DEPARTMENT OF TRANSPORTATION · STATE OF HAWAII ·

H A W A I I

STATEWIDE AND MAUI & KAUAI REGIONAL ITS ARCHITECTURE

FINAL DOCUMENTATION

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Hawaii Statewide ITS Architecture

Hawaii Statewide and Maui & Kauai Regional ITS Architectures Final Documentation

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List of Acronyms and Abbreviations

AD ..... Archived Data
APTS ..... Advanced Public Transportation Systems
ARFF ..... Airport Rescue and Fire Fighting
ATIS ..... Advanced Traveler Information Systems
ATMS ..... Advanced Traffic Management Systems
CCTV ..... Closed-Circuit Television
CDA ..... Civil Defense Administration
DMS ..... Dynamic Message Sign
DOT ..... Department of Transportation
DPW ..... Department of Public Works
EM ..... Emergency Management
EMS ..... Emergency Medical Services
EOC ..... Emergency Operations Center
FHWA ..... Federal Highway Administration
FTA ..... Federal Transit Administration
GPS ..... Global Positioning System
HAZMAT ..... Hazardous Materials
HDOT ..... Hawaii Department of Transportation
HDOT-AIR ..... Hawaii Department of Transportation, Airports Division
HDOT-AIR-H ..... Hawaii Department of Transportation, Airports Division, Hawaii District
HDOT-AIR-K ..... Hawaii Department of Transportation, Airports Division, Kauai District
HDOT-AIR-M ..... Hawaii Department of Transportation, Airports Division, Maui District
HDOT-AIR-O ..... Hawaii Department of Transportation, Airports Division, Oahu District
HDOT-HAR ..... Hawaii Department of Transportation, Harbors Division
HDOT-HAR-H ..... Hawaii Department of Transportation, Harbors Division, Hawaii District
HDOT-HAR-K ..... Hawaii Department of Transportation, Harbors Division, Kauai District
HDOT-HAR-M ..... Hawaii Department of Transportation, Harbors Division, Maui District
HDOT-HAR-O ..... Hawaii Department of Transportation, Harbors Division, Oahu District
HDOT-HWY ..... Hawaii Department of Transportation, Highways Division
HDOT-HWY-H ..... Hawaii Department of Transportation, Highways Division, Hawaii District
HDOT-HWY-K ..... Hawaii Department of Transportation, Highways Division, Kauai District

HDOT-HWY-M.....Hawaii Department of Transportation, Highways Division, Maui District

HDOT-HWY-O .....Hawaii Department of Transportation, Highways Division, Oahu District

HDOT-HWY-V ..... Hawaii Department of Transportation, Highways Division, Motor Vehicle Safety Office

HVCB ..... Hawaii Visitors and Convention Bureau

IT..... Information Technology

ITS..... Intelligent Transportation Systems

STIP .....Statewide Transportation Improvement Program

Note: The Hawaiian language uses two diacritical markings. The `okina is a glottal stop; and the kahakō is a macron. The State of Hawaii strongly encourages the use of Hawaiian diacritical markings. The National ITS Architecture tool, Turbo Architecture™, does not allow for the Hawaiian diacritical markings to be input and as such, customized service package diagrams, operational concepts and other outputs from Turbo Architecture™ are unable to reflect the diacritical markings. To ensure consistency in this ITS Architecture document, no Hawaiian diacritical markings are used.

1 Introduction

Intelligent Transportation Systems (ITS) are advanced sensor, computer, electronics and communication technologies that are applied to transportation systems to maximize the safety and efficiency of transportation. Examples of ITS commonly deployed include:

- Computerized traffic signal control;
- Real-time traffic condition information disseminated to travelers through various means (e.g., dynamic message signs, websites and mobile apps); and
- Systems for information sharing and dissemination to support real-time decision-making (e.g., computer aided dispatch and automated vehicle location systems, roadway camera mages, etc.).

1.1 The What and Why of ITS Architecture

The Federal Highway Administration (FHWA) requires that ITS-related projects that use federal funds must be part of a regional ITS Architecture.

In the past, FHWA noticed that systems for traffic control and monitoring, or transit operations and monitoring, were built and implemented in such a way that obtaining and sharing data out of these systems was very costly, and often not feasible. The ability to integrate electronic data is one of the key goals of developing an ITS Architecture.

FHWA researched data and systems planning best practices across all IT fields. Systems architecture planning emerged as a key best practice to meet the goal of data accessibility.

An ITS architecture is a plan that outlines existing and potential future:

- Computerized systems;
- Information flows between those systems; and
- Data sources for systems – such as traffic detectors or operator inputs to a system.

The ITS architecture represents a shared vision of how multiple agencies will work together in the future, sharing information and resources to provide a safer, more efficient and more effective transportation system for travelers.

1.2 Background

As part of its Hawaii ITS Strategic Plan, published in 2015, the Hawaii Department of Transportation (HDOT) established three goals:

1. Implement an interagency incident management program
2. Provide advanced traveler information
3. Expand ITS state-wide

These goals directly support HDOT Highways Division's mission to provide safe, efficient and accessible land transportation facilities and are framed by planning and policy work accomplished to date.

1.2.1 Goal #1: Implement an interagency incident management program

Incident management consists of surveillance and detection, mobilization and response, and information dissemination. HDOT's role is a supporting one, providing assistance to first responders (police, fire and emergency medical services) in these three areas of incident response.

HDOT will implement an interagency incident management program through Freeway Service Patrol, video coverage, variable message signs, incident management information systems and interagency coordination. HDOT will focus initially on the freeway system and expand to other National Highway System roads.

1.2.2 Goal #2: Provide advanced traveler information

Advanced Traveler Information Systems (ATIS) take real-time and static data on transportation conditions, incidents and events, and fuse the data in a database. The information is then disseminated to the public via the internet (and personal web-enabled devices), twitter feeds, phone and other means. By providing the public with information on traffic conditions, construction, special events, incidents and advisories, travelers can make informed travel choices. Thus, travelers become active participants in congestion management as they are empowered with information and may choose to change their individual travel behavior.

1.2.3 Goal #3: Expand ITS state-wide

Work by HDOT to date has focused on Oahu. To support expansion of ITS to the neighbor islands, regional and statewide ITS architectures must be developed.

Oahu and the County of Hawaii developed their Regional ITS Architectures in 2003 and 2012, respectively, and thus, the counties for both islands are able to leverage their local funds by receiving federal matching funds from the FHWA. Both of these Regional ITS Architectures have been incorporated wholesale into the Statewide ITS Architecture.

Prior to this effort, Kauai and Maui did not have ITS architectures. This project has developed regional architectures for both Kauai and the County of Maui ("Maui") as well as a Hawaii Statewide ITS Architecture that addresses services that are statewide in nature.

The majority of ITS projects that receive federal dollars are funded at an 80:20 federal-to-local match (80% federal dollars, 20% local dollars).

1.3 Regional and Statewide ITS Architectures

The ***Hawaii Statewide and Maui & Kauai Regional ITS Architectures*** are planning documents for the deployment of ITS devices and systems in Hawaii over the next ten years. The ITS architectures have been created through a cooperative effort by regional and state transportation agencies and cover all modes and roadways.

The overarching goal of the ITS architecture development process is for the evolution to take place with the maximum amount of integration knowledge possible, so as to efficiently and economically implement the ITS required to serve the transportation community and users.

The ITS architectures are important tools that will be used by:

- Operating agencies to recognize and plan for transportation integration opportunities in the region;
- Planning agencies to better reflect integration opportunities and operational needs into the transportation planning process; and
- Other organizations and individuals that use the transportation system in the region.

The ITS architectures provide a framework that spans organizations and individual transportation projects. Using the architectures, each transportation project can be viewed as an element of the overall transportation system.

ITS Architecture	Date Completed
Hawaii Statewide	**2017**
Maui	**2016**
Kauai	**2016**
Hawaii Island	2012
Oahu	2003

ITS Architectures in **bold** are documented in this report.

2 Regional and Statewide ITS Architecture Development Process

The Regional and Statewide ITS Architectures incorporate stakeholder input to reflect local and regional needs and plans. The development process is described below.

The specific stakeholders and products for each ITS architecture are listed in Chapter 4 (Statewide), Chapter 5 (Maui), Chapter 6 (Kauai) and in the Appendices.

2.1 Kick-off Meeting/Stakeholder Interviews

A kickoff meeting was held for the Regional and Statewide ITS Architectures with stakeholders to introduce them to the ITS Architecture project. In-person interviews were conducted with key stakeholder agencies to determine their current ITS deployments and to identify ITS project plans for the future.

2.2 Initial ITS Architecture Drafts

An initial set of ITS elements, services, interconnections and operational concepts were created based on the results of the stakeholder interviews.

The service package diagram (the collection of ITS elements, equipment packages and functions that work together to perform a specific ITS service) for each existing or future ITS service was edited so that each National ITS Architecture subsystem or terminator was associated with the local stakeholder element name. In some cases, multiple instances of the service package were developed when the service had more than one instance, or where there were multiple agencies performing the same service within the region.

A set of customized service packages was created in preparation for stakeholder outreach so that each could be reviewed and refined based on actual operating procedures (or theories) for each agency.

2.3 Stakeholder Workshop

Additional stakeholder outreach was conducted via one-day stakeholder workshops. The objective of each workshop was to develop an ITS architecture that reflected agencies' existing systems as well as their plans and desires for ITS.

Workshops incorporated an overview of the National ITS Architecture, regional ITS architectures and a discussion of the ITS architecture scope, so that stakeholders would understand and more fully participate in the ITS architecture development process. After the basic training on ITS architectures, the focus shifted to reviewing the initial draft architecture. Stakeholders reviewed stakeholder definitions, operational concepts, the ITS inventory and the planned ITS projects. The second part of the workshop was spent reviewing customized service package diagrams and adding or deleting diagrams, elements and interconnections where necessary.

2.4 Draft Architectures

Following the stakeholder workshop, customized service packages were revised and a full draft architecture was created. Using the customized service package diagrams (as modified during and after the workshop), a Turbo Architecture™ software database was utilized to create a draft ITS architecture. This involved the following activities:

- Creating an ITS inventory, stakeholders list and project list;
- Revising the customized service package diagrams;
- Creating operational concepts (or stakeholder roles and responsibilities); and
- Creating a Turbo Architecture™ software database that represents the sum of all of the customized service packages.

A hypertext version of the complete Turbo Architecture™ database was created and placed on a website (http://hawaii.itsarchitecture.org) for stakeholder review. The final website describes each element of the ITS architecture and its interconnection with other elements.

2.5 Stakeholder Reviews

Stakeholders were encouraged to review the Statewide ITS architecture online and provide feedback electronically through the website.

2.6 Final Architectures

Following the stakeholder review period, the ITS architecture and website were updated to reflect the comments received (http://hawaii.itsarchitecture.org).

The Hawaii Statewide, Maui and Kauai ITS architectures published in this Final Documentation identify the current set of ITS elements and interfaces as agreed to by the stakeholders. Existing funding processes will continue to be used to decide how to allocate limited resources for ITS elements and interfaces for deployment.

3 Regional and Statewide ITS Architectures Components

3.1 FHWA Final Rule (23 CFR 940) and FTA Policy

The FHWA Final Rule (23 CFR 940) and FTA Policy on Intelligent Transportation System Architecture and Standards, which took effect on April 8, 2001, defines a set of requirements that regional ITS architectures should meet.

Table 1 shows how the requirements of the rule are met by the outputs developed for the Regional and Statewide ITS Architectures. The rest of this chapter describes the various components of the ITS Architectures.

TABLE 1: MAPPING OF REQUIREMENTS TO STATEWIDE ARCHITECTURE OUTPUTS

Rule 940 Regional ITS Architecture Requirements	Where Hawaii Architecture Requirements are Documented
Description of region	Geographic definition, identification of services and a timeframe are in: • Chapters 1 and 2
Identification of participating agencies and other stakeholders	Listings of stakeholders (and their definitions) and inventory of the elements operated by the stakeholders is found in • Sections 4.2, 5.2 & 6.2 • Hyperlinked website • Turbo Architecture™ database
An operational concept that identifies the roles and responsibilities of participating agencies and stakeholders	• Sections 4.3, 5.3 & 6.3 • Hyperlinked website • Turbo Architecture™ database
A list of any agreements (existing or new) required for operations	• Sections 4.8, 4.9, 5.8, 5.9 & 6.8, 6.9 • Turbo Architecture™ database
System functional requirements	• Hyperlinked website • Turbo Architecture™ database
Interface requirements and information exchanges with planned and existing systems and subsystems	• Hyperlinked website • Turbo Architecture™ database
Identification of ITS standards supporting regional and national interoperability	• Hyperlinked website • Turbo Architecture™ database
The sequence of projects required for implementation	• Sections 4.7, 5.7 & 6.7 • Hyperlinked website • Turbo Architecture™ database
Develop and implement procedures and responsibilities for maintaining the architecture as needs evolve within the region	• Chapter 7

3.2 Stakeholders

Stakeholder coordination and involvement is one of the key aspects to the development of an ITS architecture. Because ITS often transcends traditional transportation infrastructure, it is important to consider a range of stakeholders beyond the traditional traffic, transit and maintenance areas. In addition, it is important to consider stakeholders at a regional level, including those stakeholders in adjoining regions.

3.3 Operational Concepts

An operational concept documents each stakeholder's current and future roles and responsibilities in the operation of the regional ITS across a range of transportation services.

3.4 ITS Systems Inventory

The systems inventory is a list that represents all existing and planned ITS elements as well as non-ITS elements that provide information to, or receive information from, the ITS. These elements are owned, operated or maintained by stakeholder entities. The inventory focuses on systems that support, or may support, interfaces that cross stakeholder boundaries (e.g., public to private interfaces).

Each element in the inventory is described by a name, stakeholder, description, general status (e.g. existing or planned) and the associated subsystems or terminators from the National ITS Architecture that the element is mapped to.

3.5 Summary Diagrams

While some services are internal to a single agency and do not involve multiple agencies, it is oftentimes beneficial to understand the interactions amongst various agencies that support a consolidated service. In an effort to present this information in a holistic manner summary, service package diagrams are drawn for multi-agency services.

3.6 Services

The ITS in the region currently support a wide array of transportation services, and the number will grow as more systems are developed or upgraded.

A subset of the services contained in the National ITS Architecture are used for the Statewide, Maui and Kauai ITS Architectures. The selected services (service packages) used are based on information gathered at stakeholder meetings, needs assessments and review of planning documents. Each service is described by one or more customized service package diagrams, which illustrate the connections between ITS elements. The connections between the ITS elements are shown either as existing or planned, and designated by a solid or dotted line, respectively.

The customized service package diagrams show information flows between elements that provide a single service. Most of these information flows are drawn from the National ITS Architecture. User-defined (ud) flows, indicated by *flow name_ud*, were created to express interface connections not contained in the National ITS Architecture. In the Advanced Vehicle Safety service package diagrams, connected vehicle (cv) flows, indicated by *flow name_cv*, are flows defined in the Connected Vehicle Reference Implementation Architecture (CVRIA), rather than in the National ITS Architecture.

3.7 Projects

Projects were identified and refined based on information and review from the stakeholders.

The following information was created for each project:

- **Project Name.** The name of the proposed ITS project.
- **Description.** The description of the project or services to be provided.
- **Timeframe.** The estimated timeframe indicated for an ITS project to be deployed. Near-term projects will be implemented in 0-5 years; long-term projects will be implemented thereafter.

The incorporation of the Regional and Statewide ITS Architectures into the Statewide Transportation Improvement Plan (STIP) planning process will ultimately yield projects that are linked to the ITS Architectures. Project implementation completes the evolution from: transportation plans, to functional descriptions in the Regional and Statewide ITS Architecture, to project identification in the STIP, to project definition and deployment. The overarching goal of the ITS Architecture development process is for this evolution to take place with the maximum amount of integration knowledge possible, so as to efficiently and economically implement the ITS required to serve the transportation community and users.

3.8 Agreements

The identification of institutional agreements is a key output and should be updated periodically. Existing agreements were identified during the stakeholder workshops. For future potential (planned) agreements, each project developed for the ITS Architectures was reviewed and agreements that may be needed to implement projects were identified.

4 Hawaii Statewide ITS Architecture

4.1 Overview

The Statewide ITS Architecture began with a kick-off meeting on February 11, 2016. In-person interviews were held around this time period. A stakeholder workshop was held on May 26, 2016. The Statewide ITS Architecture details are provided in this chapter, in Appendix A & B and on the hyperlinked website: http://hawaii.itsarchitecture.org.

4.2 Statewide Stakeholders

The Statewide ITS Architecture is defined by a set of elements (or systems), each of which is owned (or operated or maintained) by a stakeholder. The agencies that attended stakeholder meetings and that own, operate or maintain elements in the Hawaii Statewide ITS Architecture are listed in Table 2.

TABLE 2: STATEWIDE STAKEHOLDERS

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
American Association of Motor Vehicle Administrators	The American Association of Motor Vehicle Administrators (AAMVA) is a nonprofit organization striving to develop model programs in motor vehicle administration, police traffic services and highway safety. AAMVA represents the state and provincial official.	AAMVA
City and County of Honolulu Department of Emergency Management	The City & County of Honolulu Department of Emergency Management (DEM) has responsibility for the City & County of Honolulu Emergency Management Center (EOC). DEM coordinates emergency management plans, programs and initiatives with that of the city, state, federal, private and corporate entities. It monitors day-to-day conditions and is able to stand up the EOC within 30 minutes. When the EOC is activated, they coordinate with, and bring in, all necessary departments and all stakeholders to respond to the event.	DEM
City and County of Honolulu Department of Information Technology	The City and County of Honolulu Department of Information Technology (DIT) provides information technology services to the Mayor of Honolulu and City agencies. It also provides computer services to other governmental and non-governmental agencies doing business with the City. DIT manages the City computer network and a central data processing operations center 24 hours a day, seven days a week.	DIT
City and County of Honolulu Department of Transportation Services	The City & County of Honolulu Department of Transportation Services (DTS) has responsibility for transportation planning, traffic engineering, traffic operations and public transit for the City and County of Honolulu (City). The Traffic Signals and Technology Division has primary responsibility for design, construction, operation and maintenance of traffic signals and ITS equipment on the island of Oahu.	DTS
City and County of Honolulu Regional Payment Instrument Stakeholder Group	Represents a stakeholder group for a multi-agency regional payment instrument for the City and County of Honolulu.	---

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
County of Hawaii - Civil Defense Agency	The County of Hawaii Civil Defense Agency is responsible for administering and operating the various local, state and federal civil defense programs for the county. This includes planning, preparing and coordinating civil defense operations in meeting disaster situations and coordinating post-disaster recovery options.	Hawaii CDA
County of Hawaii Department of Public Works	The County of Hawaii Department of Public Works is composed of six (6) divisions: Administration, Automotive, Building, Engineering, Highway Maintenance and Traffic. The Traffic Division has primary responsibility for design, construction, operation and maintenance of traffic signals and ITS equipment on the island of Hawaii.	Hawaii DPW
County of Kauai – Civil Defense Agency	The Kauai Civil Defense Agency is responsible for administering and operating the various local, state and federal civil defense programs for the county. This includes planning, preparing and coordinating civil defense operations in meeting disaster situations and coordinating post-disaster recovery options, as well as operating the Kauai County Emergency Operations Center (EOC).	Kauai CDA
County of Kauai - Department of Public Works	The County of Kauai Department of Public Works provides engineering and inspection services to plan and construct highway, drainage and bridge replacement projects for the County of Kauai and maintains County of Kauai roads.	Kauai DPW
County of Maui - Civil Defense Agency	The County of Maui Civil Defense Agency is responsible for administering and operating the various local, state and federal civil defense programs for the county. This includes planning, preparing and coordinating civil defense operations in meeting disaster situations and coordinating post-disaster recovery options. In addition, the County of Maui Civil Defense operates the County of Maui Emergency Operations Center (EOC).	Maui CDA
County of Maui Department of Public Works	The County of Maui Public Works Administration directs and oversees the three operating divisions in the Department of Public Works: Development Services Administration, Engineering Division and Highways Division. The mission of Public Works is to protect the health, safety, property and environment of the public by developing and operating County infrastructure and administering its building codes.	Maui DPW
County of Maui Department of Transportation	The County of Maui Department of Transportation is responsible for planning and implementing all modes of transportation in the County of Maui, including those in the air and those on the water and land. In addition, it is responsible for planning and developing an efficient program to facilitate the rapid, safe and economical movement of people and goods in the County of Maui. Finally, the department is responsible for coordinating transportation programs in the County of Maui with other county departments and with agencies of the state and federal government.	Maui DOT
Federal Motor Carrier Safety Agency	The Federal Motor Carrier Safety Agency (FMCSA) is the agency in the U.S. Department of Transportation responsible for commercial vehicle operations.	FMCSA
Federal Transit Administration	The Federal Transit Administration, part of US DOT, is responsible for compiling statistics and makes recommendations for U.S. mass transit.	FTA

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
Hawaii County Mass Transit Agency	The Hawaii County Mass Transit Agency operates transit service on the Island of Hawaii.	---
Hawaii Department of Transportation - Airports Division	The Hawaii Department of Transportation Airports Division has overall responsibility for the plans, designs and supervision of the construction and maintenance of the State Airport System. HDOT-AIR participates at the Statewide EOC and, during activation of the Statewide EOC, is responsible for coordinating information from each of the four Airport Districts (Oahu, Hawaii, Kauai and Maui).	HDOT-AIR
Hawaii Department of Transportation - Airports Division, Hawaii District	The Hawaii Department of Transportation, Airports Division, Hawaii District (HDOT-AIR-H) manages, operates and maintains all State airports on the island of Hawaii in conformity with State and Federal laws and requirements, and has responsibility for all aspects of airport operations including fire, security, parking, etc. HDOT-AIR-H is not responsible for Homeland Security.	HDOT-AIR-H
Hawaii Department of Transportation - Airports Division, Kauai District	The Hawaii Department of Transportation, Airports Division, Kauai District (HDOT-AIR-K) manages, operates and maintains all State airports on the island of Kauai in conformity with State and Federal laws and requirements, and has responsibility for all aspects of airport operations including fire, security, restaurants, parking, etc. HDOT-AIR-K is not responsible for Homeland Security. HDOT-AIR-K Airport Rescue and Fire Fighting (ARFF) has primary responsibility for responding to emergencies at the Lihue Airport and supports the Kauai County Fire Department as needed.	HDOT-AIR-K
Hawaii Department of Transportation - Airports Division, Maui District	The Hawaii Department of Transportation, Airports Division, Maui District (HDOT-AIR-M) manages, operates and maintains all State airports on the islands of Maui, Lanai and Molokai in conformity with State and Federal laws and requirements, and has responsibility for all aspects of airport operations including fire, security, parking, etc. HDOT-AIR-M is not responsible for Homeland Security.	HDOT-AIR-M
Hawaii Department of Transportation - Airports Division, Oahu District	The Hawaii Department of Transportation, Airports Division, Oahu District (HDOT-AIR-K) manages, operates and maintains all State airports on the island of Oahu in conformity with State and Federal laws and requirements, and has responsibility for all aspects of airport operations including fire, security, restaurants, parking, etc. HDOT-AIR-O is not responsible for Homeland Security.	HDOT-AIR-O
Hawaii Department of Transportation - Harbors Division	The Hawaii Department of Transportation, Harbors Division (HDOT-HAR) is responsible for planning, design, construction, operation and maintenance of State facilities in all modes of water transportation. It coordinates with other State, County and Federal programs in order to achieve this objective; and currently provides, operates and maintains ten (10) commercial harbors.	HDOT-HAR
Hawaii Department of Transportation - Harbors Division, Hawaii District	The Hawaii Department of Transportation, Harbors Division, Hawaii District (HDOT-HAR-H) manages, operates and maintains all commercial State harbors on the island of Hawaii. HDOT-HAR-H manages harbors at Hilo and Kawaihae.	HDOT-HAR-H

