Pilsner Urquell Brewery
(Czech Republic)

Upgrade of SIEMENS S5 Control System to S7
Utilising ProfiNet Wireless Communication

PROFIBUS - PROFINET
user conference

Stratford-on-Avon, 29-30th
June 2010

SIEMENS

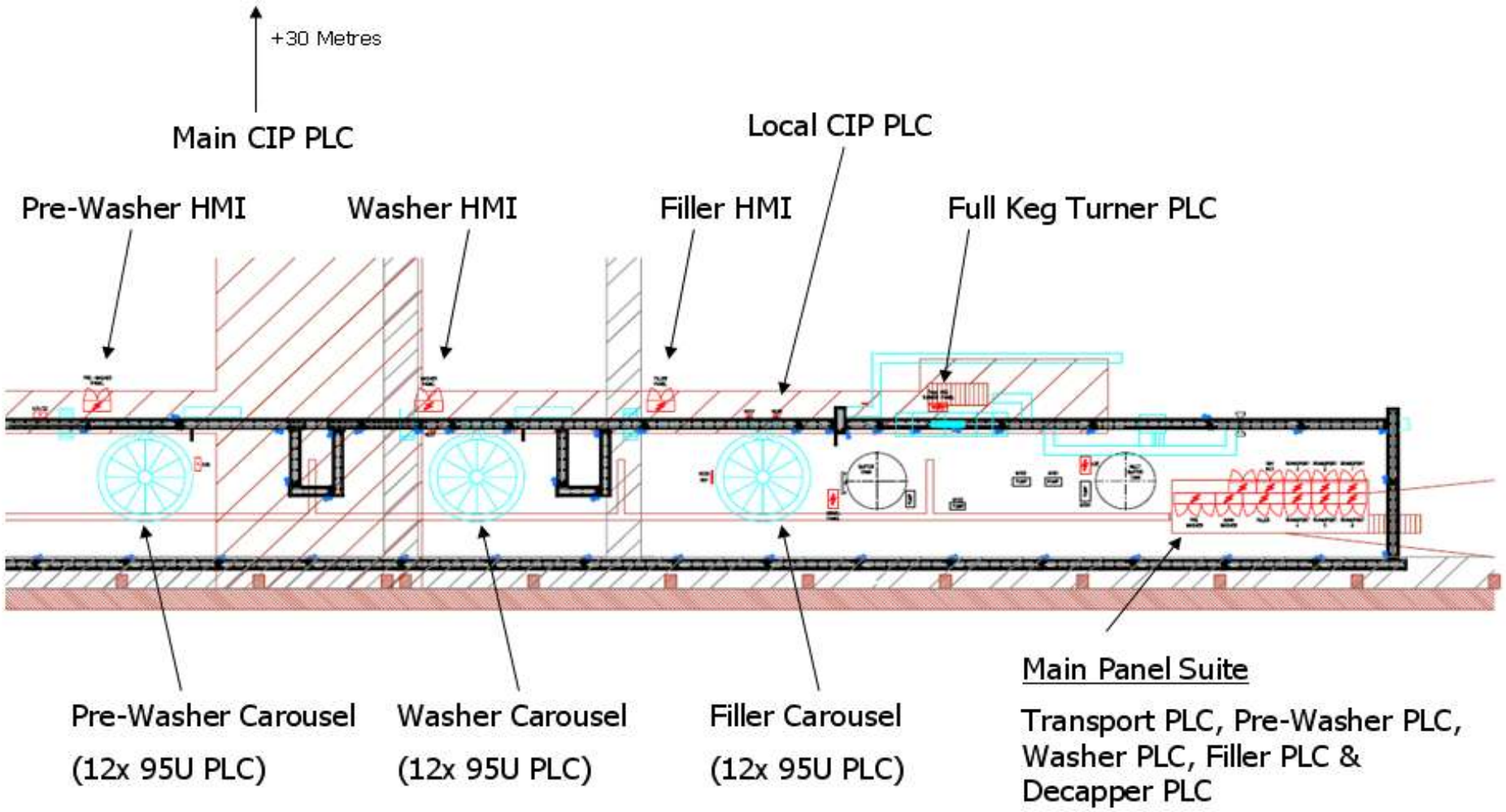
fma

daconi

engineering solutions – delivering efficiencies

PROFIBUS - PROFINET
user conference


12.11.2008


+30 Metres
Main CIP PLC
Local CIP PLC
Pre-Washer HMI
Washer HMI
Filler HMI
Full Keg Turner PLC
Pre-Washer Carousel
(12x 95U PLC)
Washer Carousel
(12x 95U PLC)
Filler Carousel
(12x 95U PLC)
Main Panel Suite
Transport PLC, Pre-Washer PLC, Washer PLC, Filler PLC & Decapper PLC

