

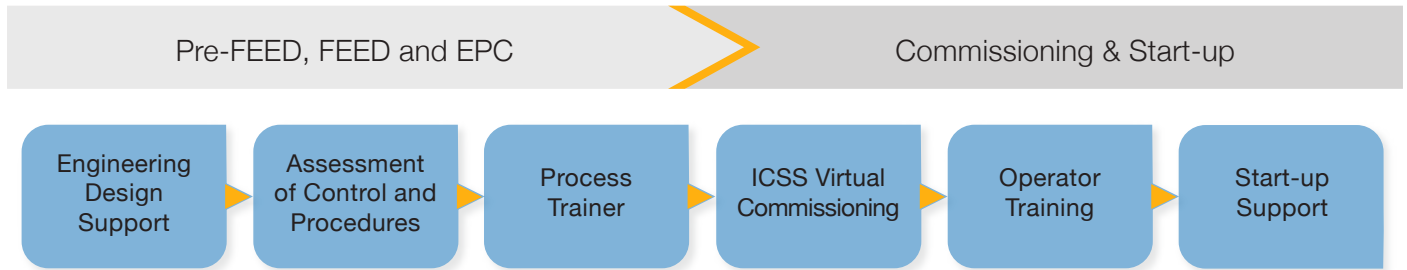
simulation
knowledge
profit

Ensuring success in your FPSO Process Digitalization Journey

FPSO constructors and operators are increasingly adopting **digitalization** to support **data-driven decision-making**, while also focusing on sustainability through **energy consumption management** and **GHG emissions reduction**.

At Inprocess, we have the expertise, capabilities, and passion to support FPSO players on this digitalization journey by applying process simulation in the below lifecycle phases.

Inprocess Digitalization Applications for FPSO Greenfield Projects



• Engineering Design Support

- Equipment Sizing
 - Slug-catcher sizing and control settings
 - Anti-surge protection design for compression systems
 - Flow Assurance
 - HIPPS + MDMT + Blowdown studies

• Validation of Control Philosophy and Operating Procedures

- Defining and testing of operating procedures for Start-up, Shutdown, load changes, products transition
- Cause & Effect Matrix Verification
- Set point values, Alarm rationalization, pre-tuning of controllers

• Process Trainer (Emulated OTS)

- With the Dynamic Model and the validated Control Philosophy it is possible to train operators on the processes independently of the ICSS vendor delivery schedule.

• ICSS Virtual Commissioning

- Check out of the Control and Safety logics
- Controllers De-bugging



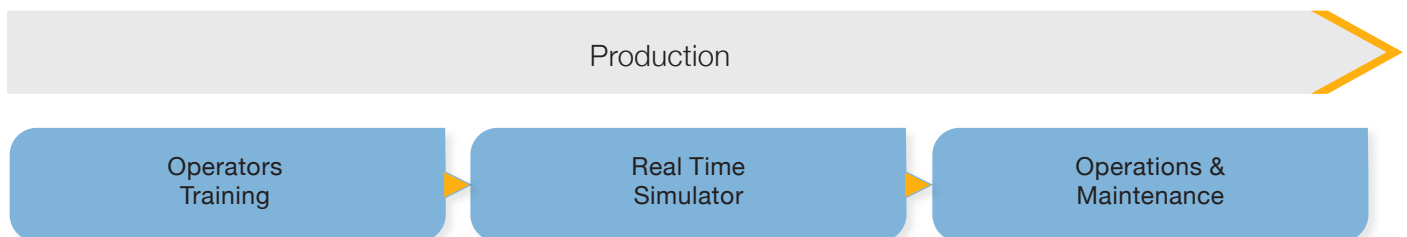
• Operators and Local Content Training

- Direct-Connect Operator Training Simulator
- Train Operators on FPSO's control and safety

• Support during facilities Start-up

- Support to commissioning activities

Inprocess Digitalization Applications for FPSO Brownfield Projects



• Operators Training with OTS

- Refresher trainings
- Train new hires
- Trainings after major revamps
- Simultaneous Training of control room and field operators

• Real-Time Simulator: Online Digital Twin

- What-if analyses
- Equipment monitoring
- Look-ahead studies
- Inferential measurements

• Operations & Maintenance

- Flare system revalidation

- De-bottlenecking studies
- Emissions reduction
- Controllers fine-tuning
- Post-incident analysis for flaring episodes
- Development of procedures for new operating conditions, e.g.:

- Modes transitions (e.g., from high- to low-CO₂ content gas)
- Start-up of Non-Associated Gas processing facilities
- Analysis of gas reinjection compressors
- Dry Gas Export System operational study



Digitalization Benefits of Inprocess' dynamic process simulation application

With Inprocess' simulation-based digitalization applications during (pre-)FEED, Commissioning, and Operations, our customers can improve and fasten decision-making processes across the whole FPSO's lifecycle.

• Development Phase

- Ensure safe-by-design processes through realistic engineering studies
- Reduce capital costs (CAPEX) by accurate design of the equipment
- Minimize commissioning time by having virtually checked out the ICSS
- Train Operators on time, before first oil

• Production Phase

- Reach Operational Efficiency utilizing optimized operating procedures
- Infer process values by simulation for non-instrumented variables
- Detect deviations of equipment performance
- Decision support with real time information obtained from process simulation

Additional benefits by combining digitalization applications to Multi-Purpose Dynamic Simulator (MPDS)

A Multi-purpose Dynamic Simulator (MPDS) aims to optimize the utilization and the benefits of dynamic process models across all the applications described above.

It serves as a valuable tool from initial stages in design and development of Greenfield projects up to operational and maintenance stages of both Greenfield and Brownfield projects.

Key benefits of MPDS include de-risking projects, virtual ICSS commissioning, availability of offline and online process Digital Twins (Real Time Simulators), among many others.



Global Inprocess Presence with successfully delivered FPSO Projects

