The Cross-ministerial Strategic Innovation Promotion Program (SIP)

Development of Smart Mobility Platform

【Subtheme Ⅰ】Redesigning Mobility Services

Development of a new mobility-oriented city with an agglomeration of places for social exchange

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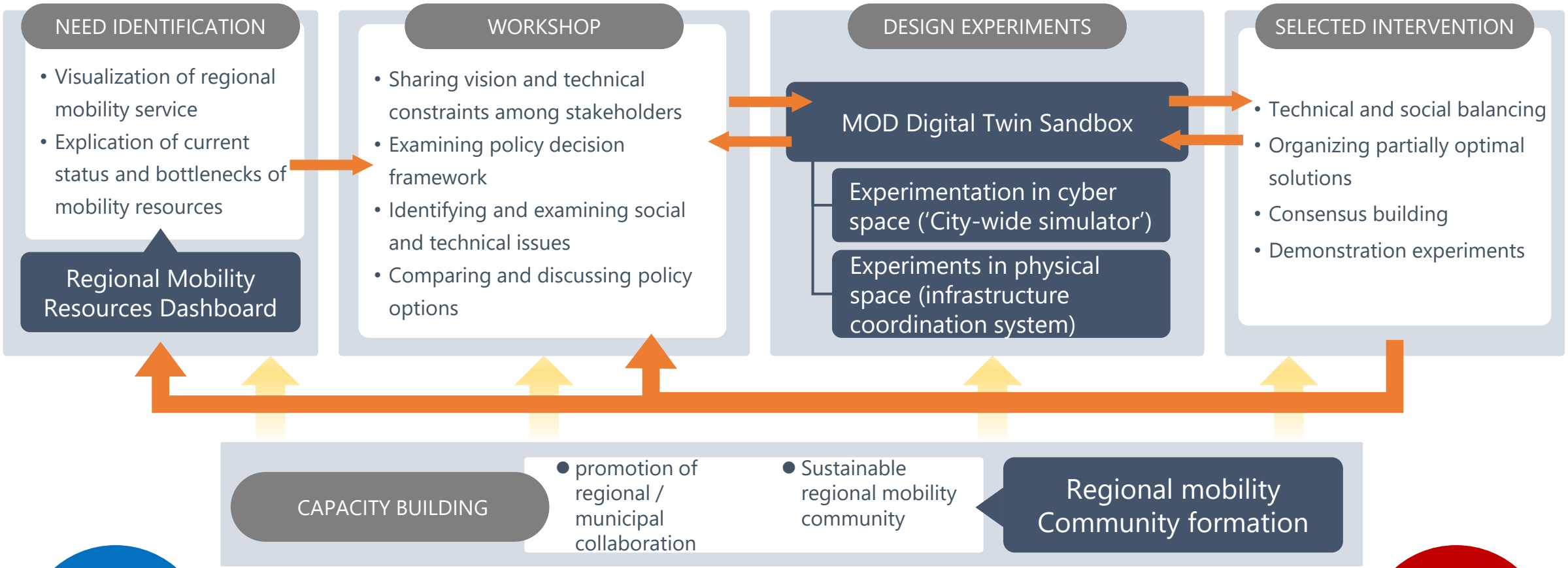
Framework



Users: Municipalities in charge of city and transportation planning, regional mobility providers

Linear Decision-making

Significant time reduction for policy decision-making and implementation related to urban transportation planning

Exploratory decision-making

Framework

- The issues in promoting mobility-oriented development (MOD) with an agglomeration of places for social exchange are as follows.

Key issues in promoting MOD

Difficulty in sharing a common understanding of the problem among the parties concerned.

- In promoting MOD, it is difficult and time-consuming to properly understand and recognize the current situation and challenges.

Difficulty in accurately predicting the effectiveness of measures.

- Conventional simulators have difficulty in properly predicting the expected effects of MOD, such as increased “interaction” of people.

