

Tunnel inspection with Mobile Measurement System **MIMM-R**

Measurement for tunnel images and evaluation of damage level

--- Shot images of tunnel lining surface, then grasping damages.

Tunnel laser measurement and deformation mode analysis

---Measurement of sectional shape and difference in level, estimation of damage reason with deformation mode.

Tunnel radar measurement and evaluation of Thickness, cavity of behind the lining and internal defects

---Noncontact electromagnetic wave radar evaluates thickness of lining, cavity of behind lining and internal defects.
(ex. flotation, honeycomb and so on)

High-precision topographical survey

---High-precision topographical survey of road surface, facilities and structures by using high-precision laser, and applying to slope prevention.

Noncontact cavity survey radar

Thickness of lining and **Cavity** of behind the lining

Noncontact internal defects radar

Floating and **Honeycomb** on lining

Max operation speed for inspection

Inspection data can be obtained with running **70km/h speed**.

MMS SICK Laser

3D topographical survey

High precision Laser

3D Tunnel survey
1Million points / sec

Full HD 2M Pix Video Camera

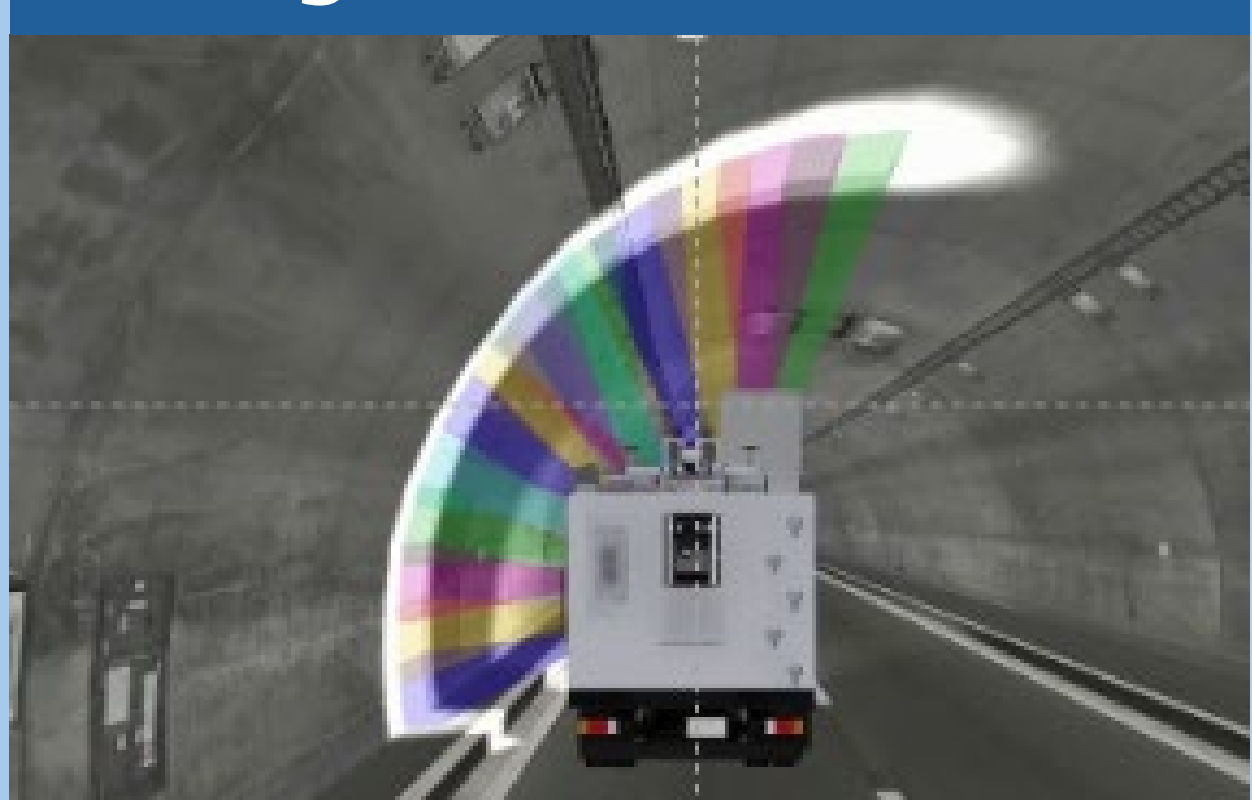
20nos Cameras, Continuous shooting for **cracks** and **damages** of lining



