

AS500428

Urban Master Planning Process and Modeling with Infraworks

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Learning Objectives

- Learning basic information on urban planning process.
- Improving problems in the urban planning process.
- Urban planning method utilizing infraworks.
- How to utilize data and Modeling at planning stage.

Description

- In this lecture, we would like to present solutions through software to reduce problems that occur in urban design and master planning.
- It contains methodology using data and modeling which differs from the existing urban planning process and future directions for technology development.
- In order to actively utilize data and modeling, we will look into application method in Infraworks and Civil 3D and how to apply each process. These will be important references for those who are actually engage in similar tasks, as well as for software developers.

Speaker

SeongCheol Hwang is an urban design expert who has been working in the field of urban planning for more than 15 years. He has been carrying out projects on a variety of scales, from urban planning to urban block planning. He is focused on city information modeling (CIM) research using Infraworks, Revits, and Civil 3D.

In addition, he is trying to secure technology to implement user-oriented design by combining design with real-time rendering and VR.

He is currently working as an urban planner at SAMOO A&E in Korea. He continues to develop various domestic and international urban master planning projects and research on smart cities. He is also participating in discovering technologies for future smart city.

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Urban Master Planning Process and Modeling with Infracore

Introduction

The existing urban planning process has been generally conducted based on 2D programs. However, the existing method had limitations in using urban space efficiently and three-dimensionally.

For this reason, many attempts are being made to improve the existing method, and this lecture will introduce the approach methods and technologies SAMOO A&E is using to reduce these problems.

Urban Master Planning Methodology

Urban Planning

Urban planning is a comprehensive plan that places all the necessary environments for living, focusing on open outdoor space, buildings, and transportation.

Urban planning can be divided into five major stages.

First, the site is selected to determine the location, size, and shape of it. In addition, the topography, water system, and natural environment of the selected site will be analyzed to distinguish between developable and non-developable area.

The plan is based on the analyzed topography. At this time, the land use plan determines the location of the street network system, the spatial system for central business district (CBD) and sub-center. Then, location by use such as residential, commercial, industrial, and green area.

Based on the determined land use plan, will proceed with a more detailed master plan and action plan.



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Problems and concerns of the existing method

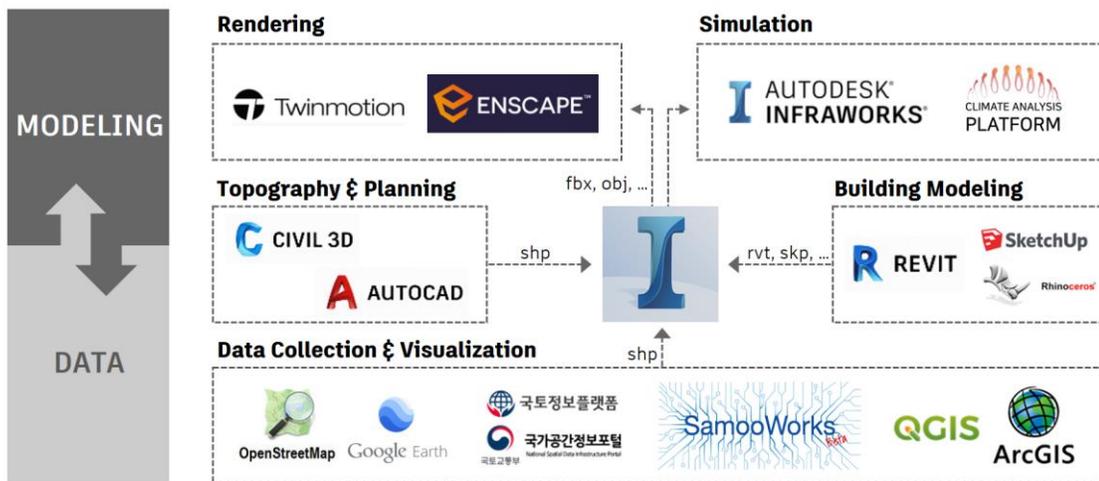
Existing 2D technology based urban planning method has been facing few problems. It is difficult to quickly change modeling when need for adjustment, takes a lot of time and effort to build model, and is difficult to simulate transportation and environment.

Recently, however, with the development of 3D modeling programs, many attempts have been made to solve problems by utilizing them.

Data-driven urban planning process

The most important part to consider in creating urban planning methodology is data utilization.

SAMOO A&E has been seeking new ways to visualize the collected topographic data and big data most effectively from topographic planning to building modeling, and introduced Infracworks as a solution.

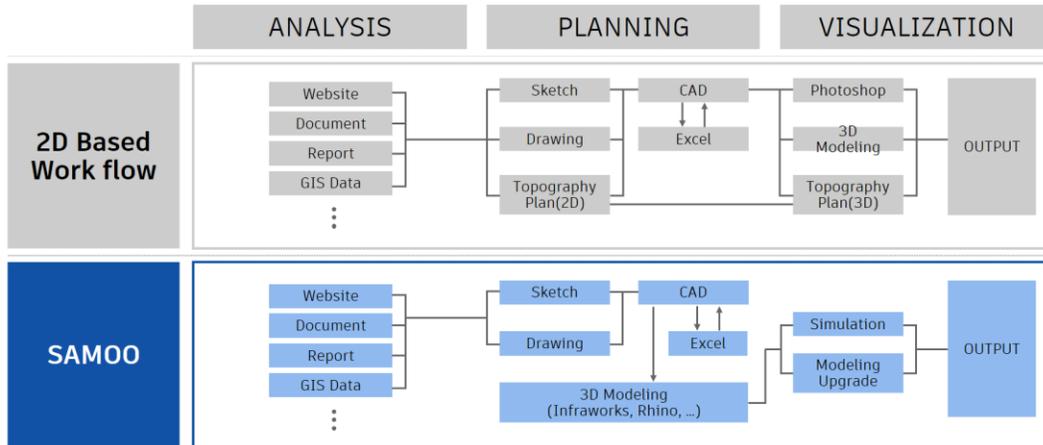


Master Plan Modeling Process

Compared to the existing urban planning method

The difference between SAMOO A&E's urban planning process and existing 2D-based urban planning is that it actively utilizes three-dimensional modeling from the planning stage rather than three-dimensionalizing various information collected in the analysis stage as before .