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
Hawaii Department of Transportation - Harbors Division, Kauai District	The Hawaii Department of Transportation, Harbors Division, Kauai District (HDOT-HAR-K) manages, operates and maintains all commercial State harbors on the island of Hawaii. HDOT-HAR-K manages harbors at Nawiliwili and Port Allen.	HDOT-HAR-K
Hawaii Department of Transportation - Harbors Division, Maui District	The Hawaii Department of Transportation, Harbors Division, Maui District (HDOT-HAR-M) manages, operates and maintains all commercial State harbors on the islands of Maui, Lanai and Molokai. HDOT-HAR-M manages harbors at Kahului, Hana, Kaunakakai and Kaumalapau.	HDOT-HAR-M
Hawaii Department of Transportation - Harbors Division, Oahu District	The Hawaii Department of Transportation, Harbors Division, Oahu District (HDOT-HAR-O) manages, operates and maintains all commercial State harbors on the island of Oahu. HDOT-HAR-O manages harbors at Honolulu and Kalaeloa Barbers Point.	HDOT-HAR-O
Hawaii Department of Transportation - Highways Division	The Hawaii Department of Transportation, Highways Division (HDOT-HWY) plans, designs and supervises the construction and maintenance of the State Highway System.	HDOT-HWY
Hawaii Department of Transportation - Highways Division, Hawaii District	The Hawaii District of the Hawaii Department of Transportation, Highways Division performs for the island of Hawaii 1) engineering services and field inspections of transportation construction projects in conformance with approved plans and specifications; and 2) maintenance, alteration and repair of State roads, highways and related structures.	HDOT-HWY-H
Hawaii Department of Transportation - Highways Division, Kauai District	The Kauai District of the Hawaii Department of Transportation, Highways Division performs for the island of Kauai 1) engineering services and field inspections of transportation construction projects in conformance with approved plans and specifications; and 2) maintenance, alteration and repair of State roads, highways and related structures.	HDOT-HWY-K
Hawaii Department of Transportation - Highways Division, Maui District	The Hawaii Department of Transportation, Highways Division, Maui District performs for the islands of Maui, Molokai and Lanai 1) engineering services and field inspections of transportation construction projects in conformance with approved plans and specifications; and 2) maintenance, alteration and repair of State roads, highways and related structures.	HDOT-HWY-M
Hawaii Department of Transportation - Highways Division, Oahu District	The Oahu District of the Hawaii Department of Transportation, Highways Division performs for the island of Oahu 1) engineering services and field inspections of transportation construction projects in conformance with approved plans and specifications; and 2) maintenance, alteration and repair of State roads, highways and related structures.	HDOT-HWY-O

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
Hawaii Department of Transportation - Highways Division, Planning Branch	The Hawaii Department of Transportation, Highways Division, Planning Branch (HDOT-HWY-P) coordinates and manages pre-design highway planning processes and activities; develops, revises and manages the statewide Long and Short Range Land Transportation Plans, Statewide Transportation Improvement Program, statewide traffic data collection program and many other statewide planning programs.	HDOT-HWY-P
Hawaii Department of Transportation - Highways Division, Traffic Branch, Safety Section	The Hawaii Department of Transportation, Highways Division, Traffic Safety Section (HDOT-HWY-TS) manages the Traffic Accident Records System (TARS) and the State Highway Safety Improvement Program (HSIP), conducts in-depth studies of highway facilities to provide recommendations to improve traffic safety, provides support for litigation investigations and maintains and updates the statewide traffic accident data system.	HDOT-HWY-TS
Hawaii Department of Transportation - Public Affairs Office	The Hawaii Department of Transportation Public Affairs Office (DIR-P) is the primary interface between HDOT and the public. DIR-P is responsible to inform and educate the public about HDOT, while also promoting the mission of HDOT to the public.	DIR-P
Hawaii Department of Transportation - Highways Division, Motor Vehicle Safety Office	The Hawaii Department of Transportation, Highways Division, Motor Vehicle Safety Office (HDOT-HWY-V) has responsibility for developing, implementing and managing statewide non-engineering safety programs (e.g., Safe Communities Program, Statewide Alcohol Impaired Driver Program, Statewide Seat Belt Usage Program, etc.); statewide uniform standards and procedures for driver licensing, commercial driver licensing and registration; various driver education programs; enforcement of commercial vehicle rules and regulations; and data collection for the Fatality Analysis Reporting System (FARS), Drug Recognition and Enforcement (DRE) and other reporting required by the Federal Motor Carrier Safety Administration (FMCSA), National Highway Transportation Safety Administration (NHTSA), etc.	HDOT-HWY-V
Hawaii Emergency Management Agency	The State of Hawaii Emergency Management Agency (HI-EMA) leads the State of Hawaii in the preparation for, response to and recovery from disasters and emergencies. It works to save lives, protect property and protect infrastructure. HI-EMA is responsible for standing up and operating the State Emergency Operations Center (EOC), collecting information, organizing it and providing it to senior leaders to make decisions.	HIEMA
Hawaii State Judiciary	The Hawaii State Judiciary has responsibility for the Judicial Information Management System.	---
Hawaii Tourism Authority	Established in 1998, the Hawaii Tourism Authority (HTA) is the lead state agency for tourism.	HTA
Hawaii Visitors and Convention Bureau	Hawaii Visitors Convention Bureau (HVCB) is the marketing organization contracted to HTA with responsibility for the U.S. market. The HVCB is a private, nonprofit membership organization with island chapters on Kauai, Maui, Oahu and Hawaii. Each of these reports to the HVCB; each has a seat at its respective County EOC.	HVCB

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
Honolulu Authority for Rapid Transportation	The Honolulu Authority for Rapid Transportation (HART) is responsible for the development of a fixed guideway rail system for Oahu. Once constructed, HART will be responsible for operating and maintaining the system.	HART
International Fuel Tax Agreement	The International Fuel Tax Association represents the entity responsible for managing and administering the International Fuel Tax Agreement within the U.S.	IFTA
Kauai County Transportation Agency	The Kauai County Transportation Agency is responsible for providing public transportation via fixed route buses and paratransit vehicles. The Transportation Agency provides service on Kauai island, from Kekaha to Hanalei. Services are provided seven days a week.	Kauai Bus
NOAA	The National Oceanic and Atmospheric Administration is responsible for weather reports and weather-related disaster alerts.	NOAA
Pacific Disaster Center	The Pacific Disaster Center (PDC) is responsible for data collection and observation systems, computing, impact modeling and risk assessment, visualization, and information and communication systems to empower decision makers, disaster management professionals and the public.	PDC
The American Red Cross	The American Red Cross is a nonprofit providing disaster relief to those in need.	---

Table 3 lists generic stakeholders — those that either do not have an agency assigned to it (e.g., Hawaii Data Warehouse) or may be found in any architecture (e.g., financial institutions).

TABLE 3: GENERIC STAKEHOLDERS

Stakeholder Name	Stakeholder Description
Archived Users	This generic stakeholder represents users of archive data.
Commercial Vehicle Enforcement Stakeholder	This generic stakeholder represents a future agency or agencies responsible for law enforcement.
County of Hawaii Data Warehouse Stakeholder	This generic stakeholder represents a future agency or agencies responsible for the County of Hawaii Data Warehouse.
County of Kauai Data Warehouse Stakeholder	This generic stakeholder represents a future agency or agencies responsible for the Kauai Data Warehouse.
County of Maui Data Warehouse Stakeholder	This generic stakeholder represents a future agency or agencies responsible for the Maui Data Warehouse.
Financial Institutions	This generic stakeholder represents financial and banking institutions that play a role in electronic payment financial transactions.
Hawaii Statewide Data Warehouse Stakeholder	This generic stakeholder represents a future agency or agencies responsible for the Statewide Data Warehouse.
Local Media	This generic stakeholder represents owners/operators of communications media, including television, radio and newspapers.
Local Public Safety Agencies	This generic stakeholder represents public safety agencies operating at a local level in the State of Hawaii.

Stakeholder Name	Stakeholder Description
Oahu Data Warehouse Stakeholder	This generic stakeholder represents a future agency or agencies responsible for the Oahu Data Warehouse.
Private Commercial Vehicle and Fleet Operators	This generic stakeholder represents owners/operators of private commercial vehicles and fleet.
Private Personal Computing Devices	This generic stakeholder represents personal computing devices, such as smartphones.
Private Sector Traveler Information Services	This generic stakeholder represents private traveler and transportation information service providers.
Private Travelers	This generic stakeholder represents the general public, including passengers and travelers.

4.3 Statewide Operational Concepts by Stakeholder

Services covered by the Hawaii Statewide ITS Architecture, in order of influence, include:

- **Freeway Management**. The development of systems that manage traffic on limited access highways.
- **Incident Management**. The development of systems to provide rapid and effective response to incidents. Includes systems to detect and verify incidents, along with coordinated agency response to the incidents.
- **Traveler Information.** The development of systems that provide traveler information beyond the usual transportation information.
- **Information Dissemination**. The development of systems to provide static and real-time transportation information to travelers.
- **Emergency Management**. The development of systems to provide emergency call taking, public safety dispatch and emergency operations center operations.
- **Traffic Signal Control**. The development of systems that react to changing traffic conditions and provide coordinated intersection timing over a corridor, an area or multiple jurisdictions.
- **Commercial Vehicle Operations**. The development of systems that perform electronic clearance and safety inspection of commercial vehicles.
- **Connected Vehicle Management.** The development of infrastructure-based systems that can be used with connected vehicle deployments to provide traffic management services.
- **Transit Management**. The development of systems that implement electronic fare payment systems used on transit vehicles and train systems.
- **Smart Cities Management**. The development of systems that support collection and sharing data from both transportation and non-transportation sources.
- **Archived Data Management**. The development of systems to collect transportation data for use in non-operational purposes (e.g., planning and research).

The complete list of operational concepts organized by stakeholder and service is presented in Table 4. The ‘status’ distinguishes existing from future capabilities.

TABLE 4: STATEWIDE OPERATIONAL CONCEPTS, BY STAKEHOLDER

Stakeholder	Service Area	Role and Responsibility Description	Status	Notes
Hawaii Department of Transportation - Highways Division (HDOT-HWY)	Freeway Management	Coordinate traffic information and traffic control with the City and County of Honolulu Traffic Management Center.	Existing	
		Obtain traffic images and traffic flow data through CCTVs and field sensors, and maintain operational control of its own field equipment.	Existing	This role is currently performed, but not connected to a center.
		Operate changeable speed limit signs, including collecting traffic count information from the devices.	Existing	
	Connected Vehicle Management	Coordinate with private vehicles to enable connected vehicle applications for safety and mobility.	Future	
	Incident Management	Provide incident information to travelers via traffic information devices on state roads.	Existing	
		Coordinate maintenance resources for incident response with county maintenance and construction systems.	Existing	
		Perform network surveillance for detection and verification of incidents on state roads.	Existing	This role is currently performed, but is not connected to a center.
		Send traffic/incident information and traffic images to local and statewide emergency management agencies.	Future	
	Information Dissemination	Provide traffic information to travelers via HDOT DMS equipment and GoAkamai.	Existing	
		Coordinate with the Hawaii Convention and Visitors Bureau to notify visitors of significant weather alerts, such as tsunami or hurricane warnings.	Existing	This role is currently performed, but not using ITS.
	Emergency Management	Coordinate incident and threat information with the Hawaii State EOC and the City and County of Honolulu EOC.	Existing	This role includes video teleconferencing, email, phone tree, phone, email, text, notification system, Web EOC software and face-to-face via EOC liaisons.
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the Hawaii State EOC and the City and County of Honolulu EOC.	Existing	Planning is conducted prior to the event in planning, training and exercise initiatives as well as prior dissemination.

Stakeholder	Service Area	Role and Responsibility Description	Status	Notes
		Coordinate incident and threat information with the Hawaii State EOC and the City and County of Honolulu EOC.	Existing	This role includes video teleconferencing, email, phone tree, phone, email, text, notification system, Web EOC software and face-to-face via EOC liaisons.
Hawaii Department of Transportation – Public Affairs Office (HDOT-DIR-P)	Emergency Management	Disseminate disaster traveler information to the public.	Existing	
	Information Dissemination	Disseminate HDOT statewide construction information to the public.	Existing	
		Disseminate HDOT highways, airports and harbors traveler information to the public.	Existing	
Hawaii Department of Transportation - Highways Division, Oahu District (HDOT-HWY-O)	Emergency Management	Coordinate incident and threat information with the Hawaii State EOC and the City and County of Honolulu EOC.	Existing	
		Coordinate emergency plans, evacuation and reentry plans and disaster management plans with the Hawaii State EOC and the City and County of Honolulu EOC.	Existing	
		Coordinate incident and threat information with the Hawaii State EOC and the City and County of Honolulu EOC.	Existing	
Hawaii Department of Transportation – Highways Division, Hawaii District (HDOT-HWY-H)	Traffic Signal Control	Coordinate traffic information and traffic control with the HDOT-HWY Traffic Management Center on Oahu.	Future	
Hawaii Department of Transportation – Highways Division, Kauai District (HDOT-HWY-K)	Traffic Signal Control	Coordinate traffic information and traffic control with the HDOT-HWY Traffic Management Center on Oahu.	Future	
Hawaii Department of Transportation – Highways Division, Maui District (HDOT-HWY-M)	Traffic Signal Control	Coordinate traffic information and traffic control with the HDOT-HWY Traffic Management Center on Oahu.	Future	

Stakeholder	Service Area	Role and Responsibility Description	Status	Notes
Hawaii Department of Transportation – Highways Division, Traffic Branch, Safety Section (HDOT-HWY-TS)	Archived Data Management	Collect and archive crash data from incident management agencies.	Existing	
HDOT Highways, Motor Vehicle Safety Office (HDOT-HWY-V)	Commercial Vehicle Operations	Regulate commercial vehicles, including commercial vehicle permitting and roadside commercial vehicle screening, in the State of Hawaii.	Existing	
Hawaii Department of Transportation - Airports Division (HDOT-AIR)	Emergency Management	Consolidate airport emergency information from HDOT-AIR district EOCs.	Existing	
		Coordinate emergency information relevant to airports with the Hawaii State EOC.	Future	
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the Hawaii State EOC.	Existing	This role is currently performed, but not using ITS.
Hawaii Department of Transportation - Airports Division, Hawaii District (HDOT-AIR-H)	Emergency Management	Coordinate airport emergency information with the HDOT-AIR EOC.	Existing	
Hawaii Department of Transportation - Airports Division, Kauai District (HDOT-AIR-K)	Emergency Management	Coordinate airport emergency information with the HDOT-AIR EOC.	Existing	
Hawaii Department of Transportation - Airports Division, Maui District (HDOT-AIR-M)	Emergency Management	Coordinate airport emergency information with the HDOT-AIR EOC.	Existing	
Hawaii Department of Transportation - Airports Division, Oahu District (HDOT-AIR-O)	Emergency Management	Coordinate airport emergency information with the HDOT-AIR EOC.	Existing	

Stakeholder	Service Area	Role and Responsibility Description	Status	Notes
Hawaii Department of Transportation, Harbors Division (HDOT-HAR)	Emergency Management	Coordinate incident and threat information with the Hawaii State EOC.	Future	
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the Hawaii State EOC.	Existing	This role is currently performed, but not using ITS.
		Consolidate emergency management information from HDOT Harbor Districts.	Existing	
Hawaii Department of Transportation, Harbors Division, Hawaii District (HDOT-HAR-H)	Emergency Management	Coordinate harbor emergency information with HDOT Harbors statewide operations.	Existing	
Hawaii Department of Transportation, Harbors Division, Kauai District (HDOT-HAR-K)	Emergency Management	Coordinate harbor emergency information with HDOT Harbors statewide operations.	Existing	
Hawaii Department of Transportation, Harbors Division, Maui District (HDOT-HAR-M)	Emergency Management	Coordinate harbor emergency information with HDOT Harbors statewide operations.	Existing	
Hawaii Department of Transportation, Harbors Division, Oahu District (HDOT-HAR-O)	Emergency Management	Coordinate harbor emergency information with HDOT Harbors statewide operations.	Existing	
Honolulu Authority for Rapid Transportation (HART)	Transit Management	Provide transit passenger electronic fare payment capabilities on all HART vehicles.	Future	
		Perform fare reconciliation with other transit systems using the same fare payment system	Future	
City and County of Honolulu Department of Information Technology	Transit Management	Provide transit passenger electronic fare payment capabilities on all City and County Honolulu transit vehicles.	Future	
	Smart Cities Management	Coordinate traffic and other relevant information with HDOT-HWY to enhance situational awareness.	Future	

Stakeholder	Service Area	Role and Responsibility Description	Status	Notes
		Coordinate emergency and other relevant information with the Hawaii State EOC to enhance situational awareness.	Future	
		Disseminate emergency and incident information to the public.	Future	
	Archived Data Management	Archive multimodal transportation data, incident information and emergency information.	Future	
City and County of Honolulu Department of Transportation Services (City and County Honolulu DTS)	Transit Management	Provide transit passenger electronic fare payment capabilities on all City and County Honolulu transit vehicles.	Future	
		Provide an intermodal payment card for use on transit.	Future	
	Traffic Signal Control	Coordinate traffic information and traffic control with the HDOT-HWY Traffic Management Center.	Existing	
	Information Dissemination	Provide traffic information to travelers via GoAkamai.	Existing	
County of Hawaii Department of Public Works (County of Hawaii DPW)	Traffic Signal Control	Coordinate traffic information and traffic control with the HDOT-HWY Traffic Management Center.	Future	
County of Kauai Department of Public Works (Kauai DPW)	Traffic Signal Control	Coordinate traffic information and traffic control with the HDOT-HWY Traffic Management Center.	Future	
County of Maui Department of Public Works (Maui DPW)	Traffic Signal Control	Coordinate traffic information and traffic control with the HDOT-HWY Traffic Management Center.	Future	
Hawaii Emergency Management Agency (HI-EMA)	Emergency Management	Coordinate statewide disaster response with County Departments of Emergency Management and Civil Defense Agencies.	Existing	This role includes video teleconferencing, email, phone tree, phone, email, text, notification system, Web EOC software and face-to-face via EOC liaisons.
		Operate the State EOC, including incident coordination with regional emergency management providers.	Existing	

Stakeholder	Service Area	Role and Responsibility Description	Status	Notes
		Develop and coordinate statewide emergency plans, evacuation and reentry plans, and disaster management plans.	Existing	Planning is conducted prior to the event in planning, training and exercise initiatives as well as prior dissemination.
		Provide evacuation and incident information to travelers in the state using the National Alert Warning System, the Hawaii Alert Warning System, the Statewide Siren Warning System and the Emergency Alert system.	Existing	This role is currently performed, but not using ITS.
		Coordinate with the National Weather Service systems (e.g., Pacific Tsunami Warning Center).	Existing	This role is currently performed, but not using ITS.
	Incident Management	Coordinate incident and threat information as part of an early warning system with the County Departments of Emergency Management and Civil Defense Agencies.	Existing	This role includes video teleconferencing, email, phone tree, phone, email, text, notification system, Web EOC software and face-to-face via EOC liaisons.
City and County of Honolulu Department of Emergency Management (C&C DEM)	Emergency Management	Coordinate disaster, evacuation and threat information with the Hawaii State EOC.	Existing	
County of Hawaii – Civil Defense Agency (County of Hawaii CDA)	Emergency Management	Coordinate disaster, evacuation and threat information with the Hawaii State EOC.	Existing	
County of Kauai – Civil Defense Agency (Kauai CDA)	Emergency Management	Coordinate disaster, evacuation and threat information with the Hawaii State EOC.	Existing	
County of Maui – Civil Defense Agency (Maui CDA)	Emergency Management	Coordinate disaster, evacuation and threat information with the Hawaii State EOC.	Existing	
Hawaii Tourism Authority	Traveler Information	Disseminate emergency traveler information to the public.	Existing	
Hawaii Visitors and Convention Bureau	Traveler Information	Disseminate emergency traveler information to the public.	Existing	

4.4 Statewide ITS Inventory by Stakeholder

The majority of elements in the inventory represent a specific existing or planned system. An example of a specific system is the *HDOT-AIR-H Security Office*.

Some elements represent sets of devices rather than a single specific system or device. An example of this type of element is *HDOT-HWY Field Devices*, which represents all existing and planned ITS field devices that are, or will be, operated by HDOT-HWY in the state of Hawaii. The element describes any of the ITS field devices (e.g., Dynamic Message Signs or CCTV) rather than the specific number of each device.

Another type of element in the inventory is a "generic" element that represents all of the systems of a certain type in the region. An example of this type of element is *Media*, which represents all potential media outlets, such as television stations, websites, radio or newspapers that may wish to connect to an Intelligent Transportation System. These generic elements have been created for two primary reasons: First, they represent elements with similar types of interfaces. From a standardization standpoint, describing how one of the major elements in the state (e.g., the *HDOT-HWY Traffic Management Center*) interfaces with various media outlets would be the same. Second, describing many systems with a single element helps keep an ITS architecture from growing too large.

The Hawaii Statewide ITS Architecture Inventory, organized by stakeholder, is presented in Table 5.

TABLE 5: STATEWIDE ITS INVENTORY, BY STAKEHOLDER

Stakeholder Name	Stakeholder Abbreviation	Statewide ITS Architecture Subsystems and Elements
American Association of Motor Vehicle Administrators	---	• IRP Clearinghouse
Archived Users	---	• Archived Data User Systems
City and County of Honolulu Department of Emergency Management	DEM	• City and County of Honolulu EOC
City and County of Honolulu Department of Information Technology	DIT	• City and County of Honolulu Intelligent Operations Center
City and County of Honolulu Department of Transportation Services	DTS	• City and County of Honolulu Traffic Management Center • TheBus Administration • TheBus Vehicles
County of Hawaii – Civil Defense Agency	CDA	• County of Hawaii EOC

Stakeholder Name	Stakeholder Abbreviation	Statewide ITS Architecture Subsystems and Elements
County of Hawaii Department of Public Works	DPW	• County of Hawaii DPW Traffic Management Center
County of Kauai – Civil Defense Agency	Kauai CDA	• Kauai EOC
County of Maui – Civil Defense Agency	Maui CDA	• Maui EOC
County of Maui Department of Public Works	Maui DPW	• Maui DPW Traffic Operations Center
County of Maui Department of Transportation	Maui DOT	• Maui Bus Administration • Maui Bus Fixed Route Vehicles
Federal Motor Carrier Safety Agency	FMCSA	• Safety and Fitness Electronic Record
Federal Transit Administration	FTA	• National Transit Database
Hawaii County Mass Transit Agency	---	• Hele-On Administration • Hele-On Vehicles
Hawaii Department of Transportation - Highways Division, Motor Vehicle Safety Office	HDOT-HWY-V	• Hawaii Motor Vehicle Registration Database • HDOT-HWY-V CVIEW • HDOT-HWY-V E-Screening System • HDOT-HWY-V Trucking in Hawaii Web Portal • HDOT-HWY-V Vehicle Registration System Database • HDOT-HWY-V Virtual Weigh Stations
Hawaii Department of Transportation - Airports Division	HDOT-AIR	• HDOT-AIR EOC
Hawaii Department of Transportation - Airports Division, Hawaii District	HDOT-AIR-H	• HDOT-AIR-H EOC • HDOT-AIR-H Security Office
Hawaii Department of Transportation - Airports Division, Kauai District	HDOT-AIR-K	• HDOT-AIR-K EOC • HDOT-AIR-K Security Dispatch Center
Hawaii Department of Transportation - Airports Division, Maui District	HDOT-AIR-M	• HDOT-AIR-M Command Center • HDOT-AIR-M EOC
Hawaii Department of Transportation - Airports Division, Oahu District	HDOT-AIR-O	• HDOT-AIR-O EOC • HDOT-AIR-O Security Office
Hawaii Department of Transportation - Harbors Division	HDOT-HAR	• HDOT-HAR EOC
Hawaii Department of Transportation - Harbors Division, Hawaii District	HDOT-HAR-H	• HDOT-HAR-H Security Office
Hawaii Department of Transportation - Harbors Division, Kauai District	HDOT-HAR-K	• HDOT-HAR-K Security Center
Hawaii Department of Transportation - Harbors Division, Maui District	HDOT-HAR-M	• HDOT-HAR-M Security Office

Stakeholder Name	Stakeholder Abbreviation	Statewide ITS Architecture Subsystems and Elements
Hawaii Department of Transportation - Harbors Division, Oahu District	HDOT-HAR-O	• HDOT-HAR-O Security Office
Hawaii Department of Transportation - Highways Division	HDOT-HWY	• GoAkamai • HDOT-HWY Connected Vehicle RSE • HDOT-HWY Field Devices • HDOT-HWY Traffic Management Center
Hawaii Department of Transportation - Highways Division, Kauai District	HDOT-HWY-K	• HDOT-HWY-K Traffic Control Center
Hawaii Department of Transportation - Highways Division, Maui District	HDOT-HWY-M	• HDOT-HWY-M Traffic Operations Center
Hawaii Department of Transportation - Highways Division, Planning Branch	HDOT-HWY-P	• HDOT-HWY-P Roadway Data Archive
Hawaii Department of Transportation - Highways Division, Traffic Branch, Safety Section	HDOT-HWY-TS	• HDOT-HWY-TS Crash Data Archive
Hawaii Department of Transportation - Public Affairs Office	DIR-P	• HDOT-DIR-P Communications Network
Hawaii Emergency Management Agency	HIEMA	• Hawaii State EOC • HIEMA INFORMER
Hawaii Tourism Authority	HTA	• GoHawaii.com • HTA Command Center • HTA Mobile App
Hawaii Visitors and Convention Bureau	HVCB	• HVCB Information System
Honolulu Authority for Rapid Transportation	HART	• City and County of Honolulu Fare Collection Back Office • HART Administration • HART Fare Gates • Open Payment Instrument • Regional Payment Instrument • Ticket Loading Equipment
International Fuel Tax Agreement	IFTA	• IFTA Clearinghouse
Kauai County Transportation Agency	Kauai Bus	• Kauai Bus Administration • Kauai Bus Fixed Route Vehicles

Stakeholder Name	Stakeholder Abbreviation	Statewide ITS Architecture Subsystems and Elements
Other Statewide Elements		• Commercial Carriers • Commercial Vehicles • Commercial Vehicle Enforcement • Commercial Vehicle OBE • County of Hawaii Data Warehouse • Financial Institutions • Hawaii Statewide Data Warehouse • Judicial Information Management System • Kauai Data Warehouse • Kauai DPW • Local EMS • Local Fire • Local Police • Maui Data Warehouse • Media • National Weather Service • Oahu Data Warehouse • Pacific Disaster Center • Pacific Tsunami Warning Center • Private Traveler Information Services • Private Personal Computing Devices • Red Cross • Vehicles

4.5 Statewide Summary Diagrams

The Hawaii Statewide ITS Architecture incorporates a number of services. While some services are internal to a single agency and do not involve multiple agencies, it is oftentimes beneficial to understand the interactions between numerous agencies that support a consolidated service. In an effort to present this information in a holistic manner summary, service package diagrams have been drawn for these areas:

- Traffic Management
- Disaster and Evacuation Management
- Traveler Information
- Connected Vehicles
- Commercial Vehicle Operations
- Archived Data
- Transit Management

4.5.1 Traffic Management

The summary diagram for Traffic Management (Figure 1) envisions a future statewide Traffic Management Center (HDOT-HWY Traffic Management Center) that will connect to other HDOT centers and field equipment. In addition, this center could connect to county traffic centers on all islands. Currently, all traffic control is managed on each individual island, either by a single center, such as on the island of Hawaii, or by a combination of two centers, such as Oahu, where the City and County of Honolulu operates county roads and HDOT operates highways. In the near future, all traffic on Oahu will be managed from a single Joint Traffic Management Center.

