MIZUTANI LAB.

[Big Data Construction of Infrastructural Quantitative Information]
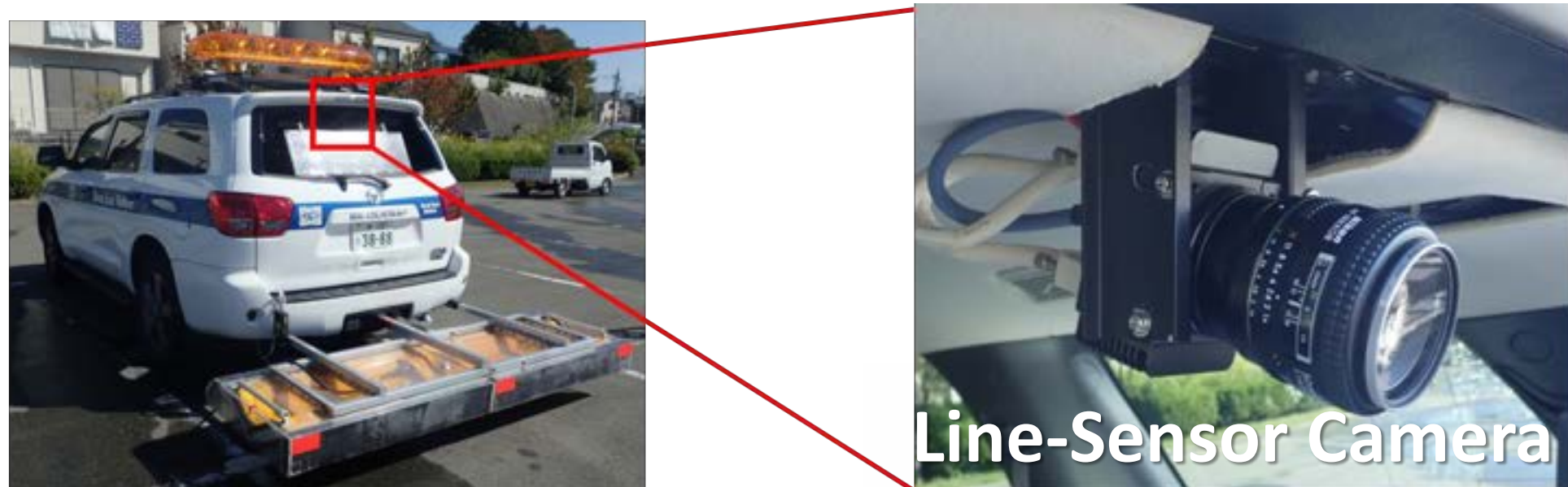
Department of Human and Social Systems

Real-Time Spatial Analysis

Department of Civil Engineering

https://www.iis.u-tokyo.ac.jp/en/research/staff/mizutani-tsukasa/

Our Laboratory is Constructing Big Data of Infrastructural Quantitative Information by Digital Signal Processing and Artificial Intelligence Analysis of the Data of State-of-the-Art Laser, Radar and Image Devices.

Line-Sensor Camera

Example of Road Surface Image taken by "Line-Sensor Camera"

