

Next-Generation Fan Filter Units using EC Motors & Motorized Impellers

Presented by:

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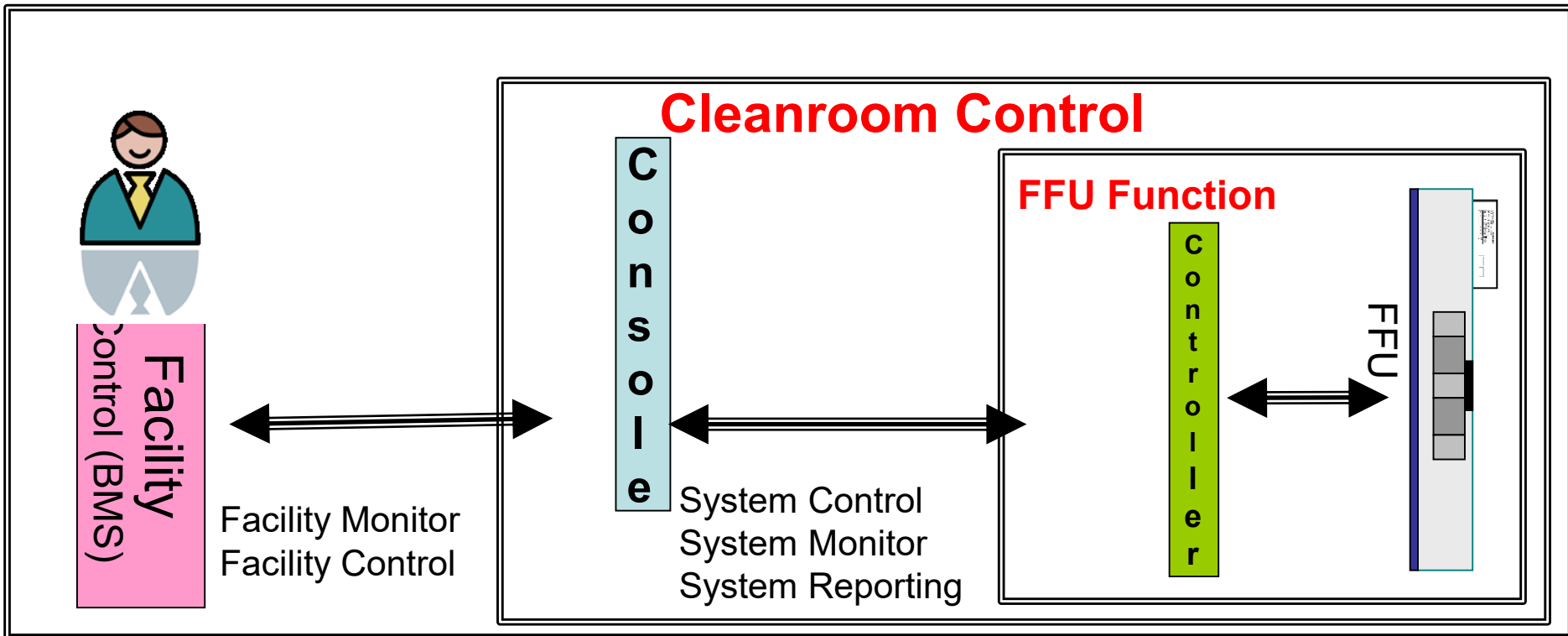
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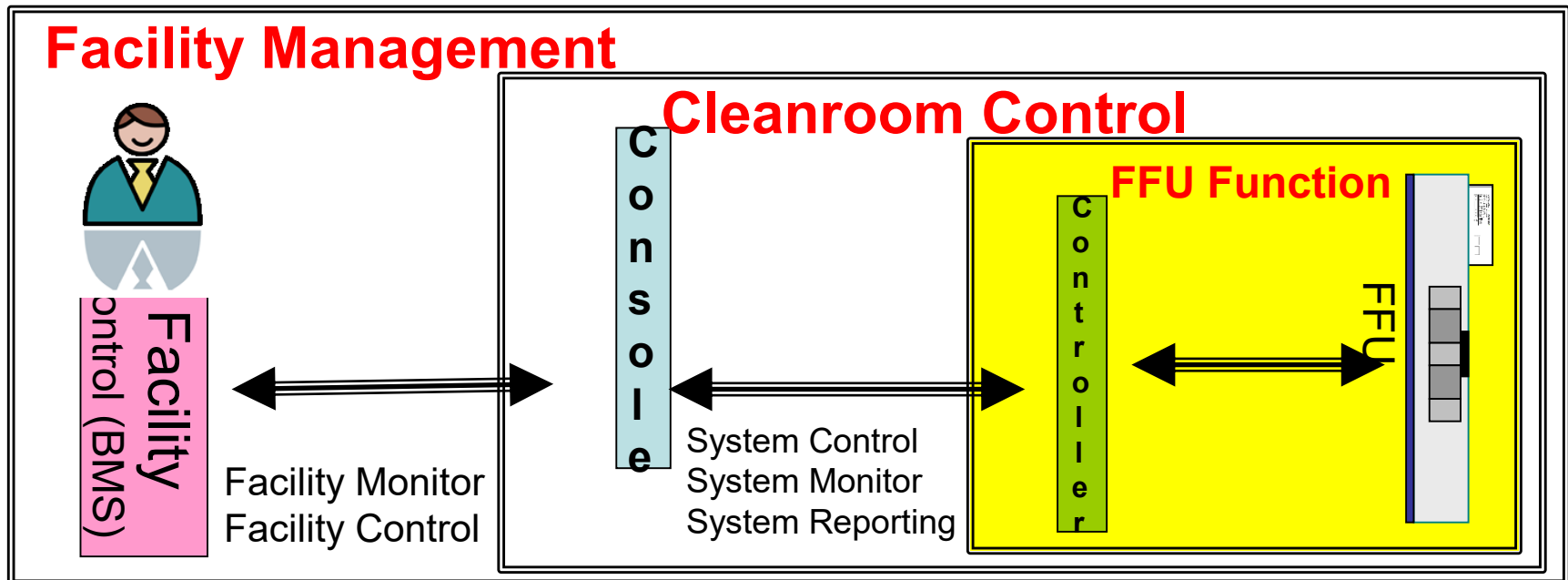
Cleanroom Control System



