

Research on urban area simulation using 3D city models

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1. Introduction

The Ministry of Land, Infrastructure, Transport and Tourism has been promoting Project PLATEAU¹⁾ as a leading project for the development, utilization, and data disclosure of 3D urban models to promote the digital transformation of urban infrastructure and city planning. The 3D city models in Project PLATEAU, developed using international standard specifications (CityGML), are expected to create new innovations when used by governments, private businesses, and residents according to their purposes.

This paper describes the efforts to utilize 3D city model data for the simulation of wind environments and fire spread in urban areas.

2. Research overview

In order to promote the utilization of 3D city model data in PLATEAU, the Urban Planning Department has been conducting "Research on Promoting the Disclosure and Utilization of City-Related Data"²⁾ and working on the following items (1) through (3).

(1) Study of specifications for extending 3D city models

Studying the specifications for extending 3D city models in order to develop detailed attribute data needed to examine various urban issues (environment, disaster prevention, etc.).

(2) Study on reducing the cost of creating and updating 3D city models

Studying methods to reduce the cost of creating and updating 3D city models by utilizing existing point cloud data acquired through aerial laser surveying, etc.

(3) Verification of specifications for extension, etc. through case studies

Studying individual environment and disaster prevention issues and verifying data consistency between the common specifications of 3D city models and the added extension specifications through case studies.

3. Study of extending specifications for 3D city models

The simulation of urban wind environments and fire spread requires attribute data such as the fire prevention capability of building windows and leaf density of exterior trees, in addition to geometric shape data obtained from 3D city models (Figure). This study extended the common specifications of PLATEAU, examined the specifications for storing these data, and also created sample data, clarifying issues in converting the data to data used for simulations.

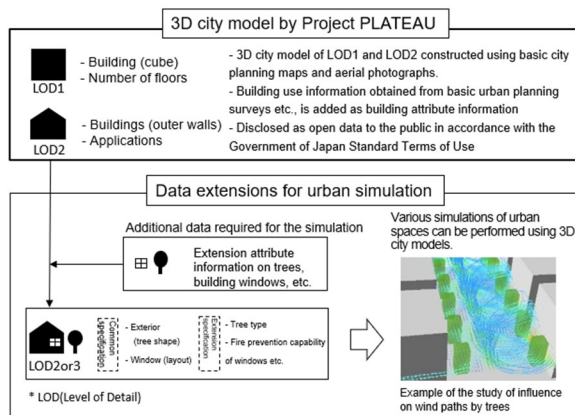


Figure: Flow of simulation with data extension

4. Conclusion

In this paper, a study was conducted to standardize the method of storing data for extending specifications. The future plan is to create data for a wider area based on the extended specifications, conduct urban area simulations to verify them, and publish them as examples of use cases.

☞ For more information:

- 1) Project PLATEAU: <https://www.mlit.go.jp/plateau/>
- 2) Press release: "National Institute for Research on Society's Future: Seven Research Projects to Protect, Improve, and Create Society: FY 2021 Budget Request," September 25, 2020, pp. 7
http://www.nilim.go.jp/lab/bcg/kisya/journal/kisya2_0200925.pdf#page=9