

TEKKEN TUNNEL

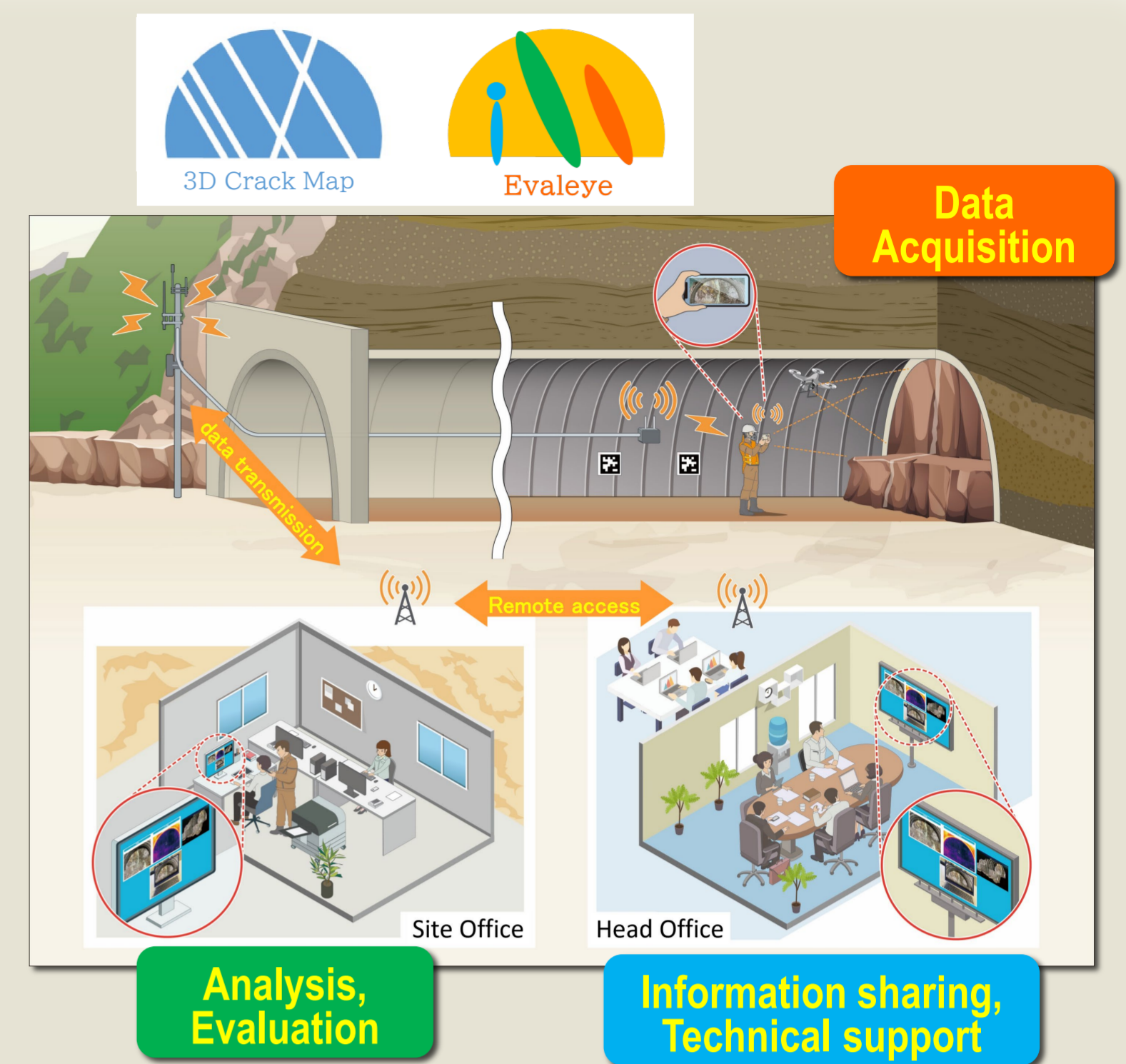
Advanced Tunnel Construction Technologies

Tunnel Geotechnical DX "Remote Geo"

This technology integrates the **Tunnel Face "3D Crack Map"**, a system for analyzing crack conditions on the tunnel face using point cloud data, with the **Tunnel Face Evaluation AI System "Evaleye"**, which performs AI-based tunnel face evaluation.

