



## **Safe Operation of Chemical Plants**

New Techniques to improve safety

*FieldApp TAGnology*

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Specialisation

Expertise

Main Services and Products

Why Mobatec Modeller?

Why Modelling?



## Background

- PhD in dynamic modeling
- 2 years Protomation
- Mobatec (13 years)
  - 1<sup>st</sup> 7 years just 2 people + coordinator PPD
  - Focus: models, consulting, software development
  - 1<sup>st</sup> Large project => Growth
- 4 years ago: started OTS (Operator Training Solutions)



## Specialisation

## Expertise

## Main Services and Products

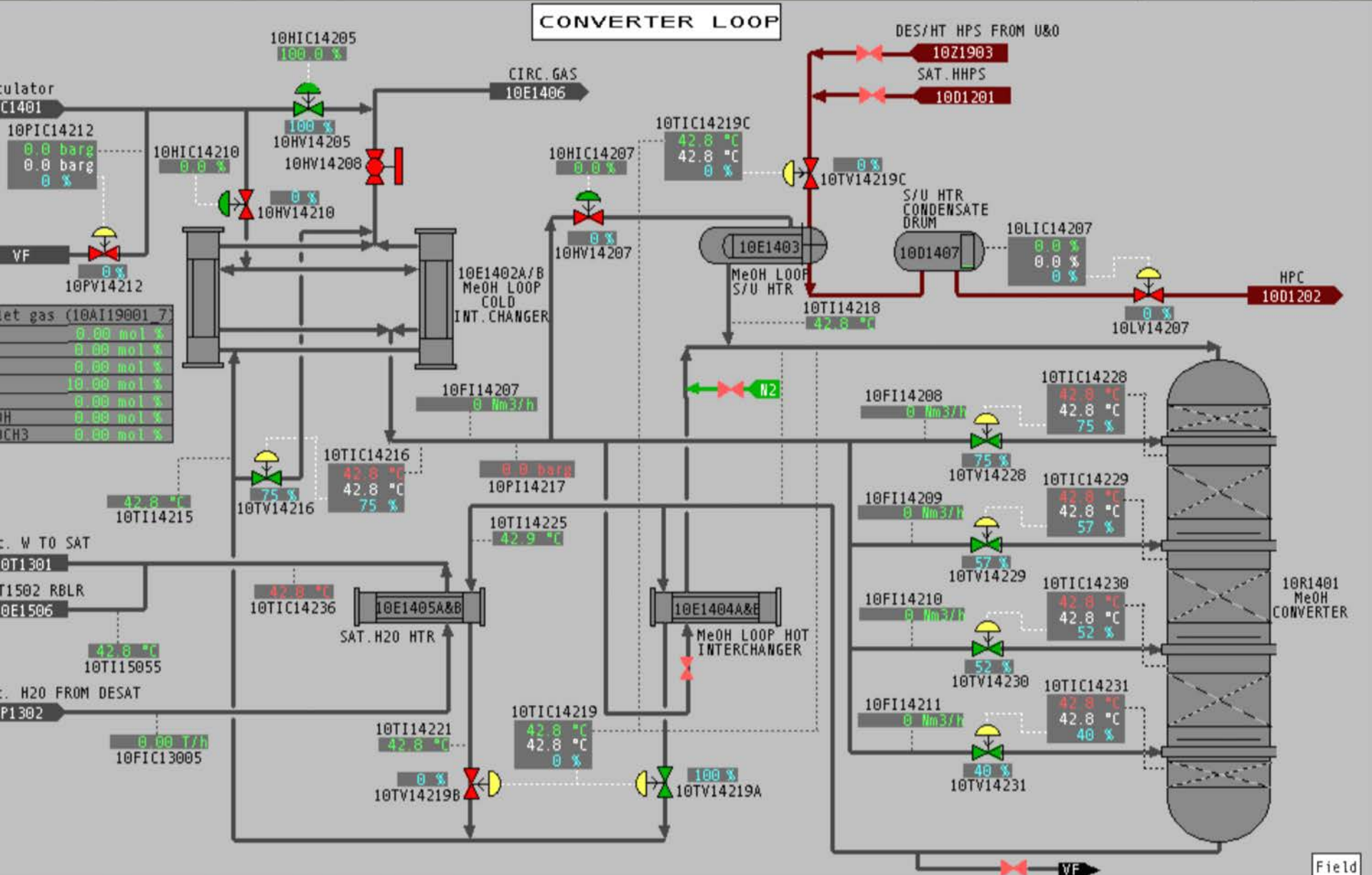
## Why Mobatec Modeller?

## Why Modelling?



## Specialisation

- Mathematical Modelling of any kind of process knowledge in Chemical Engineering
- Modelling Activities for purpose of:
  - Process Design
  - **Process Analysis**
  - Process Optimisation
  - Process Control
  - **Real-Time Training Simulation**







Mobatec

Modelling Examples

Modelling Approaches

Our Approach

Examples

Conclusions

Specialisation

Expertise

Main Services and Products

Why Mobatec Modeller?

Why Modelling?



