



Vehicle Infrastructure Integration (VII) Suitcase Project

Introduction

The Vehicle Infrastructure Integration (VII) Suitcase project was developed from discussions among VII stakeholders who highlight technology to improve safety in transportation and organize VII Technology Showcase demonstrations to highlight these efforts. Collaboration between TechnoCom and Econolite produced the first VII Suitcase prototype.

TechnoCom developed the [Multiband Configurable Networking Unit \(MCNU™\)](#), an Institute of Electrical and Electronic Engineers (IEEE) 802.11a/b/g and p compliant wireless platform that supports 4.9 GHz public safety, 2.4 GHz and 5 GHz municipal Wi-Fi and [5.9 GHz Dedicated Short Range Communications \(DSRC\)/ Wireless Access in a Vehicular Environment \(WAVE\)](#) applications and developed application software to demonstrate interaction between the vehicle and the roadside infrastructure. TechnoCom also provided systems integration expertise. Econolite provided expertise in traffic management and traffic signal controllers. Together, [TechnoCom](#) and Econolite developed "VII in a Suitcase" – an integrated road side equipment platform. created an integrated unit containing a traffic signal and traffic signal controller using an initial version of the VII demonstration message protocol developed to support preliminary proof-of-concept applications.

The VII Suitcase has a built-in universal AC/DC power supply and radio antenna and combines a traffic controller and a typical traffic signal head by Econolite, and a WAVE/ DSRC radio integrated into the wireless application platform developed by TechnoCom. The VII Suitcase can host several viable and vital software applications such as in-vehicle signage warning, remote wireless traffic signal preemption and in-vehicle driver warning.

Problem Statement

Achieving the vision of the Intelligent Transportation Systems (ITS) and VII requires a broad reach and strong support from various stakeholders. Everyone, from common drivers, to state officials and business leaders must be able to understand benefits of VII as it relates to ITS systems and its impact on existing technology, vehicles and people. Educating various constituents and demonstrating immediate benefits is a challenge considering the technological complexities and aggressive 3-5 year timeframe when the first VII applications come to the market.

The goal of the VII Suitcase Project was to create a portable VII application platform that would help educate various transportation stakeholders, transportation government officials, automotive OEMs, and electronics manufacturers, of the benefits of a national VII network.

Previous Options

Prior to VII Suitcase usage, developers had to test the VII applications they created in the lab, at live intersections. This posed a problem because getting the proper city approval to use their right-of-way was time consuming, application limited and usually temporary. By implementing the VII Suitcase, a developer can now create an application in the lab, and then set up the mobile VII Suitcase in a parking lot to test the application. Because the VII Suitcase uses a standard traffic controller, the developer can be secure in the knowledge that their application would ultimately work in a real-world environment.

To support ITS America's VII Outreach Program, several VII concept applications were successfully demonstrated, at the 2005 ITS World Congress and at the AASHTO Cross-Country convoy celebrating the 50th Anniversary of the Interstate. These applications required advanced preparation, comprehensive coordination and dedicated staff. Most of these types of applications are not portable or require equipment, which is usually in limited supply. The VII Suitcase creates a system that can be easily transported from site to site, installed in less than an hour by a few staff, and demonstrated using any general purpose (rented) vehicle.



The VII Suitcase Solution

The VII Suitcase has been developed by TechnoCom and Econolite to address the need for supporting a VII Public Outreach Program, organized by ITS America and sponsored by the U.S. DOT. However, in the course of providing a number of VII demonstrations, strong interest from various businesses and academia has been uncovered, to acquire VII Suitcase for internal engineering and application development of ITS technologies. The VII Suitcase is proving to be a useful tool that helps uncover and define new market interest and demand for intelligent traffic management applications.

The VII Suitcase has proved valuable in hosting a wide variety of demonstrations and technical evaluations, critical to appraising the benefits of VII.

The demonstration has a considerable impact on the experiences of the people who use the VII Suitcase. The "VII in the Suitcase" has been demonstrated during several ITS and automotive trade events including state DOTs, SAE (Society of Automotive Engineers) – Convergence 2007, the 2007 Consumer Electronics Show (CES) in Las Vegas and at ITS America's Annual Meeting in 2007 in Palm Springs. Extensive demonstrations at local DOTs, World Congress New York in 2008 are expected to continue in 2007-2008 as the ITS America VII Outreach Program for the VII Initiative gains momentum.

Potential as a Model:

The project was created as a model to let other VII stakeholders explore potentials of the intelligent vehicle systems and their interaction with roadside applications. Because the system is based on the latest VII Federal Standards, other stakeholders can use this system for their own VII proof-of-concept application development. This model can be the foundation for transportation companies to develop their strategy for entering the future VII marketplace.

Executive Summary:

The VII Suitcase combines expertise of both companies to create a unique new value to the ITS industry. Econolite's knowledge of the transportation market combined with TechnoCom's leadership in wireless technologies and software development resulted in a product that enables other companies to experiment and test VII concept applications.

Through our partnership we are spreading the message that, in our opinion, the VII Suitcase project proves that VII deployment is possible using our nation's existing roadway infrastructure. In addition, the VII applications that are being demonstrated reveal that the deployment of VII will truly enhance the safety of our intersections, and contribute to solving our increasing traffic congestion problems. The benefits of VII are immediately evident to people who experience the demonstrations by riding in a VII-enabled vehicle.

The project has been developed using internal resources and funding of the partners. Software application development was partially funded by Raytheon. Future plans include making the VII Suitcase commercially available for other companies to purchase and use for their internal VII projects.

Hosted by ITS America, TechnoCom in concert with Econolite and Raytheon created a national VII 5.9 GHz DSRC Road Show using TechnoCom's 5.9 GHz DSRC message protocol to support preliminary proof-of-concept applications covering 22 cities in 17 states. This successful tour led to the FMCSA inspection demonstration