California Oregon Advanced Transportation Systems
Phase VIII
Final Report

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EXECUTIVE SUMMARY

This document summarizes the work completed for continued Intelligent Transportation Systems (ITS) demonstration, evaluation and technology transfer in rural northern California and southern Oregon. This work was completed under the eighth phase (Phase VIII) of the California and Oregon Advanced Transportation Systems (COATS) project. The purpose of the overall COATS effort has been and continues to be encouraging regional, public and private sector cooperation between California and Oregon organizations to better facilitate the planning and implementation of ITS in a rural bi-state area extending between Eugene, Oregon, and Redding, California.

As COATS matured, it, as well as projects which have spun off from the effort, gained interest from surrounding states, specifically Washington, Nevada, and Utah. Consequently, the COATS region is now the Western States Rural Transportation Consortium (WSRTC), which includes California, Nevada, Oregon, Utah, and Washington. Although future research efforts will be conducted under the umbrella of the WSRTC, the work discussed in this document was conducted as part of COATS and is discussed as such.

The primary goal of COATS Phase 8 was to build on the success of earlier COATS phases to preserve and expand the COATS region as an innovator in rural ITS demonstration. To help the partnership achieve the COATS vision and mission, initiatives that were undertaken include technology transfer through the Western States Forum, a Handbook for the Forum, and maintaining and expanding the COATS web presence for the technology transfer of results of this effort.

1   Introduction

The purpose of this document is to summarize the work completed for continued Intelligent Transportation Systems (ITS) demonstration, evaluation and technology transfer in rural northern California and southern Oregon. This work was completed under the eighth phase (Phase VIII) of the California and Oregon Advanced Transportation Systems (COATS) project. The purpose of the overall COATS effort has always been to encourage regional, public and private sector cooperation between California and Oregon organizations to better facilitate the planning and implementation of ITS in a rural bi-state area extending between Eugene, Oregon, and Redding, California.

As COATS has matured, it, as well as projects which have spun off from the effort (One Stop Shop (OSS), Integration of Aviation Automated Weather Observing System (AWOS) with Road Weather Information System (RWIS), Redding Responder, WeatherShare, Automated Safety Warning System Controller (ASWSC), etc.), have gained interest from surrounding states, specifically Washington, Nevada, and Utah. This work has also generated interest based on being finalists and award winners for the following:

- One Stop Shop
    - 2014 Best of ITS (Awarded)
    - 2013 California Transportation Foundation Tranny Awards (Finalist)
- Redding Responder
    - 2010 Best of Rural ITS Award (Awarded)
    - 2009 California Transportation Foundation Tranny Awards (Finalist)
    - 2007 Best of ITS Award (Finalist)
- Automated Safety Warning System Controller
    - 2014 Best of Rural ITS Award (Finalist)
- Western States Rural Transportation Technology Implementers Forum
    - 2012 Best of Rural ITS Award (Awarded)

Because of this interest, the COATS region evolved during the course of Phase 4 into the Western States Rural Transportation Consortium (WSRTC) with the states of California, Oregon, Washington and Nevada. Utah joined the Consortium in 2018. The WSRTC was established to facilitate and enhance safe, seamless travel throughout the western United States. The Consortium seeks to promote innovative partnerships, technologies and educational opportunities to meet these objectives. Additionally, the Consortium seeks to provide a collaborative mechanism to leverage research activities in a coordinated manner to respond to rural transportation issues among western states related to technology, operations and safety. Consequently, activities of the Consortium are focused on technology transfer/education (Western States Rural Transportation Technology Implementers Forum) and incubator projects (small scale research tasks intended to serve as a "proof of concept" for larger subsequent efforts) centered on the Consortium pillars of technology, operations and safety. Although future research efforts will be conducted under the umbrella of the WSRTC, the work discussed in this document was conducted as part of COATS and will be discussed as such.

1.1   COATS Vision

As part of the shift from COATS to the WSRTC, the vision of the group has been defined as follows: "The WSRTC shall promote innovative partnerships, technologies and educational opportunities to facilitate and enhance safe, seamless rural travel throughout the western United States." Throughout COATS Phase 8, the WSRTC vision has been employed in guiding the various efforts associated with the project.

