

4.1 INTRODUCTION

This chapter provides the operational concept for the Salem-Keizer Metropolitan area. The operational concept defines each stakeholder agency's current and future roles and responsibilities in the implementation and operation of the regional transportation system. It provides a high-level overview of the way the region's systems and stakeholders will work together to provide ITS services. This chapter includes discussion about many of the components that contribute to the high level operational concept database and the corresponding input into the Turbo Architecture database including: operational concept approach and overview, agency roles and responsibilities, information flows and pictorial flow diagrams for each of the program areas of ITS services included in this plan.

4.1.1 Operational Concept Approach

Interviews were conducted with key stakeholders to determine existing and planned relationships between different public agencies. Ongoing discussions with the Steering Committee regarding market package and user service selection, and previously defined user needs contributed information used to develop the operational concept for the Salem-Keizer region. The purpose of the interviews was to discuss existing problems and opportunities for interagency coordination and shared resources for the future. The results discussed in this chapter do not represent all of the potential interactions, but does present key relationships, coordination, and information flows that can be incorporated into the Salem-Keizer regional ITS plan.

The Salem-Keizer operational concept has been split into several different operational concepts; with each one covering a particular aspect of the transportation system. Operational concepts will be defined for each of the following ITS areas:

- ▶ Regional Traffic Control
- ▶ Traveler Information
- ▶ Incident Management
- ▶ Public Transportation Services
- ▶ Maintenance and Construction
- ▶ Archived Data

4.2 OPERATIONAL CONCEPT OVERVIEW

The following section outlines the different components that contribute to the operational concept for the Salem-Keizer region. The deployment of ITS projects is unique; many of the benefits are seen when ITS projects are implemented together on a region-wide basis, rather than on an individual basis. As a result, the implementation of ITS projects requires coordination and ongoing cooperation between various agencies within a region.

4.2.1 Operational Concept Database

The operational concept database was created from input from key stakeholders regarding existing and future relationships between agencies. The High-Level Operational Concept database consists of agency roles and responsibilities and information flows between agencies. These two areas are discussed in more detail in the section below. Each relationship and information flow was characterized as existing (the relationship/information flow is operational), planned (the relationship/information flow is planned) or consider (the relationship/information flow will be considered in the future). This database can be used to develop the framework for setting up inter-agency agreements within the Salem-Keizer Region and is included in Appendix I.

4.2.2 Agency Roles and Responsibilities



Key Stakeholder agencies within the Salem-Keizer Region currently interact with each other on various levels. The purpose of the operational concept database is to capture these existing relationships, as well as to look to the future at potential relationships that could be incorporated into the regional ITS architecture plan and affect the functional success of future ITS deployments. Table 4-1 defines eight different relationships that are used to characterize relationships between public agencies in the High-Level Operational Concept Database.

Table 4-1. Agency-to-Agency Relationships

Relationship	Definition	“From/To” Example
Independent	Parties operate independently with no interaction	No interaction (e.g. existing relationship between Oregon State Police and the City of Salem).
Consultation	One party confers with another party, in accordance with an established process, about an anticipated action and then keeps that party informed about the actions taken. No electronic sharing of information.	FROM agency provides information on activities to interested TO agencies (e.g. existing relationship from the City of Salem to the local police and fire agencies).
Cooperation	The parties involved in carrying out the planning, project development and operations processes work together to achieve common goals or objectives. No electronic sharing of information.	Both agencies cooperate in the development and execution of common plans, projects, and operational procedures (e.g. existing relationship between the City of Salem and the NWTOC).
Information Sharing	The electronic exchange of data and device status information between parties, for the purposes of coordinated operations, planning, and analysis.	FROM agency will provide status, data, and/or video information from the FROM agency’s field devices to the TO agency (e.g. planned ODOT’s detector data to the City of Salem)
Control Sharing	The ability, through operational agreements, to allow for one party to control another party’s field devices to properly respond to incident, event, weather, or traffic conditions	FROM agency is allowed by the TO agency to control the TO agency’s field devices—(e.g. planned City of Salem control of ODOT cameras).
Only Operational Responsibility Shifted	One party operates the field equipment of a second party on a full time basis.	FROM agency will operate the field devices of the TO agency (e.g. County operates a City’s traffic signals but the City is responsible for maintenance and repairs.)
Only Maintenance Responsibility Shifted	One party maintains the field equipment of a second party.	FROM agency maintains the field devices of the TO agency, but the TO agency is responsible for operations.
Full Responsibility Shifted	One party has full responsibility for the field equipment of a second party including operations and preventative and emergency maintenance.	FROM agency operates and maintains the field devices of the TO agency (e.g. existing City of Salem operates and maintains Marion County’s traffic signals)

4.2.3 Information Flows

Information flows represent the different types of information that can be shared or exchanged between agencies, roadside devices, or vehicles within the Salem-Keizer region. There are two types of information flows: center to center and center to field. A center to center information flow occurs when information is exchanged between agencies’ centers. A center to field information flow is characterized by an information flow (e.g. data) being sent directly to an agency’s center from or to a field device.

