriate action (e.g., change in appointment time) may be needed.

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-TRV-10	Inaccurate notifications	There may be situations when notifications provided to Travelers the day before and/or same day are not reliable (e.g., vehicles not there to pick-up as notified). This could be caused by malfunction in notification delivery system or in the TMS pushing out this information. Inaccurate notifications may cause anxiety and, in some cases, may lead Travelers to cancel their appointments.	3	C	Medium	Travelers will be advised to call HIRTA customer service if their vehicle does not arrive within 10 minutes of pick-up time, as notified to them.
SC-TRV-11	Inaccurate real-time information	There may be situations when system is not providing accurate prediction arrival information. This could be caused by lack of reliable vehicle tracking information and manifest progress updates.	3	C	Medium	Travelers will be advised to call HIRTA customer service if their vehicle does not arrive within 10 minutes of pick-up time, as notified to them.
SC-TRV-12	Drop-off	Travelers may get dropped off at a different spot than originally intended due to construction or other issues. It may be a safety issue if Travelers are not familiar with the facility and wayfinding direction from the drop-off is not available.	3	D	Low	Drivers will be trained to assist Travelers in this situation, so they are able to reach the correct entrance. Travelers will also be able to request human assistance via Health Connector app.

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-TRV-13	Outdoor wayfinding malfunction	Wayfinding system installed at a medical facility for customers to locate the right building and entrance is not functional. This will cause a different level of safety hazard to Travelers based on their disabilities.	2	C	Medium	<p>Traveler may request human assistance via Health Connector app when the wayfinding system is fully non-functional.</p> <p>If the system does not have pathway information available to offer step-by-step guidance it will notify as such to the Traveler. Also, the system will warn if the accuracy of pathway information was not verified within the past 7 days.</p>
SC-TRV-14	Indoor wayfinding malfunction-infrastructure	Wayfinding system installed indoors is not functional due to issues with infrastructure (e.g., sensors or visual markers to support indoor positioning) installed within the facility.	2	C	Medium	<p>The system will be designed to detect anomalies with the indoor navigation infrastructure that cause issues with localization and orientation functions.</p> <p>If the system does not have pathway information available to offer step-by-step guidance it will notify as such to the Traveler. Also, the system will warn if the accuracy of pathway information was not verified within the past 7 days.</p> <p>Traveler may request human assistance via Health Connector app.</p>

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-TRV-15	Indoor wayfinding malfunction-device	Wayfinding application on the Traveler device is not able to provide the desired step-by-step guidance.	2	C	Medium	Traveler may request human assistance via Health Connector app. HIRTA team is planning to design a kiosk-based digital assistant for Travelers that may not have smartphones. Kiosk could be used by Travelers to print direction and guide them.
SC-TRV-16	Indoor wayfinding – configurations	Traveler profile for wayfinding application is not accurately configured causing the system to provide incorrect guidance (e.g., elevator vs escalator) and causing a safety risk.	2	E	Low	Likelihood is really low since such cases will be carefully reviewed during deployment and tested.
SC-TRV-17	Insufficient data-outdoor wayfinding	Travelers are not dropped off at the facility entrance and have to access sidewalk, but sidewalk data may not be accurate. The system should take into account the accuracy of sidewalk data prior to providing the step-by-step guidance.	1	D	Medium	Likelihood is really low since such cases will be carefully reviewed during deployment and tested.
SC-TRV-18	Insufficient data-indoor wayfinding	The data needed for the indoor wayfinding may not be sufficient, causing the system to provide incorrect guidance.	1	D	Medium	Likelihood is really low since such cases will be carefully reviewed during deployment and tested.