1.2   COATS Mission

The COATS Project serves to focus member agencies on a seamless, state-of-the art, multi-modal transportation network benefiting travelers, goods movement, economic activity, and transportation systems operators in California, Nevada, Oregon, Utah, and Washington. Collaboration between the COATS project and its partnership coalition provides information and serves to promote increased safety, mobility, traveler comfort, environmental quality, and operational efficiency and productivity. Again, as part of the shift from COATS to the WSRTC, the mission of this effort is presented as follows: "The WSRTC shall provide a collaborative mechanism to leverage research activities in a coordinated manner to respond to rural transportation issues among western states related to Technology, Operations and Safety." The mission of the WSRTC guided the work for COATS Phase 8.

1.3   Phase 8 Goals

The primary goal of COATS Phase 8 was to build on the success of earlier COATS phases to preserve and expand the COATS region as an innovator in rural ITS demonstration. To help the partnership achieve the COATS vision and mission, initiatives that were undertaken include technology transfer through the Western States Forum, a Handbook for the Forum, and maintaining and expanding the COATS web presence for the technology transfer of results of this effort.

1.4   Project Tasks

The work plan for COATS Phase 8 consisted of the following five tasks:

- Task 1: Project Management
- Task 2: Project Technical Advisory Panel (PTAP) Meetings
- Task 3: Western States Rural Transportation Technology Implementers Forum (WSRTTIF)
- Task 4: Update Forum Handbook
- Task 5: Submit Final Report and Workshop Presentation

Central to the project were the needs and interests of stakeholders within the COATS region. Their input was used to identify what activities would be pursued, as well as provide feedback and information in support of on-going work. WTI managed the project in consultation with the Project Manager and the PTAP, to ensure integrity and unity in the project approach.

1.5   Report Organization

This report presents a summary of activities completed during Phase 8 of the COATS effort. Specifically, this report provides an overview of the major efforts of the project, including the Western States Forum, regular PTAP meetings, website development and maintenance, and the Western States Forum Handbook.

2   Technology Transfer

2.1   Western States Rural Transportation Technology Implementers Forum

This task provided financial and logistical support for the 2020, 2021, and 2022 Western States Forums and a portion of the 2023 event. An event focused on delivering high quality technology transfer and networking opportunities, the Forum targets an audience of professionals working in design and maintenance of ITS technologies in rural environments. It is unique nationally with respect to its audience and technical content, and its origin and development over the years reflect the idea of using COATS as an incubator for innovations in the use of technology to address rural transportation challenges.

In March of 2020, plans for the 15th Annual Forum were on track and progressing according to schedule. However, a global pandemic (coronavirus COVID-19) significantly impacted the United States with most states issuing some level of shelter in place or stay at home order at the time. Taking into consideration federal Center for Disease Control recommendations and state government guidelines, the decision was made to cancel the 2020 Forum. The event was to be held at the Holiday Inn Express in mid-June, speakers had been selected and draft presentations reviewed, registration was about to be opened, and many logistics close to finalized. The Steering Committee felt that making the decision at that point in the planning process, versus closer to the event, was in the best interest of all involved given the uncertainty amid the current environment, teleworking, and expected increased workload after some return to normalcy.

The Steering Committee has desired to hold the Forum in a similar time frame each year (early to mid-June. With continuing travel and participation concerns surrounding the COVID-19 pandemic, the 2021 Forum was postponed from June until October of 2021. The 2022 Forum returned to mid-June and the 2023 Forum is also being planned for that time of year.

The 2021 and 2022 Forums were held in Yreka, California, at the Best Western Miner's Inn. The 2023 Forum is being planned for that venue as well. Being close to the Oregon border and an international airport facilitated participation from other states while remaining within Caltrans District 2. The venue is economical with the necessary facilities, including lodging in proximity to the meeting facility.

