



**CREATING INTELLIGENT SITES**





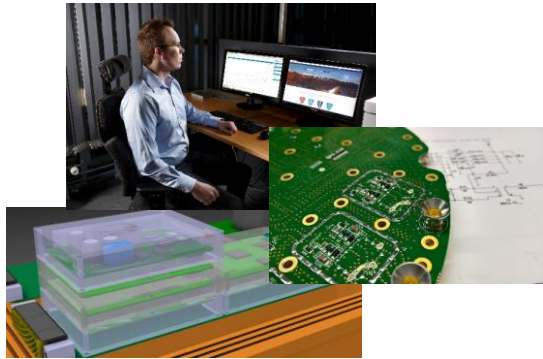
# CREOWAVE OY

- **FOUNDED 2004**
- **BASED IN OULU, FINLAND**
- **PRIVATELY OWNED**
- **MAIN MARKETS: OIL & GAS**
- **CERTIFIED OPERATIONS**



# ENABLING COMPANY

## RESEARCH & DEVELOPMENT



**ELECTRICAL, MECHANICAL & SW ENGINEERING  
IT & SERVER SERVICES  
R&D CONSULTING AND PROJECT MANAGEMENT**

## PRODUCTION



**IN-HOUSE MANUFACTURING  
UNIT TESTING  
QUALITY CONTROL**

## TESTING



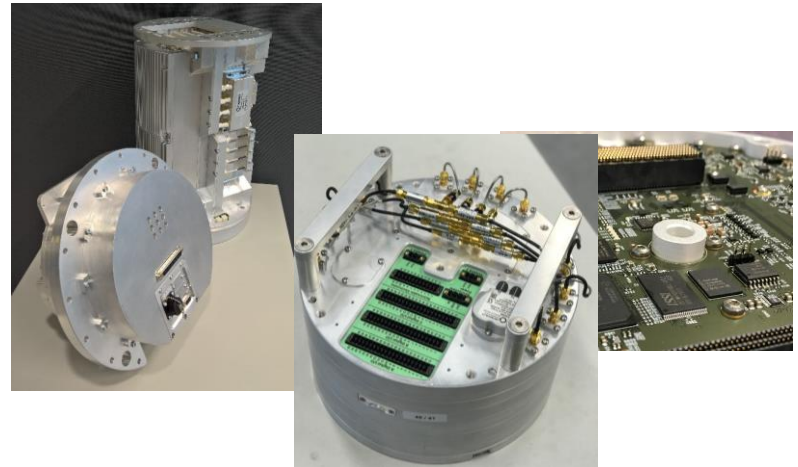
**FULLY EQUIPPED ESS TESTING  
LABORATORY**