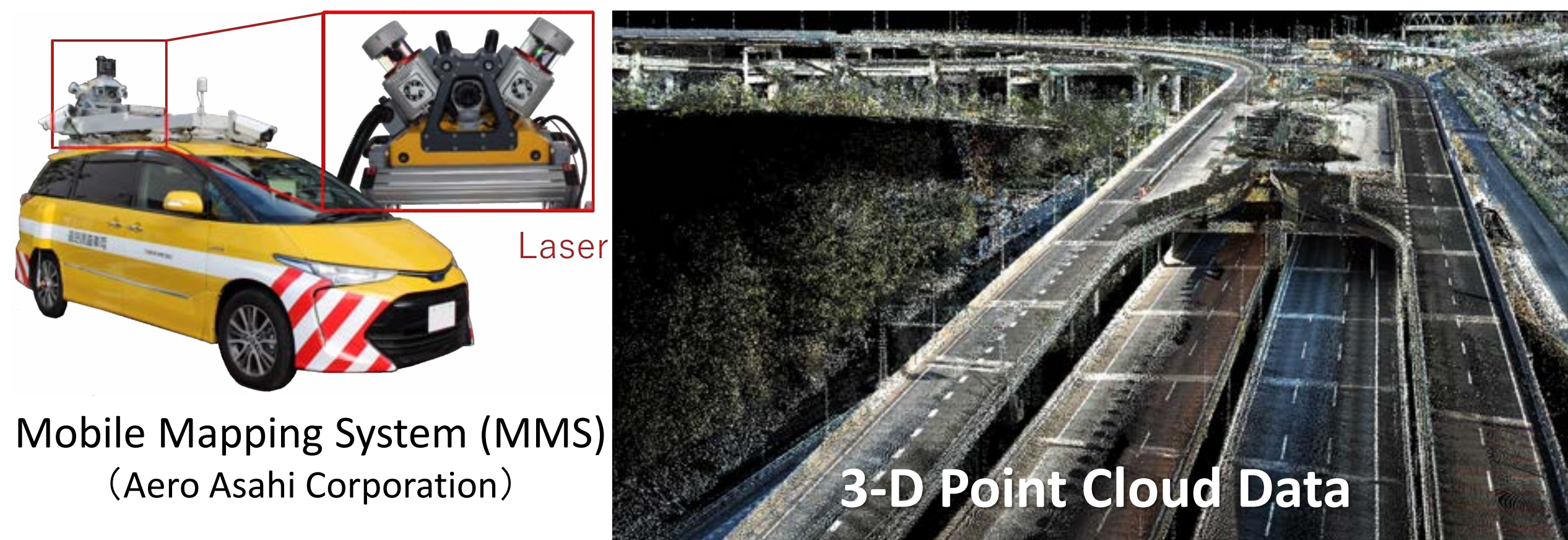Detection of Crack

- Multiple Crack (red)
- Single Crack (yellow)
- No Crack (blue)

Detection of Manholes and Handholes

- Full Manholes or Handholes (red)
- Partial Manholes or Handholes (yellow)

Evaluation of Whiteline

- Severely Damaged (red)
- Damaged (yellow)
- No Damage (blue)

