BE A FIELD OPERATOR IN HYSYS-BASED OTS AND OCULUS RIFT VIRTUAL REALITY

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inprocess
Simulation to Business.
Knowledge to Profit.

In a Field Operator´s Shoes

20 years ago I completed my M.Sc. Electrical Engineer degree and entered to Dow Chemical as a process control engineer.

During the first months of my job I asked one thing to the Plant Manager:

Can I move the office air conditioning control system to the DCS of the plant?

Plant manager answer was: *NO!*

During the first months I also realized the there were many practical things from Field that nobody taught me in the University, so I asked to the plant manager:

Can I be a Field Operator for 3 months?

Answer: *NO!*

IN A FIELD OPERATOR´S SHOES

Field Operators are more than half of the Operation Staff in a typical process plant.

Simultaneous Training

In green field projects, when physical plant is being built, they need to be educated and trained with all Operating Procedures in combination with the Control Room Operators.

Communication between the field operator and the control room operator is vital for successful operation in the process industry
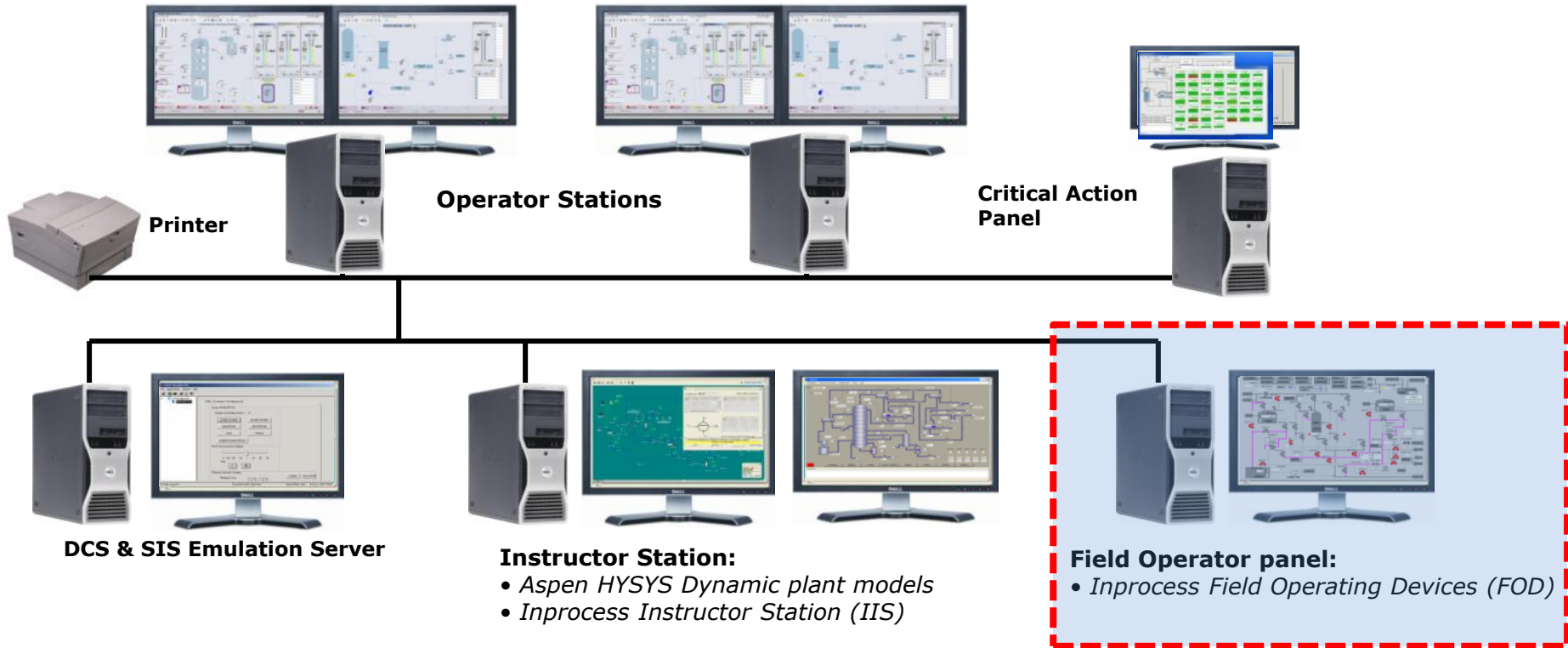
Field actions in operator training simulators (OTS) are not available in the control room operator displays. They need to be executed by the Instructor or by the Field Operator:

- Start-up/Shutdown procedures with manual valves

- Certain pumps/equipments are started/shutdown at field

- Compressors/Turbines packages use local operation panels

- Special operating procedures require manual by-passes

- ESD valves/pumps need to be re-armed at field

- Inspection of equipments and field instruments reads

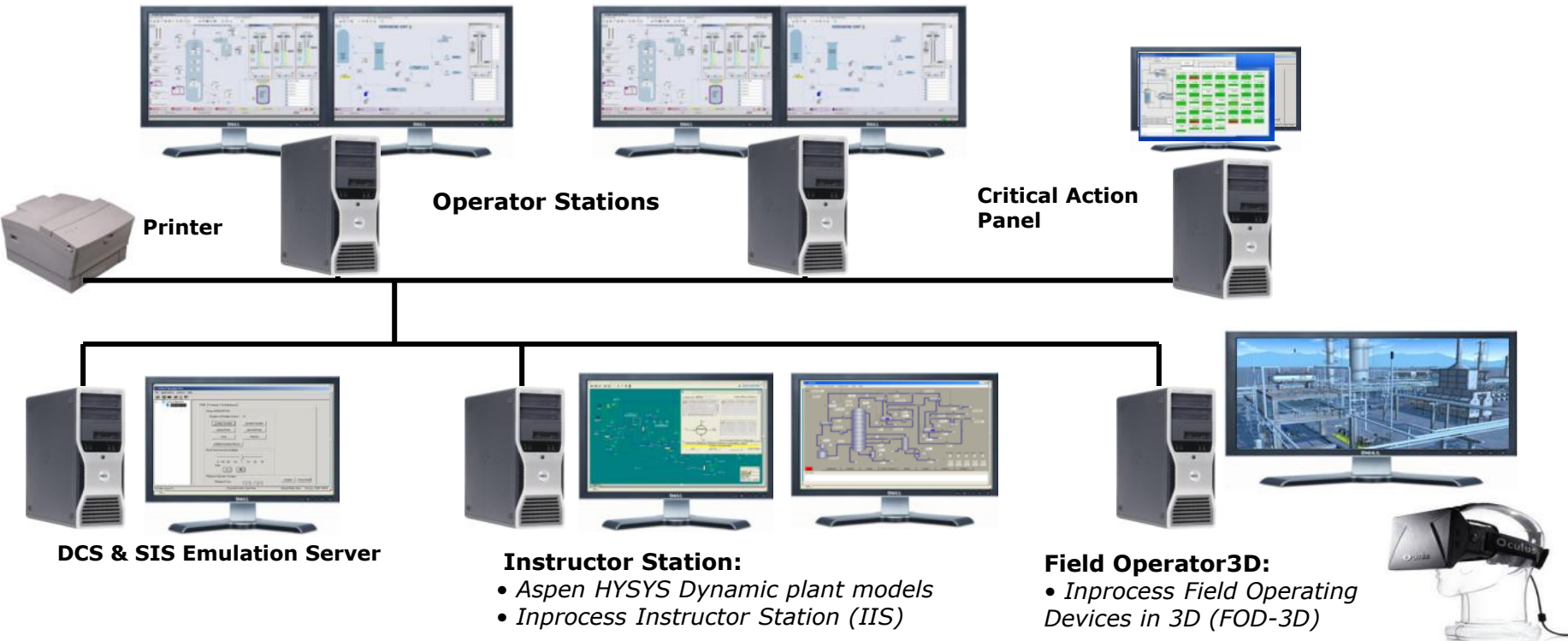- Isolation procedures for equipment maintenance

TYPICAL OTS ARCHITECTURE WITH FOD

Printer

Operator Stations

Critical Action Panel

DCS & SIS Emulation Server

Instructor Station:
- *Aspen HYSYS Dynamic plant models*
- *Inprocess Instructor Station (IIS)*

Field Operator panel:
- *Inprocess Field Operating Devices (FOD)*

TYPICAL OTS ARCHITECTURE WITH FOD

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Field Operator3D:
- *Inprocess Field Operating Devices in 3D (FOD-3D)*

NEW VIRTUAL REALITY TECHNOLOGY

Oculus VR, Inc has created new technology to fully immerse the user in the virtual world.