# PRODUCTS

## C-SITE IOT PLATFORM



## MULTIPHASE METER ELECTRONICS







THE WORLD'S ONLY COMPLETE IOT PLATFORM FOCUSED ON

**MAKING OILFIELDS INTELLIGENT**

**INTELLIGENT...**



...TANK FARMS



...ASSET MONITORING

# C-SITE BUILDING BLOCKS



Battery operated,  
self-organising  
sensor unit

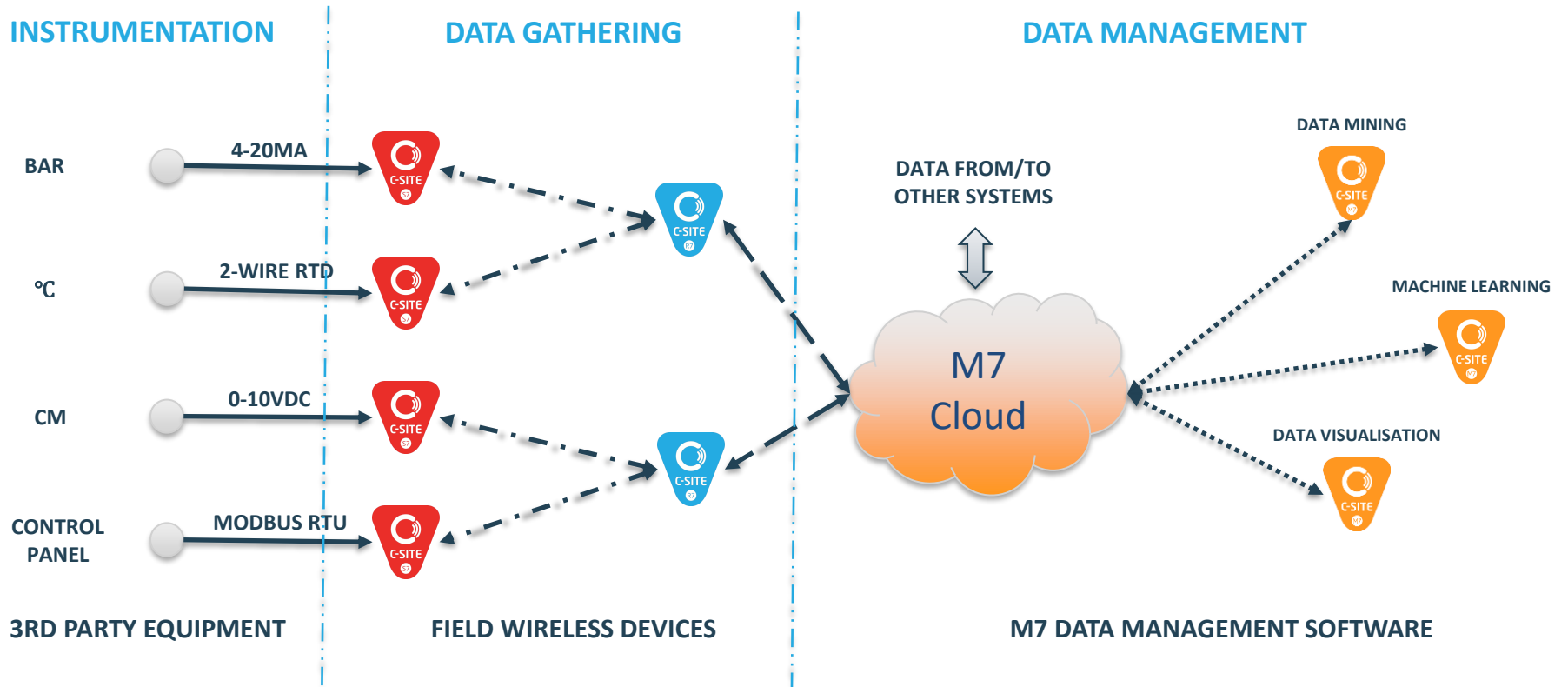


Intelligent access  
point for wireless  
sensor units



Complete software  
platform for data  
visualisation and analytics

# C-SITE IOT PLATFORM







**OPTIMIZED DAILY ACTIVITIES  
WITH REAL-TIME DATA**



**REDUCED DOWNTIME  
IMPROVED EFFICIENCY  
IMPROVED MAINTENANCE**

# SIMPLE AND RISK FREE

**simple**  
**simplest)**

1 easy to do or und  
ary is written in sim  
do you open this?



