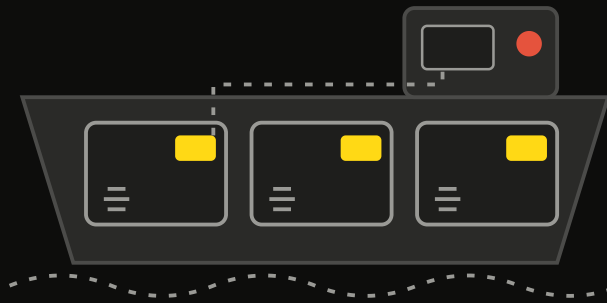


FISHING FLEET · ARDUINO PLC

Fresh fish, from the fishing grounds to port. **PLCs watch every hold.**

Temperature, humidity and air quality, alarms for the whole crew.

[Read the interactive case study online ›](#)



three holds, one control room

Schematic illustration, not the real vessel

3

critical parameters per hold: temperature, humidity and air quality

3

kinds of notification: warnings, reports and alarms

1

Modbus network between the PLCs, the screens and the warning devices

3

ways to alert: lights and alarms in the control room, crew messages and wireless devices

THE CHALLENGE

Keep the hold right for fresh fish, at sea.

The fish travels at a controlled temperature to keep its quality and freshness. The company wanted to know at every moment that the holds were in the right conditions, and to act before a deviation could damage the catch.

01

Measure the hold

Temperature, humidity and air quality are the critical parameters. Each one must stay close to its reference value.

02

Catch deviations early

Any deviation from the reference values must be detected, so the crew can take preventive measures before the fish suffers.

03

One view for the control room

The values of every hold, and every active alarm, must be visible in real time on the screens of the control room.

04

Reach the people on board

An alarm must reach the crew where they are, not only the control room: warning lights, messages and wireless devices.



Connected to the cold

The PLCs are connected to the refrigeration and air conditioning systems of the holds, so the monitoring sits next to the machines that keep the fish cold.

HOW IT WORKS

Three loops: measure the hold, share the data, alert the crew.

Loop 1 · Measure the hold

Three values, three reference bands, three kinds of notice.

Sensors in the hold send temperature, humidity and air quality to the PLC on analog or digital inputs. The PLC compares each value with its reference. In this example, a small deviation gives a warning, a lasting one an alarm, and the PLC also sends reports.

- Sensors on analog or digital inputs of the PLC
- Each value compared with its reference
- Warnings, reports and alarms

Loop 2 · Share the data

Modbus brings every hold to the control room.

The PLCs and the other devices on board share their data over Modbus. The screens in the control room ask each PLC for its values and show them in real time, with the active alarms. If a PLC stops answering, that is an alarm too. Cut the link to one hold.

- Modbus between the PLCs, the screens and the warning devices
- Real-time values and alarms on the control room screens
- A silent PLC is detected, not ignored

Loop 3 · Alert the crew

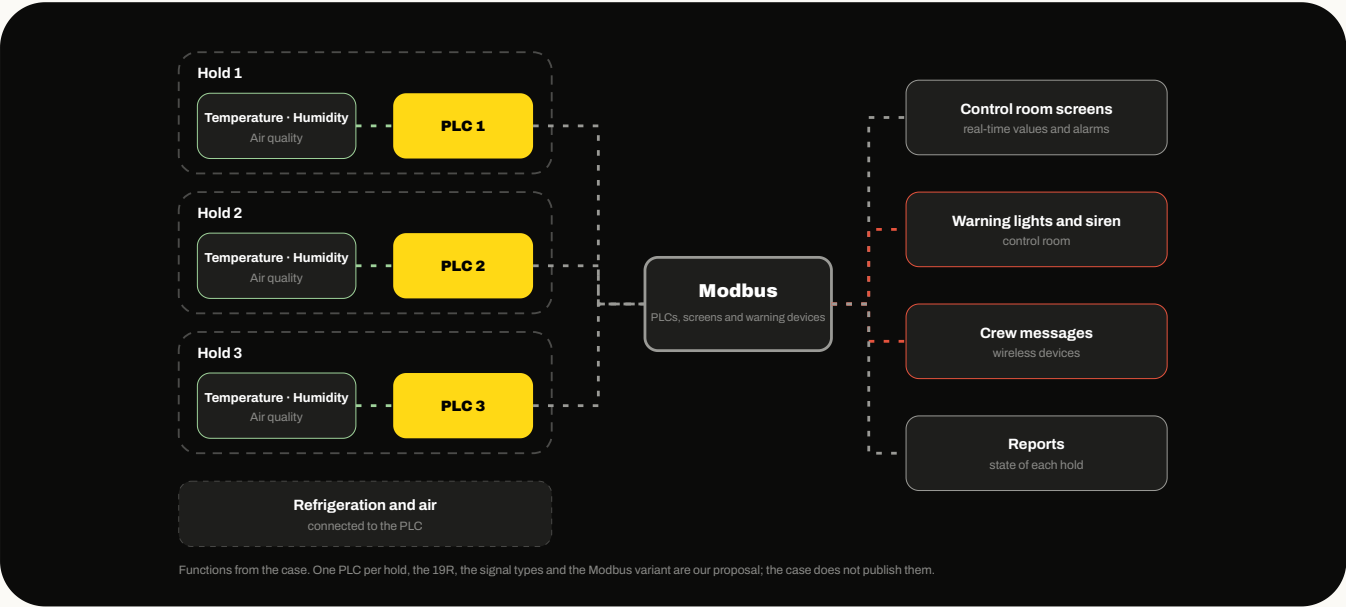
Lights, sirens and messages until someone answers.

