



SIEMENS

Small Scale PA

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Agenda

- What has changed?
- The application
- The HART solution
- The problem with HART/ why PA
- The PA solutions
- How do the economics work out?

What has changed?

Up until the last few years, the cheapest Profibus master was still over a thousand £.

Then...

- HMS Ethernet to Profibus gateway (~450 £)
- S7-1200 micro PLC with Profibus interface (~500 £)
- IFAK gateways (~1200 £)

Plus, to link to PA, last year there were two manufacturers, now there are 4:

- Siemens
- P+F
- Procentec
- IFAK

Profibus is not just for large applications anymore!



Application: Small Scale Oil and Gas



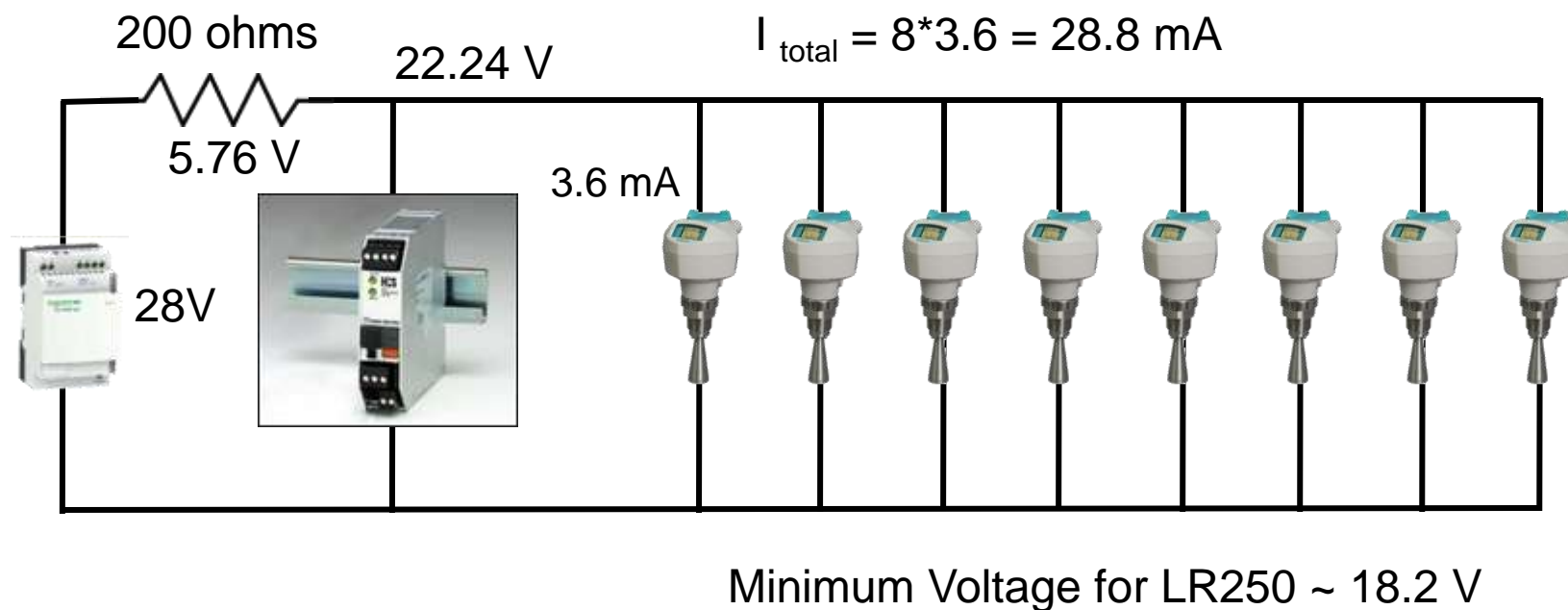
The HART solution

Multi-drop HART

Used a HART to Modbus RTU converter (HCS by Moore Industries)

