A study on large-scale road map preparation methods using digital maps and point cloud data

IMAI Ryuichi (Ph.D.), Researcher
MATSUI Susumu, Guest Research Engineer
FUKADA Masayuki, Guest Research Engineer
KIMURA Atsushi, Guest Research Engineer
SHIGETAKA Koichi, Head
Maintenance Information Technology Division, Research Center for Land and Construction Management

(Key words) fundamental geospatial data of road, digital map, point cloud data

1. Introduction

Since 2006, Ministry of Land, Infrastructure and Transport and Tourism (MLIT) has been promoting provision of "fundamental geospatial data of road" for large scale road maps. The fundamental geospatial data of road represents road structure data about 30 types of features that are highly serviceable in road administration or automated driving [1)]. The fundamental geospatial data of road have already been provided for about 30% of government-managed national roads. It is necessary to provide the fundamental geospatial data of road about the government-managed national roads exhaustively in order to use it as a common base for the government-private sector[2)]. So the NILIM began to implement "Joint Research on Providing and Updating Large Scale Road Map by government-private sector" (FY2013-2014).

This joint research has proposed methods of providing the fundamental geospatial data using existing resources such as digital maps or point cloud data of government-private sector. This paper reporst on results of the trial preparation of the fundamental geospatial data using the proposed methods and future prospects for these approaches.

2. Concept of the provision method

The following three methods were proposed as methods of providing the fundamental geospatial data of road using existing resources.

Method 1: Provision method using digital maps

Method 2: Provision method using point cloud data

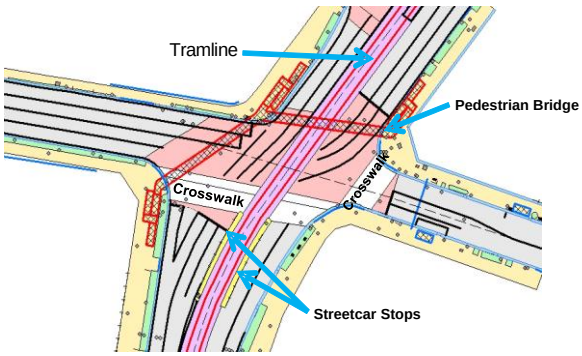
Method 3: Provision method using multiple existing resources

3. Evaluating usefulness of provision methods by trial preparation of maps

This joint research trial prepared maps in conformity with the three methods and confirmed their usefulness. This is a report on the results of the trial preparation of the fundamental geospatial data for Chiba City (road including road intersections and underground crosswalks, etc.) and Kumamoto City (roads including intersections with Prefectural and City roads with tramline or streetcar stops) using method 3 that can provide the most features.

The figure shows an example of the fundamental geospatial data that was trial prepared. It shows that crosswalks and streetcar stops and similar road structures can be represented in detail. As a result of the trial preparation, it was possible to provide about 60% of features in Chiba City and about 90% of features in Kumamoto City.

Figure. The fundamental geospatial data that was trial prepared by Method 3 (Kumamoto City)



4. Summary and future prospects

The results of trial preparation using the three methods revealed that it is possible to provide many features on the fundamental geospatial data of road. Based on the results, Collected Rules for provision methods proposed by the joint research were prepared. In the future, we will work hard to promote the provision of road infrastructure map information based on the Collected Rules and to create a sustained operation model.

[References]

1) Ministry of Land, Infrastructure, Transport and Tourism (MLIT): Product Specification of the Fundamental Geospatial Data of Road (Beta version) (Japanese only), 2008

2) R. Imai, M. Fukada, K. Shigetaka, A study of a method of creating and updating large scale road maps by public and private sectors (Japanese only), *the GIS Association of Japan* , Vol. 22., 2013

3) R. Imai, S. Matsui, M. Fukada, A. Kimura, K. Shigetaka, A Study of a method of creating large scale road maps by public-private partnerships (Japanese only), *the GIS Association of Japan* , Vol. 23., 2014