## Main Services and Products

- Construction of Process Models
- Consulting Services Related to Mathematical Modelling
- Mobatec Modeller
- LauTrane Solver



Some of the Mobatec customers:



STC-GROUP

DSM



سابک  
sabic

HUNTSMAN

TU/e

Technische Universiteit  
Eindhoven  
University of Technology

bodec  
process optimisation and development

nyrstar

Protomation

ExplainMedia

lyondellbasell



Stamicarbon  
pure knowledge

ACTEMIUM

# Introducing *Real Reality* in Operator Training: Field Simulator Training

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# Chemical Process Industry in the Past

## History of most chemical plants

- Built 25 – 50 years ago
- First years exposed to many up sets:
  - equipment failures
  - disturbances from the outside world
- From start-up: low degree of automation

## Result

- A lot of hands-on experience



# Chemical process industry today

## Smooth operation

- less disturbances
- greater intervals between maintenance shut downs
- higher degree of automation

## Result

- lack of hands-on experience

## And

- operating window smaller
- automation paradox

## We expect

- same professionalism as before

# What will be happening?

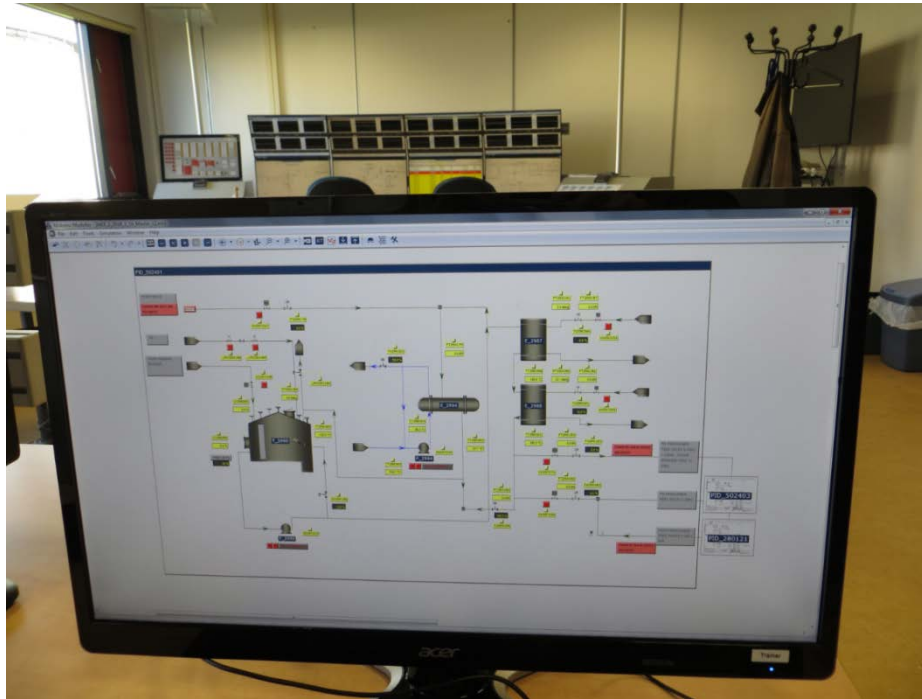
## Soon

- experienced operators will retire
- new operators hardly exposed to abnormal situations
- new operators scarce

## Society

- License to Operate not for granted
  - operator certification
- companies need to show what they are doing
- be an attractive and responsible employer:
  - give the operators the right tools

