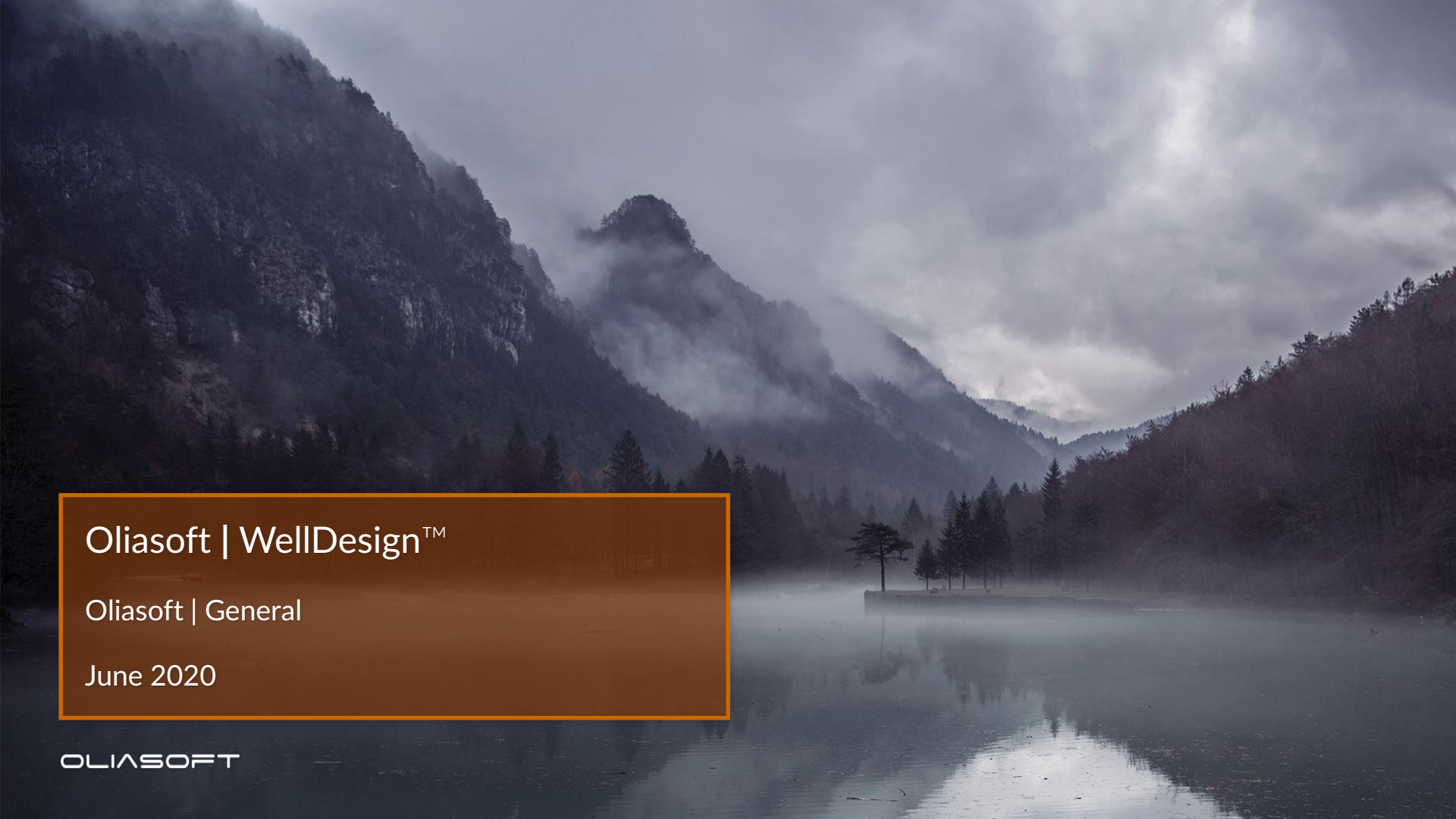


# Oliasoft | WellDesign™

Oliasoft | General

June 2020

OLIASOFT

# Oliasoft – Short Story

## Team

Oliasoft has 40 employees and consultants on full time, and we are hiring.

Oil companies use internal man power to help develop the product. In total 70 – 80 people work full time on Oliasoft WellDesign.

## Well Funded

Raised NOK ~110 million in private equity and grants

Awarded funding from the Norwegian Research Council program, Petromaks2 in 2017 and Demo 2000 in 2018
Cash and accounts receivable NOK ~65million

## Demanding Clients

Oliasoft WellDesign is being validated in cooperation with Equinor, Shell, Chevron + 17 other oil companies

## Well Built Foundation

~250 000 hours spent to build Oliasoft WellDesign 1.0

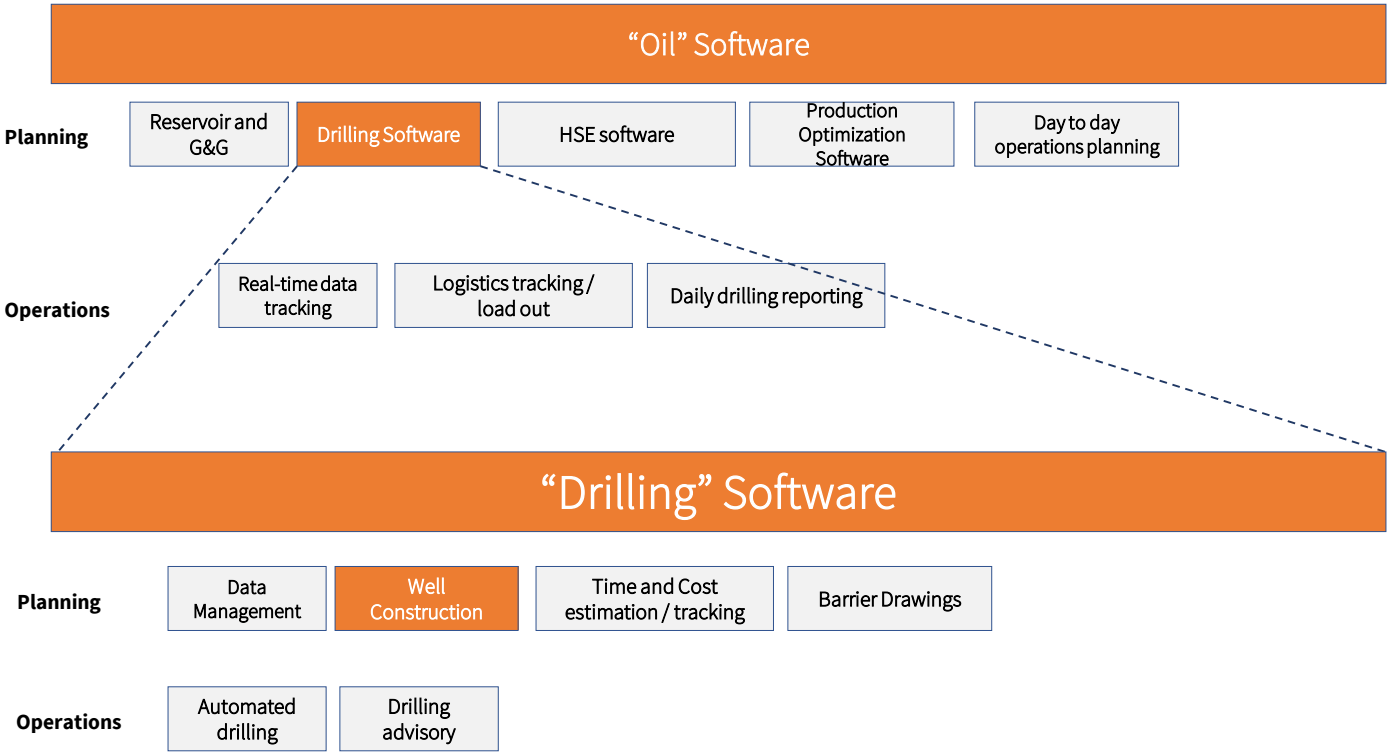
## Solving a little piece of the industry