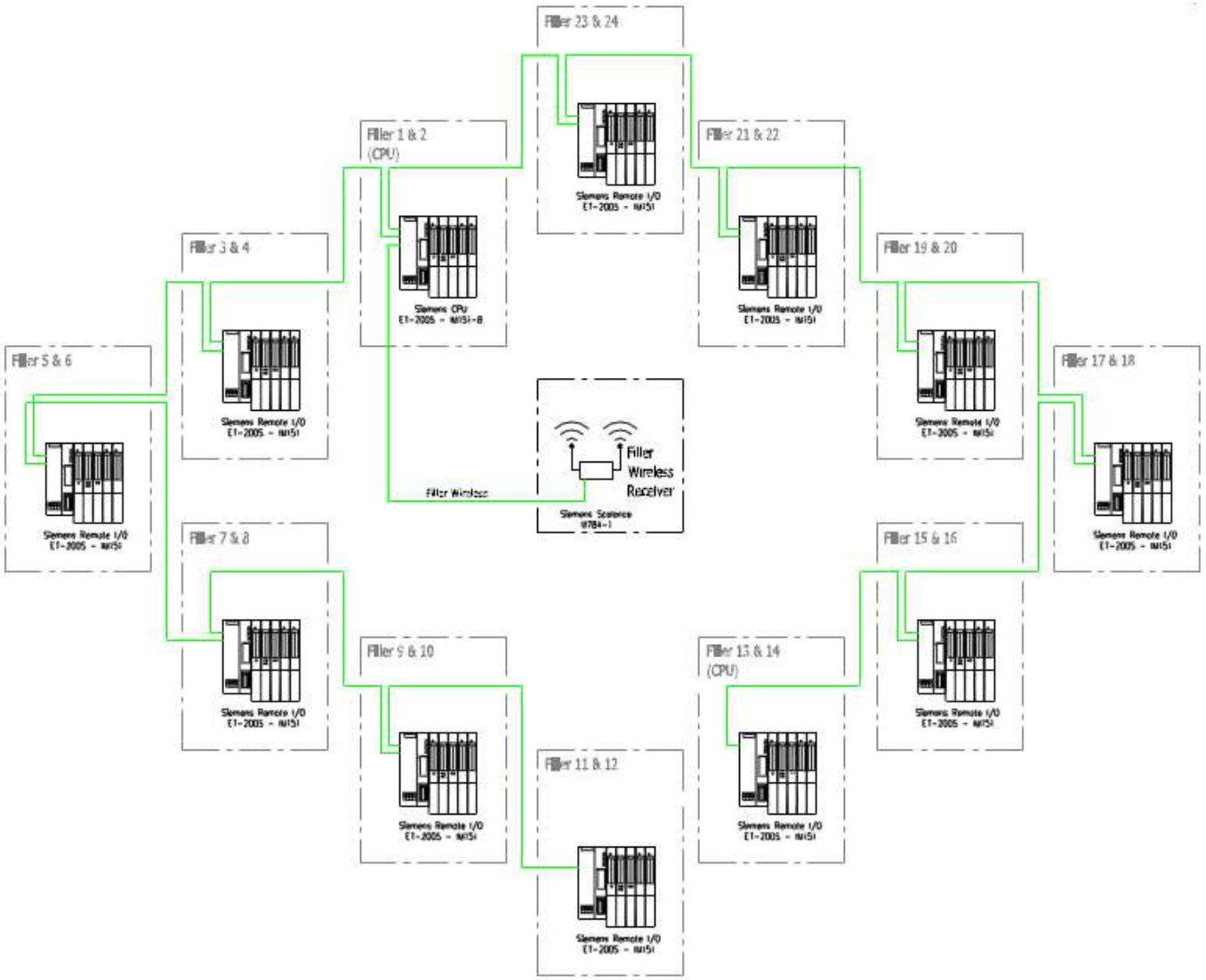
Networking

- To bring both performance and reliability up to benchmark standards, FMA Process Engineering proposed a solution using ProfiNet and an Industrial Wireless Local Area Network (IWLAN).
- Before committing to the wireless approach, FMA employed Daconi to carry out a wireless survey.
- Based on the results of the survey, a proposed network topology was drawn up.

SIEMENS

fma

daconi



PROFIBUS - PROFINET user conference

Stratford-on-Avon, 29-30th June 2010

Installation

- Easy installation.
  - Final terminations quick and easy using fast connect technology.
- A variety of topology methods available.
  - Star topology possible via the use of switches
  - Line topology also possible, due to most PN devices having at least 2 ports.
    Note: device must be powered to allow line topology to work.
- One baud rate!
  - One set of rules for network design and installation

SIEMENS fma daconi

Implementation

Implementation

- The solution included SIEMENS Scalance Industrial WLAN access points that transmit ProfiNet wirelessly at the data rate of 54 Mbit/s between a SCALANCE W786-1PRO access point and SCALANCE W784-1 access point mounted on the carousels. This provided a seamless connection of the ProfiNet network, controllers and I/O modules.
- The Simatic ET200 Configuration Tool was used to initially verify each of the I/O rack's design.
- Using a prommer, MMC cards were preconfigured with the device names – the method employed by ProfiNet to identify each device.