4.5.2 Disaster and Evacuation Management

The Hawaii Emergency Operations Center (EOC) is responsible for coordinating disaster management and evacuation management on a statewide level, including coordinating information from and between the county EOCs on individual islands. The Hawaii State EOC coordinates disaster traveler information dissemination through a variety of streams, including the HDOT Public Affairs Office, and the HTA and HVCB. Combined with Emergency Management (EM), the Disaster and Evacuation summary service package enhances the ability of the surface transportation system to respond to and recover from disasters. As shown in Figure 2, the services address the most severe incidents that require an extraordinary response from outside the local community. All types of disasters are addressed including natural disasters (hurricanes, earthquakes, tsunamis, etc.) and technological and man-made disasters. As shown in the summary diagram, the State EOC is at the center and coordinates between multiple agencies and entities in response and recovery. Depending on the severity of the event, representatives from public safety, human services, infrastructure agencies and private utilities each have seats at the EOC to ensure a collaborative response. The interfaces between the EOC, first responders and transportation agencies provide situational awareness and resource coordination.

4.5.3 Traveler Information

Figure 3 shows the collection of data — traffic conditions, advisories, incident information and the like — that is broadcast to the public. The automatically generated information includes images from county and state traffic cameras, incident alerts and a congestion map. HDOT currently operates and maintains the GoAkamai traveler information system on Oahu and it is envisioned that traffic information from future ITS deployments on neighbor islands will be published on GoAkamai's website (http://www.goakamai.org/) and mobile app. In addition, emergency traveler information can be disseminated to the public through the HTA mobile application and through GoHawaii.com, the HTA website. In addition, GoAkamai already has the capability to provide personalized traveler information interactively — meaning that a traveler may set up a profile on GoAkamai.org to request alerts about traffic congestion, construction and incidents on Oahu.

FIGURE 1: STATEWIDE TRAFFIC MANAGEMENT SUMMARY DIAGRAM

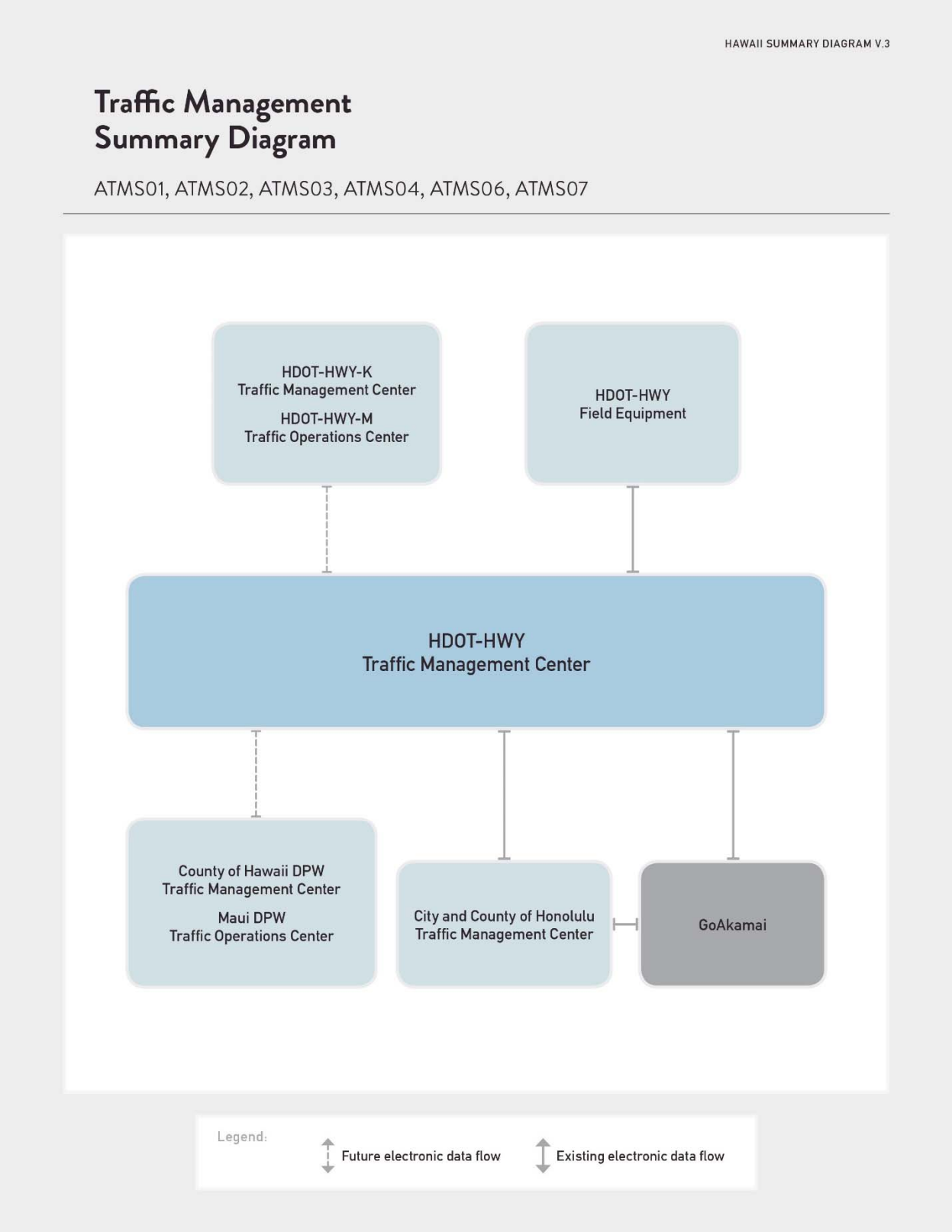


FIGURE 2: STATEWIDE DISASTER AND EVACUATION SUMMARY DIAGRAM

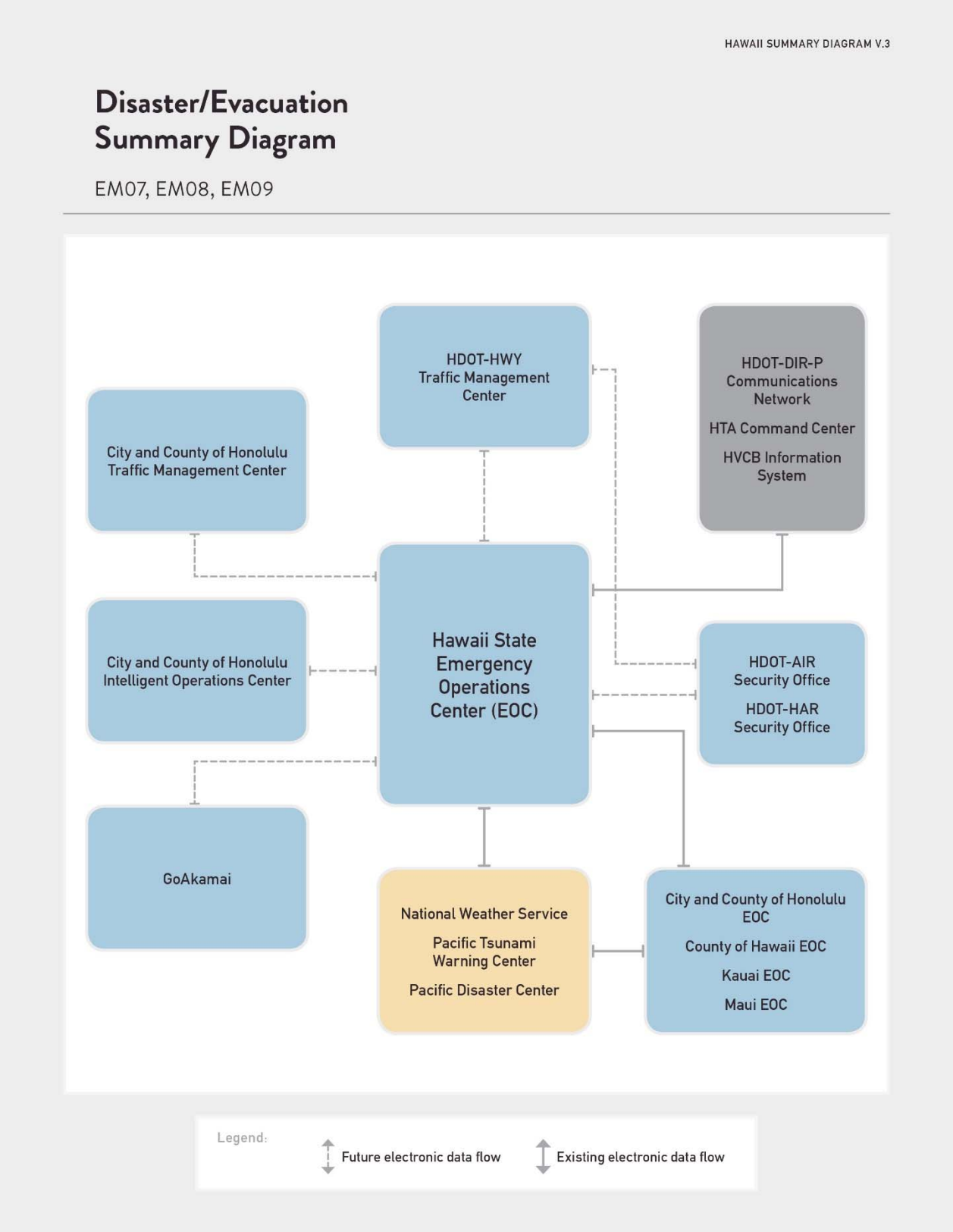
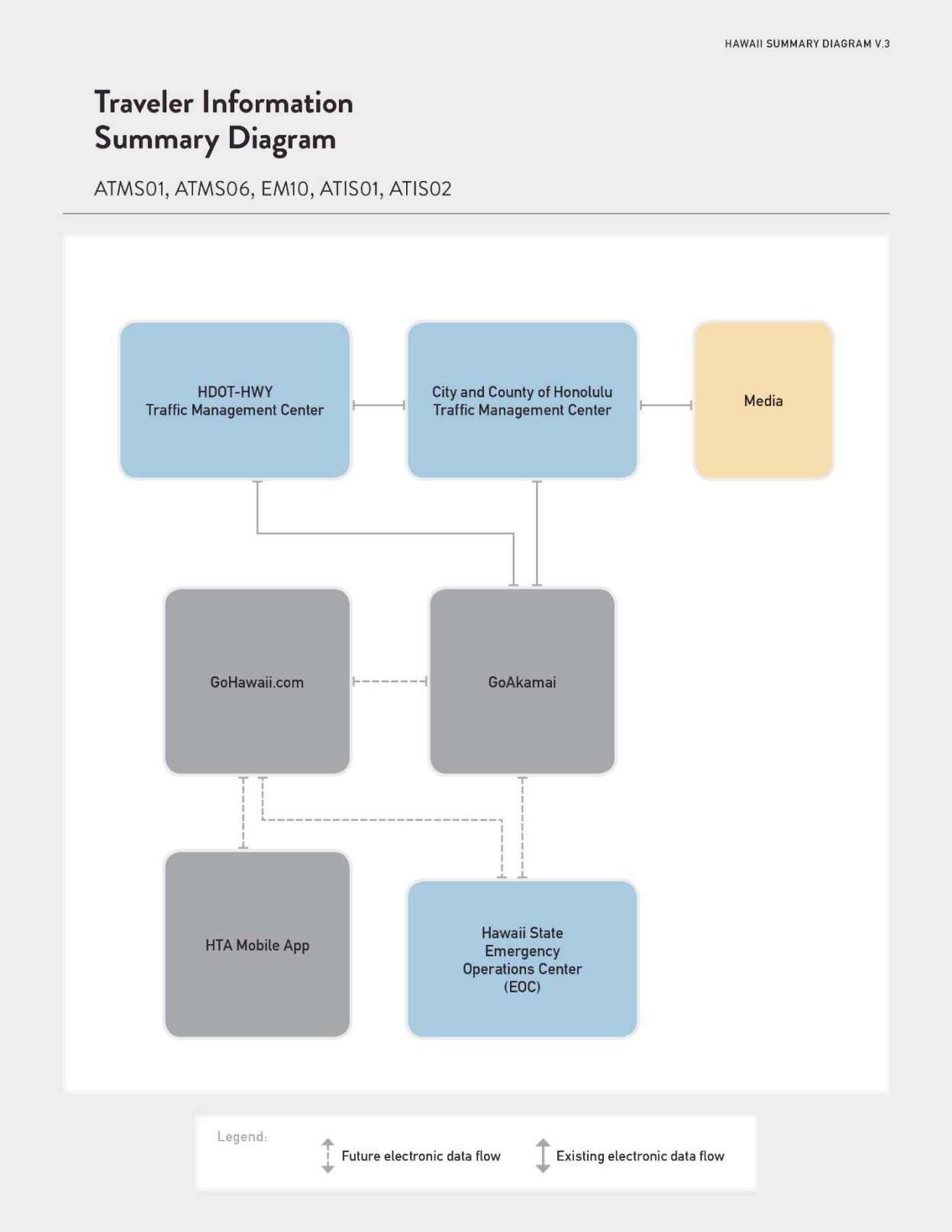


FIGURE 3: STATEWIDE TRAVELER INFORMATION SUMMARY DIAGRAM



4.5.4 Connected Vehicles

Connected Vehicles is a next-generation technology where vehicles may exchange messages with other vehicles, as well as infrastructure, to improve safety, mobility and the environment. As presented in Figure 4, this summary diagram shows the potential for future connected vehicle applications in the State of Hawaii. These applications are sourced from the US DOT Connected Vehicles Reference Implementation Architecture (CVRIA), which identifies the key interfaces across the connected vehicle environment.

The Connected Vehicle applications identified for Hawaii include:

- ***Reduced Speed Zone Warning***: provides connected vehicles which are approaching a reduced speed zone with information on the zone's posted speed limit.
- ***Spot Weather Impact Warning***: alerts drivers to unsafe conditions or road closure at specific points on the downstream roadway as a result of weather-related impacts.
- ***Work Zone Warning***: provides information about the conditions that exist in a work zone to vehicles that are approaching the work zone.
- ***Queue Warning***: utilizes connected vehicle technologies, including vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communications, to enable vehicles within the queue event to automatically broadcast their queued status information, such as rapid deceleration or a disabled status.
- ***Connected Vehicle Data for Traffic Operations***: uses probe data information obtained from vehicles in the network to support traffic operations, including incident detection and the implementation of localized operational strategies.

4.5.5 Commercial Vehicle Operations

The summary diagram in Figure 5 shows statewide Commercial Vehicle administrative systems operated by the HDOT Motor Vehicle Safety Office (HWY-V). The primary service shown is the HDOT-HWY-V CVIEW system, which will serve as the primary data repository for credential, safety, motor carrier census and Electronic Freight Manifest data.

Once this system is in place, the Motor Vehicle Safety Office plans to implement a number of other initiatives shown in this summary diagram, including the Trucking in Hawaii Web Portal, which serves as a single point of access for motor carriers to view commercial vehicle regulatory and enforcement information from all state agencies. Additional initiatives may include E-Screening and Weigh-in-Motion.

4.5.6 Archived Data

Figure 6 shows the potential for a future Hawaii Statewide Data Warehouse, which would collect archived data from a number of other data archives operating in the State of Hawaii. In the future, these could include individual data warehouses on each island, as well as statewide archives such as the HDOT Highways Division Traffic Branch, Safety Section Crash Data Archive or the HDOT Highways Planning Office Roadway Data Archive.

FIGURE 4: STATEWIDE CONNECTED VEHICLE SUMMARY DIAGRAM

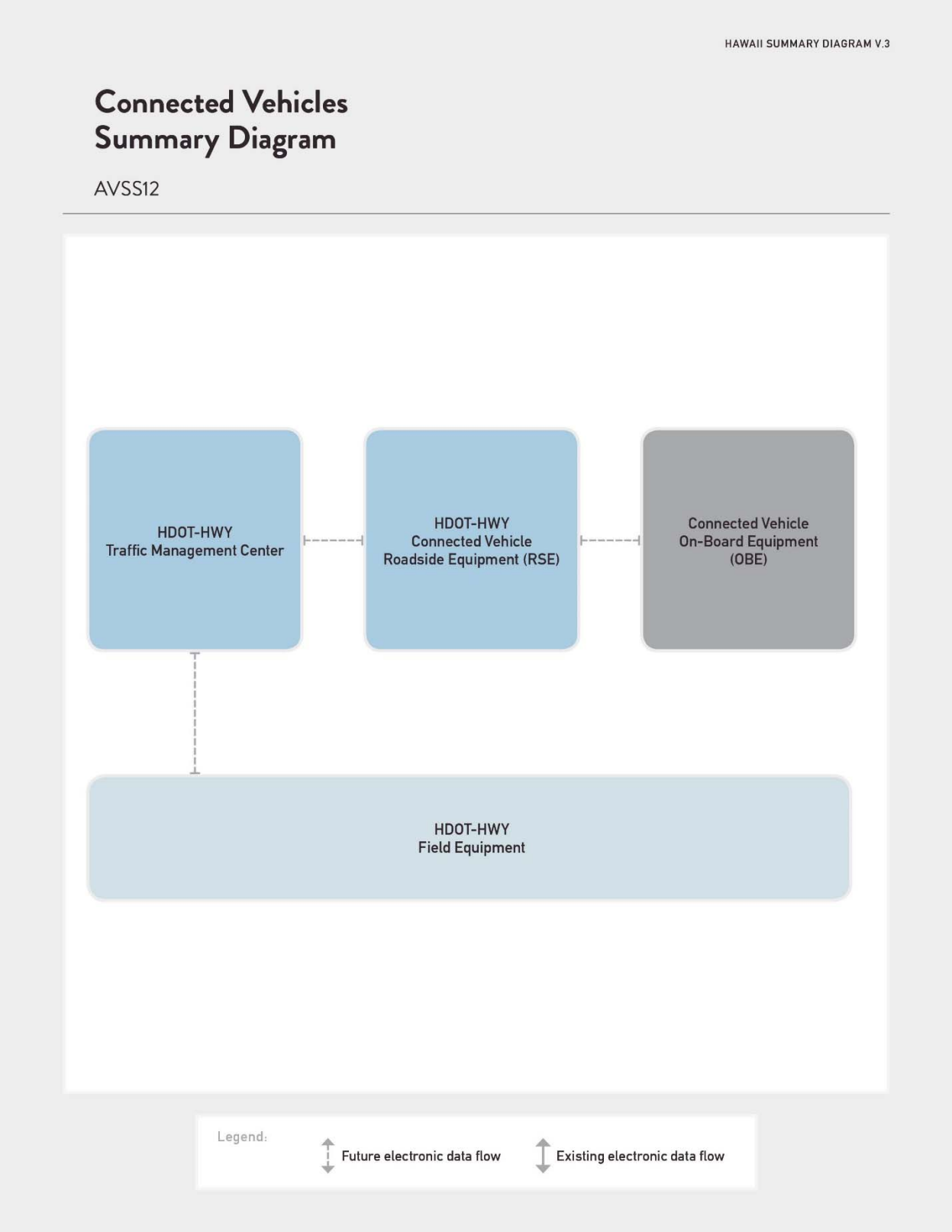


FIGURE 5: STATEWIDE COMMERCIAL VEHICLE OPERATIONS SUMMARY DIAGRAM

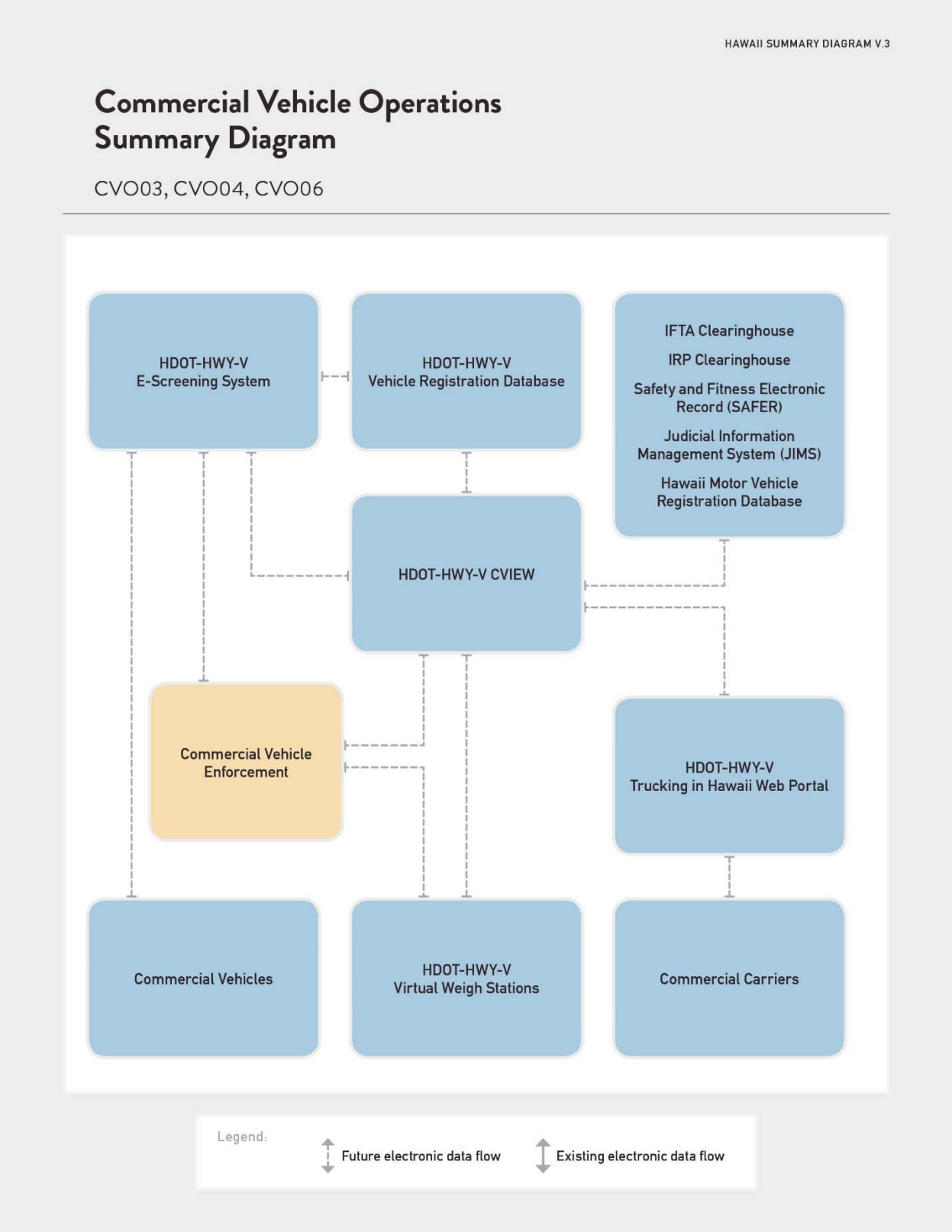
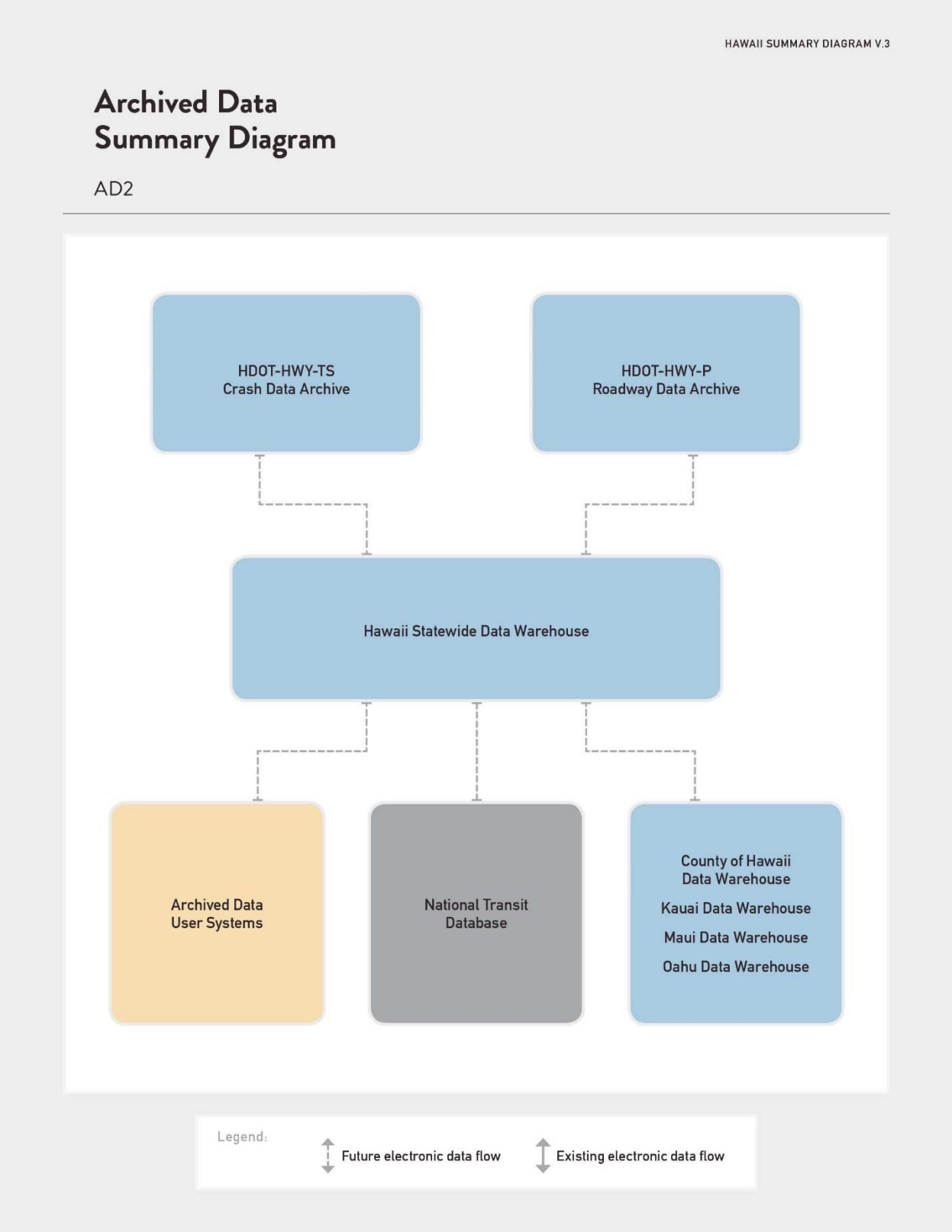


