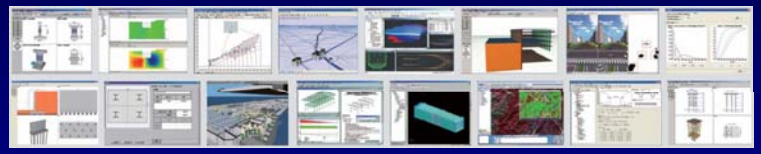
FORUM8 Design Solution

VR / FEM / CAD / Web
Engineering-Services



August, 2009

FORUM8 Co., Ltd.

Contents

FORUM 8 Company profile

Established: May 1987
Capital stock: 50 Million JPY
Activities: Civil engineering software design and support
Staff: 134 people (June 2008)

"Civil Engineer's Forum"

- Established as a developer and distributor of package software to support civil design on PCs with the commencement of development of UC-1 in 1981
- Number of clients: 12 465 (19/2/2008), top class share in civil engineering software.
- Clients: 60% are construction consultants, the remainder include government administration offices, as well as construction, university, automobile and a variety of other research institutes
- Company advisors: Professors from Kansai University, Arizona State University, Seika University and Gunma University
- Offices: 5 in Japan, of which 4 handle sales & support, as well as 5 overseas, with experience exporting UC-win/Road and other software packages.
- Commenced user support in China with a subsidiary in Shanghai – FORUM8 Technology Development (Shanghai) Co., Ltd.
- Increased sales for the last 5 fiscal years and increased profits for the last 3 fiscal years
- Registered construction consultant (2 analysis departments)

"Practical IT Business Theory Course (Kansai Graduate School Lecture Materials)"

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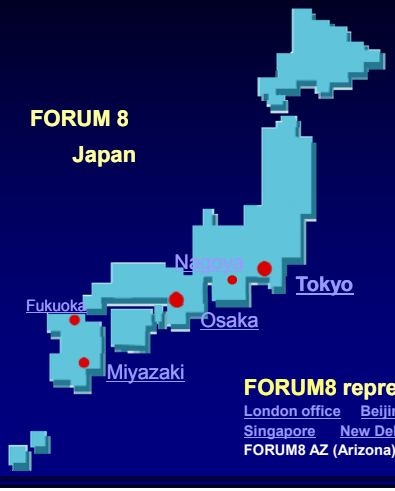
FORUM 8 Company profile

FORUM 8
Japan



FORUM8 (China)
Shanghai China
New!

FORUM 8 (NZ)
New Zealand

Dealer Network

FORUM8 representative offices
London office Beijing Thailand New!
Singapore New Delhi Sydney
FORUM8 AZ (Arizona) New!

Contents

FORUM 8 Company profile

UC-win/Road
VR Studio
V R
Virtual Reality
VR Data Service
System Development Service
F E M
Dynamic Non-linear Analysis
Foundation Analysis
CALS/CAD
FRAME3D / Foundation
Customised Development
Analysis support service
Design
UC-1 Design / CAD / GIS
Construction Consultants
Engineer's Studio
GIS / GSS
Web
Web Infrastructure Technology
Customised Development