# Simulator Elements



**Dynamic Process Model**

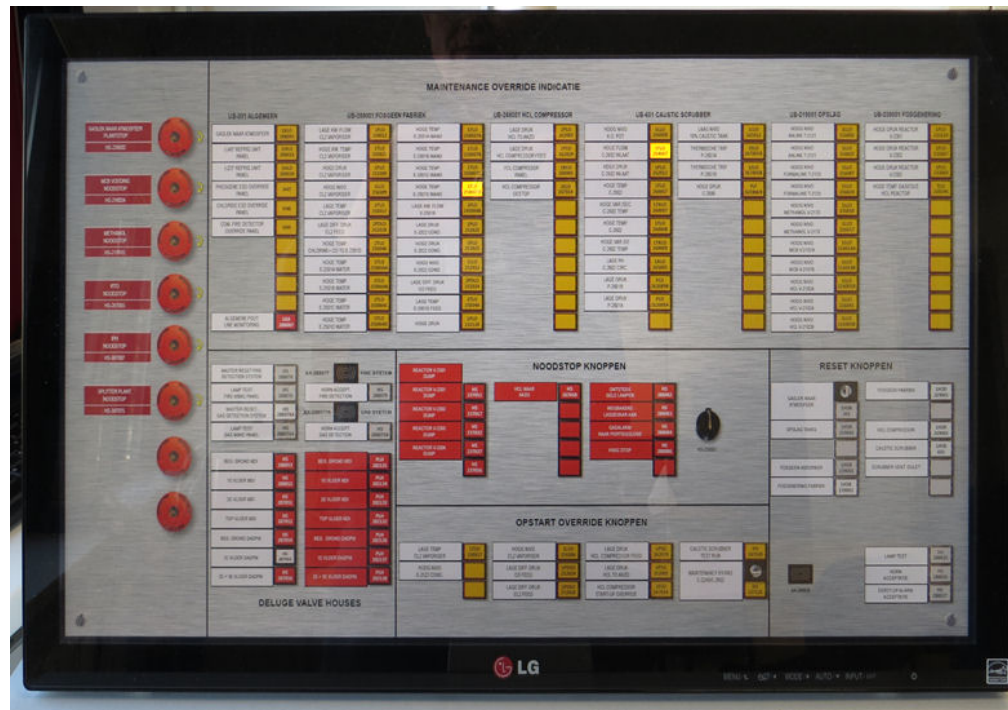


# Simulator Elements



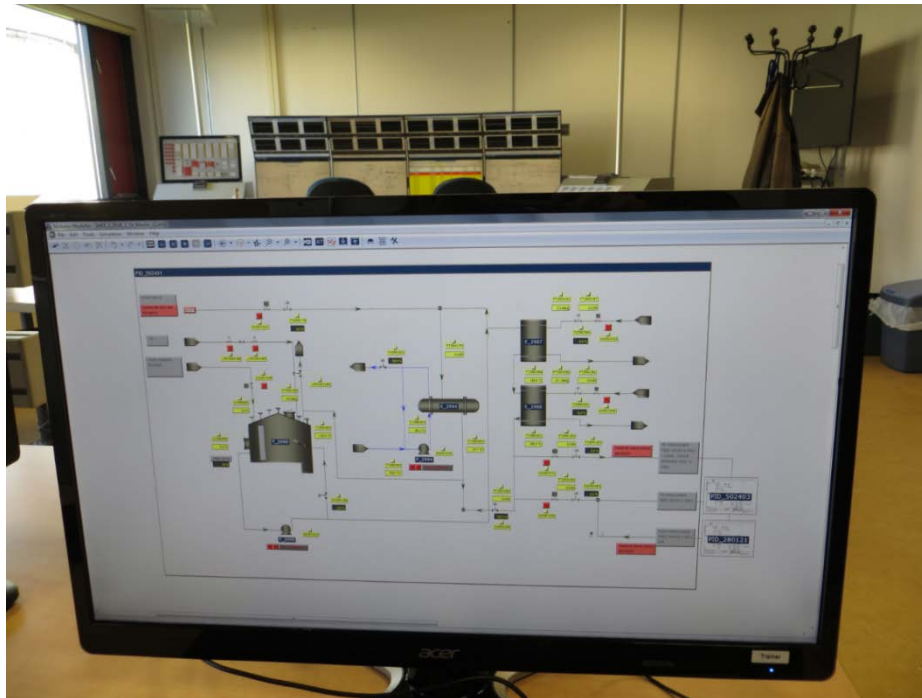
**Distributed Control System**

# Simulator Elements



Push Button Panel

# Simulator Elements



**Instructor Panel**



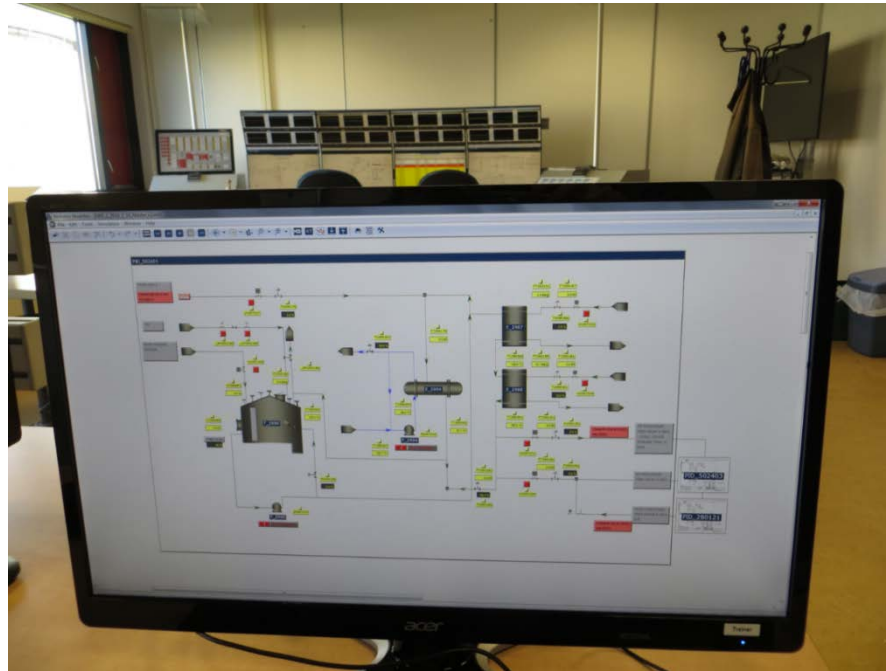
# Missing Element (so far) !