Oliasoft is rigged to solve a little piece of the industry by offering a modern, transparent and low barrier system to operators, capable of performing all authority and company specific well design calculations – ready for digitalization and automation.

For this, **Oliasoft was in 2019 awarded the prize "Most Promising Startup"** by Rice University, voted for by a panel of 140 investors and oil companies.

OLIASOFT

# Oliasoft WellDesign is an Engineering Software for planning and real time monitoring of oil and gas wells



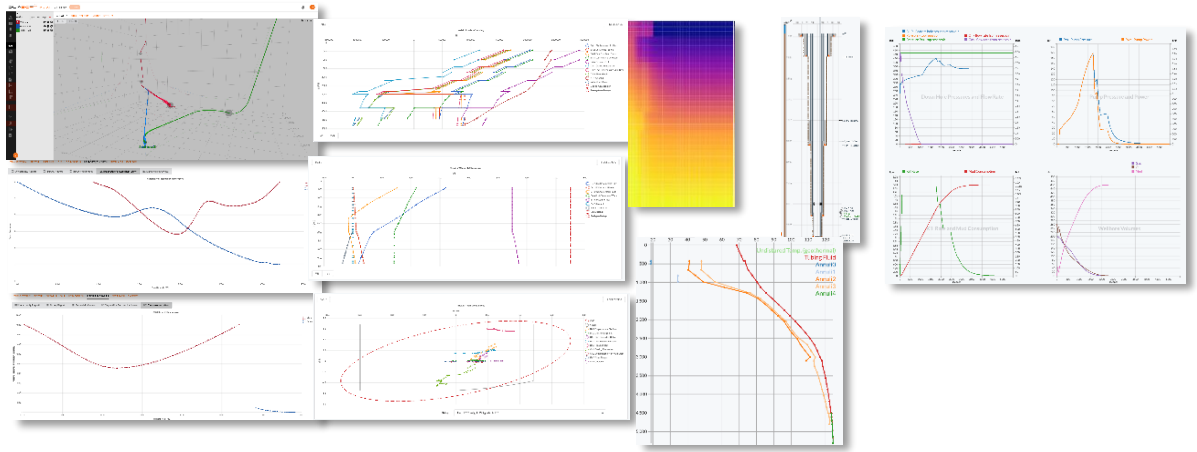
# Well Construction

**Categories**

- Well trajectory
- Casing design
- Tubing design
- Blowout & Kill Simulation
- Conductor analysis

**Authority Requirements**

| Well trajectory | Casing design | | | | | Tubing design | | | | | Blowout & Kill Simulation | | | | | Conductor analysis | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Target homing | Anti-collision | Basic load cases | Triaxial stress | Wear Simulations | Torque & Drag | Hydraulics | Temperature sim. | Flow induced stress | Annular Fluid exp. | Wellhead growth | Tubing stress | Duration simulation | Rate simulation | Kill simulation | Stochastic model | Monte Carlo sim | Mechanistic sim | Fatigue approximation | Cement height sim | Capping stack sim |

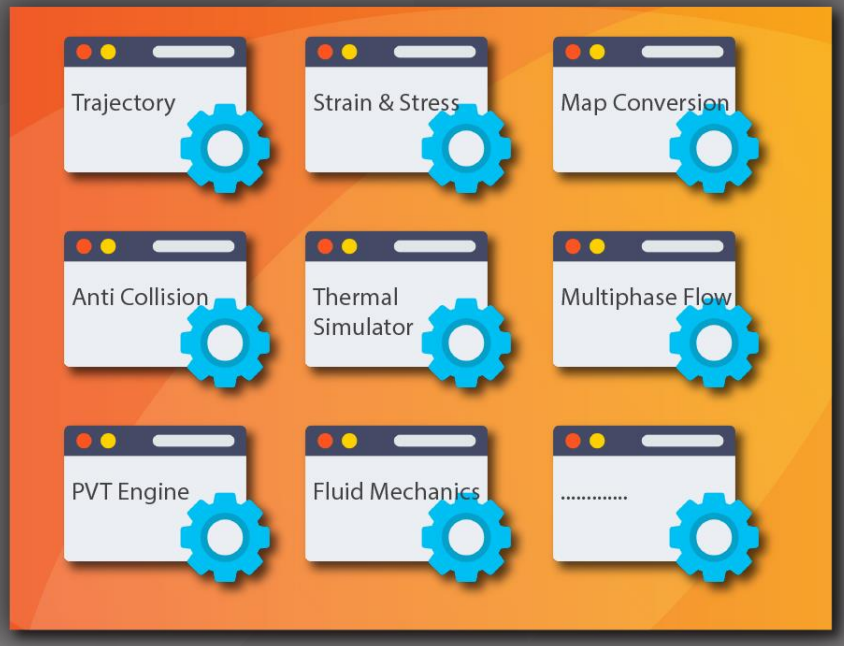


Full documentation of all calculators and APIs available at [docs.oliasoft.com](docs.oliasoft.com)

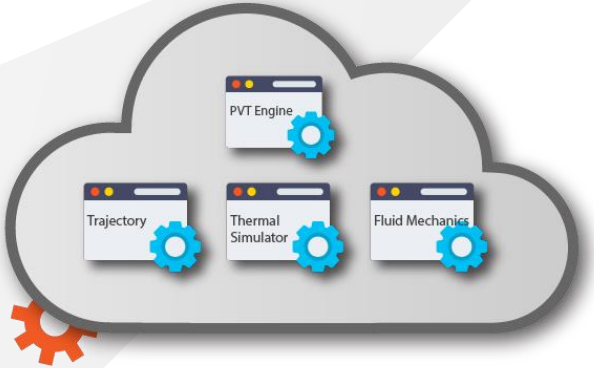
Oliasoft provides calculators specific to the value chain in the oil industry

