



Particle Counting Systems - Design, Installation & Qualification Challenges

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Design Considerations

Whether designing new facilities, or retrofitting existing facilities, there are several key points to consider when planning particle monitoring.

Other parameters affecting room cleanliness need to also be considered, and the flow of staff and products through your facility.

These considerations will help establish a holistic approach to monitoring your facility.

Other important considerations include the following:

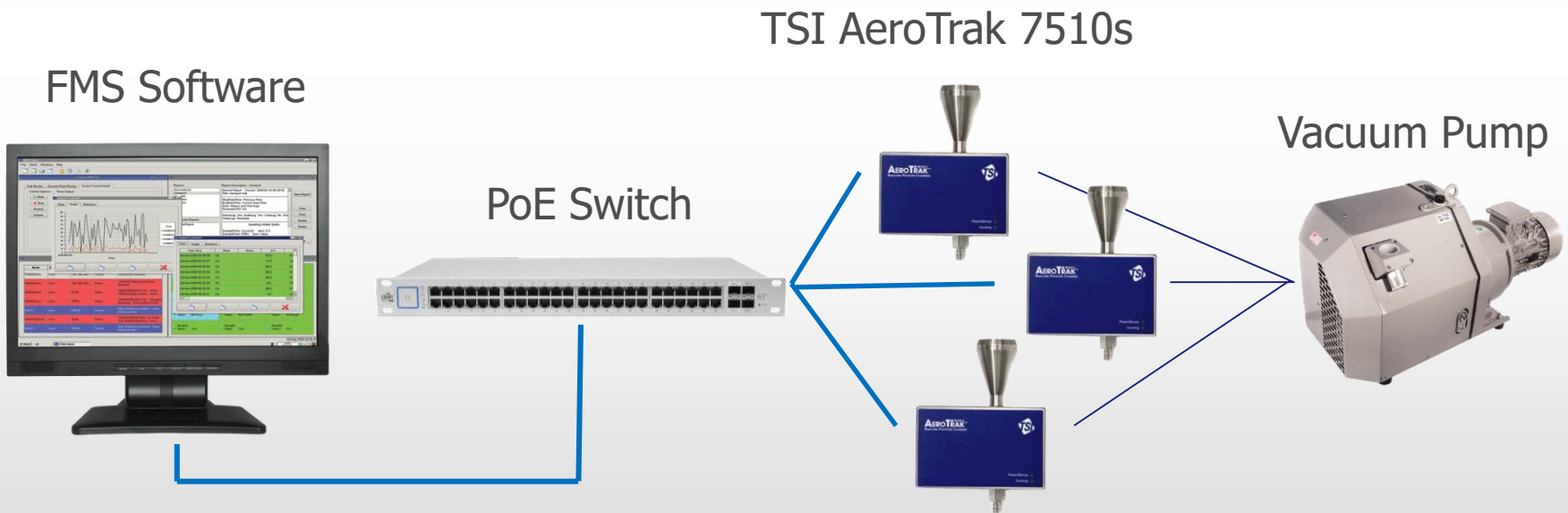
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Design Considerations

- The number and location of sample points (Risk Analysis)
- Other parameters that need to be measured
- Whether monitoring is to be continuous or scheduled
- Whether particle counters are to be standalone, or have a centralised vacuum system
- Room construction, access for services and staff workflow (need to consider wireless options, power options, etc.)
- Alarm notifications required (visual, audible, e-mail, sms, etc.)
- Data redundancy and network architecture

Design Considerations - Case Study 1

Application	Solution
Customer is building a new facility and needs to monitor particles at 20 locations spread across multiple rooms within the facility	Remote particle counters connected to a centralised vacuum system and powered by a PoE switch



Design Considerations - Case Study 2

Application	Solution
Customer has a new requirement to monitor particles, temperature, relative humidity and differential pressure at 4 locations	Remote particle counters with integrated pump (TSI 6510) and attached temperature, relative humidity and pressure sensors