Individual and diverse participation at the Forum indicates its growth and success. Starting with 15 in 2006, there were 45 participants at the 2022 event. The 2021 Forum had 33 attendees. While participation numbers were a bit lower for 2021, the Steering Committee still felt this was reasonable given the different time of year and the ongoing pandemic effects on travel and work schedules. The Forum continues to attract a diverse audience from within the WSRTC and surrounding region. Attendees of the 2021 and 2022 Forums came from ten different states -Arizona, California, Iowa, Massachusetts, Montana, Nevada, Oregon, Texas, Utah, and Washington – with Arizona, Iowa, and Massachusetts new additions to the list of participant states. They represented six of the 12 Caltrans Districts, several offices and divisions within Caltrans, five state departments of transportation, seven universities, the Southwest Research Institute, and HW Lochner. It should be noted that the Forum aims to maintain a smaller audience around 40 – 50 people. However, the Best Western Miner's Inn could

potentially accommodate additional participation. On the other hand, ongoing travel restrictions in California and other states have and will continue to cause attendance numbers to fluctuate.

Each year, the Forum has been distinguished by informative, in-depth technical presentations and demonstrations given by a diverse group of rural ITS practitioners. Presenters have delved into how solutions were developed, focusing on applications that have been deployed in the field and are being used in live traffic situations. Success stories have been shared along with failures and problems so that participants learned not only what does work, but also what doesn't work and why. The extended length of the presentations (60-120 minutes) and the informal atmosphere have allowed frank discussion of equipment functionality, vendor claims, system performance, and other key information that practitioners need to know for successful rural ITS projects. The Committee has specifically encouraged presentations that discuss and/or demonstrate a project implemented or improved because of participation in a past Forum. For example, at the 2022 Forum, Utah DOT gave an update on their Rural Intersection Conflict Warning System projects that they presented at the 2019 Forum. As another example of Forum content, the 2021 Forum also had presentations from three different states on wrong-way driving related projects, which provided an interesting look into different approaches to a problem.

The Western States Forum website (www.westernstatesforum.org) has been maintained and the Forum continues to have a presence on the Western States Rural Transportation Consortium (WSRTC) website (www.westernstates.org). The Forum website includes a home page and individual pages that describe the Forum and its history and share pertinent information about the current Forum such as registration, lodging, maps and directions, and things to do around the Forum location. Each past Forum has a set of pages that includes downloadable versions of the technical content and an image gallery. Contact information is also easily accessible.

To increase awareness of the Forum and its value, a one-page fact sheet that describes the Forum was updated, distributed, and posted on the Forum website as well as the WSRTC website. The annual evaluations collected comments about how the participants would use the information from the Forum (projects, discussion points, philosophy, networking, etc.) as well as whether they or someone from their department implemented or improved a project because of participating in the Forum. A selection of these comments and others are on the Consortium website at http://www.westernstates.org/Impact/WSF/Default.html. This page details how the Forum is effectively impacting change across the WSRTC region.

Participants repeatedly expressed a very high interest in attending a similar Forum the following year. Average evaluation ratings for quality, level of detail, relevancy and overall aspects of the Forum were consistently positive. Attendees appear to be satisfied with the length and general format of the Forum, including the small, focused group, detailed presentations, rural perspective, and excellent networking opportunities. The feedback suggests that the Forum is successfully meeting the needs of practitioners and the goals, mission and vision outlined for the Forum.

A more detailed review of this task can be found in the meeting review reports completed as part of this task (1, 2 , 3).

2.2   Project Technical Advisory Panel (PTAP) Meetings

In addition to the technology transfer completed by the Forum, COATS/WSRTC PTAP meetings and ITS related conferences also provided opportunities for discussion of current and future ITS activities in the region. Stakeholders also met and guided planning and decision-making related to the COATS project.

