



equinor

FieldTwin Design* and OLGA workflow in Equinor

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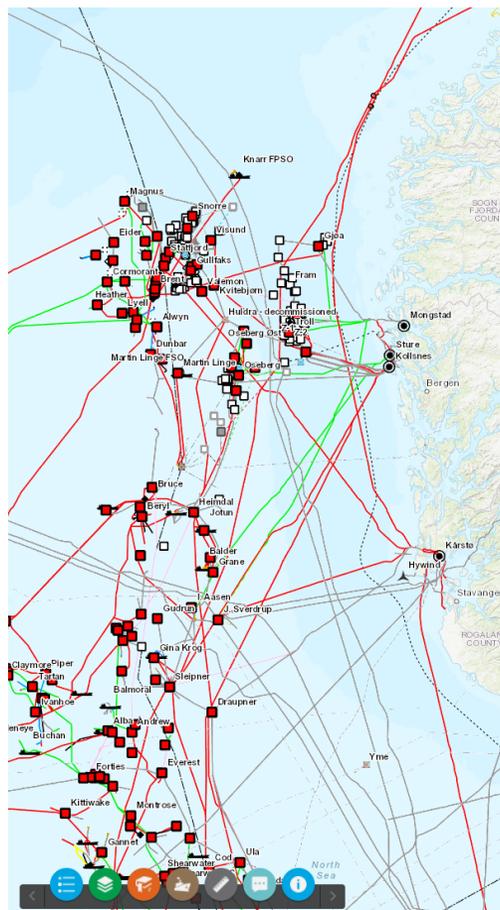
Schlumberger Digital Forum 2022
September 20-22 | KKL Luzern, Switzerland



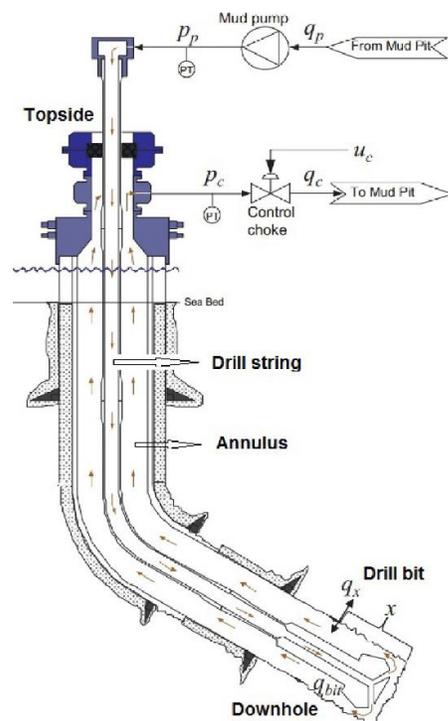
*A FutureOn data storage and visualization platform

Examples of Digitalization within different disciplines (does not necessarily promote interdisciplinary collaboration)

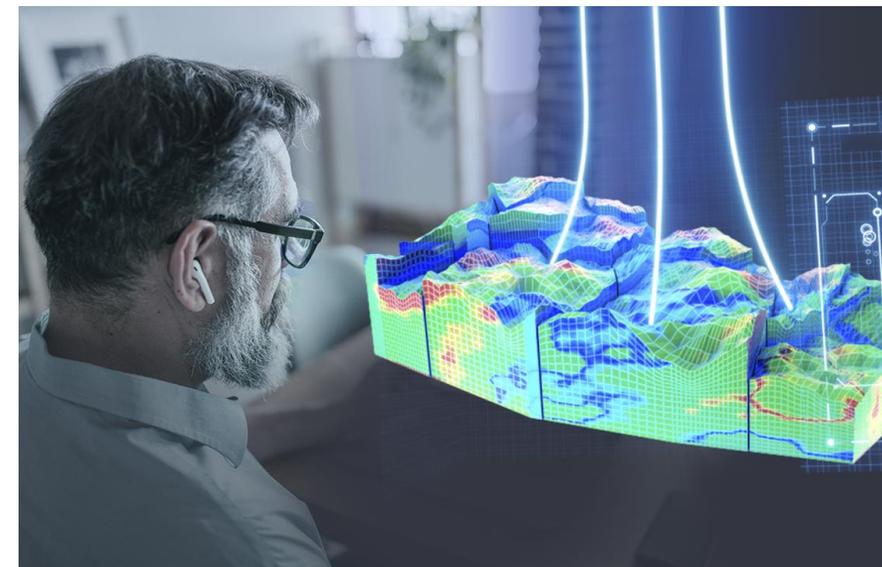
Equinor: MapHub



Equinor: Well database



SLB: DELFI (OLGA, Pipesim, Eclipse)



Field development projects: Multiple databases/files for data storage

Area specific data:

- Bathymetry data (maps)
- Marine infrastructure data
- etc.