Analysis Time: 1-2 hours/100 km Image

High-Speed and Automatic Diagnosis of Road Surface Condition by Artificial Intelligence Analysis of "Line-Sensor Camera"
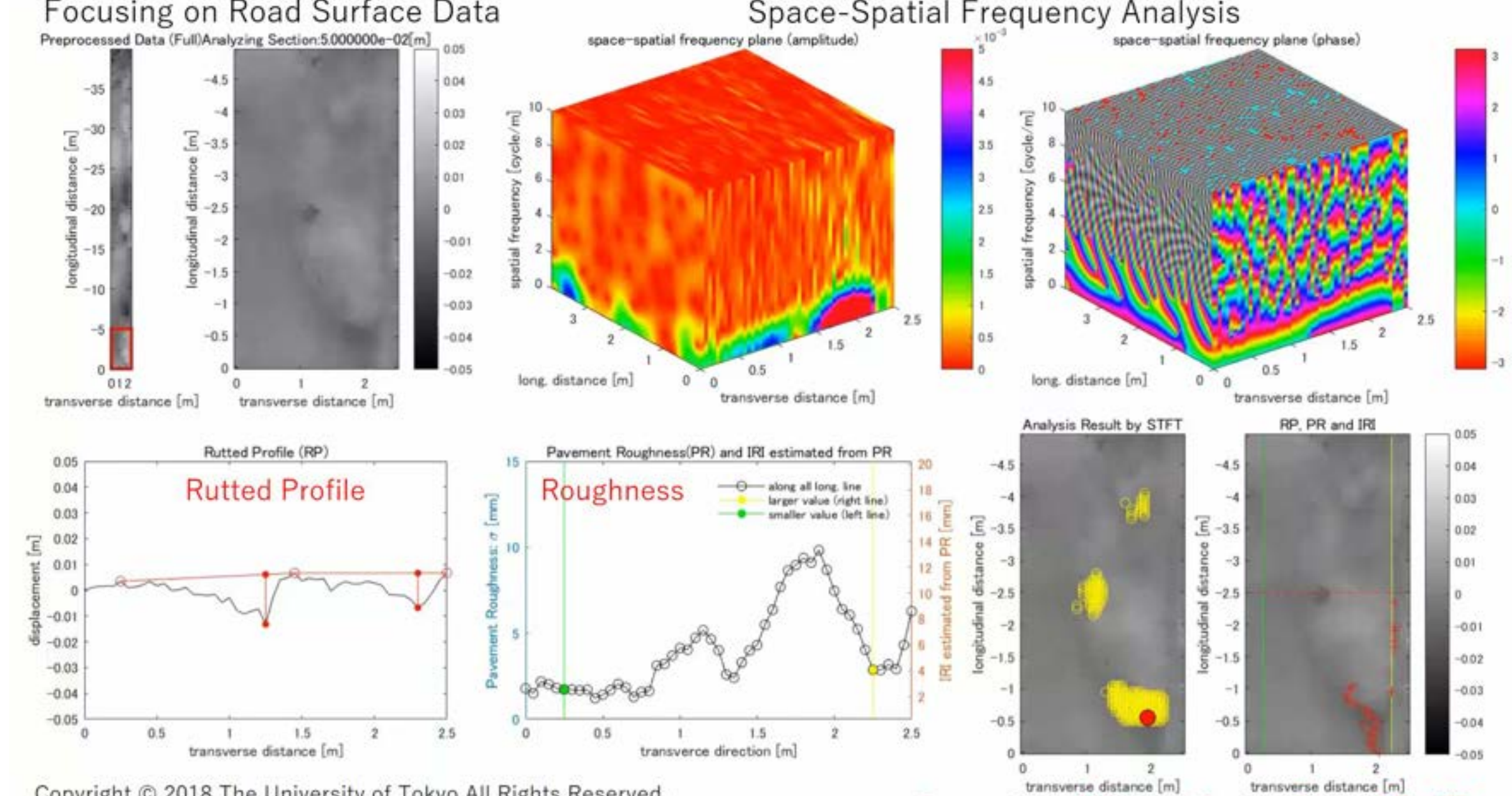