Experiments and simulations require a lot of cost and time.

- The time required to conduct multiple demonstrations and to estimate the future case for consensus-building is long, and the time required to introduce the system is long.

Lack of technology for vehicle-infrastructure coordination.

- In addition to mobility, it is essential for MOD implementation to establish technologies to link up with public transport and the infrastructure required for new mobility..

Lack of strategies to overcome the chasm.

- Between demonstration and full-scale implementation, the community promoting MOD has stagnated or shrunk because of the inability to overcome the chasm caused by technical and social factors, etc.

Methods of solution through this project

Regional Mobility Resource Dashboard

- Visualize and diagnose the current status and bottlenecks of regional transport with easy-to-understand indicators to accelerate common understanding and discussion among stakeholders and citizens.

Development of “City-wide simulator”

- Develop a new simulator that can evaluate the introduction of new mobility and predict the effects of the exchanges.

Develop the MOD Digital Twin Sandbox

- Simplify and rapidly generate and visualize a large number of future scenarios from simulators and actual demonstration data, and develop tools for use among citizens and stakeholders.

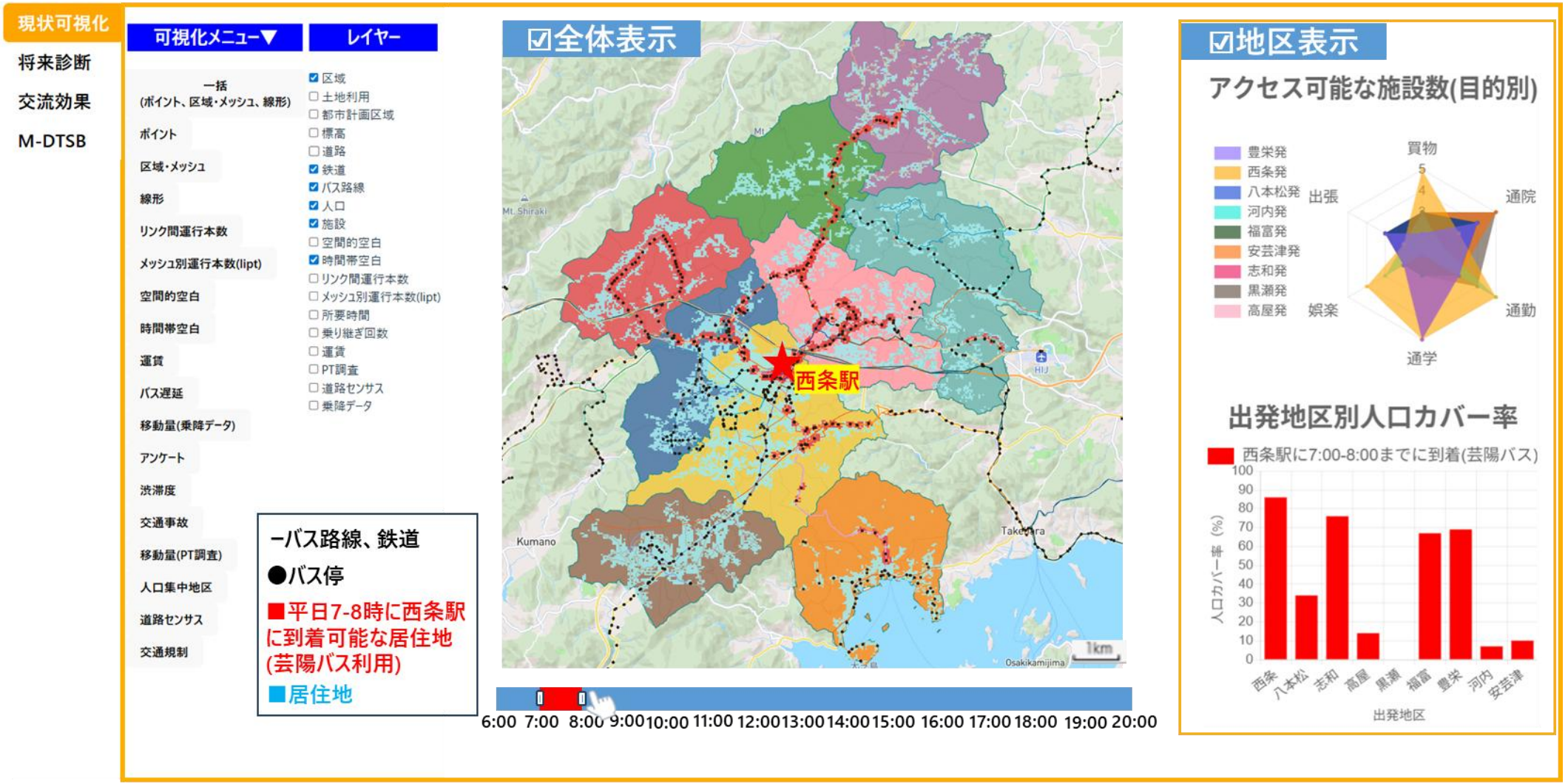
Develop vehicle-infrastructure coordination systems