## Field Operator Involvement in Training

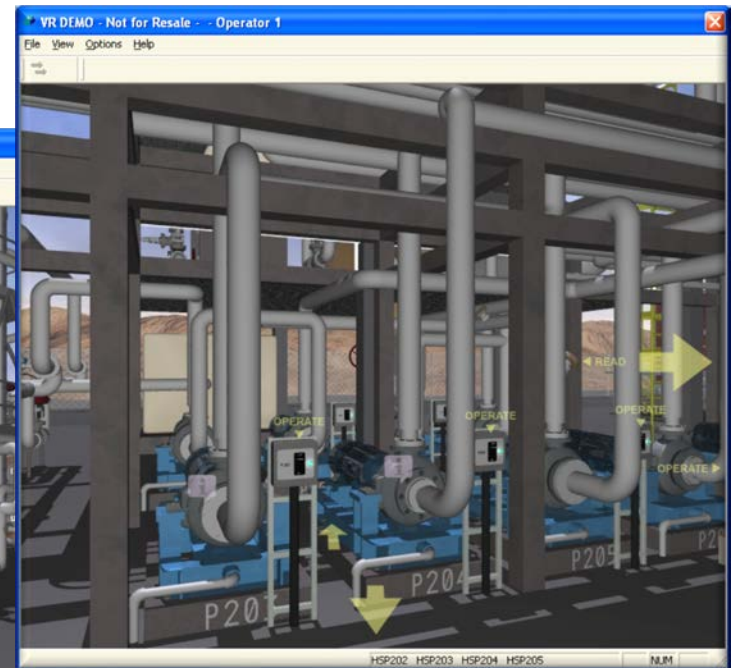
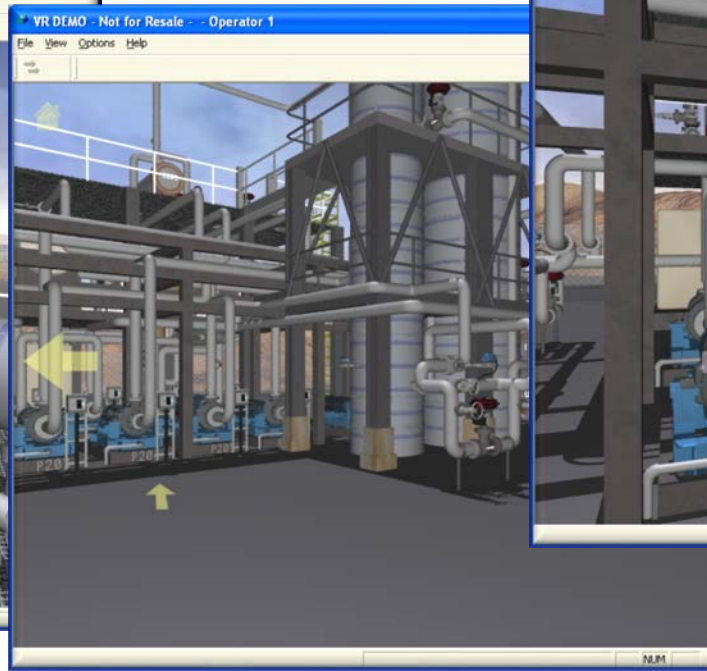
# “Solutions” to involve Field Operations

- Trainer “is” Field Operator



# “Solutions” to involve Field Operations

- Link to 3D environments





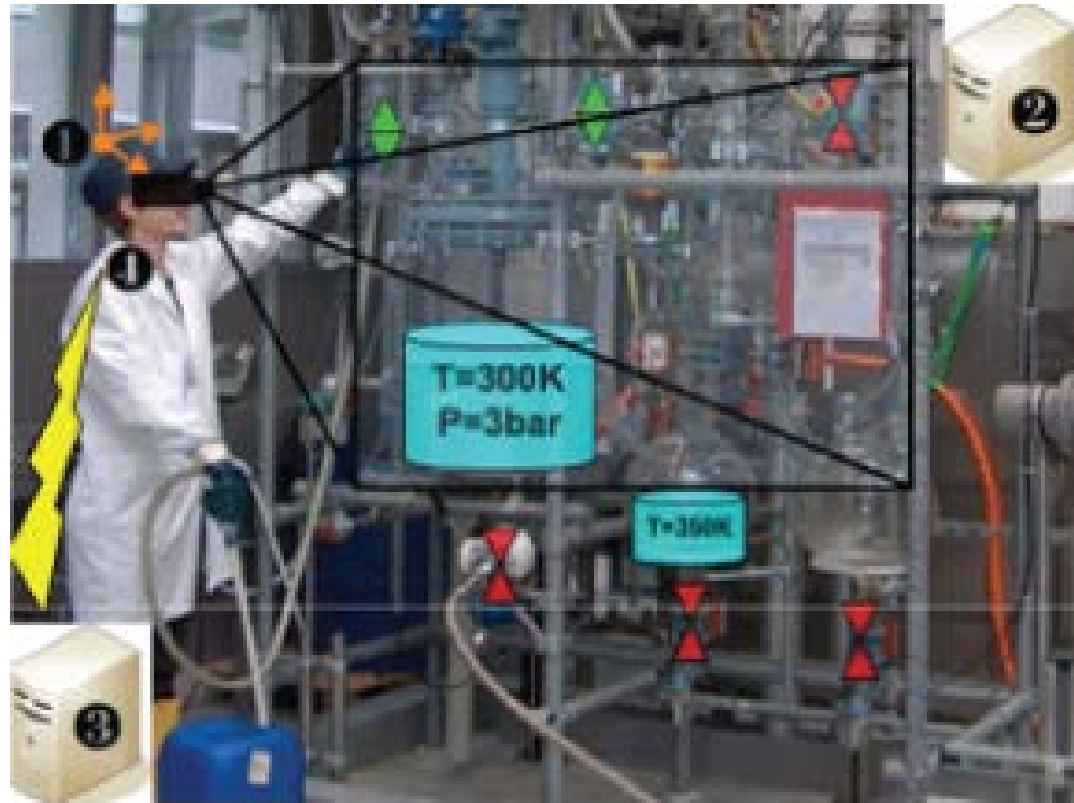
# “Solutions” to involve Field Operations