By combining these systems, geological information such as **crack strike and dip, crack spacing, potential rockfall or spalling hazard zones, geological features, and water inflow conditions** can be visualized and shared in an integrated manner.

- ❑ Engineers can easily perform data analysis and evaluation, significantly improving operational efficiency.
- ❑ The system enables information sharing with geological specialists, allowing effective remote technical support.



Operational Concept of "Remote Geo"

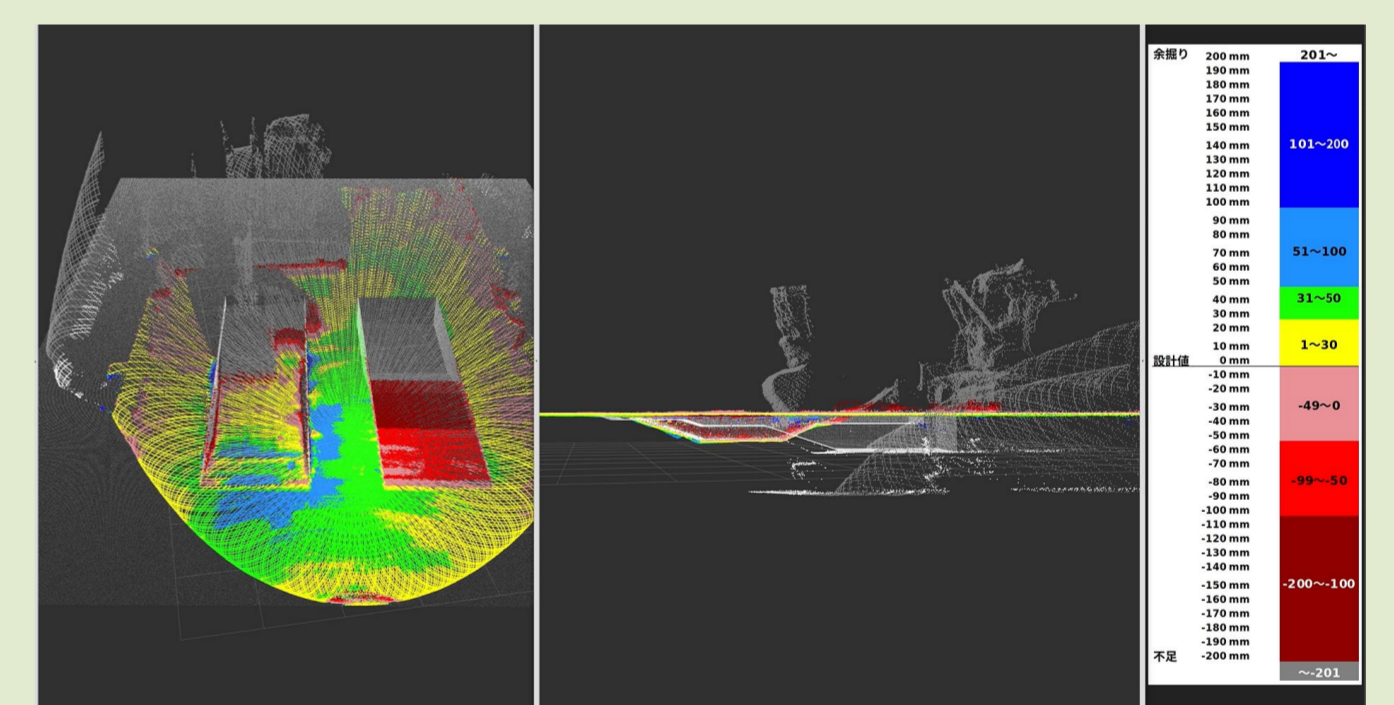
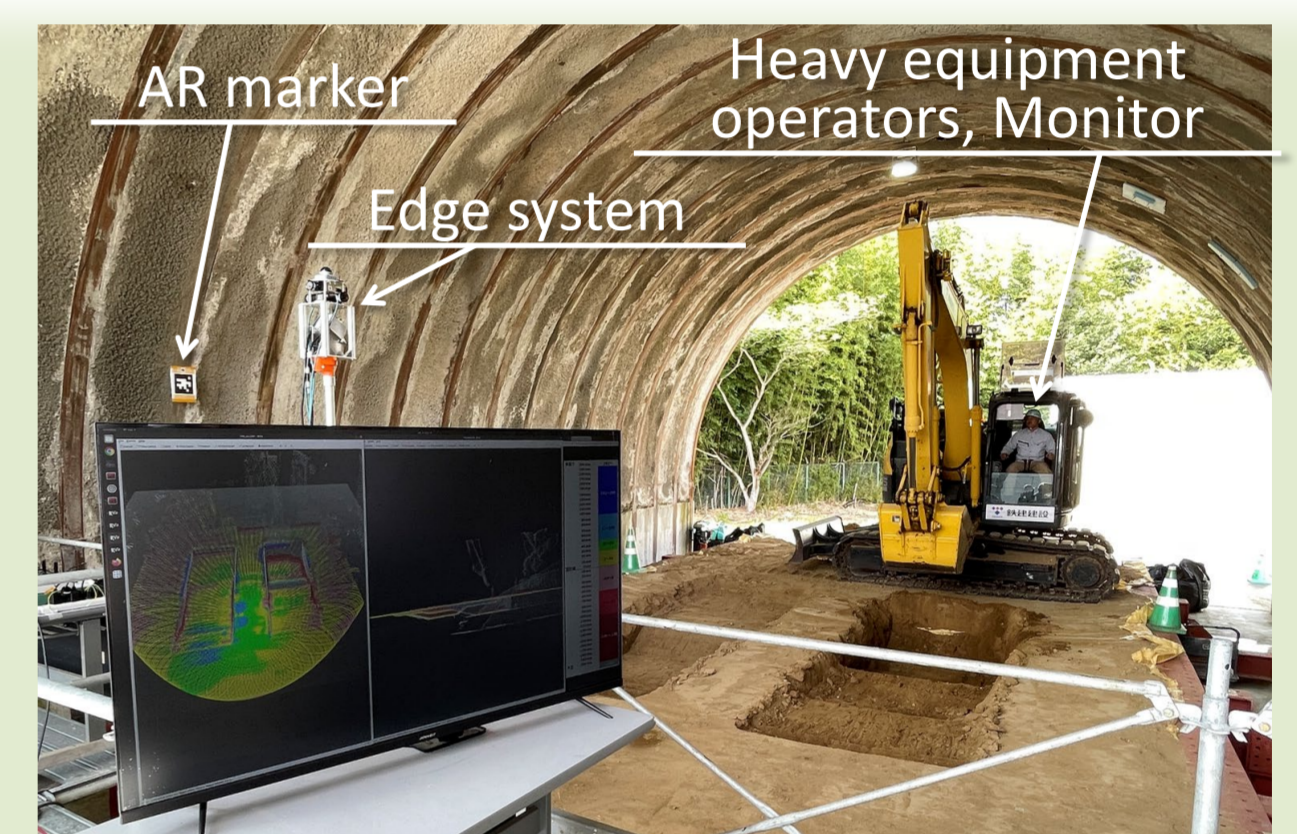
Construction Guidance System for GNSS-Denied Environments

This system enables accurate real-time as-built control of tunnel excavation base surfaces prior to invert construction in GNSS-denied environments such as tunnels and underground construction sites.

An integrated **edge system** combining a **Camera** and **3D LiDAR** detects multiple **AR markers** to estimate its position without GNSS signals.

