

# MIZUTANI LAB.

[Big Data Construction of Infrastructural Quantitative Information]

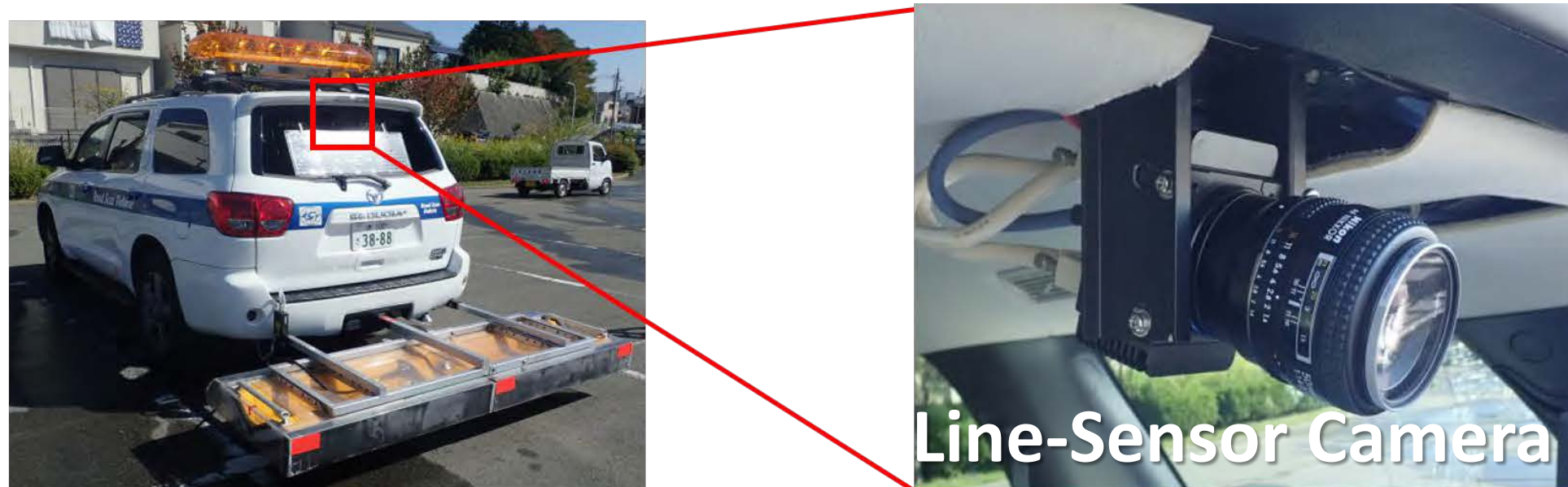
Department of Human and Social Systems

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
- Single Crack
- No Crack

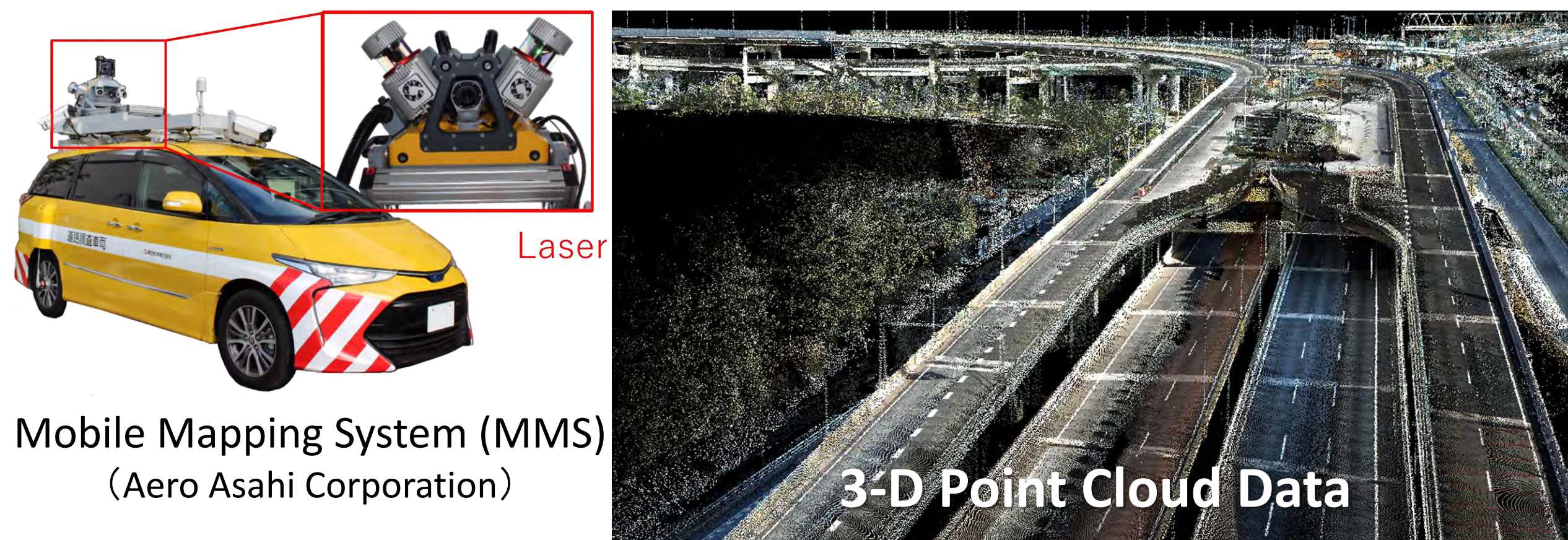
Detection of Manholes and Handholes

- Full Manholes or Handholes
- Partial Manholes or Handholes

Evaluation of Whiteline