- FFU Function – AC, EC- Smart-motor, EC motorized Impeller
- Cleanroom Control - Console – Control FFU, Exhaust, Monitor Key Parameters
- Facility Control – Building Management System , HVAC

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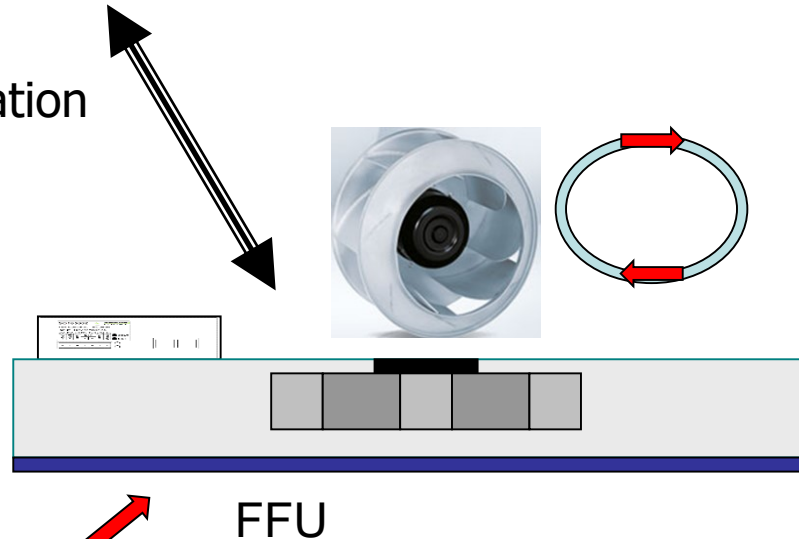
FFU Function- User, Network, FFU, Motor

Network Communications

- Speed adjust
- Status/fault
- System Integration
- Addressing

Monitor and Regulate

- Manual or Network
- Auto Adjust
- Airflow
- Power Consumption
- Temperature
- Filter Status (blockage)



User Interaction

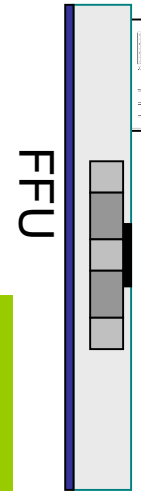
- Display RPM/CFM
- Status/fault
- Manual Adjustability?



FAN/FFU – Interface Options



AC Motor
No Motor Smarts
All Motor / FFU Function provided by Interface



EC Motor
PWM I/O limited to Motor speed set/fdbk
Add'l features thru Interface
Motor info access thru complex interface



EC- Motorized Impeller
General Purpose RS 485 I/O
Application specific features added by others
Application specific transferred to Console/System



EC Motor Interface - PWM I/O

Universal Input/ Speed Set- Feedback

- * Manual – speed pot
- * Analog - 0-10V DC
- * Network – MODBUS RTU
- * Network – BACNET MSTP



Multiple Outputs

- * DMM output (selectable/ set-point or RPM)
- * Remote LED (failsafe-fault)
- * Analog Output Signal
- * Display Board for User interaction