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-TRV-19	Unable to notify healthcare facility regarding arrival	When Travelers need assistance in situations when they are not accompanied by caregivers, system should be able to notify the healthcare staff for such requests as the vehicle is approaching the facility. If this function is not available, Traveler should be notified so they can call to make such arrangements.	3	E	Low	Traveler can call via phone.
SC-TRV-20	Unable to book return trip with HIRTA	Travelers may not be able to book return trip with HIRTA if capacity is not available and Travelers may get stranded at the hospital and may be forced to walk if can't afford for premium mode alternatives. Alternate arrangements through taxis or TNCs should be facilitated via Health Connector in such situations and in partnership with funding entities.	1	C	High	HIRTA will take several actions to ensure the availability of same day service to all travelers. These actions include: <ul style="list-style-type: none"> • Service availability during after-hours. • Engaging third party service providers (e.g., taxi) so needed capacity is available. • Engaging TNC so additional capacity is available. • Engaging volunteer drivers so capacity is available where TNCs and taxis may not be available (e.g., rural areas). • Provision of microtransit service so capacity can be made available through a better coordinated shared ride service. • Provision to allow hospitals to pay for premium fare where appropriate funding sources cannot be identified.

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-TMS-1	Health Navigator/ Caregiver are not able to access TMS	Health Navigators/Caregivers will have access to TMS in limited capacity to help Travelers they are working with to provide them a status on appointment booking (medical or transportation) and trip progress. Not having this access will disrupt Travelers' trips in situations where they are fully reliable on Caregivers and Health Navigators, leaving them vulnerable to safety risks.	3	D	Low	A multi-party phone call may be arranged either by Health Navigator or HIRTA with Traveler and their caregiver to assist.
SC-TMS-2	TMS Server Failure	Failure in TMS server will disrupt HIRTA's ability to book trips and manage trips in real-time. HIRTA will have to fall back on two-way radio and Drivers will have to turn to paper manifests. This will cause severe disruption to the standard operations. In the absence of operational tools Dispatchers' capability to ensure safe operations will be severely impacted	1	C	High	Paper manifest and two-way radio will be used which will cause severe disruption to real-time service management. Full failure of TMS may limit access to other information and can have major issues. Same-day service may get impacted.
SC-TMS-3	Cellular communication disruption or loss of data connectivity between vehicle and TMS subsystems.	In the event of data communication failure, HIRTA vehicles will not be able to communicate with TMS and real-time operations will be impacted. HIRTA will have to fall back on two-way radio and Drivers will have to turn to paper manifests. In the absence of operational tools Dispatchers' capability to ensure safe operations will be severely impacted.	1	D	Medium	Paper manifest and two-way radio will be used which will cause severe disruption to real-time service management. Same-day service may get impacted.

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-TMS-4	HIRTA is not able to connect to Access2Care	HIRTA's inability to connect to Access2Care will limit its ability to deliver Medicaid trips unless those manifests are made available in another format (e.g., email, fax). While not a direct safety risk, inability to timely and correctly process details may cause delays and missed trips for Medicaid customers.	3	C	Medium	Manifests will have to be delivered to HIRTA using another method (email/fax).
SC-TMS-5	Incorrect geocoding of addresses	Incorrect geocoding of addresses, caused by a variety of issues, may impact scheduling and service delivery. Drivers may get sent to wrong location or wrong side of the road causing delays in pick-up and drop-off of Travelers.	2	A	High	A thorough review will be conducted during deployment. Also, periodic review will be planned for new customers for accuracy. Drivers will be trained to report any time they encounter incorrect address location by sending a text message using their terminal.
SC-TMS-6	Obsolete basemap data used for scheduling	Obsolete basemap data may not have current data on road network, barriers and other pertinent details resulting in inefficient and in some cases unsafe schedules and runs.	2	C	Medium	Maps will be updated at deployment and also the design will look into cloud-based mapping so basemaps are always current.
SC-TMS-7	Customer profile details incomplete or have changed but not adjusted in the system	In some cases, Travelers may not update their details (e.g., mobility needs, eligibility, contact, and address) when booking trips leaving the system to schedule trips with incorrect details. It may result in both inefficient schedule and cause safety risks.	3	D	Low	Standard practice of verifying details at trip booking will be implemented.
SC-TMS-8	TMS does not have access to real-time information on third party service providers	Not having access to Driver/Vehicle resources and information on the status of trips may cause severe safety risks.	1	C	High	SLAs will be developed to have HIRTA access to such data at all times.