- Interactive Photographs of Field

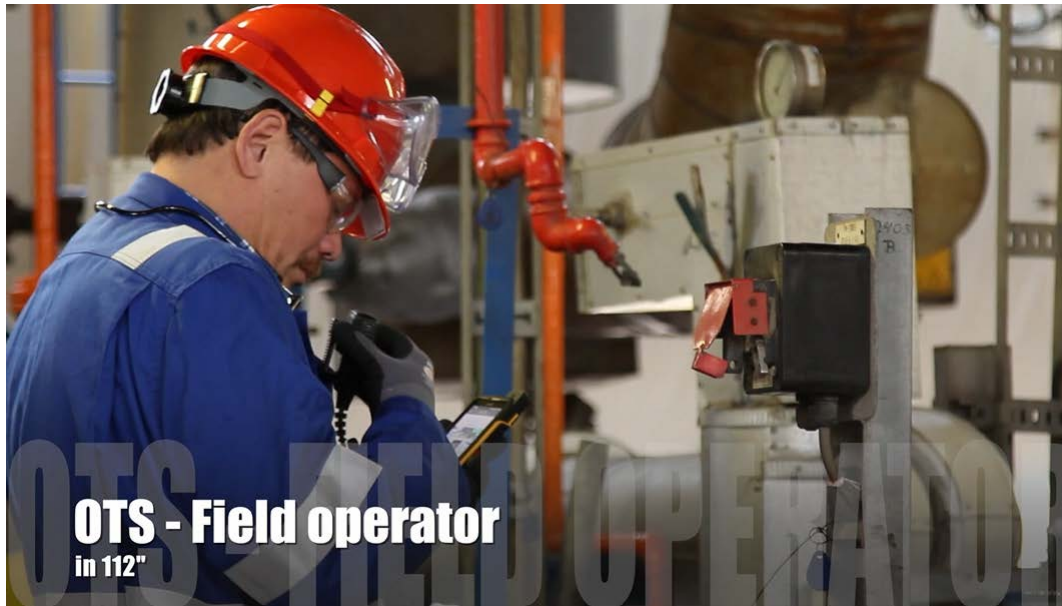


# Why not use the Real Plant ?

- Augmented Reality



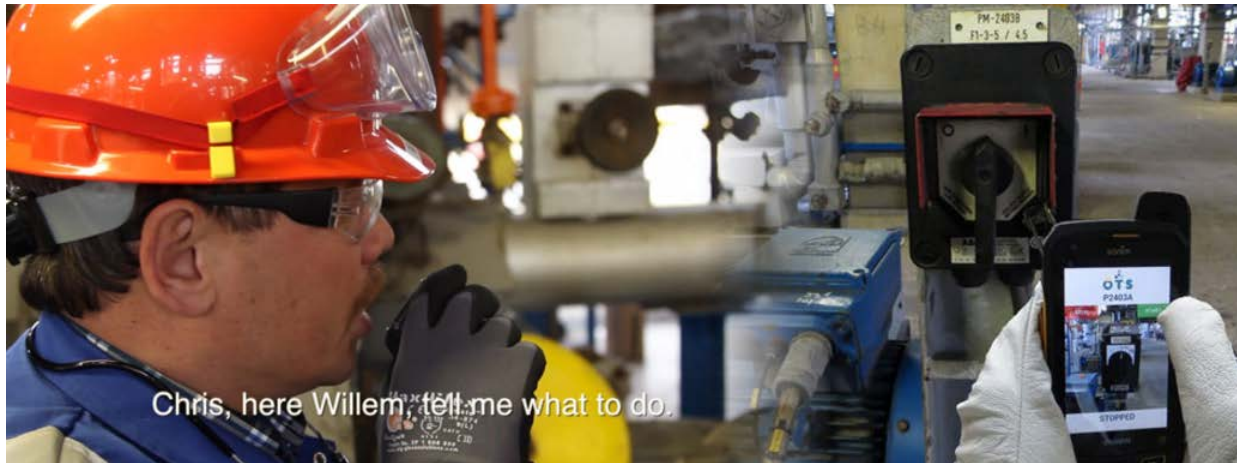
# Field-operator activities in the simulator



Go to <http://ots.expert/field-operations/> and play the video



# From the Huntsman video



**The simulated pump in the OTS can only be operated when the ATEX smart device is close to the real pump in the real plant. The real pump remains unaffected.**

# From the Huntsman video



**Teamwork will be trained under actual field conditions, like walking the real distance to the equipment that needs to be operated or watched and the nuisance of ambient noise while communicating over the radio.**