FMS Software



TSI AeroTrak 6510



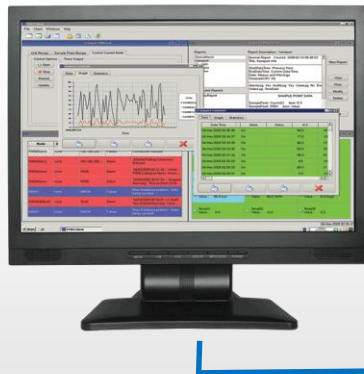
Vaisala Temp, RH, DP Sensors



Design Considerations - Case Study 3

Application	Solution
Customer needs to add 5 particle counters to an existing facility, where running cables and tubing is problematic	Remote particle counters with integrated pump (TSI 6510) with additional long-range and secure wireless interface

FMS Software



Wireless Interface



TSI AeroTrak 6510



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Installation Considerations and Challenges

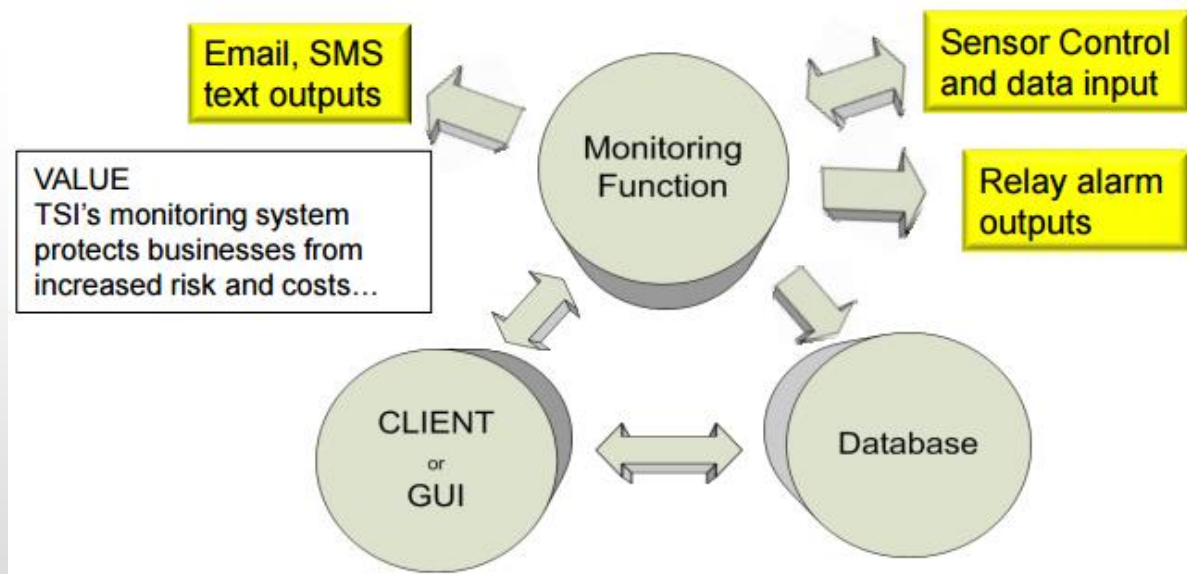
There are several challenges that can arise when installing a PCS/EMS/FMS:

- Field wiring and cable sizes
- Vacuum pump and tubing size
- Access for future service and calibration work
- Physical or environmental interference from surrounding devices
- HVAC supply and return locations
- Software architecture, redundancy and backup provisions
- Antenna type and orientation for wireless systems

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Installation Considerations – Network Architecture