Project specific data:

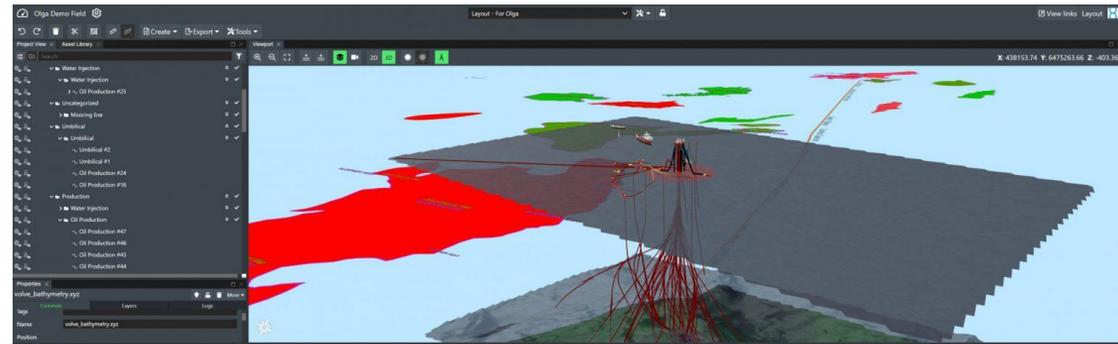
- Design basis
- Fluid data
- Reservoir data / production profiles
- Well data
- SURF data
- etc.

FieldTwin Design

to promote interdisciplinary collaboration

One common platform to visualize and
store **common** project data

To share information between different disciplines
working in field development projects



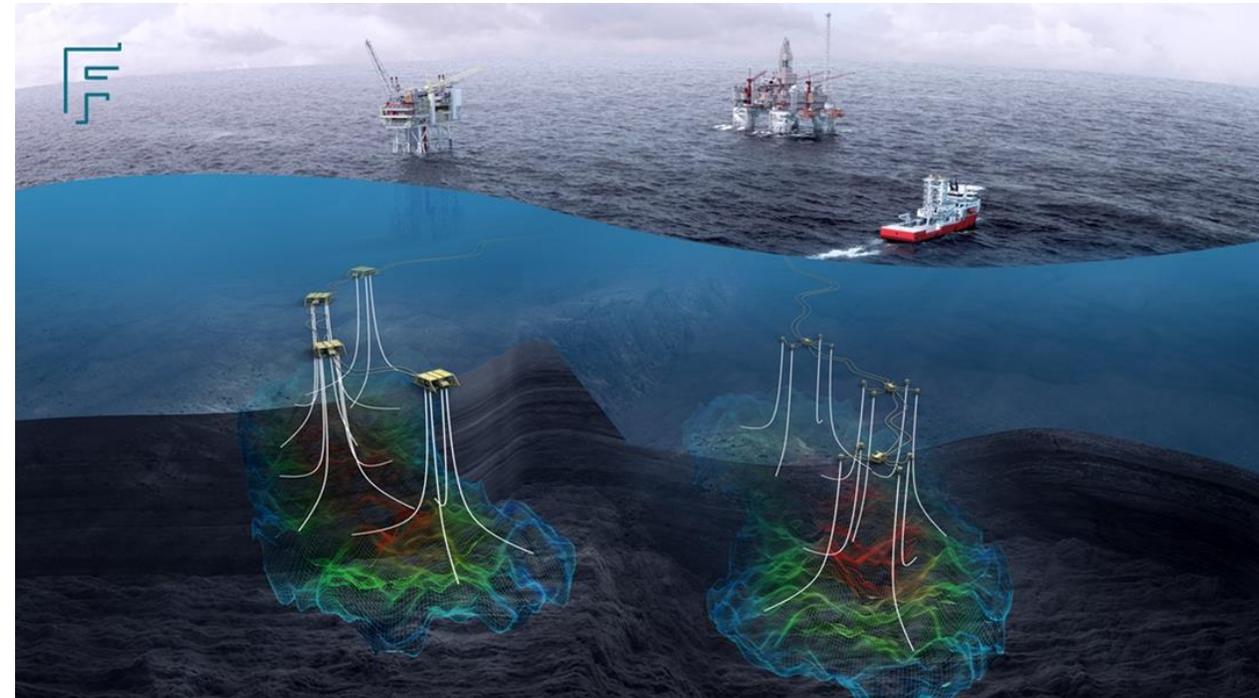
FieldTwin Design in Equinor

A Digital Twin for field development projects

- Data storage and visualization platform
- Screening of concepts with cost estimates
- Store system meta data to build /populate disciplines models like OLGA
- Key results from disciplines models made available in FieldTwin