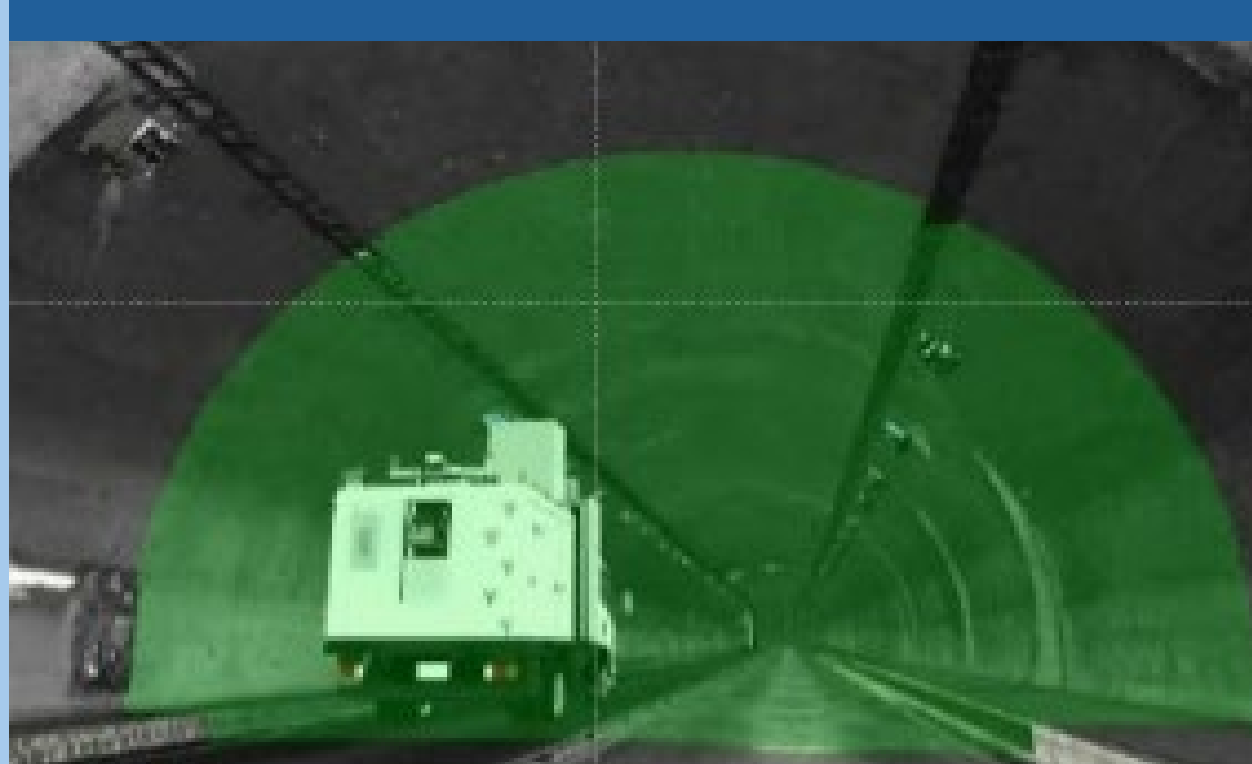
MIMM - R

Mobile Measurement

Image measurement



Laser measurement



Radar measurement



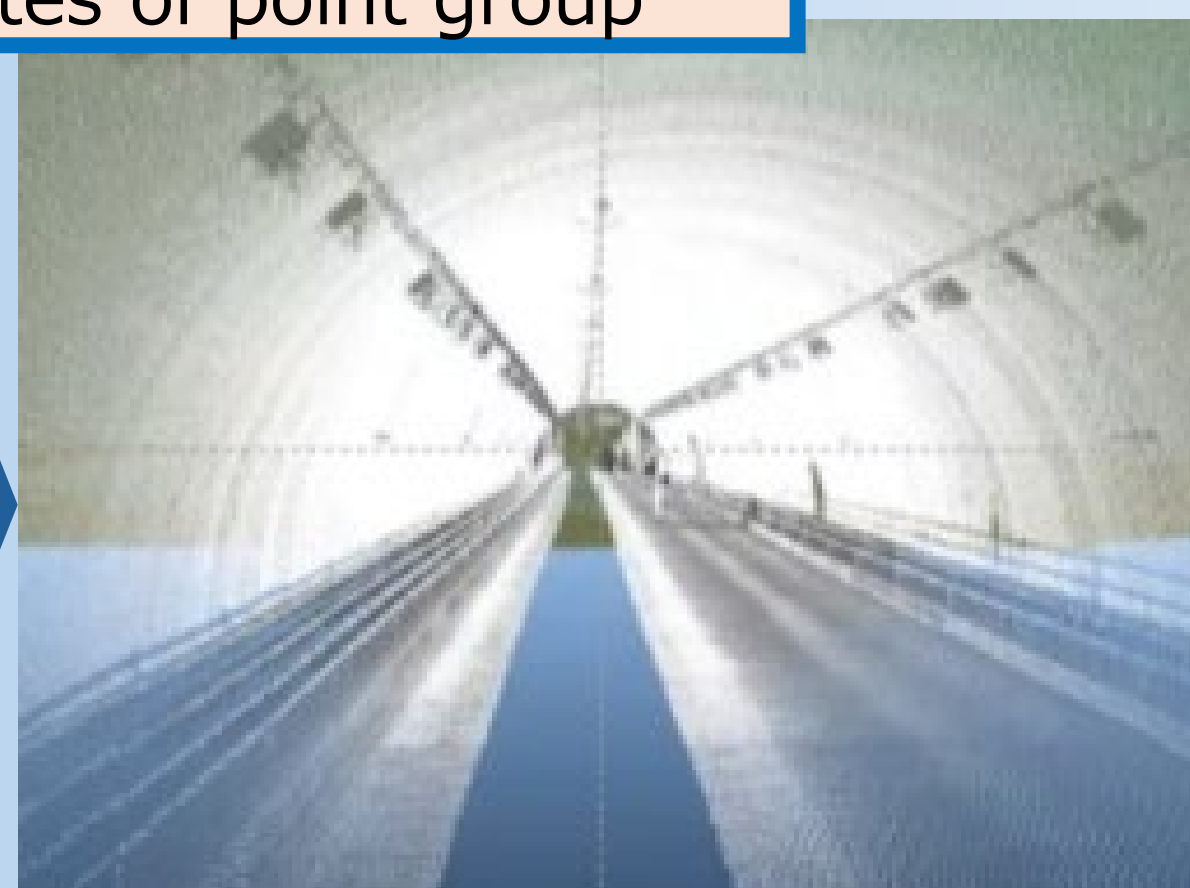
