

## Smart Toilet Overview

Benewake LiDAR could provide remaining squatting space and toilet traffic for users and administrators. The management will predict the flow density and make reasonable cleaning arrangement with these data. Relying on sensor based IoT technology, it can provide better, efficient, convenient and comfortable services for toilet users.

LiDAR is a non-contact, based on Time of Flight principle measurement equipment. Single beam of light can be used for point level detection in bins, silos and hoppers filled with grain or other solid materials.

## LiDAR Sensor Advantages

### Customer Benefits



Improve the utilization rate of toilets management. Automatically detect toilets and passenger flow (0-12m), and save labor costs.



Optimize the measurement capability in outdoor, high light, complex reflectivity background. There is no false or missed report.






Small spot with stable detection. Small volume could be integrated easily and flexible.



The power consumption is generally lower than 1W,. It will save energy and power. 20 USD for sample price.

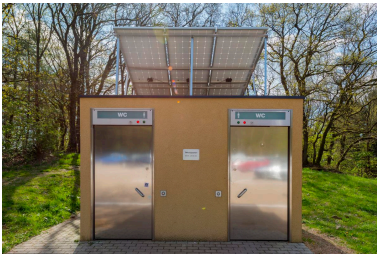
### Performance

Product	 TF-Luna	 TFmini-S	 TFmini Plus
Range	0.3-8m@90%reflectivity	0.1-12m@90%reflectivity	0.1-12m@90%reflectivity
Accuracy	±6cm@(0.2-3m) ±2%@(3-8m)	±6cm@(0.1-6m) ≤1%@(6-12m)	±5cm@(0.1-5m) ±1%@(5-12m)
FoV	2°	2°	3.6°
Interface	UART, I <sup>2</sup> C	UART, I <sup>2</sup> C, I/O	UART, I <sup>2</sup> C, I/O
Power	≤0.35W	≤0.7W	≤0.55W
Frequency	1-125Hz	1-1000Hz	1-1000Hz
Protection	无	无	IP65
Volume	35mm*21.2mm*12.5mm (L*W*H)	42mm*15mm*16mm (L*W*H)	35mm*18.5mm*21mm (L*W*H)



## Case Study

The real-time measurement ability of Benewake LiDAR sensor is remarkable. Its Fov is small, energy is concentrated, accuracy is high and reliability is strong. Compared with the infrared sensor, it can obtain more accurate and stable measurement with flexible installation. The service life is more than 3 years. At present, Benewake LiDAR sensor can be widely used in airport, railway, park scenic spots, high-speed service areas, shopping malls and other places to realize the detection of public toilet traffic flow and squatting space.



### Scenic Spots

Installed LiDAR on top of the toilet door (face down). When one person walks in, the distance changed. Then marked 1 person in.



### Shopping Centers

Installed LiDAR in the shopping center toilet on the top of stool powered by batteries. It can detect squatting space in the real time.

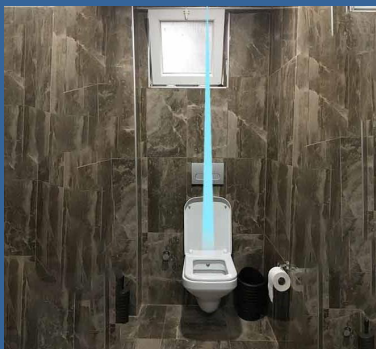


### Airports

LiDAR is installed at the entrance of airport toilet, which can detect the entry of personnel in the real time

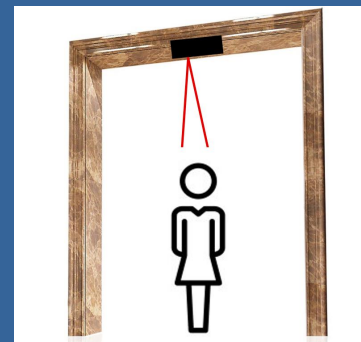
## Installation

### Squatting Detection



LiDAR is installed above the squatting position and measures vertically downward or obliquely. This application mode does not need to have any restrictions on the installation height, children's body shaking back and forth and other special circumstances will not cause the accuracy changes or missing reports.

### Toilet Traffic Detection




Two LiDARs are installed at the entrance and exit, which can not only count the number and height of personnel, but also judge whether the personnel are in or out. In case of personnel entering side by side, you can install 3D LiDAR or multiple single point LiDAR in a row.



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