By comparing LiDAR point cloud data with the design model at the tunnel construction site, heavy equipment operators can accurately understand excavation conditions in real time.

This technology reduces the manpower required for surveying and construction management around heavy equipment, contributing to labor savings, improved productivity, and enhanced safety in tunnel construction.



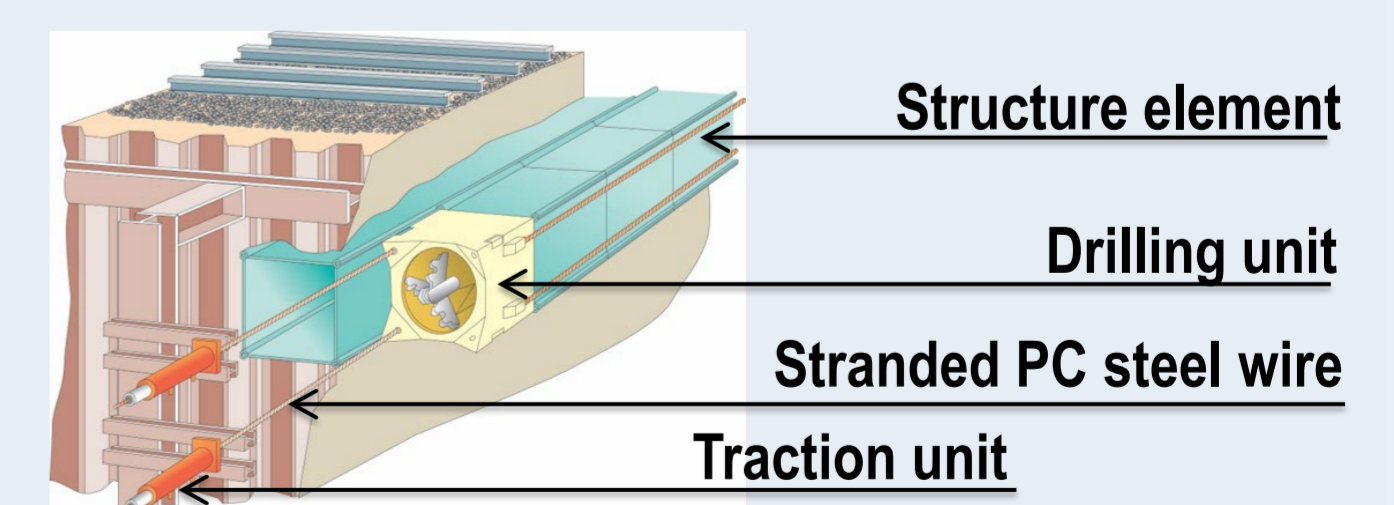
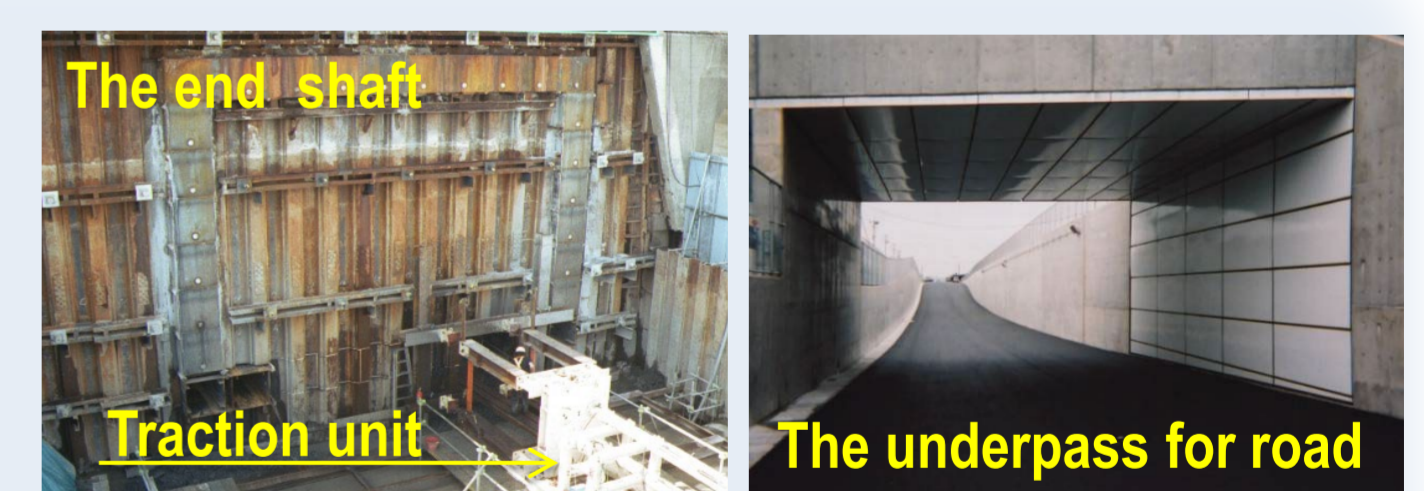
Real-time Heat Map of Excavation

