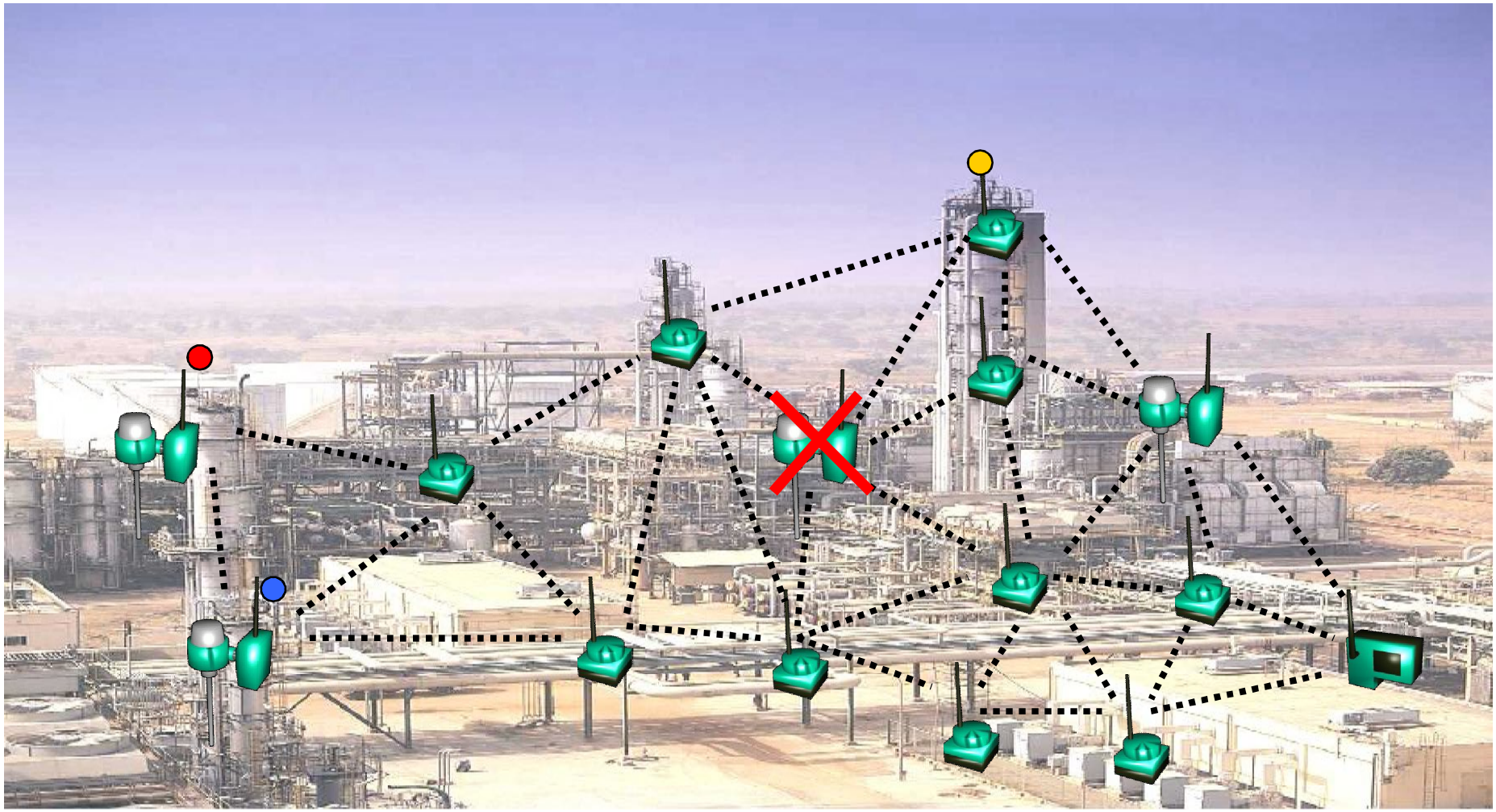
Mesh Network: How it Works



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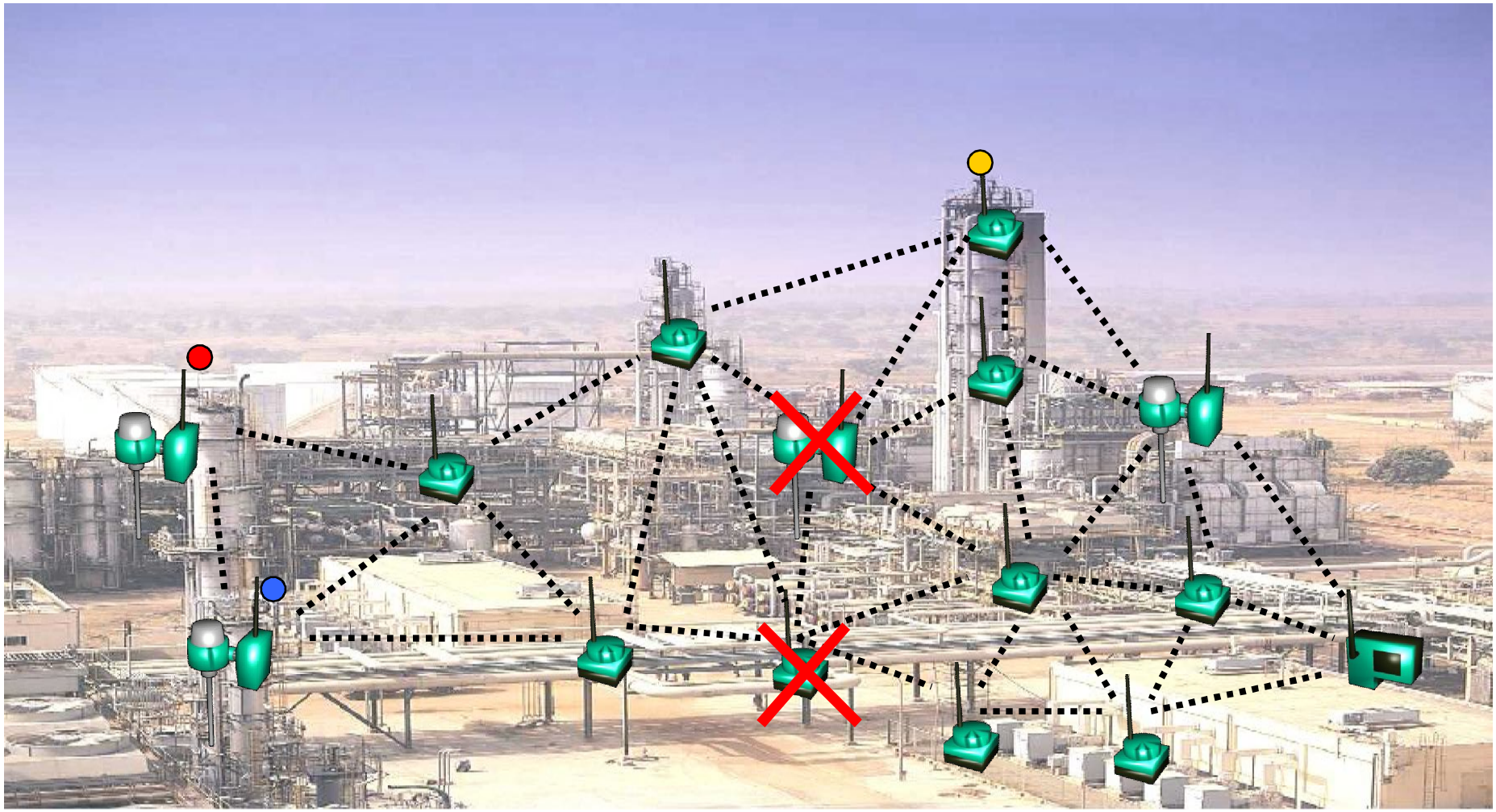


Elements of WirelessHART

- Besides of the operation, several other issues must be addressed
  - Identifying Networks and the associated devices
  - Forming Networks
  - Secure the Network

