Statewide ITS Architecture

An Overview of ITS & Architecture Development

February 22, 2016

Agenda

- Definitions
  - Intelligent Transportation Systems
  - ITS Architectures
- Purpose & Limits
- Process and Development Tasks
- Stakeholders
- Schedule
  - Maui – *completed Sept. 2015*
  - Kauai – *to be completed Feb. 2016*
  - State of Hawaii

ITS Architecture Overview

A Definition of Intelligent Transportation Systems

- ITS is a collection of technologies, systems and transportation management concepts that collectively aim to make surface transportation systems safer and more efficient

History of ITS Architecture

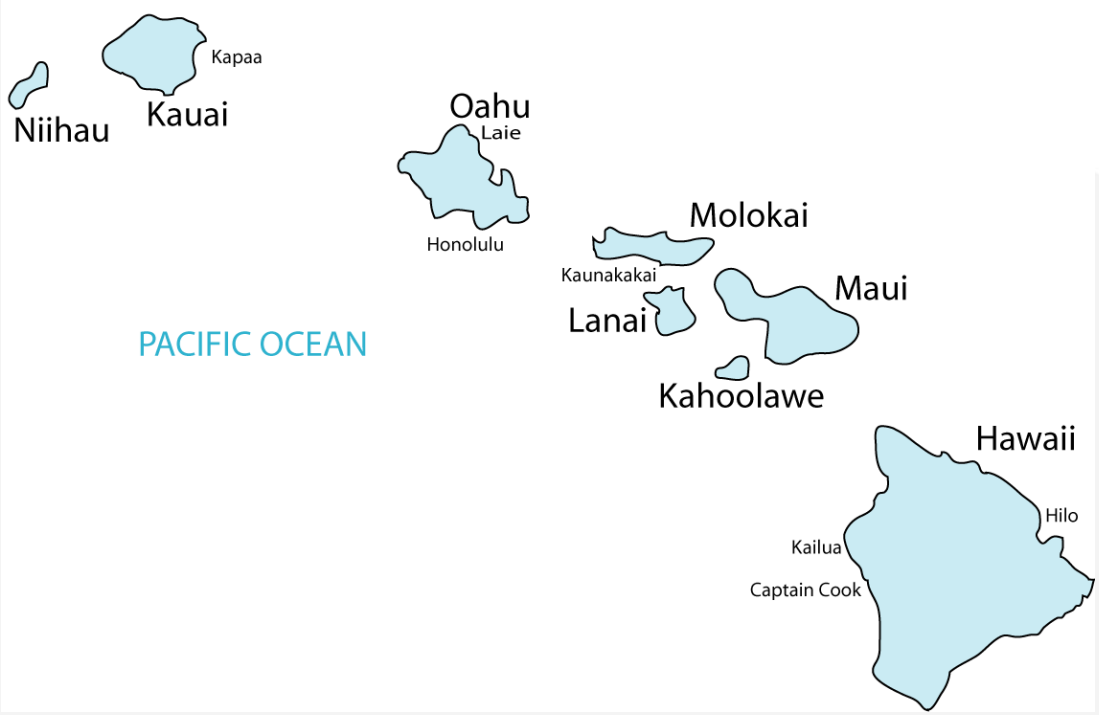
- Broad FHWA funding for regional ITS in early 1990s
- Many systems deployed but data collected was proprietary and systems could not talk to each other
- In 1996, National ITS Architecture established
- In 2001, FHWA issued Rule 940 requiring that ITS architectures be developed for 'regionally significant' ITS projects to be eligible for federal funding

What an ITS Architecture is….