- Study, develop and demonstrate specific measures for priority signal control to prioritize public transport.

Managing the process of community building for local mobility services

- Verify and establish the design of communities and processes that do not stagnate and have a strong driving force for the project to achieve an appropriate MOD.

Target Image of the Regional Mobility Resource Dashboard



The interface integrates service-level accessibility diagnostics for current conditions, interaction-effect analysis using a town-walking simulator, and future scenario assessment using M-DTSB. This screen configuration supports multi-purpose, scenario-based discussions through functions such as overlay visualization.

City-wide Simulator Prototype FY2025

Input data

GTFS data 2022–2023

Digital road maps Ver. 3403

Population data H27/R2

Building point data 2020

Traffic diary survey data 2011

Transport Simulation Platform (MATSim)

Multimodal Dynamic Traffic Assignment

Demand and supply interaction

Activity-based Model

Pieter. Luo, Yaqiu Azis, Fukunaga(TBC)

Output

Demand：Generation/Attraction; Destination distribution; Modal share; Departure time; Social exchange

Supply：Traffic congestion; Congestion in vehicles; Link traffic volume; Link travel speed

Impact of BRT Introduction

Note: Figures are preliminary estimates based on the simulator under development.

Current Condition:

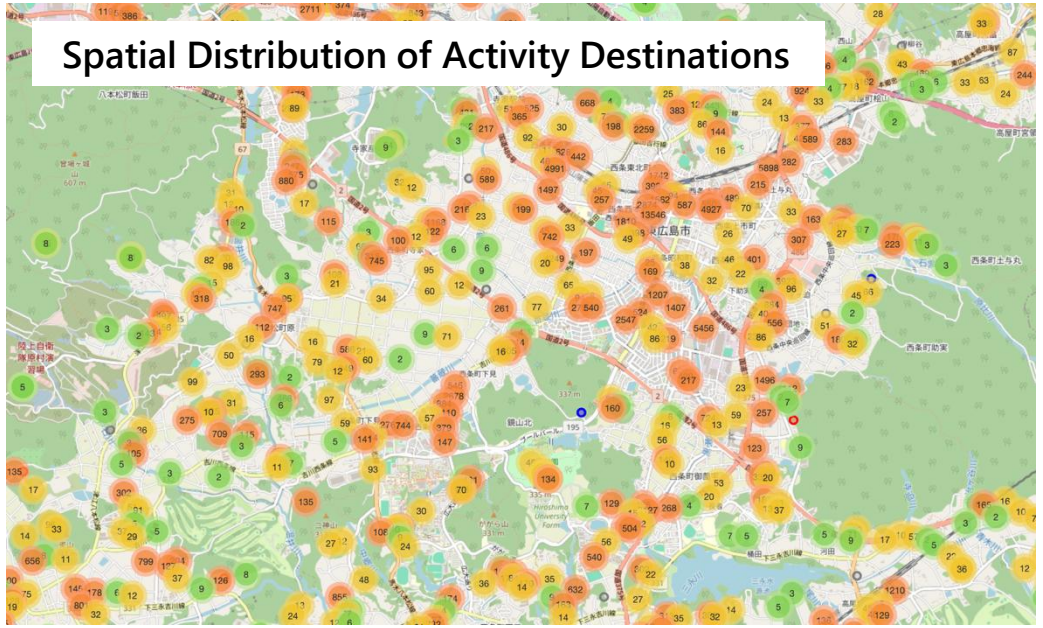
Number of users on the Saijo Station–Hiroshima University route:
1,343 persons/day (Higashi-Hiroshima residents only)