Not a Digital Twin for as built systems in Equinor

However, FieldTwin supports collaboration with contractors
Promotes development of an as built Digital Twin during the engineering phase



OLGA – FieldTwin workflow

(Development project between FutureOn, Schlumberger and Equinor)

Phase 1: Released in OLGA 2021.1 and FieldTwin 6.2

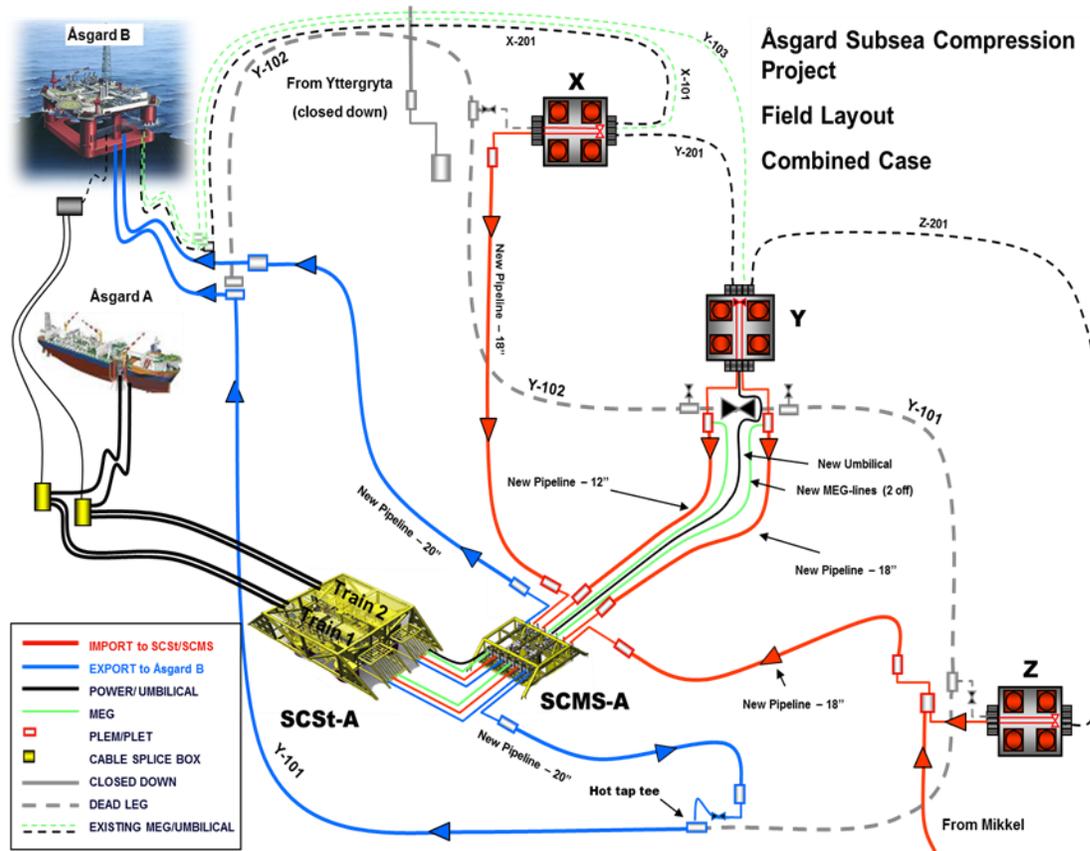
- Generate single flowpaths in FieldTwin with ID and Roughness
- Import flowpath (XY coordinates, ID and Roughness) into OLGA Profile Generator

Phase 2: Start Q1 2022 – Delivery Q3 2022

- Also import of U-value and Steel wall thickness to OLGA
- Set up heat transfer key in OLGA based on U-value
- Make wall based on U-value and steel wall thickness in OLGA
- Improve OLGA Profile Generator