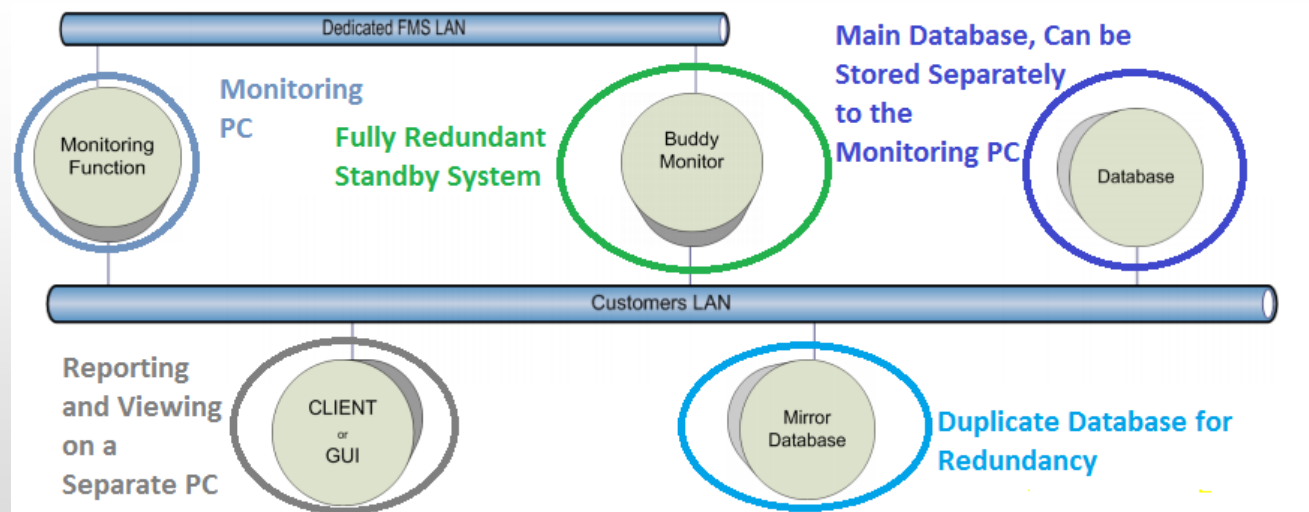
Planning the architecture of the PCS/EMS/FMS can help reduce the likelihood and impact of system failures, reducing the risk to your production. The key to this approach is having a distributable system.



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Installation Considerations – Network Architecture: Features

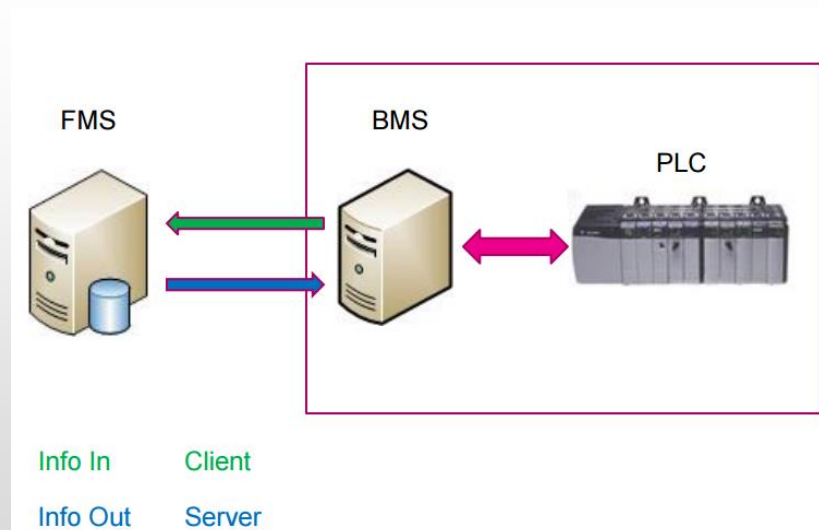
- Database can be stored separately and data will be spooled on the Monitoring PC if the DB is not available
- Redundant DB can also be implemented (Mirror)
- Fully Redundant Standby System can take over in case of Monitor PC failure



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Installation Considerations – Integration with other systems

- The PCS/EMS/FMS is usually set up as a standalone system. But facilities also capture extensive data from a separate BMS.
- The ability to link the two can simplify HVAC commissioning and identify operational issues with sensors and plant.
- Enter OPC Server and Client



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Validation Challenges

Challenges can often arise during qualification work, and these can include:

- Verifying alarm outputs at separate locations (multiple levels, etc.)
- Format of included evidence – software reports, photographs, etc.
- Access to IT system – needs to be pre-arranged and carefully planned
- Sign-off – documentation needs to meet the needs of all stakeholders
- Building Management System – problems during HVAC commissioning can delay validation of the PCS/FMS/EMS.



ANY QUESTIONS?