Average car travel speed: **50.92 km/h**

BRT Scenario: Double Service Frequency

Number of users on the Saijo Station–Hiroshima University route:
1,549 persons/day (Higashi-Hiroshima residents only)

Average car travel speed: **50.74 km/h**

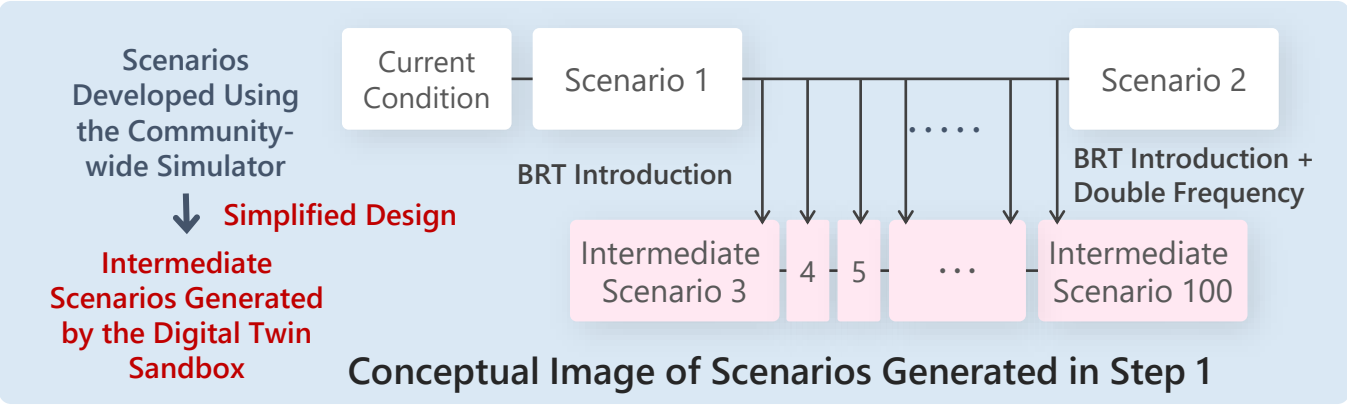


Basic Design of the MOD Digital Twin Sandbox

Specific Algorithms, Data-Driven UI/UX Design, and Front-End Design

In Step 1, algorithms are examined to easily and rapidly generate numerous intermediate scenarios based on a small number of carefully designed simulation cases.