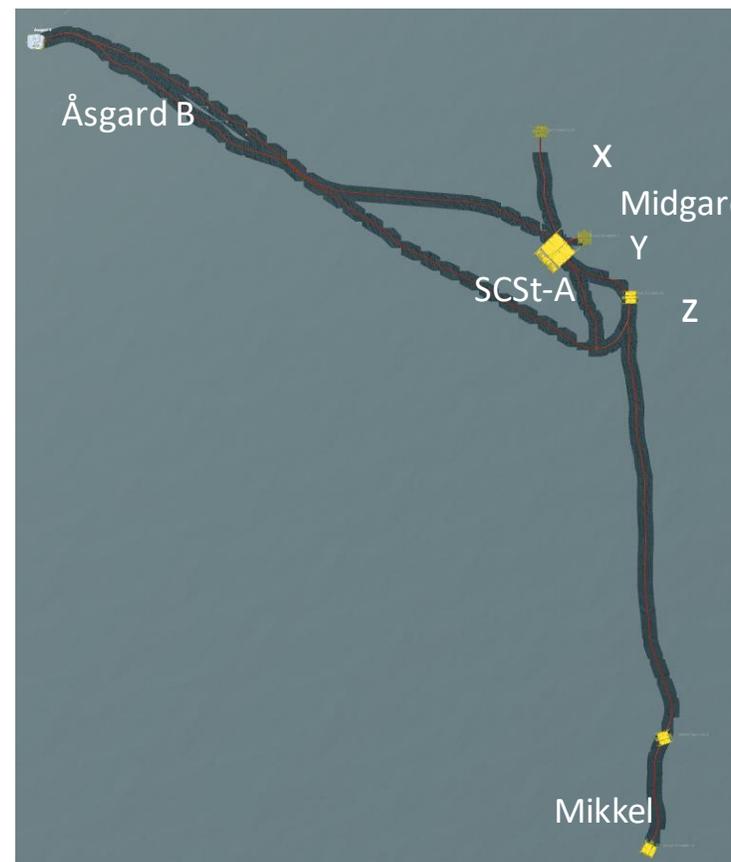
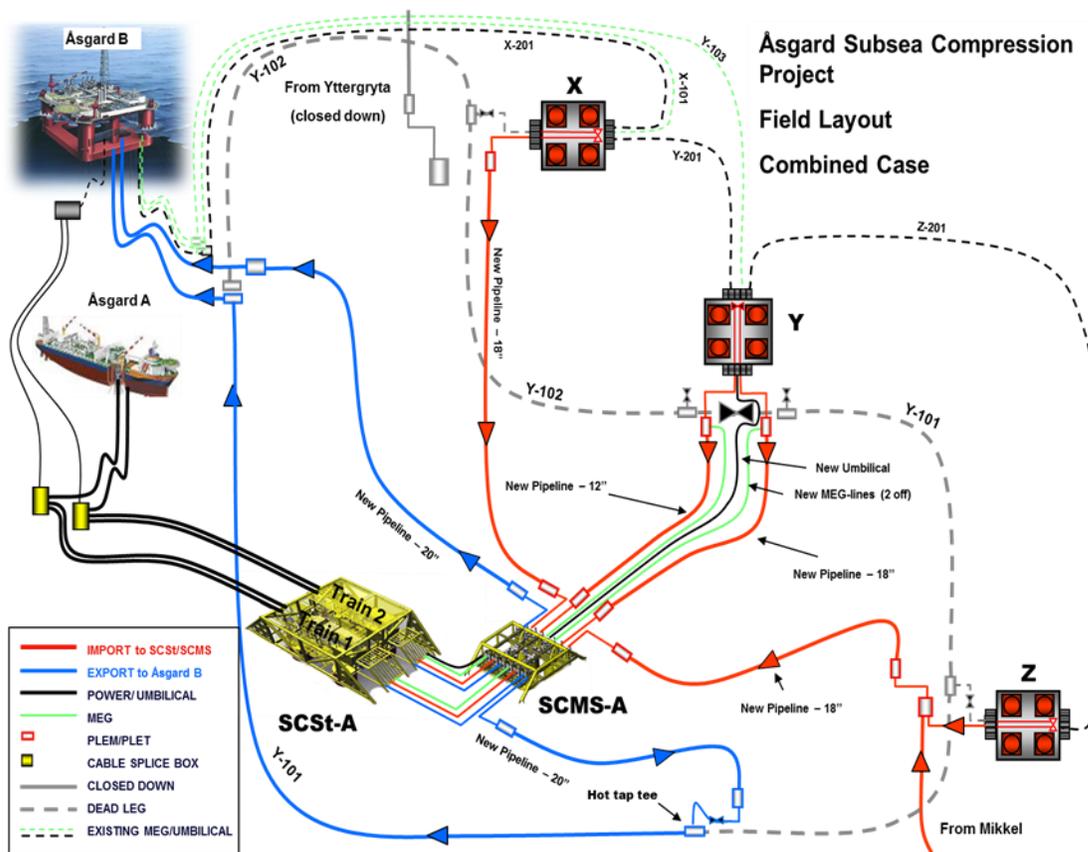