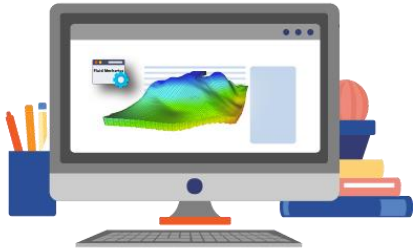
## 30+ API based Physics Calculators

*(no graphical user interface)*

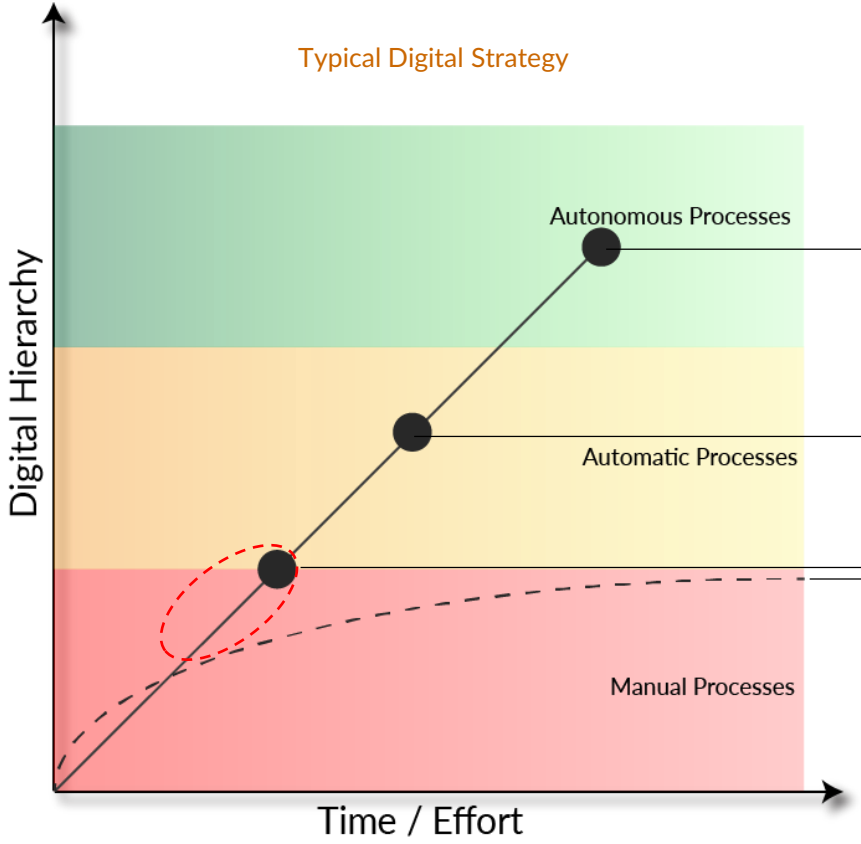



Can be used by any other 3rd party system or software to enable automation



# Industry wants to move towards a greater degree of automation and autonomy. This requires new engines capable of automation, i.e “API based engines”




### Autonomous Drilling Operations

The “goal” of a typical modern digital strategy. Get closer to autonomous operations for maximum efficiency and safety.

### Automatic Well Planning

In order to achieve autonomy, the first step is to be able to perform automatic or semi-automatic engineering.

### ”New” API based calculation engines

In order to achieve automation, new engines are needed, capable of automation. That means that communication and giving/taking instructions across different software and systems is possible, without human input.

### Technical limitations inherent in “old” solutions

Investments in modernizing old solutions often give quick wins, but eventually fail due to technical limitations inherent in legacy systems.

# Partnership Model with Leading Commercial and Academic Research Institutions and Oil Companies

## Multiple high level research grants

Oliasoft has as only 1 of 6 SMB companies in the world received the European Union Petromaks 2 scolarship for outstanding research of high commercial value for the oil industry, and Demo 2000 for full scale piloting for world leading operators

