

## AIGC Solutions – Smart and IoT Devices

### *Case Study: Use of LiDAR camera for underground tunnel inspection*

#### **The Opportunity**



Underground tunnels such as for railways, or flood mitigation, or underground traffic must go through periodic inspection to ensure any cracks resulted from fatigue or creep stresses can be identified early before any worsening propagation. Commonly this is performed manually where humans walk along the tunnels to visually inspect for any cracks. This is very time-consuming and ineffective. Often, large portions of the tunnels have to be ignored due to the human limitation and therefore any potential failure are left undetected.

#### **The Approach**

A mobile wheeled-robot is installed with LiDAR system and pre-programmed to autonomously go through the tunnels to

360-degree scan the tunnel walls. In some cases where the wall is too high for the robot, a caged-drone is installed to fly inside and scan close to the walls to gather detailed accurate 3D points of the structure. The data is then generated to present a very detailed 3D images of the wall structure. Any cracks can easily be detected.

#### **The Benefits**

- Complete and accurate representation of structures are captured
- Much reduced time to perform to gather data and to create detailed image results
- Highly effective and wide coverage of the structures can be inspected
- Remove humans from hazards within the structures
- Early identification of structure-failures can be achieved
- Early repairs and maintenance can be planned and implemented and eventually avoid potential catastrophe.