Apply FieldTwin – OPGA workflow to Åsgard subsea compression



Apply FieldTwin – OLGA workflow to Åsgard subsea compression

FieldTwin model

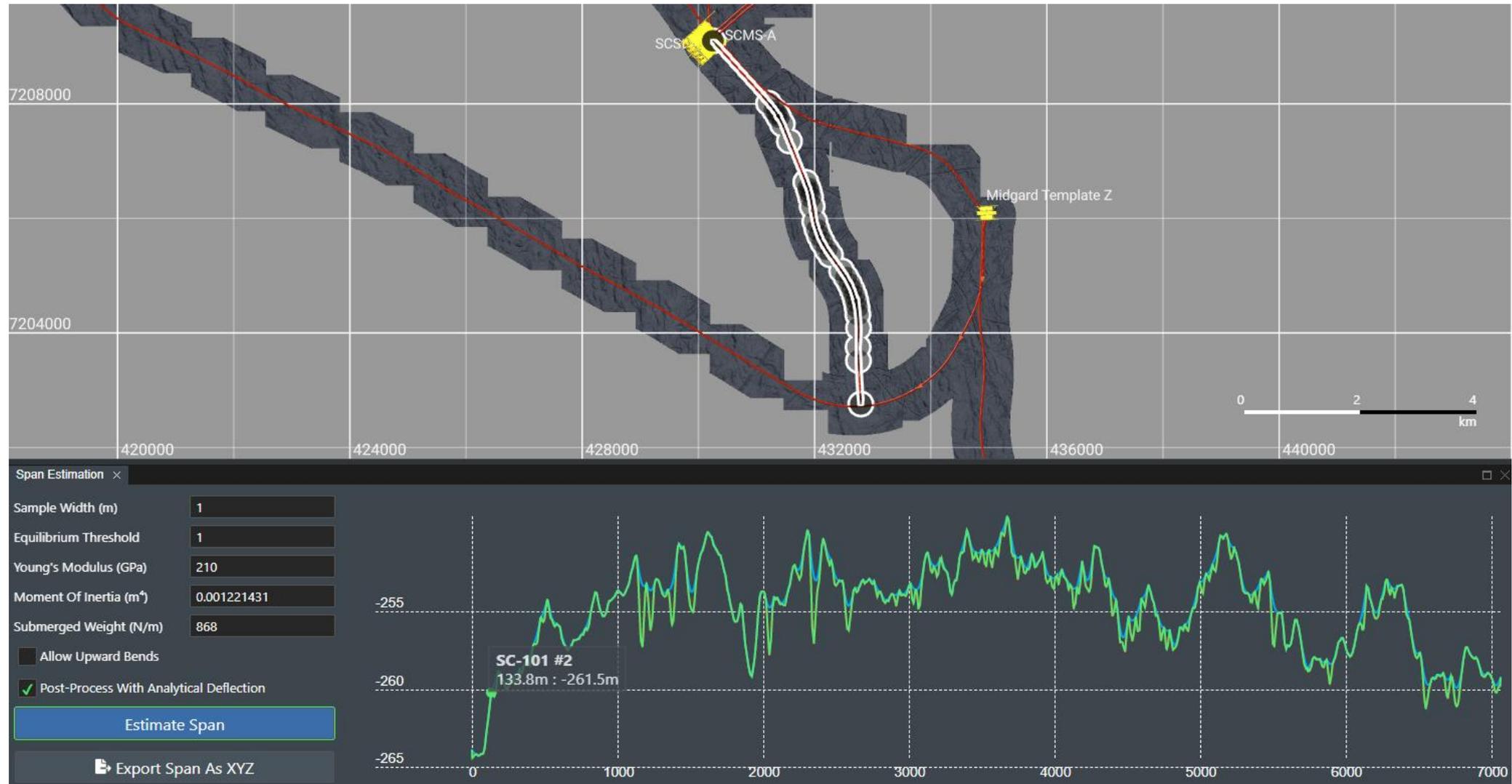


5 min to import 14 wells from database

2-3 weeks to get flowlines in place

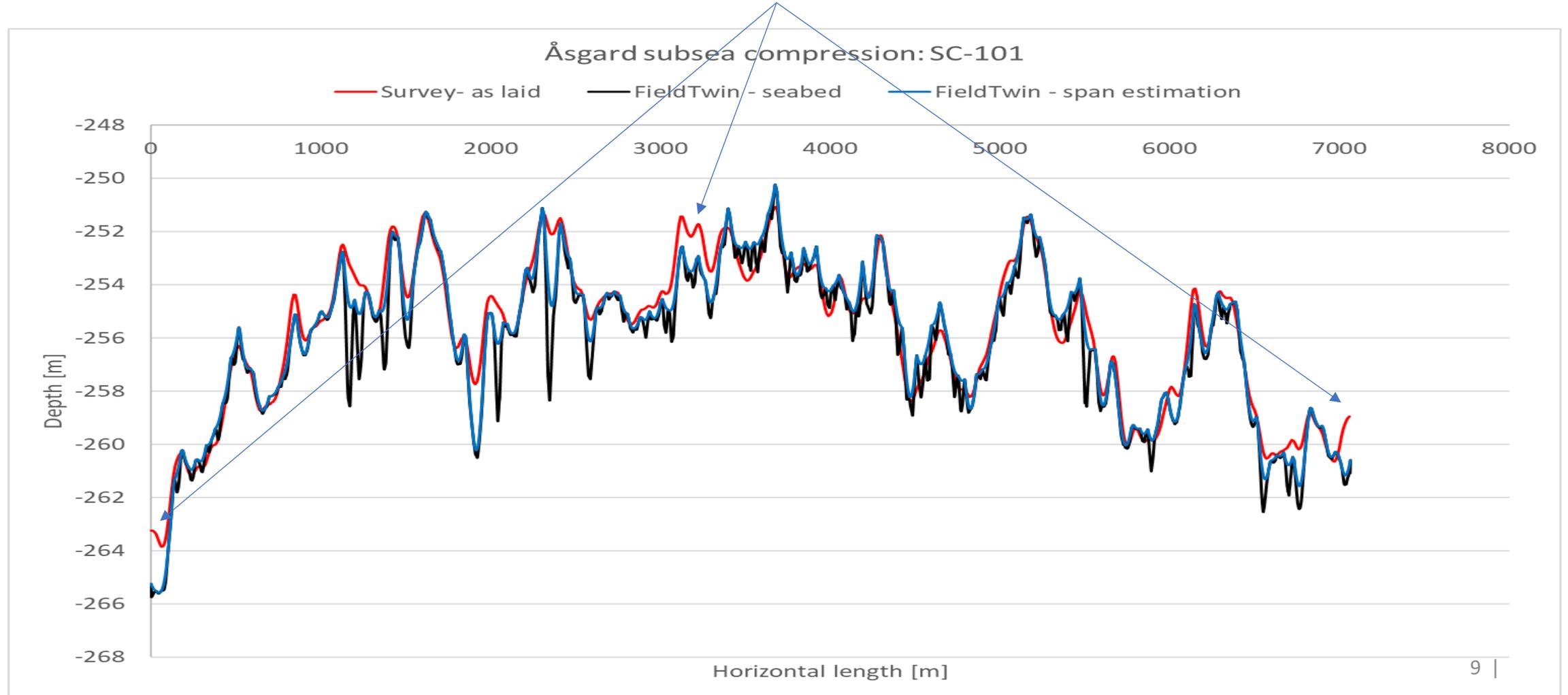
Need database also for flowlines

FieldTwin: Detailed map (green line) As laid pipeline estimation (blue line)