SIEMENS

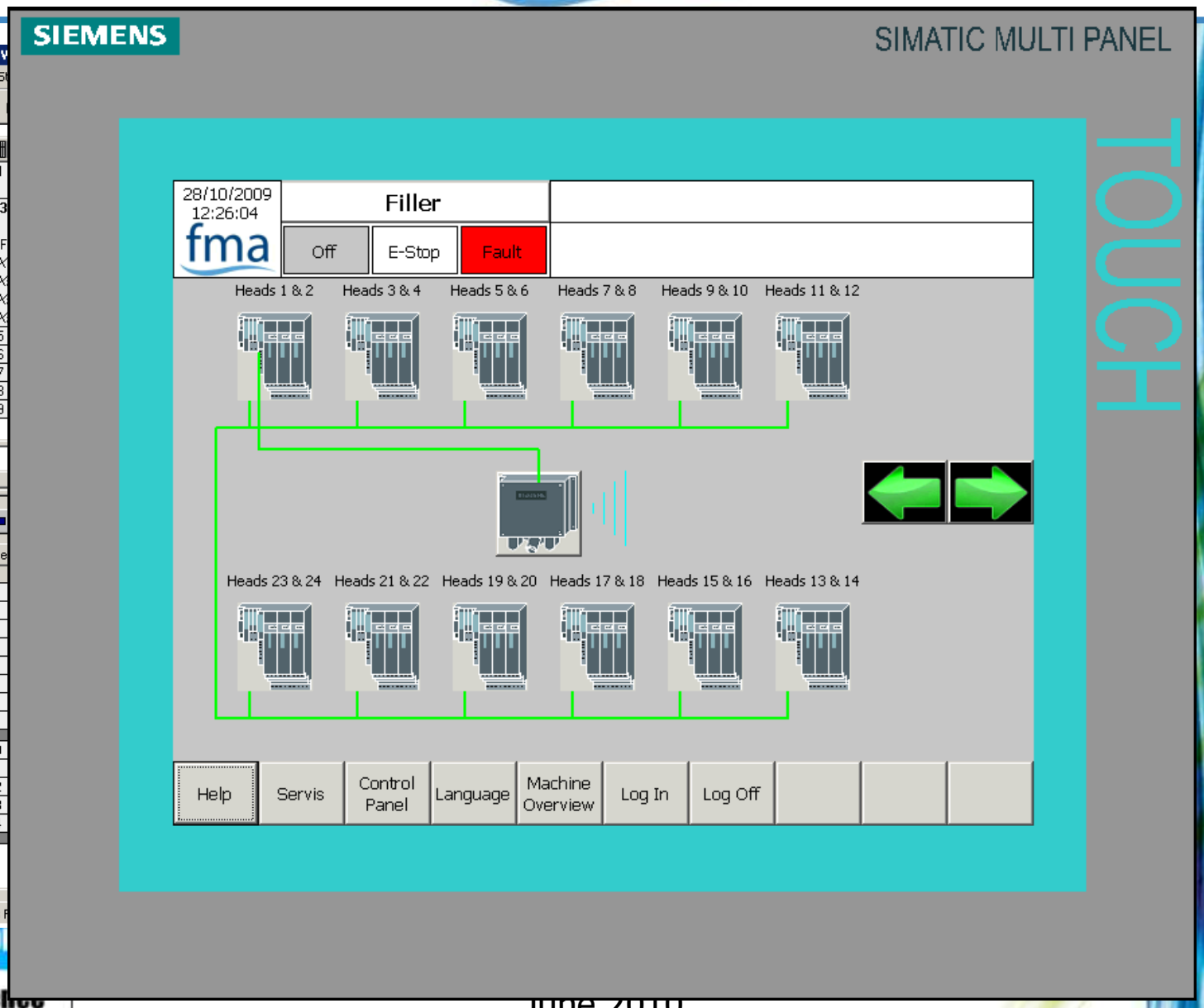
fma

daconi

•A t
com
ass
ET2

•On
exis
sing
Pro

•On
con
rem
I/O



PROFIBUS - PRO
user conferenc

June 2010

Benefits

- All the ProfiNet devices utilise MMC cards to store their identities (Device Name). Failed devices can be easily substituted by inserting the MMC card from the failed unit into the replacement.
- The Wireless access points and managed switches also employ a similar principle, where they utilise a 'C-Plug' to store both device name and configuration data such as security settings, VLAN, WDS mode etc. Again this allows easy exchange of device following a failure, without the need to reconfigure
- Existing Profibus networks can be seamlessly incorporated into ProfiNet networks, using PN/DP couplers, so migration can be done systematically.
- For remote I/O, only the bus unit (header) is different, the I/O cards themselves are the same as Profibus. Therefore the reusability of existing Profibus modules, guarantees a protection of investment, as purchasing replacement hardware is not required
- **Wireless commissioning is possible !!**
  - **(dependant on project hardware / wireless card in laptop)**

passionate about wireless

Why Survey?