VR Device	Oculus DK1	Oculus DK2	Oculus CV1
Release Date	March 2013	July 2014	Q1 2016
Screen Resolution:	1280 x 800	1920 x 1080	2160x1200
Field of View	110º	100º	110º
Latency	50ms – 60ms	20ms – 40ms	<20ms
Refresh Rate	60 Hz	75 Hz	90 Hz
Orientation Tracking	YES	YES	YES
Positional Tracking	NO	YES	YES
3D view	Stereoscopic	Stereoscopic	Stereoscopic
3D audio	independent	independent	integrated
Units sold	75000	100000	

Operating companies have found advantages in:

- Deeper involvement of field staff in understanding the process
- The full operations team can practice critical events such as startups, shutdowns and emergency responses in a fully realistic manner
- "Best field practices" can be designed and communicated to all staff
- Field Operator performance can be fully tracked and documented, for evaluation and compliance purposes
- This type of learning is extremely motivating
- Reduce travel and living costs associated with on-the-job training

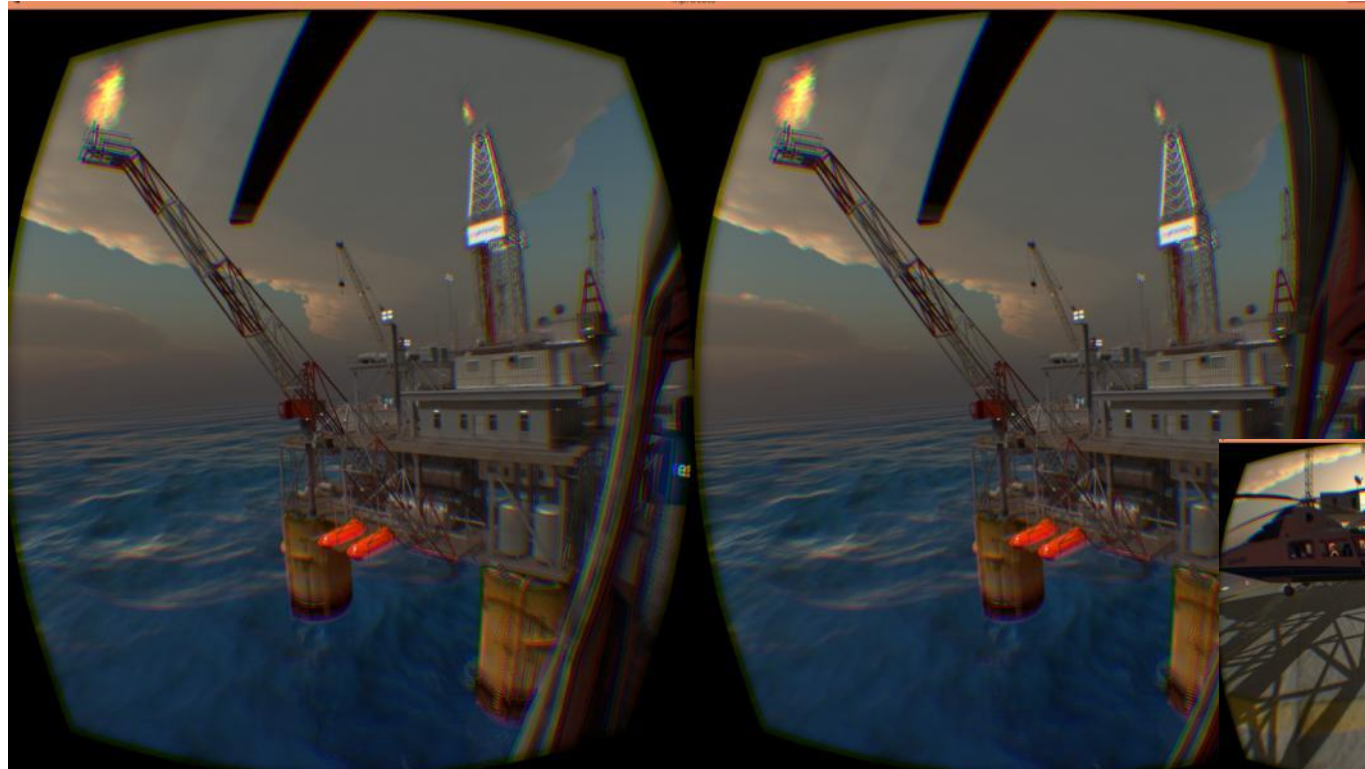All previous page reasons could be summarized in one word:

SAFETY

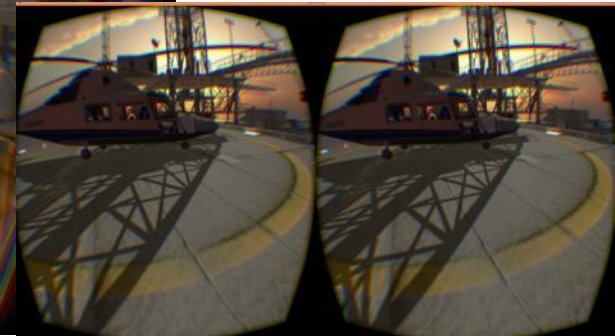# REFINERY DK2 DEMO: FIELD OPERATOR VIEW

You are allowed to manipulate any field device or manual valve with Xbox controller

