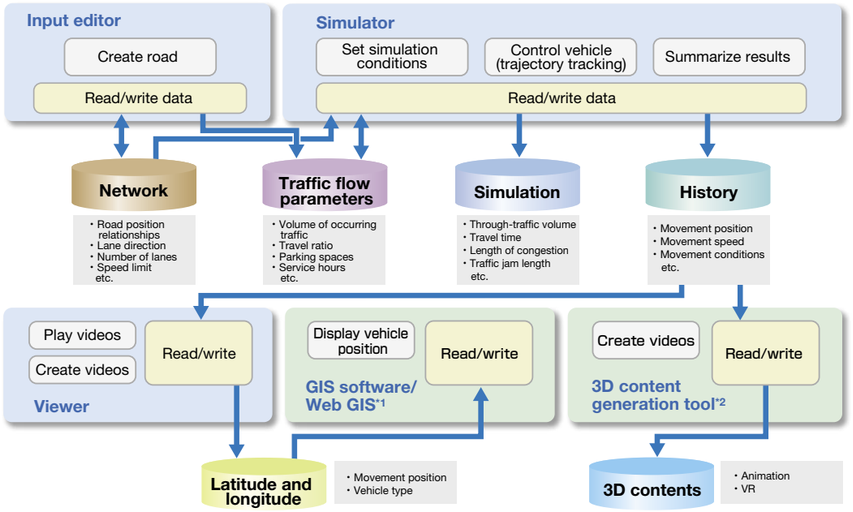
System Structure



Operating environment

OS: Windows 10
CPU: IntelCore i3-6100 or higher is recommended
Memory: 4GB or more
Hard disk space amount: 1GB or more

・This system is a product which utilizes the results of research conducted by the Research & Development Group of Hitachi, Ltd.

*1. A system that allows geographical data to be used on a computer. It is not included in this system.

*2. A system utilized with 3D content provision services. It is not included in this system.

Hitachi image traffic counter (offline processing)

〈System outline〉

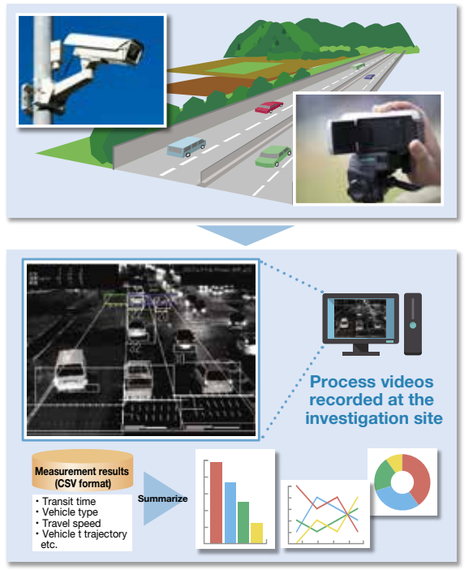
- Automation of traffic volume measurement operations based on recorded pictures using existing CCTV and video cameras.
- Simultaneously reads traffic volume, speed, and vehicle tracking etc. in many points.
- Results of reading are outputted by text or CSV files.

〈Importation results〉

- Economization of traffic volume examinations
- Increased measurement data reliability
- Reduced cost with easy-to-use machinery

〈Adaptations〉

- Existing road traffic volume measurements
- Basic data acquisition for traffic simulation
- Travel speed measurements (speed required by vehicle to travel between two points)
- Vehicle mobility assessments (movement direction analysis of passing vehicles)