- To save cost
  - eliminates wrong installation costs
  - reduces operational downtime costs
- To determine the ideal number of access points
  - increase efficiency
- To specify where to install the equipment
- To work out what wireless spectrum can be used
  - avoid interference
- To check that critical areas are covered
- To check installation restrictions:
  - cabling, mounting, power
- **Get it right first time**

The Plsen Survey Objectives

- Identify existing wireless sources
  - Enables wireless band and channels to be specified
- Measure building wireless propagation
  - To specify the number of access points and their location
- Identify installation obstacles
  - Enables power, mounting and cabling to be specified
- Measure wireless performance
  - Enables best antenna to be specified
  - Enables wireless architecture to be specified
- Survey report specified:
  - Bill of Materials
  - Configuration of the wireless equipment

Interference – The ISM Band

(Industrial, Scientific & Medical - 2400 - 2483.5 MHz)

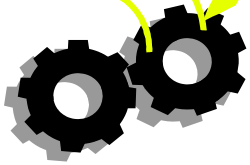
Bluetooth phones

Wireless LANs

Wireless WANs, Government & Military radio links

Microwave ovens

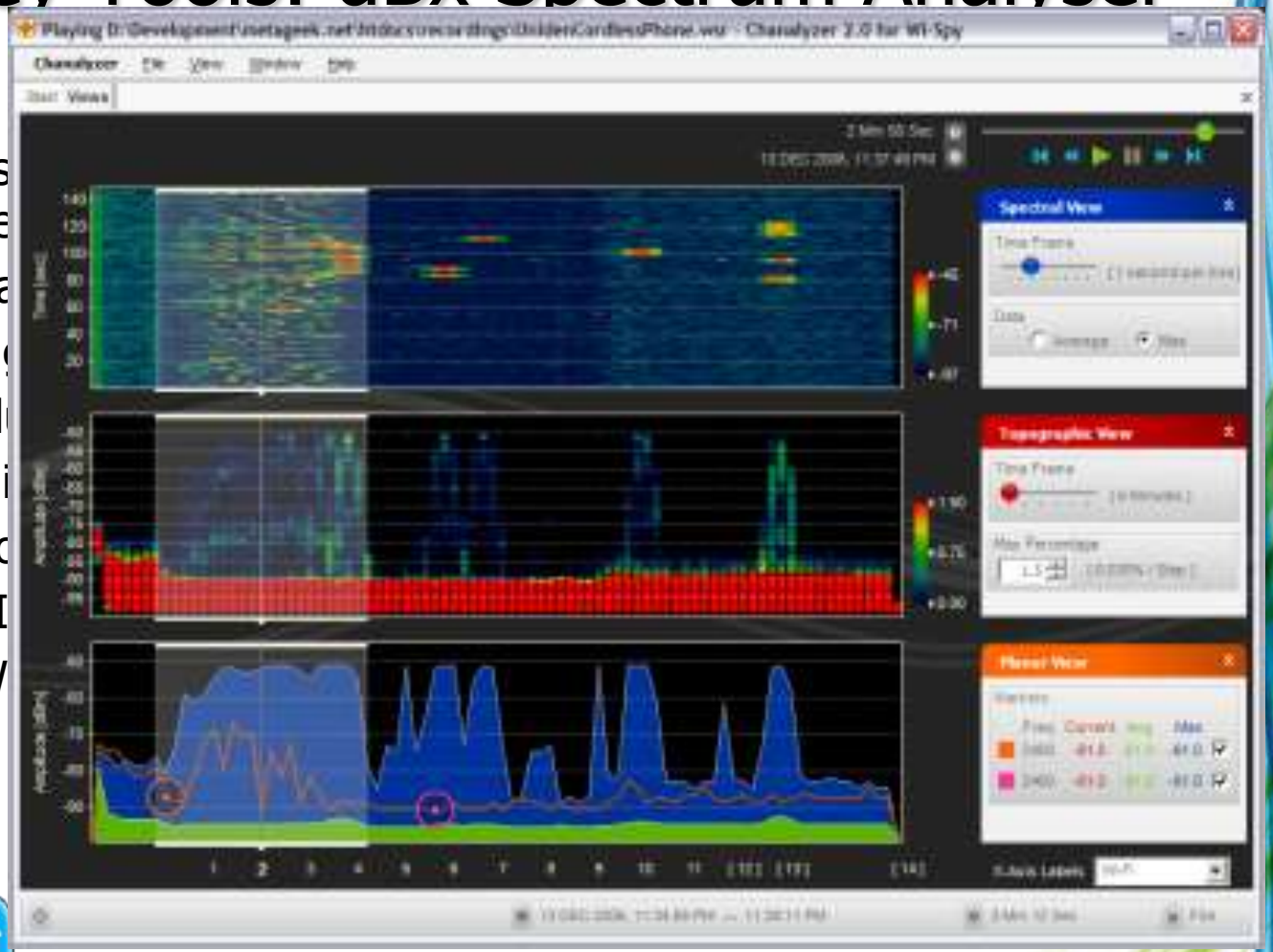
Weather, Military and Civil Radar



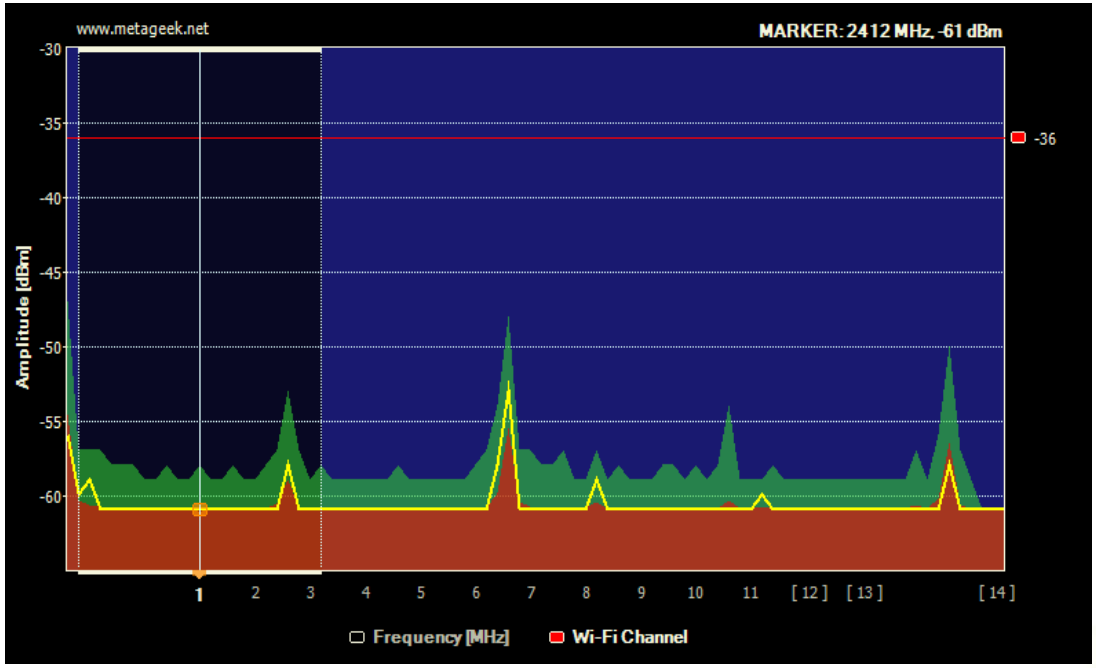
Industrial Equipment

Survey Tools: dBx Spectrum Analyser

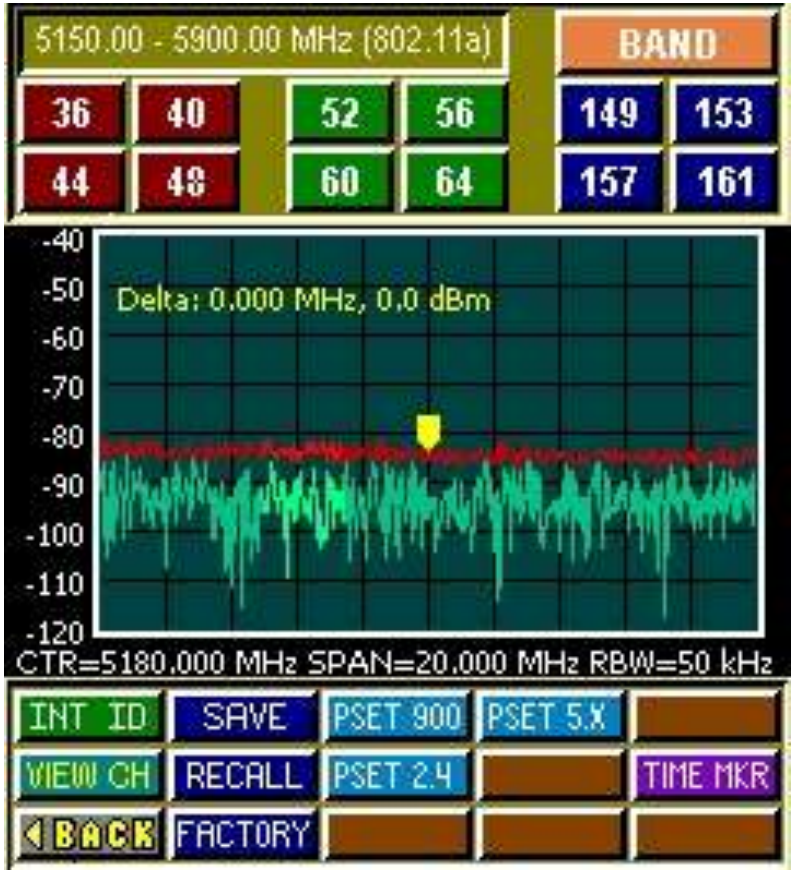
- 2.4 &
- shows
  device
  - Ra
  - Zi
  - Bl
  - Mi
  - Cc
  - PI
  - W