Other important functional information flows include request or control. Requests for information, (e.g. signal timing plan) may occur from one agency's center to another agency's field devices. The information flows included in the High-Level Operational Concept Database are defined in Table 4-2.

Table 4-2. Information Flow Definitions

Information Flows	Definition	“From/To” Example
Data	The dissemination of data gathered from one party's field devices to another party. Data can include, but is not limited to, traffic, weather, parking, transit data etc	FROM agency sends data to the TO agency's field devices and centers
Video	The dissemination of live video and still images from one party's field camera's to another party	FROM agency sends live video and still images to the TO agency (e.g. planned roadway information data/video flows from the City of Salem Traffic Management to Cherriots Transit Operations Center)
Status	The ability for one party to monitor another parties field devices, and receive such information as current signal timing/response plan, current message sets, etc.	FROM agency sends status information on its devices to the TO agency (e.g. planned signal status information from the City of Salem to NWTOC)
Request	The ability for one party to solicit either data or a command change, such as DMS messaging or signal timings, from another party.	FROM agency requests information or action from the TO agency (e.g. existing request for resource from the Willamette Valley 911 center to local police vehicles)
Control	The ability for one party to control another party's field devices. Control can include but is not limited to, changing DMS messaging, changing traffic signal timings, camera control, etc.	FROM agency issues control instruction to the TO agency's field devices (e.g. planned control of ODOT's dynamic message signs by the City of Salem)

4.2.4 Roles and Responsibilities

In addition to the operational concept database, detailed roles and responsibilities are included for each of the key stakeholders in the Turbo Architecture database. The report output from the Turbo file includes these roles and responsibilities that are classified according to the list below:

- ▶ Design: Includes the design of equipment and systems required under each program area
- ▶ Operations: Includes agency roles in operations of equipment and systems in each functional area after implementation
- ▶ Operational Planning: Includes agency roles in defining operational planning process and procedures to support ongoing operations and future expansion of each program area
- ▶ Maintenance: Includes agency roles in maintenance of equipment and systems in each program area.
- ▶ Construction: Includes the construction or installation of equipment and systems required under each program area. This category also includes requirements for integration of the old systems with the new systems.
- ▶ System Development and Integration: Includes the responsibility for development of new software interfaces and integration between systems to support each program area.

4.2.5 Program Area Operational Concepts

The operational concept for each program area includes flow diagrams, description of the program area, applications of the program area and detailed roles and responsibilities that have been input into the Turbo Architecture file. The flow diagrams depict relationships and information flows that were developed to illustrate relationships between agencies, roadside devices and other factors that influence the operations of each program area.

4.3 REGIONAL TRAFFIC CONTROL

4.3.1 Description

The operational concept for regional traffic control represents a broad view of interagency coordination and information exchanges that contribute to the success of the region-wide implementation of ITS services related to traffic management. Figure 4-1 illustrates the operational concept for regional traffic control within the Salem-Keizer region.



The city and county field devices and traffic management centers have been grouped together because they operate similarly; the majority of the roadside devices are operated and maintained by the City of Salem. Roadway information, as indicated on the flow diagram, from field devices or centers may include:

- ▶ Incident information
- ▶ Construction information
- ▶ Congestion information
- ▶ Weather information

