

# Rig Monitoring System

**BACKGROUND**

Facility has multiple rigs for Test & Integration of new hardware/software for naval platforms in development and in-service. Rig parameters need to be monitored for test operations, maintenance and automated testing purposes.

**PROBLEM**

Need for autonomous monitoring system to measure & capture Temperature, Humidity, Power, cooling, Run-time and utilisation of equipment.

**METHODS**

Project Managed against Lifecycle Management Phases scheduled via Gantt Chart. Engineering following the V-diagram methodology.

**SOLUTION**

Analog/Digital Sensors connected to Arduino MEGA & Ethernet Shield networked to LabVIEW for alarm management and log generation plus alarm panels for operator/automated test system interface.

**OUTCOME**

Partial completion due to ambitious project. Future work will involve designing/implementing power measurement capabilities and web development for Alarm Panel GUI over IP.

**1 - MONITORING PROCESSOR**

Parses Web Servers for sensor information to check for Alarm Events. Creates logs of Alarm Events and Sensor Values to .CSV file.

**2 - NETWORKING**

Ethernet Network; widely used & easily expanded

**3 - ALARM PANEL**

Displays Alarms, Sensor History and Current State of Monitoring System to user. GUI allows user input of Alarm Thresholds, Alarms Resets and Alarm Event Navigation.

**4 - DCU**

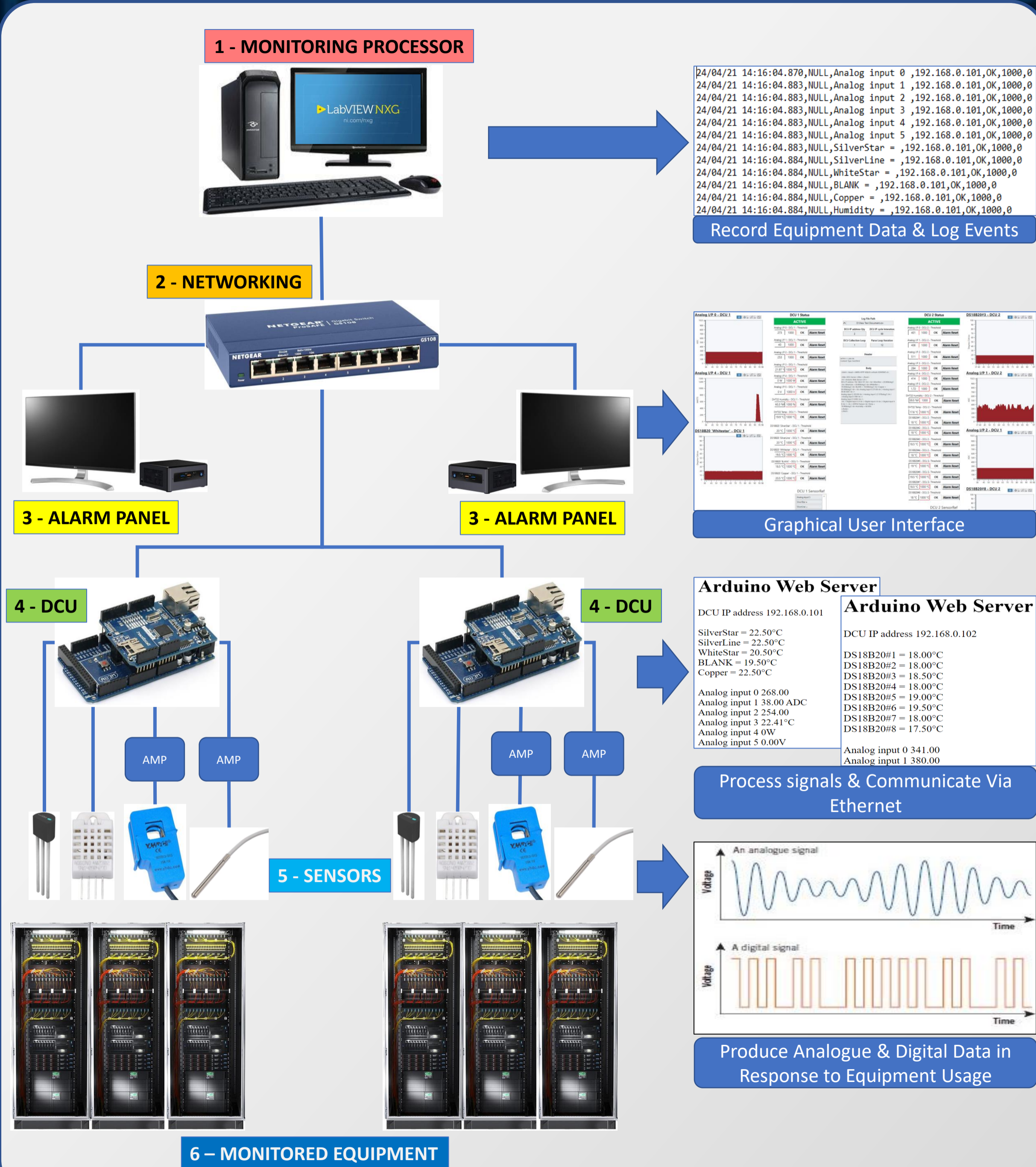
Data Collection Unit (DCU) Processes Analogue/Digital sensor inputs and publishes results to unique Web Server

**5 - SENSORS**

Multiple Mixed Analogue & Digital Sensors responding to equipment stimulus (wild heat, chilled water, power consumption, humidity).