- Severely Damaged
- Damaged
- No Damage

**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"**



**Mobile Mapping System (MMS)**  
(Aero Asahi Corporation)

**3-D Point Cloud Data**

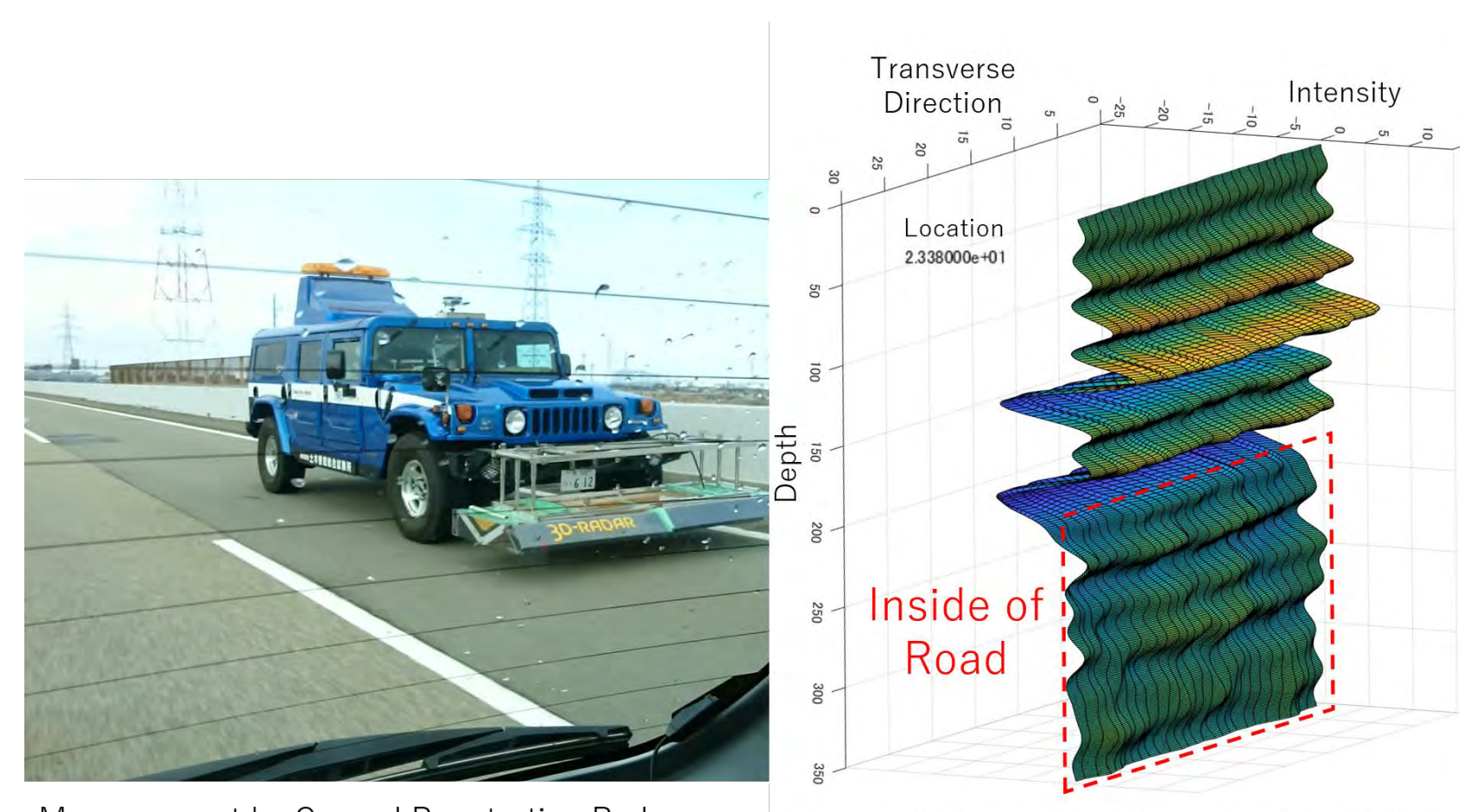
**Focusing on Road Surface Data**

**Space-Spatial Frequency Analysis**

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**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**