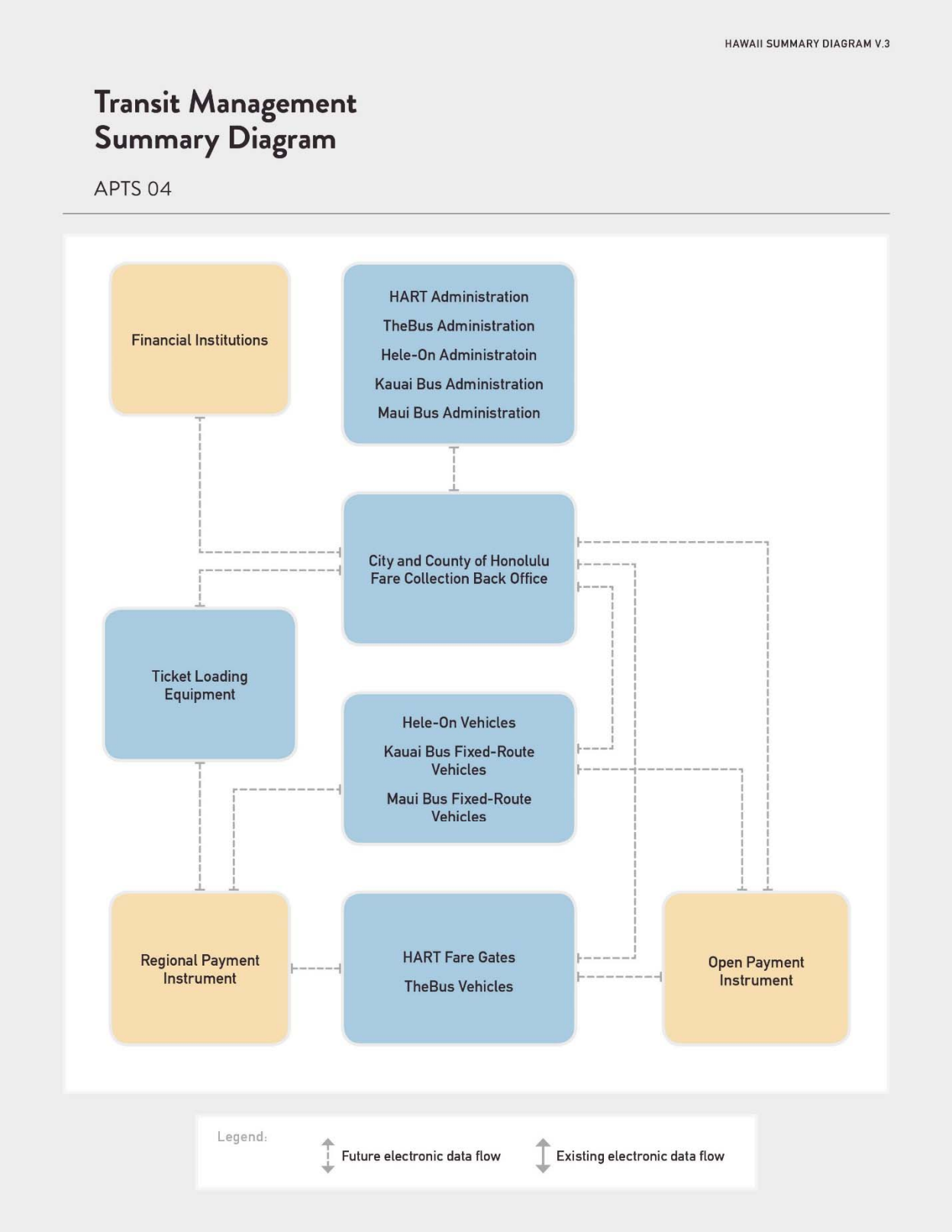
FIGURE 6: STATEWIDE ARCHIVED DATA SUMMARY DIAGRAM



4.5.7 Transit Management

Figure 7's summary diagram shows a future electronic payment system operating in Hawaii. In a first stage, this system will allow for a single payment method on Oahu. Later iterations may include deployment on neighbor islands. Fares would be reconciled between agencies through a single back office system. In addition, this summary diagram shows the potential for an open payment instrument, allowing transit riders to pay using a chip-enabled device or card.

FIGURE 7: STATEWIDE TRANSIT MANAGEMENT SUMMARY DIAGRAM



4.6 Selected Statewide Regional Service Package

A full set of the Statewide Customized Service Package Diagrams are provided in Appendix A. Table 6 summarizes the listing of Service Packages for the Statewide ITS Architecture.

TABLE 6: SELECTED STATE SERVICES (SERVICE PACKAGES) FOR HAWAII

Service Package	Service Package Name
Archived Data (AD)	
AD2	ITS Data Warehouse
AD3	ITS Virtual Data Warehouse
Advanced Public Transportation Systems (APTS)	
APTS04	Transit Fare Collection Management
Advanced Traveler Information Systems (ATIS)	
ATIS01	Broadcast Traveler Information
ATIS02	Interactive Traveler Information
Advanced Traffic Management Systems (ATMS)	
ATMS01	Network Surveillance
ATMS02	Traffic Probe Surveillance
ATMS03	Traffic Signal Control
ATMS05	HOV Lane Management
ATMS06	Traffic Information Dissemination
ATMS07	Regional Traffic Management
ATMS08	Traffic Incident Management System
Advanced Vehicle Safety System (AVSS)	
AVSS12	Connected Vehicle Safety Systems
Commercial Vehicle Operations (CVO)	
CVO03	Electronic Clearance
CVO04	CV Administrative Processes
CVO06	Weigh-In-Motion
Emergency Management (EM)	
EM07	Early Warning Systems
EM08	Disaster Response and Recovery
EM09	Evacuation and Reentry Management
EM10	Disaster Traveler Information

4.7 Statewide Project List

The projects included in the Hawaii Statewide ITS Architecture are summarized in Table 7, with project sheets provided in Appendix B.

Near-term projects will be implemented in 0-5 years; long-term projects will be implemented thereafter.

TABLE 7: STATEWIDE PROJECT LIST

Name	Description	Timeframe
HDOT-HWY CCTV Expansion	This project will expand CCTV camera coverage on HDOT-HWY facilities.	Near-Term
HDOT-HWY DMS Expansion	This project will add additional Dynamic Message Signs (DMS) on HDOT-HWY facilities.	Near-Term
HDOT-HWY Fiber Optic Network	This project will expand the HDOT-HWY fiber optic network, and supplement it with the City and County of Honolulu's fiber optic network.	Near-Term
HDOT-HWY GoAkamai Traveler Information Upgrade	This project will upgrade GoAkamai to provide additional functionality.	Near-Term
HDOT-HWY TMC	This project will migrate existing systems to a new Traffic Management Center (TMC). This project will also include upgraded connections to the City and County of Honolulu's Department of Transportation Services (DTS) Traffic Management Center, and the Communications Centers for the Honolulu Police, Fire and Emergency Medical Services Departments.	Near-Term
HDOT-HWY Traffic Sensor Expansion	This project will expand traffic sensor coverage for spot speeds on HDOT-HWY facilities.	Near-Term
HDOT-HWY Travel Time Expansion	This project will expand highway travel time coverage on HDOT-HWY facilities.	Near-Term
HDOT Website Update	This project will redesign the HDOT statewide website for Highways, Airports and Harbors divisions.	Near-Term
HDOT-AIR Communications Systems Upgrade	This project will upgrade the HDOT-AIR communications network statewide to allow coordination with public safety and between HDOT-AIR facilities.	Long-Term
HDOT-HWY and City and County of Honolulu DTS Incident Management Coordination	This project will create a coordinated incident management program involving both HDOT-HWY and C&C of Honolulu DTS, as well as first responder agencies.	Near-Term
HDOT-HWY-V Automated VIC Process	This project will automate the application, issuance and receipt of Vehicle Identification Card (VIC) credential and support the real-time roadside effort of VIC credential. The intent is to provide on-line credentialing for VIC applications, with links to CVIEW so that VIC status may be cross-checked electronically during other credentialing processes.	Near-Term

Name	Description	Timeframe
HDOT-HWY-V CVIEW	This project will deploy a CVISN-compliant Commercial Vehicle Information Exchange Window (CVIEW) that will serve as a primary data repository for credential (e.g., VIC), safety (e.g., out-of-service orders), motor carrier census and Electronic Freight Manifest (EFM) data. CVIEW will also be the State conduit for downloading Federal motor carrier census and safety data and support intra-agency and inter-agency exchange of safety and credential information with authorized users as well as support motor carriers' review of their safety and credential data contained in federal and state systems.	Near-Term
HDOT-HWY-V Deploy E-Screening at Sand Island	This project will electronically identify vehicles as they approach Sand Island Facility.	Long-Term
HDOT-HWY-V Deployment of Virtual Weigh Station	This project will deploy virtual weigh stations in Hawaii.	Long-Term
HDOT-HWY-V Modernize Vehicle Registration System Database	This project will make online commercial vehicle renewals available to fleet operators, and enable authorized Federal, State and county users to access vehicle registration data in real time.	Long-Term
HDOT-HWY-V Trucking in Hawaii Web Portal	This project will provide a single point of access for motor carriers to view commercial vehicle regulatory and enforcement information from all state agencies. Specifically, a trucking portal will minimize motor carrier effort required to collect information about CVO-related state agencies and programs; reduce time required by state personnel to respond to motor carrier inquiries; create a user experience that streamlines motor carrier operations; and provide a single storefront for the Hawaii CVO credentialing systems.	Near-Term
HI-EMA Emergency Messages on DMS	This project will create a connection to allow HI-EMA to have the ability to put emergency messages on HDOT-HWY DMS. HI-EMA would not have direct control of the signs, but provide information or messages via a center-to-center connection.	Near-Term
HI-EMA Web EOC Upgrade	This project will upgrade HI-EMA's Web EOC capabilities to include hosting information in the cloud. This upgrade will allow multiple agencies outside of the Hawaii State EOC to access information on WebEOC.	Near-Term
Intermodal Fare Card	This multi-agency project will deploy an intermodal fare card. Initially, the card will be used for transit fare collection by the City and County of Honolulu DTS's public transit provider, and then by HART for transit fare payment. Ultimately, the card will be also used for payment of City services.	Near-Term
City and County of Honolulu Smarter Cities System	This project is under development and creates a City Intelligent Operation Center, initially to support Emergency Management and Disaster Response and ultimately to enhance day-to-day operations of the City. The Smart Cities system will connect to the Hawaii State EOC at the statewide level.	Near-Term
HTA Smartphone App	This project will deploy a smartphone app that can be used for general info and safety. The app will be developed first in English and Chinese, with safety being the primary focus for version 1. In future versions, HTA plans to provide additional languages and integrate with flight information.	Near-Term

Name	Description	Timeframe
HTA Update of GoHawaii.com Website	This project will update the GoHawaii.com website to include real time information on weather as well as emergency information.	Near-Term

4.8 Existing Statewide Agreements

During the stakeholder workshop the topic of existing agreements were discussed and no existing statewide agreements were identified.

4.9 Potential Statewide Agreements

Each project developed for the Statewide ITS Architecture was reviewed and the following table represents an agreement that may be needed to implement statewide projects.

TABLE 8: POTENTIAL AGREEMENTS FOR HAWAII

ID	Stakeholders	Agreement Title	Agreement Type	Description	Supporting Projects and Service Packages
1	• HDOT • Hawaii DPW • Kauai DPW • Maui DPW	Statewide Traffic Management Center	Operations	Agreement for the operations of a statewide traffic management center that will have data and video feeds from each of the neighbor island county traffic management / operations centers.	• HDOT-HWY TMC • Service Package ATMS07
2	• HDOT • HI-EMA	DMS Operations and Control	Device Sharing and Control	Agreement to allow HI-EMA to have the ability to put emergency messages on HDOT-HWY DMS.	• HI-EMA Emergency Messages on DMS
3	• HDOT • C&C Honolulu DTS and DIT	Fiber Optic Cable Network Sharing	Communications Network Sharing	Agreement to share fiber optic cable to create a complete and robust communications network.	• HDOT-HWY Fiber Optic Network
4	• C&C Honolulu (HART, DTS and DIT) • Hawaii Mass Transit Agency • Kauai Transportation Agency • Maui Department of Transportation	Transit Fare Collection System	Transit Fare Card Sharing	Agreement to use C&C Honolulu's electronic payment system (for TheBus and HART trains) on the transit systems in the Hawaii, Kauai and Maui Counties.	• Intermodal Fare Card • Service Package APTS04

ID	Stakeholders	Agreement Title	Agreement Type	Description	Supporting Projects and Service Packages
5	• HDOT • Hawaii Tourism Authority	HDOT-HTA Data Sharing	Data Sharing	Agreement to share video and data between GoAkamai and GoHawaii.	• HTA Update of GoHawaii.com Website • Service Package ATIS01-2

5 Maui Regional ITS Architecture

5.1 Overview

The Maui Regional ITS Architecture began with a Kick-off Meeting on February 23, 2015, with in-person interviews the same week. A stakeholder workshop was held on May 14, 2015. The details of the final Maui Regional ITS Architecture are provided in this chapter, in Appendix C & D, and on the hyperlinked website: http://hawaii.itsarchitecture.org.

5.2 Maui Stakeholders

The Maui ITS Architecture is defined by a set of elements (or systems), each of which is owned (or operated or maintained) by a stakeholder. The agencies that attended stakeholder meetings and that own, operate or maintain elements in the Maui ITS Architecture are listed in Table 9.

The list of stakeholders contains a mix of specific agencies or organizations and generic names used to represent a variety of stakeholders. An example of a specific agency or organization is County of Maui Department of Public Works, which represents those responsible for traffic operations and maintenance throughout the County. An example of a generic stakeholder name would be Maui EMS, which represents all of the EMS operations for Maui, which are currently contracted to a vendor.

TABLE 9: MAUI STAKEHOLDERS

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
Hawaii Department of Transportation - Highways Division	The Hawaii Department of Transportation, Highways Division (HDOT-HWY) plans, designs and supervises the construction and maintenance of the State Highway System.	HDOT-HWY
Hawaii Department of Transportation - Highways Division, Maui District	The Hawaii Department of Transportation, Highways Division, Maui District performs for the islands of Maui, Molokai and Lanai 1) engineering services and field inspections of transportation construction projects in conformance with approved plans and specifications, and 2) maintenance, alteration and repair of roads, highways and related structures.	HDOT-HWY-M
Hawaii Department of Transportation - Airports Division, Maui District	The Hawaii Department of Transportation, Airports Division, Maui District (HDOT-AIR-M) manages, operates and maintains all State airports on the islands of Maui, Lanai and Molokai in conformity with State and Federal laws and requirements, and has responsibility for all aspects of airport operations including fire, security, parking, etc. HDOT-AIR-M is not responsible for Homeland Security.	HDOT-AIR-M
Hawaii Department of Transportation - Harbors Division, Maui District	The Hawaii Department of Transportation, Harbors Division, Maui District (HDOT-HAR-M) manages, operates and maintains all commercial State harbors on the island of Maui, Lanai and Molokai. HDOT-HAR-M manages harbors at Kahului, Hana, Kaunakakai and Kaumalapau.	HDOT-HAR-M

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
County of Maui Department of Public Works	The County of Maui Public Works Administration directs and oversees the three operating divisions in the Department of Public Works: Development Services Administration, Engineering Division and Highways Division. The mission of Public Works is to protect the health, safety, property and environment of the public by developing and operating County infrastructure and administering its building codes.	Maui DPW
County of Maui Department of Fire and Public Safety	The Department of Fire and Public Safety provides emergency and non-emergency services for the islands of Maui, Molokai, Lanai and Kahoolawe and the surrounding waters. The Department has 14 fire stations throughout the County of Maui.	Maui Fire
County of Maui Police Department	The mission of the Maui Police Department is to serve the community in a manner that epitomizes those ideals woven into the fabric of the Constitution of the United States and the spirit of aloha.	Maui Police
County of Maui - Civil Defense Agency	The County of Maui Civil Defense Agency is responsible for administering and operating the various local, state and federal civil defense programs for the county. This includes planning, preparing and coordinating civil defense operations in meeting disaster situations and coordinating post-disaster recovery options. In addition, the County of Maui Civil Defense operates the County of Maui Emergency Operations Center (EOC).	Maui CDA
County of Maui Department of Management IT Services	The Information Technology Services Division (ITSD) serves as the central information technology agency for the County of Maui. The ITS Services Division assists the County's departments and agencies in the use of computer technology to achieve their goals and objectives.	Maui IT
County of Maui Department of Transportation	The County of Maui Department of Transportation is responsible for planning and implementing all modes of transportation in the County of Maui, including those in the air and those on the water and land. In addition, it is responsible for planning and developing an efficient program to facilitate the rapid, safe and economical movement of people and goods in the County of Maui. Finally, the department is responsible for coordinating transportation programs in the County of Maui with other county departments and with agencies of the state and federal government.	Maui DOT
State of Hawaii Emergency Management Agency	The State of Hawaii Emergency Management Agency (HIEMA) leads the State of Hawaii in the preparation for, response to, and recovery from disasters and emergencies. It works to save lives, protect property and protect infrastructure. HIEMA is responsible for standing up and operating State Emergency Operations Center (EOC), collecting information, organizing it and providing it to senior leaders to make decisions.	Hawaii Emergency Management Agency
Hawaii Health Systems Corporation	Hawaii Health Systems Corporation (HHSC) is a public benefit corporation of the government of the State of Hawaii which owns and operates hospitals and care facilities in the County of Maui.	---
Hawaii Visitors and Convention Bureau	Hawaii Visitors Convention Bureau (HVCB) is the marketing organization contracted to HTA with responsibility for the U.S. market. The HVCB is a private, nonprofit membership organization with island chapters on Kauai, Maui, Oahu and Hawaii. Each of these reports to the HVCB; each has a seat at its respective County EOC.	HVCB

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
NOAA	The National Oceanic and Atmospheric Administration is responsible for weather reports and weather-related disaster alerts.	NOAA
Pacific Disaster Center	The Pacific Disaster Center (PDC) is responsible for data collection and observation systems, computing, impact modeling and risk assessment, visualization, and information and communication systems to empower decision makers, disaster management professionals and the public.	PDC
The American Red Cross	The American Red Cross is a nonprofit providing disaster relief to those in need.	---
	Generic Maui Stakeholders	
County of Maui Data Warehouse Stakeholder	This generic stakeholder represents a future agency or agencies responsible for the Maui Data Warehouse.	---
Event Promoters	This generic stakeholder represents local bodies that promote events.	---
Local Media	This generic stakeholder represents owners/operators of communications media, including television, radio and newspapers.	---
Medical Transportation	Entity responsible for providing emergency and non-emergency medical transportation in the County of Maui. This is provided by a private company which is contracted statewide to provide these services.	Maui EMS
Private Sector Traveler Information Services	This generic stakeholder represents private traveler and transportation information service providers.	---
Travelers	This generic stakeholder represents the general public, including passengers and travelers.	Private Travelers

5.3 Maui Operational Concepts by Stakeholder

An operational concept documents each stakeholder's current and future roles and responsibilities in the operation of the regional ITS across a range of transportation services. Services covered by the Maui Regional ITS Architecture, in order of influence, include:

- **Traffic Signal Control**. The development of traffic signal systems that react to changing traffic conditions and provide coordinated intersection timing over a corridor, an area or multiple jurisdictions.
- **Incident Management**. The development of systems to provide rapid and effective response to incidents. Includes systems to detect and verify incidents, along with coordinated agency response to the incidents.
- **Transit Management**. The development of systems to more efficiently manage fleets of transit vehicles or transit rail. Includes systems to provide transit traveler information both pre-trip and during the trip as well as electronic fare payment systems used on transit vehicles.

- **Information Dissemination**. The development of systems to provide static and real-time transportation information to travelers.
- **Emergency Management**. The development of systems to provide emergency call taking, public safety dispatch and emergency operations center operations.
- **Maintenance and Construction Management**. The development of systems to manage the maintenance of roadways in the region, including the management of construction operations.
- **Airport Operations**. The development of systems to aid transportation to and from an airport. These may include some elements of parking management and security monitoring.
- **Archive Data Management**. The development of systems to collect transportation data for use in non-operational purposes (e.g., planning and research).
- **Harbor Operations.** The development of systems to aid transportation of people, goods and services to and from harbors. This may include elements of security monitoring and traffic control coordination.
- **System Management.** The development and maintenance of communications infrastructure, used in this case to provide vital support for Intelligent Transportation Systems.

The complete list of operational concepts organized by stakeholder and then by service is in Table 10.

