

Project Overview

Mapping Technology Assessment for Connected Vehicle Highway Network Applications

AASHTO GIS-T Symposium
April 2012

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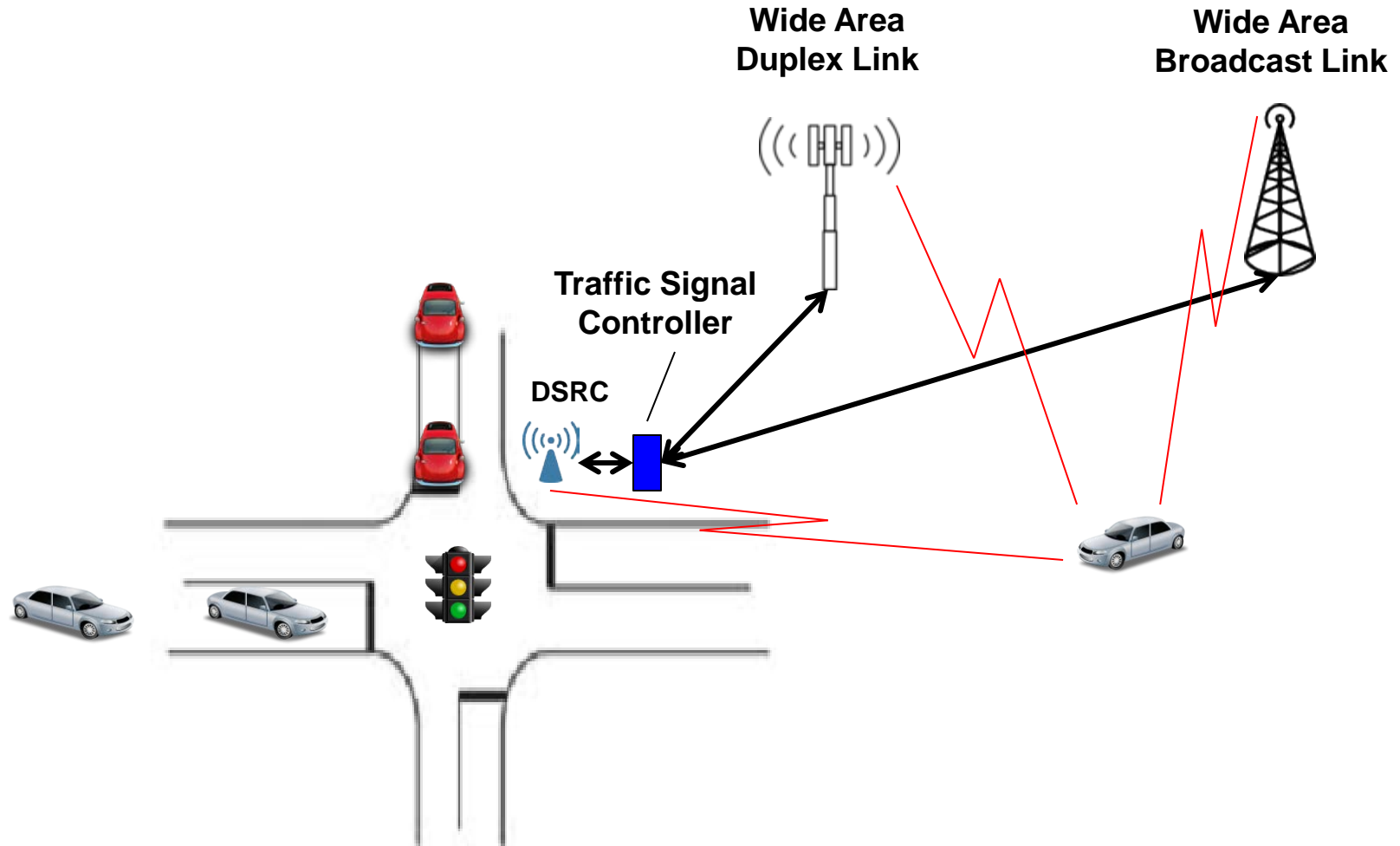
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Connected Vehicle Program Goals and Objectives