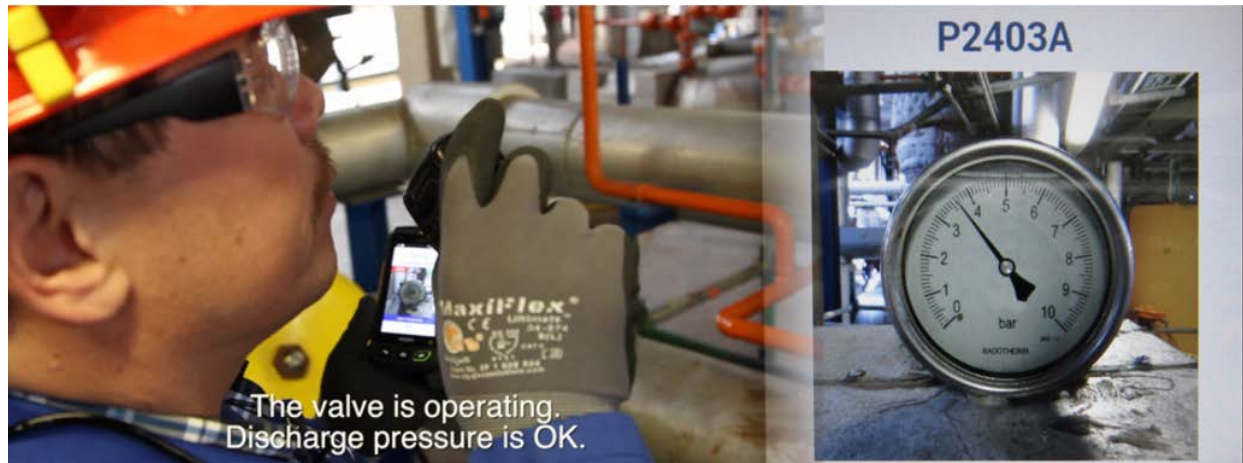
# From the Huntsman video



Now I'll open the discharge valve.

**Valves can be opened and closed while sliding a ruler to control the speed.**

# From the Huntsman video



**The simulated pressure will be shown on the ATEX smart device only  
when in the neighborhood of the real  
pressure gauge.**



# Field-operator activities in the simulator



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# Field-operator activities in the simulator