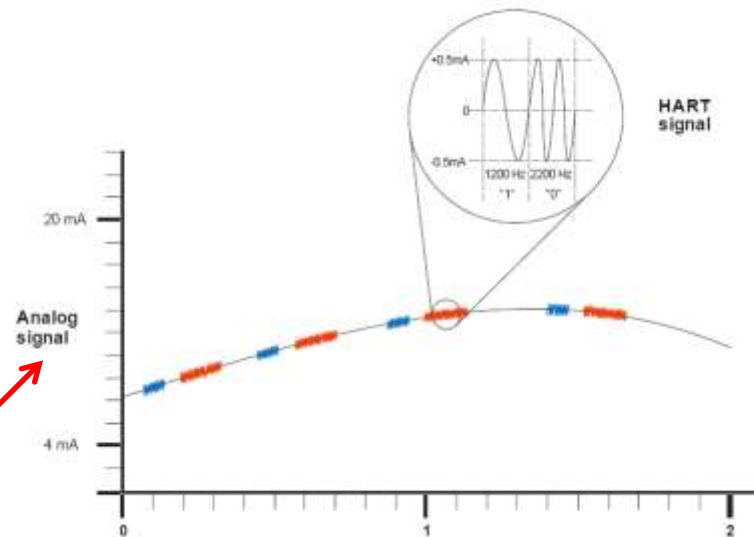
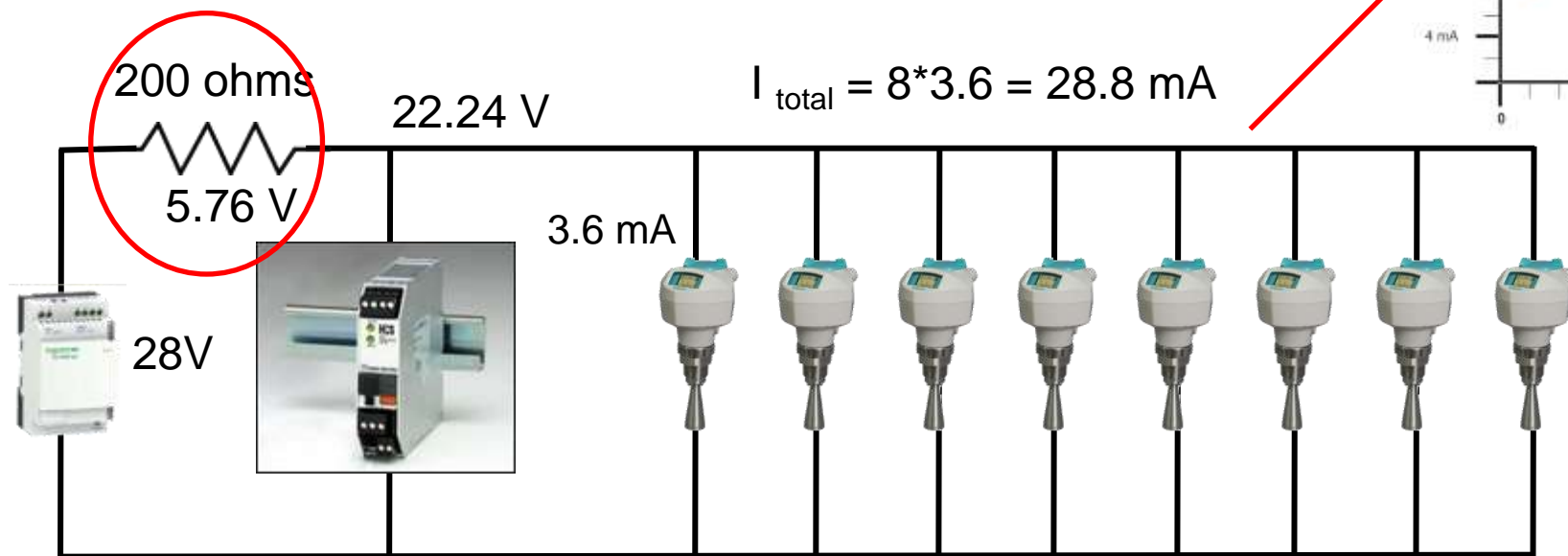
Results

90% of sites worked with the odd problem
9% of sites were problematic
1% of sites did not work at all



Problem with HART

- Sizing the HART resistor (having to modify it in cold weather operation)
- HART waveform



Minimum Voltage for LR250 ~ 18.2 V

Why Profibus PA?