Measurement Analysis result



Synthesize image + Damage image

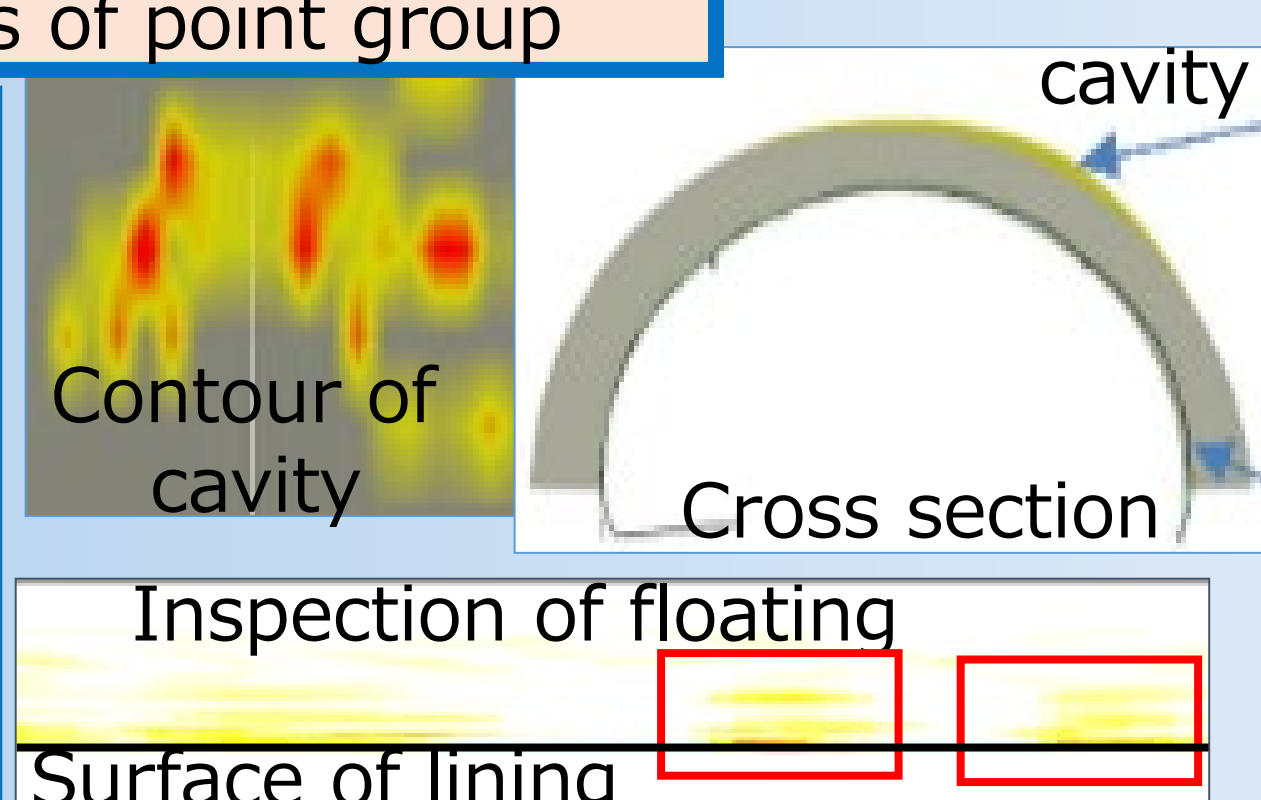
Synchronize the position with coordinates of point group