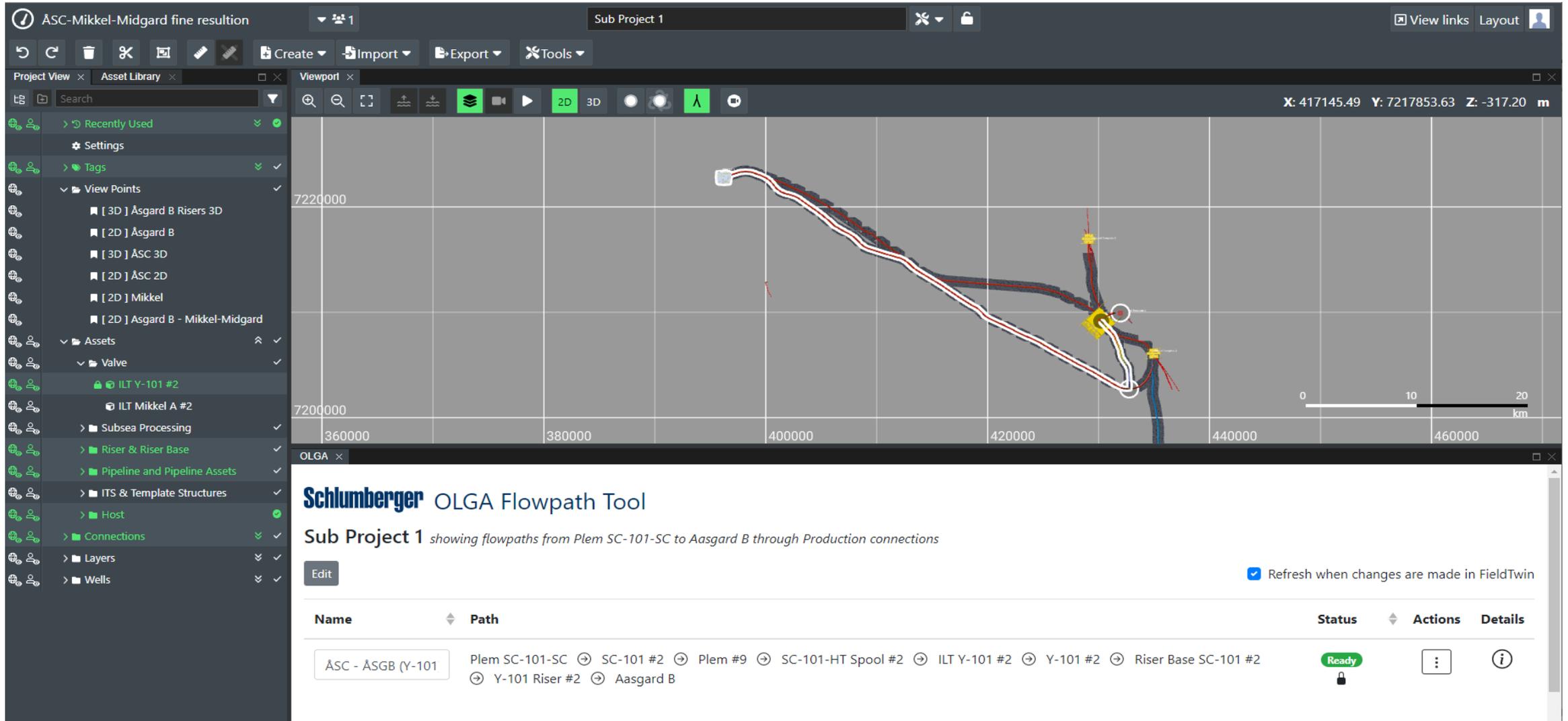


Sea-bed, survey pipeline data and as laid estimated profiles

Deviations between survey and estimated as laid profiles can partly be attributed to rock dumping



Schlumberger OPGA Flowpath Tool in FieldTwin



ASC-Mikkel-Midgard fine resolution | Sub Project 1 | View links | Layout

Project View | Asset Library | Viewport | Search | 2D | 3D | X: 417145.49 Y: 7217853.63 Z: -317.20 m

Recently Used | Settings | Tags | View Points | Assets | Valves | ILT Y-101 #2 | ILT Mikkel A #2 | Subsea Processing | Riser & Riser Base | Pipeline and Pipeline Assets | ITS & Template Structures | Host | Connections | Layers | Wells

Schlumberger OPGA Flowpath Tool
 Sub Project 1 showing flowpaths from Plem SC-101-SC to Aasgard B through Production connections

Refresh when changes are made in FieldTwin

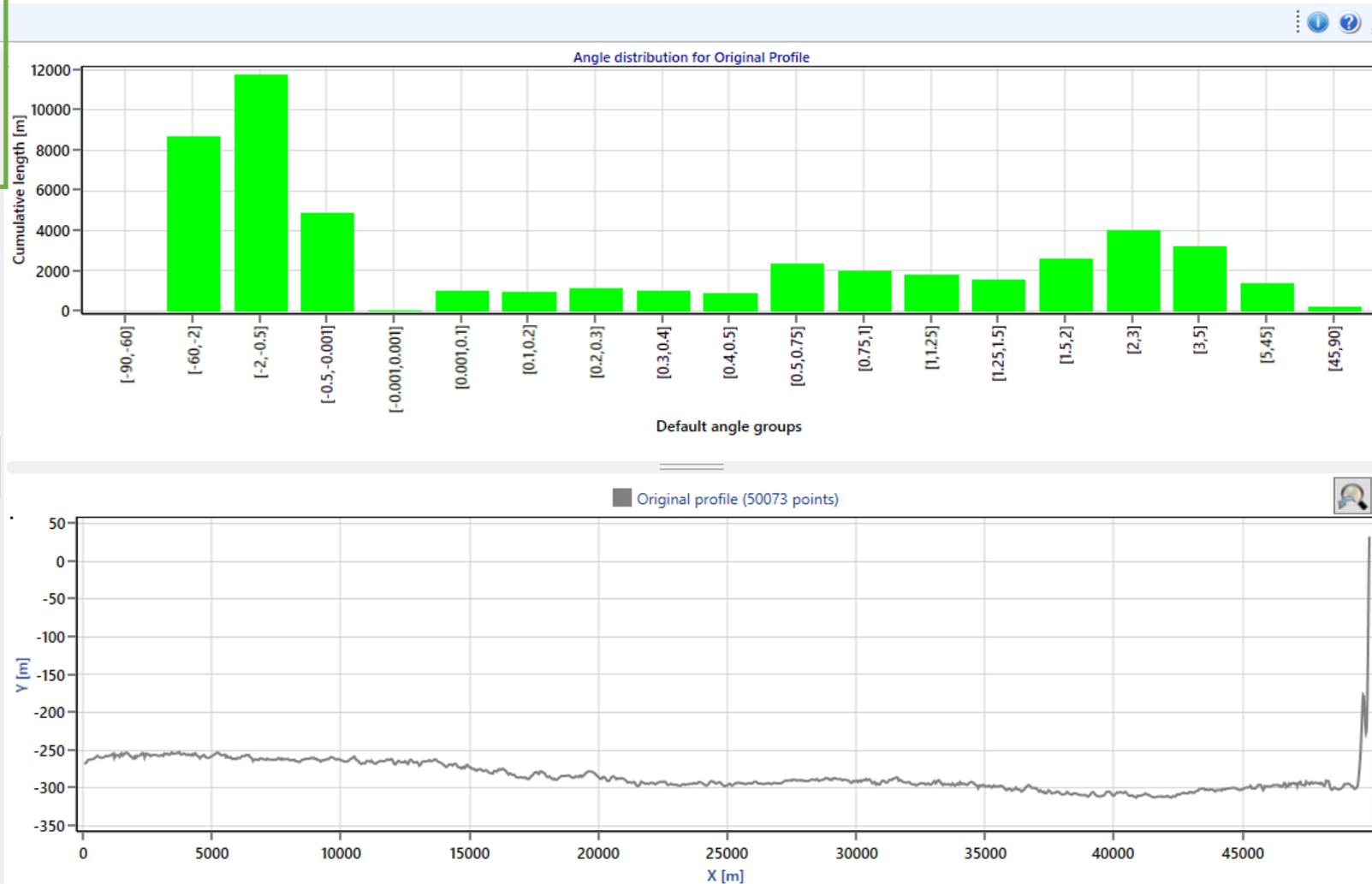
Name	Path	Status	Actions	Details
ASC - ASGB (Y-101)	Plem SC-101-SC → SC-101 #2 → Plem #9 → SC-101-HT Spool #2 → ILT Y-101 #2 → Y-101 #2 → Riser Base SC-101 #2 → Y-101 Riser #2 → Aasgard B	Ready	<input type="button" value="⋮"/>	<input type="button" value="i"/>