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-TMS-9	Inability to communicate with Drivers	HIRTA must be able to communicate with Drivers at all times via data or voice communications. If neither of these options are available that will be a severe safety risk.	2	D	Medium	HIRTA will ensure to have one communication method always available (Driver terminal, radio, back-up communication device)
SC-TMS-10	Issues with timely update of manifest details	System may behave erratically when it is not able to timely send out new trips, changes to existing trips or cancellation requests in real-time. This may result in Driver's trip performance and may result in missed trips for customers.	2	D	Medium	Appropriate action may need to be taken by system support team.
SC-TMS-11	Maintenance issues with assigned vehicle	There may be issues with vehicle assignment if TMS does not have accurate information from maintenance department. It may impact vehicle's ability to pull out or there may be some issues that occur while the vehicle is still in revenue service causing vehicle breakdown and trip reassignments.	3	C	Medium	A list of available vehicles will be provided to Dispatcher before service day starts.
SC-TMS-12	System not having capability to accommodate all members of the group in the same vehicle	There may be situations where in shared ride scenario when more than one person is traveling as part of a group, not all people can be accommodated on the same vehicle. Alternate assignments methods (e.g., assigning another vehicle, taxi service) may be needed for Traveler's safety.	3	C	Medium	Scheduling parameters will be defined such that this issue doesn't occur. Any occurrences as reported by Travelers or Drivers will be noted and data will be analyzed to assess the cause.

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-VEH-1	Data communication system failure	As discussed earlier in the case of TMS, data communication failure (on the carrier or network side) will disrupt any communication between vehicle and central systems and therefore severally impacting Health Connector operations.	1	C	High	Paper manifest and two-way radio will be used which will cause severe disruption to real-time service management. Same-day service may get impacted.
SC-VEH-2	Voice communications system failure	HIRTA's voice and data communications systems use separate infrastructure. In some cases, voice communication system may go down while data communications are still operational. This may be a moderate risk but voice communication going down at the same time as cellular system (e.g., in the event of a storm/lightning or faulty modem/radios on vehicle) the vehicle may not be operational unless communications are stored.	1	D	Medium	Back-up communication method will have to be instituted for continuity of operations.
SC-VEH-3	Surveillance and driver behavior monitoring system not operational	While not part of Health Connector system, on-board surveillance and driver behavior monitoring systems will be supporting technologies for ensuring Driver and Traveler safety.	3	B	Medium	Maintenance department will maintain units.
SC-VEH-4	Driver not able to log on	Inability of Drivers to log on to their devices will disrupt the electronic manifest management. If situation cannot be resolved, Drivers will have to utilize paper manifests and two-way radios.	2	C	Medium	If situation cannot be resolved, Drivers will have to utilize paper manifests and two-way radios.

ID	Safety Scenario	Description	Severity	Likelihood	Safety Risk Index	Control Strategy
SC-VEH-5	Delivery of changes to Driver manifests do not occur timely	For various reasons, sometimes data transmission may be slow causing delays in messages. This will, however, disrupt the operations causing delays in trip delivery and may also cause missed trips.	2	D	Medium	Appropriate action may need to be taken by system support team.
SC-VEH-6	Manifest details are inaccurate	Manifest details may be inaccurate due to data entry error during booking or incorrect field mapping between vehicle and central subsystems during system configuration. This may impact trip delivery.	3	D	Low	Occurrence is rare but will be reviewed and addressed as part of SOP.
SC-VEH-7	Turn-by-turn navigation not sending to correct destinations	Incorrect geocoding or issues in the turn-by-turn navigation software may provide incorrect guidance.	1	C	High	Geocoding will have to be corrected as mentioned earlier.
SC-VEH-8	Wheelchair lift non-operational	Due to unexpected issues wheelchair lift may not be operational and the built-in function to automatically notify such failure may not be available. This is a severe issue and may require sending another vehicle causing trip delays.	1	C	High	Vehicle will be swapped out

5 Safety Operational Concept

As stated earlier, HIRTA has already adopted Federal Transit Administration's Public Transportation Agency Safety Plan (PTASP) framework for safety management, as mandated by PTASP regulation at 49 U.S.C. § 5329 and 49 CFR Part 673. The HIRTA PTASP was developed and adopted in November 2020. Safety Assurance and Safety Communication are part of the current safety management system framework. This SMP will inform the current PTASP adopted by HIRTA to also incorporate Health Connector-related safety risks in the existing SMS framework.