Laser

Mobile Mapping System (MMS)
（Aero Asahi Corporation）

3-D Point Cloud Data

Focusing on Road Surface Data
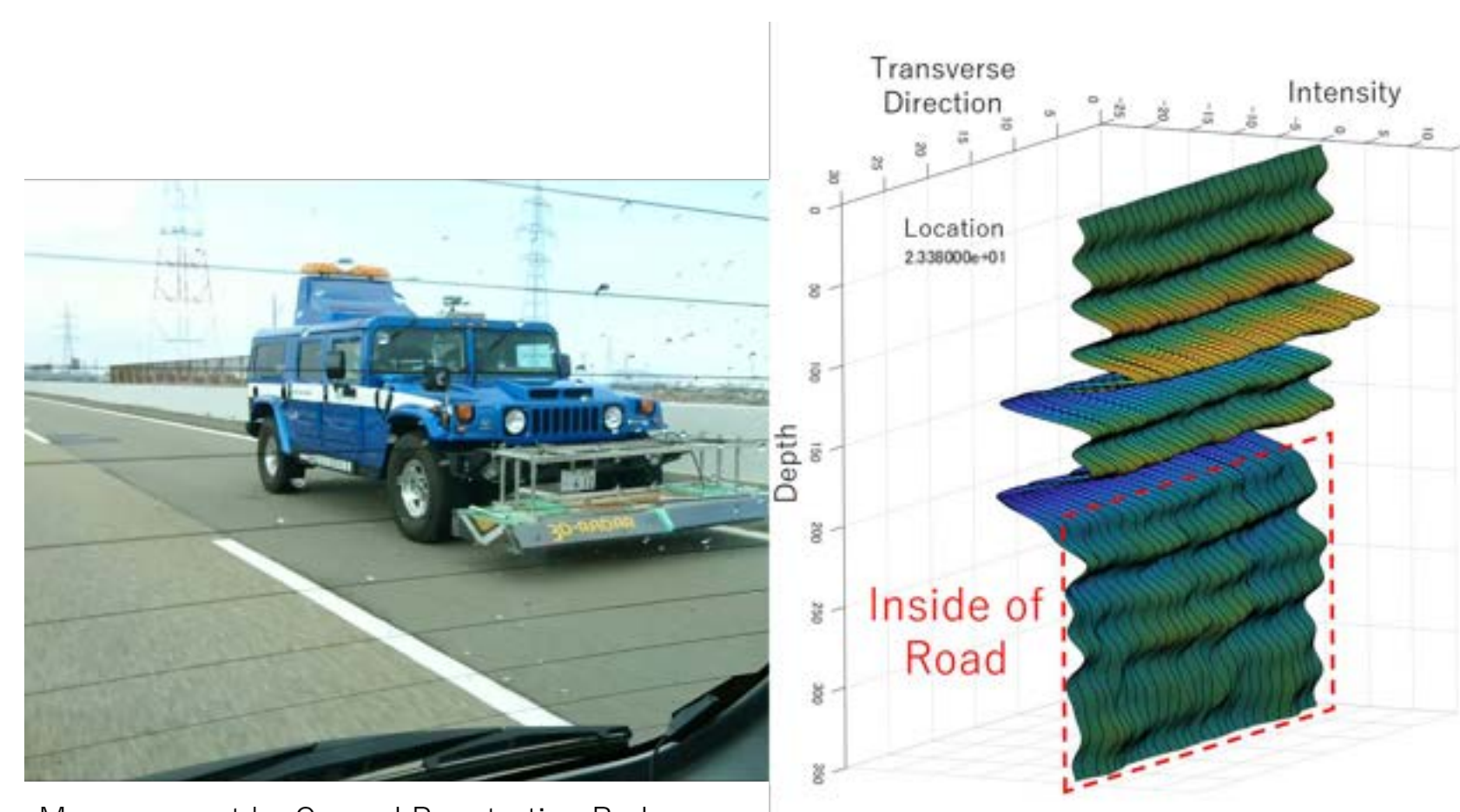
Space-Spatial Frequency Analysis

