Digital Twin

Faster Start-up & Stay up of your Facility

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PRODUCTIE PROCES AUTOMATISERING PPA 21

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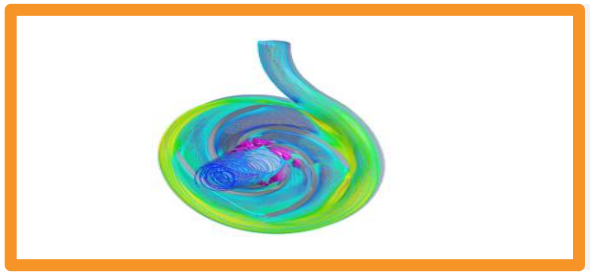
Industrie 4.0 Cyber Security Industrial Internet of Things Data Cloud IT/OT Integration

Same Term: Many Applications

Digital Twin

Mechanical



- **Mechanical and material design oriented**
- **Predicts how the mechanical asset will perform over**

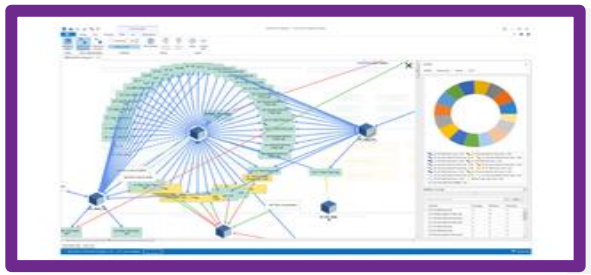
Process

- **1st Principles based & Data driven**
- **Predicts process behavior & dynamics**

Immersive

- **3D Virtual Reality, CAD model source**
- **Immersive facility floor environment**

RTMS



- **Real Time Modelling + Scheduling**
- **Bottleneck detection over facility**
- **Peak utility & resource demand**

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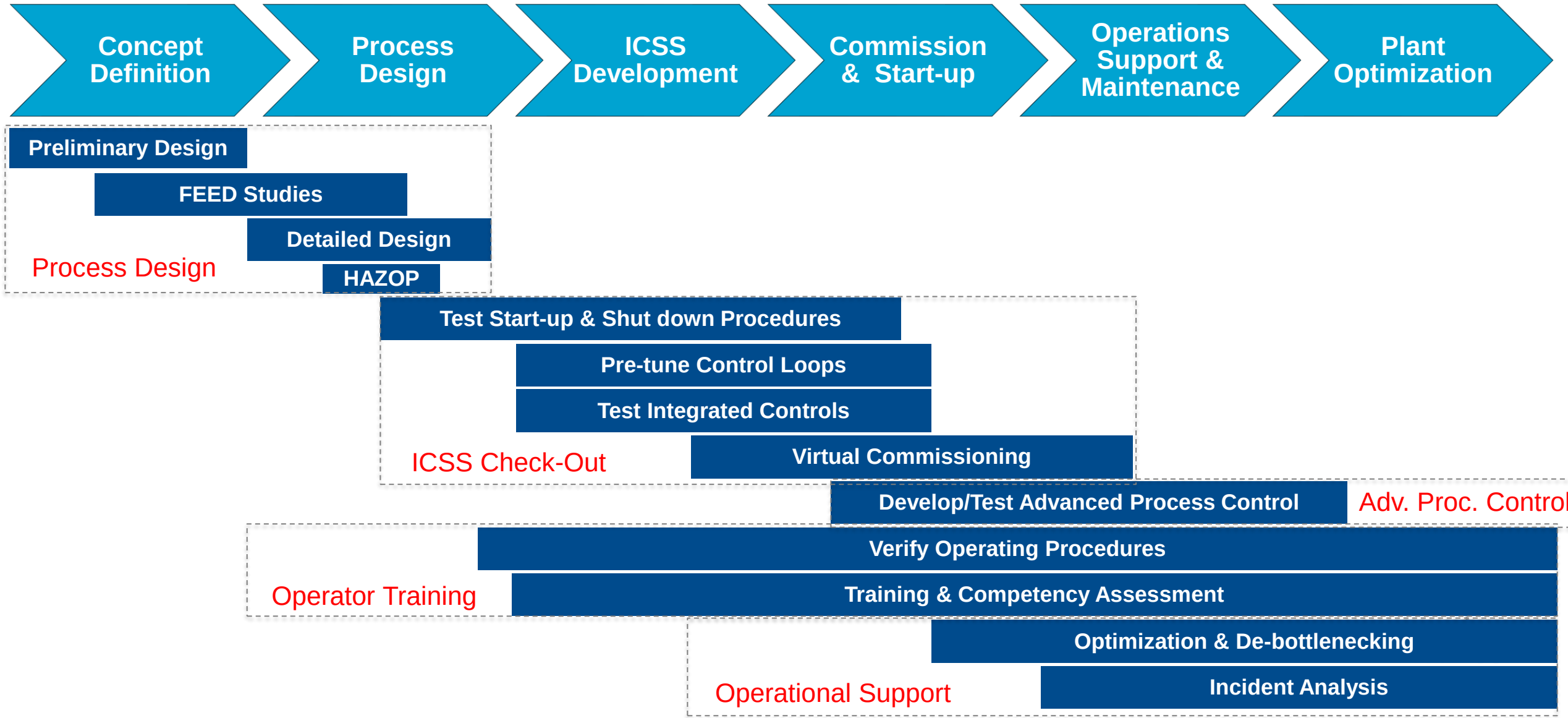
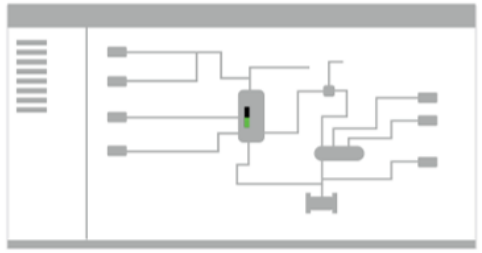
Digital Twin Lifecycle