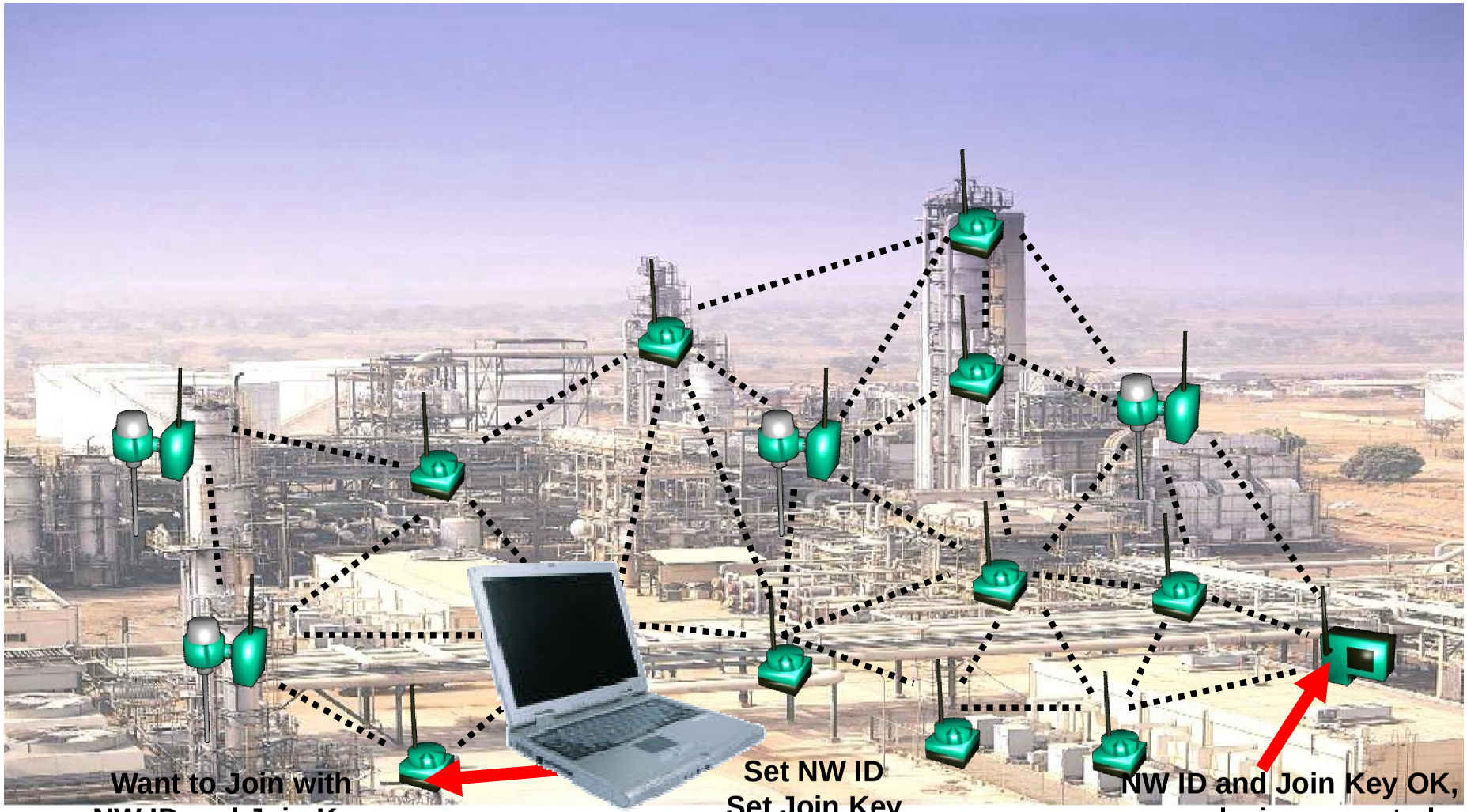
Elements of WirelessHART

- Each Network is identified by a unique Network ID
- Each Device in this Network must carry this Network ID for identification
- This enables also to run a second WirelessHART Network in parallel with another Network ID

Elements of WirelessHART

- **To form a Network, following steps must be taken**
  - Set Network ID and Join Key in the Network Manager (NM)
  - Set same Network ID and Join Key in the field device that shall be added to the network
  - For security reasons, both Network ID and security ID must be set in the devices with a wired interface
  - When switching the field device ON, it will ask the NM to join the network
  - If Network ID and Join Key are OK, it will be added to the network, otherwise joining will be refused

Mesh Network: New Device Addition



Elements of WirelessHART

- To make communication safe, all messages are encrypted with a 128Bit encryption key
- The encryption keys are distributed and changed in certain intervals by the Network Manager
- This makes it very hard to break into a WirelessHART Network. The “hacker” would need to…
  - find out Network ID
  - find out Join Key
  - find out encryption key
- The only way for a “hacker” to find this information would be during the join-up phase!
- Therefore the WirelessHART infrastructure is very safe!