2.4GHz band interference

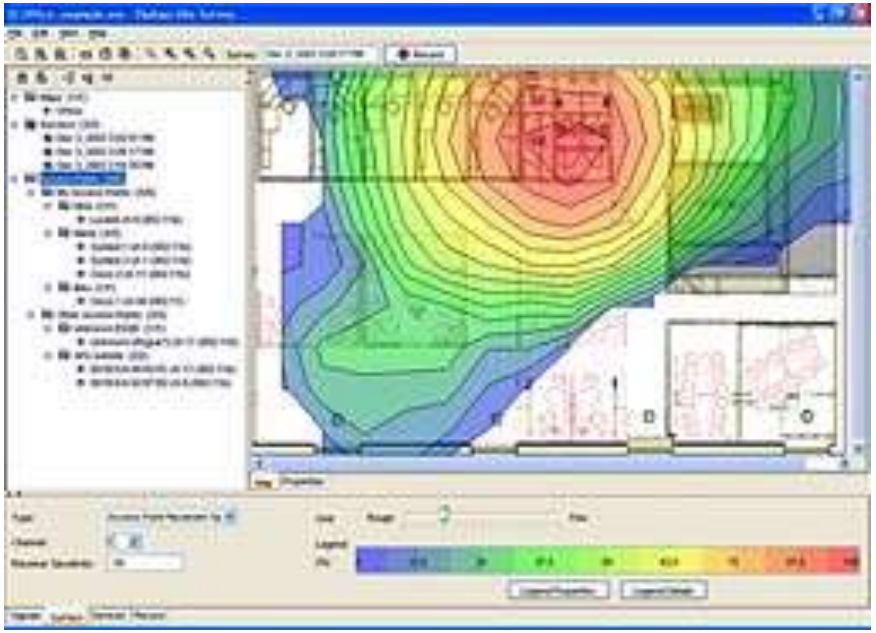


5 GHz band interference



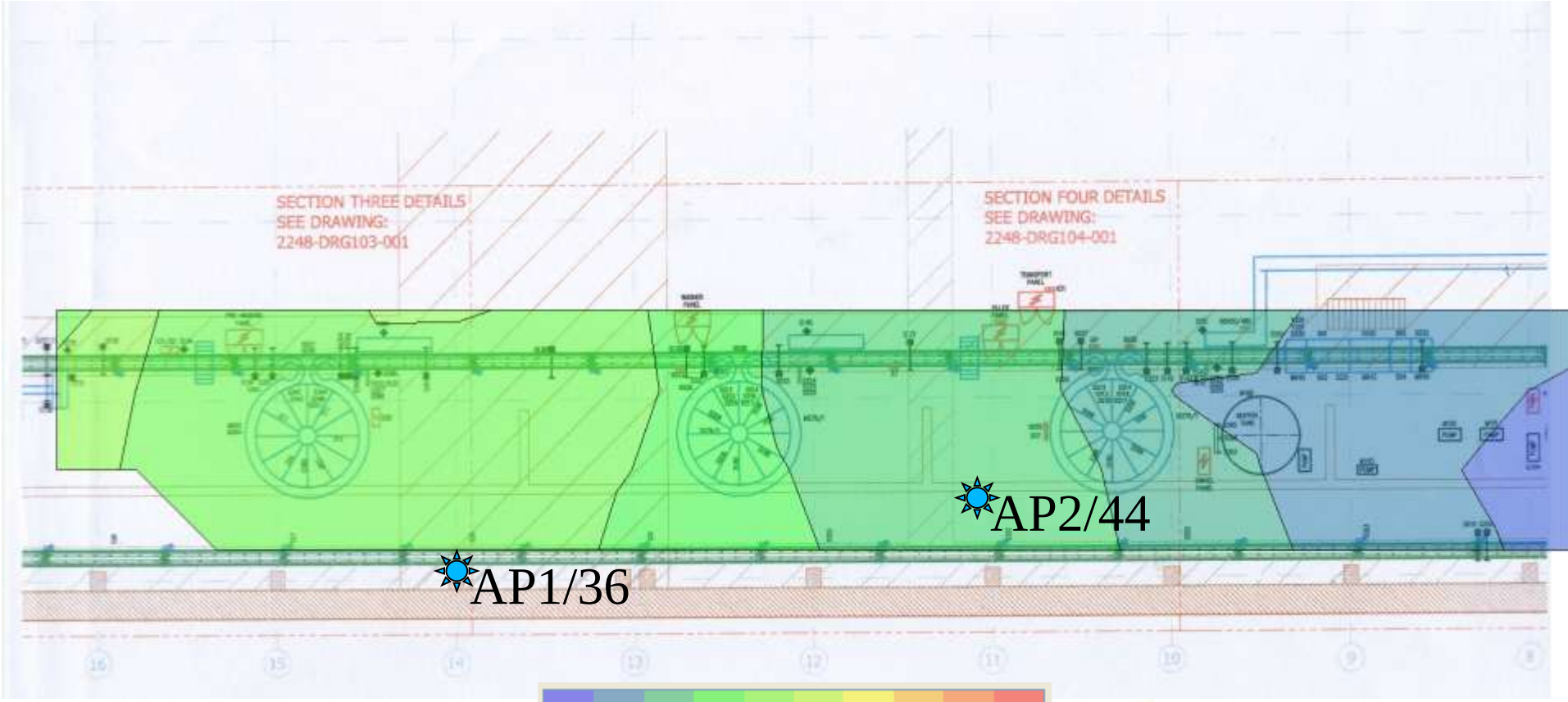
Survey Tools: Ekahau Site Survey Tool

- 802.11 a/b/g/n WiFi networks
- shows existing WiFi equipment via colour contours
- provides analysis of interference, signal-to-noise, data-rate
- aids network optimisation and planning