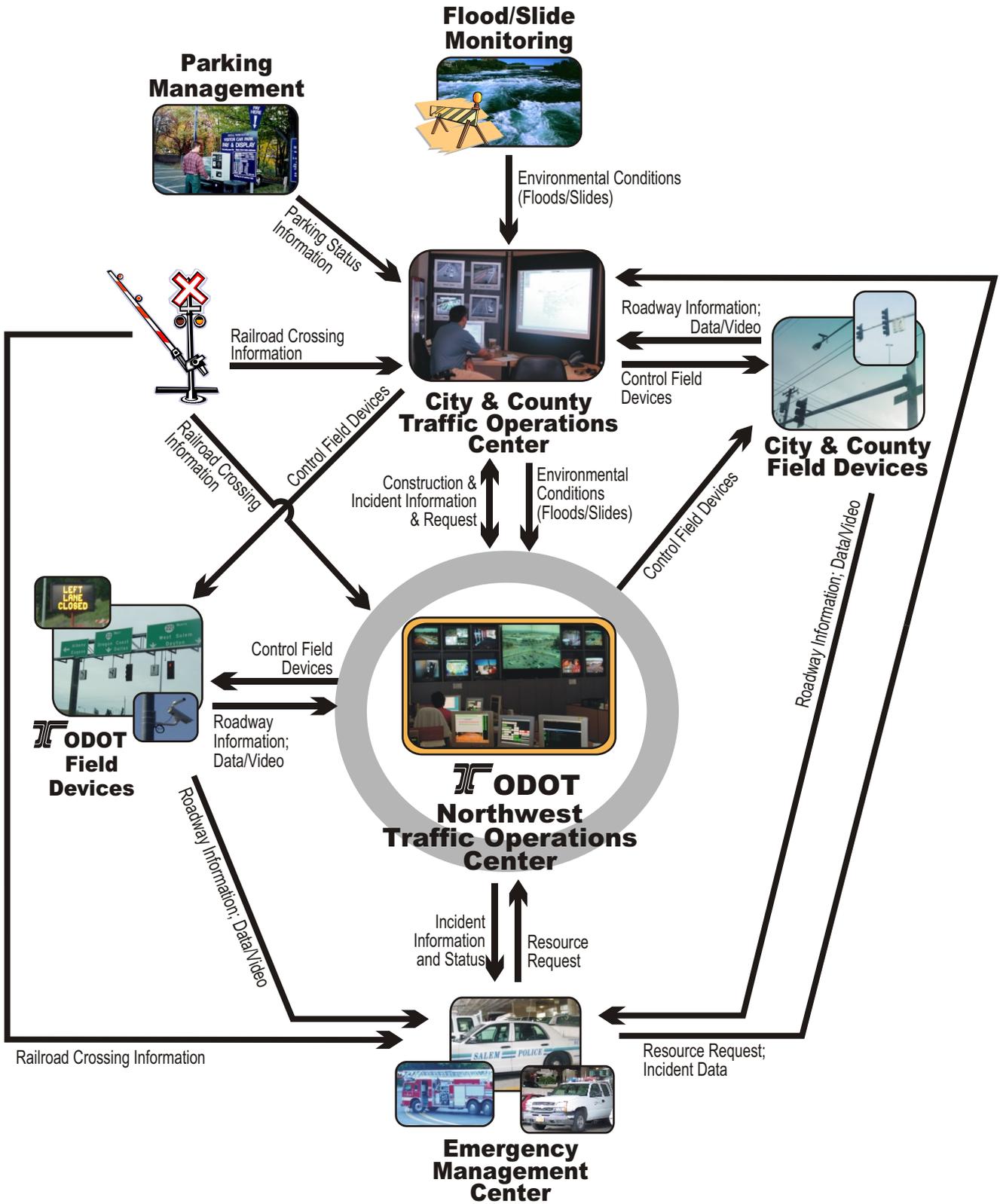
The diagram also indicates shared video images, requests for resource, status information and control of field devices between corresponding agencies.

4.3.2 Applications of the Program Area

Communications between the city and county traffic management centers and the ODOT NWTOC represent one component of this program area. Other planned information flows include: flood and slide monitoring, railroad crossing occupation information, and parking status information. These changes to the regional system will contribute to more efficient operations of the transportation network and reduced delays for travelers and emergency responders.

4.3.3 Roles and Responsibilities

Currently, there is existing coordination between the city and county traffic management and ODOT's field devices. The city of Salem operates and maintains many of the traffic signals that are owned by ODOT, City of Keizer and Marion County within the study area. Additional shared responsibilities are planned between emergency management, ODOT, and city/county traffic operations centers. Detailed roles and responsibilities are shown in Appendix J.



4.4 TRAVELER INFORMATION

4.4.1 Description

Traveler information includes the coordination and dissemination of information that affects travel within the Salem-Keizer region. Traveler information includes planned information, such as special events and construction activities and unplanned events, such as incidents and detour routes. Traveler information is collected and then distributed to the individual traveler via cell phones, websites, PDA's, kiosks, or other media sources. This information can be used to make informed travel decisions and contribute to decreased delays caused by congestion, incidents or construction. Figure 4-2 illustrates the operational concept for traveler information within the Salem-Keizer region.