- It provides:
  - A blue print on how ITS systems will work together to satisfy surface transportation needs
  - Identifies the ITS stakeholders in a region and their elements
  - Identifies the information to be exchanged between stakeholder elements
  - Selects standards for information exchange
- It does not:
  - Define select specific technologies or design
  - Determine how projects are selected or funded

A Regional ITS Architecture is…

- A regional framework for ensuring institutional agreement and technical integration for the implementation of ITS projects in a region



The National ITS Architecture

- National ITS Architecture was developed so that every region would have the same ‘language’
- Process is based on a typical planning process

How the National ITS Architecture relates to Regional ITS Architecture

- National ITS Architecture (the cookie cutter)
  - A framework or template
  - A menu of possibilities

- Regional ITS Architecture (the cookies)
  - Specific instances, associated with local stakeholders and projects
  - Current inventory + future projects
  - Only use the pieces you need
  - Put together based on local needs
  - Extensions, where necessary

Look Beyond Current Set of Projects

- How will your systems evolve?
  - What new or enhanced services will you provide?
  - What systems will you connect to and what information will you share?
  - What agreements need to be in place to make it happen?

- The regional ITS architectures will provide the framework and plan for the evolution of your systems over the next 10 years.

Why Develop an ITS Architecture

Benefits of a Regional ITS Architecture

- Transportation planning tool
  - Understand where we are going with our Intelligent Transportation System
- Find opportunities to work together across multiple jurisdictions and agencies

More Benefits

- Regional information sharing opportunities
  - The problem: patchwork deployments that make sharing information difficult
  - Regional ITS Architecture: Get early insight into what ITS information others have that can help you do your job better (or you can provide to others)
  - Identify open ITS standards: reduce long term risk/cost

Still more Benefits

- Institutional Agreement:
  - The problem: Time consuming when information crosses institutional boundaries
  - Regional ITS Architecture: Establish consensus based foundation for agreements – to get the process started

And finally….

- Addresses FHWA Rule/FTA Policy on ITS Architecture and Standards
  - Requires development of a Regional ITS Architecture if using Highway Trust Fund money to fund deployment of projects containing ITS elements
  - Intended to foster integration of ITS
  - Defines requirements for ITS projects

FHWA Rule / FTA Policy

1. Description of the region (scope)
2. Identification of participating agencies and their systems (inventory)
3. Operational concept
4. Agreements required for implementation
5. System functional requirements
6. Interface requirements
7. Identification of ITS standards
8. Sequence of projects required for implementation
9. Process for maintaining your ITS Architecture

ITS Projects

- Regional ITS Architecture partially satisfies the systems engineering requirements for FHWA Rule / FTA Policy on ITS Architectures and Standards
- Part 940.11 Requirements
  - Portion of the regional ITS architecture
  - Roles and responsibilities
  - High-level requirements
  - Alternative communications infrastructure
  - Applicable ITS Standards
  - Procurement options
  - Operations and Maintenance

In Summary…

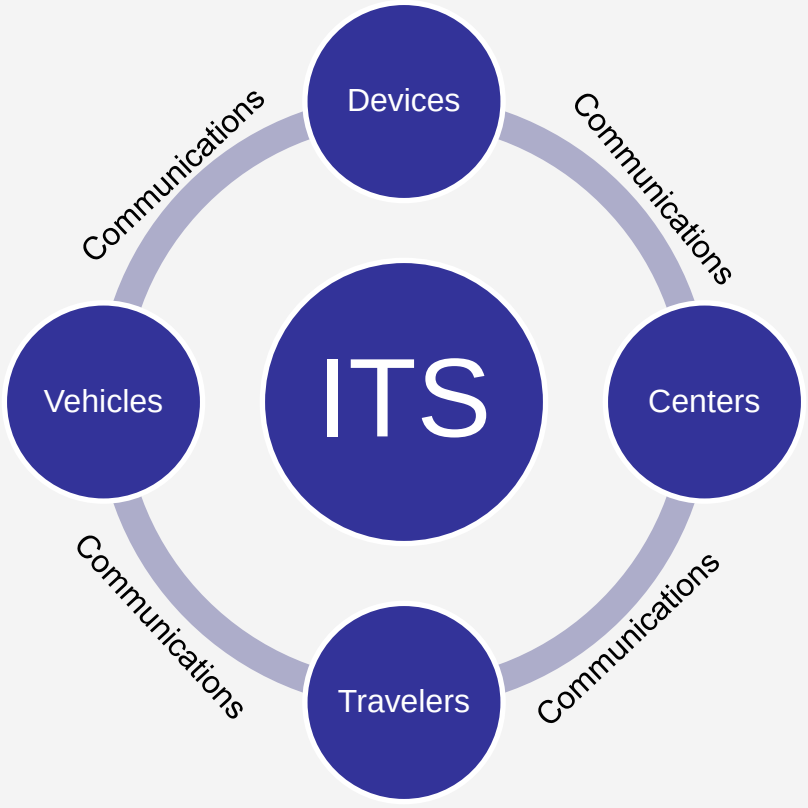
- To ensure investments in ITS can be leveraged
  - Primary purpose of ITS is for daily traffic operations and safety
  - Provide additional services based on primary purpose
- To be eligible for FHWA funding