Features

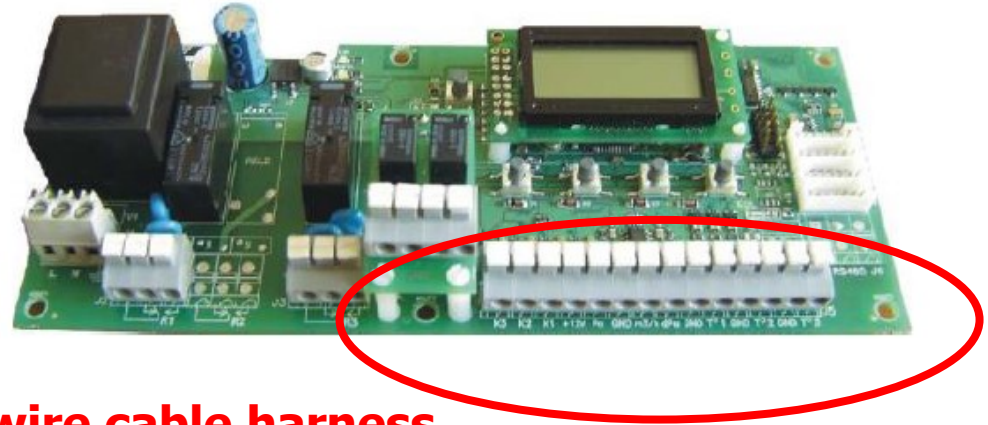
- * RPM Monitoring
- * External Sensor – AirFlow Control
- * EC Motor Load Control Algorithm
- * Filter Loading Monitoring



Diagnostics

- * Status and NET LED on board
- * Display and/or Remote LED Fault notification
- * Network Fault notification

EC Motor Interface – Motor/Board Combo



16 wire cable harness

Motor & Control Board Integration

- Control Mode through multi-wire harness
- Air-Flow and/or CFM monitoring through software
- Control Mode control through software settings
- Power consumption
- Temperature of Motor
- Display and manual interface

EC Motorized Impeller – Network Interface

General purpose interface provides:

- Network connectivity.
- Manual Control
- Fault notification
- Analog sensor connectivity



- **General remarks:** RS485 terminal box with
 - 2x RJ45 sockets for ebmBUS
 - ebmBUS line with Molex Mini-Fit female connector for connection to the motor
 - 3-pole 4-pin unit connector with AMP Mate-N-Lock female connector to connect to motor
 - Mode of operation display (LED2 green) and alarm display (LED 1 red)
- **Delivery scope:**
 - Terminal Box
 - Supply line (800 mm)
 - ebmBUS line (800 mm)
- **Material:** ABS (fire rating V0 according to UL)

Connection box



MODBUS RTU connection box (Art. No. 380085)

- Connection box for easy connection to power supply and bus on the FFU housing
- Supports MODBUS RTU
- Supports MODBUS auto-addressing
- Service socket (RJ45) for easy connection to diagnostic tool
- 2 LEDs display the status/error flashing code of the fan



NEXTGEN FFU Function – EC Motor

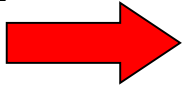
- **EC Motor – PWM Limited Data Transfer**
 - NextGen - Network Comms
 - 2- line communication - RS485 or Climate Talk
 - Speed Set / Speed Feedback
 - Motor Temp / Power Consumption/ Control Modes
 - Additional FFU features (display/analog/ auto-adjust etc.)
- **Motorized Impellers – Generic Interface is limited**
 - NEXTGEN – App Specific Interface Cards
 - Universal Input (network, manual, analog)
 - Display/LED indicators
 - AirFlow Control
 - Power Monitoring

Existing

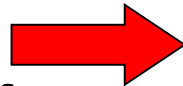
NEXTGEN

FFU Function – Optimization

PWM
I/O



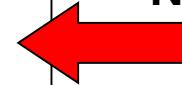
RS485 BUS
Generic Interface



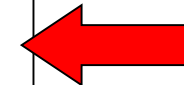
FFU Function - Features

1. *Unique Address*
2. *Manual, Analog, Network*
3. *Set Fan Speed*
4. *Read/Report Fan Speed*
5. *Memory Speed setting*
6. *Display & on-board setting*
7. *LED Driver for Status*
8. *Analog Output signal*
9. *Auto Addressing*
10. *Auto-Adjust*
11. *Run Time Monitor*
12. *Air-Flow Monitoring*
13. *BMS Direct Connect (BACNET)*

Network Comm
RS485
Climate Talk



RS485 BUS
FFU Function
Specific Interface



EC Motor/Motorized Impeller NEXTGEN Summary

- EC Motor and Motorized impellers will communicate through network comm (RS485 or other)
- *Cleanroom Specific Interface* will provide access to motor/fan features and add **FFU FUNCTION** specific features per customer/application needs
- Consoles and Network systems will rely on FFU FUNCTION information and self-regulation to provide cleanroom functional support
- User interaction and Display / Access will be driven by application specific needs and specifications
- Cleanroom "SYSTEM" implementation optimizing the FFU FUNCTION (contribution) will improve performance and reduce system cost/complexity.



Thank you

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