## Customer Participation


## Research Partners

IFE

Original team behind OLGA

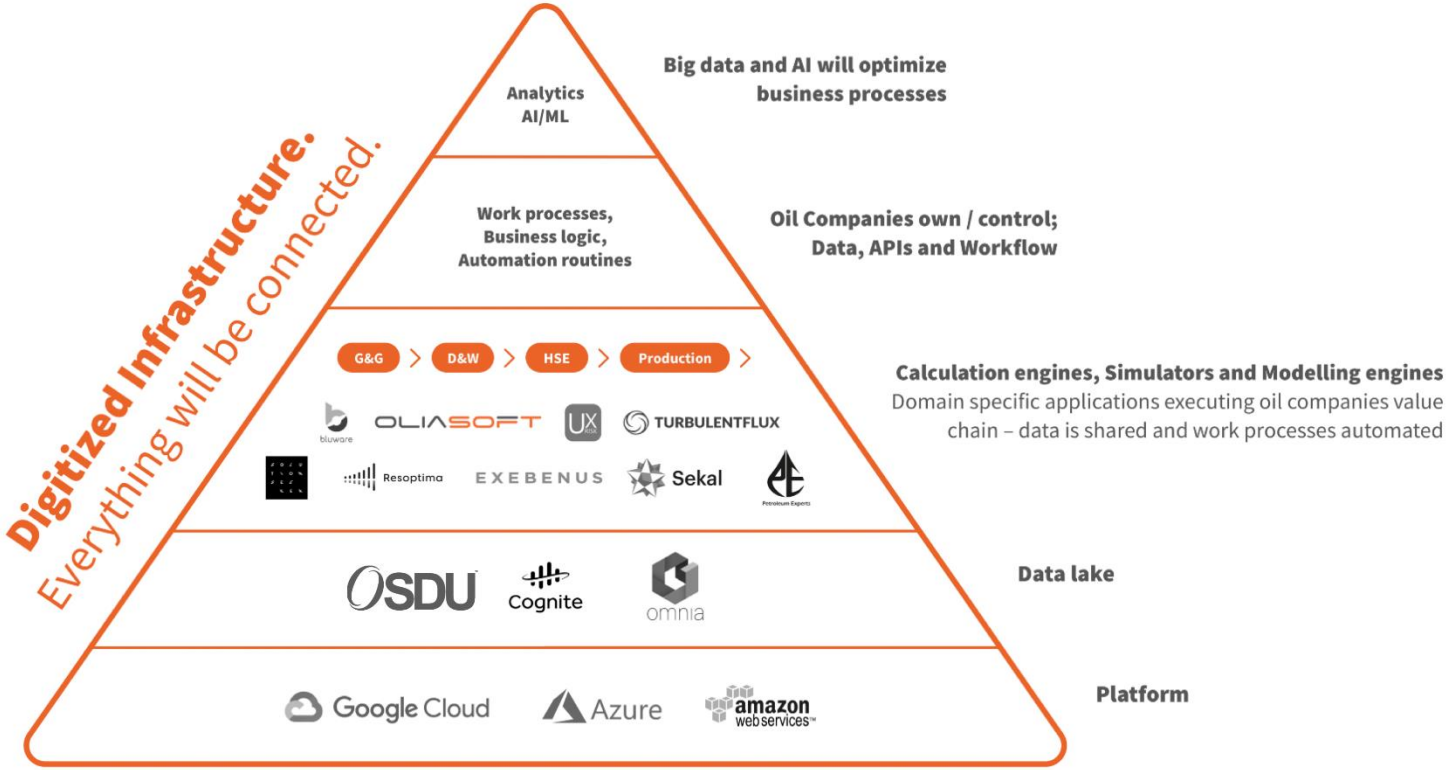
TERJE SIRA
SCIENTIST / DEVELOPER

JAN NOSSEN
SCIENTIST / DEVELOPER

STEINAR GROLAND
SCIENTIST / DEVELOPER

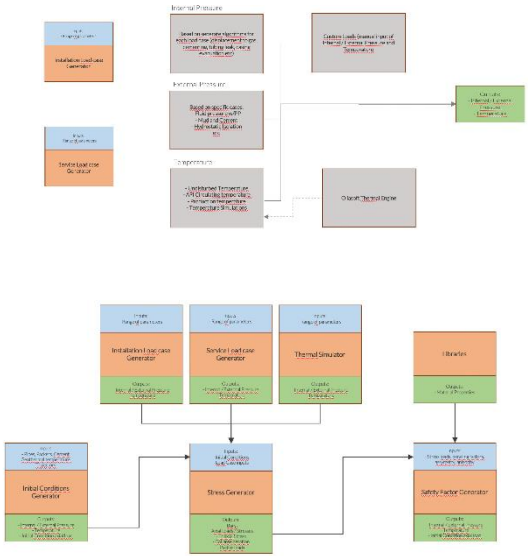
JAN SAGEN
SCIENTIST / DEVELOPER

The digital infrastructure currently is being built is enabled by a cloud foundation with new API based applications throughout the value chain. Eventually this will lead to automated and autonomous processes

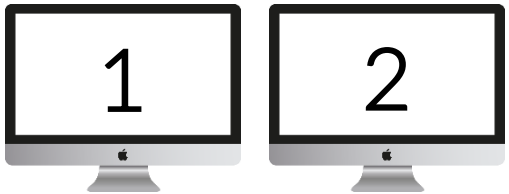


# TRL Programme

## Full Public Documentation




## Extensive user testing + technical unit testing and integration testing throughout application




## Industry Verification

Industry verification in the form of acceptance from industry leaders is necessary.

These are the only organizations capable of helping us finalise the application.

equinor

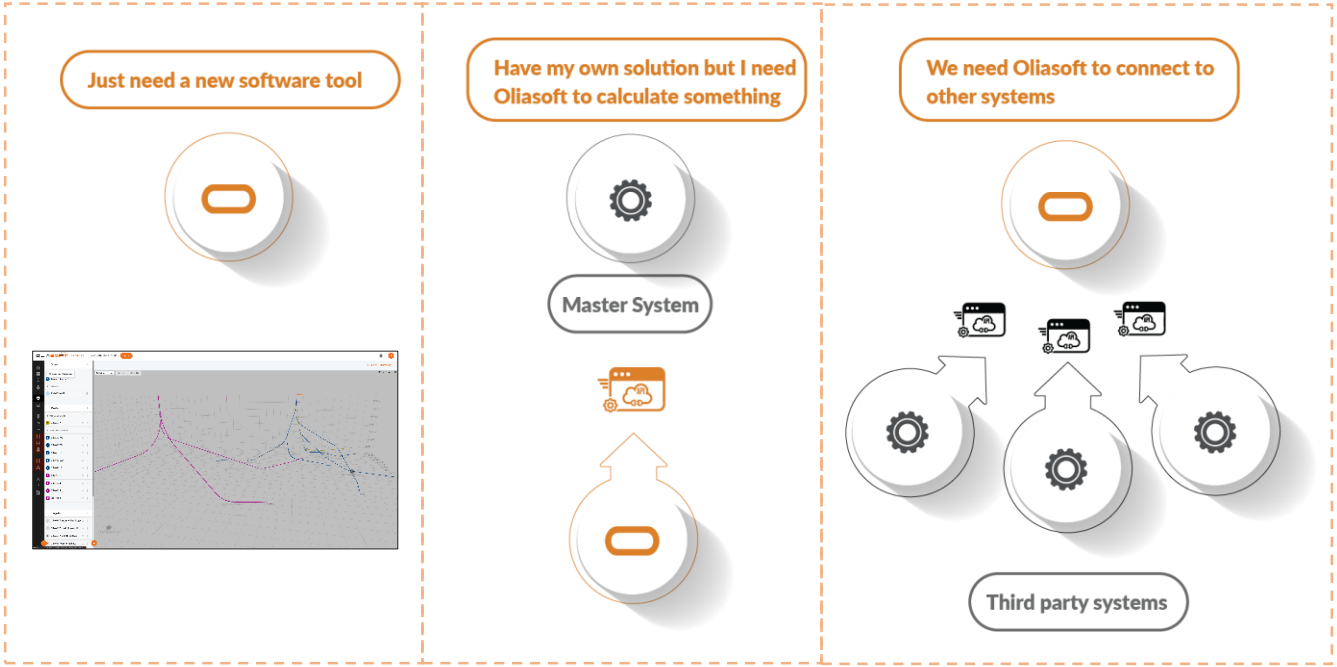
Chevron

OMV

Lundin Petroleum

# How does companies use Oliasoft WellDesign?

3 main types of users



# Trajectory modelling and anti-collision

## Full trajectory modelling engine

Contains all variations of lines, DLS methods, Toolface methods and build-to-target alghoritms.

## Anti-collision compatible with IPM methodology

Contains a full anti-collision module, capable of using IPM files for custom error models. Contains MWD models, Gyro models, and will contain continuous gyro from January 2020.

