

CASE STUDIES DEVELOPMENT

Application of laser technology in silos

Part 1: General information for the enterprise

[LV Logics](#) is located in Ballyhist, Carnaross, Kells, Co. Meath. The organisation has developed a patented “self-cleaning” laser that is placed inside a silo, that permits users to accurately gauge the level of supplies that are remaining in their silos. Traditionally, if placed inside a silo, due to dust accumulation within the silo, the laser would become dusty, making it impossible to take accurate readings and measurements.

With thanks to the patented technology, [SiloSpi](#) has a self-cleaning function embedded into its design which prevents the laser from being blocked by residue. A fully functioning laser is required for SiloSpi for measuring stock which then allows for preventing shortages, optimising production and reducing waste levels. SiloSpi is currently available within the agricultural sector, to measure dairy, pig and poultry feed and to measure slurry levels. It is also used in industry, including the polymer and plastics sector, cement industry, molasses, and to monitor biomass levels.

Part 2: Smart technologies used

The technology in question, SiloSpi, is a sensor which is placed on top of a silo that uses a time-of-flight laser sensor to determine the distance between itself and the top of the silo contents.



Figure 1: The SiloSpi complete in its housing

The monitoring system calibrates 2 empty / fill cycles to calculate the tonnage of the contents within the silo. Should a farmer wish to gain more accurate levels, they are required to take more calibrations at different levels. This technology is essential for businesses that can't afford to run out of supplies within their silos, such as factories which produce reactive resin systems, or cattle farms.

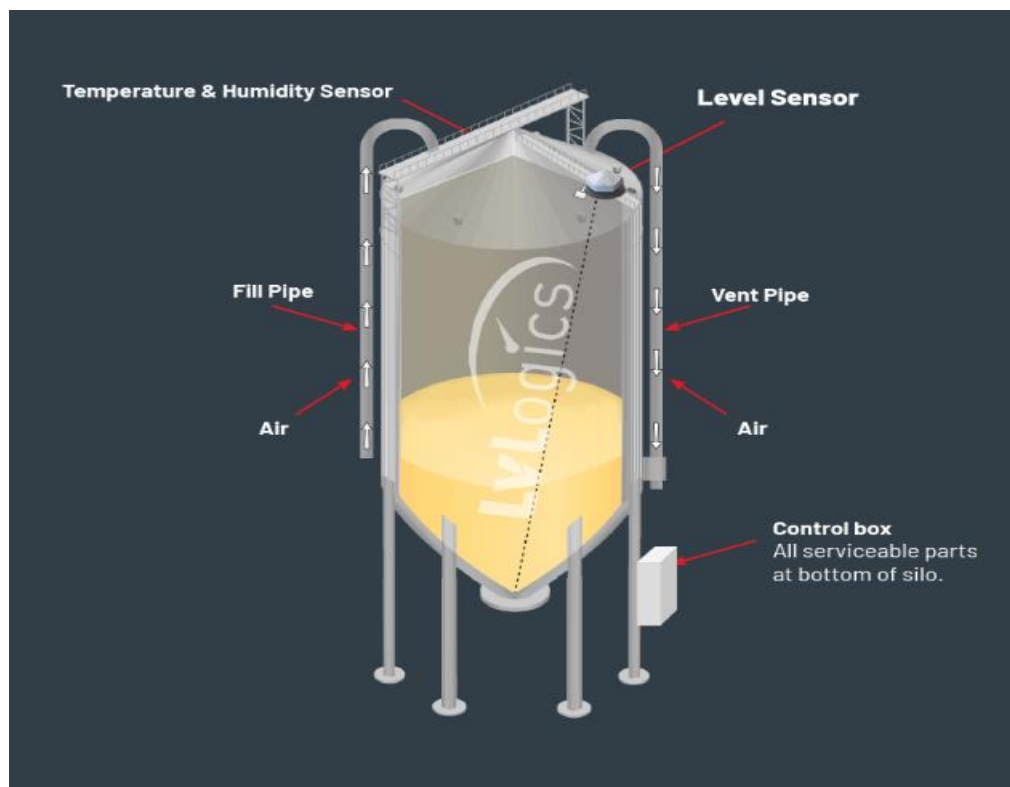


Figure 2: Schematic of SiloSpi operation in a silo

Once the measurements have been taken by the sensor, the data is shared with the user over the sigfox network. Farmers can access the data using a dedicated web application.