Rutted Profile · Roughness

Detection of "Pot-Holes"   Rutted Profile

Analysis Time: 10-20 min./100 km Data

High-Speed and Automatic Diagnosis of Road Surface Condition by Digital Signal Processing of 3-D Point Cloud Data measured by Mobile Mapping System(MMS)
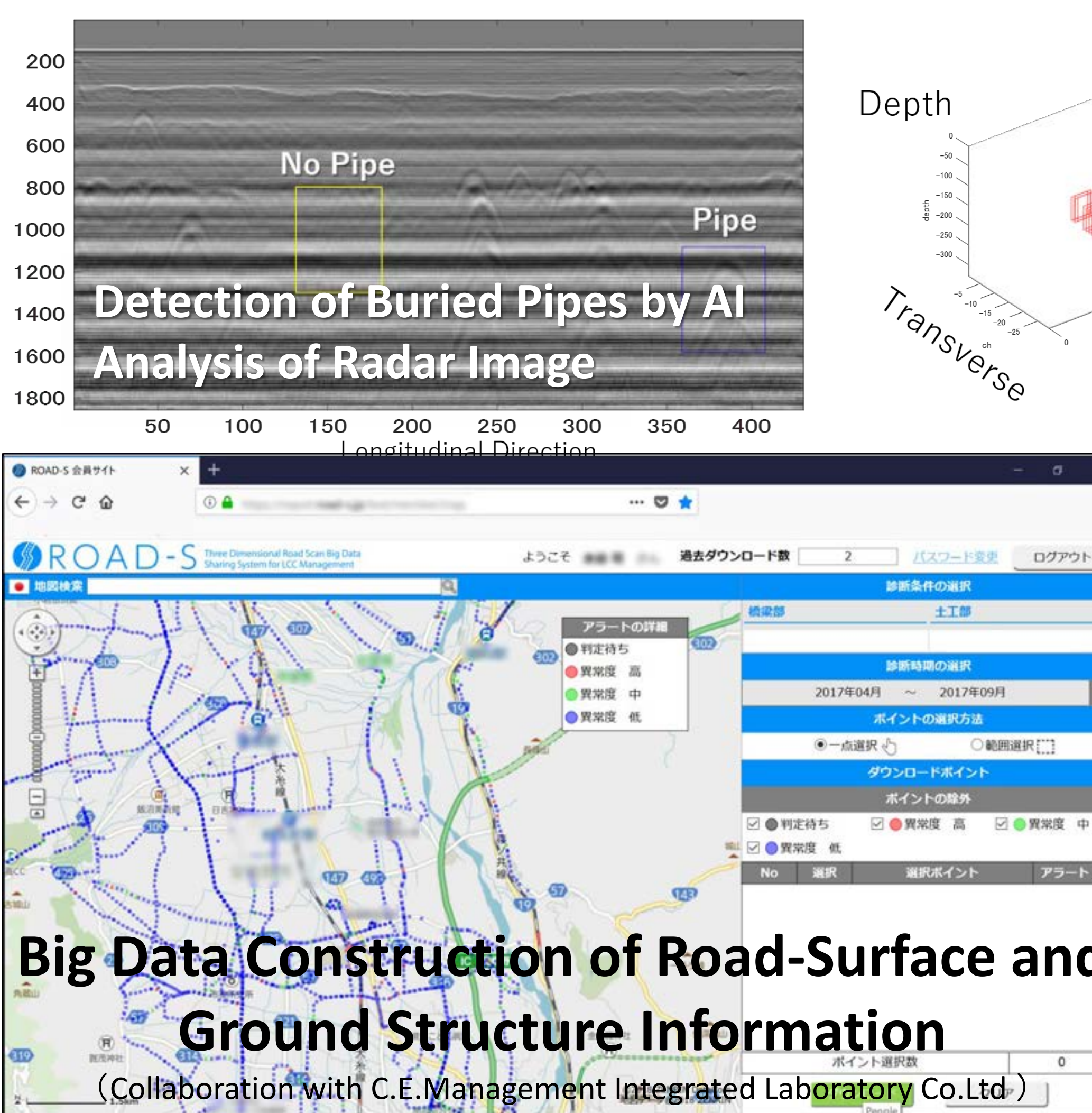