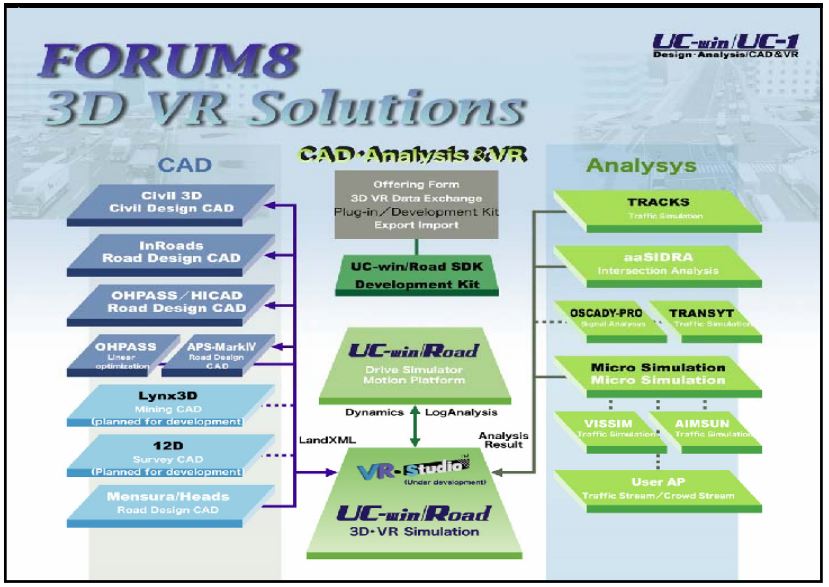
Contents

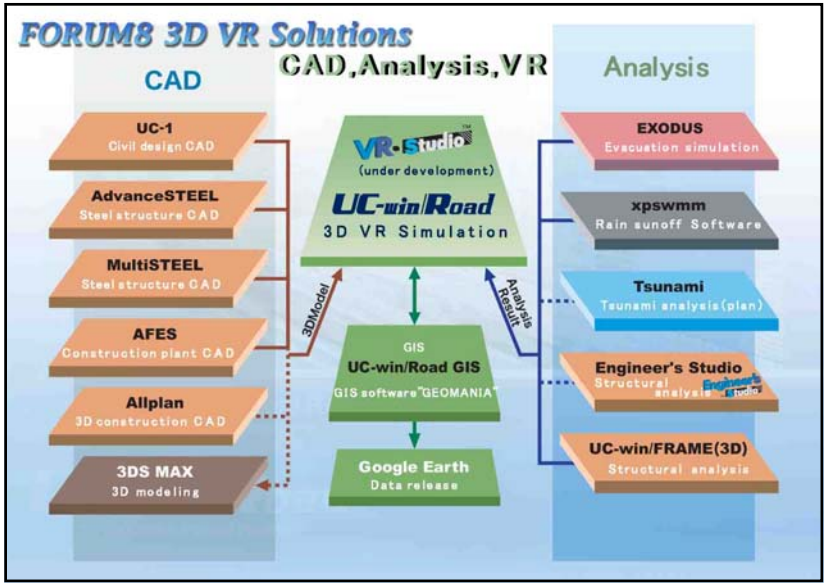
FORUM8 Solution

3D Real time Virtual Reality
UC-win/Road

3D VR Solution and examples of advanced usage

Contents





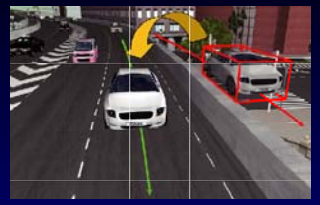
Ⅱ. Development

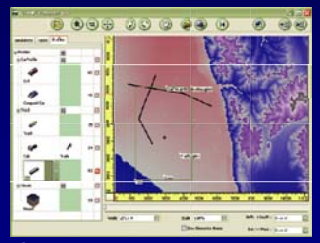
Micro simulation player　OpenMicroSim

Function to replay the animation of various types of simulations expressed by movement of 3D models

Object:
- Replay results from other AP in VR
- Customizing available to express in VR environment

Simulation sample:
- All kinds of traffic simulation
- 4D planning software
- Movement of the object in a factory
- Operation of the heavy industrial machine in engineering work
- Application which needs other VR expressions





Format is open to public as "OpenMicroSim".　http://openmicrosim.org/

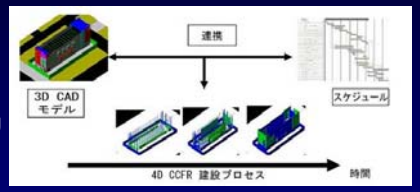
Contents

Example of micro simulation player used

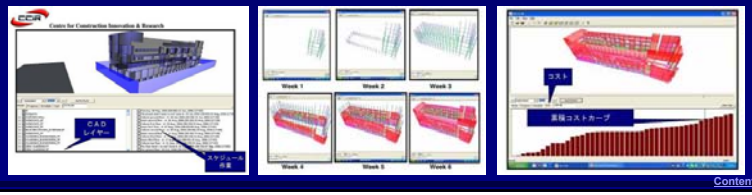
4D CAD UC-win/Road for Virtual - Construction Project Manager

