

MIZUTANI LAB.

[Big Data Construction of Infrastructural Quantitative Information]

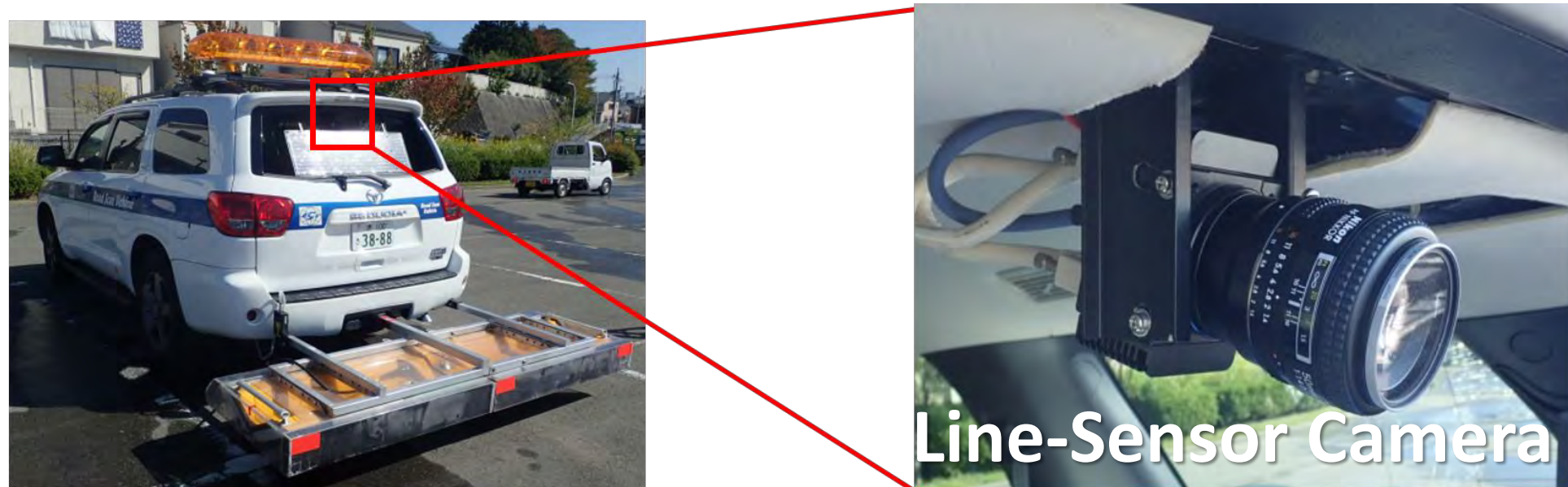
Department of Human and Social Systems

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

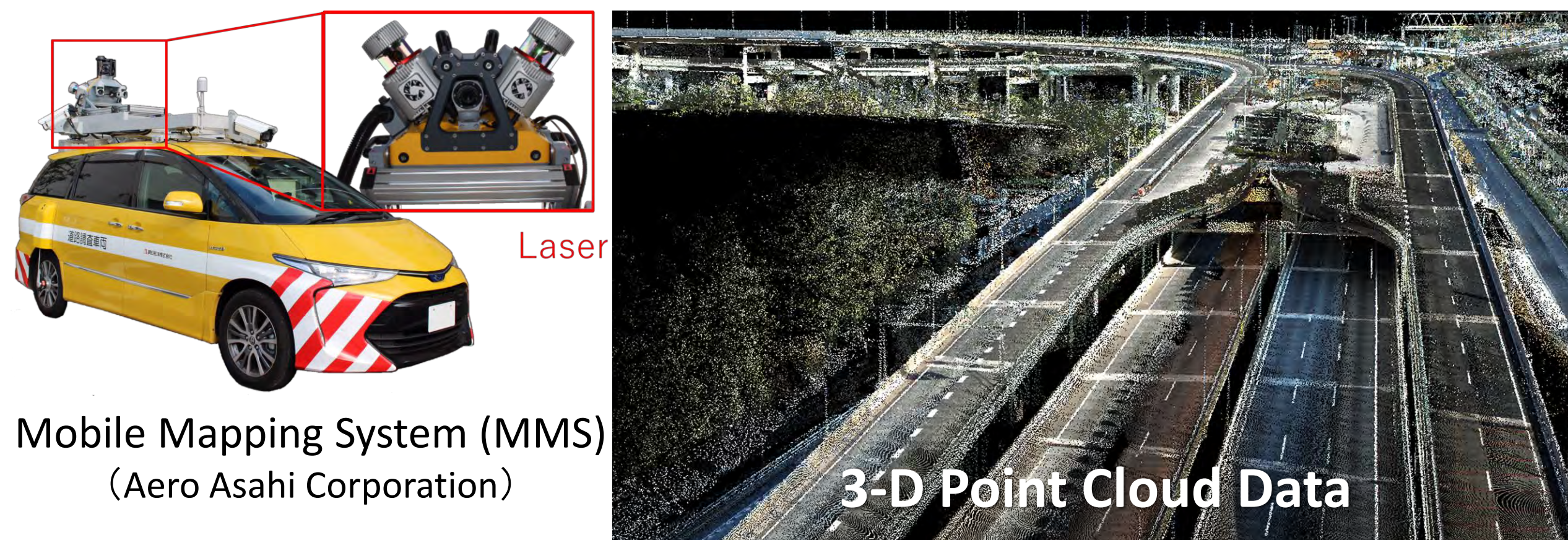
Detection of Manholes and Handholes

- 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)

Laser

3-D Point Cloud Data

Focusing on Road Surface Data

Space-Spatial Frequency Analysis

Ruted Profile (RP)