Measurement by Ground Penetrating Radar

Measured Signal from Inside of Road

Inside of Road

Detection of Buried Pipes by AI Analysis of Radar Image

Depth — Transverse — Longitudinal

Estimation of 3-D Spatial Information of Buried Pipes

Quantitative Evaluation of Radar Signal Change

Signal Change: Large / Small

Joint

1st Span

2nd Span

3rd Span

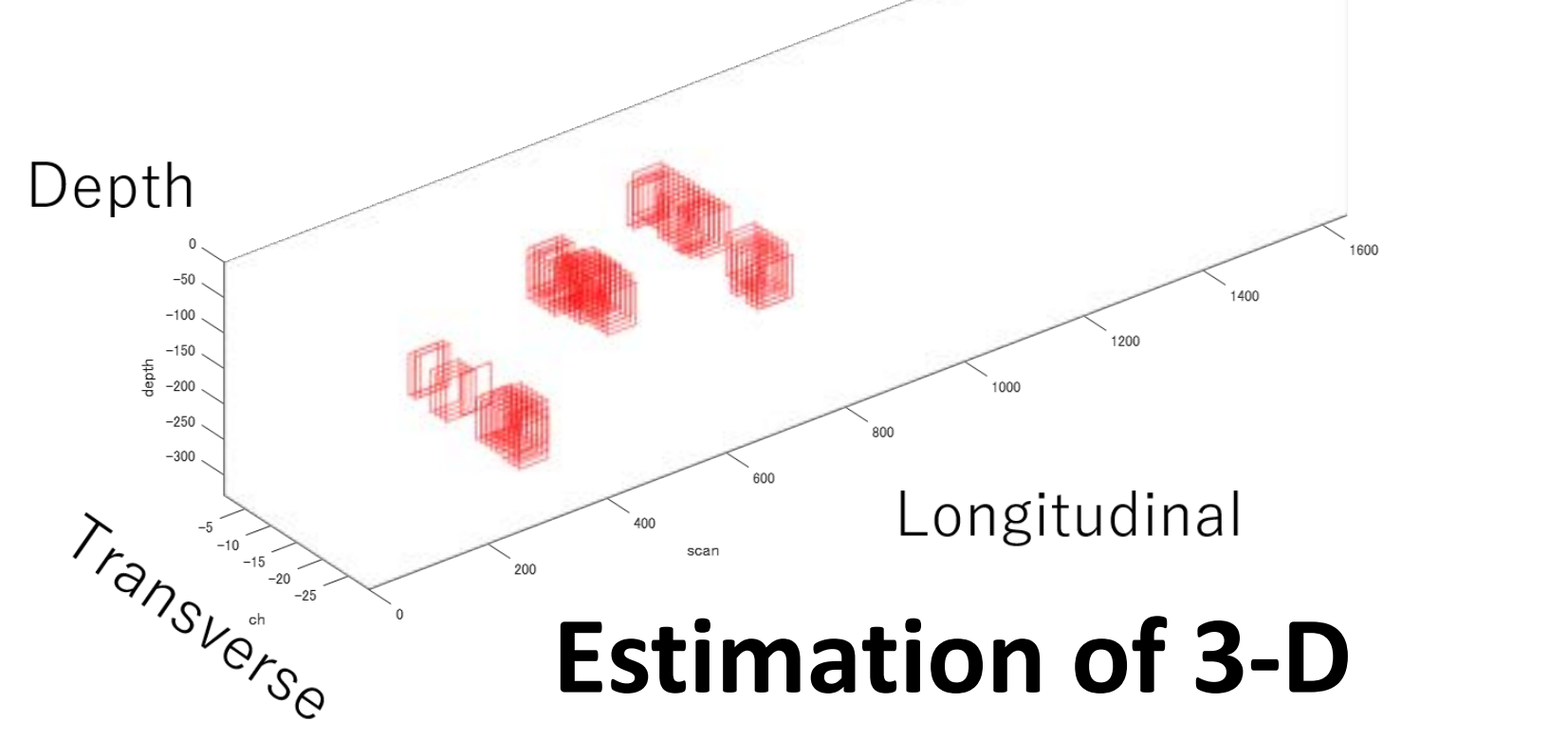**Damage Detection of Bridge by Digital Signal Processing of Radar Data**

Big Data Construction of Road-Surface and Ground Structure Information

（Collaboration with C.E.Management Integrated Laboratory Co.Ltd）

Automatic Big Data Construction of Bridge Condition and Ground Structure Information by Both Digital Signal Processing and AI Analysis of 3-D Ground Penetrating Radar Data

Institute of Industrial Science, The University of Tokyo