WirelessHART Device Types

WirelessHART Gateway

- Wireless HART divides into 2 main device types
  - Wireless HART Gateway
  - Wireless HART Device
    - Every HART device can become a Wireless HART device by connecting a Wireless HART adaptor to it

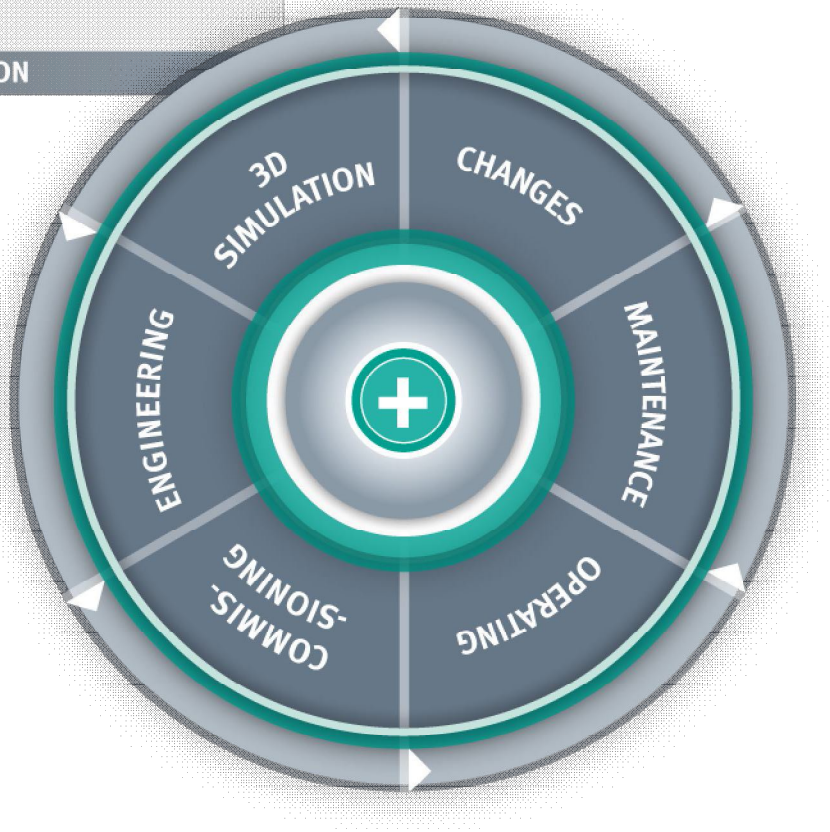
WirelessHART Temperature Multiplexer

WirelessHART Adaptor

3D Simulation

- WiNC Mod
- WiNC Sim

3D SIMULATION



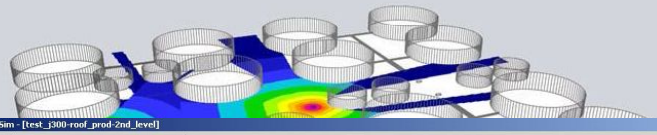
3D Simulation Software

- Wireless Network Checker (WiNC)
  - Simulation (Sim)
    - To model plants and areas
  - Modeling (Mod)
    - To place WirelessHART devices and simulate a network
  - Simulation based on 3-D Module
- Key features:
  - Allows test the application up front
  - Stand-alone software