Limits of ITS Architecture

- The development of an ITS architecture does NOT result in project commitments – just possibilities
  - There is NO federal mandate to implement projects identified in an ITS architecture
  - The ITS architecture IS required to received Federal funds for ITS projects

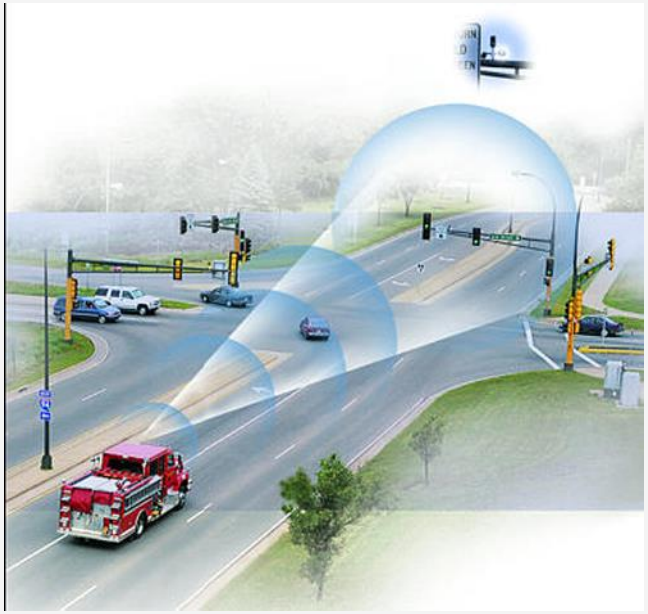
ITS:
Systems, Elements, Etc.

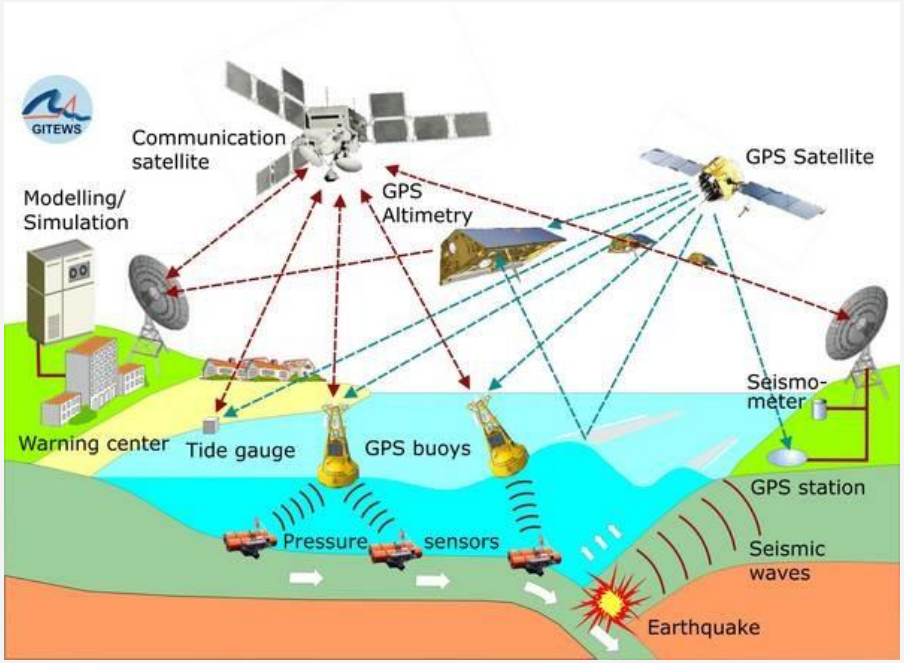
Architecture Elements: Subsystems thru Communications