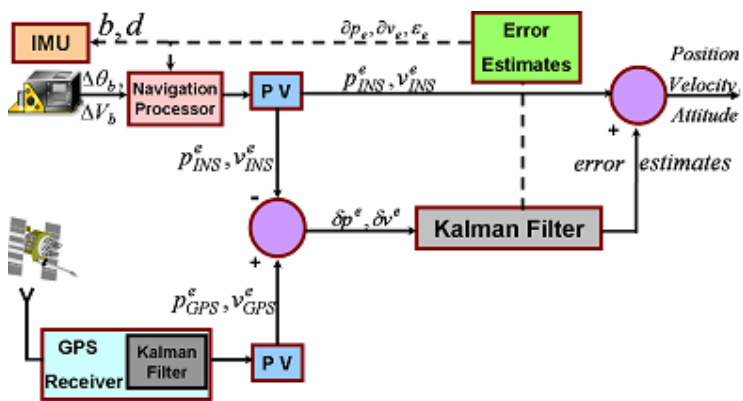
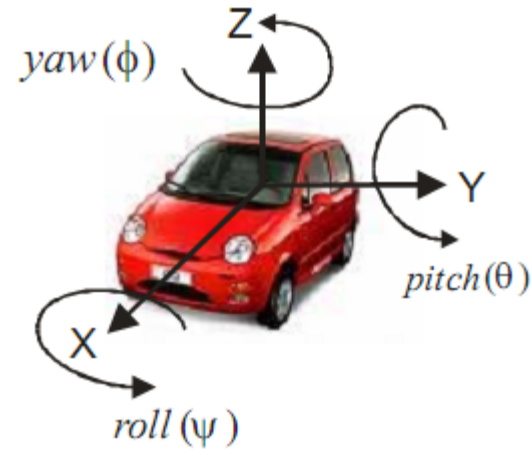
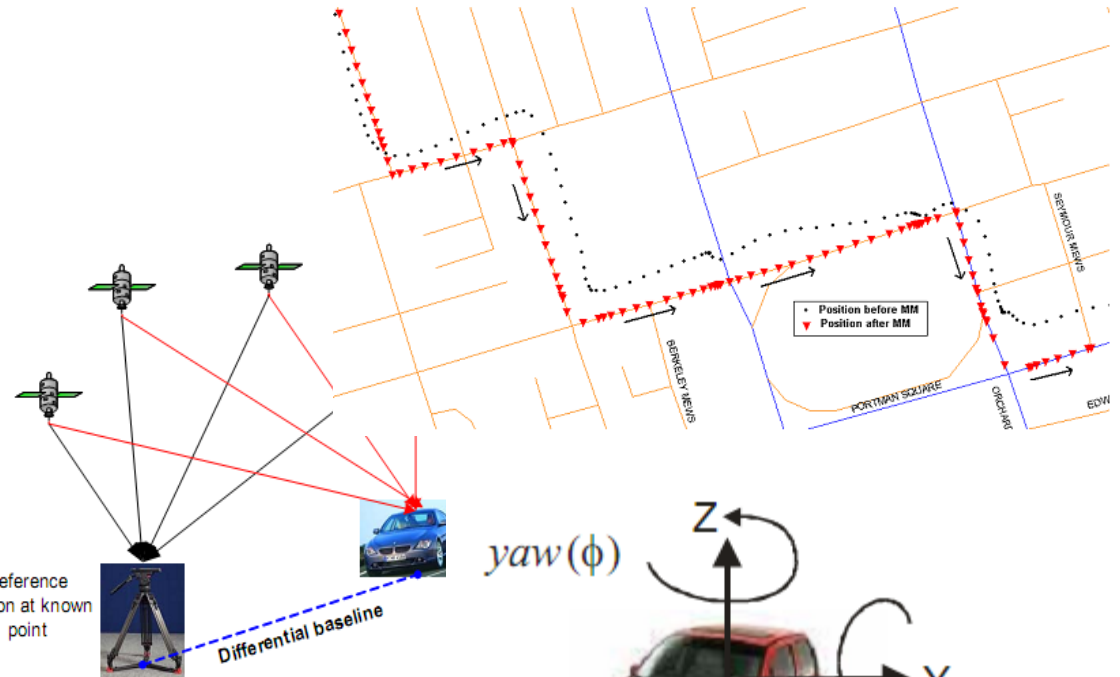
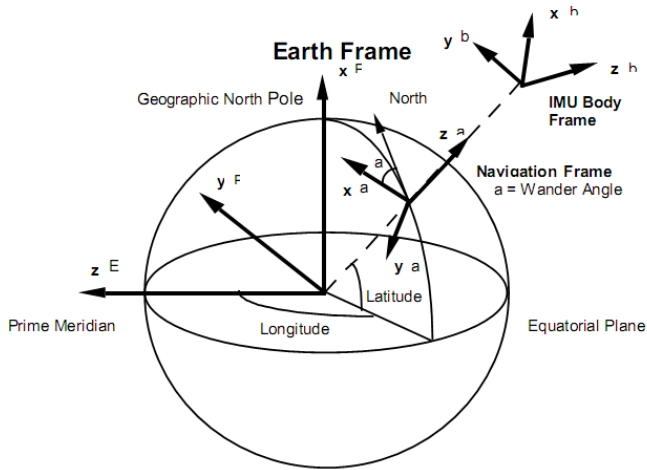
- ▶ FHWA's Connected Vehicle Program was established to facilitate the implementation of applications related to vehicles and/or infrastructure for helping to enhance safety, mobility, and the environment.
- ▶ These applications will utilize mapping, positioning, and communication technology for their operations to provide information on the location of vehicles in relation to the roadway, other vehicles, and pedestrians.
- ▶ Connected Vehicle is a large, multi-faceted program managed by the ITS Joint Program Office of the Research and Innovative Technology Administration (RITA)