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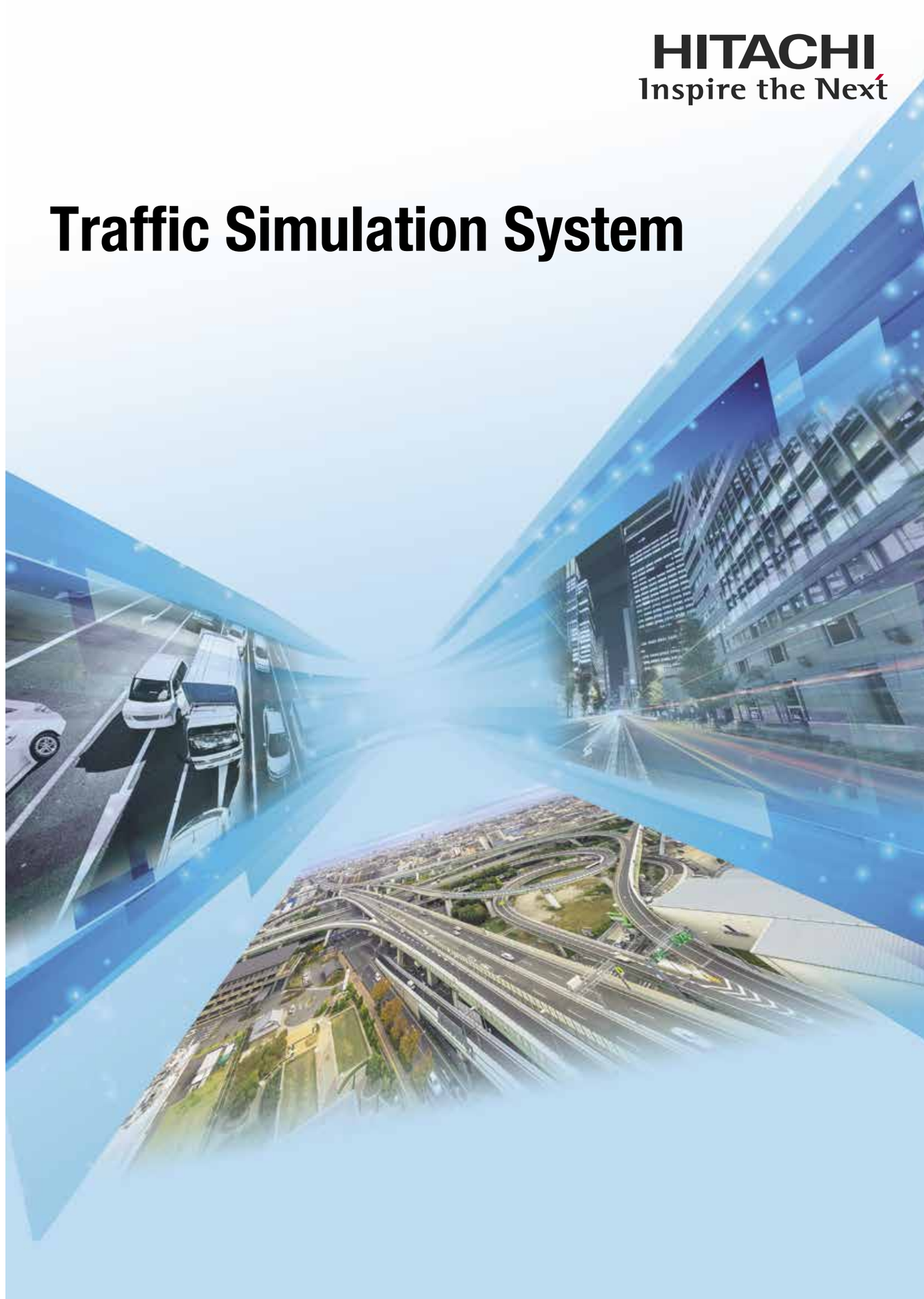
Traffic Simulation System



City planning partner
- Fine detailed simulation of traffic conditions
- Compatible with overseas road transportation systems

Traffic simulation visually demonstrates various events with video data and makes quantified evaluations of traffic volume possible by reproducing simulated vehicle movement on a computer. The use of this system allows congestion of city streets to be evaluated in fine detail since it can incorporate computations which include the movements of each vehicle, signal changes, vehicles parked at roadsides, and pedestrian behavior. In accordance with the Large-scale Retail Store Location Law, analysis of traffic conditions which will affect plans for parking facilities based on the openings of large-scale stores, as well as their surrounding roads, can be performed and effectively applied when making presentations.

New Technology Information System registered products
Registered No. KT-060096-A

Fine detailed representation of vehicle behavior using a drive event formula

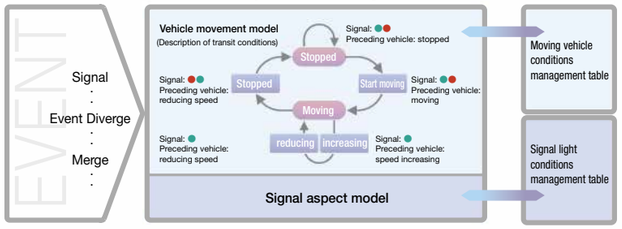
Various events that occur on the road, such as signal changes, vehicles merging and diverging, and pedestrian crossings, are reflected on each vehicle movement. Complicated movements of thousands of congested vehicles can be finely simulated.

Operational improvements with GUI formula

By using GUI, easy input of a wide range of road structures is possible, and time requirements for input or revisions are reduced. Easily responding to a variety of situations.

* GUI: Graphical User Interface

Operation theory



Visual presentation function

The traveling conditions of each moving vehicle can be verified using road conditions in 2D or 3D animation. Additionally, the results can be output in the form of graphs which show data such as the number of vehicles traveling in different directions on each road or at each intersection, the travel time between road sections, and the length of congestion delays. The 3D simulator can also display environments which closely approximate the actual landscape for effective use in presentations.

Example of input items

- Volume of occurring traffic
- Divergence rate or OD*
- Signal aspect
- Network data
- Parking information

*OD: Origin-Destination

Supports Windows OS

Supporting most types of operating environments. Can be used on lap top computers for mobile presentations.