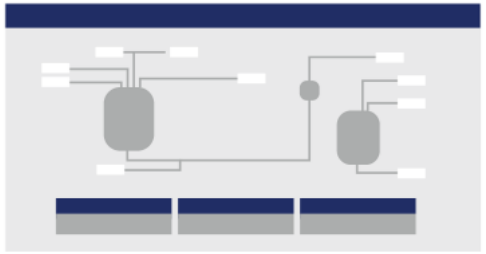


Emerson Digital Twin Architecture

Engineering

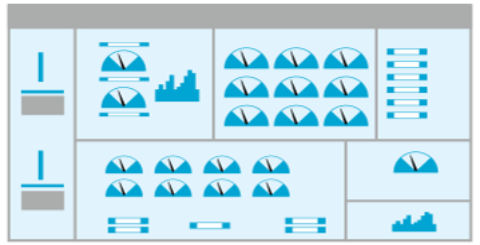


Instructor



Field Operator

Panel Operator



On Premise Virtual or Emerson Cloud Hosted

aspentech

HYSYS Dynamics Process Model

HYSYS End Point Server

Mimic

Train | Test | Field 3D | Analytics

Process
First Principles Dynamic Models

Foundation
IO / Equipment Models, Simulated IO Drivers, HYSYS Link

DELTAV™

DeltaV Live/Operate

Control Modules

DeltaV DST

Other ICSS Simulators

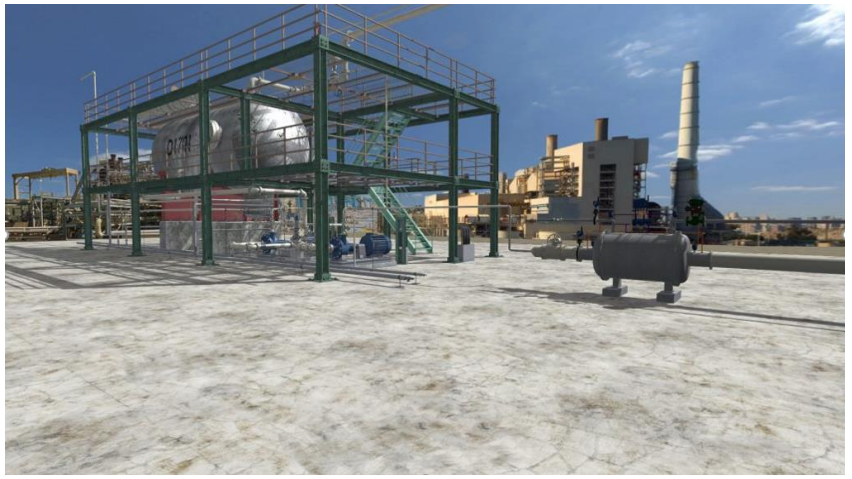
HMI

Control Modules

IO Registers

Digital Twin Components - 3D Immersive Simulation

- Training for **field operators and maintenance staff**
- Plant familiarisation – based upon **3D CAD model** with Equipment and Field operated devices
- **Maintenance** procedure verification
- **“Best field practices”** can be designed and communicated to all staff
- The full operations team can **practice critical events** such as start-ups, shutdowns and emergency responses in a fully realistic manner



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Building a Bridge from Plant Design to Plant Operations