TABLE 10: MAUI OPERATIONAL CONCEPTS, BY STAKEHOLDER

Stakeholder	Service Area	Role and Responsibility Description	Status
HDOT Highways Division, Maui District (HDOT-HWY-M)	Incident Management	Provide incident information to travelers via traffic information devices on State roads.	Existing
		Coordinate maintenance resources for incident response with County maintenance and construction systems.	Existing
		Perform network surveillance for detection and verification of incidents on State roads.	Future
		Send traffic/incident information and traffic images to 911 Communications Center and the County of Maui EOC.	Future
	Maintenance Management	Perform roadway maintenance on State-owned roads.	Existing
		Perform maintenance on roadway equipment including traffic signals.	Existing
	Information Dissemination	Provide traffic information to travelers via HDOT dynamic message signs (DMS).	Existing
	Traffic Signal Control	Operate traffic signal systems for State-owned intersections.	Existing
		Provide emergency signal preemption for County Fire and EMS vehicles.	Existing

Stakeholder	Service Area	Role and Responsibility Description	Status
		Coordinate traffic information and traffic control with Maui County Department of Public Works.	Future
		Obtain traffic images and traffic flow data through closed-circuit television (CCTV) cameras and field sensors, and maintain operational control of its own field equipment.	Future
HDOT Highways Division, Maui District (HDOT-HWY-M)	Emergency Management	Coordinate incident and threat information with the County of Maui EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the County of Maui EOC (e.g., WebEOC).	Existing
		Coordinate incident and threat information with the State EOC.	Existing
HDOT, Airports Division, Maui District (HDOT-AIR-M)	Airport Operations	Monitor secure areas using surveillance equipment, including CCTV.	Existing
		Manage parking at the Kahului airport.	Existing
	Emergency Management	Provide emergency response including fire response for Kahului Airport, and smaller airports on Maui, Molokai and Lanai.	Existing
		Monitor secure areas using surveillance equipment, including CCTV.	Existing
		Coordinate incident and threat information with the County of Maui EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the County of Maui EOC.	Existing
HDOT, Harbors Division, Maui District (HDOT-HAR-M)	Harbor Operations	Manage and operate commercial harbors in Maui, Molokai and Lanai.	Existing
		Manage entry and exit of commercial vehicles to the ports.	Existing
		Perform video surveillance of secure areas within harbor facilities.	Existing
		Manage commercial vehicle traffic at entry and exit to Kahului Harbor.	Existing
	Emergency Management	Coordinate incident and threat information with the County of Maui EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the County of Maui EOC.	Existing
Maui County Department of Public Works (Maui DPW)	Incident Management	Coordinate maintenance resources for incident response with State maintenance and construction systems.	Existing
		Provide incident information to travelers via traffic information devices on State roads.	Future

Stakeholder	Service Area	Role and Responsibility Description	Status
		Perform network surveillance for detection and verification of incidents on County roads, and send traffic/incident information and traffic images to 911 Center and County of Maui EOC.	Future
	Emergency Management	Coordinate incident and threat information with the County of Maui EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the County of Maui EOC (e.g., WebEOC).	Existing
	Information Dissemination	Provide traffic information to travelers via County of Maui website or DMS equipment.	Future
	Traffic Signal Control	Operate traffic signal systems for County of Maui-owned intersections.	Existing
		Provide emergency signal preemption for Maui Fire and Maui EMS vehicles.	Existing
		Coordinate traffic information and traffic control with HDOT-HWY-M.	Future
		Obtain traffic images and traffic flow data through CCTVs and field sensors, and maintain operational control of its own field equipment.	Future
Maui County Fire Department (Maui Fire)	Emergency Management	Coordinate incident and threat information with the County of Maui EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the County of Maui EOC (e.g., WebEOC).	Existing
		Provide response vehicles and personnel to emergencies in the County of Maui.	Existing
		Receive local signal preemption from State or County of Maui traffic signals.	Existing
	Incident Management	Participate in incident response, coordination and reporting.	Existing
Medical Transportation	Emergency Management	Coordinate incident and threat information with the County of Maui EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the County of Maui EOC (e.g., WebEOC).	Existing
		Provide emergency medical response to emergencies in the County of Maui.	Existing
		Receive local signal preemption from State and County of Maui traffic signals.	Future
	Incident Management	Provide emergency medical response for traffic incidents countywide.	Existing

Stakeholder	Service Area	Role and Responsibility Description	Status
	Maui Archived Data	Collect transportation data from agencies in the County of Maui.	Planned
County of Maui Police Department (Maui Police)	Emergency Management	Provide response vehicles and personnel to emergencies in the County of Maui.	Existing
		Coordinate incident and threat information with the County of Maui EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the County of Maui EOC (e.g., WebEOC).	Existing
		Dispatch vehicles for Maui County Police, Maui County Fire and Maui County EMS.	Existing
	Incident Management	Provide response to traffic incidents.	Existing
		Receive emergency calls for incidents in Maui County and coordinate incident response with local public safety agencies, including Maui County EMS and Maui County Fire.	Existing
		Coordinate HAZMAT spill incident response with Maui County Fire.	Existing
		Upload crash records data to HDOT Highway Division, Traffic Safety Section.	Existing
County of Maui Civil Defense Agency (Maui CDA)	Emergency Management	Operate the County EOC, including incident coordination, with regional emergency management providers.	Existing
		Develop and coordinate countywide emergency plans, evacuation and reentry plans, and disaster management plans.	Existing
		Provide evacuation and incident information to travelers in the region using e9-1-1, HDOT GoAkamai System, the Maui County Website and through private traveler information providers.	Future
		Coordinate with the National Weather Service systems (e.g., Pacific Tsunami Warning Center).	Existing
		Coordinate incident and threat information as part of an early warning system for the County of Maui with the State EOC.	Existing
		Coordinate wide-area-alert notifications for the County of Maui, including Maile Amber Alerts and Silver Alerts.	Existing
		Coordinate emergency plans and maintenance resources with HDOT-HWY-M Maintenance and County of Maui DPW Maintenance.	Existing
	Incident Management	Participate in incident response, coordination and reporting.	Existing
County of Maui Department of	Transit Management	Provide fixed-route transit and demand-responsive bus service for the County.	Existing

Stakeholder	Service Area	Role and Responsibility Description	Status
Transportation (Maui Bus)		Provide a demand-responsive bus transit plan to users and travelers using the Maui Bus traveler information system.	Existing
		Track and evaluate schedule performance for all Maui Bus vehicles.	Future
		Coordinate with Maui County and HDOT Maui for traffic signal priority.	Future
		Provide transit traveler information via Maui Bus Traveler Information System, the Maui Bus Transit App and Maui Bus Hub Displays.	Future
		Provide transit security on all Maui Bus vehicles using silent alarms and on-board video surveillance.	Future
		Provide operator instructions and receive schedule performance data from Maui Bus vehicles while in service.	Future
		Provide automated transit maintenance scheduling on all Maui Bus vehicles using automated vehicle conditions reporting.	Future
Maui County Department of Management IT Services (Maui IT)	System Management	Develop IT and ITS Projects for the County of Maui.	Existing
		Monitor and maintain the communications network for the County of Maui.	Existing
Maui Metropolitan Planning Organization (Maui MPO)	Archive Data	Collect transportation data from agencies in the County of Maui.	Future

5.4 Maui ITS Inventory by Stakeholder

The Maui Regional ITS Architecture inventory is a list of "elements" that represent all existing and planned ITS in the region as well as non-ITS that provide information to, or receive information from, the ITS. These elements are owned, operated or maintained by stakeholder agencies, companies or groups. The inventory focuses on systems that support, or may support, interfaces that cross stakeholder boundaries (e.g., public- to-private interfaces).

Each element in the inventory is described by a name, the stakeholder, a description, general status (e.g., existing or planned) and the associated subsystems or terminators from the National ITS Architecture that the element is mapped to, for modeling purposes.

The majority of elements in the inventory represent a specific existing or planned system. An example of a specific system is the *HDOT-AIR-M Command Center*.

Some elements represent sets of devices rather than a single specific system or device. An example of this type of element is the element *HDOT-HWY-M Field Equipment*, which represents all existing or planning ITS field devices that are, or will be, operated by HDOT-HWY-M in Maui. The element describes the types of field device, not the specific number of each device.

Another element in the inventory is a "generic" element that represents all of the systems of a certain type in the region. An example of this type of element is Media, which represents all potential media outlets, such as television stations, websites, radio or newspapers, that may wish to connect to an Intelligent Transportation System. These generic elements have been created for two primary reasons. First, they represent elements with similar types of interfaces. So, from a standardization standpoint, describing how one of the major elements in the region (e.g., the HDOT-HWY-M Traffic Operations Centers) interfaces with various media outlets would be the same. Second, describing many systems with a single element helps keep an ITS architecture from growing too large.

The ITS Inventory for Maui organized by stakeholder is presented in Table 11.

TABLE 11: MAUI ITS INVENTORY, BY STAKEHOLDER

Stakeholder Name	Stakeholder Abbreviation	Maui ITS Architecture Subsystems and Elements
Hawaii Deparment of Transportation – Highways Division	HDOT-HWY	• GoAkamai • HDOT, Highways Division, Traffic Safety
Hawaii Department of Transportation – Highways, Maui Division	HDOT-HWY-M	• HDOT-HWY-M Traffic Operations Center • HDOT-HWY-M Field Devices • HDOT-HWY-M Maintenance Dispatch • HDOT-HWY-M Maintenance Vehicles • HDOT-HWY-M Call Boxes
Hawaii Department of Transportation – Airports, Maui District	HDOT-AIR-M	• HDOT-AIR-M Command Center • HDOT-AIR-M Field Devices • HDOT-AIR-M Infrastructure Monitoring Equipment • HDOT-AIR-M Parking System
Hawaii Department of Transportation – Harbors, Maui Division	HDOT-HAR-M	• HDOT-HAR-M Security Center • HDOT-HAR-M Infrastructure Monitoring Equipment • HDOT-HAR-M Field Devices
County of Maui – Department of Public Works	DPW	• Maui DPW Traffic Operations Center • Maui DPW Field Devices • Maui DPW Maintenance Dispatch • Maui DPW Maintenance Vehicles
County of Maui – Department of Fire and Public Safety	Maui Fire	• Maui Fire Base • Maui Fire Vehicles • Maui Fire Personnel

Stakeholder Name	Stakeholder Abbreviation	Maui ITS Architecture Subsystems and Elements
County of Maui – Police Department	Maui Police	• Maui 911 Communications Center • Maui Police Vehicles • Maui Police Departmental Operations Center
County of Maui – Civil Defense Agency	Maui CDA	• County of Maui EOC
County of Maui – Department of Transportation	Maui DOT	• Maui Bus Fixed Route Dispatch • Maui Bus Paratransit Dispatch • Maui Bus Fixed Route Vehicles • Maui Bus Paratransit Vehicles • Mau Bus Traveler Information System • Mau Bus Baseyard • Maui Bus Hub Displays • Maui Bus Transfer Hub Security Equipment
County Maui – Department of Management IT Services	Maui IT	• County of Maui Website • Maui IT Services Event Management System
State of Hawaii Emergency Management Agency	Hawaii State EOC	• Hawaii State EOC
Medical Transportation	Maui EMS	• EMS Base • EMS Vehicle
Other Elements		• Media • Maui Medical Memorial Hospital • Maui Data Warehouse • Maui Visitors and Convention Bureau • National Weather Service • Pacific Disaster Center • Pacific Tsunami Warning Center • Private Traveler Information Services • Private Personal Computing Devices • Private Traveler Information Services • Red Cross • Event Generators

5.5 Maui Summary Diagrams

The Maui ITS Architecture incorporates a number of services. While some services are internal to a single agency and do not involve multiple agencies, oftentimes it is beneficial to understand the interactions between numerous agencies that support a consolidated service. In an effort to present this information in a holistic manner summary, service package diagrams have been drawn for these areas:

- Traffic Management
- Incident Management and Emergency Response
- Emergency Management Disaster/Evacuation
- Traveler Information

5.5.1 Traffic Management

The summary diagram for traffic management (Figure 8) shows that the County of Maui and State of Hawaii work together in the sharing of traffic information and control of traffic between traffic management centers to support regional traffic management strategies.

Currently on Maui, there are a number of traffic signals that are operated by the County independently from the State and vice versa. Both the Maui Department of Public Works (County) and the Maui District of the HDOT Highways Division (State) expressed their desire to have a coordinated traffic signal system that can be remotely controlled from a single, co-located traffic management center. Both agencies would like to add CCTV cameras, DMS and other ITS field equipment that is used to enhance traffic operations, and ultimately provide real-time traffic information to the public.

5.5.2 Incident Management and Emergency Response

Traffic incident management consists of a planned and coordinated multi-disciplinary process to detect, respond to and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible. Figure 9 shows the State and County plan to use new traffic devices to assist in incident detection. For a number of years, signal preemption technology has been used by Fire and EMS to change traffic signals from red to green when fire trucks and ambulances respond to a 911 call. Maui Police vehicles are equipped with mobile data terminals (MDTs) that are connected to their computer aided dispatch (CAD) system and are for Fire and EMS vehicles in the future.

As part of a State Department of Health initiative, all ambulances on Maui are equipped with tablets that provide electronic charting for patient care prior to admission at Maui Memorial Medical Center (the island's only hospital facility).

In many parts of the State, HDOT call boxes are being removed because of the proliferation of mobile phones and the expansion of wireless networks. However, along Maui's Hana Highway, there are numerous areas where communications are severely limited. In these areas, the State is keeping the call boxes and is open to adding a CCTV camera at the call box location for verification purposes.

FIGURE 8: MAUI TRAFFIC MANAGEMENT SUMMARY DIAGRAM

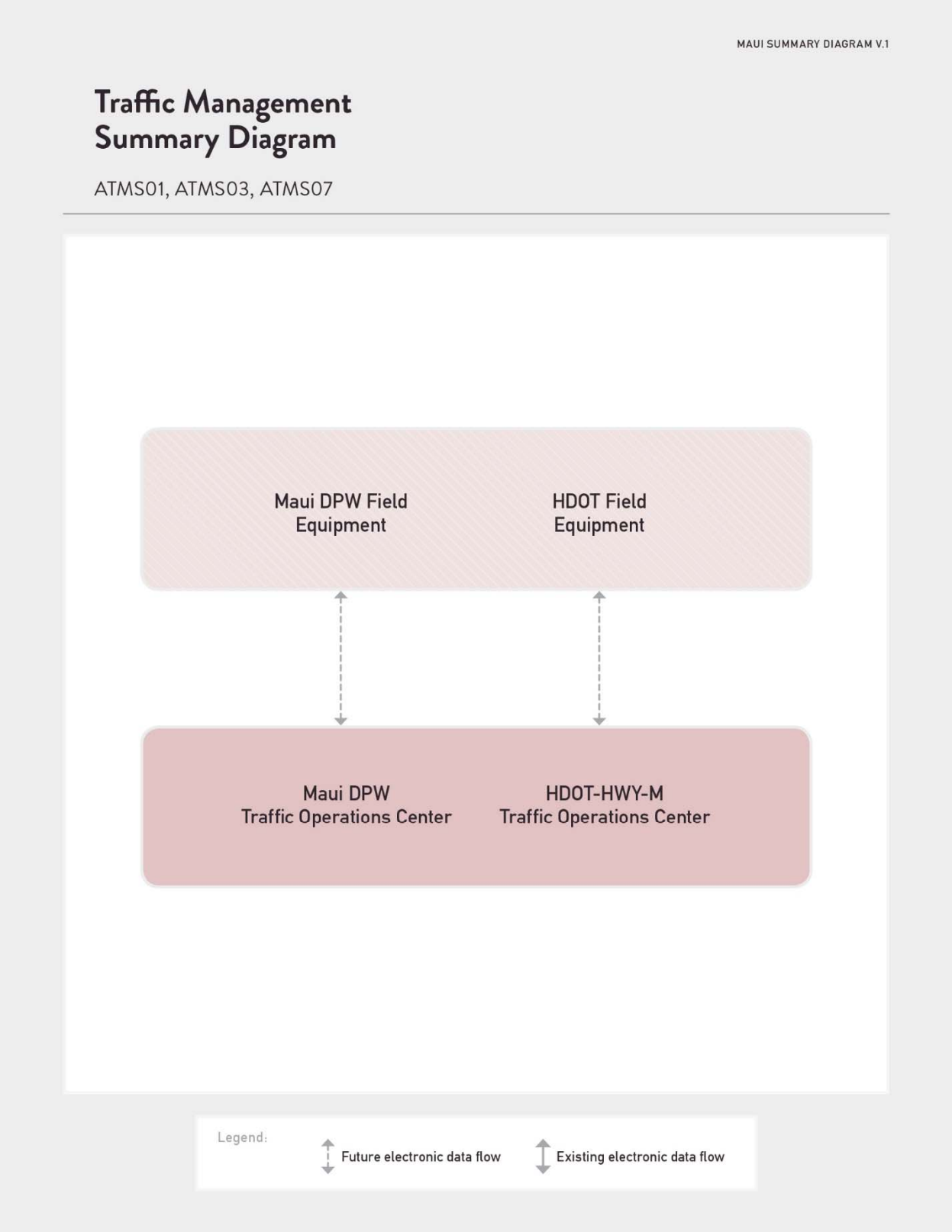
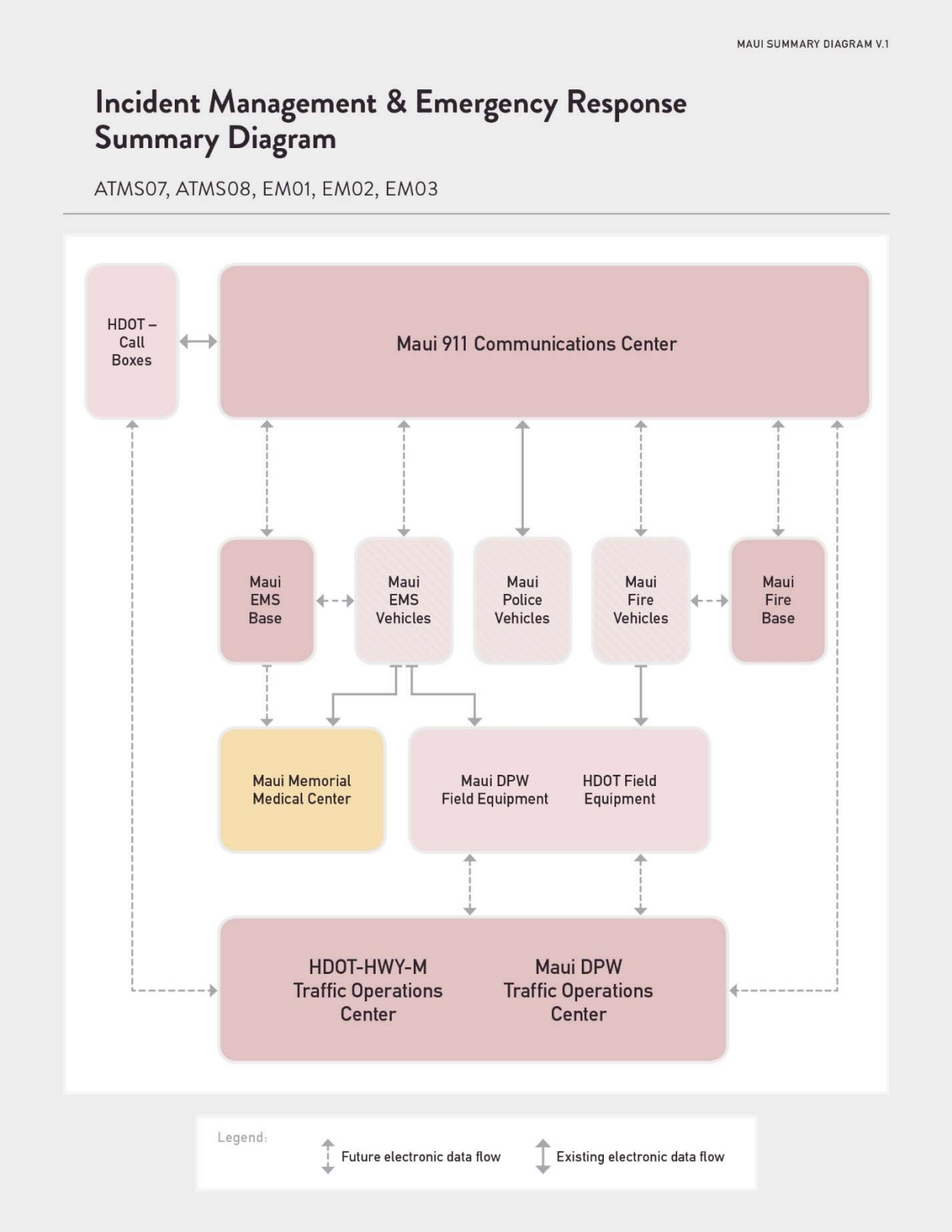


FIGURE 9: MAUI INCIDENT MANAGEMENT & EMERGENCY RESPONSE SUMMARY DIAGRAM



5.5.3 Emergency Management Disaster/Evacuation

Combined with Emergency Management (EM), the Disaster Response and Recovery summary service package enhances the ability of the surface transportation system to respond to, and recover from, disasters. As shown in Figure 10, the services address the most severe incidents that require an extraordinary response from outside the local community. All types of disasters are addressed including natural disasters (hurricanes, earthquakes, tsunamis, etc.) and technological and man-made disasters. As shown in the summary diagram, the County's EOC is at the center and coordinates between multiple agencies and entities in response and recovery. Depending on the severity of the event, representatives from public safety, human services, infrastructure agencies and private utilities each have seats at the EOC to ensure a collaborative response. The interfaces between the EOC, first responders and transportation agencies provide situational awareness and resource coordination.

When activated, Maui's EOC provides wide area alerts and disaster traveler information to the public electronically through its website, social media and subscription notifications. The Maui Police Department provides external access at the EOC to its 911 CAD system and Maui Bus assists in the evacuation of the people as needed. The HDOT Harbors Division Maui District is completing construction of a statewide monopole system that will allow communications between the State Harbors as well as provide a communications link to the Maui EOC from Harbors operations during a disaster event.

5.5.4 Traveler Information

Figure 11 shows the collection of data — traffic conditions, advisories, incident information and the like — broadcast to the public. The automatically generated information is likely to include images from County and State traffic cameras, incident alerts and a congestion map. HDOT currently operates and maintains the GoAkamai traveler information system on Oahu - a free web service that consolidates regional transportation information into a one-stop resource. GoAkamai is currently disseminating real-time traffic information to Oahu travelers and it is envisioned that traffic information from future ITS deployments on Maui will be published on GoAkamai's website (http://www.goakamai.org/) and mobile app.

As seen in Figure 11, it is envisioned that traffic and incident information will automatically be populated into GoAkamai from the future traffic operations centers.

In addition, GoAkamai already has the capability to provide personalized traveler information interactively — meaning that a traveler may set up a profile on GoAkamai.org to request alerts about traffic congestion, construction and incidents on Oahu.

FIGURE 10: MAUI EMERGENCY MANAGEMENT DISASTER/EVAUCATION SUMMARY DIAGRAM

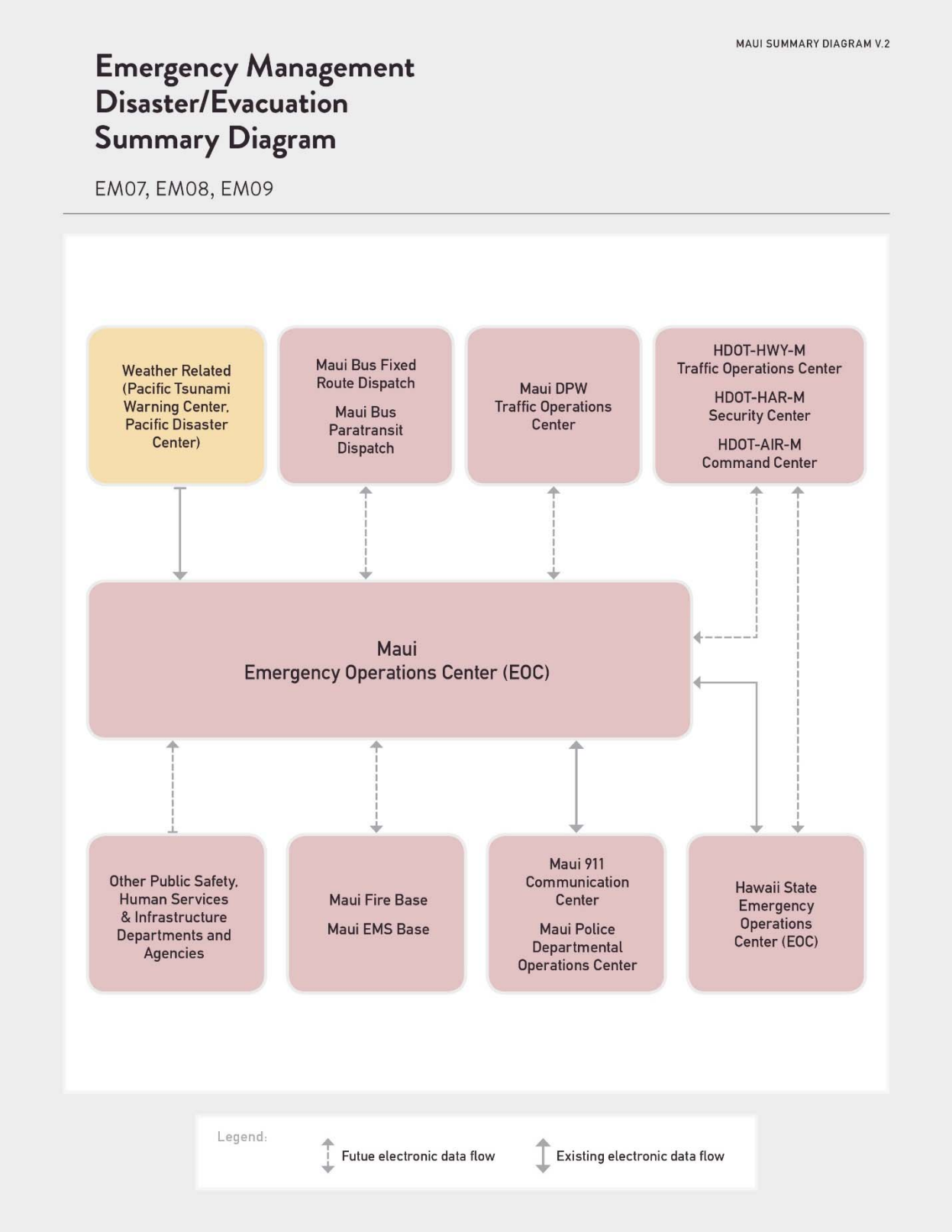
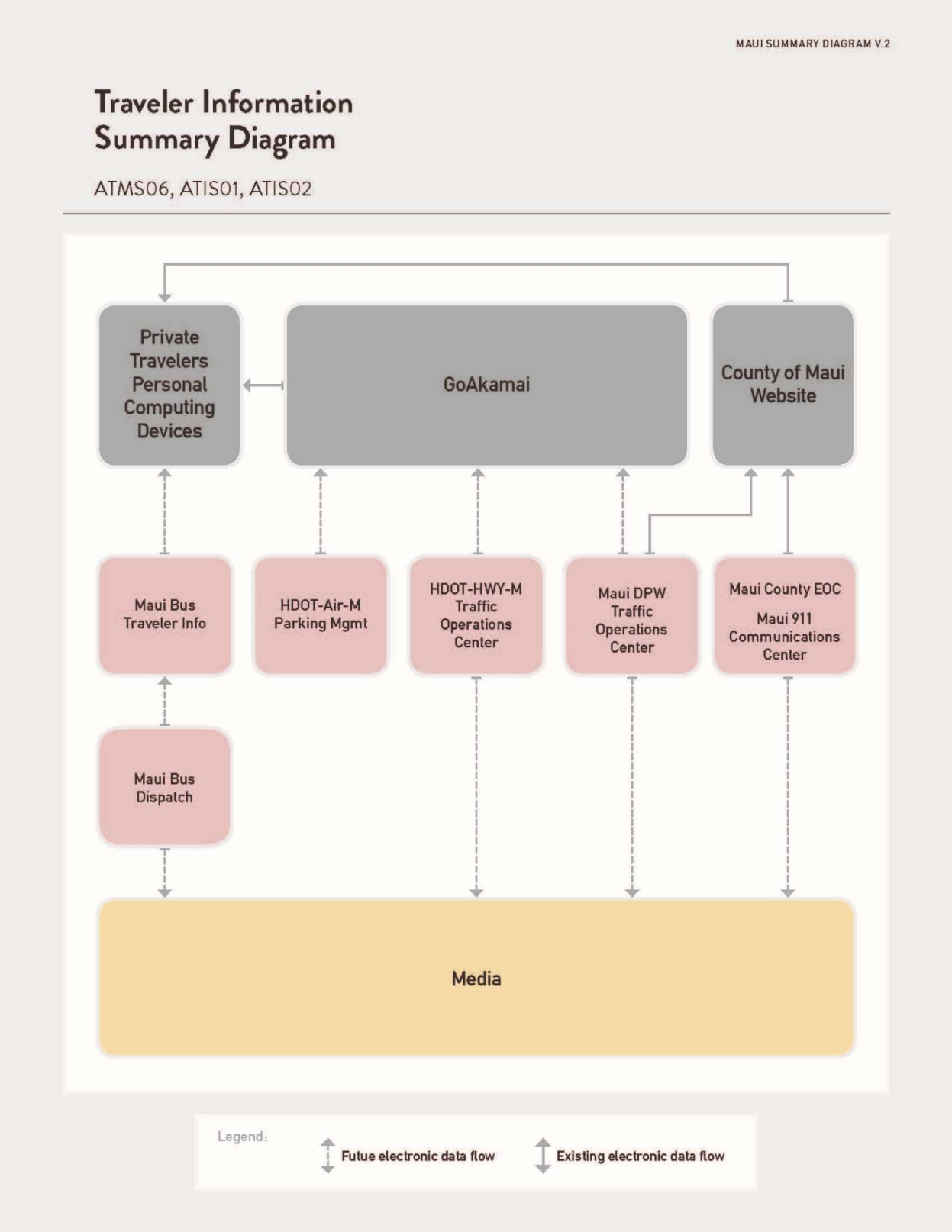