Very robust physical layer

Easier to put together than multi-drop HART (no HART resistor to size)

New features possible:

- IS wiring possible
- status information
- transparency to the instrument



Robust Physical Layer - Examples



Jetso-Diesel



Orange Sky

Univar

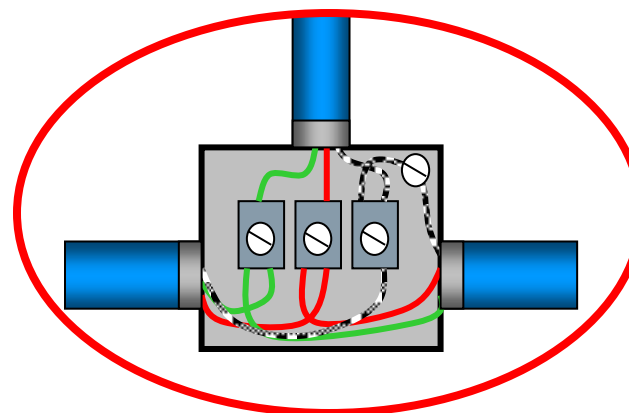
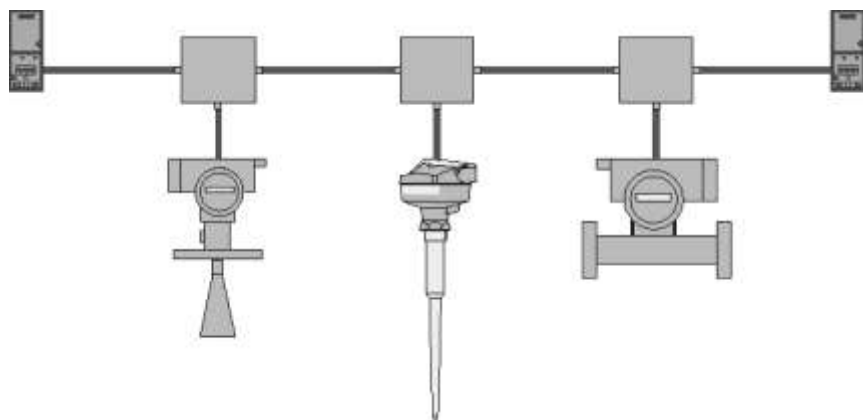


Baker Petrolite



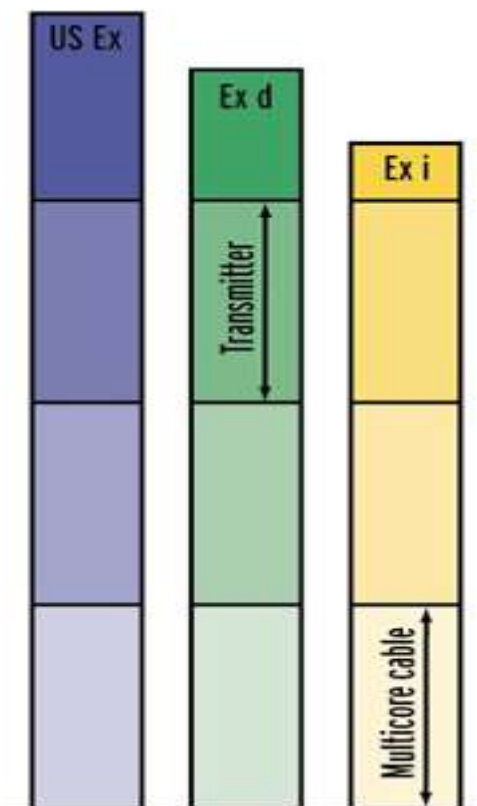
Simple Wiring

Simple Trunk wiring
No fancy junction boxes
Simple terminal strips
No HART resister



Flame-proof vs. Intrinsically Safe

Costs \$\$



EX Proof

- Rigid Conduit
- Epoxy Seals
- Expensive fittings
- Longer time to install
- Not very flexible
- More expensive
- Can't do live service
- Not as safe