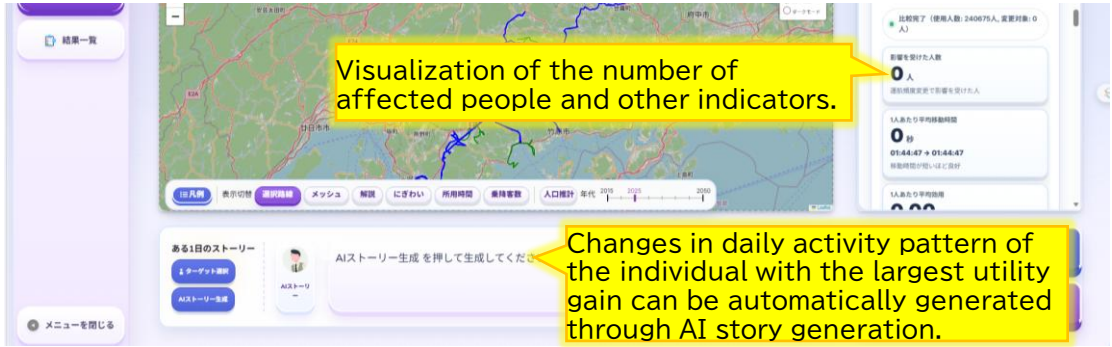
Step	Representable Policy Measures	Applicable Simulation Results	Representation Method
3	Combinations of various transport policy measures can be examined	Various simulations other than the Community-wide Simulator	Simplified Estimation + Surrogate Model
2	Various platooning BRT-related measures can be examined	Multiple cases from the Community-wide Simulator	Simplified Estimation + Surrogate Model
1	Specific platooning BRT-related measures can be examined	A small number of cases from the Community-wide Simulator	Simplified Estimation



Conceptual Image of Scenarios Generated in Step 1

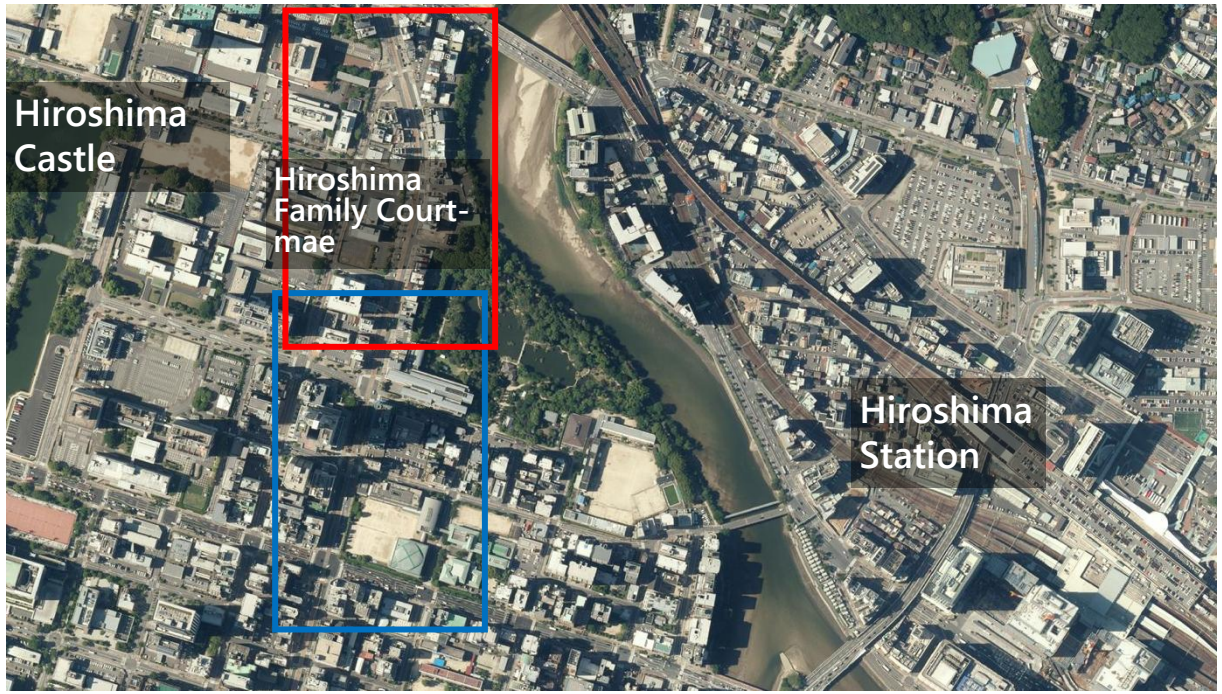
The UI is designed so that anyone can operate it intuitively, understand the results easily, and experience the effects of policy measures.