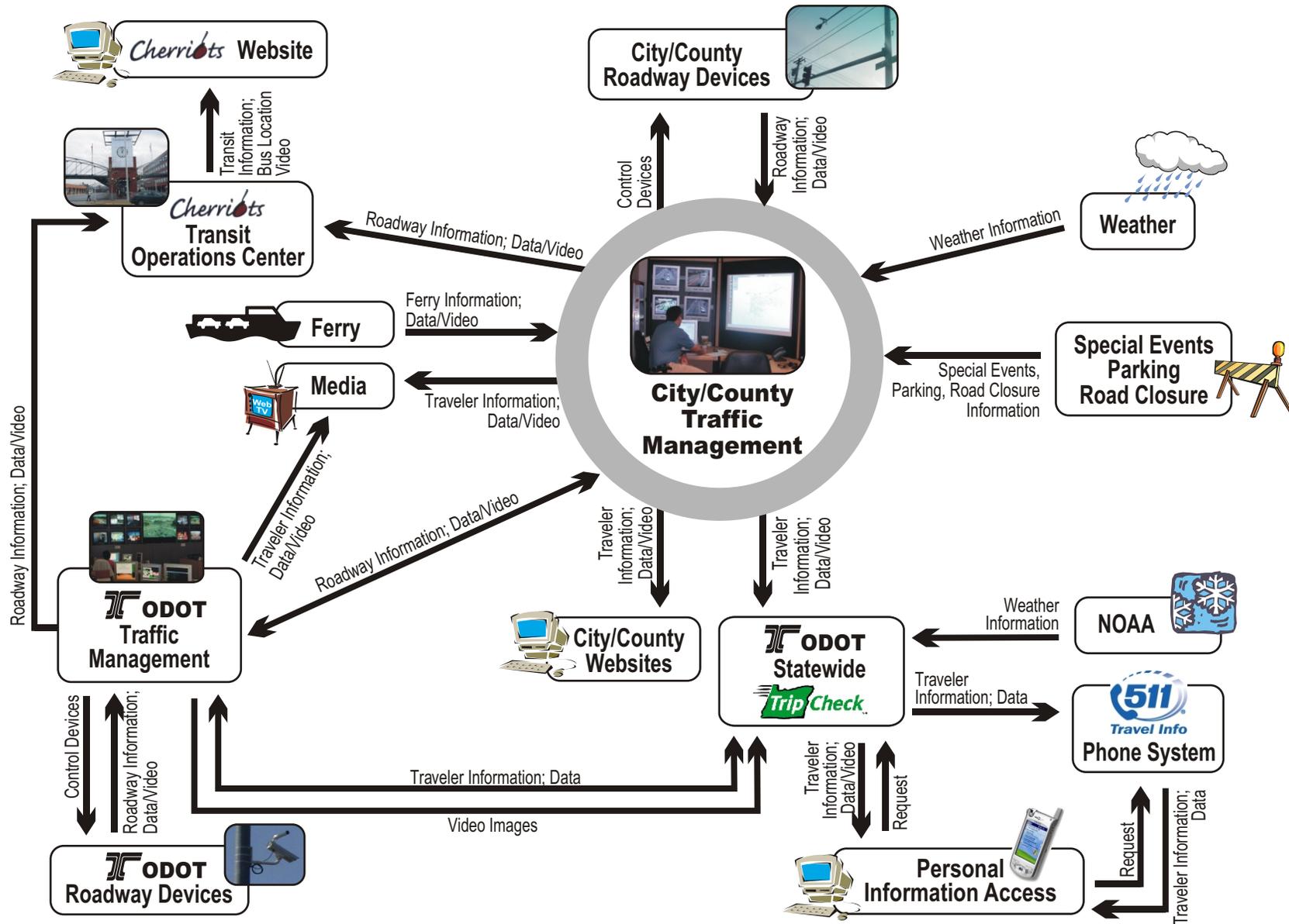


4.4.2 Applications of the Program Area

The primary source of traveler information in the Salem-Keizer region is currently ODOT's TripCheck website and the 511 traveler information telephone system. Other planned sources for traveler information dissemination include city and county websites and Cherriots transit website. The operational status of the ferries, real-time transit arrival and departure information, weather information, special events, parking and road closure information will be incorporated into the proposed regional en-route traveler information system. Additionally, there are many existing cameras in Salem and Keizer that could potentially post images on the City of Salem and TripCheck websites to illustrate real-time traffic conditions throughout the study area.