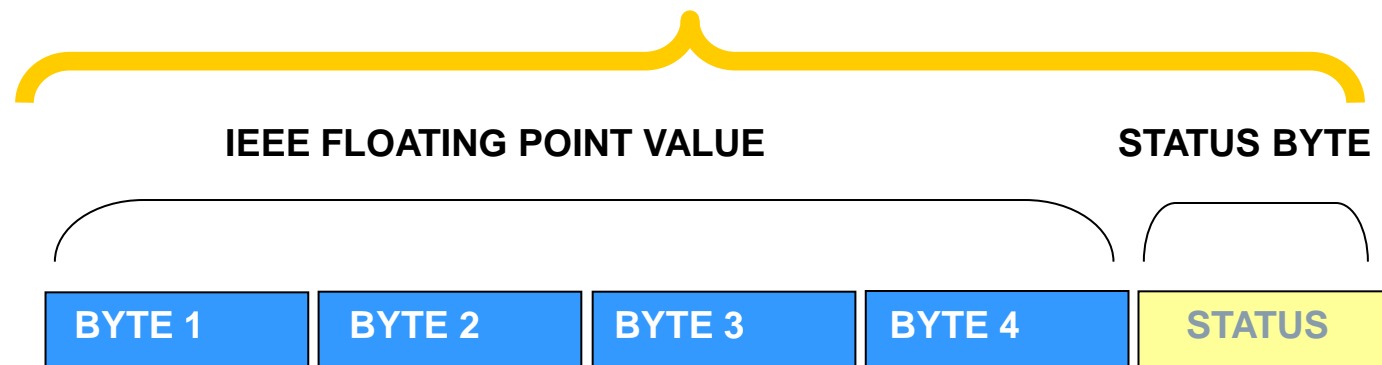


Intrinsically Safe

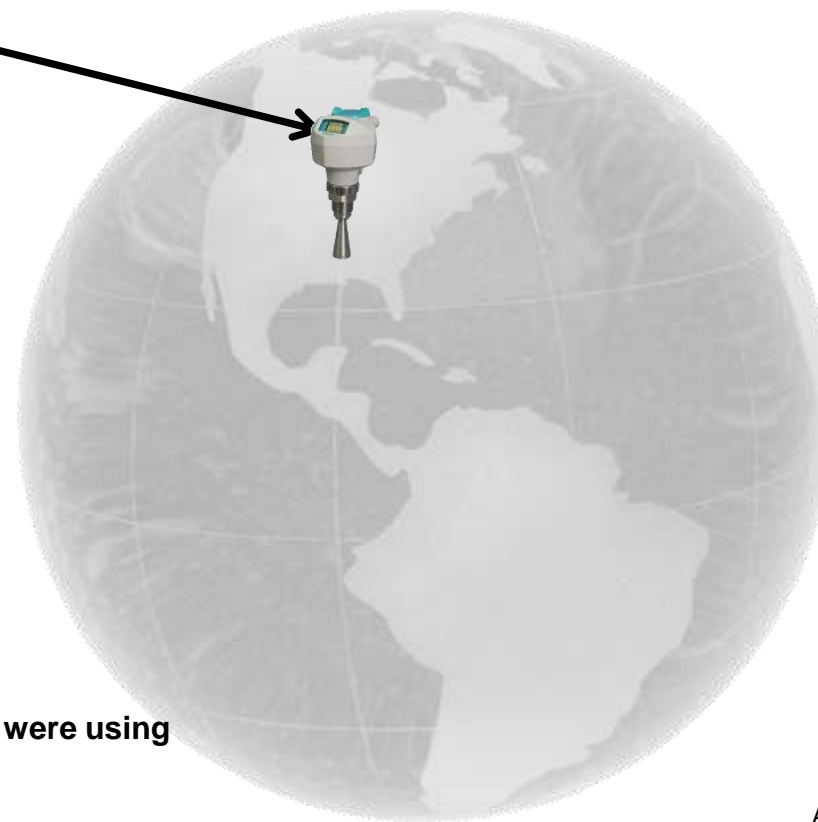
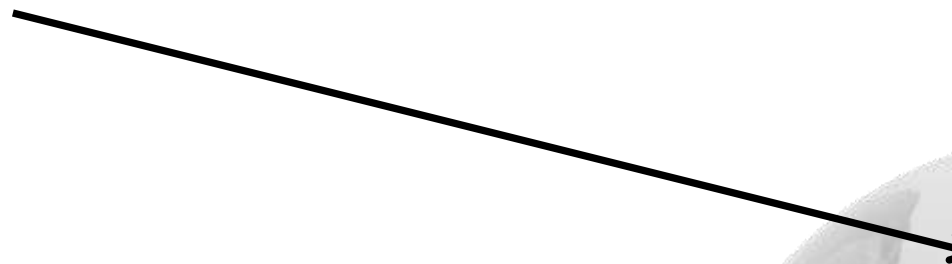
- Flexible cable
- Plastic cable glands
- Simple to install
- Safer (less prone to human error)
- Live servicing