## C-SITE SERVICES

C-SITE  
LINK

C-SITE  
REACT

C-SITE  
SMART

WIRELESS REMOTE MONITORING



AUTOMATIC WARNINGS



INTELLIGENT PRODUCTIVITY DATA



CALIBRATION AND BATTERY CHANGE

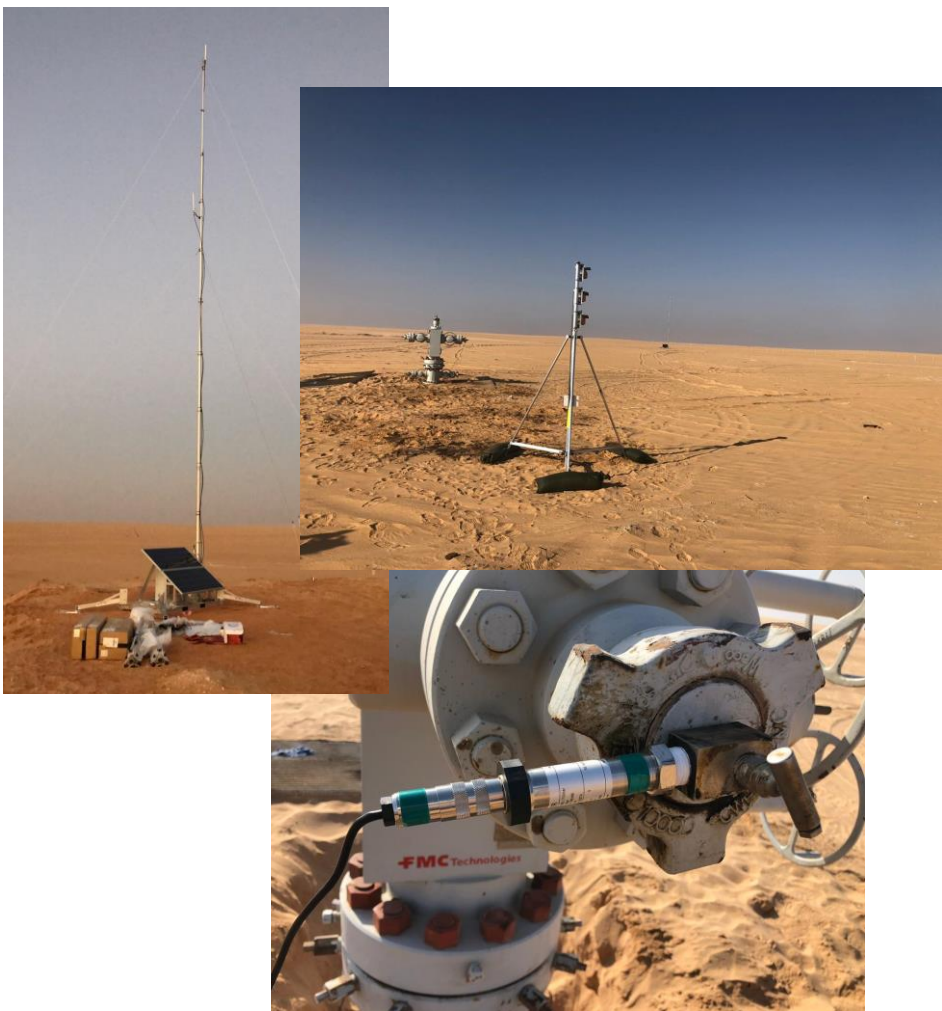


# APPLICATION EXAMPLES

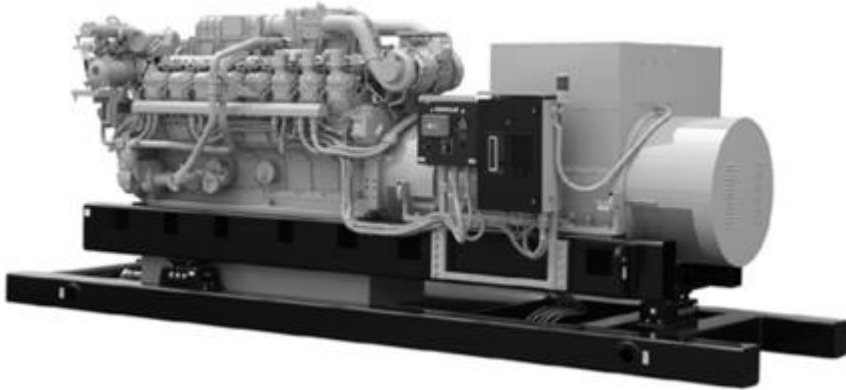


# #1: ONSHORE WELL MONITORING

- Challenge
  - Remote location
  - Wells distributed over a large area → distance between wells several kilometres
  - No data available from the field
  - Well not yet in production → site visits and routine well inspections needed
  - No infrastructure
- Solution
  - 3 C-site S7 units per well with pressure & temperature transducer
  - Measurements from annulus A & B and also the wellhead pressure
  - R7 station with solar panels
  - Data communication from R7 unit to the M7 server via 3/4G network by using R7's integrated 4G modem
- Results
  - No need for manual data collection
  - Real-time data available all the time
  - Possibility to production optimization once wells are operational
  - Early detection of problems → less damage
  - Improved maintenance efficiency, maintenance only when needed