Operational Concept based on HIRTA team's current understanding of risks and necessary response plans are discussed in the following subsections.

5.1 Safety Design Elements

HIRTA Team will use the SMP to inform the requirements development process as follows:

- Safety needs and scenarios identified in Section 3.1 and 3.2 will be used to define:
 - Functional and performance requirements to address any safety concerns with system operations.
 - Accessibility requirements to meet the needs of underserved users regarding safety concerns with use of Traveler-related components.
- Control Strategy defined in Section 4 will provide guidance for defining requirements or system configurations to address safety scenarios with operations and use of various system components.
- Table 9 provides factors to consider for safety scenarios that require design related elements to be addressed. These factors will be used for either defining functionalities or for defining system configurations.

The Team will further engage the stakeholders during requirements walkthroughs to ensure that the safety needs of underserved groups are covered. System requirements will form the basis for detailed design in Phase 2. The team will also conduct a thorough assessment of technologies involved as part of TRL assessment in Task 7 and work with the IRB on Human Use Approval in the context of safety needs and safety scenarios to ensure that system is designed with safety as the top priority.

5.2 Safety Operational Processes

Health Connector service is not an entirely new service or system. It is conceived to be built on top of current operations HIRTA already provides and systems HIRTA already uses. However, there will be various changes brought by Health Connector to HIRTA's existing SOPs given the

critical nature of healthcare trips and functionalities envisioned. Any safety-related items in SOPs will be reviewed by the Accountable Executive, Safety Program Manager, and the Safety Committee to recommend changes to the PTASP as necessary, particularly any actions related to Safety Assurance and Safety Promotion. The current PTASP framework will be adjusted to create and complete a new document during Phase 2 to ensure that the current Policy, Management, Assurance, and Promotion-based SMS is able to help HIRTA ensure the safety of all users of the Health Connector system. All users of the system will be trained and retrained to ensure that all of them have the desired level of comfort.

5.3 Mitigations and Fail-Safes

As mentioned earlier, due to various components outside HIRTA's control that may impact HIRTA operations (e.g., communications) a fully fail-safe system will be difficult. However, safety risk assessment conducted in Section 4 will be used as the guide to prioritize actions per anticipated safety risk index of safety scenarios identified. When system is in "failure" mode of operations, paper manifests and two-way radios will be the tools that will be used to serve the riders. Where possible mitigation actions will be taken as described in the initial control strategies identified in Table 8.

5.4 Safety Responses

Current framework as established in the HIRTA PTASP will be updated based on detailed actions to be identified in the Health Connector SOP for expected risks. Preliminary response actions included in the Control Strategies identified in Table 8 will form the basis for responses that will be included in the SOP and the revised PTASP. If an event occurs, an appropriate response plan will be executed.

5.5 Safety Reporting

Current framework as established in HIRTA PTASP will be followed. If an event cannot be prevented, it will be noted in the HIRTA's ESRP.

Also, per the safety reporting procedure of the ITS4US program, USDOT will be notified of any safety event details, hazard causing the event, consequence documented, and action taken as a response.

6 Safety Management Summary

6.1 Safety Risk Summary

Table 9 provides a summary of safety risk for Health Connector with a list of risks, assessment, and applicable strategies. Once complete, the Table will also be incorporated in the overall project-level risk register.

The safety operational strategies identified in Table 9 relate to the operational strategies as defined in Section 5 and use the following categories:

- **Design:** safety risks will be addressed as part of requirements development and detailed design.
- **Operations:** safety risks will be addressed by adjusting SOPs and taking optional actions.
- **Mitigation and Fail Safe:** mitigation actions as defined under control strategies in Table 8 will be taken.
- **Response:** A response action will be taken when a safety event occurs.

Also, control strategies identified in Table 8 list appropriate actions that will have to be taken to address a safety risk under aforementioned operational strategies.