FIGURE 11: MAUI TRAVELER INFORMATION SUMMARY DIAGRAM



5.6 Selected Maui Regional Service Packages

A full set of the Maui Customized Service Package Diagrams are provided in Appendix C. Table 12 summarizes the listing of Service Packages for the Maui ITS Architecture.

TABLE 12: SELECTED REGIONAL SERVICES (SERVICE PACKAGES) FOR MAUI

Service Package	Service Package Name
Archived Data (AD)	
AD2	ITS Data Warehouse
Advanced Public Transportation Systems (APTS)	
APTS01	Transit Vehicle Tracking
APTS02	Transit Fixed-Route Operations
APTS03	Demand Response Transit Operations
APTS05	Transit Security
APTS07	Multi-modal Coordination
APTS08	Transit Traveler Information
APTS09	Transit Signal Priority
APTS10	Transit Passenger Counting
Advanced Traveler Information Systems (ATIS)	
ATIS01	Broadcast Traveler Information
ATIS02	Interactive Traveler Information
Advanced Traffic Management Systems (APTS)	
ATMS01	Network Surveillance
ATMS03	Traffic Signal Control
ATMS06	Traffic Information Dissemination
ATMS07	Regional Traffic Management
ATMS08	Traffic Incident Management System
ATMS12	Roadside Lighting System Control
ATMS17	Regional Parking Management
Emergency Management (EM)	
EM01	Emergency Call-Taking and Dispatch
EM02	Emergency Routing
EM03	Mayday and Alarms Support
EM05	Transportation Infrastructure Protection
EM06	Wide Area Alert

Service Package	Service Package Name
EM07	Early Warning Systems
EM08	Disaster Response and Recovery
EM09	Evacuation and Reentry Management
EM10	Disaster Traveler Information
Maintenance and Construction (MC)	
MC01	Maintenance and Construction Vehicle and Equipment Tracking
MC02	Maintenance and Construction Vehicle Maintenance
MC07	Roadway Maintenance and Construction
MC08	Work Zone Management
MC10	Maintenance and Construction Activity Coordination
MC12	Infrastructure Monitoring

5.7 Maui Project List

The projects included in the Maui Regional ITS Architecture are summarized in Table 13, with project sheets provided in Appendix D.

Near-term projects will be implemented in 0-5 years; long-term projects will be implemented thereafter.

TABLE 13: MAUI PROJECT LIST

Name	Description	Timeframe
County of Maui DPW and PD Coordination	This project will coordinate with Maui Police Department to share information (e.g., speed).	Long-Term
County of Maui DPW Closed Circuit Television (CCTV)	This project will add CCTV on County of Maui roads for traffic operations and monitoring.	Long-Term
County of Maui DPW Conduit	This project will add spare capacity to conduit to County of Maui DPW construction projects.	Near-Term
County of Maui DPW Signal Programming Software Upgrade	This project will upgrade the County of Maui signal software.	Long-Term
County of Maui DPW Smart Lighting System	This project will deploy a smart lighting system on County of Maui streetlights.	Long-Term
County of Maui DPW Traffic Operations Center	This project will develop a traffic operations center (TOC) to monitor the County of Maui traffic signal system and CCTVs.	Long-Term
County of Maui DPW Traffic Signal Upgrade	This project will interconnect all County of Maui Traffic Signals.	Long-Term
County of Maui DPW Traffic Systems Upgrade	This project will upgrade County of Maui Traffic Systems, including signals and CCTV.	Near-Term

Name	Description	Timeframe
County of Maui Emergency Operations Center	This project will create a new EOC. Tenants in the new EOC will likely include the County of Maui Civil Defense Agency, Information Technology, 911 Center and Radio Shop.	Long-Term
County of Maui IT Communications System Upgrade	This project will upgrade the communications network for the County of Maui to enable an expansion of CCTV and signals for County of Maui DPW.	Near-Term
HDOT-AIR-M Closed Circuit Television (CCTV)	This project will install roadside CCTV for security and traffic operations to be deployed on the new road leading to Kahului Airport.	Long-Term
HDOT-AIR-M Dynamic Message Signs (DMS)	This project will deploy variable or dynamic message signs (VMS/DMS) to tell drivers leaving Kahului Airport about road closures or other relevant data.	Long-Term
HDOT-AIR-M Parking Management System	This project will create an automated parking management system for Kahului Airport visitors and employee parking.	Long-Term
HDOT-HAR-M Surveillance	This project will deploy additional port surveillance.	Near-Term
HDOT-HAR-M Traffic Control	The Kahului Ports Development Plan calls for placing ITS in the region of the port to monitor and manage traffic. They may develop large check-in lanes. These plans could include cameras and signals operated by HDOT-HAR-M.	Long-Term
HDOT-HWY-M Closed Circuit Television (CCTV) Expansion	This project will add CCTV on State roads.	Long-Term
HDOT-HWY-M Dynamic Message Signs (DMS)	This project will upgrade the DMS located south-bound on Highway 30 (to Lahaina) to be remotely configured. This project also includes installation of new DMS on State roadways in the County of Maui (actual locations TBD).	Long-Term
HDOT-HWY-M Traffic Operations Center (TOC)	This project will create a traffic control center from which State traffic signals and other ITS equipment in the County of Maui will be monitored.	Long-Term
HDOT-HWY-M Traffic Signal Upgrade	This project will upgrade the State traffic signal system in the County of Maui to have remote monitoring capability.	Long-Term
Maui Bus Automated Vehicle Location (AVL)	This project will deploy AVL on Maui Bus fixed-route vehicles. Maui Bus currently has GPS on their transit vehicles, but it must be manually downloaded. This project will create a wireless connection to the Maui Bus GPS.	Near-Term
Maui Bus CCTV	This project will connect the cameras currently deployed on Maui Bus vehicles and connect them to the Maui Bus Dispatch Center, so that images will be able to be viewed live at the center.	Long-Term
Maui Bus Enhanced Transit Traveler Information	This project will enhance a future Maui Bus Transit Traveler Information System to include: (1) number of unused bike positions on a bus; (2) electronic advertising on buses and at hubs; (3) automated announcements on buses.	Long-Term
Maui Bus Next Bus Information	This project will deploy a notification system, similar to C&C Honolulu's TheBus HEA smartphone app, to provide next bus information to customers via a smartphone.	Near-Term

Name	Description	Timeframe
Maui Bus Passenger Counting	This project will install passenger counters on the Maui Bus fixed-route system.	Long-Term
Maui Bus Roadside Equipment	This project will add roadside equipment at bus stops (i.e., at remote bus stops without lighting).	Long-Term
Maui Bus Transit Hubs	This project will create three new bus hubs in South Maui, West Maui and Central Maui. The hubs will include electronic signs with next bus information.	Long-Term
Maui Bus Transit Signal Priority	This project will deploy transit signal priority in the County of Maui.	Long-Term
Maui CDA CCTV Coordination	This project will provide a connection to the County of Maui EOC with sister agencies to see CCTV images and improve situational awareness.	Long-Term
Maui CDA Everbridge	This project will fully implement the Everbridge disaster traveler information notification (including reverse 911) system.	Near-Term
Maui EMS Automated Vehicle Location (AVL)	This project will add AVL to all Maui EMS vehicles via the Fleet Eyes System.	Near-Term
Maui EMS HEMSIS Connection	This project will use MDTs (Mobile Data Terminals) to ensure that CAD (Computer Aided Dispatch) information can be downloaded into HEMSIS (Hawaii Emergency Medical Services Information Services). This project is dependent on the deployment of Maui EMS MDTs.	Long-Term
Maui EMS Mobile Data Terminal (MDT)	This project will install MDTs in Maui EMS vehicles.	Long-Term
Maui Fire Automated Vehicle Location (AVL)	This project will install AVL on Maui Fire vehicles.	Near-Term
Maui Fire Closed Circuit Television (CCTV)	This project will add CCTV cameras to Maui Fire vehicles.	Long-Term
Maui Fire Mobile Data Terminals (MDT)	This project will install MDTs in Maui Fire vehicles.	Near-Term
Maui Fire Wearable Global Positioning System (GPS)	This project will add wearable GPS devices for fire personnel.	Long-Term
Maui Police Department Archived Motor Vehicle Crash Data Archive	This project will archive County of Maui motor vehicle crash data. The data will be electronically provided to HDOT every Monday at 3 am. Formerly, this information was provided in hard copy.	Existing
Maui Police Department Computer Aided Dispatch (CAD) Extension	This project will expand the CAD capabilities so that alerts and notifications may automatically be sent to select agencies in the County of Maui.	Existing
Maui Police Mobile Data Terminal (MDT) Upgrade	This project will upgrade and replace all Maui Police MDTs.	Near-Term

5.8 Existing Maui Agreements

During the stakeholder workshop the topic of existing agreements were discussed and the only one identified to be currently in place is shown in the table below.

TABLE 14: EXISTING MAUI AGREEMENTS

ID	Lead Stakeholder	Agreement Title	Agreement Type	Agreement Status	Description
1	Maui Fire	Maui Fire Department Mutual Aid Agreements	Mutual Aid Agreement	Existing	The Maui Fire Department has mutual aid agreements with the Hawaii Department of Land and Natural Resources, the Hawaii Volcanoes National Parks, HDOT-AIR-M and the Coast Guard.

5.9 Potential Maui Agreements

Each project developed for the Maui ITS Architecture was reviewed and Table 15 represents agreements that may be needed to implement regional projects.

TABLE 15: POTENTIAL AGREEMENTS FOR MAUI

ID	Stakeholders	Agreement Title	Agreement Type	Description	Supporting Project(s) and/or Service Packages
1	• Maui CDA • Maui DPW • HDOT-HWY-M • HDOT-HAR-M • HDOT-AIR-M	Maui EOC Video Sharing Agreement	Data Sharing	Agreement for the sharing of video data from HDOT and Maui County DPW with the Maui EOC.	• Maui CDA CCTV Coordination
2	• Maui DPW • HDOT-HWY-M	Traffic Devices Operations and Maintenance Agreement	Operations and Maintenance	Agreement for the operations and possibly maintenance of HDOT Highways traffic signals and future ITS devices by County of Maui Department of Public Works.	• Maui DPW Traffic Signal Upgrade • HDOT-HWY-M Traffic Signal Upgrade
3	• Maui DOT • Maui DPW • HDOT-HWY-M	Transit Signal Priority	Operations	Agreement for the implementation of transit signal priority benefitting Maui Bus at Maui DPW or HDOT-HWY-M controlled intersections.	• Maui Bus Transit Signal Priority
4	• Maui DPW • HDOT-HWY-M	Joint Traffic Management Center	Operations	Agreement for the operations of a Joint Traffic Management Center (TMC). This is one possible option for the development of traffic management capabilities on Maui.	• HDOT-HWY-M TOC • County of Maui DPW TOC

ID	Stakeholders	Agreement Title	Agreement Type	Description	Supporting Project(s) and/or Service Packages
5	• Maui DPW • HDOT-HWY-M	Traffic Video Sharing	Data Sharing and Shared Control	Agreement for sharing video and possibly control between agencies.	• County of Maui DPW CCTV • HDOT-HWY-M CCTV Expansion
6	• Maui DPW • Maui DOT • Maui Data Warehouse Stakeholder • HDOT-HWY	Archive Data	Data Sharing	Agreement for archiving of Maui County and/or HDOT data by the Maui Data Warehouse Stakeholder (who is currently not defined).	• Service Package AD2

6 Kauai Regional ITS Architecture

6.1 Overview

The Kauai Regional ITS Architecture began with a Kick-off Meeting on June 22, 2015, with in-person interviews the same week. A stakeholder workshop was held on September 9, 2015. The details of the final Kauai Regional ITS Architecture are provided in this chapter, in Appendix E & F and on the hyperlinked website: http://hawaii.itsarchitecture.org.

6.2 Kauai Stakeholders

The Kauai ITS Architecture is defined by a set of elements (or systems), each of which is owned (or operated or maintained) by a stakeholder. The agencies that attended stakeholder meetings and that own, operate or maintain elements in the Kauai Statewide ITS Architecture are listed in Table 16.

TABLE 16: KAUAI STAKEHOLDERS

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
Hawaii Department of Transportation – Highways, Kauai Division	The Kauai District of the Hawaii Department of Transportation, Highways Division performs for the island of Kauai 1) engineering services and field inspections of transportation construction projects in conformance with approved plans and specifications; and 2) maintenance, alteration and repair of State roads, highways, and relocated structures.	HDOT-HWY-K
Hawaii Department of Transportation – Airports, Kauai District	The Hawaii Department of Transportation, Airports Division, Kauai District manages, operates and maintains all State airports on the island of Kauai in conformity with state and federal laws and requirements. It has responsibility for all aspects of airport operations including fire, security, restaurants, parking, etc. HDOT-AIR-K is not responsible for Homeland Security. HDOT-AIR-K's Airport Rescue and Fire Fighting (ARFF) has primary responsibility for responding to emergencies at the Lihue Airport and supports the Kauai County Fire Department as needed.	HDOT-AIR-K
Hawaii Department of Transportation – Harbors, Kauai Division	The Hawaii Department of Transportation, Harbors Division, Kauai District manages, operates and maintains all commercial State harbors on the island of Kauai including the harbors at Nawiliwili and Port Allen.	HDOT-HAR-K
County of Kauai – Department of Public Works	The County of Kauai Department of Public Works provides engineering and inspection services to plan and construct highway, drainage and bridge replacement projects for the County of Kauai and maintains County of Kauai roads.	Kauai DPW
County of Kauai – Fire Department	The Kauai Fire Department (KFD) has fire-fighting responsibility for the County of Kauai. In addition to fire-fighting, KFD provides emergency and non-emergency services for the island of Kauai and responds to medical issues and rescues (e.g., hikers).	Kauai Fire
County of Kauai – Police Department	The Kauai Police Department (KPD) is the primary provider of law enforcement services for Kauai County, including traffic enforcement and incident response. KPD provides emergency response for the County of Kauai. KPD is also responsible for the organization and operation of the 911 centralized communications dispatch system.	Kauai Police

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
County of Kauai – Civil Defense Agency	The Kauai Civil Defense Agency is responsible for administering and operating the various local, state and federal civil defense programs for the county. This includes planning, preparing and coordinating civil defense operations in meeting disaster situations and coordinating post-disaster recovery options, as well as operating the Kauai County Emergency Operations Center (EOC).	Kauai CDA
County of Kauai - Department of Finance, Information Technology	Organizationally under the Department of Finance, the Information Technology (Kauai County IT) Division is responsible for maintaining the IT infrastructure for the County of Kauai, develops, operates and maintains county-wide systems, and supports IT functions for individual agencies.	Kauai IT
Kauai County Transportation Agency	The Kauai County Transportation Agency is responsible for providing public transportation via fixed route buses and paratransit vehicles. The Transportation Agency provides service on Kauai island, from Kekaha to Hanalei. Services are provided seven days a week.	Kauai Bus
Hawaii Emergency Management Agency	The State of Hawaii Emergency Management Agency (HI-EMA) leads the State of Hawaii in the preparation for, response to and recovery from disasters and emergencies. It works to save lives, protect property and protect infrastructure. HI-EMA is responsible for standing up and operating the State EOC, collecting information, organizing it and providing it to senior leaders to make decisions.	HIEMA
Kauai Visitors Bureau	The Kauai Visitors Bureau is a private, nonprofit organization charged with marketing the island of Kauai under the Hawaii Visitors and Convention Bureau (HVCB).	---
NOAA	The National Oceanic and Atmospheric Administration is responsible for weather reports and weather-related disaster alerts.	NOAA
Pacific Disaster Center	The Pacific Disaster Center (PDC) is responsible for data collection and observation systems, computing, impact modeling and risk assessment, visualization, and information and communication systems to empower decision makers, disaster management professionals and the public.	PDC
The American Red Cross	The American Red Cross is a nonprofit providing disaster relief to those in need.	---

Table 17 lists generic Kauai stakeholders — those that either do not have an agency assigned to it (e.g., Kauai Data Warehouse) or may be found in any architecture (e.g., event promoters). Where applicable, an abbreviation for the stakeholder is given.

TABLE 17: GENERIC KAUAI STAKEHOLDERS

Stakeholder Name	Stakeholder Description	Stakeholder Abbreviation
Event Promoters	This generic stakeholder represents local bodies that promote events.	---
Hospital Providers	This generic stakeholder represents the entities operating hospitals on Kauai.	---
Kauai Data Warehouse Stakeholder	This generic stakeholder represents a future stakeholder responsible for the Kauai Data Warehouse.	---
Kauai Parking and Access Provider	This generic stakeholder represents a future parking and access provider in Kauai.	---
Local Media	This generic stakeholder represents owners/operators of communications media, including television, radio and newspapers.	---
Medical Transportation	This generic stakeholder represents the organization responsible for providing emergency and non-emergency medical transportation in the County of Kauai. This is currently provided by a private company which is contracted statewide to provide these services.	Kauai EMS
Medical Transportation	This generic stakeholder represents the organization responsible for providing emergency and non-emergency medical transportation in the County of Kauai. This is currently provided by a private company which is contracted statewide to provide these services.	---
Private Sector Traveler Information Services	This generic stakeholder represents private traveler and transportation information service providers.	---
Shuttle Provider	This generic stakeholder represents a future stakeholder responsible for operating shuttle systems in Kauai.	---
Travelers	This generic stakeholder represents the general public, including passengers and travelers.	---

6.3 Kauai Operational Concepts by Stakeholder

An operational concept documents each stakeholder's current and future roles and responsibilities in the operation of the regional ITS across a range of transportation services. Services covered by the Kauai Regional ITS Architecture, in order of influence, include:

- **Traffic Signal Control**. The development of traffic signal systems that react to changing traffic conditions and provide coordinated intersection timing over a corridor, an area or multiple jurisdictions.

- **Incident Management**. The development of systems to provide rapid and effective response to incidents. Includes systems to detect and verify incidents, along with coordinated agency response to the incidents.
- **Transit Management**. The development of systems to more efficiently manage fleets of transit vehicles or transit rail. Includes systems to provide transit traveler information both pre-trip and during the trip as well as electronic fare payment systems used on transit vehicles.
- **Information Dissemination**. The development of systems to provide static and real-time transportation information to travelers.
- **Emergency Management**. The development of systems to provide emergency call taking, public safety dispatch and emergency operations center operations.
- **Maintenance and Construction Management**. The development of systems to manage the maintenance of roadways in the region, including the management of construction operations.
- **Airport Operations**. The development of systems to aid transportation to and from an airport. These may include some elements of parking management and security monitoring.
- **Harbor Operations.** The development of systems to aid transportation of people, goods and services to and from harbors. This may include elements of security monitoring and traffic control coordination.
- **System Management.** The development and maintenance of communications infrastructure, used in this case to provide vital support for Intelligent Transportation Systems.
- **Archive Data Management**. The development of systems to collect transportation data for use in non-operational purposes (e.g., planning and research).

The complete list of operational concepts organized by stakeholder and service is presented in Table 18. The “status” distinguishes existing from future capabilities.