## #2: GENERATOR SET MONITORING

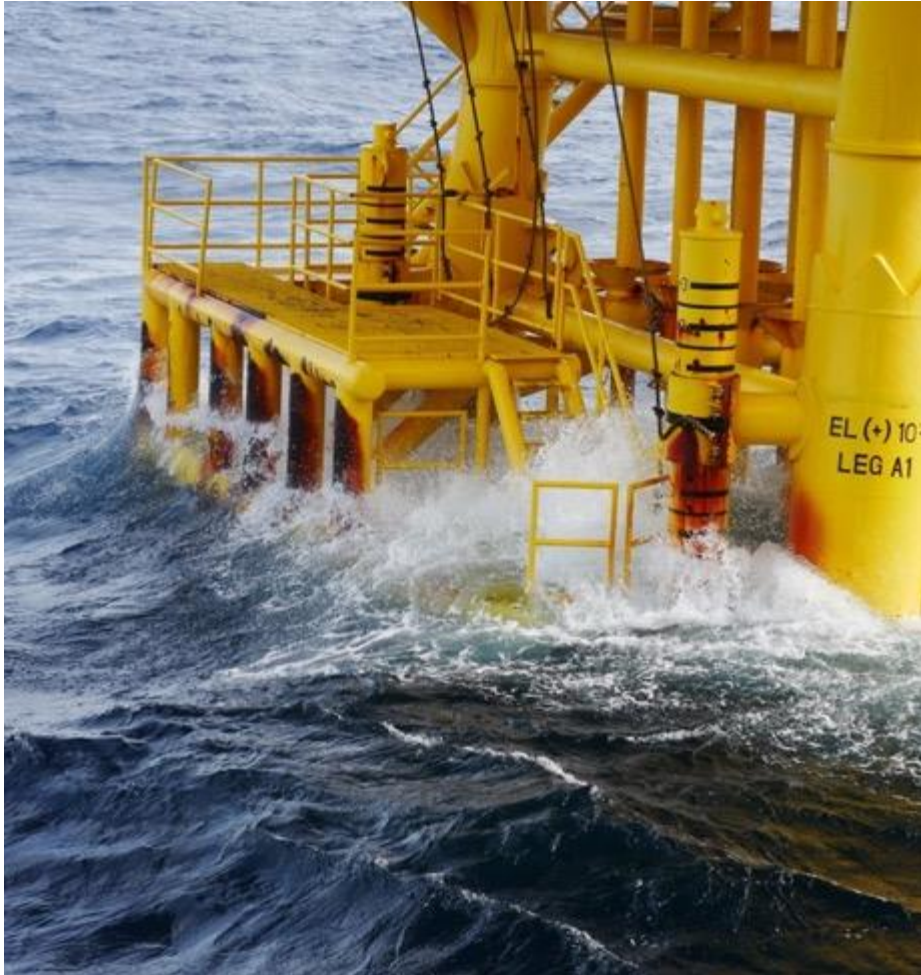


- Challenge
  - Generator set has a local monitoring system
  - Data available only on the local instrument panel
  - Operator needs to collect data manually
  - No real-time data available
- Solution
  - Creowave's C-site S7 unit collects data by using the MODBUS interface available on the instrument panel
  - R7 unit delivers the data to the control room by using plant Wi-Fi network
  - Data delivered to the control room with minimum cabling
  - M7 Management software to display real-time data and to store data into a database
- Results
  - No need for manual data collection
  - Real-time data available all the time
  - Early detection of problems → less damage
  - All vital motor parameters monitored continuously
  - Data collected to the historian → enables predictive maintenance by using data analytics
  - Improved maintenance efficiency, maintenance only when needed
  - Minimized downtime



## #3: HEAT EXCHANGER MONITORING

- Challenge
  - Fouling the biggest problem
  - Decreased heat transfer between process fluids
  - Causes operational inefficiencies
  - Current systems expensive
- Solution
  - C-site S7 units used to measure hot and cold side input and output temperatures and pressures
  - Mass flow meters can be also connected to the S7 unit if needed
  - M7 software used to calculate effectiveness of the exchanger
- Results
  - Efficiency of the exchanger can be monitored remotely
  - More effective maintenance planning
  - Performance data available → can be compared among other sites → improved operations
  - Energy savings



## #4: OFFSHORE WELLHEAD ABANDONMENT PHASE

- Challenge
  - Offshore location in North Sea
  - After the drilling no infrastructure available
  - No electricity or communication
  - Wellheads need to be monitored during the abandonment phase
- Solution
  - Creowave provided S7 units with transducers to monitor annulus pressures
  - Communication to onshore control room was done via satellite radio connected to the R7's Ethernet port
  - Solar panels were used to provide electricity for the units
- Results
  - Annulus pressure data available in real-time onshore
  - Leakage can be detected from the pressure readings
  - No site visits needed
  - Significantly reduced environmental risk





## #5: WIRED TO WIRELESS

- Challenge
  - Customer requirement: wireless valve monitoring system with minimum cabling
  - Challenges with wired systems because of the broken cables and high cost
  - Current equipment uses wired 4-20mA communication via PLC
- Solution
  - MIDAS Sensor from Score Diagnostics
  - C-site units used to deliver data from the instrument to the control room
  - S7 units gathers data from the instruments by using current interface
  - R7 unit delivers data to the M7 management software by using 3G network
  - M7 SW used to interface customer's SCADA system
- Results
  - Fast and easy wireless solution within one week
  - Minimized engineering, no PLC or other field network devices
  - Minimized cabling and installation costs

# #6: TANK MONITORING



- Challenge
  - No data on the level of the chemical in the tank
  - Estimations done through visual survey of the level
  - Operator needs to drive through all the tanks
  - Current systems is very ineffective as the tanks are spread over a large area
- Solution
  - C-site S7 units used to measure tank levels
  - The data is transmitted onto a software which optimizes a schedule for the operator
  - M7 software used to optimize routes and needed amount of chemical
- Results
  - Efficient routes, exact need for chemical can be planned
  - More effective supply chain as the data can be routed into the ERP system
  - No need to for visual check ups and data is reliable
  - Performance data available → can be compared among other sites → improved operations



**GOT AN UNSOLVED CHALLENGE?**

**CHALLENGE US**

**WE'LL PROVIDE A SOLUTION**

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