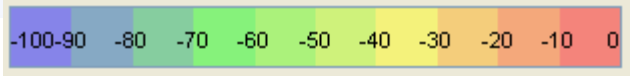


SIEMENS fma daconi

Signal Strength results from Test AP

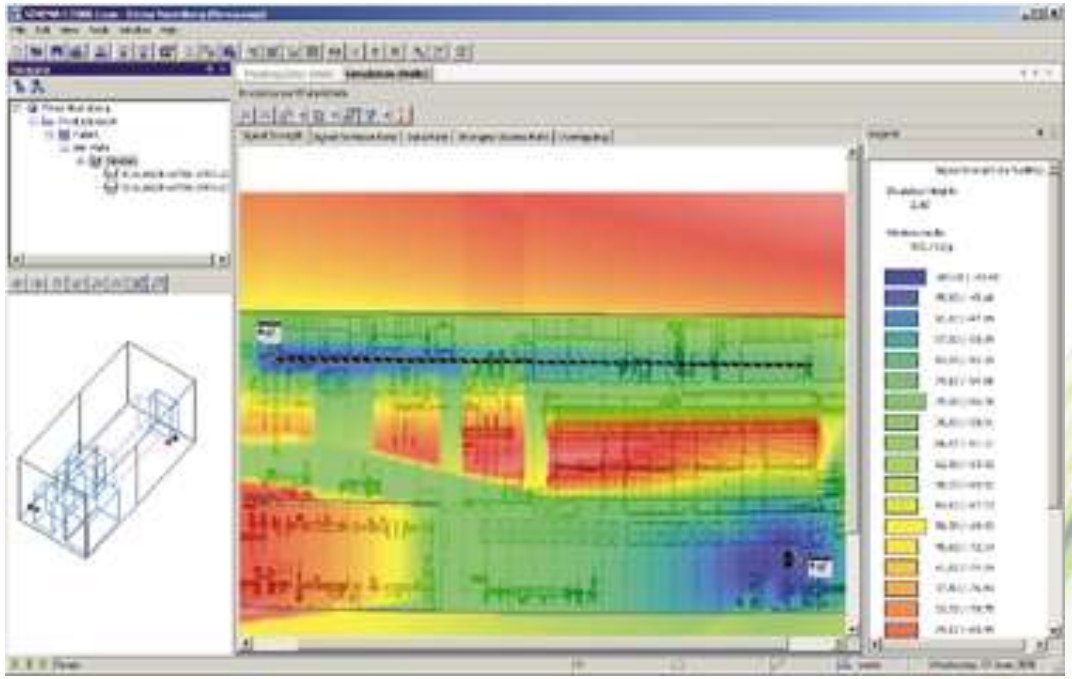


Key in dBm



SIEMENS SINEMA E – wireless simulator

- Allows planning of a wireless network
- Permits what if's to choose Access Points and Antenna models
- Reduces time required on site