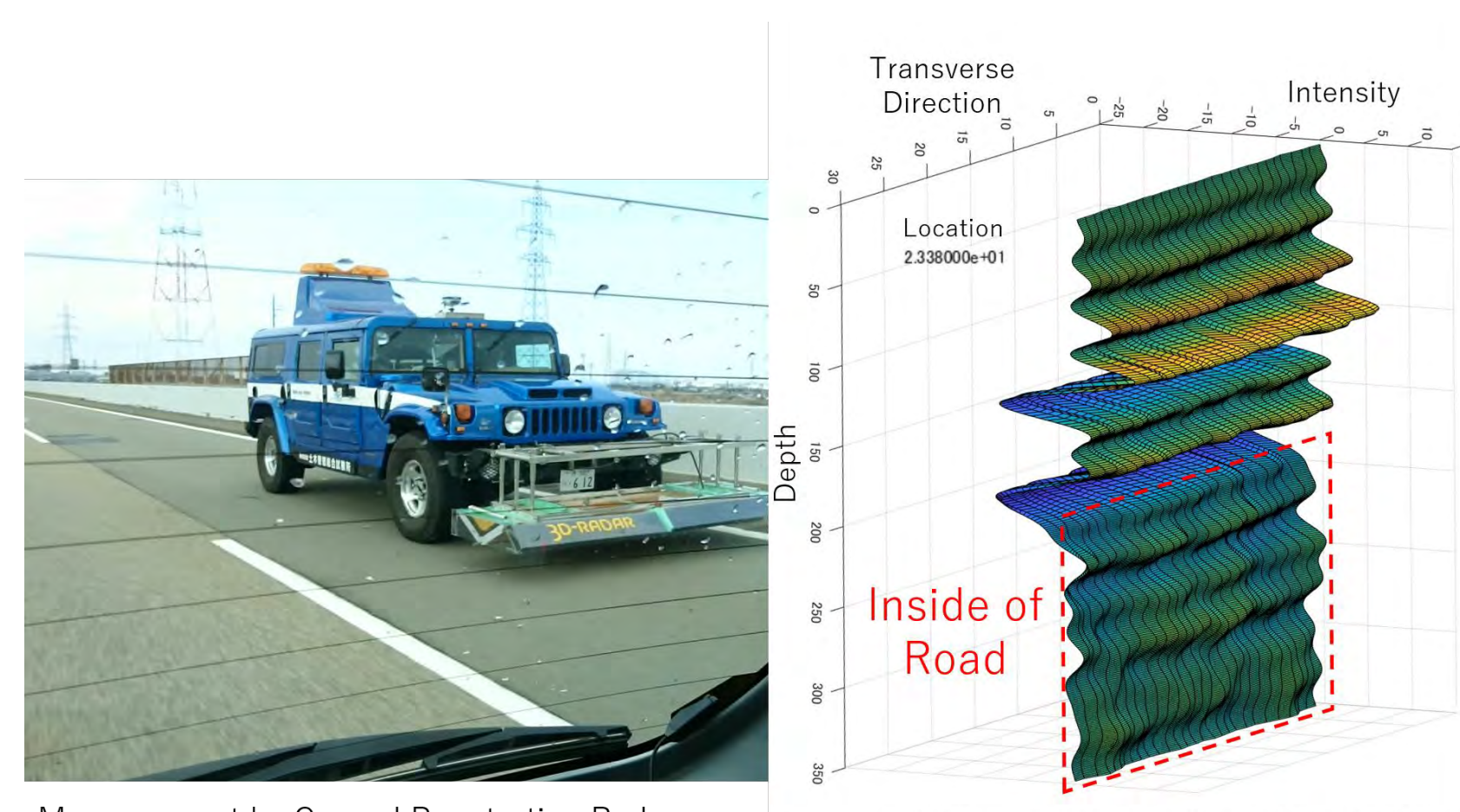
Roughness

Analysis Result by STFT

RP, PR and IRI

Detection of "Pot-Holes" Ruted 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