Status Information is transmitted each time



Transparency* to the Instrument is now possible with new hardware!

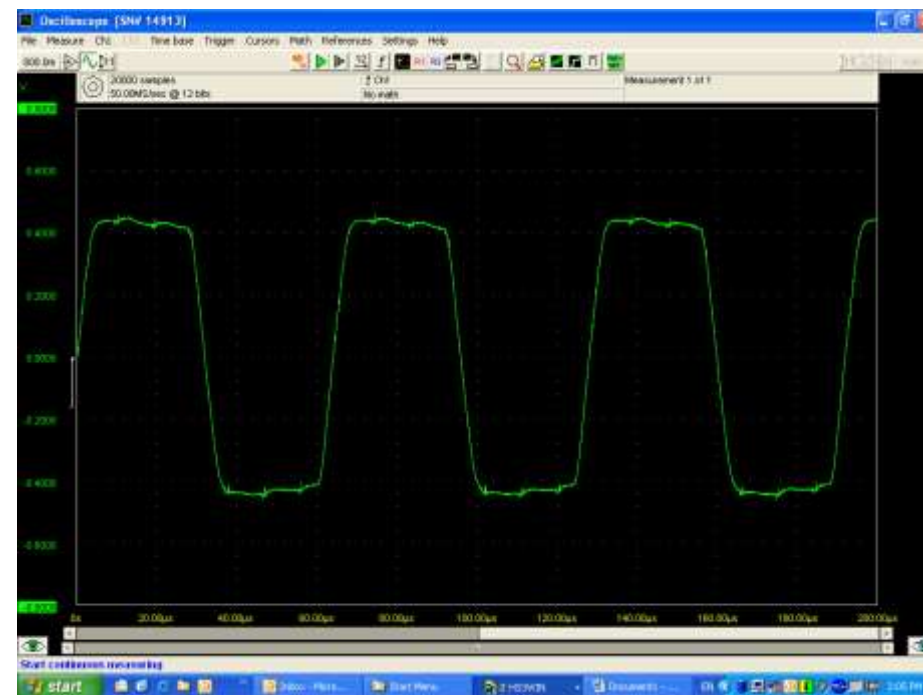


***Note: Transparency can be done with HART as well, but not with the hardware they were using**

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1st Trial Site!

Picked the site that HART would not work at all
Replaced the LR250 HART heads with LR250 PA heads
Changed the wiring
Used simple terminal strips
It worked right away!
No repeats and a perfect waveform!