TABLE 18: KAUAI OPERATIONAL CONCEPTS, BY STAKEHOLDER

Stakeholder	Service Area	Role and Responsibility Description	Status
HDOT Highways Division, Kauai District (HDOT-HWY-K)	Incident Management	Provide incident information to travelers via traffic information devices on State roads.	Existing
		Coordinate maintenance resources for incident response with County maintenance and construction systems.	Existing
		Perform network surveillance for detection and verification of incidents on State roads.	Planned
		Send traffic/incident information and traffic images to 911 Center, Kauai Fire and the Kauai EOC.	Planned
	Maintenance Management	Monitor HDOT-HWY-K Maintenance Vehicles for safety and security.	Existing
		Perform maintenance on roadway equipment, including traffic signals.	Existing
	Information Dissemination	Provide traffic information to travelers via HDOT DMS equipment.	Existing
		Coordinate with the Kauai Visitors Bureau to notify visitors of significant weather alerts, such as tsunami or hurricane warnings.	Existing
	Traffic Signal Control	Operate traffic signal systems for State-owned intersections.	Existing
		Provide emergency signal preemption for Kauai Fire and EMS vehicles.	Existing
		Coordinate traffic information and traffic control with Kauai County Department of Public Works.	Future
		Obtain traffic images and traffic flow data through CCTVs and field sensors and maintain operational control of its own field equipment.	Future
		Operate changeable speed limit signs, including collecting traffic count information from the devices.	Future
		Provide signal priority when requested for Kauai County Transit vehicles.	Future
	Emergency Management	Coordinate incident and threat information with the Kauai EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the Kauai EOC (e.g., Web EOC).	Existing
		Coordinate incident and threat information with the State EOC.	Existing
		Provide emergency signal preemption for Kauai Fire and EMS vehicles.	Existing

Stakeholder	Service Area	Role and Responsibility Description	Status
HDOT, Airports Division, Kauai District (HDOT-AIR-K)	Airport Operations	Monitor secure areas using surveillance equipment, including CCTV.	Existing
		Manage parking at the Lihue Airport.	Existing
	Emergency Management	Provide emergency response, including fire and emergency response for Lihue Airport.	Existing
		Dispatch HDOT-AIR-K/ARFF fire and emergency vehicles in response to emergencies and incidents at the Lihue Airport.	Existing
		Coordinate incident and threat information with the Kauai EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the Kauai EOC.	Existing
HDOT, Harbors Division, Kauai District (HDOT-HAR-K)	Harbor Operations	Manage and operate commercial harbors.	Existing
		Manage commercial vehicle traffic at entry and exit to Nawiliwili Harbor.	Existing
		Perform video surveillance of secure areas within harbor facilities.	Existing
	Emergency Management	Coordinate incident and threat information with the Kauai EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the Kauai EOC.	Existing
Kauai County Department of Public Works (Kauai DPW)	Incident Management	Coordinate with HDOT-HWY-K, Kauai Fire and Kauai Police to manage incidents on Kauai County roads.	Existing
	Emergency Management	Coordinate disaster and emergency response on Kauai County roads with the Kauai EOC.	Existing
	Maintenance Management	Monitor Kauai DPW Maintenance Vehicles for safety and security.	Existing
	Traffic Signal Control	Coordinate with HDOT-HWY-K to design and procure ITS field devices of Kauai County roads.	Future
		Operate traffic signal systems for Kauai County-owned intersections.	Existing
Kauai County Fire Department (Kauai Fire)	Emergency Management	Coordinate incident and threat information with the Kauai EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the Kauai EOC (e.g., Web EOC).	Existing
		Provide response vehicles and personnel to emergencies in Kauai.	Existing
		Receive local signal preemption from State traffic signals.	Existing
	Incident Management	Provide response to traffic incidents in Kauai, including HAZMAT incident response.	Existing

Stakeholder	Service Area	Role and Responsibility Description	Status
Medical Transportation	Emergency Management	Coordinate incident and threat information with the Kauai EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the Kauai EOC (e.g., Web EOC).	Existing
		Provide emergency medical response to emergencies in Kauai.	Existing
		Receive local signal preemption from State traffic signals.	Future
	Incident Management	Provide emergency medical response for traffic incidents countywide.	Existing
County of Kauai Police Department (Kauai Police)	Emergency Management	Provide response vehicles and personnel to emergencies in Kauai.	Existing
		Coordinate incident and threat information with the Kauai EOC.	Existing
		Coordinate emergency plans, evacuation and reentry plans, and disaster management plans with the Kauai EOC (e.g., Web EOC).	Existing
		Receive emergency calls and dispatch vehicles for Kauai Police, Kauai Fire and Kauai EMS.	Existing
	Incident Management	Provide countywide response to traffic incidents.	Existing
		Receive emergency calls for incidents in Kauai and coordinate incident response with local public safety agencies, including Kauai EMS and Kauai Fire.	Existing
		Coordinate HAZMAT spill incident response with Kauai Fire.	Existing
		Upload crash records data to HDOT Highway Division, Traffic Safety Section.	Existing
County of Kauai Civil Defense Agency (Kauai CDA)	Emergency Management	Operate the County EOC, including incident coordination with emergency management providers.	Existing
		Develop and coordinate countywide emergency plans, evacuation and reentry plans, and disaster management plans.	Existing
		Coordinate with National Weather Service systems (e.g., Pacific Tsunami Warning Center).	Existing
		Coordinate incident and threat information as part of an early warning system for the County of Kauai with the State of Hawaii EOC.	Existing
		Coordinate wide area alert notifications for the County of Kauai, including Maile Amber Alerts and Silver Alerts.	Existing
		Coordinate emergency plans and maintenance resources with HDOT-HWY-K Maintenance and County of Kauai DPW Maintenance.	Existing

Stakeholder	Service Area	Role and Responsibility Description	Status
		Provide evacuation and incident information to travelers in the region using Blackboard Connect CTY, the Kauai County Website and through private traveler information providers.	Future
	Incident Management	Participate in incident response, coordination and reporting.	Existing
County of Kauai Department of Transportation (Kauai Bus)	Transit Management	Provide fixed route transit and demand responsive bus service for the county.	Existing
		Coordinate emergency plans with Kauai EOC and provide emergency transit services for evacuations, fires and disasters, including reentry services.	Existing
		Provide a demand-responsive bus transit plan to users and travelers using the Kauai Bus traveler information system.	Future
		Track and evaluate schedule performance for all Kauai Bus vehicles.	Future
		Coordinate with HDOT-HWY-K for traffic signal priority.	Future
		Provide transit security on all Kauai Bus vehicles and at Kauai Bus Hubs using silent alarms and on-board video surveillance.	Future
		Provide operator instructions and receive schedule performance data from Kauai Bus vehicles while in service.	Future
		Provide Next Bus transit traveler information.	Future
		Provide automated transit maintenance scheduling on all Kauai Bus vehicles using automated vehicle conditions reporting.	Future
Kauai County Department of Management IT Services (Kauai IT)	System Management	Provide IT support for ITS Projects for the Kauai County agencies.	Existing
		Monitor and maintain the IT equipment and communications network for Kauai.	Existing

6.4 Kauai ITS Inventory by Stakeholder

The Kauai Regional ITS Architecture Inventory is a list that represents all existing and planned ITS elements in the region as well as non-ITS elements that provide information to, or receive information from, the ITS. These elements are owned, operated or maintained by stakeholder agencies, companies or groups. The inventory focuses on systems that support, or may support, interfaces that cross stakeholder boundaries (e.g., public-to-private interfaces).

Each element in the inventory is described by a name, the stakeholder, a description, general status (e.g. existing or planned), and the associated subsystems or terminators from the National ITS Architecture that the element is mapped to.

The majority of elements in the inventory represent a specific existing or planned system. An example of a specific system is the *HDOT-AIR-K Security Dispatch Center*.

Some elements represent sets of devices rather than a single specific system or device. An example of this type of element is *HDOT-HWY-K Field Equipment*, which represents all existing and planned ITS field devices that are, or will be, operated by HDOT-HWY-K in Kauai. The element describes any of the ITS field devices (e.g., Traffic Signals or CCTV) rather than the specific number of each device.

Another element in the inventory is a "generic" element that represents all of the systems of a certain type in the region. An example of this type of element is *Media*, which represents all potential media outlets, such as television stations, websites, radio or newspapers, that may wish to connect to an Intelligent Transportation System. These generic elements have been created for two primary reasons: First, they represent elements with similar types of interfaces. From a standardization standpoint, describing how one of the major elements in the region (e.g., the *HDOT-HWY-K Traffic Control Center*) interfaces with various media outlets would be the same. Second, describing many systems with a single element helps keep an ITS architecture from growing too large.

The Kauai Regional ITS Architecture Inventory, organized by stakeholder, is presented in Table 19.

TABLE 19: KAUAI ITS INVENTORY, BY STAKEHOLDER

Stakeholder Name	Stakeholder Abbreviation	Kauai ITS Architecture Subsystems and Elements
Hawaii Department of Transportation – Highways, Kauai Division	HDOT-HWY-K	• HDOT-HWY-K Traffic Control Center • HDOT-HWY-K Field Devices • HDOT-HWY-K Maintenance Dispatch • HDOT-HWY-K Maintenance Vehicles
Hawaii Department of Transportation – Airports, Kauai District	HDOT-AIR-K	• HDOT-AIR-K Security Dispatch Center • HDOT-AIR-K/ARFF Dispatch • HDOT-AIR-K/ARFF Fire/Rescue Vehicles • HDOT-AIR-K Infrastructure Monitoring Equipment • HDOT-AIR-K Flight Information Display System • HDOT-AIR-K Traveler Information Kiosk
Hawaii Department of Transportation – Harbors, Kauai Division	HDOT-HAR-K	• HDOT-HAR-K Security Center • HDOT-HAR-K Infrastructure Monitoring Equipment
County of Kauai – Department of Public Works	Kauai DPW	• Kauai DPW Field Devices • Kauai DPW Maintenance Dispatch • Kauai DPW Maintenance Vehicles
County of Kauai – Fire Department	Kauai Fire	• Kauai Fire Departmental Operations Center • Kauai Fire Vehicles

Stakeholder Name	Stakeholder Abbreviation	Kauai ITS Architecture Subsystems and Elements
County of Kauai – Police Department	Kauai Police	• Kauai 911 Dispatch Center • Kauai Police Departmental Operations Center • Kauai Police Vehicles • Kauai Police Air Assets • Kauai Police Field Equipment
County of Kauai – Civil Defense Agency	Kauai CDA	• Kauai EOC
County Kauai – Department of Finance, Information Technology	Kauai IT	• Kauai IT Services Network Management System
Kauai County Transportation Agency	Kauai Bus	• Kauai Bus Fixed Route Dispatch • Kauai Bus Paratransit Dispatch • Kauai Bus Fixed Route Vehicles • Kauai Bus Paratransit Vehicles • Kauai Transit Information System • Kauai Bus Transit Hub Displays • Kauai Bus Transfer Hub Security Equipment
Kauai Visitors Bureau	Kauai Visitors Bureau	• Kauai Visitors Bureau
Medical Transportation	Kauai EMS	• Kauai EMS Vehicles
Other State of Hawaii Elements		• GoAkamai • HDOT, Highways Division, Traffic Safety • State of Hawaii EOC
Other Elements		• Media • Hospitals • Kauai Data Warehouse • Kauai Parking and Access Management • Pacific Disaster Center • Pacific Tsunami Warning Center • Private Traveler Information Services • Private Personal Computing Devices • Shuttle Dispatch • Shuttle • Red Cross • Event Generators

6.5 Kauai Summary Diagrams

The Kauai Regional ITS Architecture incorporates a number of services. While some services are internal to a single agency and do not involve multiple agencies, it is oftentimes beneficial to understand the interactions between numerous agencies that support a consolidated service. In an effort to present this information in a holistic manner summary, service package diagrams have been drawn for these areas:

- Traffic Management
- Incident Management and Emergency Response
- Emergency Management Disaster/Evacuation
- Traveler Information

6.5.1 Traffic Management

The summary diagram for traffic management (Figure 12) shows that the County of Kauai and State of Hawaii work together in the sharing of traffic information and control of traffic devices. A single traffic control center is proposed, to be funded and operated by the State, to implement and support regional traffic management strategies.

Currently on Kauai, there are a number of traffic signals that are operated by the County independently from the State and vice versa. Both the Kauai Department of Public Works (County) and the Kauai District of the HDOT Highways Division (State) expressed their desire to have a coordinated traffic signal system that can be remotely controlled from a single, co-located traffic management center. Both agencies would like to add CCTV cameras, Dynamic Message Signs (DMS) and other ITS field equipment to enhance traffic operations and ultimately provide real-time traffic information to the public.

6.5.2 Incident Management and Emergency Response

Traffic incident management consists of a planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible. Figure 13 shows the State and County plan to use new traffic devices to assist in incident detection. Already, signal preemption technology is used by Fire and EMS to change traffic signals from red to green when fire trucks and ambulances respond to a 911 call. Kauai Police vehicles are equipped with Mobile Data Terminals (MDT) that are connected to their Computer Aided Dispatch (CAD) system. Such systems are planned for Fire and EMS vehicles in the future.

As part of a State Department of Health initiative, all ambulances on Kauai are equipped with tablets that provide electronic charting for patient care prior to admission at any of the three hospitals on Kauai: Wilcox Hospital (in Lihue), Samuel Mahelona Memorial Hospital (in Kapaa) and Kauai Veteran's Memorial Hospital (in Waimea).

FIGURE 12: KAUAI TRAFFIC MANAGEMENT SUMMARY DIAGRAM

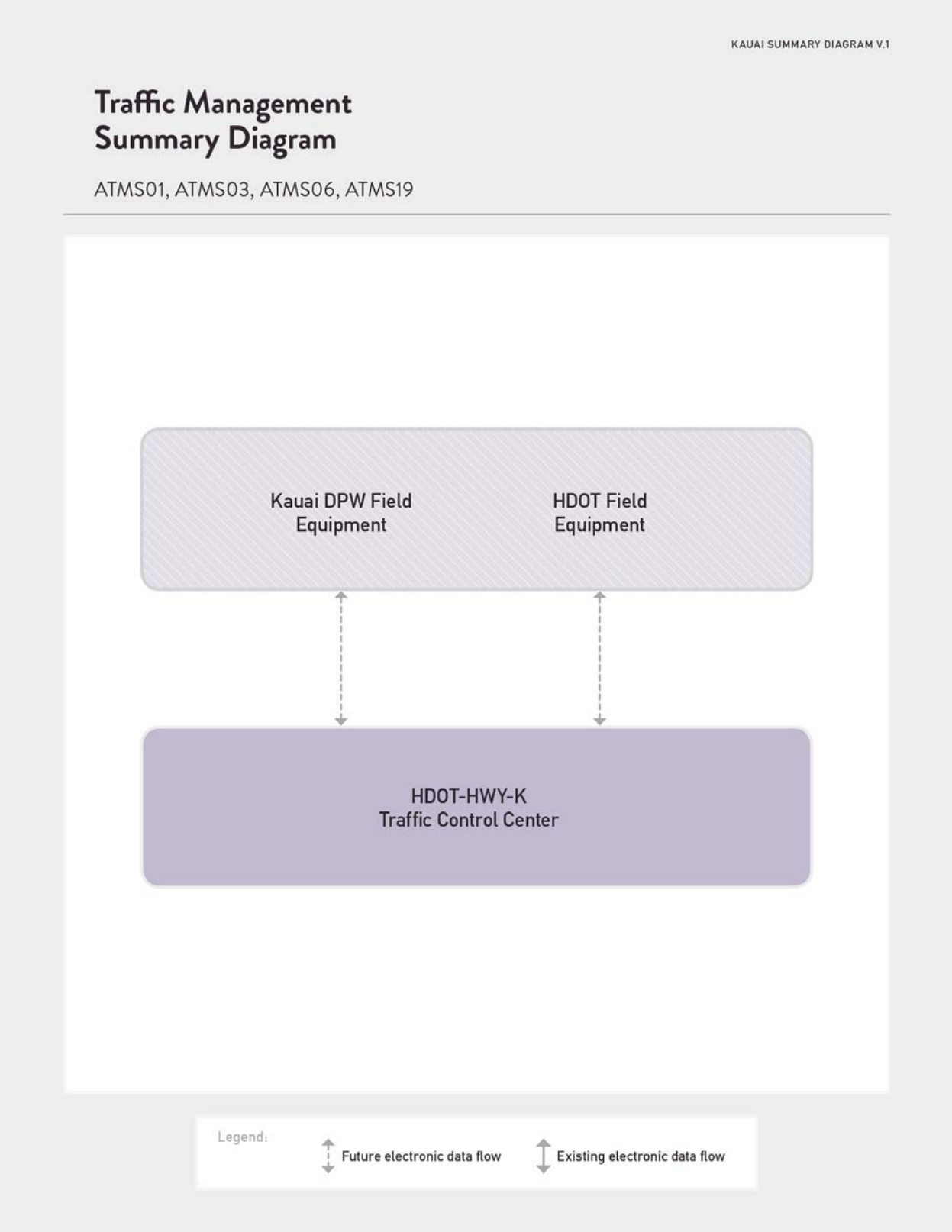
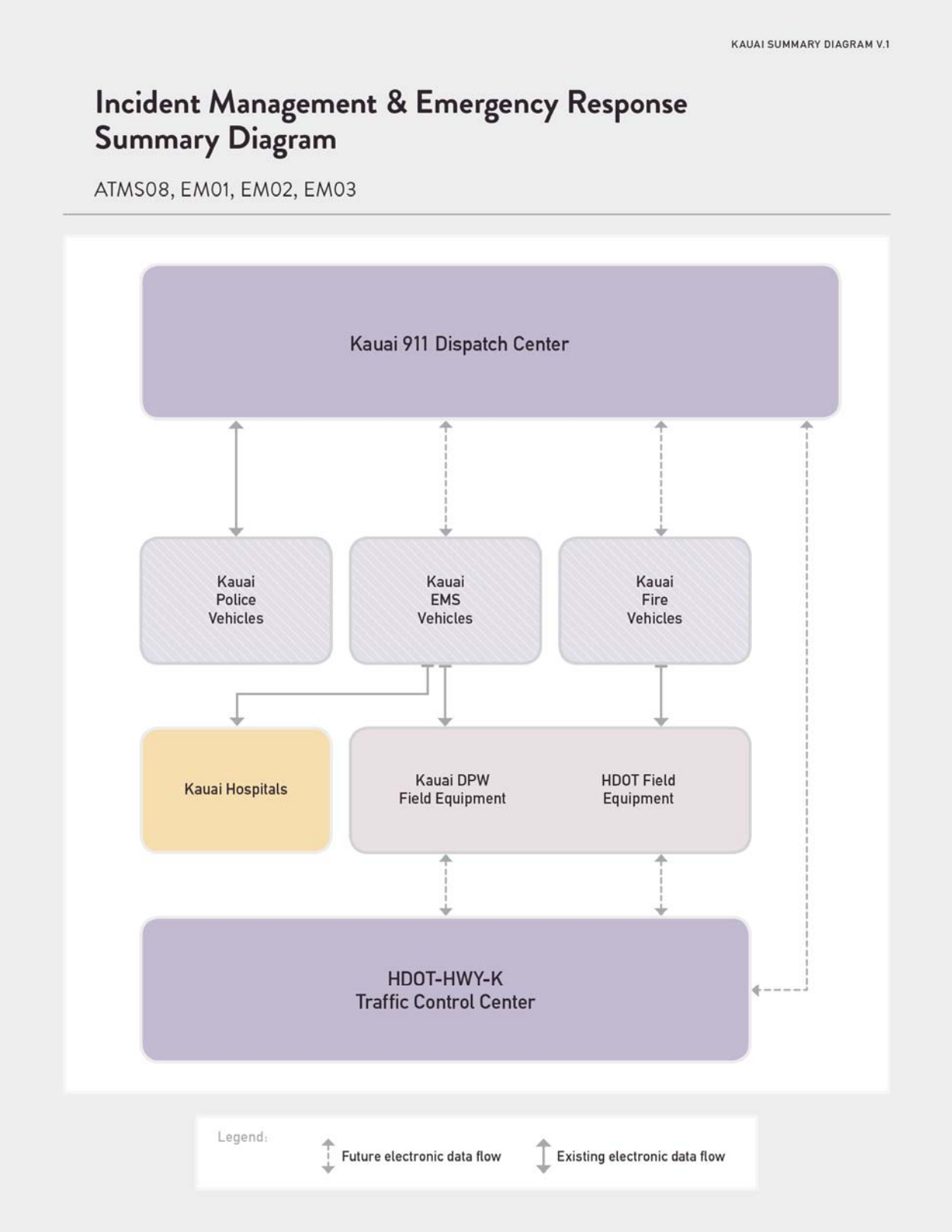


FIGURE 13: KAUAI INCIDENT MANAGEMENT & EMERGENCY RESPONSE SUMMARY DIAGRAM



6.5.3 Emergency Management Disaster/Evacuation

Combined with Emergency Management (EM), the Disaster Response and Recovery summary service package enhances the ability of the surface transportation system to respond to and recover from disasters. As shown in Figure 14, the services address the most severe incidents that require an extraordinary response from outside the local community. All types of disasters are addressed including natural disasters (hurricanes, earthquakes, tsunamis, etc.) and technological and man-made disasters. As shown in the summary diagram, the County's EOC is at the center and coordinates between multiple agencies and entities in response and recovery. Depending on the severity of the event, representatives from public safety, human services, infrastructure agencies and private utilities each have seats at the EOC to ensure a collaborative response. The interfaces between the EOC, first responders and transportation agencies provide situational awareness and resource coordination.

When activated, Kauai's EOC provides wide-area alerts and disaster traveler information to the public electronically through its website, social media and subscription notifications. The Kauai Visitors Bureau has a seat in the EOC and plays an important role in notifying the visitor industry during events. The Kauai Police Department 911 Dispatch Center is physically located next to the EOC and communicates pertinent information from its CAD system. Kauai Bus assists in the evacuation of people as needed.

6.5.4 Traveler Information

Figure 15 shows the collection of data — traffic conditions, advisories, incident information and the like — broadcast to the public. The automatically generated information is likely to include images from County and State traffic cameras, incident alerts and a congestion map. HDOT currently operates and maintains the GoAkamai traveler information system for Oahu and it is expected that traffic information from future ITS deployments on Kauai will be published on the GoAkamai website (http://www.goakamai.org/) and mobile app.

As seen in Figure 15, traffic and incident information will automatically be populated into GoAkamai from the Kauai 911 Dispatch Center and future Traffic Control Center.

In addition, GoAkamai already has the capability to provide personalized traveler information interactively, meaning that a traveler may set up a profile on GoAkamai.org to request alerts about traffic congestion, construction and incidents on Oahu.

FIGURE 14: KAUAI EMERGENCY MANAGEMENT DISASTER/EVACUATION SUMMARY DIAGRAM

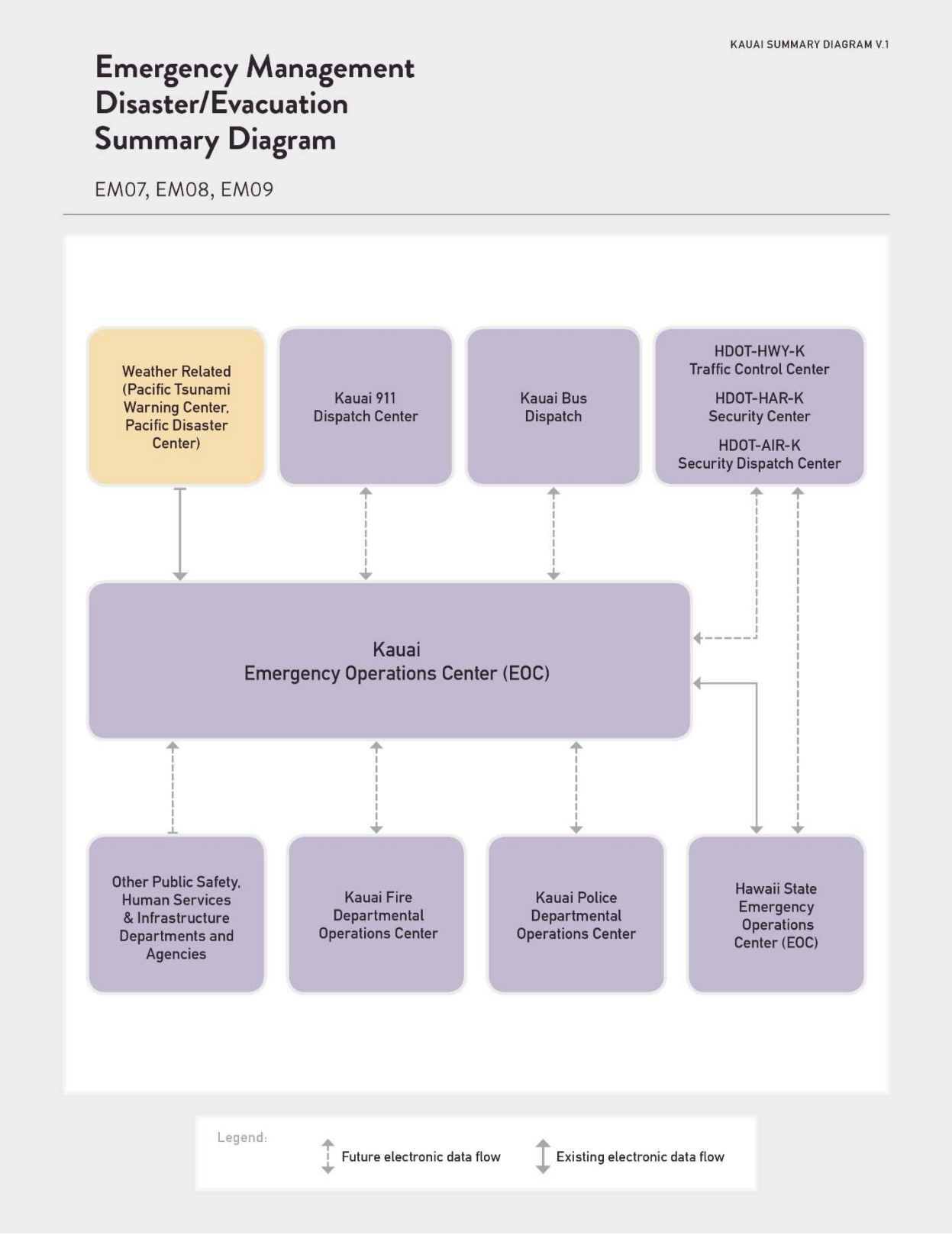
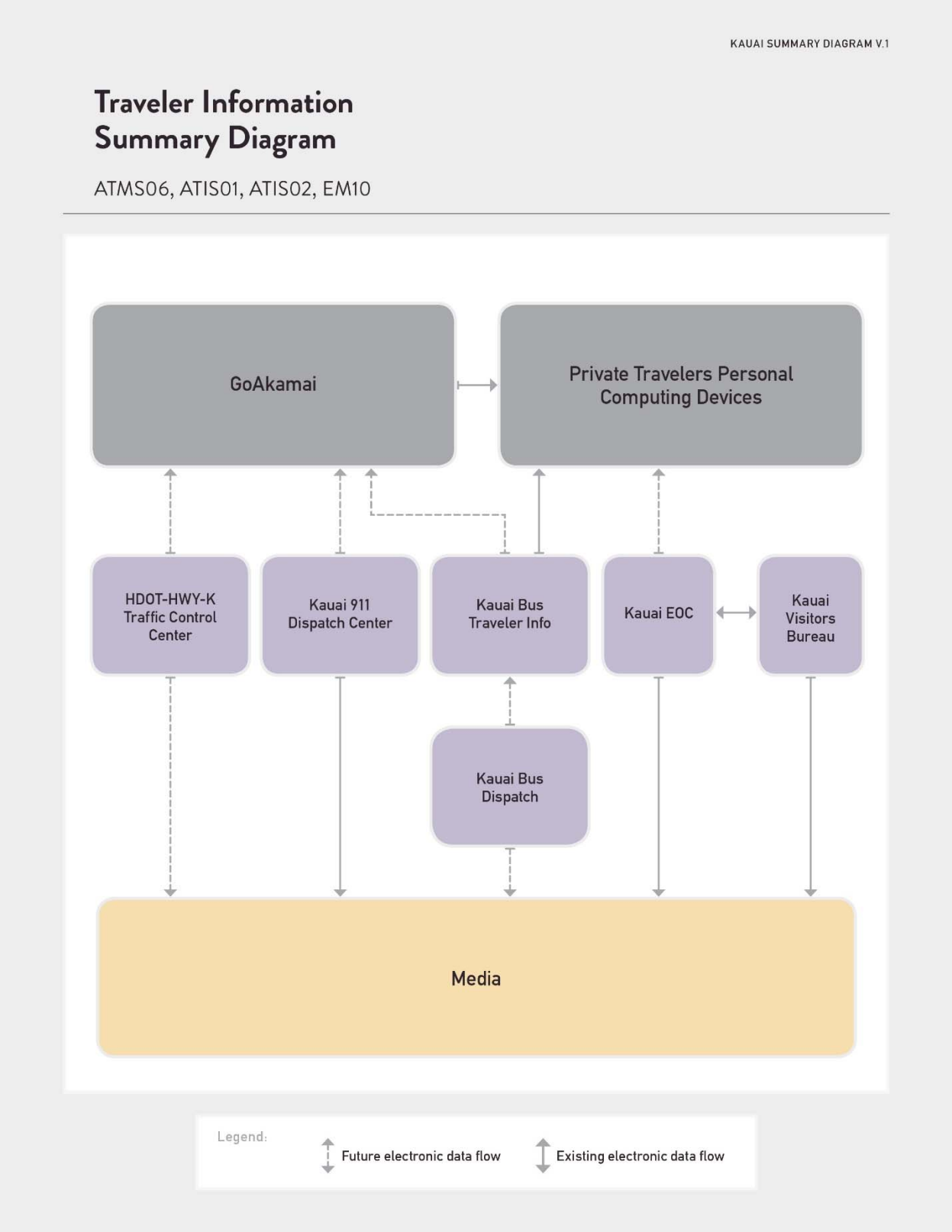


FIGURE 15: KAUAI TRAVELER INFORMATION SUMMARY DIAGRAM



6.6 Selected Kauai Regional Service Packages

The ITS in the region currently support a wide array of transportation services and will grow as more systems are developed or upgraded. The current and planned services can be described by the set of service packages that are shown in Table 20. This set of services is a subset of the services contained in the National ITS Architecture and represents all of the selected services (service packages) that will be used on Kauai, based on information gathered at stakeholder meetings, needs assessments and review of planning documents.