The original proposal called for four PTAP meetings (two per year). There was a no-cost time extension executed that could have provided for additional PTAP meetings. However, with the COVID-19 pandemic coinciding with the start of this project, few events were held in person and little travel occurred in the first year of the project. Subsequently, some events were held virtually. Five meetings were held involving the entire PTAP – Northwest Transportation Conference 2020, Corvallis, OR (March 10, 2020); March 2021 virtual meeting (March 9, 2021); Annual Meeting 2021 at the Western States Forum (October 5, 2021); April 2022 virtual meeting (April 7, 2022); Annual Meeting 2022 at the Western States Forum (June 14, 2022). WSRTC members also attended the ITE Annual Meeting + Exhibit and National Rural ITS Conferences in summer of 2020, 2021, and 2022. The 2020 (August 4 – 13, 2020) and 2021 (July 20 – 29, 2021) events were held virtually while the 2022 event (July 31 – August 3, 2022, New Orleans, LA) was held in person. In addition, WSRTC members participated in ITS America (December 7-10, 2021, Charlotte, NC) and ITS World Congress (September 18 – 22, 2022, Los Angeles, CA).

Virtual meetings allowed for a travel savings which could then be applied to other aspects of the work, specifically the Western States Forum. In some cases, the virtual format allowed a larger number of individuals to participate which consequently had a positive impact on technology transfer.

Aside from the organization and conduct of these meetings, associated deliverables included meeting presentations, meeting minutes, and related website updates. Meeting documents can be found at http://www.westernstates.org/Documents/WSRTC/Default.html. Website updates are on the Consortium's website at http://www.westernstates.org/Projects/Updates/Default.html.

2.3   Websites

Part of the goal for Task 1 of this project was to maintain and update the WSRTC and Western States Forum websites.

Western States Rural Transportation Consortium: http://www.westernstates.org/Default.html.

Western States Rural Transportation Technology Implementers Forum: http://www.westernstatesforum.org/.

These websites provide a publicly available web presence for the COATS project, spin-off projects, and the Western States Forum. Over the course of the project, regular progress reports for COATS were developed and posted to the Consortium website. PTAP meeting reports and materials (agendas, presentations, minutes) were posted along with any images from the meetings and conferences. Links and contacts were updated as needed and project updates describing progress and results of related spin-off projects were posted.

Annual website updates documenting the Western States Forum were developed and posted on both the Forum and Consortium websites. These reports included the technical content, the schedule of

events, and images from the event. The Forum website was also maintained and changed according to the planning calendar. The Call for Abstracts was posted followed by registration information, lodging information, maps/directions, and things to do around the Forum venue. After the event, a Past Forum page was developed which included technical content and an image gallery.

Additionally, the research team took steps to ensure both websites will be accessible and compliant with required state and federal standards. This work will continue during future WSRTC Pooled Fund task orders.

3   How-To Handbook / Manual for the Western States Forum

The upcoming 2023 Western States Rural Transportation Technology Implementers Forum will be the 18th annual event. The current COATS research team has been involved with the Forum on the Steering Committee for all but the first two events; WTI researchers helped found the Forum through the COATS project. The planning and execution of the Forum has been conducted by a four to five person steering committee including an on-site event coordinator. The Handbook is intended to document the Forum in such a way that the event and its standard of excellence can be easily continued even as staffing and other inevitable changes occur. The Handbook is a practical, how-to guide for planning and executing the Western States Forum. A best effort has been made to document the necessary activities and what has been done in the past to maintain the standards and expectations for the event.

The Handbook includes a description of the Forum with its goals and target audience. It discusses some of the history and background for the event in order to establish a foundation for why the event has been conducted as it has in the past. The Handbook then goes into detail on specific aspects, such as location, venue, facilities, lodging, and food and beverage services. Information is included on the schedule of events, technical program and agenda, networking, event promotion and marketing, registration, travel assistance, and meeting notebooks. The Handbook also discusses evaluation of the Forum and follow-up activities and includes a list of equipment that is part of the event.

In addition to the information about planning and conducting the Forum, the Handbook also contains a list of past topics, participation history, and sample materials. Original materials that can be minimally edited and used for future events are included in a separate compendium.

This Handbook is dynamic and is meant to be updated after each Forum to keep it current, applicable, and practical. The most recent version is *Western States Rural Transportation Technology Implementers Forum Handbook: A Practical How-To Guide for Planning and Executing the Forum, Version 2022* (4).