Tees Side introduction

VR modeling

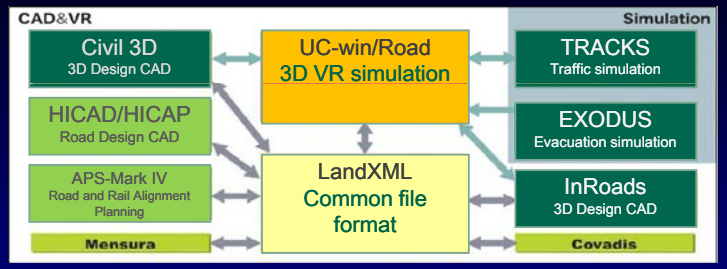


VR simulation



Contents

Data Exchange with Road CAD



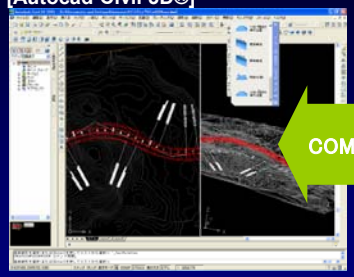
- “Autodesk Civil3D ” is a trademark of Autodesk.
- “APS-Mark Ⅳ win” is a trademark of MTC Corporation.
- “HICAD/HICAP” is a trademark of Yokogawa Techno-Information Service, Inc.
- “InRoads” is a trademark of Bentley Systems, Inc.

Contents

Data Exchange with Road CAD

Data link by UC-win/Road for Civil 3D Plug-in

[Autocad Civil 3D®]



COM－API

[UC-win/Road for Civil 3D]

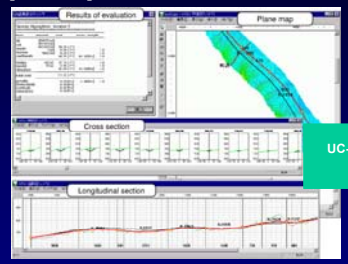
Data Compatible with Civil 3D 2007 & 2008 via COM-API

Contents

Link to OHPASS* Data

Optimum road alignment search by GA (genetic algorithm) program
The road structures and terrain data resulting from the search are linked with UC-win/Road data

[OHPASS]



UC-win/Road SDK

[UC-win/Road]

*** Optimal Highway Path Automatic Search System**
developed by: NEXCO / Mitsubishi Research Institute, Inc.
Development of Data Exchange by UC-win/Road SDK

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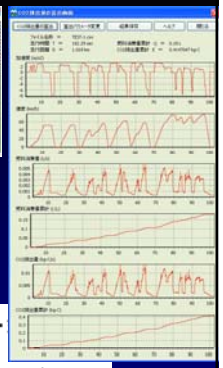
Eco-Drive Plug-in



Based on the driving log from UC-win/Road, this plug-in will support the calculation and creation of graphs that detail fuel consumption and discharge amounts of CO_2. It can be used for a ecological driving practice with a driving simulator or ITS study.

*The discharge amount of CO_2 has been known as being in proportion to fuel consumption, so it will be quantified by three factors; Travelling time (T), Travel distance (D) and Variability characteristic of vehicle speed.

$$E = K_c\,(0.3T + 0.028D + 0.056 \sum_{k} \delta_k(v_k^2 - v_{k-1}^2)) \quad \cdots$$

E: Discharge amount of CO2 for travel time (kg-C)
T: Travel time (sec)
D: Travel distance (m)
K: The number of speed measurement point

δk: when a speed is higher than at the previous point; 1
Other case; 0
vk: Running speed at "k" point (m/sec)
Kc: Emission factor CO2 0.00231kg-C/ petro cc (Ministry of Environment, 1999)

*T.Oguchi, M.Ktakura and M.Taniguchi" Carbondioxide emission model in actual urban road vehicular traffic conditions", *Journal of Infrastructure Planning and Management (JSCE)*, No.695/IV-54, pp.125-136

Contents

Ecological Drive Plug-in

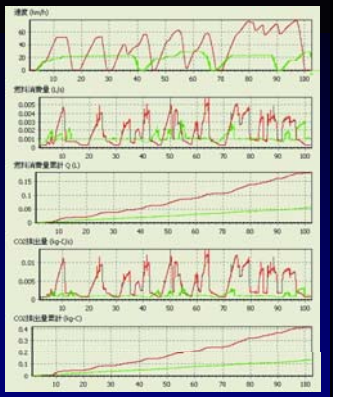
- Validation example

Validated the relationship between operating condition and discharge amount of CO_2 based on the study involving driving through an ordinary city made with UC-win/Road.