When a value leaves its reference, the control room gets warning lights and alarms, and a message goes to different crew members. If necessary, the alert goes to more crew members through wireless devices. Raise a deviation and see who hears it.

- Warning lights and alarms in the control room
- Messages to different crew users
- Wireless alerts to more crew members if necessary

How do you monitor the holds of a fishing fleet with PLCs?

Temperature, humidity and air quality sensors in the holds go to PLCs that are also connected to the refrigeration and air conditioning. The case does not say how many PLCs there are; our proposal, drawn here, is one PLC per hold. The PLCs share their data over Modbus with the other on-board devices: the display screens of the control room and the warning devices. The alarms go out as warning lights, sirens and messages to the crew, through wireless devices when necessary.



— Sensors in the hold — PLC per hold — Modbus and screens — Alarms: lights, siren, messages

Signals and data (from the case; the types are a usual choice, the case does not publish them)

Signal	Between	Type	Purpose
Temperature	Sensor in the hold → PLC	Analog input, 0-10 V	Keep the fish at its controlled temperature
Humidity	Sensor in the hold → PLC	Analog input, 0-10 V	Keep the hold in the right conditions for fresh fish
Air quality	Sensor in the hold → PLC	Analog input, 0-10 V	Detect a hold that needs ventilation
Refrigeration and air	PLC ↔ refrigeration and air conditioning	Relay outputs and inputs	The monitoring is connected to the cold
Hold data	PLC ↔ control room screens	Modbus (RTU on RS-485 or TCP)	Real-time values and alarms of every hold
Warning lights and siren	PLC → control room	Relay outputs	Alert the crew in the control room
Crew messages	Control room → crew devices	Wireless message	Reach the crew members where they are
Reports	PLC → control room	Modbus data	Regular reports on the state of each hold

Our proposal: one Arduino based PLC per hold.



OUR PROPOSAL

M-DUINO ETHERNET PLC ARDUINO 19R

An Arduino Mega based PLC with analog inputs for the sensors of a hold, relays for lights and sirens, and RS-485 and Ethernet for Modbus.

Role in our proposal	Reads temperature, humidity and air quality of one hold, drives the warning devices and talks Modbus with the screens
Inputs	6: 4 analog/digital (0-10 V, 10-bit) and 2 digital optoisolated
Outputs	11: 8 relays (230 Vac 4 A / 24 Vdc 2 A, resistive) and 3 analog/PWM (0-10 V)
Communication	Ethernet, RS-485, RS-232, I2C, SPI, serial TTL, USB
Controller	Arduino Mega 2560, ATmega2560, 16 MHz
Clock and storage	Real-time clock and micro SD card

The case says Arduino PLC and does not publish the model or how many there are; its image shows an M-Duino. We propose one 19R per hold: its analog inputs and relays cover the sensors and the warning devices of one hold.

[See the M-Duino 19R ›](#)

Preventive, not reactive

Each value is compared with its reference all the time, so the crew can act on a deviation before it damages the catch.

Three kinds of notice

Warnings, reports and alarms: the crew gets the right level of attention for each situation.

One picture of all the holds

The control room screens show every hold and every active alarm in real time.

MONITORING HOLDS OR COLD ROOMS?

Tell us about your vessels. An engineer will answer.

Tell us how many holds you have, what you measure today, how the cold is made and who must receive the alarms. We will propose the PLCs, the Modbus network and the alarm path.

READ IT ONLINE

industrialshields.com/case-study-fishing-vessel-hold-monitoring-arduino-plc

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