4.4.3 Roles and Responsibilities

A key responsibility of the regional agencies involved with providing information includes maintaining and operating user interfaces that are easily accessible and provide current, up to date traveler information. It is equally important for operating agencies to remove outdated traveler information when it is no longer applicable. For example, messages on electronic message signs about a crash ahead should be removed as soon as the incident is cleared from the roadway. Detailed roles and responsibilities are shown in Appendix J.



4.5 INCIDENT MANAGEMENT

4.5.1 Description

Incident management includes all of the information flows and agency relationships for involvement in emergency and incident response. The scenarios covered by this program area are broad in scope and include minor incidents on local streets to major region-wide emergencies that cross city and county jurisdictional boundaries. Coordination is needed for both planned and unplanned events to increase agency awareness and work towards a common goal of improving



the safety of the public and minimizing effects on traffic flow. The key agencies include: the city and county emergency management and vehicles, Oregon State Police, 911 Center, ODOT NWTOC and incident response vehicles. Each agency contributes to the regional success of incident management. Figure 4-3 illustrates the operational concept for incident management within the Salem-Keizer region.

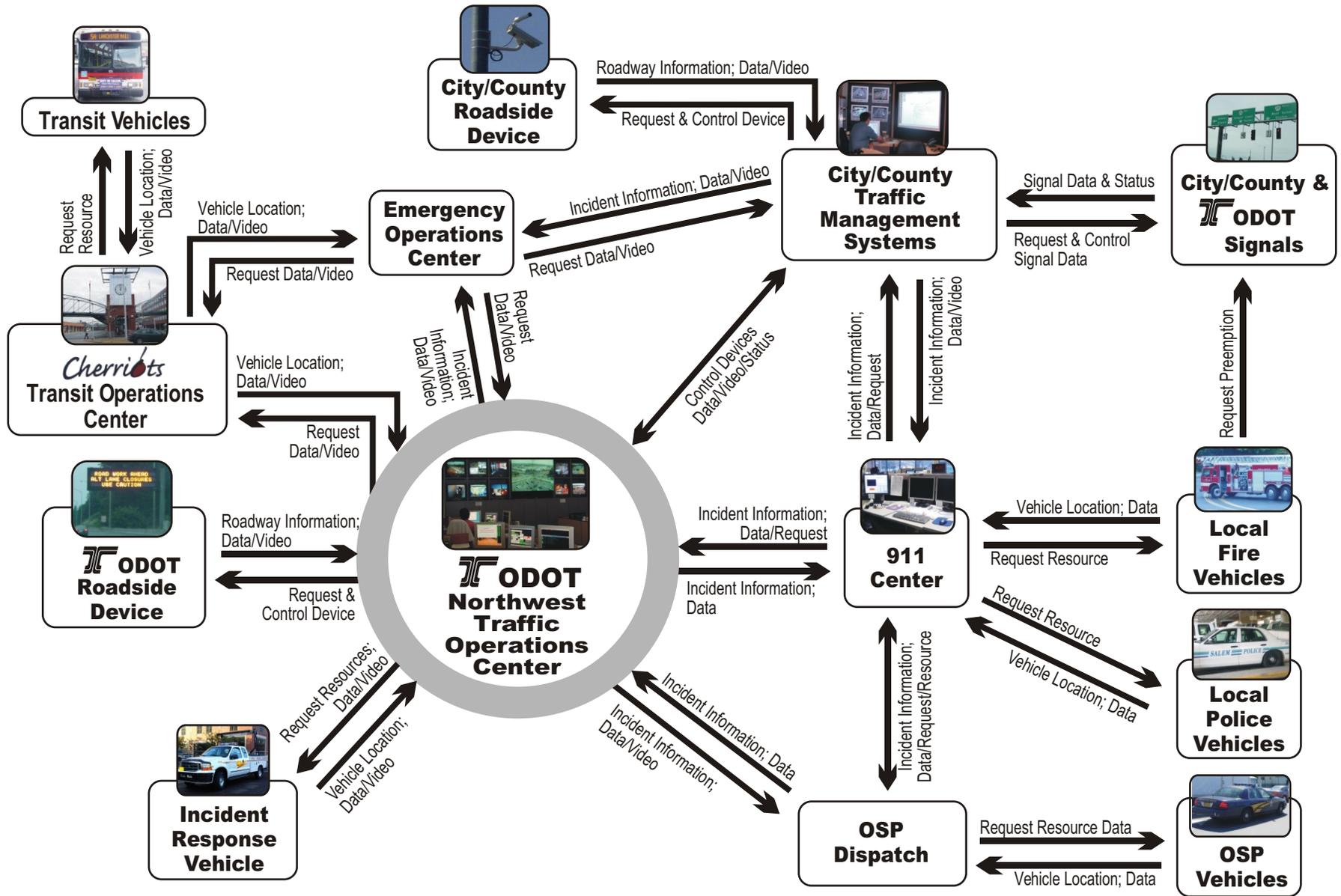
4.5.2 Applications of the Program Area

Existing relationships between the city and county traffic management centers and emergency management personnel could be enhanced through information exchanges, such as data or video images. Other useful information includes data and vehicle location for emergency and incident response vehicles to assist with efficient emergency dispatch and shared incident information between city/county traffic management, ODOT NWTOC and the Mid-Willamette Valley 911 Center.



4.5.3 Roles and Responsibilities

Incident management requires a broad range of agency coordination at many different levels. Each agency has the responsibility to install, operate and maintain individual systems that will contribute to the overall management of the regional traffic system and also to coordinate with other appropriate agencies by providing information and controlling field devices and systems as appropriate. Detailed roles and responsibilities are shown in Appendix J.



4.6 MAINTENANCE AND CONSTRUCTION MANAGEMENT

4.6.1 Description

The maintenance and construction management program area includes weather-related information and construction, work zone, and routine maintenance activities. The information exchange relies on real-time information and planned delays due to roadway construction. Public agencies utilize this information to assist in planning and reducing impacts to local and regional road networks. This program area includes city and county public work agencies, ODOT NWTOC, roadside equipment that is owned and operated by city/county/ODOT and information providers, including the media and internet websites. Figure 4-4 illustrates the operational concept for maintenance and construction management within the Salem-Keizer region.