TABLE 20: SELECTED REGIONAL SERVICES (SERVICE PACKAGES) FOR KAUAI

Service Package	Service Package Name
Archived Data (AD)	
AD2	ITS Data Warehouse
Advanced Public Transportation Systems (APTS)	
APTS01	Transit Vehicle Tracking
APTS02	Transit Fixed-Route Operations
APTS03	Demand Response Transit Operations
APTS05	Transit Security
APTS07	Multi-modal Coordination
APTS08	Transit Traveler Information
APTS09	Transit Signal Priority
APTS10	Transit Passenger Counting
Advanced Traveler Information Systems (ATIS)	
ATIS01	Broadcast Traveler Information
ATIS02	Interactive Traveler Information
Advanced Traffic Management Systems (ATMS)	
ATMS01	Network Surveillance
ATMS03	Traffic Signal Control
ATMS06	Traffic Information Dissemination
ATMS08	Traffic Incident Management System
ATMS17	Regional Parking Management
ATMS19	Speed Warning and Enforcement
Emergency Management (EM)	
EM01	Emergency Call-Taking and Dispatch
EM02	Emergency Routing
EM05	Transportation Infrastructure Protection
EM06	Wide Area Alert

Service Package	Service Package Name
EM07	Early Warning Systems
EM08	Disaster Response and Recovery
EM09	Evacuation and Reentry Management
EM10	Disaster Traveler Information
Maintenance and Construction (MC)	
MC02	Maintenance and Construction Vehicle Maintenance
MC07	Roadway Maintenance and Construction
MC12	Infrastructure Monitoring

Each service is described by one or more customized service package diagrams, which illustrate the connections between ITS elements. The connections between the ITS elements are shown either as existing or planned, and designated by a solid or dotted line, respectively. The customized service package diagrams for the Kauai Regional ITS Architecture are presented in Appendix B.

6.7 Kauai Project List

The projects included in the Kauai Regional ITS Architecture are summarized in Table 21, with project sheets provided in Appendix C.

Near-term projects will be implemented in 0-5 years; long-term projects will be implemented thereafter.

TABLE 21: KAUAI PROJECT LIST

Name	Description	Timeframe
HDOT-HWY-K Traffic Signal Upgrade	This project will upgrade traffic signal systems to have remote monitoring capability. Existing modems in equipment could be lit up and FOC could be added. Alternatively, a Public-Private partnership with telecommunications providers could be established through an MOA.	Near-Term
HDOT-HWY-K Portable Dynamic Message Sign (DMS) Upgrade	This project will upgrade HDOT-HWY-K portable DMS to have modems for remote access.	Long-Term
HDOT-HWY-K Closed Circuit Television (CCTV)	This project will add CCTV at State intersections in Kauai.	Long-Term
HDOT-HWY-K Traffic Control Center (TCC)	This project will create a traffic control center from which State traffic signals and other ITS equipment will be monitored. The center will include connections to the Kauai 911 Dispatch Center and Kauai EOC.	Long-Term
HDOT- HWY-K Fixed Dynamic Message Signs (DMS)	This project will add fixed DMS at key locations in Kauai. These signs will need to be smaller fixed mount signs that would notify the public of road closures and alternate routes.	Long-Term
HDOT-AIR-K Parking Closed Circuit Television (CCTV)	This project will expand CCTV camera coverage to include parking areas.	Near-Term
HDOT-AIR-K Roads Closed Circuit Television (CCTV)	This project will expand CCTV camera coverage to include the roads leading to/from the airport.	Near-Term
HDOT-AIR-K Traveler Information Kiosk	This project will add a traveler information kiosk at baggage claim and tie into the Flight Information Display System (FIDS) at baggage claim.	Long-Term
HDOT-AIR-K Mobile Data Terminals	This project will add MDTs to the HDOT-AIR-K/ARFF Fire/Emergency Vehicles.	Long-Term
HDOT-AIR-K Wireless Communications Upgrade	This project will upgrade wireless communications for the Kauai Airport.	Long-Term
HDOT-AIR-K Airport Secondary Entrance	Should a second entrance to the Lihue Airport be constructed, ITS field devices (e.g., CCTV cameras, traffic sensors, dynamic message signs) could be included in the project design in coordination with HDOT-HWY-K.	Long-Term
HDOT-HAR-K Monopole Wireless Communications	This project is part of the statewide maritime wireless communications project to construct and install a monopole at each port, enabling wireless communication between the Harbors Division and its districts, with the State and County Civil Defense/Emergency Management centers. Specific to Kauai, the project will enable HDOT-HAR-K to communicate with the other districts and will allow the Kauai Civil Defense to be able to see images from the HAR-K surveillance cameras at the County of Kauai's Emergency Operations Center (EOC) to increase situational awareness. Camera control would not be provided to other agencies or departments.	Near-Term

Name	Description	Timeframe
HDOT-HAR-K Expanded Closed Circuit Television (CCTV) Coverage	This project will expand CCTV coverage at the port to address blind corners.	Near-Term
HDOT-HAR-K Security Trailer	This project will construct a security trailer with a consolidated Security Office at Nawiliwili that operates 24/7 with adequate staff to monitor video from all CCTV cameras, and ensure access to camera images regardless of vendor using a video distribution system.	Long-Term
HDOT-HAR-K Emergency and Traffic Coordination	This project will establish a connection between the Harbor Security Office, the EOC and the HDOT-HWY-K's desired traffic control center (TCC).	Long-Term
Kapaa Transportation Solutions Project	The Kapaa Transportation Solutions Project will look at transportation improvements to benefit Kapaa. There may be ITS applications considered for implementation as part of this project.	Near-Term
Kauai DPW Closed Circuit Television (CCTV)	This project will coordinate with HDOT-HWY-K to add CCTV cameras for traffic monitoring on Kauai County roads at select areas.	Near-Term
Kauai DPW Temporary Speed Signs	This project coordinates with HDOT-HWY-K to deploy temporary speed signs with the dual purpose of collecting data and responding to neighborhood speed complaints.	Near-Term
Kauai DPW Fixed Dynamic Message Signs (DMS)	This project will coordinate with HDOT-HWY-K to deploy permanent DMS with advisory speed messages. The signs will also have the capability to collect speed data.	Long-Term
Kauai Bus On-Board Closed Captioned Television (CCTV) Cameras	This project will add on-board closed-captioned television (CCTV) cameras to Kauai Buses to provide security.	Near-Term
Kauai Bus Transit Center	This project will design and construct a transit center at the Lihue Civic Center.	Near-Term
Kauai Bus Next Bus Traveler Information	This project will add Next Bus real-time traveler information to Kauai buses.	Near-Term
Kauai Bus Automated Vehicle Location (AVL)/ Computer Aided Dispatch (CAD)	This project will add automated vehicle location (AVL) to all buses and paratransit vehicles, along with computer aided dispatch (CAD) for fleet management.	Near-Term
Kauai Bus WiFi	This project will add WiFi connectivity on every bus and at every Kauai Bus stop.	Long-Term
Kauai Bus Transit Signal Priority (TSP)	This project will implement transit signal priority to improve schedule adherence.	Long-Term
Kauai Bus Master Transit Coordination Center	This project would create a master transit coordination center for the island. This center could potentially include not only Kauai Bus elements, but also private shuttles if the shuttle project moves in that direction.	Long-Term
Kauai CDA and Kauai 911 Dispatch Center Coordination	This project will add a read-only CAD feed from the Kauai 911 Dispatch Center to the Kauai EOC.	Near-Term

Name	Description	Timeframe
Kauai Fire MDT Upgrade	This project will replace MDTs (likely with tablets). [Note: This project has some dependency on KFD's selection of a replacement CAD system.]	Near-Term
Kauai Fire Wireless Communications Upgrade	This project will improve wireless communications for the Kauai Fire.	Near-Term
Kauai Police Computer Aided Dispatch (CAD) System Upgrade	This project will upgrade or replace the Kauai Police CAD system.	Near-Term
Kauai Police Mobile Data Terminal (MDT) Upgrade	This project will upgrade the MDTs in Kauai Police vehicles.	Near-Term
Kauai EMS Computer Aided Dispatch (CAD) System	This project will upgrade tablets in Kauai EMS vehicles to ensure CAD functionality.	Near-Term
Kauai Wireless Communications Upgrade	This project will improve wireless communications for Kauai EMS.	Long-Term
Hanalei Flood Warning System	This project will involve HDOT-HWY-K, Kauai Civil Defense, Police and DPW to develop a warning system consisting of CCTV and other ITS equipment. Information from rain gauges operated and maintained by the National Weather Service / USGS will be used for alerting agency personnel. The Kauai EOC activate alerts about imminent floods through its Blackboard notification system, including updates concerning road closures due to flooding. Finally, the Kauai EOC will also warn shelter providers, as travelers can often be stranded during floods.	Long-Term

6.8 Existing Kauai Agreements

During the stakeholder workshop the topic of existing agreements was discussed, and one existing agreement was identified to be and is shown in the table below.

TABLE 22: EXISTING KAUAI AGREEMENTS

ID	Lead Stakeholder	Agreement Title	Agreement Type	Agreement Status	Description
1	Kauai Fire	Kauai Fire Department Mutual Aid Agreements	Mutual Aid Agreement	Existing	The Kauai Fire Department has mutual aid agreements with the Hawaii Department of Land and Natural Resources and HDOT-AIR-K.

6.9 Potential Kauai Agreements

Each project developed for the Kauai ITS Architecture was reviewed and the following table represents agreements that may be needed to implement regional projects.

TABLE 23: POTENTIAL AGREEMENTS FOR KAUAI

ID	Stakeholders	Agreement Title	Agreement Type	Description	Supporting Project(s) and/or Service Packages
1	• HDOT-HWY-K • Kauai DPW	Operation of County ITS equipment	Operations	Agreement for the management of Kauai County ITS equipment (e.g., DMS and CCTV) by HDOT-HWY-K Traffic Control Center.	• Kauai DPW Closed Circuit Television (CCTV) • Kauai DPW Fixed DMS
2	• HDOT-HWY-K • Kauai Police • Kauai Fire	Traffic Video Sharing	Data Sharing	Agreement for sharing HDOT video with County agencies.	• Service Package ATMS08
3	• HDOT-HWY-K • Kauai DPW • Kauai Planning • Kauai Police	Sharing of speed data and signs	Data Sharing and Operations	HDOT and Kauai DPW will share speed data and capability to put messages up on DMS signs.	• Kauai DPW Temporary Speed Signs
4	• HDOT-HWY-K	Use of permanent and portable DMS	Data Sharing	Capability for other agencies to put messages onto HDOT DMS signs.	• Service Package ATMS08
5	• Kauai Transportation Agency • Kauai DPW • HDOT-HWY-K	Transit Signal Priority	Operations	Agreement for the implementation of transit signal priority benefitting Kauai Bus at signalized intersections.	• Kauai Bus Transit Signal Priority
6	• Kauai DPW • Kauai Planning • Kauai DOT • Kauai Data Warehouse Stakeholder • HDOT-HWY	Archive Data	Data Sharing	Agreement for archiving of Kauai County and/or HDOT data by the Kauai Data Warehouse Stakeholder (who is currently not defined).	• Service Package AD2

7 Maintaining the Statewide, Maui and Kauai Architectures

The Hawaii Statewide, Maui and Kauai ITS Architecture are not static and will change as plans change, ITS projects are implemented, and ITS needs and services evolve on Hawaii. This section describes the maintenance plan for the Regional and Statewide ITS Architectures. The plan covers the following four key areas:

- Who will be involved in the maintenance of the architecture?
- When will the architecture be updated?
- What will be maintained?
- How will it be maintained (i.e., what configuration control process will be used)?

The Hawaii Statewide, Maui and Kauai ITS Architectures were created by documenting ITS that has been implemented and identifying those systems that are planned for the future. The three Architectures will need to be updated to reflect changes resulting from project implementation or resulting from the planning process itself. Types of changes may include:

- **Changes for Project Definition:** When actually defined, a project may add, subtract or modify elements, interfaces or information flows from an ITS Architecture. Because the ITS Architectures are meant to describe the current (as well as future) implementation of ITS, they may need to be updated to correctly reflect how the developed projects integrate into an ITS Architecture. Also, once projects are implemented, interfaces that were shown in the architecture as "planned" should be changed to "existing."
- **Changes for Project Addition/Deletion:** Occasionally a project will be added or deleted through the planning process and some aspects of the ITS Architecture may need to be expanded, changed or removed.
- **Changes in Regional Needs:** Transportation planning is done to address regional needs. Over time, these needs can change and the corresponding aspects of the ITS Architecture that address these needs may have to be updated.
- **Changes in other ITS Architectures:** Changes made in one of the Regional ITS Architectures may affect the Hawaii Statewide ITS Architecture, necessitating changes to maintain consistency between the architectures.
- **Changes in Stakeholders or Elements:** When new stakeholders are added, the Regional and Statewide ITS Architectures may need to be updated to reflect their place in the ITS elements, interfaces and information flows. Also, if stakeholders revise their agency name, or revise names of their elements in the architecture, then it may be desirable to capture these changes in the architecture.
- **Changes or Evolution in ITS Standards applicable to ITS Projects in Hawaii:** The architecture maps ITS standards to interfaces (and hence to projects). Over time, this mapping may need to be updated as standards release new versions, or as new standards are developed.

- **Changes in the National ITS Architecture:** The National ITS Architecture may be expanded and updated from time to time to include new services or better define how existing elements satisfy services. Incorporating these changes into the Regional and Statewide ITS Architectures should be considered on a regular basis.

7.1 Roles and Responsibilities for Maintenance

This section defines the roles and responsibilities of stakeholders and the Hawaii Department of Transportation, Highways Division (HDOT-HWY) in the maintenance of the Hawaii Statewide, Maui and Kauai ITS Architectures.

7.1.1 Stakeholders

Stakeholders are any government agency or private organization that is involved with or has an interest in providing transportation services in the region. Each stakeholder owns, operates and/or maintains one or more ITS element in the region and, therefore, should be included in ITS architecture maintenance.

The success of the change management process outlined in this Maintenance Plan is highly dependent on the participation of the stakeholders identified in Regional and Statewide ITS Architectures. Without stakeholder participation in tracking the development of their ITS systems, and properly updating the ITS Architectures, the change management process will not succeed and the usefulness of the ITS Architectures will diminish over time.

The primary responsibility of the individual stakeholders is to submit changes to the ITS Architectures that are brought on by new plans or projects that are being planned or deployed for the stakeholder agency. The stakeholder must submit the changes to the Responsible Agency.

7.1.2 Responsible Agency

The Hawaii Department of Transportation's Highways Division (HDOT-HWY) is the government agency that formally maintains the Hawaii Statewide, Maui, \ and Kauai ITS Architectures. HDOT-HWY assigns resources for making the changes to the ITS Architecture baselines, and for coordinating the maintenance. To do this, HDOT-HWY will appoint a Maintenance Manager to coordinate the maintenance activities.

7.1.3 Maintenance Manager

The Maintenance Manager is the coordinator and main point of contact for all maintenance activities, including receiving Change Requests forms, tracking Change Requests, and distributing documentation.

The Maintenance Manager has the following responsibilities:

- Receives Change Request forms and requests for documentation from stakeholders;
- Distributes the baseline documents and outputs of the architectures to stakeholders;
- Maintains the "official" records of the Hawaii Statewide, Maui and Kauai ITS Architectures, including the baseline documents, meeting minutes, the Change Request Database and the list of Points of Contacts for the stakeholder;

- Ensures the status of each Change Request is properly updated in the Change Request Database; and
- Maintains a complete contact list of all stakeholders within the region.

7.2 Architecture Baseline

Establishing an architecture baseline requires clear identification of the architecture products to be maintained, including specific format and version information. For the Hawaii Statewide, Maui and Kauai ITS Architectures, two components were identified as the architecture baseline:

- **Turbo Architecture™ Database**: This will be maintained with a zipped version of the Hawaii Statewide, Maui and Kauai ITS Architecture databases. The name, date, and size of the database file inside the zipped file will be entered into an architecture log as version 1.0 of the architecture.
- **Change Spreadsheet:** This will be an Excel spreadsheet with the version number in the name of the database.

Depending on the availability of staff, time and other resources, these components of the Hawaii Statewide, Maui and Kauai ITS Architectures may be maintained and updated when deemed necessary and appropriate by the HDOT-HWY:

- ITS Architecture Web Pages
- ITS Architecture Final Documentation (this document)
- Set of Customized Service Packages (Visio file; Appendices A, C & E in this document)

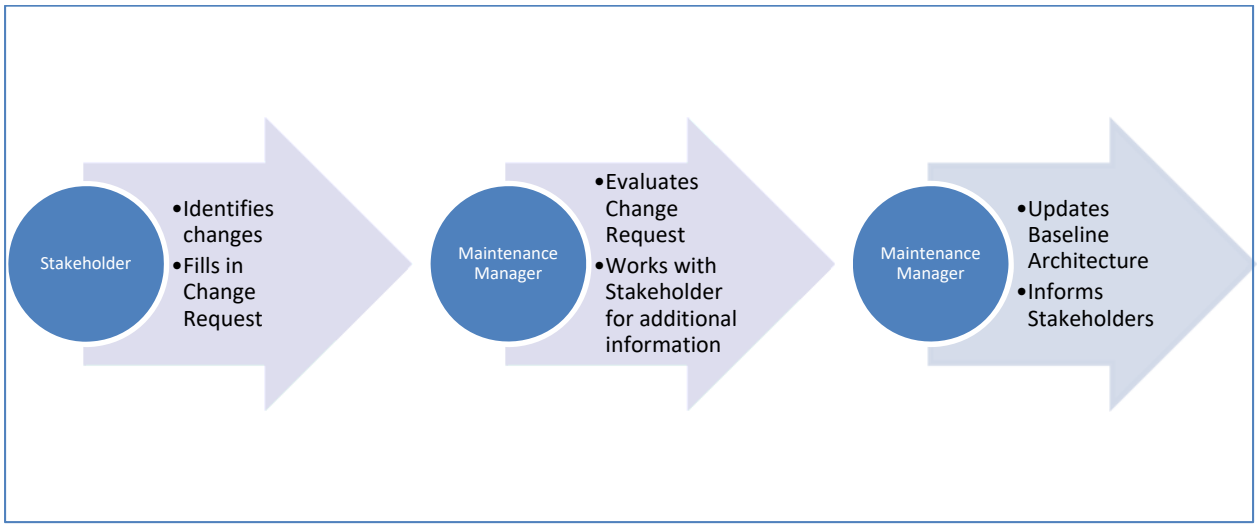
7.3 Change Management Process

The change management process specifies how changes are identified, how often changes will be made, and how the changes will be reviewed, implemented and released. The change management process involves these steps:

- **Identify Change:** Review what changes are needed and complete and submit a Change Request Form (Section 7.4).
- **Evaluate and Review Change:** Evaluate the change for completeness.
- **Update Baseline:** Apply the approved changes to the applicable Regional or Statewide ITS Architecture documents.
- **Notify Stakeholders:** Inform the stakeholders of the updated changes.

The identification of who performs these steps is shown in Figure 16.

FIGURE 16: CHANGE MANAGEMENT PROCESS



7.3.1.1 Identify Change

Stakeholders identified in the Hawaii Statewide, Maui and Kauai ITS Architectures may submit Change Requests to update the architectures. This process effectively ensures that all changes have the approval of an existing, defined stakeholder in the ITS Architecture. If the Change Request is to add a new stakeholder with associated ITS elements and interfaces, the Responsible Agency for must submit the Change Request.

The Change Request Form (Section 7.4) includes the following information:

- Name of change;
- Description of change;
- Part of baseline affected;
- Rationale for change;
- Originator name or agency; and
- Date of origination.

This information entered on the Change Request Form will be added to a change spreadsheet, maintained by the Responsible Agency. The change database will include following additional fields of information:

- Change number (some unique identifier);
- Change disposition (accepted, rejected, deferred);
- Change type (minor or significant);
- Disposition comment; and
- Disposition date.

7.3.1.2 Evaluate and Review the Change Request

Upon receiving a Change Request Form, an initial evaluation of the Request will be made by the Maintenance Manager for the impact to the overall architecture or the affected document. The purpose of the evaluation is two-fold:

- Verify that the Change Request Form and supporting materials are complete and correct
- Compare with other Change Request Forms and determine if there are any conflicts

If the proposal for architecture modification has an impact on other stakeholders, the Maintenance Manager will contact the stakeholders to confirm their agreement with the modification. All stakeholders directly affected by the proposed change(s) must approve and sign-off the Change Request before the change is approved.

If the affected stakeholders approve of the change then the change will be considered to be accepted, and the Maintenance Manager will sign off on the Change Request.

7.3.1.3 Update Baseline

Upon approval of the Change Request Form, the appropriate portions of the architecture baseline are updated by the Maintenance Manager.

7.3.1.4 Notify Stakeholders

Points of contact for each stakeholder will be notified by e-mail from the Maintenance Manager when baseline documents have been updated.

7.4 Change Request Form

Please see the following page for the Hawaii Statewide, Maui, and Kauai Architectures Change Request Form.

HAWAII STATEWIDE, MAUI, AND KAUAI ARCHITECTURES CHANGE REQUEST FORM

Originator Name:		Date Submitted:
Originator Telephone:	Originator Email:	
Originator Agency:		Revision Type: _____Major _____Minor
Agency Authorized Signature:		Signature Date:

Sponsoring Agency (if applicable):	
Agency Authorized Signature:	Signature Date:

Description of Proposed Change:		
Rationale for Proposed Change:		
Affected Agency:	Authorized Signature:	Signature Date:
Affected Agency:	Authorized Signature:	Signature Date:
List Attachments:		
Documents Affected: _____Turbo Architecture™ _____ Website _____Customized SPs _____Document _____Other (describe)		

To Be Completed by Maintenance Manager		
Change Request Number:	Date CR Received:	Date CR Logged:
Date Initially Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Disposition Comments
Date Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Disposition Comments
Date Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Disposition Comments
Date Approved by Maintenance Manager and Signature:		
Documents Affected/Version implemented ☐ Turbo Architecture™ Date: _____ Version: _____ ☐ Website Date: _____ Version: _____ ☐ Customized SPs Date: _____ Version: _____ ☐ _____ Date: _____ Version: _____		