Main testing condition
(1) Run the same course (travel distance:1km)
(2) Must stop at intersections
(3) No speed limit
(4) The result under the conditions which run various cases such as Rough driving, gentle driving and so

Case	Travel distance (km)	Fuel consumption (L)	Discharge amount of CO2 (kg-C)	Driving status
TEST-1	1.018	0.18	0.415	Repeat "sudden start" and "sudden stop" driving
TEST-2	1.018	0.147	0.339	
TEST-3	1.025	0.102	0.237	Try not to drive "sudden start" and "sudden stop"
TEST-4	1.02	0.098	0.226	

Speculation:The driving behavior which limits vehicle speed such as sudden starting, sudden stop and son is expected to reduce the discharge amount of CO_2.



In the study of the effectiveness assessment for eco drive, it was discovered that it was difficult for the experienced drivers to think about driving patterns deeply, however, it could be effective for beginners to do it if they receive some driving hints. In addition, it is advantageous that we don't need petro for training.

Contents

ECO Drive Plug-in

customizable

Customizing example:

Users can customize display of report and logic used for specific needs.

Can log results for evaluation by analysis and research.

Possible to use SDK(System Development kit)

Test result by Professor ECO
Possible to customize characters, style and logos. Available to service for examineees can take out printed document.

Contents

The 10th UC-win/Road Conference / VR-Studio™ Conference

Main Session: **Stream-1**
"New Developments with VR-Studio" Special Lecture 2

"Advanced Road Design using VR and DS"

Mr. Seiya Tazawa, Survey and Environment Group 1 Manager,

Bureau of Construction, Metropolitan expressway Company Limited

Metropolitan expressway Company Limited is performing an experiment with the Driving Simulator to check the effectiveness of driving support and traffic safety measures of the Ohashi junction which connects Central Circular Route Shinjuku and Shinagawa Line to Route 3 Shibuya Line. Ohashi junction, four-leg intersection constructed in limited site and space, is connected with two-loops in the tunnel, whose difference of elevation is 70 meters. To feedback the experiment results to road marking or traffic sign planning, the Ohashi junction has been reproduced in VR space, the experiment with the UC-win/Road Drive Simulator has been carried out and then the effectiveness and ineffectiveness of drivers' behavior and psychological state have been evaluated and reviewed.

Presentation Materials

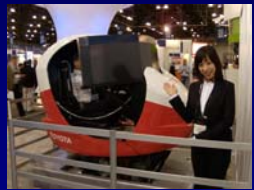
Contents

Experience simulator

●Example of UC-win/Road Trial Simulator

TOYOTA exhibited at the ITS-New York

"Vehicle-infrastructure Cooperative Systems supporting safer driving"



Customizing Trial Simulator for SUBARU type corresponding 6-axis motion platform

Features

(1)3 screens – improvement in representing the driving environment around intersection

(2Vehicle-infrastructure Cooperative
Expression of the system currently under development for commercial production in the near future
Support to prevent overlooking traffic lights (road-to-vehicle)
System to detect vehicles approaches etc. (vehicle-to-vehicle),

(3)Improving the Driving Environment
More realistic visualization of the area(Nagoya station to Toyota city)
Inclusion of various accident scenarios

(4)Vehicle Motion Model – Implementation of High-precision CARSIM

Reference AVI(Test Driving:TOYOTADS2.wmv)

Toyota Motor Corporation introduced in the user introduction in our journal Up & Coming

Experience simulator

***Example use of UC-win/Road Experience Simulator**

TOYOTA, exhibition at MEGA@WEB "The driving safety supporting system with cooperative of infrastructure"

Experience Simulator

●Application Representations with UC-win/Road

Prevention of accidents with pedestrians

Prevention of running traffic lights

Provision of emergency vehicle information

Experience Simulator

●Application Representations with UC-win/Road

Prevention of accidents with pedestrians at intersections

Prevention of collisions at right turn lights

Experience Simulator

●Application Representations with UC-win/Road

Prevention of missed stop signs


Provision of rear-end collision prevention information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Experience Simulator

