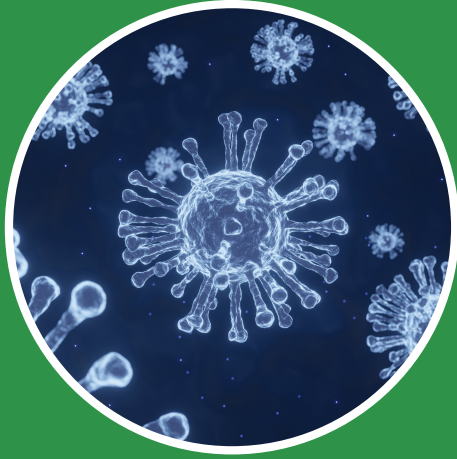




CASE STUDY

INDUSTRIAL SHIELDS®



CONTROL OF COVID-19 VACCINE

Pfizer and Moderna pharmaceutical laboratories have confirmed that they are close to finding the first vaccine against COVID-19. Both companies have been the first to announce the preliminary results of the Phase 3 trials of their respective vaccines. They claim that the new drug is highly effective against a virus that has caused more than 55 million infections and 1.3 million deaths worldwide.

2020 has been a year to record in the history books. The COVID-19 virus, which started as a simple flu, has become one of the most infectious and dangerous pandemics in history. More than 55 million people worldwide have been infected while experts were unable to control the situation.

Recently, two pharmaceutical companies have found the first vaccine using the messenger RNA method, which could be more than 90 % effective. However, these vaccines must be kept under strict conditions in order not to go bad.



More than 55 million infections and 1.3 million deaths worldwide 2020-12-17 | Source: OMS.



CHALLENGE

The messenger RNA, which is very susceptible to degradation, can be implemented in different ways; depending on the concentration of RNA, it must be preserved at one temperature or another. As for the Pfizer vaccine, it should be kept below -80 °C; while the Moderna vaccine can be between 2-8 °C up to 30 days, or up to 6 months if it is below -20 °C.



In order to guarantee that the drug reaches the end customer in perfect condition, it is necessary to ensure the correct distribution of the product by maintaining optimal temperature conditions for its proper preservation.

CASE STUDY

SOLUTION



Thanks to an Industrial Shields® PLC, a system will be implemented to:

- monitor the temperature to which the vaccines are exposed, and
- know if there are any problems to be considered.

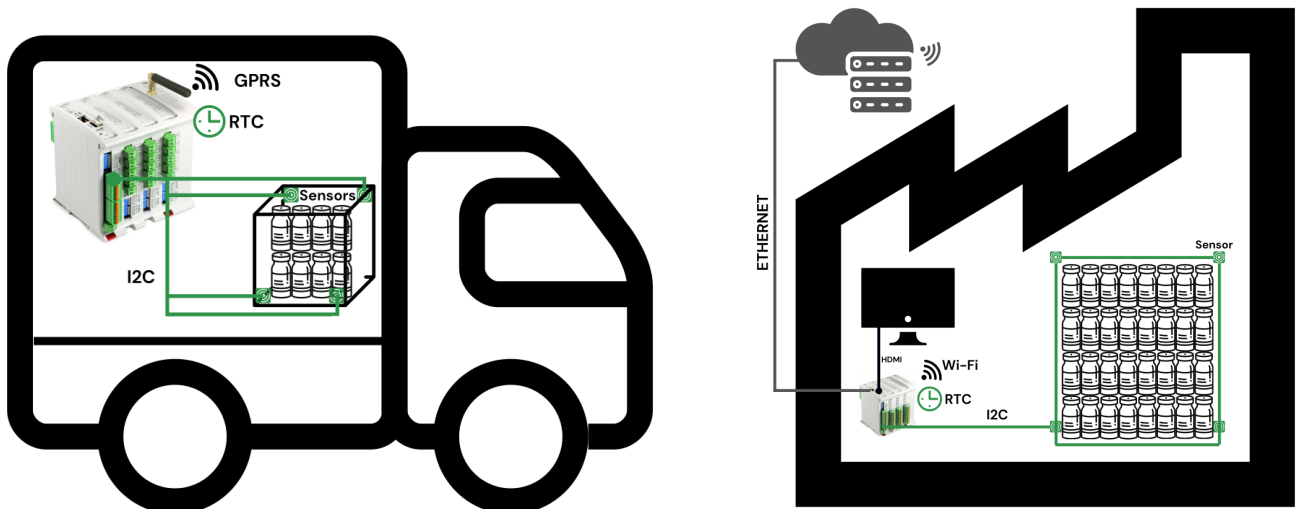
In addition, an extra implementation can be added, such as an alarm, which would be activated in case of any error.

Both vaccines should be stored and transported in extremely cold storage tanks so as not to diminish their effectiveness. Although the Moderna drug can withstand higher temperatures, an ideal temperature below -20°C is still necessary for logistics. The solution is to implement a system that uses temperature sensors, which will constantly monitor the heat to which the vaccines are exposed.

An **Industrial Shields controller** is placed outside the freezing tank, and some **sensors** are inside, communicating the information. The temperature sensors are distributed along the vaccine reservoir for more accurate data reading. The information collected is transmitted at the same time thanks to the cable communication of the I2C PLC. If the heat in the tank exceeds a temperature limit, the **Raspberry PLC** detects the inconsistency and immediately triggers an alarm to warn the supervisors, as it is crucial to act and correct the error in the shortest possible time so as not to spoil any samples. In addition, thanks to the **RTC** (Real Time Clock) it is possible to know how many days have passed since the vaccine has been deposited in the tank, as the product must be used within one month for proper effectiveness.

By working with the Raspberry PLC, the user can have an **internal database** to store all the data collected while connecting to a Wireless or Ethernet network to send it to the cloud. All sensor information can be displayed on a **screen** using an **HDMI** connection.

Using any device of the **GPRS&GSM family**, the information collected by the sensors could be sent to a server while the tank is being transported by trucks or any other logistic system, having a **full time control** of the vaccines.



CASE STUDY

WHY INDUSTRIAL SHIELDS ?



Economic savings

Thanks to the suggested solution, the customer will minimise the economic losses caused by the deterioration of the products.



Guaranteed quality

Temperature control helps the customer to keep the product in optimal conditions.



Saving time and resources

As the product is kept in optimal conditions, it is not necessary to allocate resources to the handling and disposal of products in poor condition.



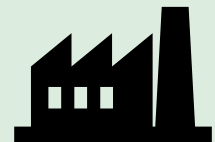
Open solution

No license fee. The great advantage of open source based solutions is that there is no cost in licenses that can be dedicated to other resources.



Modular solution

Expandable in the future if required by the customer.



Industrial design

Equipment designed and manufactured for industrial use at a very competitive price, compared to existing solutions on the market.