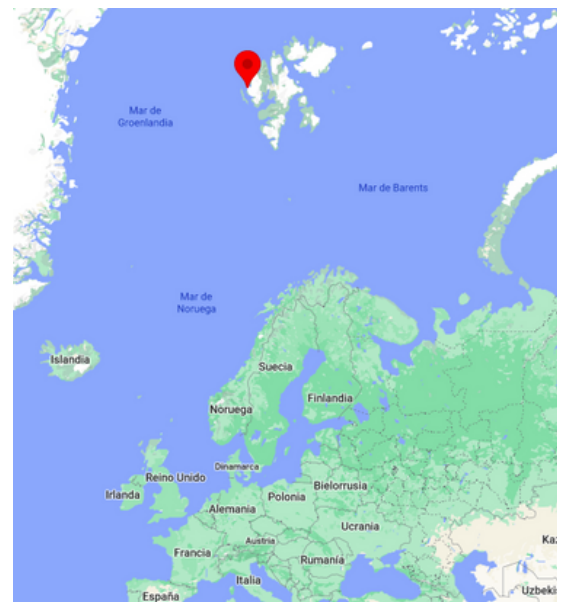# CASE STUDY

MONITORING THE EFFECTS OF CLIMATE CHANGE

The study of polar ecosystems helps to understand alterations in climate change. One of the ways to analyse the environment under controlled conditions is through mesocosms or outdoor **experimental systems**.

In the following Success Story, you will see how our customer installed **12 mesocosms** in the town of New Ålesund —in the island of Svalbard (Norway)— to monitor changes at the North Pole.

CUSTOMER

The rapid disappearance of sea ice is a clear indicator of the global climate crisis. Glacial fronts and sea ice systems are hotspots of biodiversity. Their evaporation will threaten Arctic coastal ecosystem function and ultimately local livelihoods.

The overall objective of **FACE-IT** is to enable adaptive co-management of **social-ecological fjord systems** in the Arctic in the face of rapid changes in the cryosphere and biodiversity.

CHALLENGE

Our customer's goal is to study the effects of global warming, such as:
- increase in water temperature
- decrease in salinity
- turbidity

CASE STUDY

SOLUTION

FACE-IT was looking for a PLC solution easy to program and integrate with sensors. In order to manage and implement a monitoring system, Industrial Shields proposed the installation of several **M-Duino42+ PLCs**.

IMPLEMENTATION

The implemented solution consists of locating 12 mesocosms:
- 3 of them will be control mesocosms
- the experiment will be applied in the remaining 9 mesocosms

Each mesocosm has its own 3-way temperature control valve and 2-way fresh water control valve, connected to the analogue signal in the PLCs.

Multiple **sensors** connected to an **RS-485** bus are used to measure multiple parameters such as salinity, turbidity and temperature.

Each PLC is responsible for the regulation of 3 mesocosms. The master PLC is responsible for data logging, via a **μSD card** and communication with a control computer.

The connection between the PLCs and the computer is made through **RJ45** ports, via **websocket** protocol.

Finally, a C# programming language interface is developed on the computer to **monitor** and **control** the experiment.
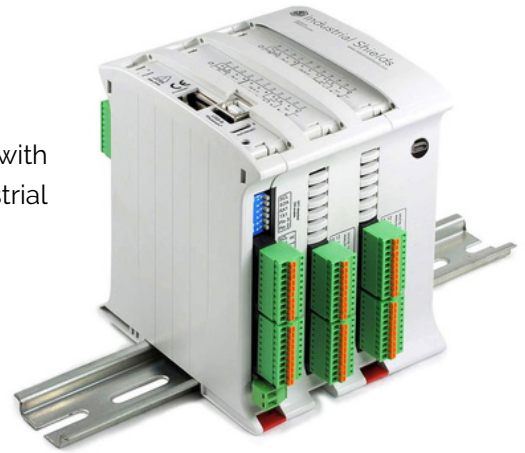
WHY INDUSTRIAL SHIELDS?

Industrial Shields won the project and beat its main competitors thanks to two main factors:

FREE   **Free cost** of the programming platform

    Flexibility of programming