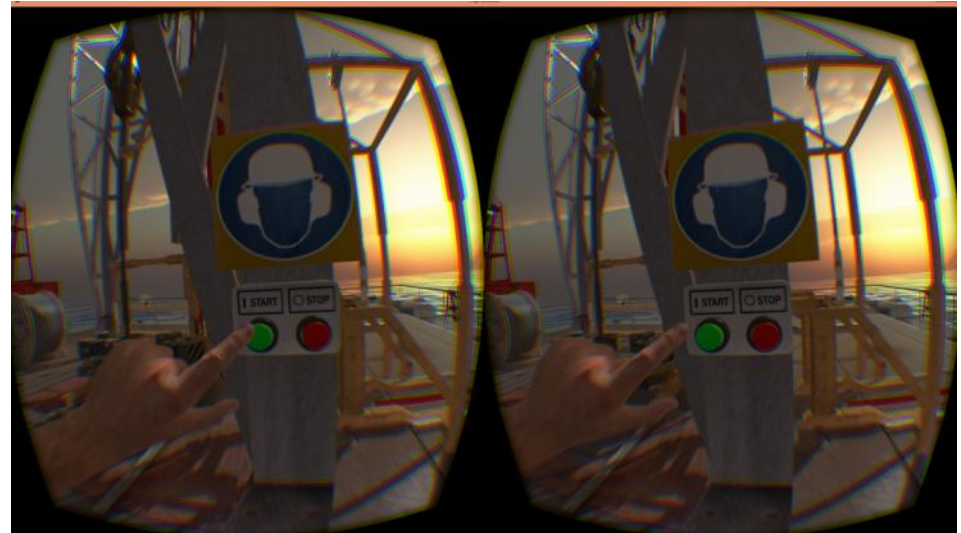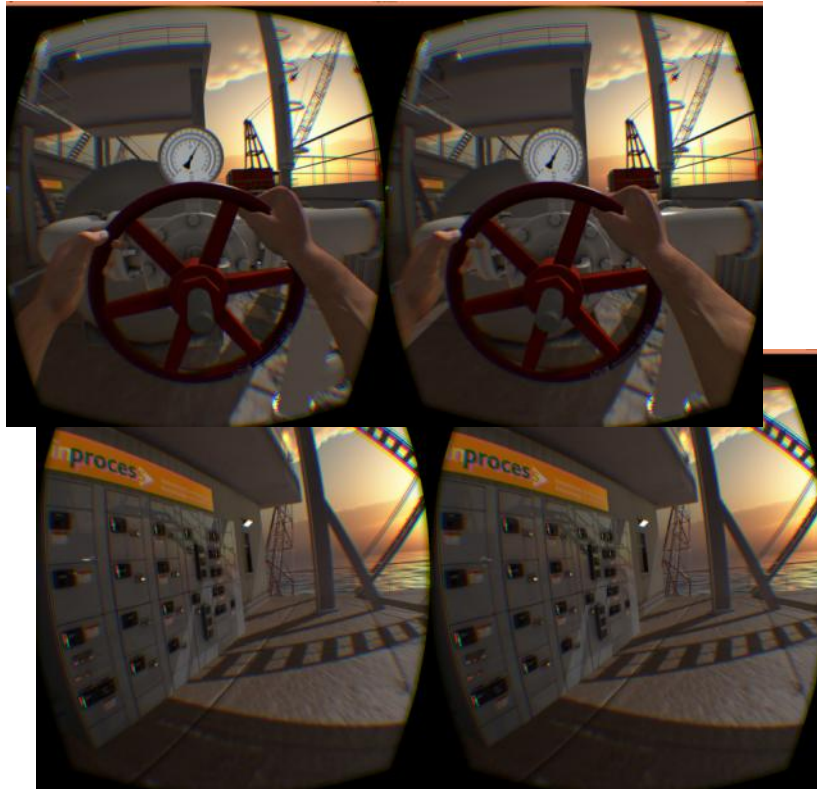# OFFSHORE DK2 DEMO: FIELD OPERATOR VIEW

You are brought by an helicopter to an offshore. Then you can explore the platform.

OFFSHORE DK2 DEMO: FIELD OPERATOR VIEW

With the LeapMotion device mounted in the DK2 you can use your own hands to manipulate valves, buttons, panel, etc.

AVAILABLE DEMOS FOR YOU

1. Oculus demo + HYSYS Dynamics simulation + Inprocess Instructor Station

2. Oculus demo (Refinery)

3. Oculus + Leap Motion demo (Offshore)
   https://www.youtube.com/watch?v=zYyFrWxQmz4

Note: The purpose of these short demos is to show the current state of the VR technology and how it can be integrated with a HYSYS-based OTS. If you are interested in them we can make them available to you.