**6 - MONITORED EQUIPMENT**

Classified Equipment **Under Test**. Rig representative of Customers' platforms, used for development and in-service support.



```
24/04/21 14:16:04.870,NULL,Analog input 0 ,192.168.0.101,OK,1000,0
24/04/21 14:16:04.883,NULL,Analog input 1 ,192.168.0.101,OK,1000,0
24/04/21 14:16:04.883,NULL,Analog input 2 ,192.168.0.101,OK,1000,0
24/04/21 14:16:04.883,NULL,Analog input 3 ,192.168.0.101,OK,1000,0
24/04/21 14:16:04.883,NULL,Analog input 4 ,192.168.0.101,OK,1000,0
24/04/21 14:16:04.883,NULL,Analog input 5 ,192.168.0.101,OK,1000,0
24/04/21 14:16:04.883,NULL,SilverStar = ,192.168.0.101,OK,1000,0
24/04/21 14:16:04.884,NULL,SilverLine = ,192.168.0.101,OK,1000,0
24/04/21 14:16:04.884,NULL,WhiteStar = ,192.168.0.101,OK,1000,0
24/04/21 14:16:04.884,NULL,BLANK = ,192.168.0.101,OK,1000,0
24/04/21 14:16:04.884,NULL,Copper = ,192.168.0.101,OK,1000,0
24/04/21 14:16:04.884,NULL,Humidity = ,192.168.0.101,OK,1000,0
```

Record Equipment Data & Log Events

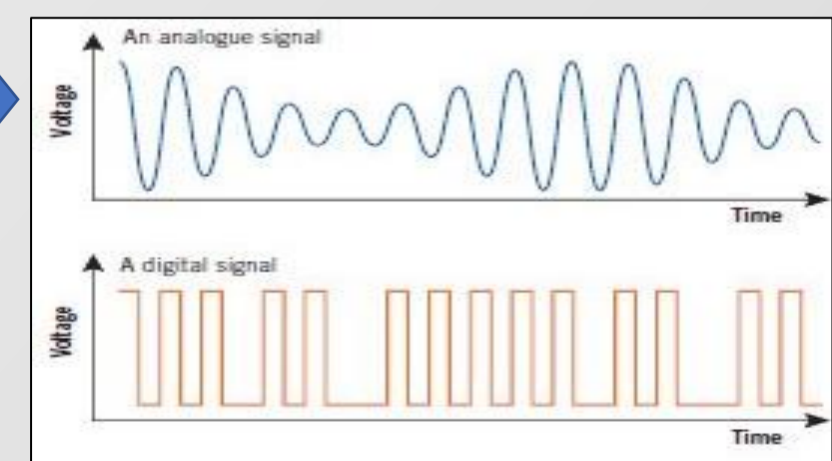


Graphical User Interface

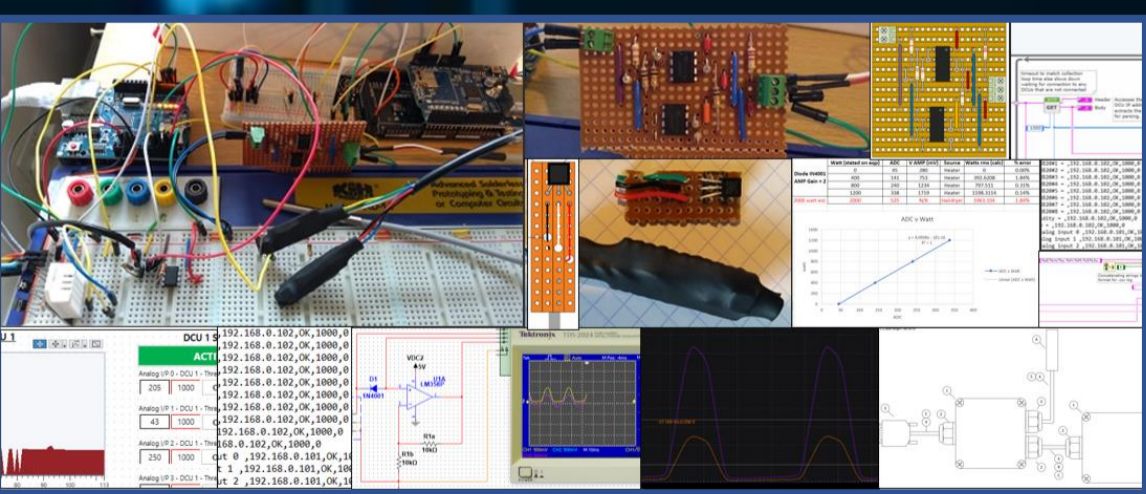
```
Arduino Web Server
DCU IP address 192.168.0.101
SilverStar = 22.50°C
SilverLine = 22.50°C
WhiteStar = 20.50°C
BLANK = 19.50°C
Copper = 22.50°C
Analog input 0 268.00
Analog input 1 38.00 ADC
Analog input 2 254.00
Analog input 3 22.41°C
Analog input 4 0W
Analog input 5 0.00V

Arduino Web Server
DCU IP address 192.168.0.102
DS18B20#1 = 18.00°C
DS18B20#2 = 18.00°C
DS18B20#3 = 18.50°C
DS18B20#4 = 18.00°C
DS18B20#5 = 19.00°C
DS18B20#6 = 19.50°C
DS18B20#7 = 18.00°C
DS18B20#8 = 17.50°C
Analog input 0 341.00
Analog input 1 380.00
```

Process signals & Communicate Via Ethernet



Produce Analogue & Digital Data in Response to Equipment Usage



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