Table 9. Safety Risk Management Summary

ID	Safety Risk	Assessment	Safety Operational Concept Strategies	Factors to Monitor	Overall Status
SC-TRV-1	Traveler device failure	Medium	Response	N/A	Open
SC-TRV-2	Caregiver or Health Navigator not authorized to assist Traveler with their needs	Medium	Design	System configurations	Open
SC-TRV-3	Traveler profile does not have accurate details on mobility needs	Medium	Operations	System configurations, Customer complaints, Driver complaints	Open
SC-TRV-4	Traveler cannot recognize HIRTA vehicle	High	Operations	Customer complaints, No-shows	Open
SC-TRV-5	Driver cannot find Traveler waiting to be picked up	High	Operations	Driver complaints, Traveler wait time	Open

ID	Safety Risk	Assessment	Safety Operational Concept Strategies	Factors to Monitor	Overall Status
SC-TRV-6	Malfunction in wheelchair lift	Medium	Operations	SOPs, Operational reports	Open
SC-TRV-7	Driver/Traveler Conflict	Medium	Mitigation/Fail Safe	Driver training, Driver complaints, Customer Complaints	Open
SC-TRV-8	Severe weather Event	Low	Operations	SOPs, Accidents, Incidents	Open
SC-TRV-9	Traffic incident delay	Medium	Operations	SOPs, On-time performance	Open
SC-TRV-10	Inaccurate notifications	Medium	Mitigation/Fail Safe	Customer complaints, System errors, No-shows, Cancelled trips, Missed appointments	Open
SC-TRV-11	Inaccurate real-time information	Medium	Mitigation/Fail Safe	Customer complaints, System errors, No-shows, Cancellations, Missed appointments	Open
SC-TRV-12	Drop-off	Low	Mitigation/Fail Safe	Incidents, System error reports, Customer complaints	Open
SC-TRV-13	Outdoor wayfinding malfunction	Medium	Design, Mitigation/Fail Safe	Incidents, System error reports, Customer complaints	Open
SC-TRV-14	Indoor wayfinding malfunction-infrastructure	Medium	Design, Mitigation/Fail Safe	Incidents, System error reports, Customer complaints	Open
SC-TRV-15	Indoor wayfinding malfunction-device	Low	Design, Mitigation/Fail Safe	Incidents, System error reports, Customer complaints	Open
SC-TRV-16	Indoor wayfinding –configurations	High	Design, Mitigation/Fail Safe	Incidents, System error reports, Customer complaints	Open

ID	Safety Risk	Assessment	Safety Operational Concept Strategies	Factors to Monitor	Overall Status
SC-TRV-17	Insufficient data-outdoor wayfinding	Medium	Operations	Incidents, System error reports Customer complaints	Open
SC-TRV-18	Insufficient data-indoor wayfinding	Medium	Operations	Incidents, System error reports Customer complaints	Open
SC-TRV-19	Unable to notify healthcare facility regarding arrival	Low	Operations	System error reports, Delayed check-in report from healthcare provider, Customer complaints	Open
SC-TRV-20	Unable to book return trip with HIRTA	Medium	Response	Customer complaints, Phone requests from healthcare provider, Service availability log, Trips booked with other providers by healthcare staff	Open
SC-TMS-1	Health Navigator/ Caregiver are not able to access TMS	Low	Mitigation/Fail Safe	System performance log	Open
SC-TMS-2	TMS Server Failure	High	Mitigation/Fail Safe	System performance log	Open
SC-TMS-3	Cellular communication disruption or loss of data connectivity between vehicle and TMS subsystems.	Medium	Response	System performance log, Communication error log	Open
SC-TMS-4	HIRTA does not able to connect to Access2Care	High	Response	Missed Medicaid appointments	Open
SC-TMS-5	Incorrect geocoding of addresses	Medium	Operations	Driver complaints, Customer complaints	Open
SC-TMS-6	Obsolete basemap data used for scheduling	Low	Design, Mitigation/Fail Safe	Basemap metadata	Open