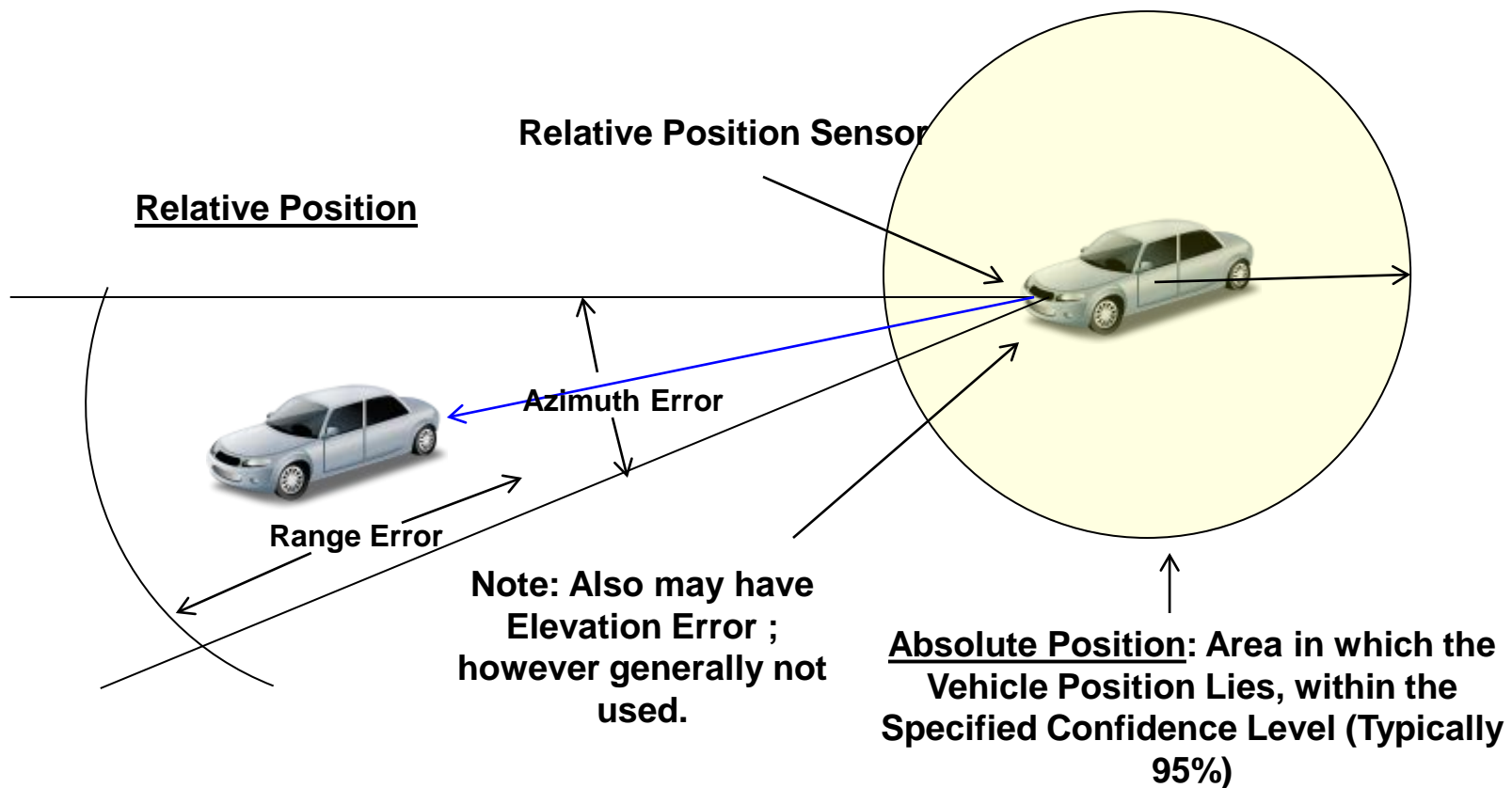
Communications Technologies



Positioning Technologies

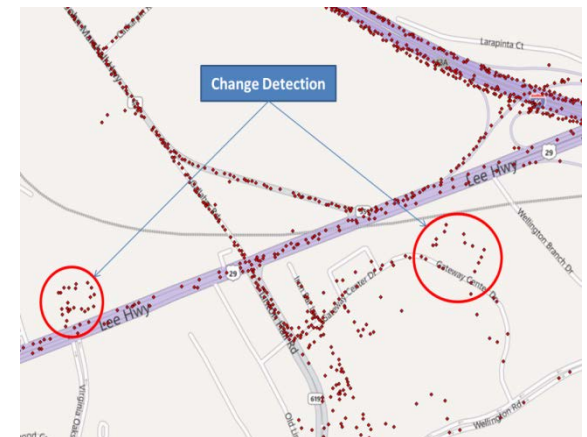
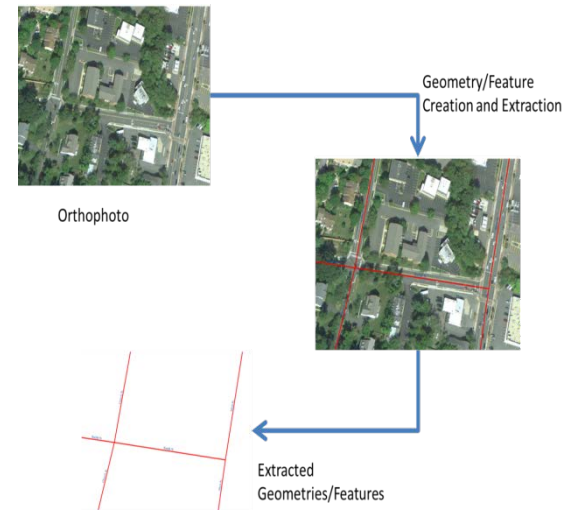


Relative Position of Targets Referenced to Absolute Position Provided by GPS



Mapping Technologies

- ▶ As one of the main supporting technologies of the Connected Vehicle Program, **Mapping Technologies** provide critical support across safety, mobility, and environment applications through the provision and update of roadway data
- ▶ The mapping of roadways involves developing an accurate geometric representation of the roadway and attribution of those geometries with application relevant data
- ▶ Roadways are usually represented in GIS databases as linear features. Lane configuration and connectivity may also be represented in the form of additional geometries in the database or through attribution
- ▶ The development of maps supporting Connected Vehicle applications requires the initial creation of the maps as well as ongoing, timely update of these maps



Mapping Technology Assessment Project

- ▶ The ***Mapping Technology Assessment for Connected Vehicle Highway Network Applications*** project aims to analyze and determine the best current and anticipated geospatial technologies and mapping approaches to support intelligent transportation systems (ITS)
- ▶ This assessment is fundamental to providing solutions that allow connected vehicle network applications to bring about transformational improvements in the safety, mobility, and environmental performance of our nation's transportation systems
- ▶ Mapping Technologies are a key enabler for the Program and its applications
 - Vehicles need to know where they are in relation to other vehicles (relative position)
 - Vehicles need to know where they are in relation to the roadway (absolute position)
- ▶ The focus of the project is across 3 major areas:
 - Assess what mapping technologies meet the requirements of Connected Vehicle applications
 - Test relevant technologies in lab and in the Connected Vehicle Highway Testbed (CVHT)
 - Develop a data management framework for compilation, storage, and update of collected data
- ▶ The goal of the connected vehicle vision is high, but the potential benefits are significant as implementation of connected vehicle network applications can have far reaching impacts on transportation

Mapping Technology Assessment Approach

Task 1 Project Planning

- Ongoing project planning and management through the course of the project.

