

ESSI™ Flow Access Module (FAM)

- Multiphase Metering
- Multiphase Pumping
- Fluid Sampling
- Fluid Intervention
- Flow Assurance
- Solids Management
- HIPPS



ESSI™ Flow Intervention Services (FIS)

- Fluid Intervention
 - Acid Stimulation
 - Organic Scale removal (Solvent treatments)
 - Inorganic scale removal (CaCO3 and BaSO4)
 - Pipeline Hydrate removal
 - Fines Treatments
 - Tubing Washes (Brines, Acids, Chelants)
 - Flow Line Clean (Brines, Acids)
 - Water injection Tests (Sea Water)

- Sampling
 - Production liquid and gas
 - Produced water identification
 - Scale squeeze inhibitor concentrations
 - Multi phase flow meter calibration
 - Commissioning i.e. glycol / solids

• IRM



ESSI™ Decom

- Characterisation of Trapped Fluids
- In Situ Sampling / Validation
- Cell Drilling Operations
- Liquid & Sediment Analysis
- 3D cavity Survey
- Pumping / Fluid Extraction
- Legacy Condition Monitoring
- Project Management
- FEED & preFEED surveying services

ENhanced PROduction

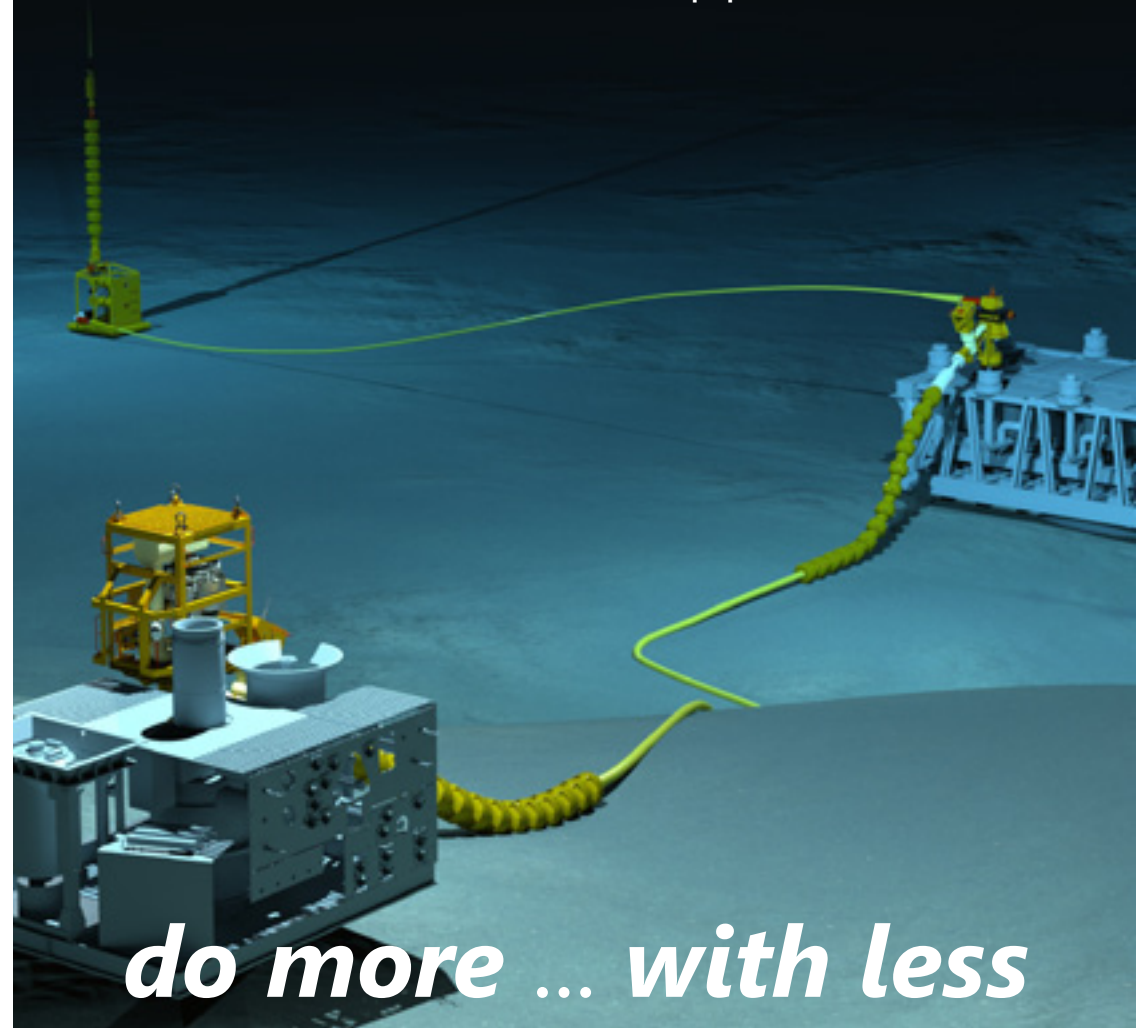
.....throughout life of field



Enhanced Subsea Sampling & Injection

Case Study, GoM, Oct 2016:

Enpro Subsea's Flow Access Modules (FAM) enabled record fast tieback (under 12 months) using unique subsea architecture and standard equipment.



do more ... with less

CASE STUDY

GoM, 3.2km tieback to existing subsea production facility
Delivered and installed Q3 2016

OPERATOR CHALLENGE:

Operator had a requirement to complete tieback within 12 months. In order to the minimise cost there was a preference to use stock equipment including a standard xmas tree. Production profile dictated need for enhanced production strategies, including:

- Multiphase metering
- Hydrate remediation
- Future potential for well stimulation

ENPRO SOLUTION:

At either end of the flowline, Enpro installed their modified goosenecks with integral FAM hubs. Additionally, we provided 3x enhanced production FAM modules, including:

- Metering FAM with multiphase flow meter (MPFM), water cut meter and acoustic sand detector
- Flow Assurance FAM with flow assurance fail safe close (FSC) hydraulic valve, chemical injection valve, PT & PTT
- Fluid Intervention FAM

The flexibility of the ESS1 solution means Operators can access a suite of interchangeable enhanced production modules throughout the life of field, independent of legacy OEM constraints.

DO MORE:

- More enhanced production solutions
- More use of standard / stock / refurbished hardware
- More strategic options throughout life of field
- More access to Xmas tree
- More access for single flowline 'spur' tiebacks

WITH LESS:

- Less time to deliver projects
- Less cost for enhanced recovery
- Less weight, size, cost and complexity of standard subsea hardware
- Less risk to schedules (concurrent offline engineering)
- Less complex specification (pipeline, not tree)