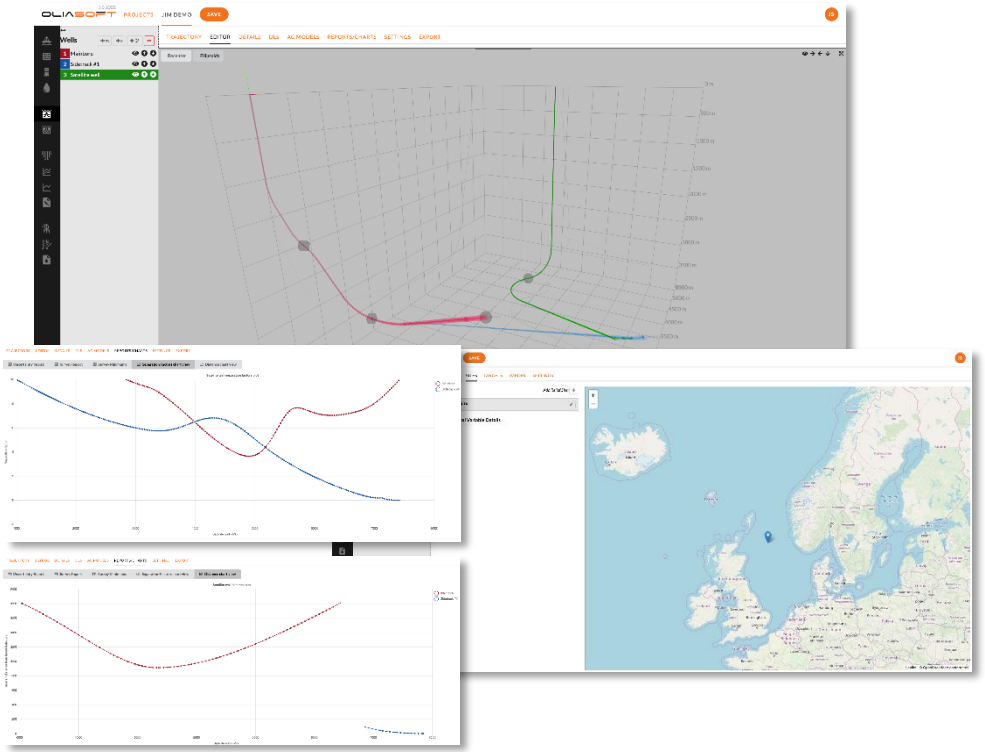
## Fully validated against ISCWSA

Modelling primitives and anti-collision have been validated against public datasets from ISCWSA. Currently validating with Equinor .

## API Usecases

equinor

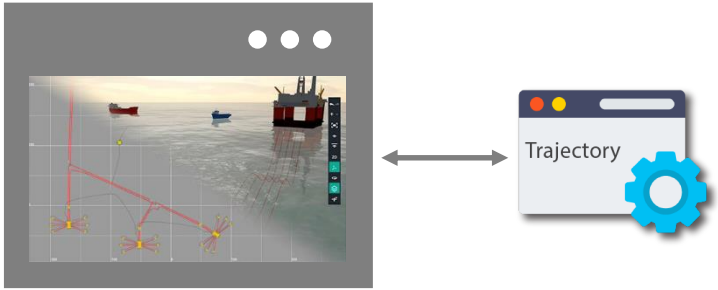
FutureOn®

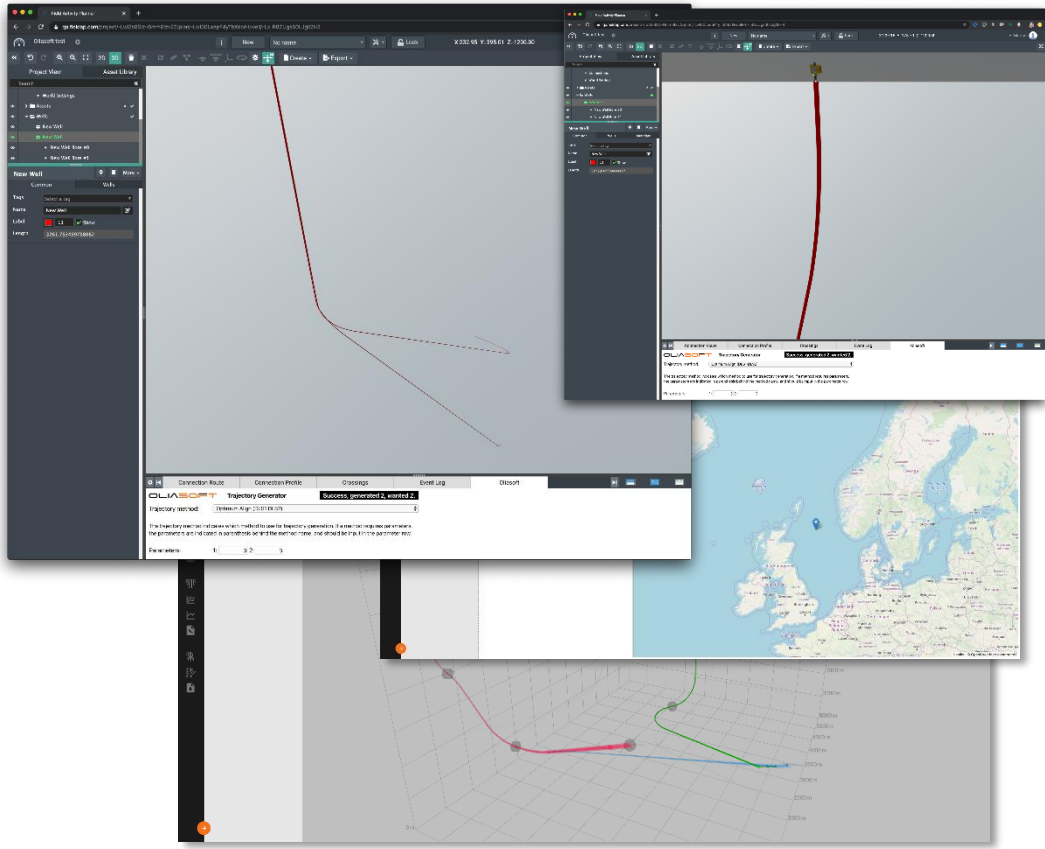


# API example – FieldAP Integration – Automated Well Trajectories

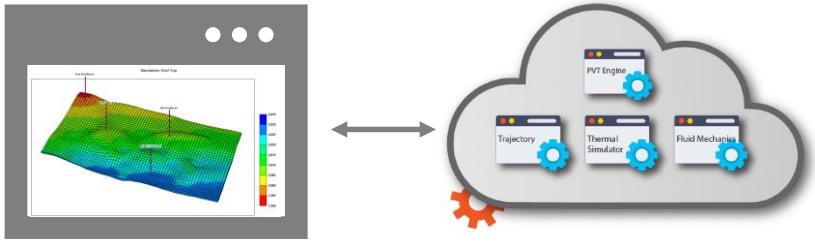
## FutureOn - FieldAP

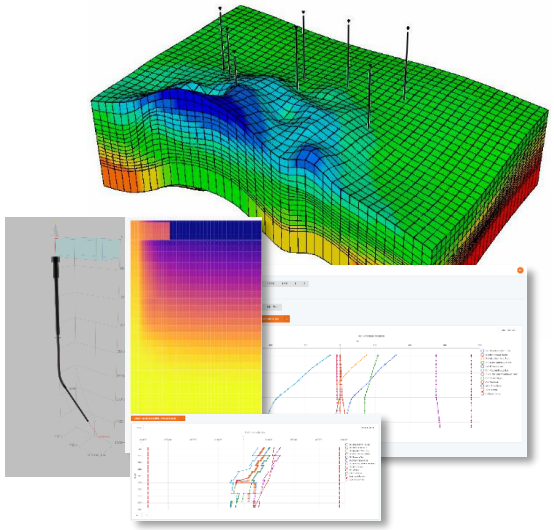
- FieldAP (Field Activity Planner) is rapid visual workflows for offshore engineering work.
- Engineering groups working on early phase planning can easily construct offshore facilities and drag and drop components in a 3D model.
- FieldAp has integrated Oliasoft trajectory engines, so that when platform locations are changed, all trajectories are re-calculated and displayed instantaneously.