Task 2 Identify Mapping Parameters

- Definition of mapping technology requirements through existing documentation review, stakeholder interviews, and participation of the Industry Advisory Board (IAB).

Task 3 Analyze Mapping Technologies

- Analyze characteristics of five candidate mapping technologies – ***As-Built Designs, Aerial Based Imagery, Vehicle Mounted Technologies, Data Fusion, and Probe/Crowd Sourced Data.***

Task 4 Develop Capability Matrix

- Analyze requirements generated in Task 2 against the technologies characterized in Task 3 to develop performance capabilities of each mapping technology.

Task 5 Technology Field Test

- Demonstration and testing of specific mapping technologies, including vehicle mounted technology solutions.

Task 6 Data Management

- Develop a data management framework guiding data collection, storage, and maintenance for use during Field Test and other related Connected Vehicle activities.

Task 7 Final Report

- Integration of all task findings into a consolidated Final Report.

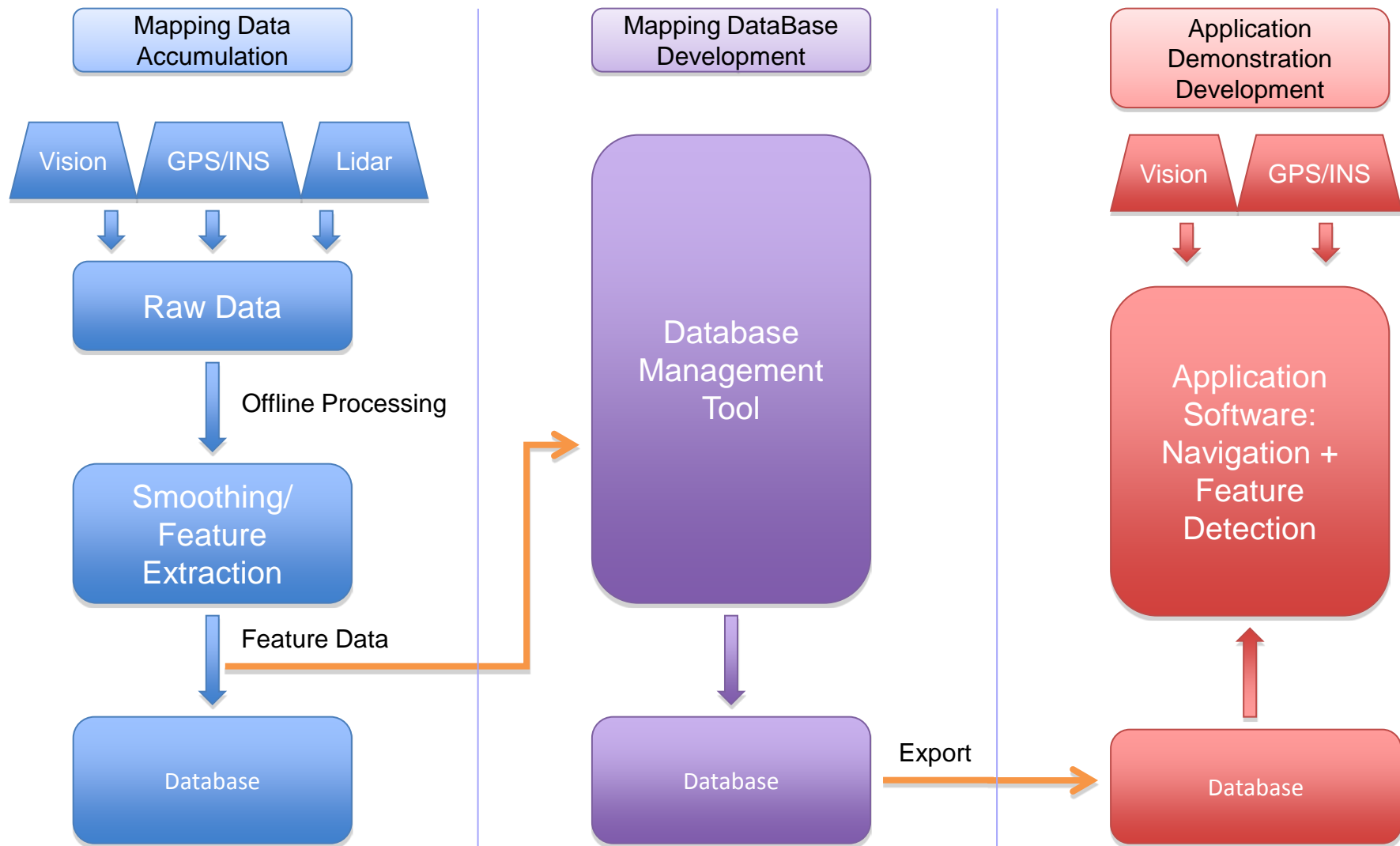
Current Project Status

- ▶ Final Interim Reports have been completed for several tasks.
 - Task 2: ***Stakeholder Feedback Summary Report***
 - Task 3: ***Mapping Technology Report***
 - Task 6: ***Data Management Report***
 - Task 4: ***Mapping Technology Evaluation***

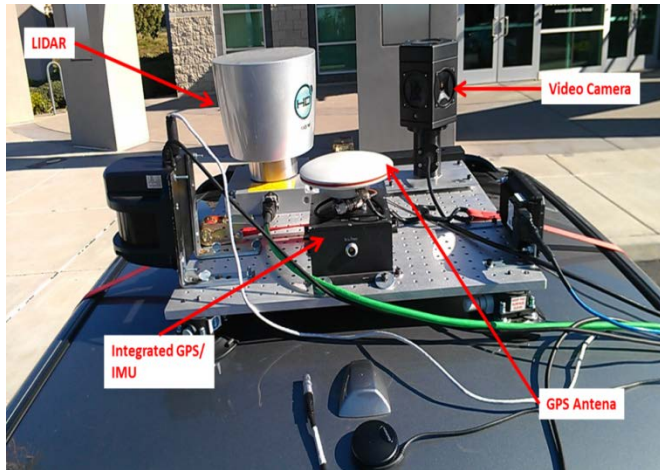
- ▶ Initial Field Testing was completed in February 2012
 - Purchase and configuration of equipment to support vehicle mounted technology test
 - Initial configuration of the equipment on test vehicle
 - Installation of road signs and road markings at test facility
 - Limited data collection

- ▶ Upcoming activities include:
 - Final preparations for full Field Test in May
 - Development of Final Findings Report

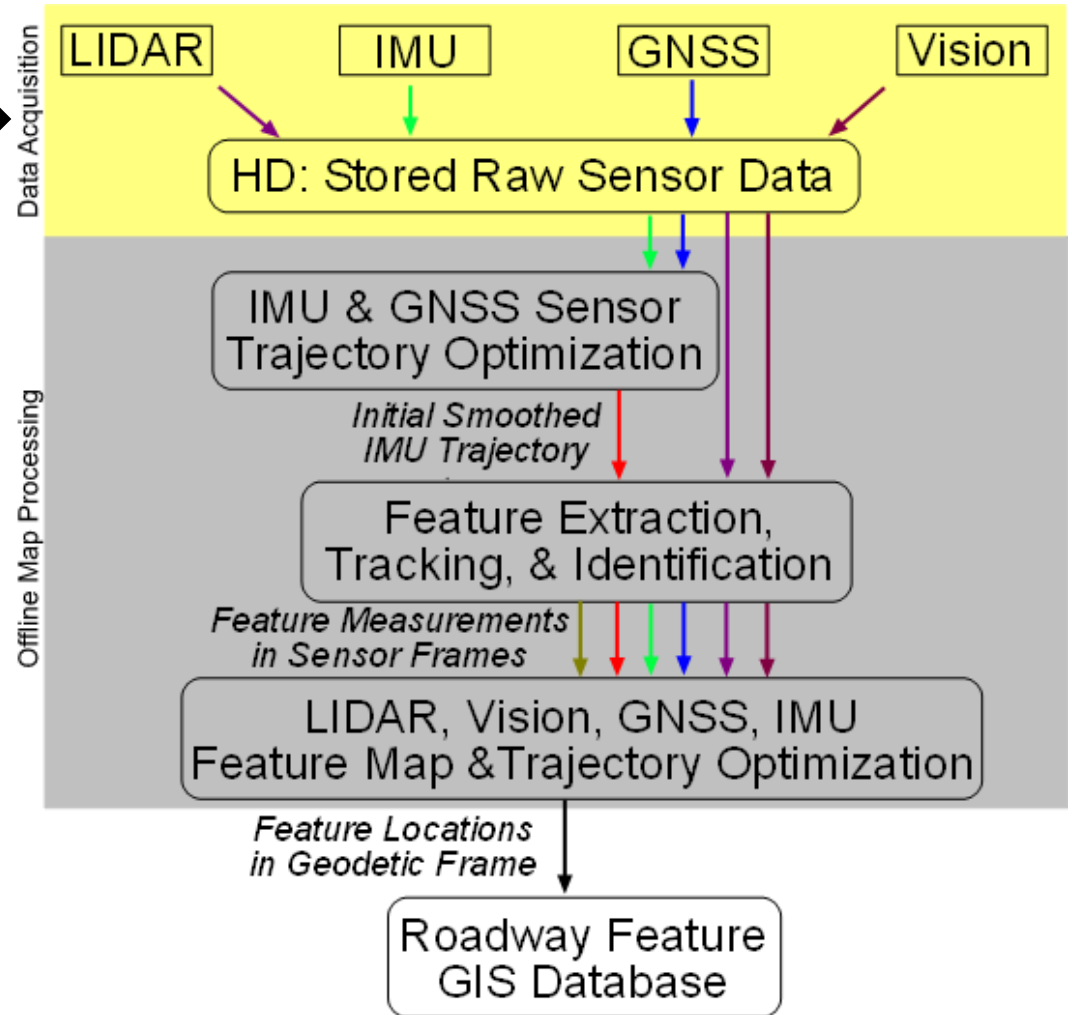
Overview of Field Test Data Flow Process



