SiloRadar 3D

3D radar scanner for silo inventory measurement



SiloRadar 3D is a 3D radar scanner mounted on the silo roof. A pan/tilt head moves its narrow-beam 80 GHz radar across the whole product surface; a pass takes 5–20 minutes depending on the program and the device scans continuously, day and night; it writes volume and tonnes to the SiloLens dashboard.

80 GHz	~2°	±175°	5–20 min
FMCW radar	narrow beam	horizontal scan	scan time, programmable

How it measures

1. Narrow-beam radar

The 80 GHz FMCW radar looks at a small spot on the surface with a ~2° beam, so the surface is measured point by point in detail. Dust does not affect the measurement.

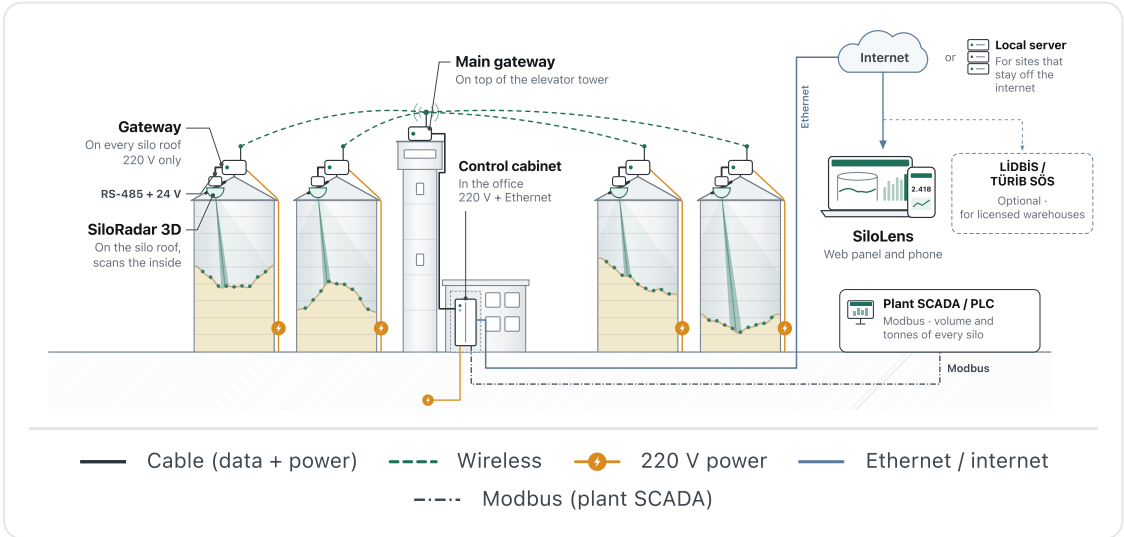
2. Pan/tilt head

The head turns the radar almost a full circle and tilts it outwards from straight down, scanning the surface ring by ring from one side to the other. The scan pattern is programmed for each silo: the fast program completes a pass in ~5 minutes; the standard program takes ~20 minutes and is the one the 2% volume target refers to.

3. Surface model and volume

A 3D model of the surface is built from the measured points; volume is calculated from that surface and converted to tonnes with the product's bulk density.

System architecture



Communication is wireless: no communication cable is run between the silos or from the silos to the office; each silo roof needs only a 220 V supply. The device gets power and communication through a single cable to the gateway on the silo roof.

Technical specifications

MEASUREMENT

Measuring principle	FMCW radar, 3D surface scanning with a pan/tilt head
Frequency	80 GHz
Beam angle	~2°
Measuring range (radar module)	0.4–40 m
Distance accuracy (radar module)	±2 mm
Volume accuracy	Target 2%
Dust	Does not affect the measurement

SCANNING

Horizontal scan (pan)	±175°
Vertical scan (tilt)	±100°
Full scan time	5–20 minutes, programmable: fast program ~5 min, standard program ~20 min. The device scans continuously, 24/7.
Scan pattern	Programmable, set for each silo
Surface model	3D surface of ~1,300 points

MECHANICAL

Dimensions	Ø215 × 366 mm (radome diameter × height, excluding sleeve)
Radome	Radar-transparent polyethylene
Mounting	From above, through a hole cut in the roof sheet; no cable or rope hangs into the silo
Installation	The silo isn't emptied, production keeps running

POWER AND COMMUNICATION

Device supply	24 V DC (from the gateway on the silo roof)
Device – gateway	Single cable: RS-485 + power (on the silo roof)
Gateway supply	220 V AC
Gateway – main gateway	Wireless; no communication cable between the silos or to the office
Main gateway – panel	Cable (main gateway on the elevator tower, panel in the office)
Panel	220 V AC + Ethernet (internet)
Software updates	Remote

SOFTWARE AND INTEGRATION

Dashboard	SiloLens, web (app.silolens.com); iOS app coming soon
Outputs	3D surface, volume (m³), tonnes, filling/discharge movements, device health
Deployment	Internet (cloud) or local server
SCADA / PLC integration	Modbus (from the panel); volume, tonnes and fill level of every silo
Licensed warehouse integration	LİDBİS / TÜRİB SÖS; verified with a real silo in the UAT environment

APPLICATION

Products	Wheat, maize, barley, soybean, sunflower, feed
Storage	Steel silos, flat (horizontal) storage warehouses

Technical values are for information; they may change without notice as part of product development. Volume accuracy refers to the volume calculated from the surface model; converting to tonnes adds uncertainty from bulk density and compaction.