

## IoT type manhole sensor × AI utilization

Supports inspection and survey DX using various sensors in sewage pipes

### SkyManhole®

This system provides real-time monitoring of water level, water temperature, hydrogen sulfide concentration, etc. in sewage pipes at low cost and in a wide range.

In addition to information gathered through various sensors, we will promote the sophistication of monitoring functions for pipeline facilities through cooperation with our cloud systems (SkyScraper®: rainfall information, pipe information, AI analysis functions, etc.)



#### Low power consumption and long-time operation

On the use of cellular LPWA and communication control according to the level of water in the pipes  
Lower power consumption enables longer battery life.  
Additionally, by adding an externally connectable power BOX (optional), the operating hours can be approximately doubled.



#### Wide-ranging water level information gathering

The areas where LTE-M are available are comparable to traditional LTE(4G) and to a wide range of areas where LTE servicing is provided  
Water level information can be collected.



#### Low-cost, short-term introduction

Because the power supply construction is not required and it is directly connected to LTE base station from the man-holes that are installed, there is no need to install a parent station, and it is low-cost.  
Short-term introduction is possible.



#### Monitoring possible with cloud system

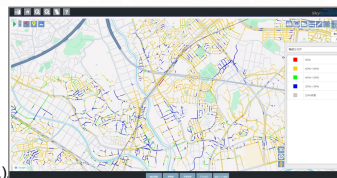
Information collected by various sensors is accumulated on the cloud system and displayed in real time. Alerts can be notified by setting a threshold value.

#### Support for Sewerage Issue Solutions Utilizing AI

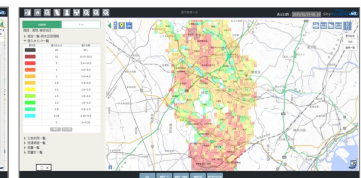
AI is learned based on the accumulated data. The optimum AI model is generated. By linking AI and GIS generated from various data-related issues, We provide support for the resolution of various issues facing sewerage projects.

●**Forecast of Deterioration of Pipeline Facilities and Forecast of Falling Risks**  
Degradation diagnosis models generated by learning sewerage infrastructure data, map and topographic data, etc. are used to forecast the deterioration (urgency) of pipelines. At the same time, it is possible to forecast the risk of falling by learning the data of key sites and major roads. By showing the colors in GIS according to rank, we support effective planning.

●**Narrowing down areas where infiltration water occurs in rainy weather**  
Using a rainwater intrusion analysis model generated by learning the data of sewerage infrastructure and past measured data (water level, amount of rainfall, etc.), the location of the intrusion water in rainy weather is narrowed down. Indicate the location of the intrusion water by color on GIS for each rate of the intrusion water.



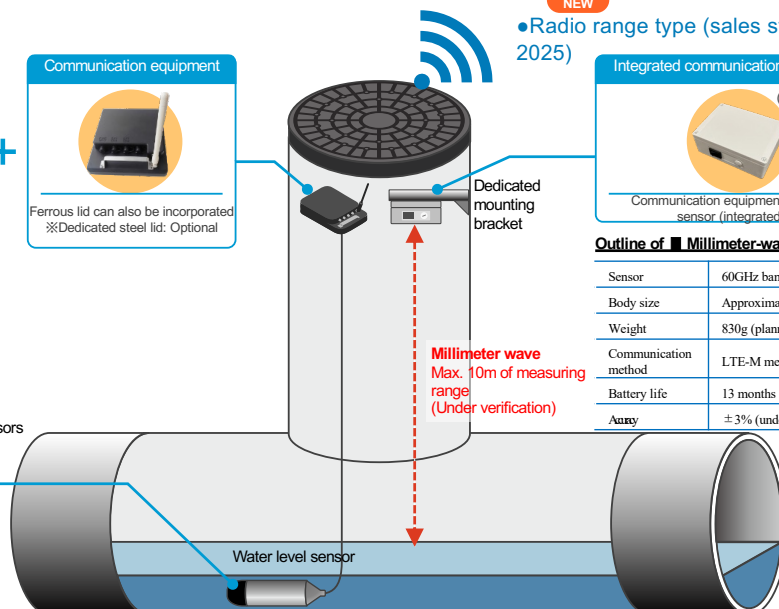
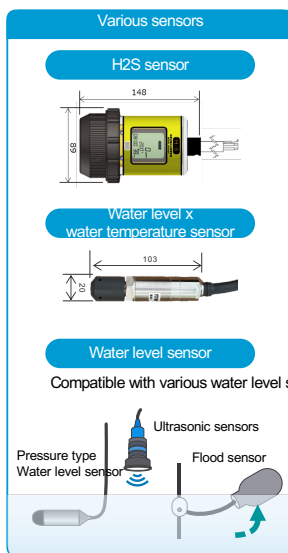
Utilization for prediction of risks of falling pipe and dock



Utilization for narrowing down water in rainy weather

### SkyManhole® Various sensors

#### ●Sensor connection type



#### Outline of ■ Millimeter-wave Sensor Node Prototype

Sensor	60GHz band millimeter-wave ranging
Body size	Approximate 125mm × 175mm × 60mm
Weight	830g (planned)
Communication method	LTE-M method
Battery life	13 months *30-minute cycle communication
Accuracy	± 3% (under verification)