# API example – Optimize drainage vs Well Cost



## Automatic well design for early planning

- A customer has developed a plugin to the reservoir simulator, that propose 100s of well trajectories through the reservoir.

1. All proposed trajectories sent to various Oliasoft calculators
2. Calculate anti-collision and automated well design
3. Calculate well cost from well design and send result back to plugin

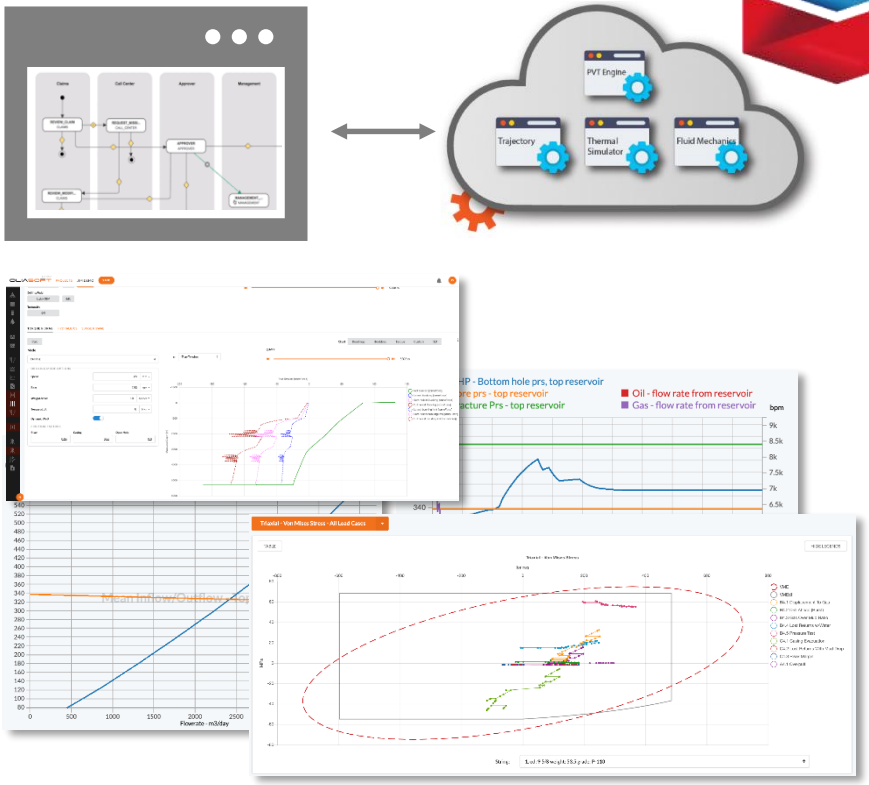
- The plugin filter away unsatisfactory trajectories due to well cost
- User is left with very good understanding of drainage strategy vs well cost at a very early phase.

# API example – Fully automated well design (rule based design)

## Internal Chevron Application

Connected to reservoir simulator, seismic databases, casing warehouse systems and rig systems.

1. Extracts necessary input data (pressure, temperature prognosis, lithology). Send to various Oliasoft calculators
2. Calculate full well design (rule based design).
3. Retrieve results and use results for additional engineering, such as feeding instructions to Nabors rig equipment



# Triaxial Stress Analysis (Casing Design)

## Triaxial stress analysis

Advanced triaxial stress analysis engine capable of handling point loads, anisotropy and asymmetry.

## Rule based design

Capable of fully automatic well design and material selection based on rules, both through Oliasoft API and GUI.

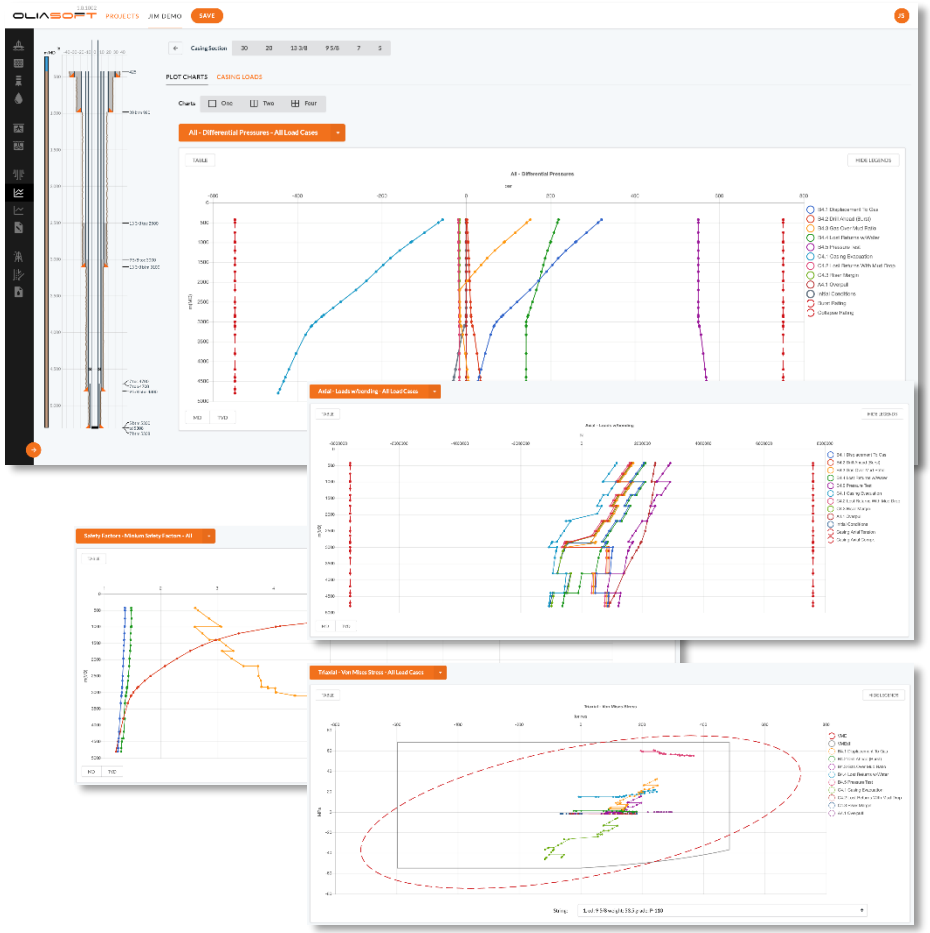
## Dynamic calculations

Any alteration of influential parameters anywhere in the calculation chain triggers re-calculations. Relevant in API applications and Realtime applications .

## API Usecases

AkerBP

Chevron



# T&D / Hydraulics

## Soft and Hybrid string

Accurately predicts,T&D, side forces, buckling, Soft 3D models, overbending and a whole range of related parameters.