3D modeling was used in the planning stage of the existing method as well, but it is different from our modeling of the city by comprehensively modeling transportation, topography, and environment in that it is mainly used for city's skyline planning.

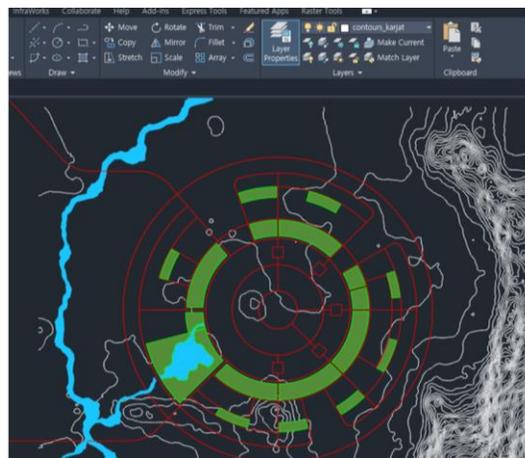
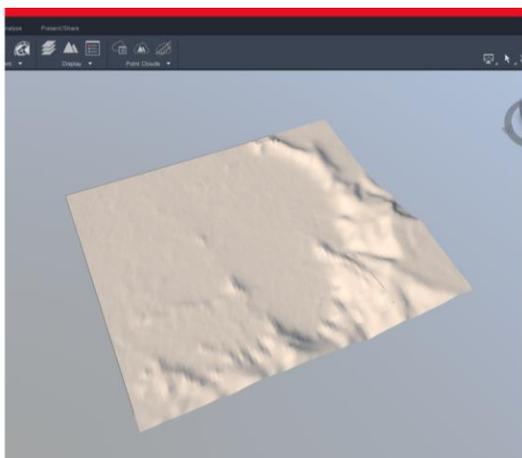


Analysis Phase

In the analysis phase, analysis is performed based on data collected from topographic information platforms such as Google Earth and the National Geographic Information Institute.

After the analyzed data is converted into a file, an urban structure is created in a suitable location considering the natural environment such as elevation, slope, and water system.

Civil 3D is used instead of AutoCAD to utilize coordinate systems and topographic data. In Civil 3D, terrain data can be checked in three dimensions, so it is very useful when deciding the location.



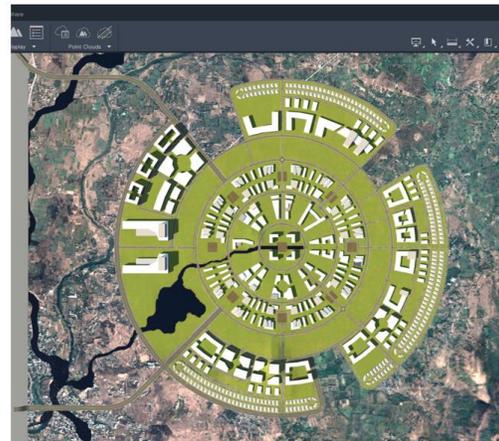
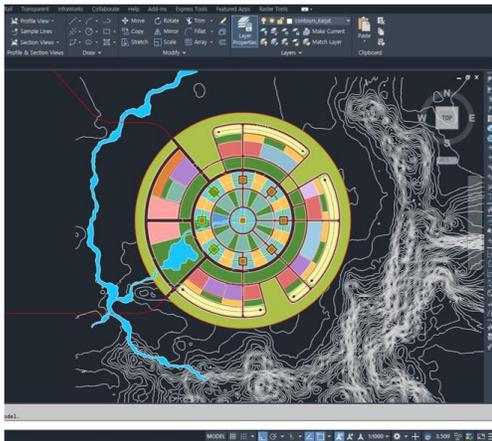
Planning Phase

The planning phase is to create an urban spatial structure in consideration of transportation, community planning, and programs.

At this phase, the plan is three-dimensionalized into Infracad to check how traffic or landscape is affected by changes in spatial density, which is a different approach from the existing 2d-based planning process.

In the planning phase, we use Civil 3D to create a land use plan. AutoCAD can also create a land use plan without any problem. However, in order to use data with coordinate values more effectively, we prefer to use Civil 3D.

Based on the completed land use plan, Infracad conducts three-dimensional modeling. Especially, Infracad is very useful tool in designing alternatives because it is possible to change the height of buildings, land use, and road systems in the program relatively quickly.



Visualization Phase

Visualization quality is still a challenging issue in Infracad to solve. Many designers choose other 3D modeling programs for the final touch of rendered outcomes after completing the plan in Infracad.

In addition, traffic demand for planned street networks is predicted through traffic simulation functions included in Infracad. In fact, this part uses predicted traffic data rather than existing traffic data, so it may be questionable whether it will actually be applied in that way, but it is meaningful in that it can be roughly reviewed for capacity.

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Improve Visualization

We are using real-time rendering programs and VR to enhance visualization and attractiveness of space.

In particular, VR is very effective in inducing customers to make decisions and plays a big role in enhancing customers' understanding of space.

We believe that using fast-developing VR technology will greatly help to improve productivity and economic efficiency of work along with solving problems in the existing planning process.