HEP & JES Method

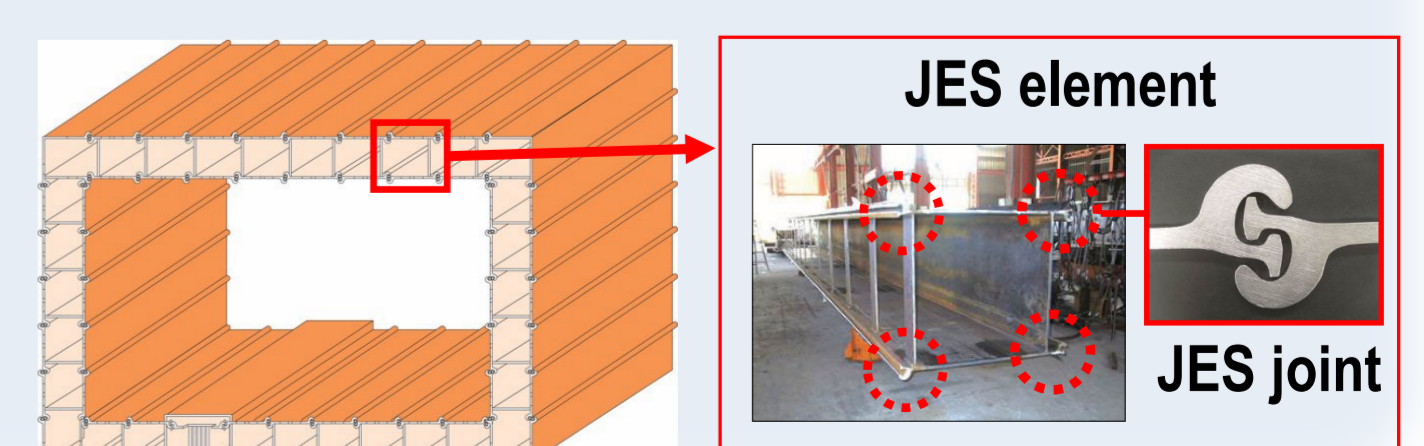
The **HEP & JES**(High speed **E**lement **P**ull method and **J**ointed **E**lement **S**tructure)method is a trenchless grade-separation construction technique that enables the safe, rapid, and highly accurate construction of underpasses(such as for roads, railways, pedestrian walkways and waterways).

The **HEP** method is a method for completing under-crossing construction in a short time. Instead of pushing elements from the start shaft of a tunnel in the conventional method, the traction unit installed on the end shaft of the tunnel pulls the stranded PC steel wire fixed to the drilling the structure element directly connected to the drilling unit.

The **JES** method involves assembling steel elements (JES elements) equipped with joints capable of transmitting forces perpendicular to the axis, to construct box-shaped or circular structures beneath the road surface. By filling the JES elements with concrete, they can be used as part of the main structural body.



HEP Method



JES Method