WiNC Mod - Functions

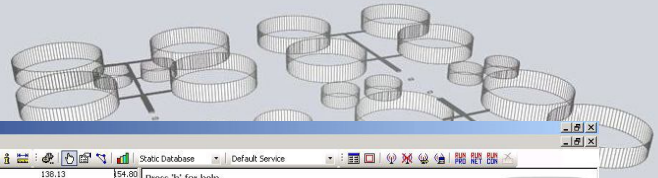
WiNCSim

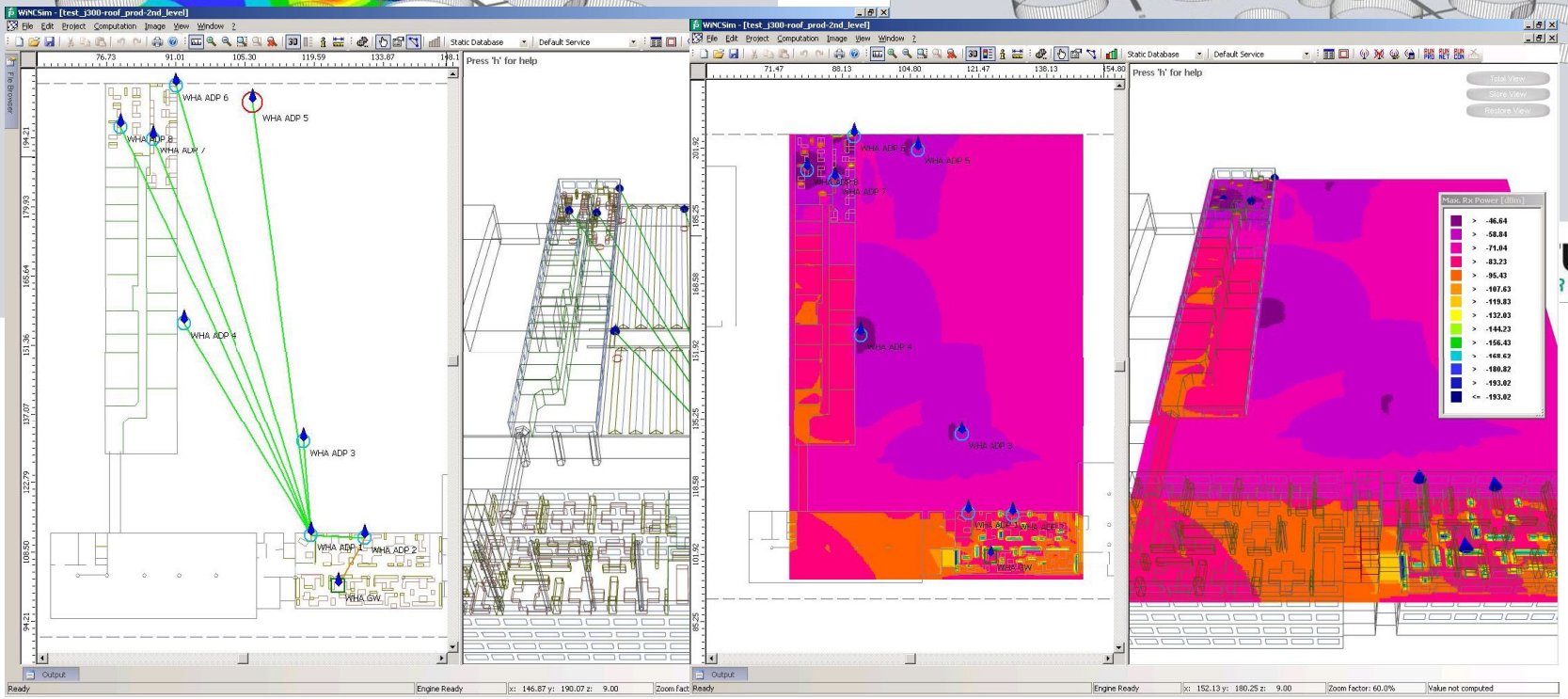
Wireless Network Checker - Simulation



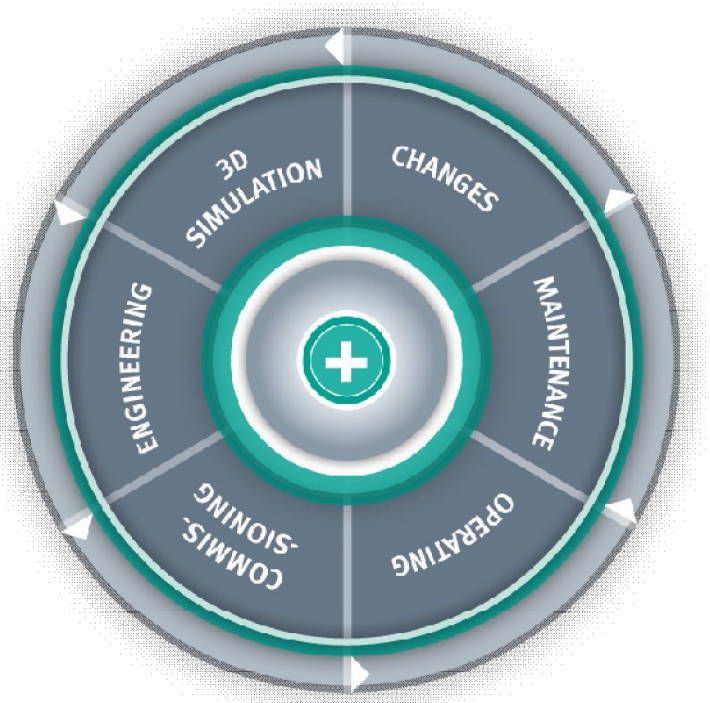
WiNCMod

Wireless Network Checker - Modeling





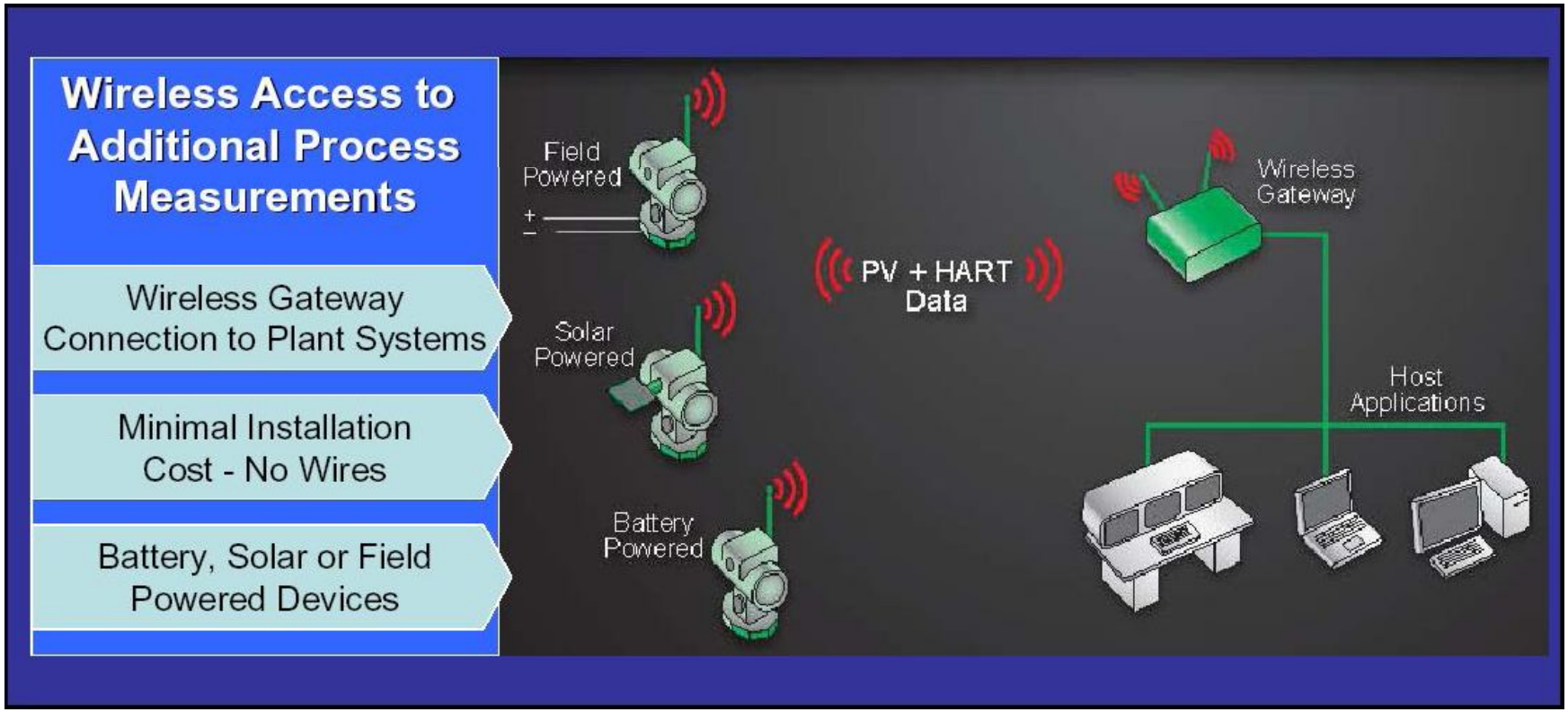
Benefits



YOUR BENEFITS

- Optimization of amount of router
- Easy to understand Network diagnostics
- Saves time at commissioning and installation
- Parallelization of planning work packages
- Bulk processing saves engineering time
- Fully flexible choice of control system manufacturer, downwards compatible

Wireless Devices for Measurement & Control



Summary

- *Wireless*HART is an enabling technology to bring wireless communication to process automation plants. It is built upon the known and proven HART protocol and combines this technology with mechanism to increase the reliability and range of wireless communication.

- A wide variety of *Wireless* HART devices will be available to increase the number of applications.

- The easy implementation of *Wireless*HART products and the HOST integration in the same manner as WiredHART makes it easy to set up, operate, and maintain *Wireless*HART networks.

- *Wireless* HART will redefine the definition of asset management, preventive maintenance, and plant monitoring; therefore, it will help to plan services and maintenance tasks. This reduces down time of plants.

uravindranath@in.pepperl-fuchs.com