## Dynamic operations

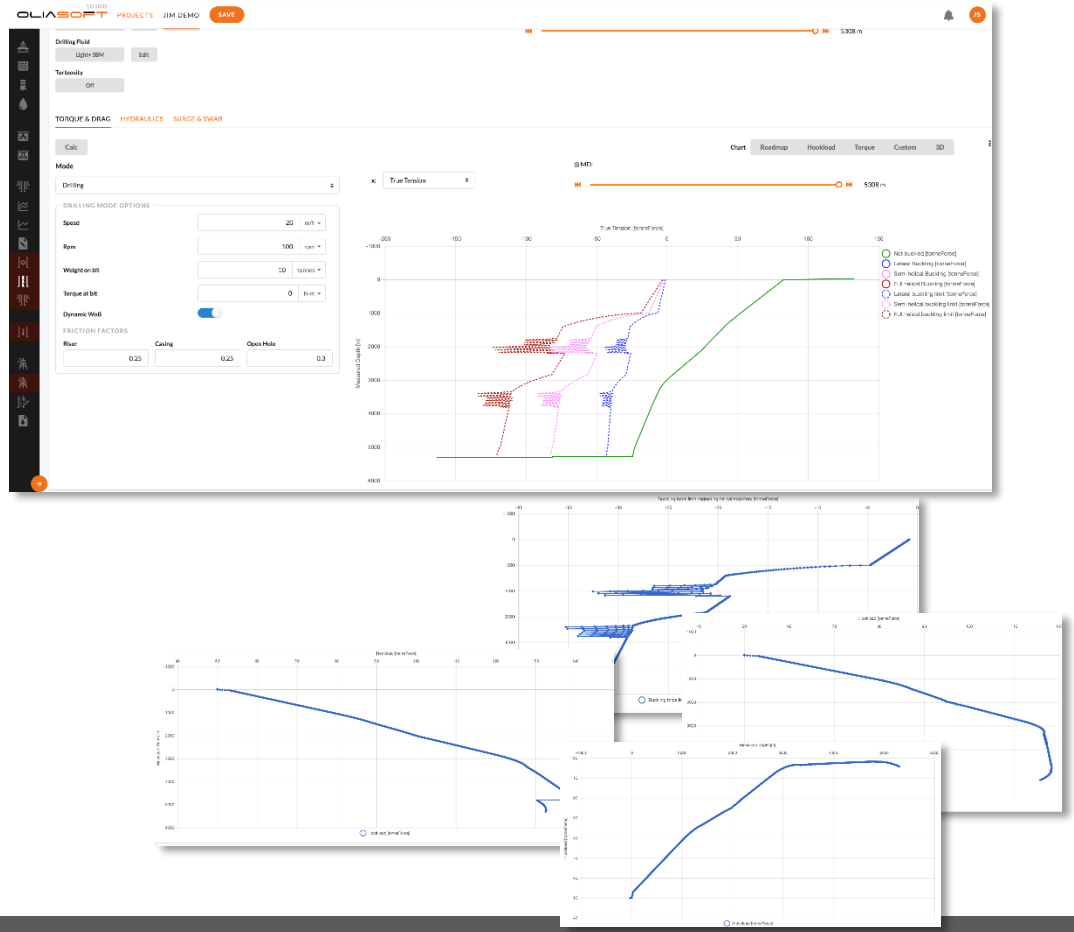
Calculates the forces along the entire drill string while in motion, with powerful visualizations and toggles to view forces at any time in the operation.

## Realtime capabilities

Capable of integration in realtime environment, effectively re-calculating all profiles continuously.

## API Usecases

Chevron



# Tubing Design / Thermal Simulations

## Advanced finite volume thermal simulator

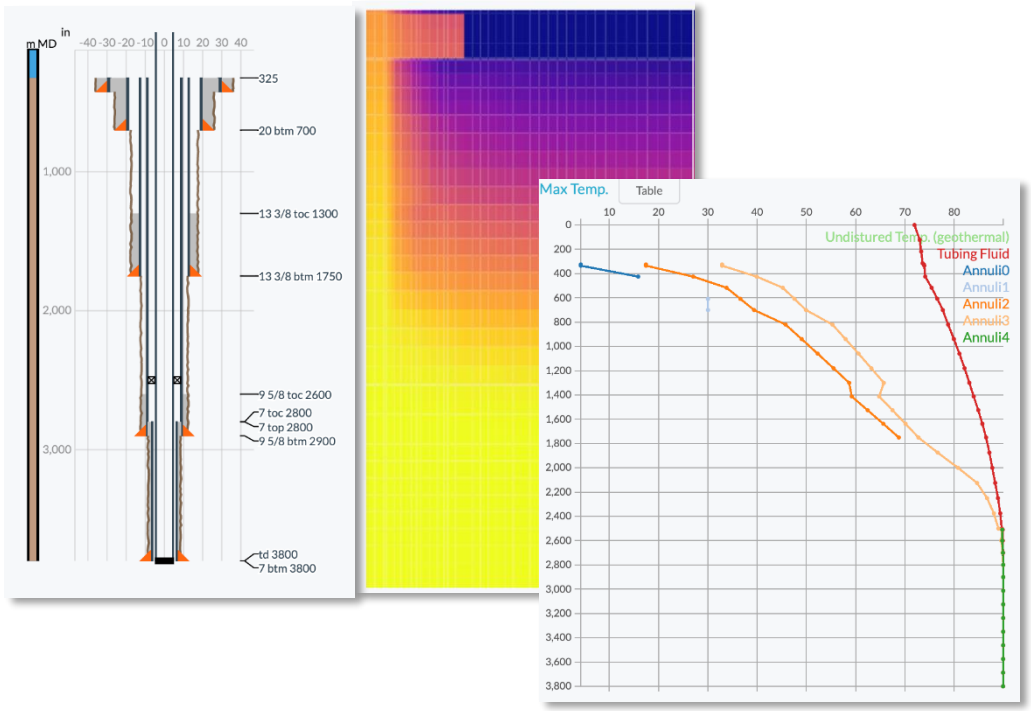
Capable of simulating any well configuration and fluid movement based on each elements thermal properties, including temperature development in all annuli, cement and formations.

## Nested simulations

Unlimited number of nested operations enable accurate simulations of each individual operation and how the thermal profiles develop over time. The resulting transient thermal profiles can be used in any other Oliasoft module.

## Multistring analysis, APB, Wellhead growth

Based on simulated temperatures, APB/AFE can be simulated with a range of mitigation effects,  as well as wellhead growth and other multistring effects – in line with NORSOK D-010 requirements.