●Application Representations with UC-win/Road

Prevention of accidents with unseen pedestrians at right-hand turns


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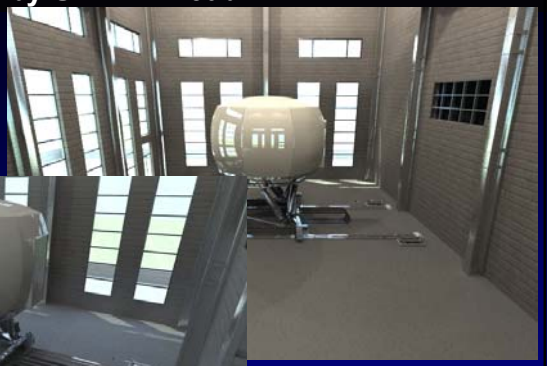
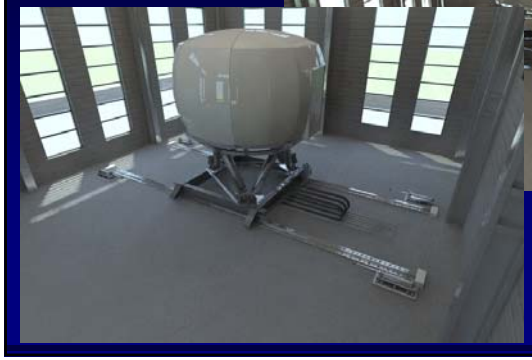
8DOF Simulator by UC-win/Road

★Motion Image AVI

Contents

VR Studio™

VR-Studio (Trade Mark 2006-120249)

VR-Studio

3D Stereo View
Multi User
Large Scale
Multiple Realties

Multi Core / CPU
Enhanced Traffic simulation
Advanced Shading Lighting
Multi Modal Editors

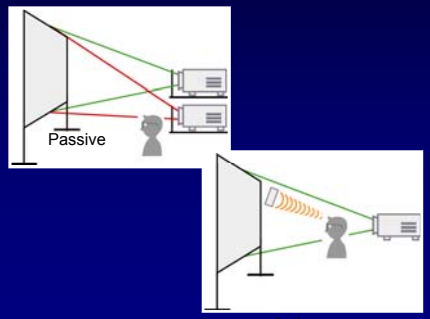
Contents

VI. Future

3D Stereo View

VR Studio

The 3D stereo view function allows us to view VR data from UC-win/Road in 3D. After the creation of the 3D stereo function, we foresee an increase in the use of this function for the creation of VR contents, driving simulation, researches, developments etc.



Contents

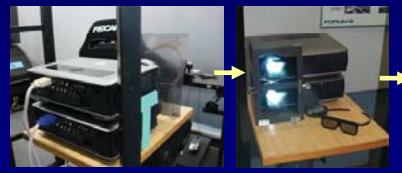
VI. Future

The example of a systems configuration of 3D stereo view

VR Studio

Illustration of polarization projection (passive system) installation

1. 2 sets of projectors can be stacked and displayed.
2. Projection is done through a polarizing filter.
3. Setting up the viewing distance and focal length as a part of UC-win/Road stereo option.
4. Data is projected on a silver screen and 3D Stereo picture can be visualized using polarization glasses.

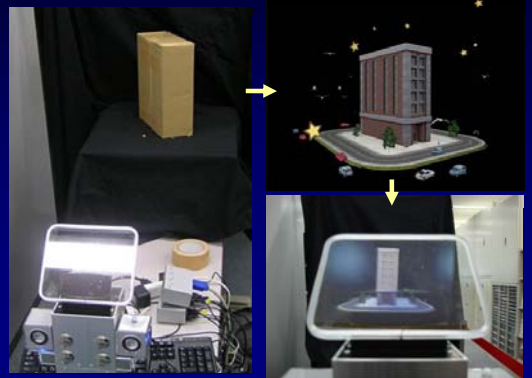


VI.Future

The example of a systems configuration of 3D stereo view

VR Studio

The example of a system of M(Mixed)/A(Augmented)R
Glasses-less 3-dimensional image.
Composition of a diorama and 3-dimensional image is realized.



