

Summary of SIP-adus Project (FY2016)

Name of the Project	Surveys and Investigations for Prototyping and Evaluation Toward Construction of a Dynamic Map, as Part of Surveys and Investigations to Determine Issues and Directions in Resolving These Issues to Achieve an Automated Driving System
Responsible Organization	Dynamic Map Consortium (Representative Company: Mitsubishi Electric Corp...)

Name Yasuhiko Miyamae, Mitsubishi Electric Corp.,

Object of the Project

The Cabinet Office is focusing on technology to upgrade map information, as in “Cabinet 1: Surveys and Investigations to Determine Issues and Directions in Resolving These Issues to Achieve an Automated Driving System.” Furthermore, since Japanese Fiscal Year 2014 (MAR/2015), the Cabinet Office has been investigating and surveying the future roadmap for advancing the assembly and construction of map information. The objective of this project is to examine and test the functions of the dynamic map centers based on the investigation results from FY2014 (MAR/2015) and FY2015 (MAR/2016), and to clarify items such as necessary requirements and various issues to be resolved for the large-scale demonstration test proposed for FY2017 (MAR/2018).

Project Summary

(1) Creation of a basic map of the dynamic map

We completed measurements on ~50 km of ordinary roads and ~250 km of expressways (automated vehicles only), as agreed upon by the Map Construction TF. This was done after verifying that these are places in which creation of updated data is possible by comparing them to measurements from the past year, looking at the use cases in the “Automated Driving Systems Use Case Survey,” among others. The use case survey was compiled by the Dynamic Map SWG within the SIP-adus System Implementation WG.

In addition, we created a “Proposal for the Map Data Specifications for Automated Driving Systems Ver.1.1” based on information such as proposals from Japan Automobile Manufacturers Association (JAMA) and lane-level location referencing methods for which international standardization is being advanced in ISO/TC204WG3.

(2) Examination of the functions of the dynamic map center

In working toward the realization of dynamic map center functions, the following frameworks were examined: framework for updating the basic map, framework for collecting and creating semi-dynamic/semi-static information, and framework for delivering data to map suppliers.

With regard to the framework for updating the basic map, we considered proposals such as using public information for detecting issues, like measurement oversight, and for measurement planning by preemptively catching changes on roads. In addition, we surveyed methods that predict updates on roads through information including those from vehicular sensors (probe information) and differences on dynamic maps.

With regard to the framework for collecting and creating semi-dynamic/semi-static information, we examined such matters as methods for making use of public information and classification of information that can be generated from probe.

With regard to the framework for delivering data to map suppliers, we stipulated an interface (protocols and sequences) as a framework for disseminating data to map suppliers of semi-dynamic/semi-static information in dynamic map centers.

(3) Structure of dynamic map center functions

We examined the following functions that will be necessary for the implementation of the dynamic map center, based on the analyses in (1) & (2):

- Basic map creation, update, management, and distribution
- Semi-static/semi-dynamic information creation, update, management, and distribution
- Quality control and security

In addition, through analyzing these functions for the implementation of the dynamic map center, we designed the prototype system that will be created this fiscal year.

(4) Verification of the dynamic map center functions and implementation costs

We verified and inspected the operation of the dynamic map center (prototype) constructed. Furthermore, we were able to visually display the results of the dynamic map prototype, while creating a viewer that makes inspection possible. We also displayed and verified the basic map and semi-dynamic information that is distributed by the dynamic map center.

We compiled the share of costs per unit of distance by basic map implementation process for the prototype created this fiscal year, while also examining potential policies for cost reduction.

Future Plans

(1) Preparation for large-scale demonstration test

Looking toward the large-scale demonstration tests that SIP-Adus is planning for September 2017 through March 2019, it will become necessary to complete tasks, such as creating basic maps for areas within the demonstration tests that were not covered by the 300 km created this fiscal year and expanding dynamic map center functions for the actual distribution of semi-dynamic information.

(2) Survey regarding actual distribution of semi-dynamic information

In order to distribute semi-dynamic information successfully, consensus building among the private firms that hold probe information and the relevant institutions that hold public information will become crucial. Further, tasks like the creation of reference tables and survey of placement standards for CRP will become essential, for CRP will become the locational referencing basis for connecting the semi-dynamic information and basic map.

(3) Assessment of dynamic map

For large-scale demonstration tests such as this, participants from industry and academia, both foreign and domestic, will conduct dynamic map assessments. As part of the assessments, checks like the review of excess and deficiency with regard to land objects, attributes, their relations, and the like to be included in the dynamic map as cooperative domains, and verification of whether the dynamic map satisfies the requirements of each use case in the automated driving system will be necessary.

Additionally, concerning the tunnel segments that do not satisfy the 1/2500 absolute accuracy requirements in the prototype for this fiscal year, there is a need to assess whether the current prototype data will contribute to the automated driving system.