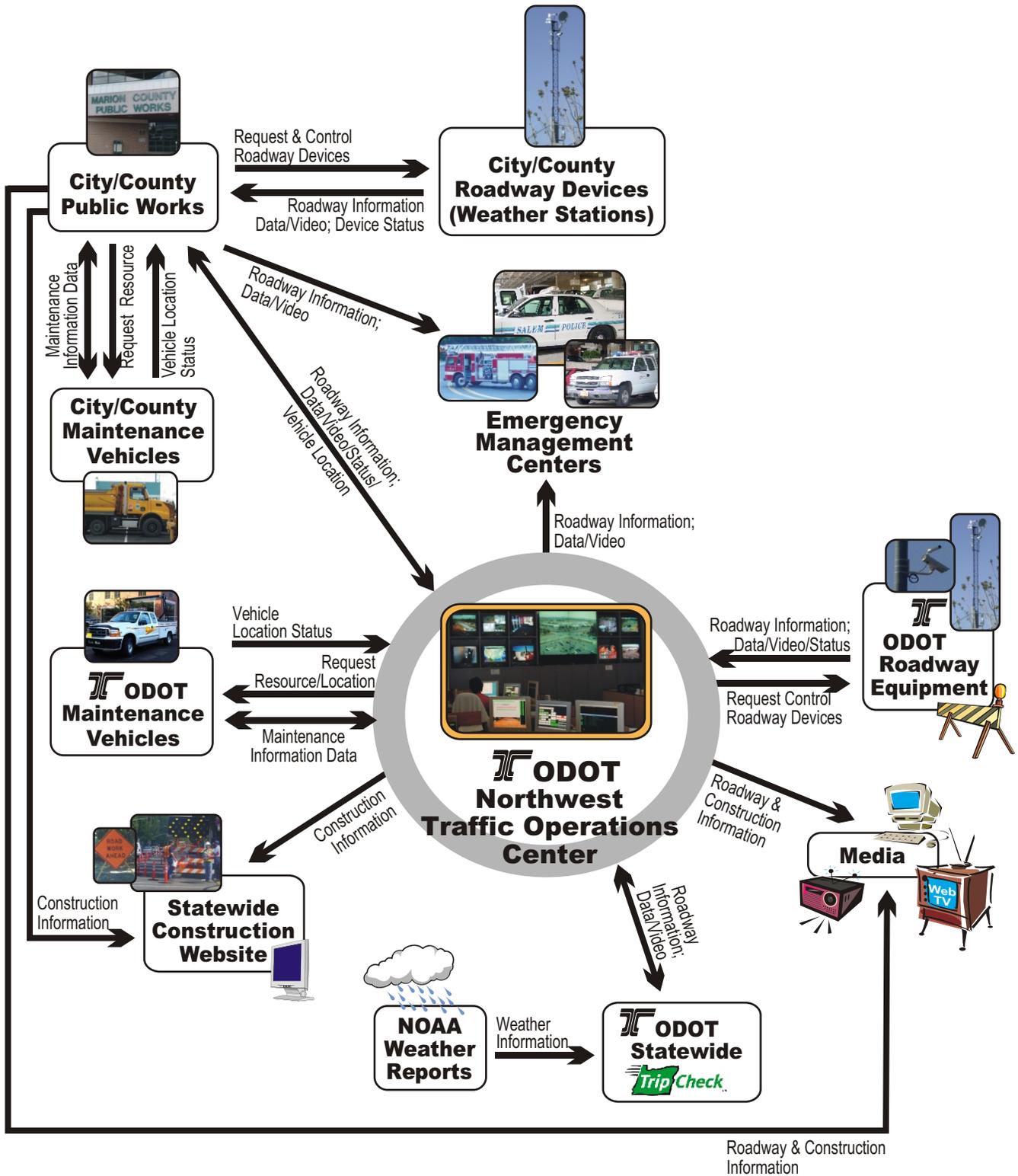


4.6.2 Applications of the Program Area

Currently the city of Salem is equipped with GPS on some maintenance vehicles for tracking routine maintenance needs; future use of this technology will extend to tracking pothole repairs. A statewide construction website will offer a source of information for planned construction events within the state as well as the local Salem-Keizer region. Construction and/or weather related information flows to emergency management centers and Cherriots Transit Management from the city/county/ODOT traffic operations centers are also planned.

4.6.3 Roles and Responsibilities

The statewide construction website relies on local agencies providing up to date information about planned construction activities. The city and county public works will also be responsible for installing, operating and maintaining field devices and on-board equipment that will enhance maintenance and construction operations. Detailed roles and responsibilities are shown in Appendix J.



4.7 PUBLIC TRANSPORTATION SERVICES

4.7.1 Description



Within the Salem-Keizer region, Cherriots operates fixed-route services and Oregon Housing and Associated Services (OHAS) operates demand-responsive paratransit service. This program area focuses on improving transit services through coordination and implementation of ITS technologies, such as transit signal priority, CAD interface integration between paratransit and fixed route service and the use of automatic vehicle location to provide real-time arrival and departure information. Figure 4-5 illustrates the operational concept/informational flows for public transportation services within

the Salem-Keizer region.