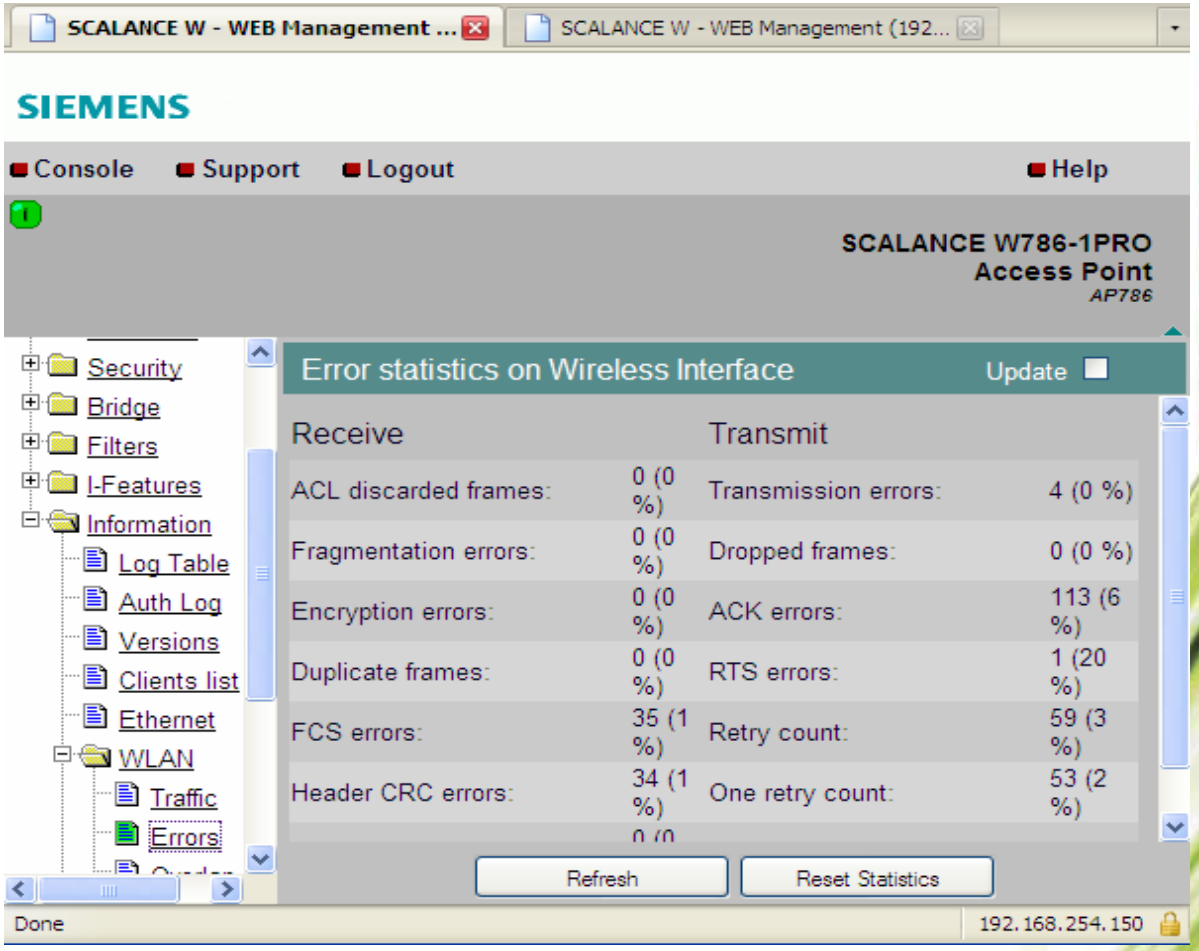


Solution Design

ANT795-6MN

- Architecture: WDS
  - no client association time
  - 12 IP addressable devices per carosel
- Security: AES 128 bit PSK
- Band: 5GHz
- Channels: 36 & 44 non-DFS
- Antenna choice:
  - W786 integrated omni-antenna
  - Dome antenna for carousels
    - IP65 rated

Fill AP Web i/f Performance Results



Wireless Survey Summary

- Daconi are wireless experts
- A wireless survey is critical to:
  - getting it right first time
    - right equipment, right configuration
  - keeping costs under control
    - works first time, every time
  - mitigate risks and meet legal requirements
    - eliminate 'soft' time consuming problems
  - providing the bespoke solution that meets the customers requirements
    - provides the Bill of Materials
    - specifies the operational configuration

- The blend of FMA's solution integration skills, Daconi's wireless expertise and SIEMENS Industrial grade products combined to provide an upgrade which exceeded Plzensky Prazdroj requirements.

- Ondřej Sykora, discusses: "There have been significant improvements to the efficiency of the site resulting directly from the installation. We have benefited from reduced downtime due to enhanced alarming functions which means we can find faults faster and rectify them sooner. Also, we now have quicker resumption of power in the event of a power outage which has improved productivity. In addition, the reduction in numbers of PLCs has meant we no longer have such a reliance on inter-PLC communications where problems were difficult to diagnose and remedy. Our service technicians have also found the PLC code easier to follow now it is in S7 format and, again, this has kept downtime to a minimum and helped ensure the line runs as efficiently as possible."

SIEMENS fma daconi

Questions ?

…..Video here…..