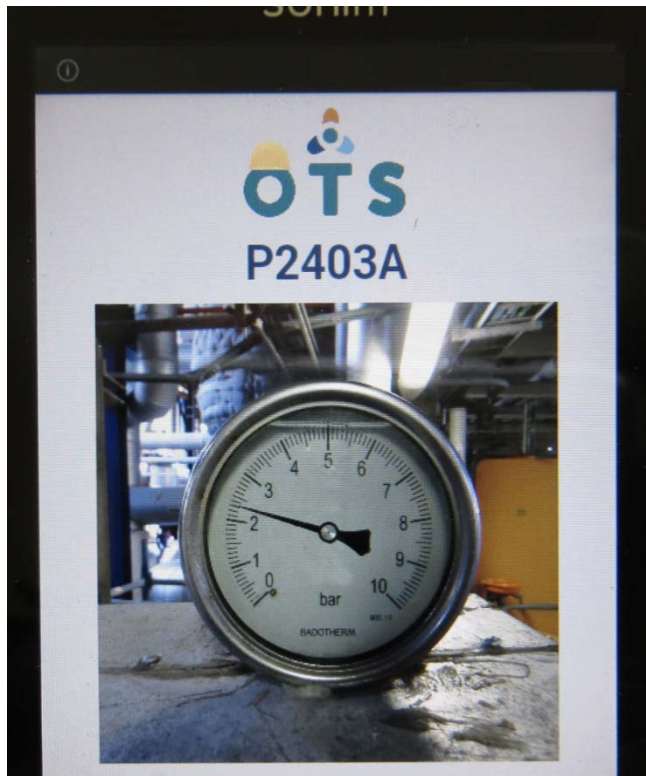


# Field-operator activities in the simulator

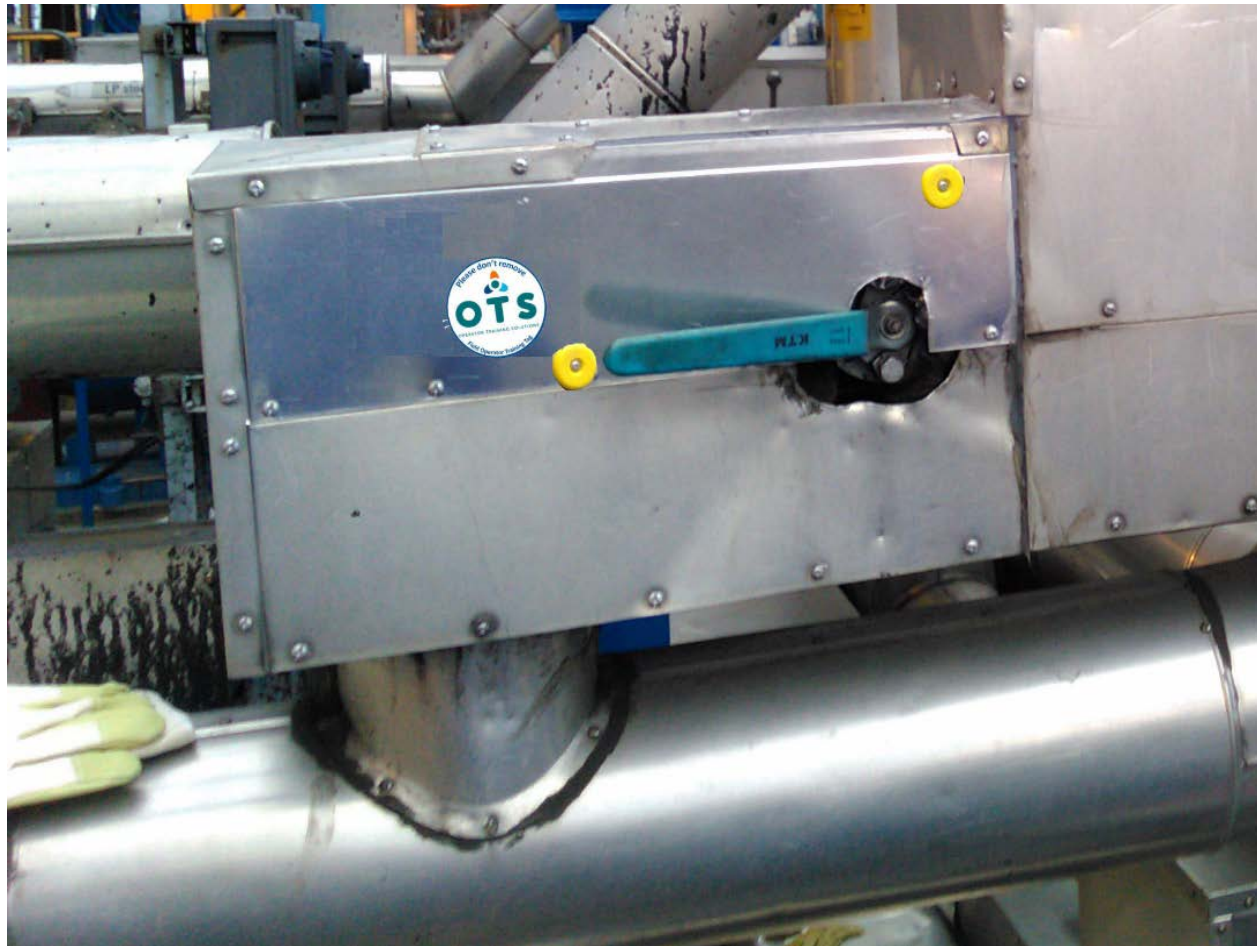




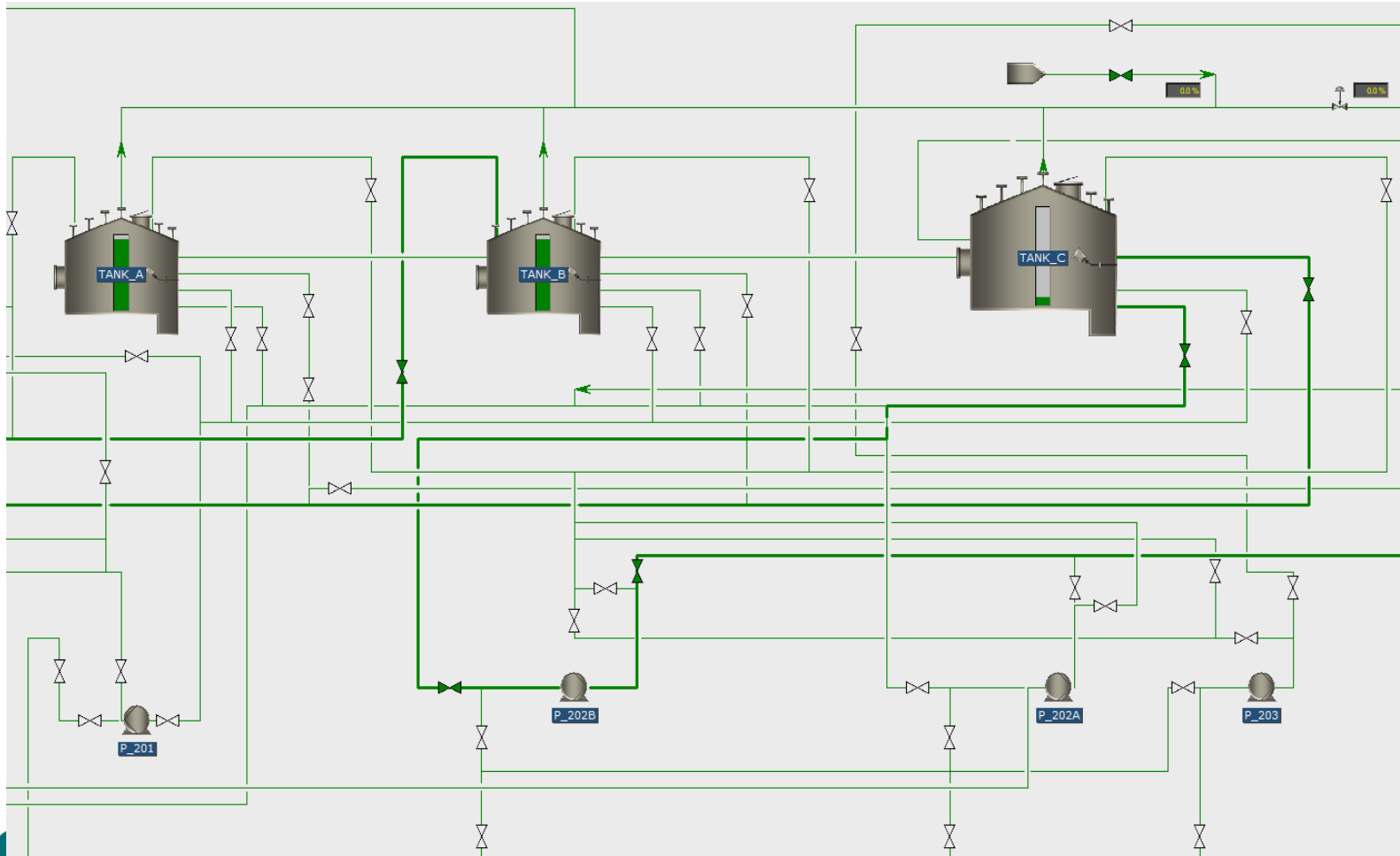
# Field-operator activities in the simulator