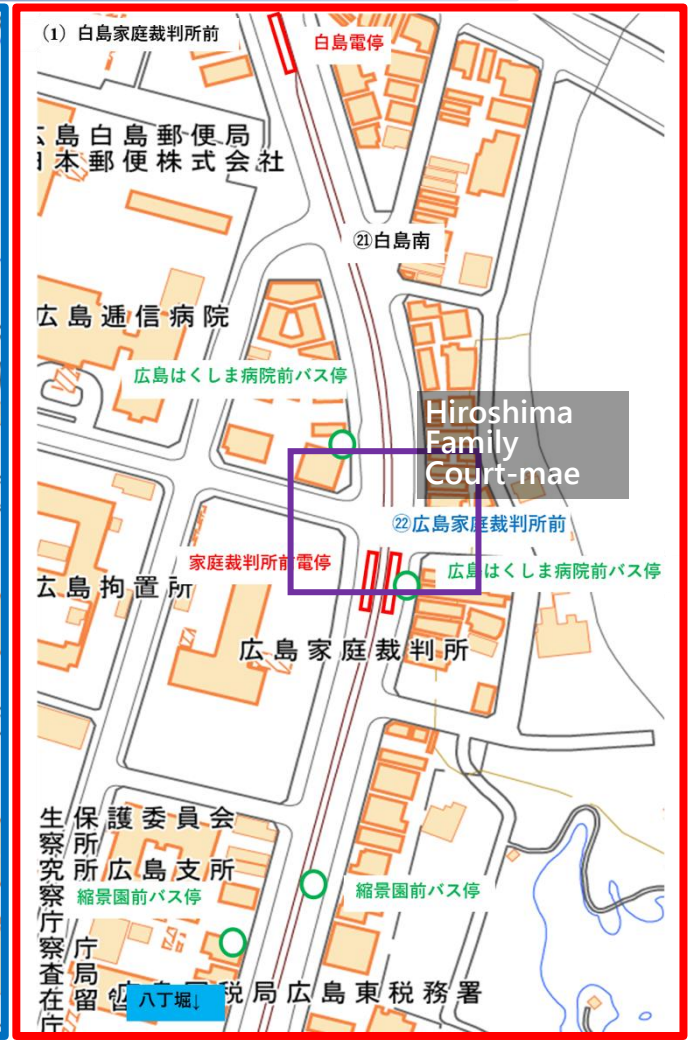
Condition Input → Simulation Results → Results Comparison



Developed a Prototype of MOD Digital Twin Sandbox based on user needs. Improved UI and enhanced computation speed.

Selection of Target Intersections for Short- and Long-Term Verification





Among intersections where streetcars pass and traffic volumes are relatively low, “Joint Government Building mae,” “Shukkeien Garden mae,” and “**Hiroshima Family Court**” were selected as candidates. Based on the reasons below, “Hiroshima Family Court” was selected as the target intersection.

- **Joint Government Building**: Not suitable for PTPS control because the intersection gives priority to push-button signals for elderly people and mobility-vulnerable users.
- **Shukkeien Garden**: Not suitable because it is only 70 m from the “In Front of the Joint Government Building” intersection, and the influence of push-button priority control would remain.

Selection of the target intersection for short- and long-term verification

MOD Community Building

- **Higashi-Hiroshima Mobility Workshop**
  The 2nd Higashihiroshima Mobility Workshop was held on May 15, 2025, bringing together transit operators, public authorities, consulting firms, and universities to discuss regional mobility issues and future directions.

- **Kyre City Workshop**
  Two workshops were also held in Kure City, Hiroshima Prefecture, on July 7, 2025, and January 21, 2026, bringing together industry, government, and academia stakeholders involved in mobility and urban development.