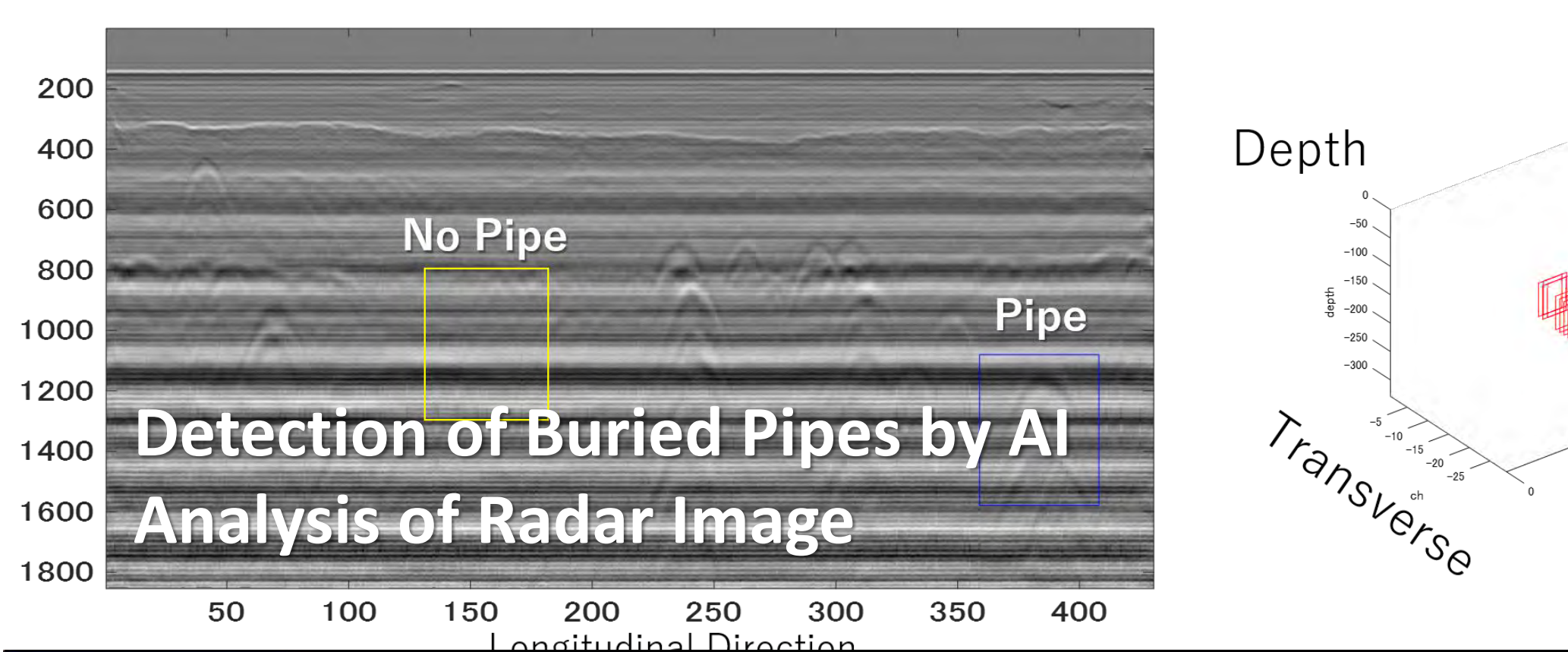
Joint

1st Span

2nd Span

3rd Span

Damage Detection of Bridge by Digital Signal Processing of Radar Data

