SERVICE SPECIFICATION / OPERATIONAL SYSTEMS

# Environmental and facility monitoring

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Sensors, placement, gateways, power, network, timestamps, thresholds, persistence, alerts, acknowledgement, escalation, retention, and maintenance, assembled as one monitoring system.

## Intended outcome

**Condition data with known units and location, tested thresholds, working alert and escalation paths, stale-data detection, and maintenance records.**

## Service scope

Environmental monitoring is a chain: measurand, sensor, placement, sampling, gateway, timestamp, transport, storage, threshold, alert, acknowledgement, escalation, action, and record. A dashboard alone does not create an operational response.

Sensors should be placed for the protected process rather than convenience. Required accuracy, calibration, mapping, validation, redundancy, and record controls vary by use; regulated or safety-critical environments need discipline-specific requirements.

## How the system fits together

| | |
|---|---|
| **01 Measure** | Condition, range, accuracy, location, sensor, calibration assumption |
| **02 Collect** | Sampling, gateway, time, network, power, buffer, health state |
| **03 Interpret** | Units, threshold, persistence, hysteresis, trend, stale or invalid data |
| **04 Respond** | Notification, acknowledgement, escalation, action, work record, retention |

## Typical project triggers

- Equipment or product damage is discovered after the condition has passed
- Alerts are frequent, ignored, misrouted, or lack acknowledgement and escalation
- Sensors are mounted where installation is easy rather than where risk occurs
- No one tracks calibration, batteries, gateway health, time, or last successful test

# Delivery and acceptance



The final project scope identifies quantities, locations, dependencies, and the evidence required at each delivery stage.

## 01 Define condition and consequence

Identify what is protected, measured condition, range, accuracy, location, time sensitivity, persistence, consequences, response owner, maintenance, and record need.

**Acceptance evidence: Condition-response matrix, site observations, current incidents, measurement requirements, and ownership list.**

## 02 Design measurement and alerting

Select sensors, placement, mapping, gateways, network, power, time, sampling, thresholds, hysteresis, persistence, notifications, acknowledgement, escalation, and retention.

**Acceptance evidence: Sensor and gateway plan, data-flow diagram, threshold rationale, alert matrix, maintenance schedule, and validation method.**

## 03 Install and baseline

Label and place sensors, configure units and timing, establish users and routes, compare readings where appropriate, and observe normal variation before final thresholds.

**Acceptance evidence: Asset and placement photos, configuration record, baseline trend, comparison observations, and alert contacts.**

## 04 Exercise condition and failure

Safely simulate or test threshold, persistence, alert, acknowledgement, escalation, sensor loss, low battery, gateway loss, power loss, stale data, recovery, and reporting.

**Acceptance evidence: End-to-end alert samples, timestamps, acknowledgement and escalation record, stale-data alarm, recovery result, and owner runbook.**

## Handover deliverables

- Condition, threshold, response, and ownership matrix
- Sensor, placement, gateway, network, power, and data-flow plan
- Baseline, threshold rationale, and configuration record
- End-to-end condition, stale-data, communication, power, escalation, and recovery evidence
- Asset list, maintenance and calibration assumptions, alert runbook, and reporting guide

Closeout: GHT and the customer review the agreed evidence, record unresolved exceptions and owners, and confirm acceptance against the signed project scope.

# Planning and scope boundaries



## Customer and site inputs

- Protected asset or process, condition, range, accuracy, location, time, and consequence
- Normal variation, thresholds, persistence, hysteresis, schedule, and rate of change
- Sensor environment, mounting, calibration, battery, gateway, network, power, and time source
- Recipients, acknowledgement, escalation, after-hours coverage, response target, and work ownership
- Data units, quality, retention, export, privacy, integration, reporting, and maintenance

## Constraints and coordination

- Monitoring does not by itself control the condition or guarantee that a person responds
- Accuracy, calibration, placement, sampling, drift, condensation, interference, batteries, and connectivity affect data quality
- Regulated storage, clinical, food, industrial, environmental, or safety applications can require validated procedures and records beyond general facility monitoring
- Coverage windows, response targets, and escalation are contract- and owner-specific and must be documented explicitly

## Commercial scope and responsibilities

This specification describes the service framework. The signed statement of work defines included equipment, quantities, software licenses, integrations, access windows, schedule, pricing, warranty, and support coverage. Additional construction, electrical work, recurring subscriptions, and ongoing support require an explicit line item.

The customer appoints an acceptance owner and provides authorized access, required site information, and decisions. GHT records assumptions, coordinates assigned work, and submits changes for agreement before expanding the scope.

## Technical references

National Institute of Standards and Technology — SP 800-53 Rev. 5: Security and Privacy Controls | Source review: 2026-08-20

National Institute of Standards and Technology — SP 800-82 Rev. 3: Guide to Operational Technology Security | Source review: 2026-08-20

National Institute of Standards and Technology — Cyber-Physical Systems and Internet of Things Program | Source review: 2026-08-20

Service guide and project discussion | Source review: 2026-09-06