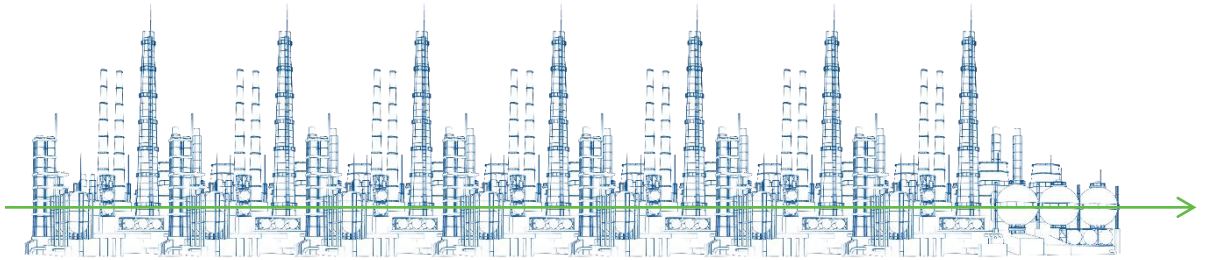
ANALYTICS

+ KNet

REAL-TIME MODEL

+ Aspen HYSYS Dynamics

INTEGRATED OPERATIONS



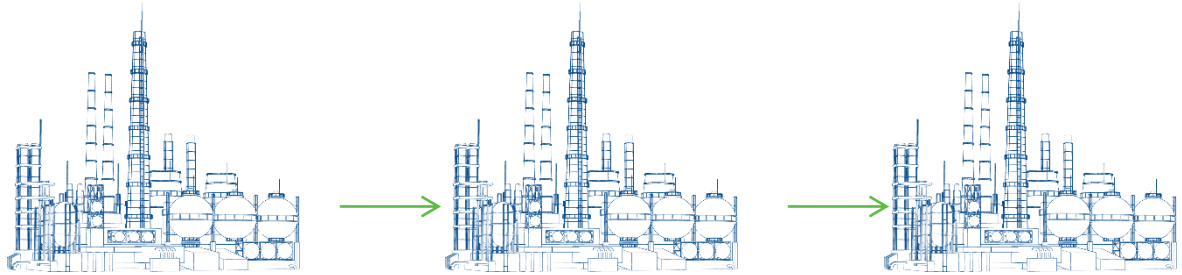
DYNAMIC MODEL

+ Aspen HYSYS Dynamics

IO MODEL

+ Mimic

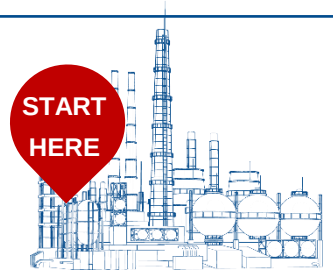
PERIODIC UPDATE



STEADY STATE MODEL

Aspen HYSYS®

BUILT AT CONSTRUCTION



Continuous updates of the Digital Twin model **improves decision integrity.**

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Digital Twin in the Cloud

COMMON CHALLENGES

- Collaboration or training for geographically distributed teams
- Secure access to engineering, simulation, or training system
- Scalable, expandable system
- Highly available, maintenance-free environment
- Temporary or changing needs not a fit for on-premise solution

KEY BENEFITS

- Multi-user, shared DeltaV Simulation environment accessible via URL
- Multi-factor authentication over secure HTTP connection
- Predefined packages easily upscale
- Emerson hosted and maintained SaaS, with 99.6% uptime
- Annual subscription flexibility reduces solution commitment

NEW!

DeltaV™ Simulation Cloud

Featuring:

DeltaV Simulate v13.3.1
DeltaV Simulate v14
Mimic Foundation
Mimic Process Core
Mimic Process Plus
Mimic Train

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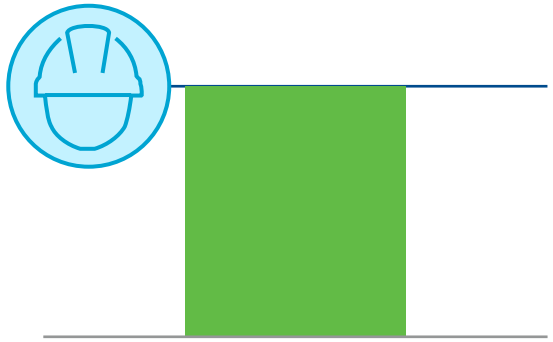
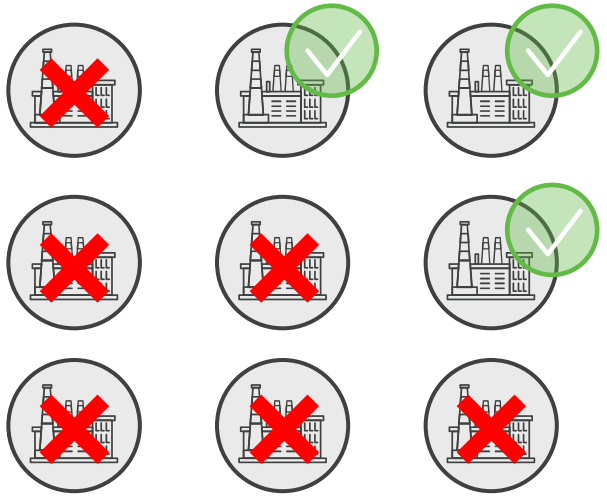
Benefits of the Digital Twin

$15.3 million total estimated savings per plant

31%
improvement



On average, reduced by 3 per year



Operator effectiveness

Commissioning & start -up

Plant shutdowns

Ref: Economic benefits of training simulators, Dec 2012

The Value Proposition

Faster Commissioning & Start-up

Decision Support & Competency

Regulatory Compliance

Get to Market Faster

Development & Optimization

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QUESTIONS?
COMMENTS?
DISCUSSION?

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