- Field Devices
  - Cameras
  - Electronic Signs
  - Speed Sensors
- Centers
  - Traffic Mgmt Center
  - 911 Dispatch
- Vehicles
  - GPS and AVL tracking
- Travelers

Different Systems Talking to One Another

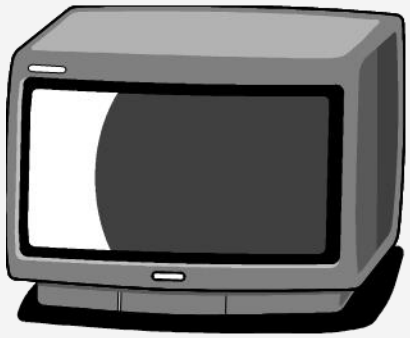




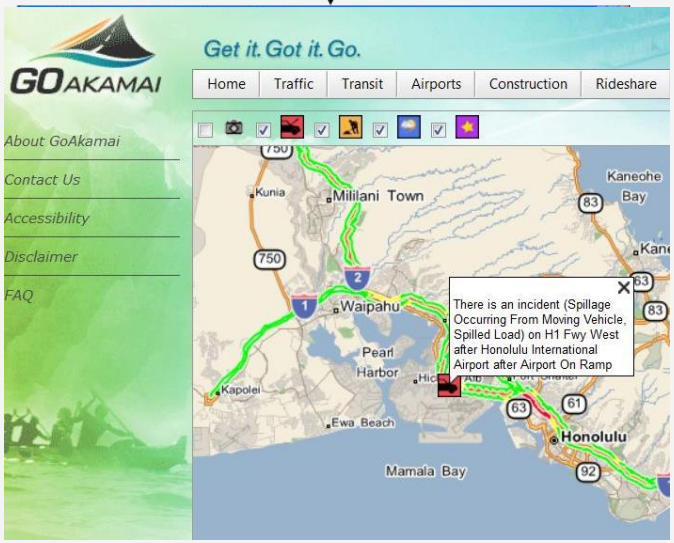
Traffic Information Dissemination

TMC

Dynamic Message Signs



Television Station



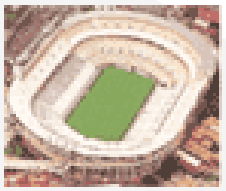
Web Site

Motorist

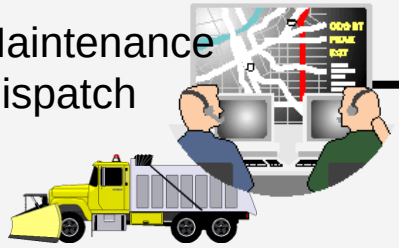
Incident Management

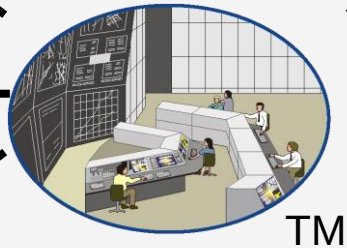
TMC
Personnel

Info
Provider



Maintenance
Dispatch





TMC

911
Center

Other
TMC

Other
911
Center

Process and Development Tasks

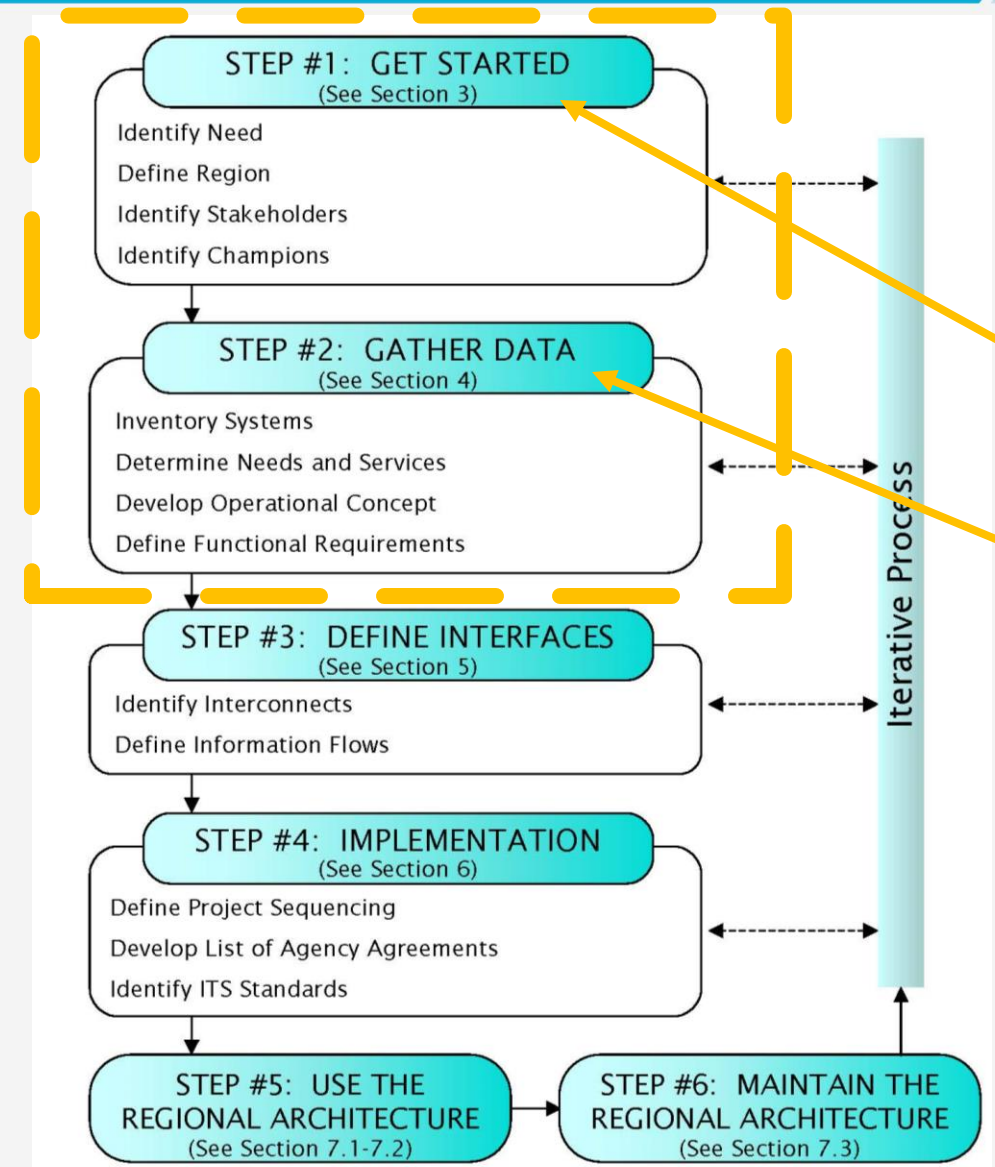


Figure 1: Regional ITS Architecture Development Process

Statewide Architecture: Process Summary

- Step 1: Complete
- Step 2: Data Gathering – where we are today

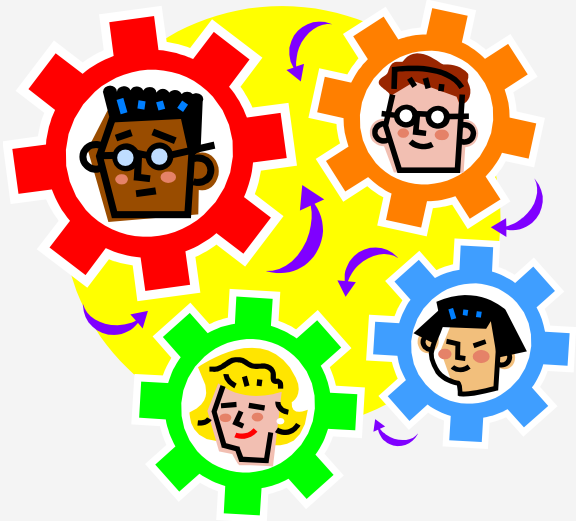
Outcomes: 3 Architectures

- Maui County Regional ITS Architecture
- Kauai Regional ITS Architecture
- State of Hawaii Regional ITS Architecture