*Supports Microsoft Windows 10

Examples of output items

- Travel time
- Length of congestion
- Congestion length
- Waiting order conditions
- Vehicles in transit
- Animation

Example of traffic simulation adaptation

1. Local traffic congestion countermeasures (intersections, road structure improvements, traffic control and others)
2. Road planning and relevant evaluations
3. New large industry location facilities constructions and event countermeasures
4. Evacuation simulation in the event of a large-scale disaster

1st Application example for traffic congestion

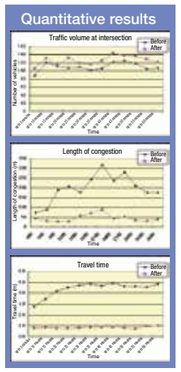
▼Analysis of congestion problem ▼Analysis for improvement measures

Change vehicle lanes or signals

Problems: Large number of signal displays and not enough progressing vehicles

Green light on-time increases lead to diffusing traffic congestion

Quantitative results



2nd Application example for traffic congestion

▼Current conditions ▼Quick-fix measures (change signal aspect) ▼Long-term measures (solidify)

Number of vehicles

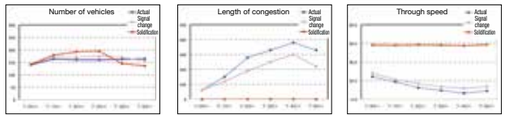
	Actual	Signal change	Solidification
7:00~	140	142	141
7:10~	163	172	179
7:20~	160	170	192
7:30~	160	175	195
7:40~	162	170	145
7:50~	164	155	136
Total	949	984	988

Length of congestion【m】

	Actual	Signal change	Solidification
7:00~	60	60	0
7:10~	150	120	0
7:20~	280	190	0
7:30~	330	250	0
7:40~	380	300	0
7:50~	330	220	0
Max	380	300	0
Effect		21% reduced	100% reduced

Through speed【Km/h】

	Actual	Signal change	Solidification
7:00~	24.2	28.0	58.2
7:10~	18.6	20.9	57.9
7:20~	12.3	16.8	58.4
7:30~	9.4	13.3	58.1
7:40~	6.5	11.7	57.4
7:50~	8.9	13.5	58.7
Max	13.3	17.4	58.1
Effect		130%increased	436%increased



Services to provide 3D animation and VR contents
Presentations can be made using smartphones or tablets

By using commercially-available 3D maps, compelling animations that recreate actual cityscapes can be created.

[Example for Reference]

VR*1 contents can be created to confirm the future state of road conditions after measures are completed, from a driver's perspective.

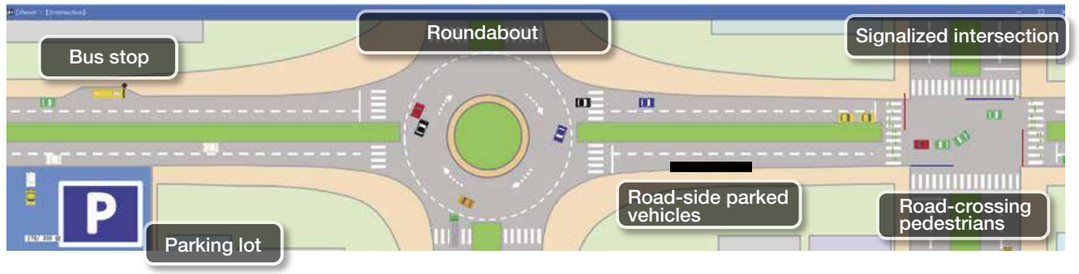
[Example for Reference]*2

*1. VR: Abbreviation for "Virtual Reality".
*2. VR contents are produced jointly by "Utsunomiya Machidukurisuishinkiko", National University Corporation Utsunomiya University, Ricoh Japan Corporation Tochigi Branch Office and Hitachi, Ltd.

Fine detailed setting of various events that occur on the road
Create current condition analyses and planning design simulations

Wide variety of road condition settings

The number of lanes, direction of travel, and signal indication can be set to evaluate the road network, including bus stops, parking lots, and roundabouts. In addition, the impact of on-street parking and pedestrian crossings can be also evaluated.



Vehicle position management according to latitude and longitude

Vehicle positions according to latitude and longitude can be managed using the World files*1.
In addition, the vehicles can be deployed to Geospatial Information Authority of Japan maps or Google Earth.

TRAFFICSS Viewer Software

Export → Vehicle position data (kml file) → Import

Geospatial Information Authority of Japan maps*2

*1. World files: Text files which include records of latitude and longitude coordinate position data, and can be used with the Geographic Information System (GIS), etc.
*2. Created by loading simulation results (kml files) on the Geospatial Information Authority of Japan map website.