**Quantitative Evaluation of Radar Signal Change**

Large Signal Change

Small

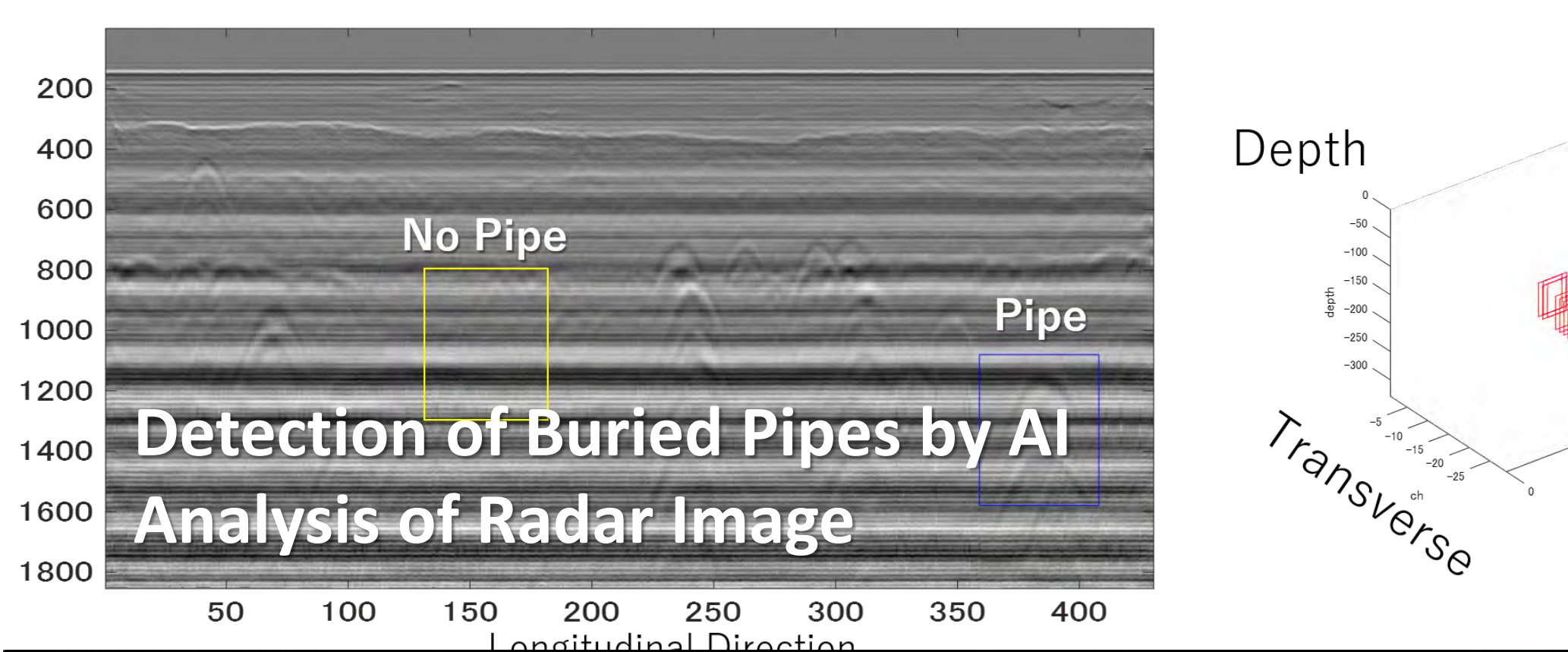
Joint

1st Span

2nd Span

3rd Span

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



**Detection of Buried Pipes by AI Analysis of Radar Image**

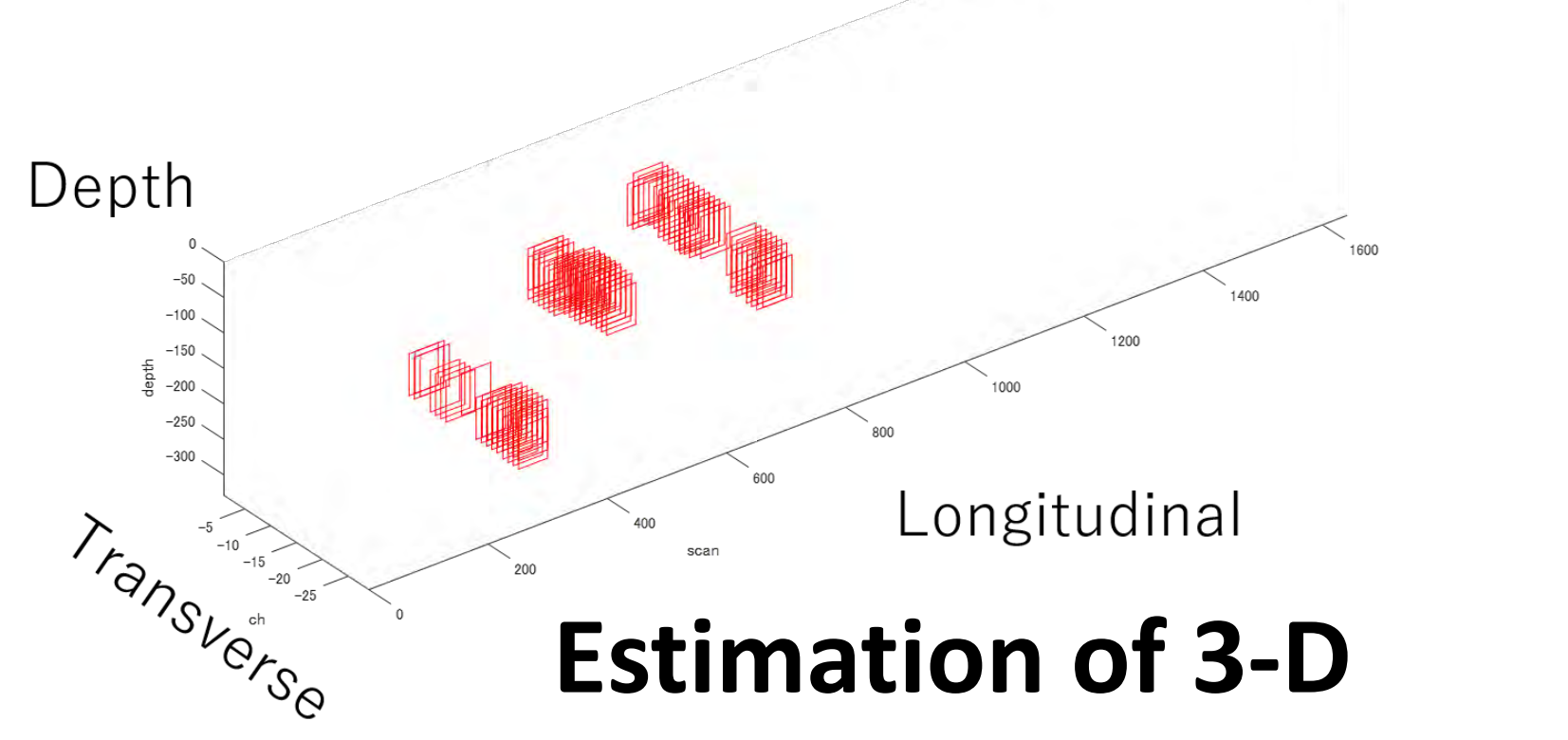
No Pipe

Pipe

**ROAD-S**

Three Dimensional Road Scan Big Data Sharing System for ICC Management

**Big Data Construction of Road-Surface and Ground Structure Information**  
(Collaboration with C.E. Management Integrated Laboratory Co.Ltd.)



**Estimation of 3-D Spatial Information of Buried Pipes**

Depth

Longitudinal

Transverse

**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**