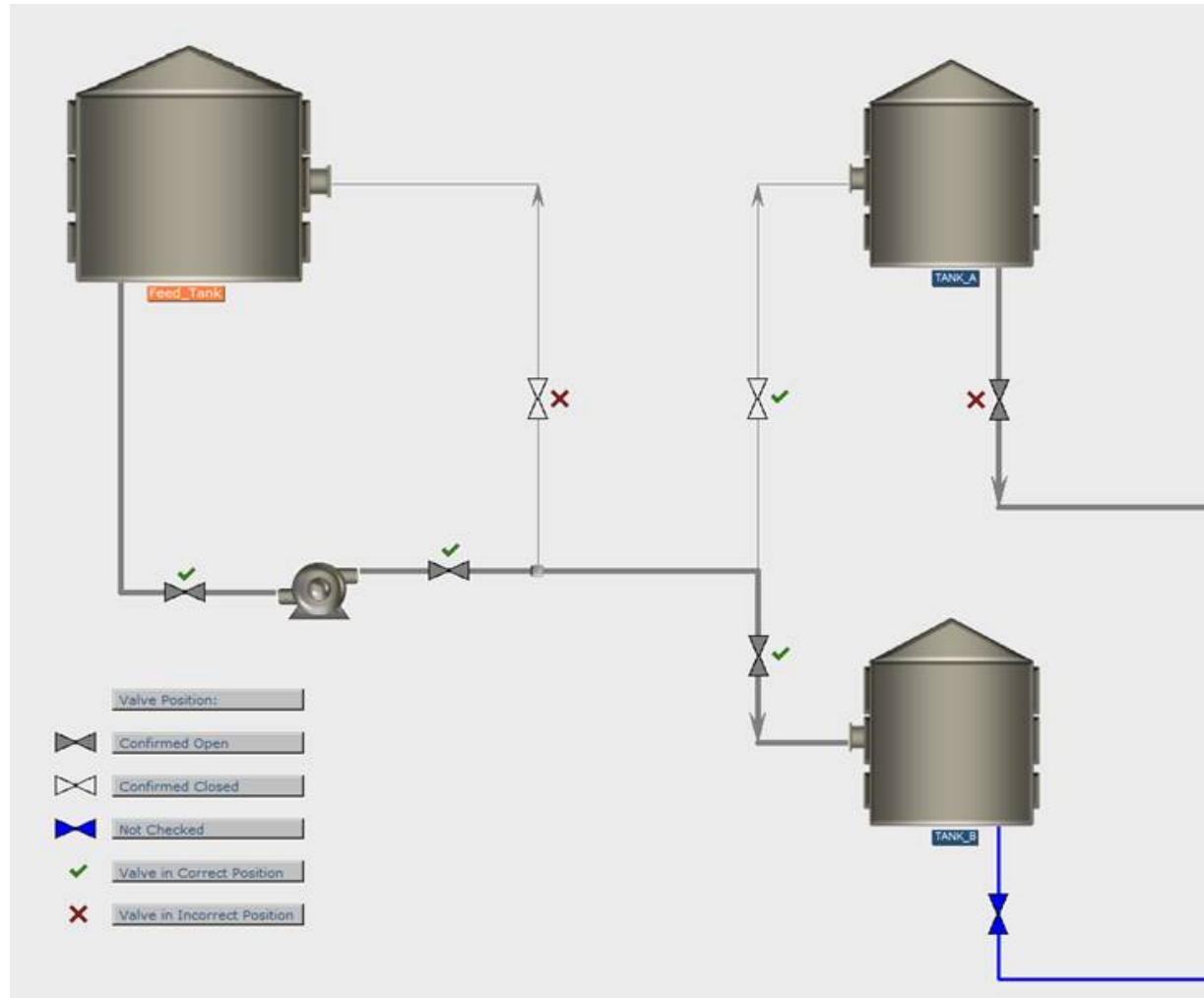
# Spin-off Idea: Use App for Operations



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# Spin-off Idea: Use App for Operations





# Conclusions

## Smart Tag Technology



- Low cost solution
- Reduces operational mistakes
- Optimizes Production
- Reduces mistakes/costs caused by wrong valve positions
- **Field and Control Room Operator Training**
- **Actual Valve Positions Overview**

- No wiring
- No special infrastructures needed
- Easily Scalable
- Any conceivable interface is possible
- Multipurpose ATEX proof solution

OTS  
(any vendor)

Field  
Training

Field  
Overview

Smart Tags