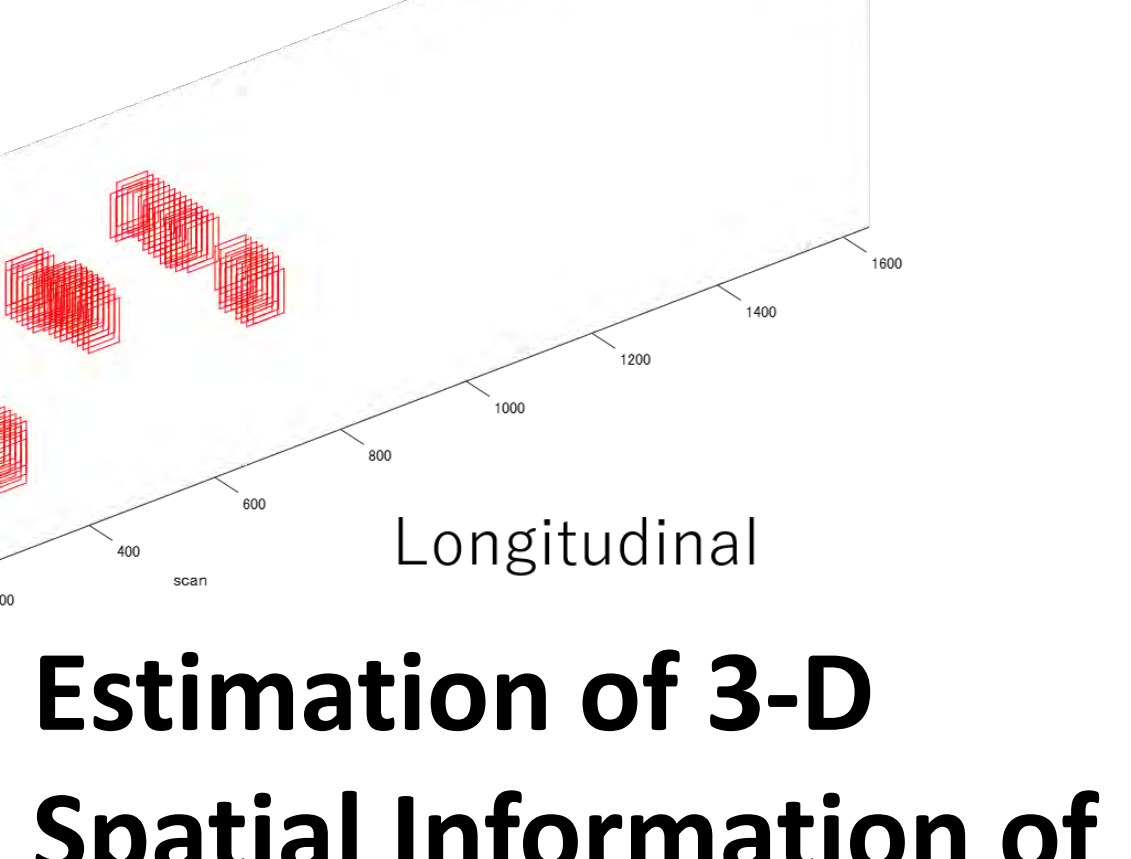


Detection of Buried Pipes by AI Analysis of Radar Image

No Pipe

Pipe

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