- Note: Hawaii County & Oahu ITS Architectures, developed in 2012 and 2003, respectively, will be incorporated wholesale into the Statewide ITS Architecture

Task 1: Identify Stakeholders

- Roadway Planning & Design
  - Hawaii DOT Districts
  - County Dept. of Public Works / Transportation Services
  - Planning Departments
  - IT Departments
- Transit Agencies
- First Responders
  - Police
  - Fire
  - EMS
  - Emergency Management (Civil Defense)
- Others



Task 2: Gather Data

- Stakeholder Interviews
  - What ITS systems are currently operated?
  - What are agency needs?
  - What ITS projects are currently planned?
  - What are agency desires?

Task 3: Compile Inventory & Services

- Develop an ITS inventory
  - List of centers, field equipment, vehicles, etc.
  - Mapped to stakeholders
- Develop draft ‘service packages’
  - First cut at a comprehensive picture of ITS statewide
- Examples
  - Maui Inventory: http://www.consystec.com/hawaii/maui/web/inventory.htm
  - Maui Service Packages: http://www.consystec.com/hawaii/maui/web/files/mpimages/ATMS07-1.htm

Task 4: Operational Concepts Workshop

- Stakeholders meet to review draft ITS services and inventory
  - Check accuracy of inventory ***and projects***
  - Accuracy of interfaces
    - Within agencies
    - Between agencies
  - Gather additional information
  - Document roles and responsibilities
  - Identify memoranda of understanding/agreements
    - Collect agreements already in place
    - Recommend agreements that may be required

Task 5: Draft ITS Architecture

- Update inventory and services according to inputs from ITS architecture Operational Concepts Workshop
- Develop:
  - Operational Concepts
  - Roles and Responsibilities
  - Functional Requirements
  - Map ITS Standards to Architecture Flows
  - Gather and input Institutional Agreements
  - Project Architectures
- Stakeholders can review the Draft ITS Architecture via website: http://www.consystec.com/hawaii/default.htm

Task 6: Final ITS Architecture

- Incorporate stakeholder comments
  - Address comments not incorporated
- Final ITS Architecture Outputs
  - Executive Summary
  - ITS architecture document
  - ITS architecture website