SiloSpi

The Unique Low Maintenance Silo Monitor



Figure 3: Steps in data collection by SiloSpi; silo, to sigfox cloud, to web/app

The data is shown in the format of a graph in Figure 4 below, illustrating to the user the current level of feed within the silo. From this data, farmers can easily see stock levels and forecast the frequency of refills based on data collected over time.

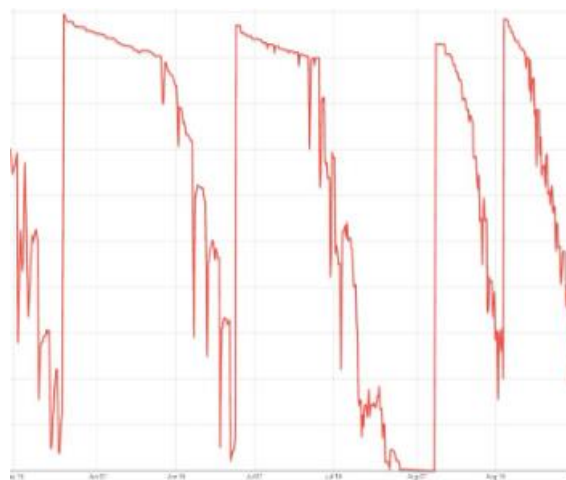


Figure 4:

Part 3: Owners' satisfaction with the use of smart technologies

SiloSpi provides lots of benefits to the user, including efficiency in the delivery of feed, increased safety, stock quality control, cost savings, customer retention and overall peace of mind.

The technology also provides more accurate indications for the user on the remaining quantity of produce that is inside the silo at any given time, through the graphs available on the app, enabling the user to save money by not over purchasing supplies. The technology also permits users to receive a text message when the quantity of product is reaching a critical level.

Improved safety with the operation of silos is also a benefit of using SiloSpi. Traditional silos that are not fitted with this technology are dangerous when trying to accurately measure the content of the silos. As the SiloSpi measures the amount of content in silos, and is fitted with self-cleaning technology, the need for farmers to climb up a silo and open the silo hatch to look at the content is removed. In addition, the silos do not need to be attached to a power source, as the power supply is through solar. However, there is an optional power source which can be added to the device. Overall, this increases safety levels on farms and across businesses that use the product.

LV Logics offer aftersales support to their clients should they require any additional information or clarification on the technology that they have introduced. In Europe, there are more than 1,7m silos but only 0.03% of them are monitored using any form of technology. As a result, the SiloSpi is providing an innovative product that directly addresses a gap in the market as well as safety concerns on farms, bring a plethora of potential benefits to farmers and relevant industry workers.

Part 4: Financing the investment in smart technologies

Investing in the SiloSpi costs €1,400 + 23% VAT. Typically, cash reserves are used to purchase this equipment. If the farmer is VAT registered, they can claim this VAT back.

In Ireland, silos can be purchased with thanks to the [TAMS grant](#). The SiloSpi can either be attached to the silo during its production or after purchase, making it easier and more accessible for the farmer to avail of grants available to them. Unfortunately, there are no direct financial incentives offered to Irish farmers from the Government to buy this piece of technology. However, in purchasing the SiloSpi, costs on the farm would potentially reduce as deliveries of stock could be managed more efficiently and cost-effectively. This would also have a knock-on effect of there being less vehicles on the road resulting in less carbon emissions. There would also be less wastage and spoil of products as accurate data (+/- 3% accurate on silos up to 40m tall) is shared with the farmers.

As the data is transferred on the sigfox network, no cellular fees or WIFI charges need to be paid. There is a subscription fee made payable to the organisation to manage the connectivity to and maintenance of the system. The benefit of the sigfox network is that frequent small packets of data can be shared over a radius of up to 25-kms and is much cheaper than data networks.

Part 5: Future intentions towards smart technologies

Moving forward, LV Logics intends on creating a self-fit SiloSpi. This will primarily remove the cost of installing the SiloSpi and thereby reducing the overall cost to the end user and will make the SiloSpi generally more accessible to purchase and use. As the SiloSpi is patented technology, the product is protected from direct competition. At the moment, it is not intended that there will be new generations of the product. This means that once the farmer purchases the equipment, they will not need to purchase additional add-ons.

Part 6: Some photos



Calibration of the SiloSpi