Equipment Configuration for Field Test

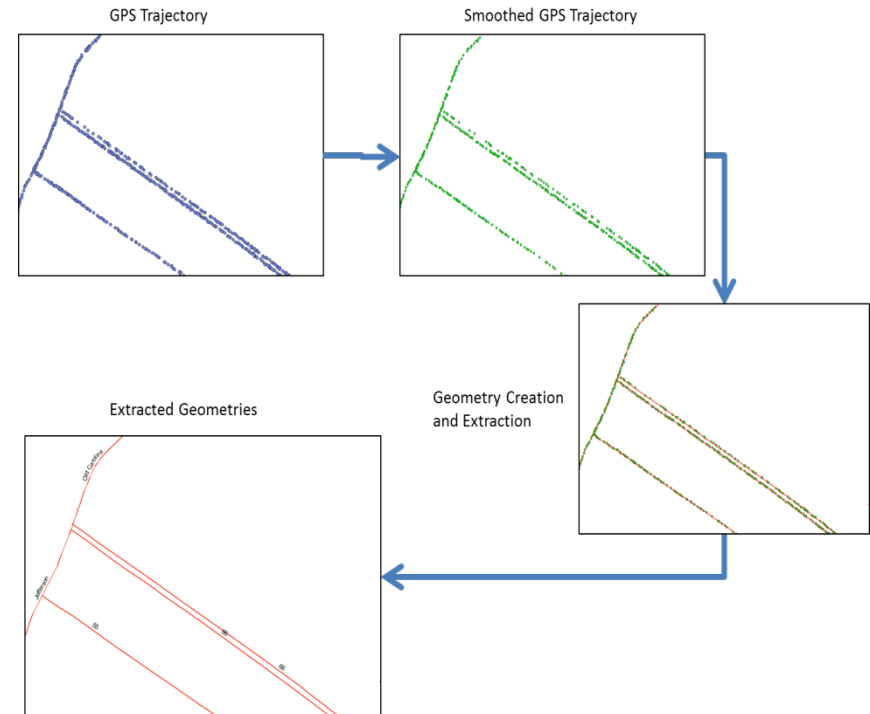


Vehicle Mounting of Equipment



Next Steps

- ▶ In preparation for full Field Test in May, analyze results from initial Field Test to refine approach and solution
- ▶ Perform full Field Test at CVHT
- ▶ Parse collected data into “layers” for use by the applications
- ▶ Use collected data in selected applications to ensure the right data is being collected at the correct resolution to support requirements
- ▶ Use results from current project to support ongoing activities and research driving towards nationwide deployment



Vehicle Mounted Technology Data Creation Example

Questions ?