# Blowout & Kill

## Probabilistic methodology

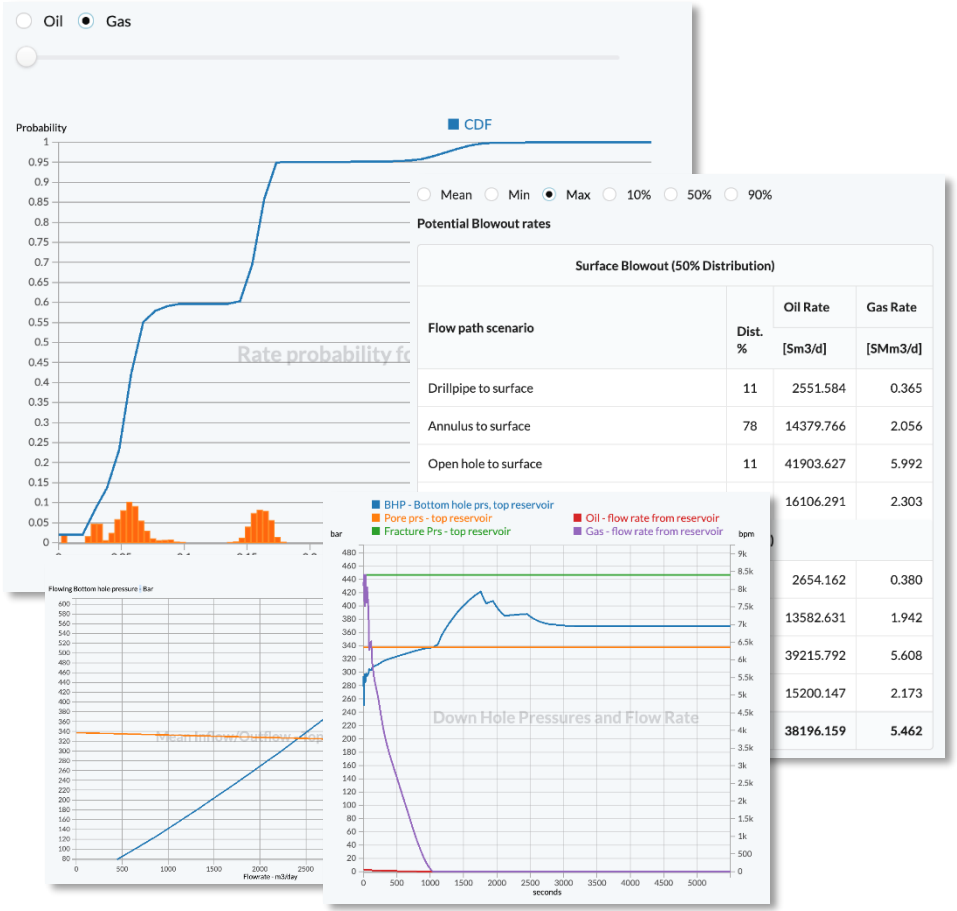
Based on OLF guideline for calculation of blowout rates, while including uncertainties from any input parameters.

## Dynamic kill engine

Capable of simulating a wide range of dynamic kill scenarios, including relief well kill, kill through DP, bullheading etc. Based on full PVT fluid characterizations .

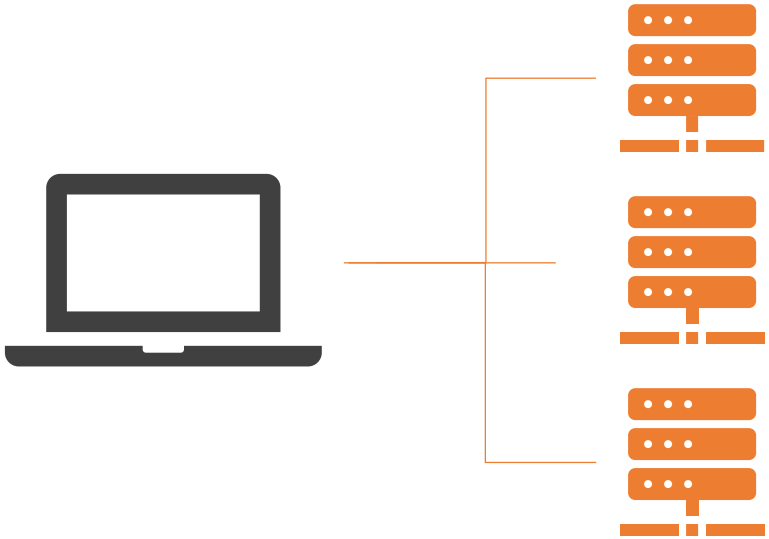
## Automated scaling of computational resources

Computationally heavy kill simulations are automatically optimized over multiple temporary servers for each individual scenario.



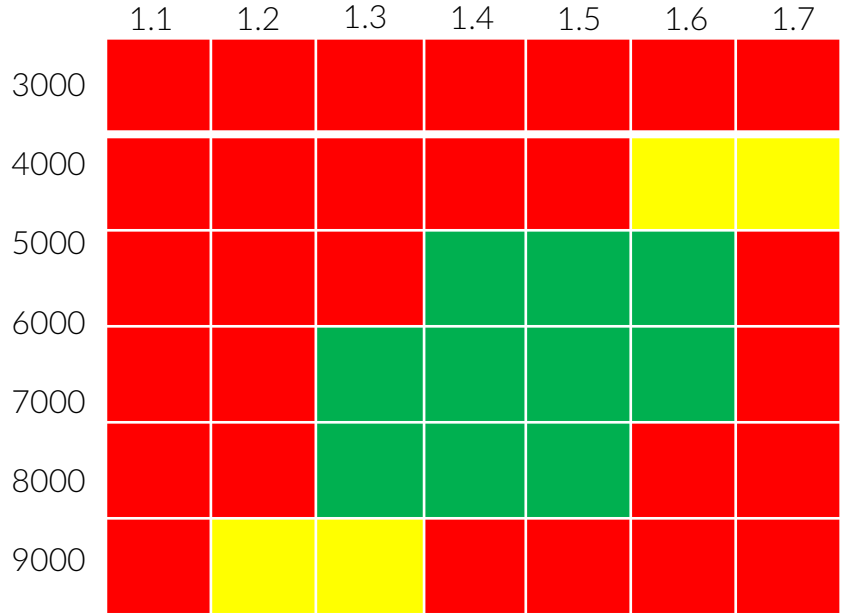
## Blowout & Kill 1.0

Automatic scaling of calculation power and parallelization

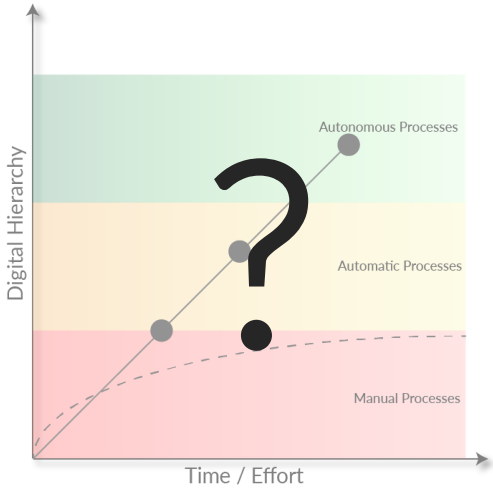


## Blowout & Kill 2.0

Enabling vast improvements in scenario analysis



# Where are you on the digital hierarchy?




Many new players are contributing to the transformation up in the digital hierarchy.

Engage with the new players and support them. Transition will not happen without your support.

# Thank You

Industrial Partners


Research Partners