ID	Safety Risk	Assessment	Safety Operational Concept Strategies	Factors to Monitor	Overall Status
SC-TMS-7	Customer profile details incomplete or have changed but not adjusted in the system	High	Operations	Driver complaints, Customer complaints	Open
SC-TMS-8	TMS does not have access to real-time information on third party service providers	Medium	Mitigation/Fail Safe	Missed trips. Delayed trips	Open
SC-TMS-9	Inability to communicate with Drivers	Medium	Mitigation/Fail Safe	Communication error log	Open
SC-TMS-10	Issues with timely update of manifest details	Medium	Mitigation/Fail Safe	Delayed trips, Missed Trips	Open
SC-TMS-11	Maintenance issues with assigned vehicle	Medium	Operations	Operational reports, Driver complaint	Open
SC-TMS-12	System not having capability to accommodate all members of the group in the same vehicle	High	Operations	Driver complaint, Customer complaint	Open
SC-VEH-1	Data communication system failure	Medium	Response	Communication error log	Open
SC-VEH-2	Voice communications system failure	Medium	Mitigation/Fail Safe	Communication error log Driver complaint	Open
SC-VEH-3	Surveillance and driver behavior monitoring system not operational	High	Response	System error, Driver complaint	Open
SC-VEH-4	Driver not able to log on	High	Response	System error, Driver complaint	Open
SC-VEH-5	Delivery of changes to Driver manifests do not occur timely	Low	Operations	System error, Driver complaint	Open
SC-VEH-6	Manifest details are inaccurate	High	Operations	Driver complaint	Open
SC-VEH-7	Turn-by-turn navigation not sending to correct destinations	Medium	Operations	Driver complaint	Open
SC-VEH-8	Wheelchair lift non-operational	Medium	Response	Driver complaint	Open

6.2 Continuing Safety Planning

Safety planning will be critical to Health Connector system and we plan to continue to identify risks as we continue with other tasks and have additional discussions with stakeholders or delve deeper into system requirements and other tasks. We will continue to identify and monitor risks in the risk register throughout the life of the system beyond Phase 1, including during design, deployment and operations.

Appendix A. Acronyms and Glossary

Access2Care

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

ADA – Americans with Disabilities Act

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

Billing

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

CHNA - Community Health Needs Assessment

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

CO: Contract Officer

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

COR - Contract Office Representative

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

Cost Allocation

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

CTAA – Community Transportation Association of America

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

DCHD – Dallas County Health Department

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

DR-Demand Response

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

Dispatching

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

DMP – Data Management Plan

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

DOT – Department of Transportation

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

EDI – Electronic Data Interchange

In this context, refers to the electronic data interchange (EDI) format messages developed by HIPAA following American National Standards Institute (ANSI) X12 standard for electronic data exchange and are used to communicate with third-party health care provider systems (e.g., Medicaid).

EHR – Electronic Healthcare Record

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

GTFS – General Transit Feeds Specification

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

HIPAA – Health Insurance Portability and Accountability Act of 1996

Provides guidelines for data protection of sensitive patient health information.

HIRTA - Heart of Iowa Regional Transit Agency

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

HL7 – Health Level Seven International

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

HN-Health Navigator

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

ICTDP – Integrated Complete Trip Deployment Plan

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

Information and Referral

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

IPFP - Institution, Partnership, and Financial Plan

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

ISU– Iowa State University

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

KPI – Key Performance Indicators

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

LEP – Limited English Proficiency

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

NDSP- Non-Dedicated Service Provider

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

NEMT – Non-emergency Medical Transportation

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

PII – Personally Identifiable Information

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

Provider:

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

Reservation:

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

RWP – Requirements Working Group

Is subset of identified stakeholders that will guide the requirements development process.

Scheduling

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

SEMP – System Engineering Management Plan

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

SMP – Safety Management Plan

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

Smart Device

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

TAG – Transportation Advisory Group

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

TNC – Transportation Network Company

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

Wayfinding

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

U.S. Department of Transportation
ITS Joint Program Office-HOIT
1200 New Jersey Avenue, SE
Washington, DC 20590

Toll-Free "Help Line" 866-367-7487
www.its.dot.gov

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