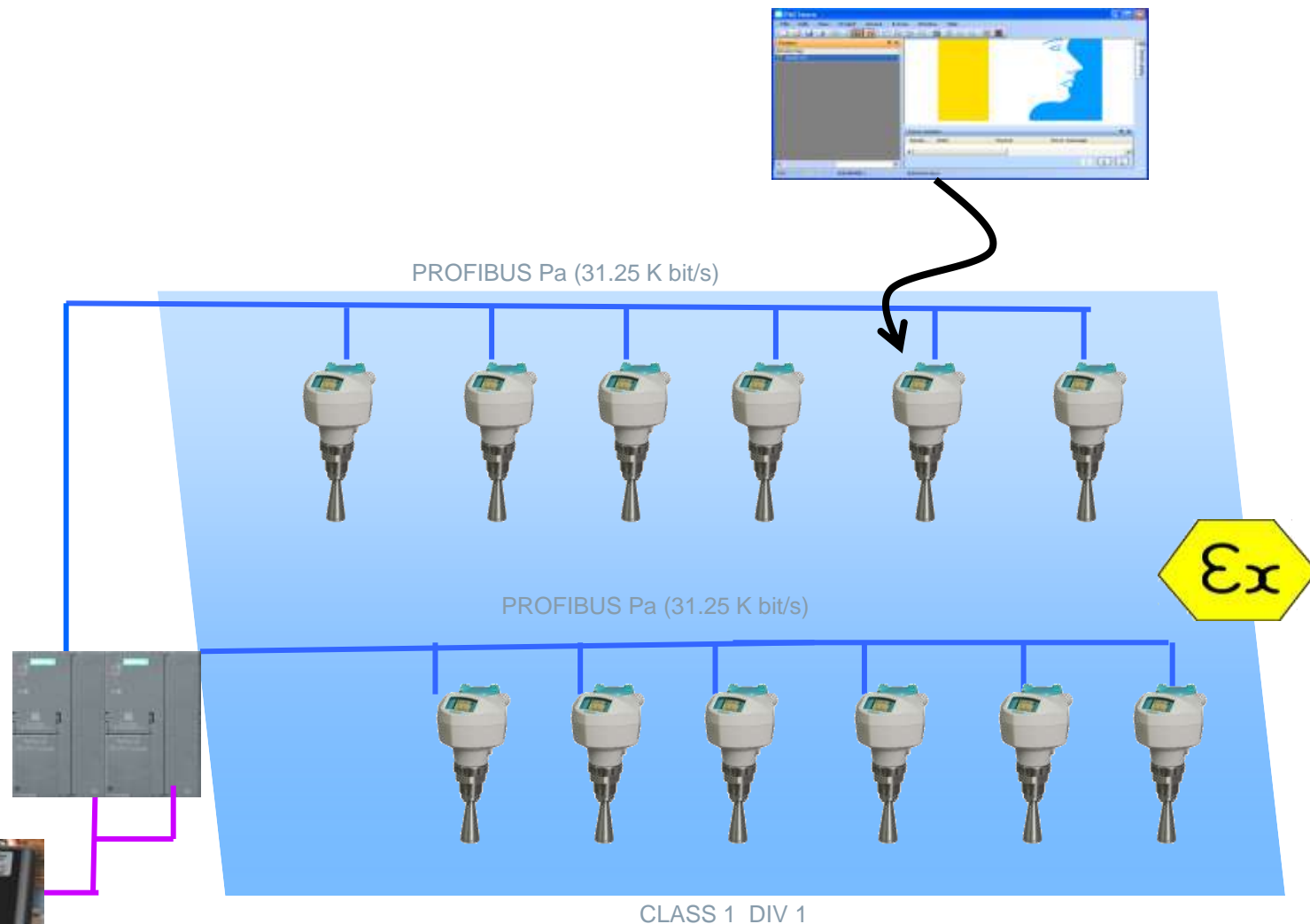
The current solution!

- GSM/GPRS Modem
- Ethernet Switch
- Micro-PLC (Schneider Electric)
- SITRANS LR250
- Anybus Gateway (Profibus master on One side and Modbus TCP/IP server on the Other side)
- Siemens DP/PA Ex Couplers
- Pactware with SITRANS DTM



MODBUS TCP/IP
INDUSTRIAL ETHERNET

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The current solution!



Economics of PA and IS instead of Ex construction

Multi-drop HART (using Ex)

- Used cheaper gateway
 - Had no transparency
 - Expensive Ex fittings
- Because of Ex fittings, instruments are hard to remove
- HART comms did not always work

Profibus PA (using IS)

- Used cheaper fittings
- Did not have to be careful with conduit
 - Had a more expensive gateway
 - Required couplers
- Instruments were slightly more expensive
 - Had transparency
 - Worked!

For their typical application, the Profibus solution was only between 15% and 20% more expensive than HART multi-drop, but cheaper when you take into account that:

- Profibus worked!
- Transparency could reduce site visits
- if you have to change an instrument, it was now easy!