Laser point group



Synchronize the position with coordinates of point group

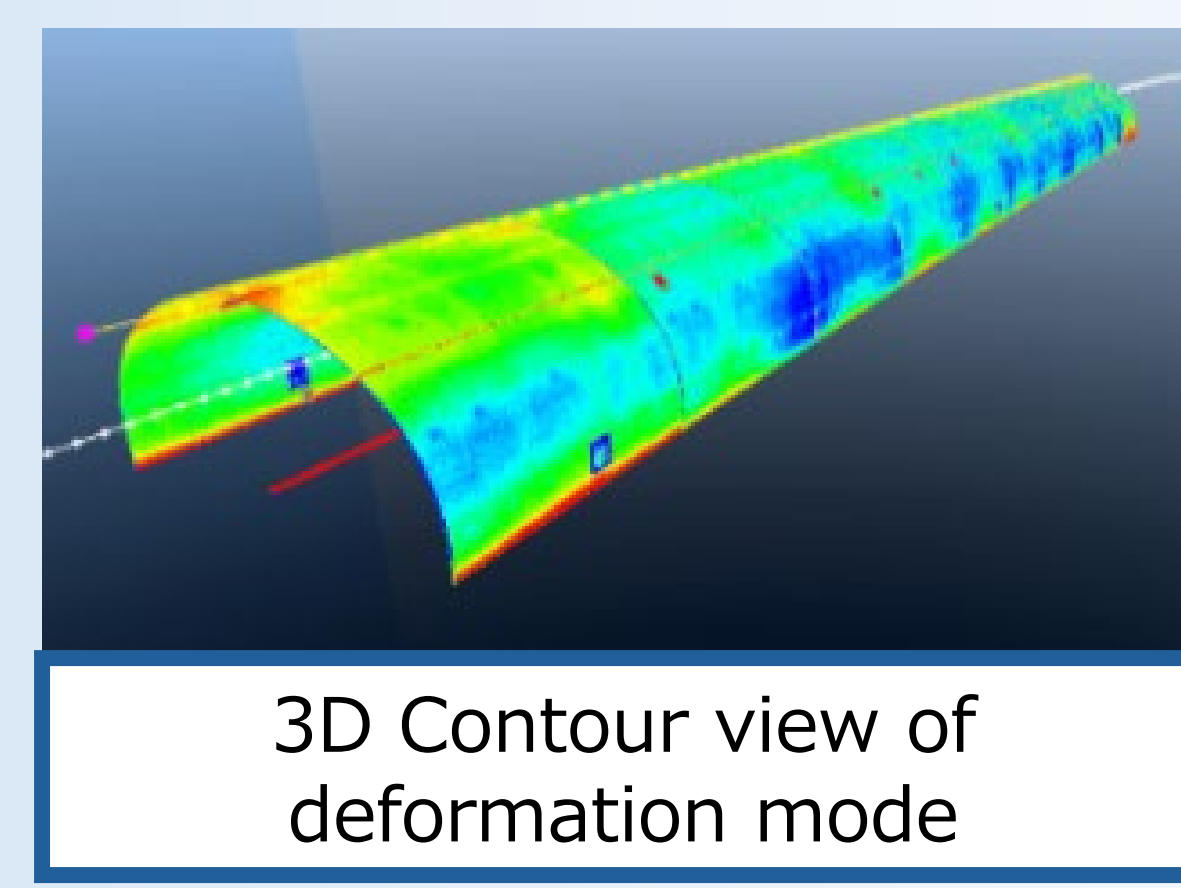
Cross section contour fig. of thickness and cavity