4 Conclusion

This report reviews the various activities conducted for the COATS Phase VIII project. These activities centered on technology transfer, specifically the growth and continuation of the annual Western States Forum, continued development of a Forum Handbook, and website maintenance and development.

4.1 Summary of Major Efforts

The COATS Phase VIII project was active from February 2020 through January of 2023. The project focused on technology transfer and provided support for the 2020, 2021, 2022, and part of the 2023 Western States Forums. The Forum served as a technology transfer platform where informative, in-depth technical presentations were given by rural ITS practitioners. Presenters delved into how solutions were developed, focusing on applications that have been deployed in the field and are being used in live traffic situations. Success stories were shared along with failures and problems, so participants learned what does and doesn't work and why. The Forums included live demonstrations of rural ITS technologies and "hands-on" question and answer periods. Speakers and participants brought actual ITS equipment and gave informal "show and tell" sessions during breaks and networking opportunities. This event will continue under the scope of the Western States Rural Transportation Consortium transportation pooled fund and is expected to keep providing a quality forum for the discussion of rural ITS applications, successes, and failures. One of COATS' primary goals is to promote technology transfer; by providing this venue for ITS discussion this goal has been met.

Developing a comprehensive Handbook for the planning and conduct of the Western States Forum will help ensure that this event will continue to meet the needs and expectations of rural ITS practitioners in the Western states region. The websites will also continue to share valuable research efforts and impact change across the region.

4.2 Summary of Deliverables

During the course of COATS Phase VIII, a number of deliverables were produced. Specific report documents are listed in the References section of this report.

The deliverables produced to meet the research objectives of COATS VIII included:

- Quarterly progress reports and quarterly updates on the Consortium website (http://www.westernstates.org/Projects/COATS/Default.html);
- PTAP meeting minutes, meeting presentations, and meeting agendas for Steering Committee meetings, virtual and in person; posted on the Consortium website (http://www.westernstates.org/Documents/Default.html);
- Organization and conduct of the Western States Rural Transportation Technology Implementers Forum in 2020, 2021, and 2022; organization of the 2023 Western States Forum;
- Annual reports summarizing the Western States Rural Transportation Technology Implementers Forum (1, 2, 3);
- Website updates (Forum and Consortium websites) documenting the Western States Rural Transportation Technology Implementers Forum;
    - Forum website, Past Forums pages
        - 2021: http://www.westernstatesforum.org/PastForums/2021/Default.html
        - 2022: http://www.westernstatesforum.org/PastForums/2022/Default.html
    - WSRTC website, Forum project pages

- - Report on the 2021 Western States Forum:
      http://www.westernstates.org/Projects/WesternStatesForum/Updates/2023-01-31_WSF2021.html
    - Report on the 2022 Western States Forum:
      http://www.westernstates.org/Projects/WesternStatesForum/Updates/2023-01-31_WSF2022.html
- Maintenance and expansion of the COATS project pages (http://www.westernstates.org/Projects/COATS/Default.html), Western States Rural Transportation Consortium website (http://www.westernstates.org/Default.html), and Western States Forum website (http://www.westernstatesforum.org/Default.html);
- Version 2022 of the Western States Forum Handbook including information from 2021 as well, *Western States Rural Transportation Technology Implementers Forum Handbook: A Practical How-To Guide for Planning and Executing the Forum, Version 2022* (4).

5   References

1 Koon, Leann A.F. Western States Rural Transportation Technology Implementers Forum, Review of 2020 Meeting. California Department of Transportation, Division of Research, Innovation, and System Information, December 2020.

2 Koon, Leann A.F. Western States Rural Transportation Technology Implementers Forum, Review of 2021 Meeting. California Department of Transportation, Division of Research, Innovation, and System Information, October 2022.

3 Koon, Leann A.F. Western States Rural Transportation Technology Implementers Forum, Review of 2022 Meeting. California Department of Transportation, Division of Research, Innovation, and System Information, October 2022.

4 Koon, Leann A.F. Western States Rural Transportation Technology Implementers Forum Handbook, A Practical How-To Guide for Planning and Executing the Forum, Version 2022. California Department of Transportation, Division of Research, Innovation, and System Information, January 2023.

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