Alternate Solution

GSM/GPRS Modem

Micro-PLC

Ethernet Switch

IFAK IsNet Lite with Modbus and PA module

Pactware with SITRANS DTM

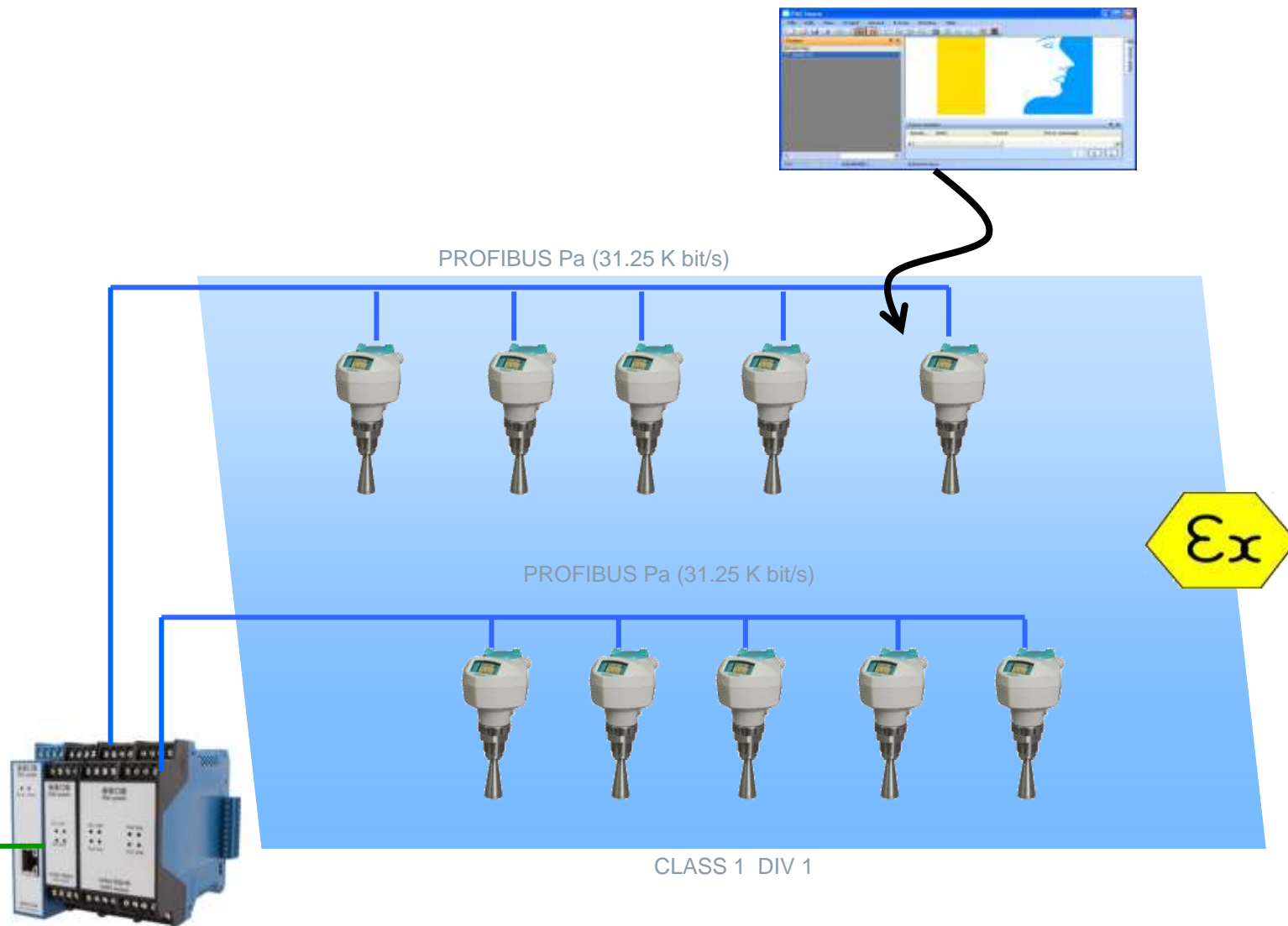
LR250

This has a lower capital costs



Profinet

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