TODA CORPORATION × Spiral

Equipped with SLAM-Free Autonomous Navigation Technology

# Autonomous Drone Flight System for Tunnels

Navigation Marker

Tunnel | Management / Site Office

Autonomous Drone

Image

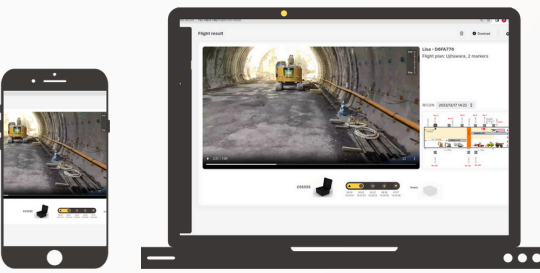Video

Analysis
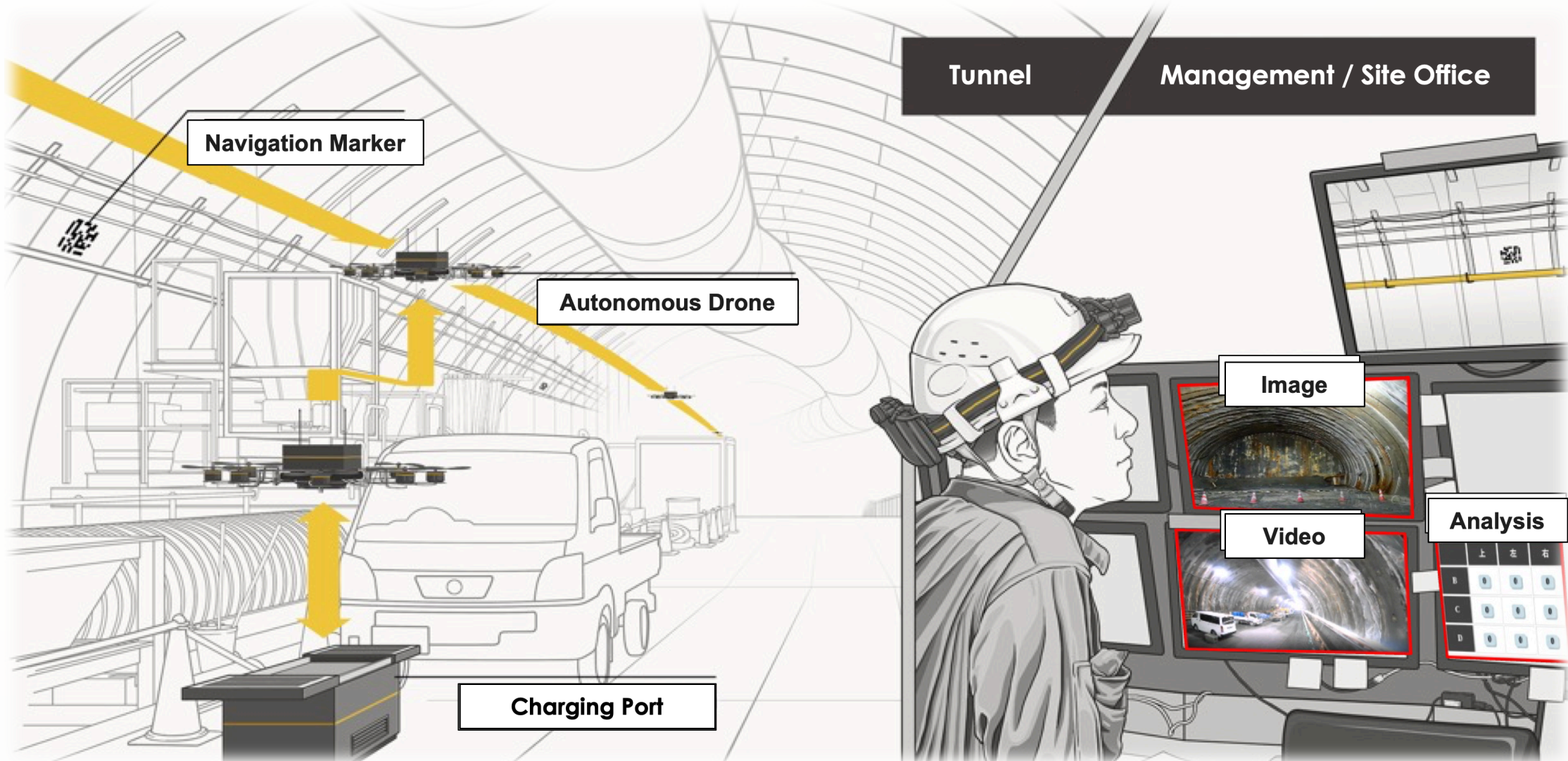
Charging Port

## System Components

### LISA - Autonomous Drone

Marker-guided system without SLAM. Enables safe and stable autonomous flight in confined tunnels.

### D100 - Auto-Charging Port

Maintenance-free dock with waterproof, dustproof, and temperature-control features. Keeps the drone safely stored and ready.

### MFA Tracker - Web App

No programming needed. Enables easy setup of flight paths and access to captured data.

## Development Background

To address labor shortages and improve safety in tunnel construction, we developed a world-first (*1) drone system that enables stable autonomous flight without GNSS or complex setup.
This smart solution drives digital transformation (DX) in the construction industry, enabling safer and more efficient operations.

(*1) Based on in-house research
(*2) GNSS: Global Navigation Satellite System

## 3D Measurement & Mapping

Uses drone-mounted 4K cameras and LiDAR to capture high-resolution 3D data.
Reduces manual labor and survey time, cutting costs.

✓ Safer and more efficient

LinkedIn video link >>>
3D measurement inside a construction tunnel

## Remote Patrol

Streams real-time 4K video from tunnels. Enables remote supervision and efficient site-to-office information sharing.

✓ Reduced work loads = Lower costs

## Excavation Face Reporting

Captures and analyzes tunnel face images during excavation.
AI automatically evaluates the data and generates reports.

✓ Up to 86% time savings ※3

## Other Applications

Supports shield tunnels and other underground sites.
Can be customized for various automation needs.

✓ Customizable Solution

*(3) Tested with the charging port placed 150 meters from the tunnel face at a trial site

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