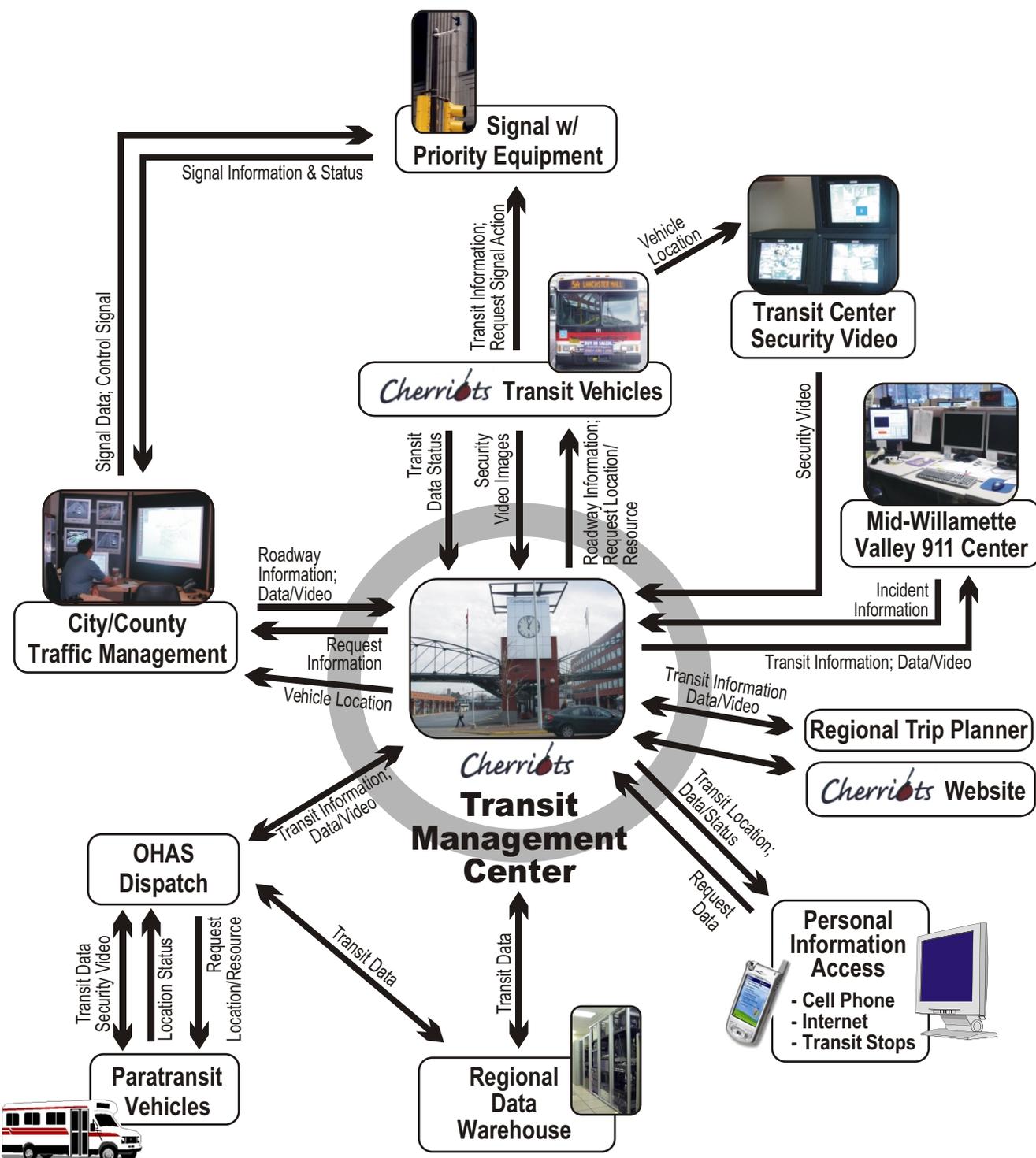
4.7.2 Applications of the Program Area

Transit signal priority is planned on many signalized corridors in the Salem-Keizer Metropolitan area, specifically on the high priority transportation corridor on North River Road. Transportation agencies owning signals will control, operate and maintain traffic signals with equipment (software and detection hardware) to support transit priority. Cherriots will equip busses with priority equipment to request priority at traffic signals. Additional flows include the transmittal of real-time traveler information to the Cherriots website and transit security surveillance images from the busses to transit center.

Users can access the Cherriots website for real-time traveler information. Planned information flows from the city/county traffic management centers and emergency management provide construction, incident and weather information that may affect scheduled routes and transit arrivals and departures.

4.7.3 Roles and Responsibilities

Cherriots and OHAS are primarily responsible for the daily operation, maintenance, design and implementation of field devices used to support their agencies' services. Additional coordination with the City of Salem is required for the operations, maintenance, design and installation of traffic signal priority devices and the exchange of roadway information that may influence the transit services, such as incidents, construction or weather information. Detailed roles and responsibilities are shown in Appendix J.



4.8 ARCHIVED DATA

4.8.1 Description

The purpose of the data warehouse is to provide a centralized, electronic database that facilitates information/data sharing between agencies within the Salem-Keizer region. As illustrated in Figure 4-6, data will be shared between the regional data warehouse and other public agencies within the Salem-Keizer region.

4.8.2 Applications of the Program Area



Data from the following agencies will be collected, stored and archived: City of Salem, City of Keizer, Marion County, Polk County, Cherriots transit management, Emergency management and ODOT's traffic management systems. Types of data that will be exchanged may include traffic count data, weather data, incident data and transit data. ODOT has a policy not to store video images due to institutional and privacy issues.

The capability to store select images should be considered for the purpose of detailed traffic analysis.

4.8.3 Roles and Responsibilities

The Mid Willamette Valley Council of Government (MWVCOG) will lead the development, design, operations and maintenance of a regional data warehouse within the Salem-Keizer region. Each agency will participate in data exchange to/from the warehouse and create their corresponding user interface for sharing information. Detailed roles and responsibilities for this program area are shown in Appendix J.