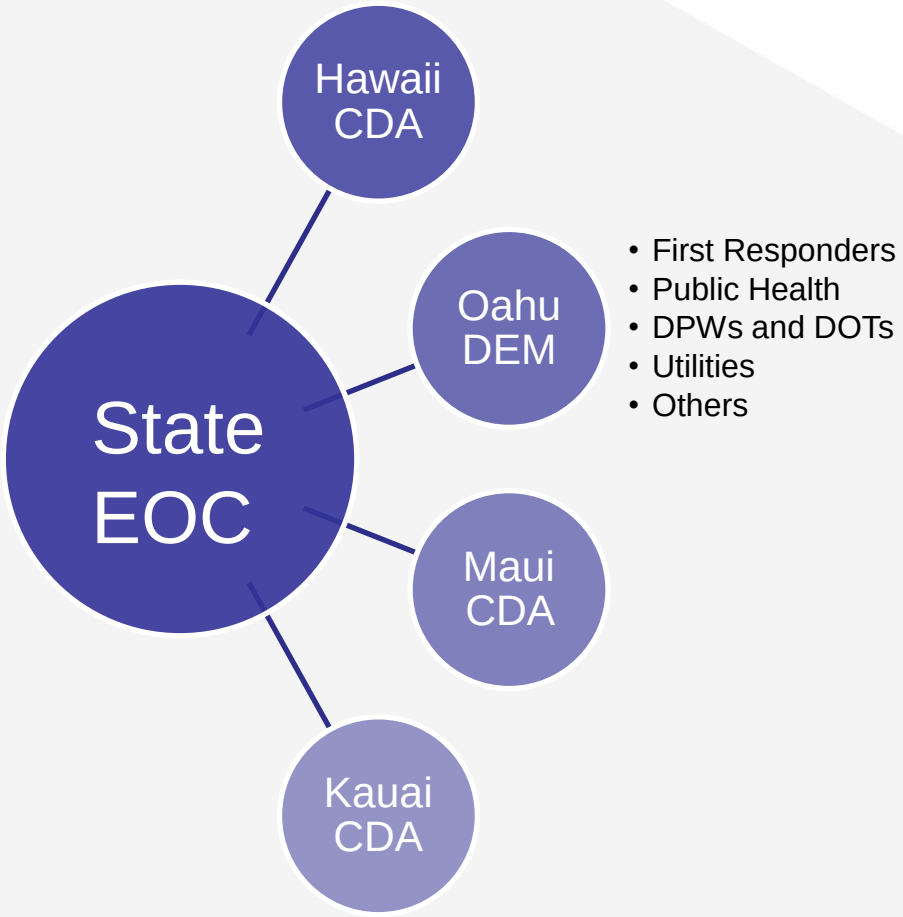
Stakeholders

Stakeholders Provide the following types of Statewide ITS Services

- Emergency Management & Disaster Response
- Transportation Infrastructure Protection
- Broadcast Traveler Information
- Transit Fare Collection Management
- Archived Data