3D-B-Vision Price: 660,000 yen

MR system preparation (MPEG)
MR system image (MPEG)

Contents

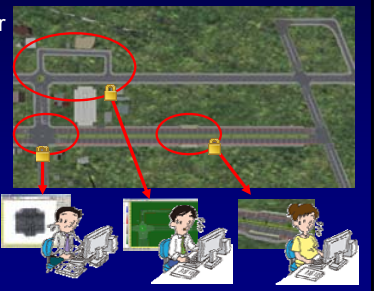
VI. Future

VR-Studio

VR Studio

Multi-user editing

- Single user / Team user version
- Allow different users to edit different parts of a project at the same time.
- Lock based system to central server
- Road split into multiple sections
- Full history of changes



AVI sample

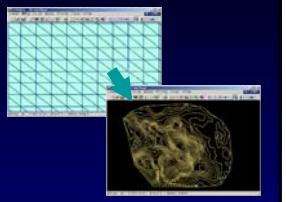
・Teamwork computing

Contents

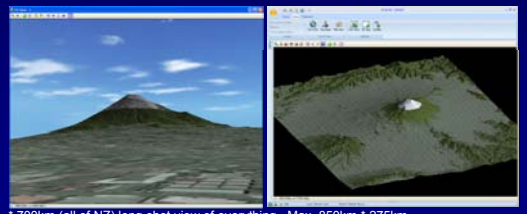
VR-Studio

Large and flexible terrain / space

- Terrain becomes collection of points and contours
- Arbitrary shape (no longer based on 50m grid)
- Initially a single collection, can be sub-divided to allow multi-user editing
- Terrain easily extendable



Scalable for terrain LOD (Load of Detail)



* 700km (all of NZ) long shot view of everything. Max. 850km * 275km

AVI Sample
Large-scale, flexible terrain selection

3D Digital City Construction Proposal
Adelaide, Australia

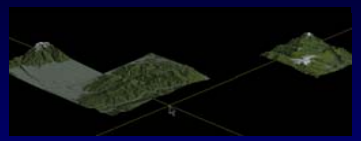
Contents

VR-Studio

Multi-reality (Expanded Before-After)

Before-Now-After function

Switch between multiple designs for 3D models, 3D trees, buildings, traffic signs and so on



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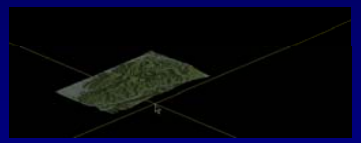
Multi-Reality

Instantly display changes to multiple designs for models including roads and terrain



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VR-Studio

Dramatic improvement in performance

Multi-processor
Multi-core CPU

↓

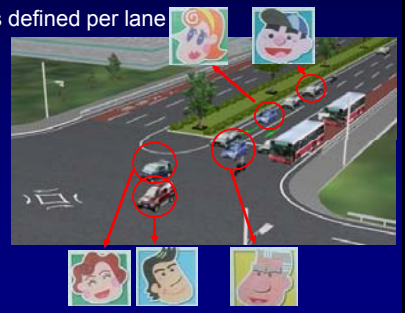
Massive reduction of VR data creation time
Improvement in traffic simulation abilities

Contents

VR-Studio

The advancement of traffic simulation

- Improved driver behaviour
- More configurable parameters for drivers
- Traffic generators / sinks / sources defined per lane
- Two-way roads
  (on a single carriageway)



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The 10th UC-win/Road Conference

May 20th, 2009 (Wed) 11:00-17:00

Engineer's Studio™ VR-Studio™

FORUM8 Design Festival 2009

November 18th-20th, 2009

18th (Wed) : the 3rd FORUM8 Design Conference

19th (Thu) : the 3rd International VR Symposium

20th (Fri) : the 8th 3D VR simulation contest

Tokyo Conference Center in Shinagawa Hall A & B

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8th 3D VR simulation Contest by UC-win/Road

VR-Studio™

Date: November 20th, 2009

Place: Tokyo Conference Center, Shinagawa. Halls A & B

The center is directly connected to the Konan exit of JR's Shinagawa Station

3D-VR SIMULATION CONTEST by UC-win/Road

Grand Prix

"Simulated driving diagnosis system using CG simulation"
National Agency for Automotive Safety & Victims' Aid

"Sakai City Oshoji LRT Project VR data"
Osaka University, Graduate School of Engineering, Division of Sustainable Energy and Environmental Engineering

FORUM8 Design Festival

November 18th (Wed.) to 20th (Fri.), 2009
Tokyo Conference Center, Shinagawa. Halls A & B
The center is directly connected to the Konan exit of JR's Shinagawa Station

tokyo conference center shinagawa

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Thank you very much for your attention!

UC-win/UC-1
Design・Analysis/CAD&VR

FORUM8
FORUM8 Co., Ltd.

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