Flowpath from FieldTwin imported into OLGGA Profile Generator

Profile generator

Import profile Import from cloud

#	X [m]	Y [m]	D [m]	R [m]	U [W/]	T [m]
1	0.00	-265.2	0.47	3E-5	30.00	0.03
2	0.99	-265.3	0.47	3E-5	30.00	0.03
3	1.97	-265.5	0.47	3E-5	30.00	0.03
4	2.94	-265.7	0.47	3E-5	30.00	0.03
5	3.91	-265.9	0.47	3E-5	30.00	0.03
6	4.92	-266.0	0.47	3E-5	30.00	0.03
7	5.88	-266.1	0.47	3E-5	30.00	0.03
8	6.42	-266.1	0.47	3E-5	30.00	0.03
9	6.47	-266.1	0.47	3E-5	30.00	0.03
10	6.52	-266.1	0.47	3E-5	30.00	0.03
11	6.57	-266.1	0.47	3E-5	30.00	0.03
12	6.62	-266.1	0.47	3E-5	30.00	0.03
13	6.67	-266.1	0.47	3E-5	30.00	0.03
14	6.72	-266.1	0.47	3E-5	30.00	0.03
15	6.76	-266.1	0.47	3E-5	30.00	0.03
16	6.81	-266.1	0.47	3E-5	30.00	0.03
17	6.87	-266.1	0.47	3E-5	30.00	0.03
18	6.92	-266.1	0.47	3E-5	30.00	0.03
19	6.97	-266.1	0.47	3E-5	30.00	0.03
20	7.02	-266.1	0.47	3E-5	30.00	0.03
21	7.07	-266.1	0.47	3E-5	30.00	0.03
22	7.12	-266.2	0.47	3E-5	30.00	0.03
23	7.18	-266.2	0.47	3E-5	30.00	0.03
24	7.23	-266.2	0.47	3E-5	30.00	0.03
25	7.28	-266.2	0.47	3E-5	30.00	0.03



OLGA Profile generator – zoomed in

Profile generator

Import profile Import from cloud

#	X [m]	Y [m]	D [m]	R [m]	U [W/	T [m]
1	0.00	-265.2	0.47	3E-5	30.00	0.03

New:
FieldTwin

New:
D: Inner diameter
R: Inner wall Roughness
U: U-value
T: Steel wall thickness

Summary of the work process for FieldTwin-OLGA

1. Build model with system data in FieldTwin
2. Define Flowpaths in FieldTwin (can contain well and several “connections”)
3. Import of one-by-one flowpath into OLGA Profile Generator
4. Follows standard work processes in OLGA to include the Flowpaths in an OLGA model

Summary

Equinor sees FieldTwin Design as a Digital Twin for field development projects:

- A Data storage and visualization platform
- Screening of concepts with cost estimates
- Store system meta data to build /populate disciplines models like OLGA
- Key results from disciplines models made available in FieldTwin

Acknowledgements for allowing giving this presentation go to:

- FutureOn AS, Schlumberger Norge AS and Equinor Energy AS
- Åsgard license partners: Petoro AS, Equinor Energy AS, Vår Energi ASA, TotalEnergies EP Norge AS