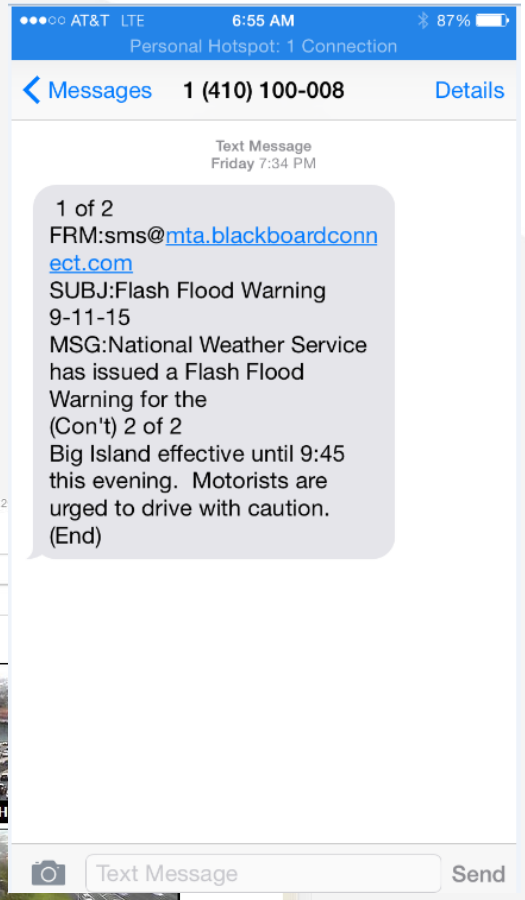
Stakeholders in the Architecture

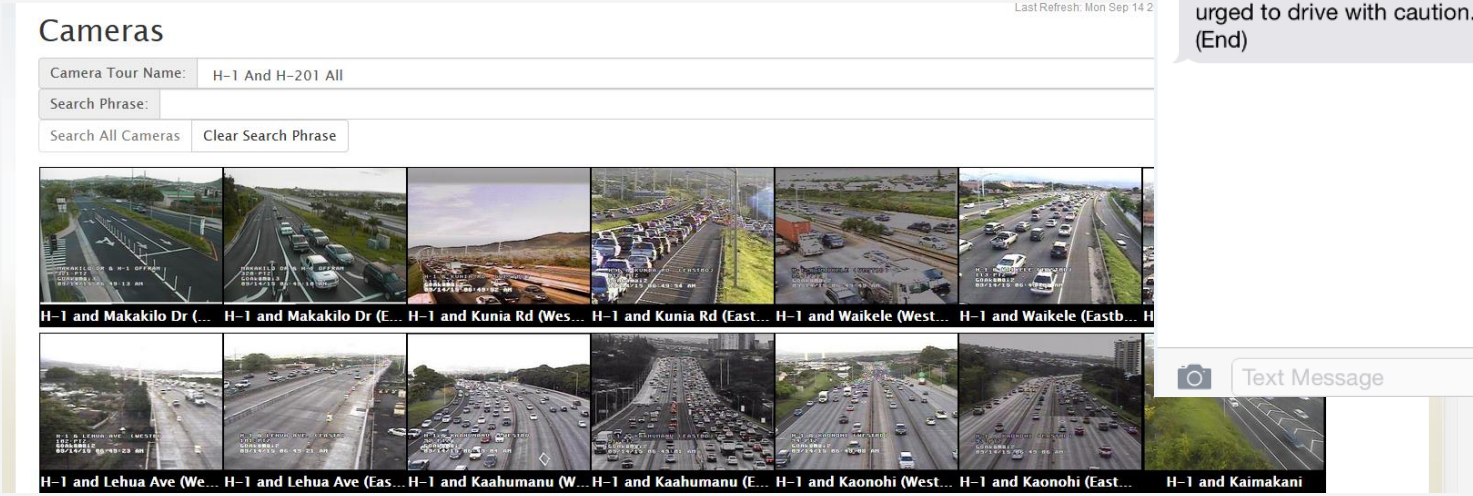
- Emergency Management & Disaster Response
  - Civil Defense Agencies
  - Depts. Of Emergency Mgmt.
  - Others who sit in the State EOC



Stakeholders in the Architecture

- Broadcast Traveler Information
  - GoAkamai
  - HTA & HVCB
  - Nixle, SMS Blackboard, CTY





Stakeholders in the Architecture

- Transit Fare Collection Management
  - C&C Honolulu Dept. of Transportation Services
  - Maui Department of Transportation
  - Kauai Transportation Agency
  - Hawaii Mass Transit Agency
- Archived Data
  - HDOT-HWY-P
  - County DPWs & DTS (volumes, speeds, counts, etc.)
  - Maui & Oahu MPOs (travel demand forecasting)
  - County Transit Agencies (boardings, headways, etc.)

Schedule

Schedule

- Jan. 2015: Identify Stakeholders
- Feb. – April 2015: Maui Stakeholder Interviews
- May – July 2015: Maui Architecture Development
- June – Sept. 2015: Kauai Stakeholder Interviews
- Oct. ‘15 – Feb. ‘16: Kauai Architecture Development
- Jan. – March 2016: Hawaii Statewide Interviews
- April – July 2016: Hawaii Statewide Architecture Development
- Aug. – Sept. 2016: Final Architecture

Thank you!