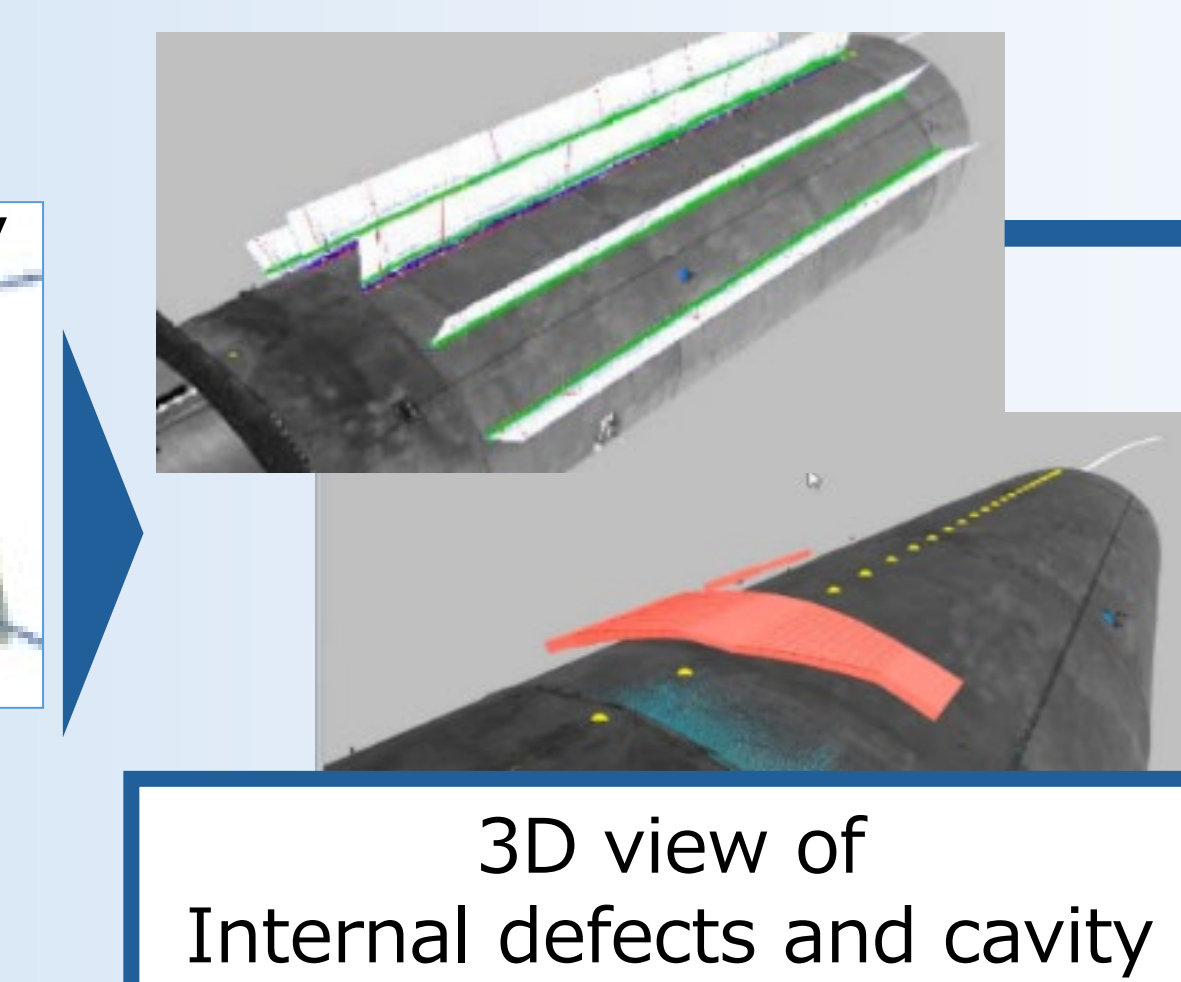
Visualization with 3D



Combined 3D View, Lining image and Damage Fig.



3D Contour view of deformation mode



3D view of Internal defects and cavity

Database and diagnosis system

Unifying information of damage figures, deformation figure, cavity, internal defects and images, which synchronized with point group that has coordinate info, then visualizing 3D view and changing view mode makes it possible to comprehensive diagnosis of damage size, reason and soundness.

Input tool for tunnel inspection on-site system



Utilizing the elevation images in a result of visual inspection and photo shall be input at on-site. Then it will be synthesized by multi devices and reflect to elevation image DB

