STORMFJORD


Industrial Simulation
Enticing Future Use Cases for
Massively Parallel GPU Processing
In industry

Market

The use cases in this presentation, represents a 6000 Billion dollar potential increase in earnings for the Oil industry. 10% Nor.

Documented by :

- NASA
- Stanford
- StatoilHydro (13th)
- OLF

Estimated potential - quantified

Cost element	% estimated reduction
Reduced no. of inspection trips x no. of personnel (more efficient performance)	25%
Reduced downtime x oil-gas production value pr. day x days (reduced interruptions)	5%
Duration of training on site x no. of persons x offshore cost (prepared in VR prior to trip)	90%
Safer operation (complete SJA in VR environment and visual hazard control in 3D model)	15%
Reduced time of familiarisation and general job training x no of personnel	25%
Increased production x daily production x 365 (better decision support)	5%
Fewer unwanted incidents (due to increased expert back up and process understanding)	5%
reduced shuttling costs x no of persons	25%
reduced no of beds x average accommodation cost.	25%

The numbers are documented

StatoilHydro

6000 Billion $ Globaly
60 Billion $ in Norways 1%

6 Billion is already taken out in Norway.

http://www.olf.no/news/english-summary-article2886-291.html

Næringspolitikk | HMS og drift | Miljø | Arbeidsliv | Kompetanse

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English version

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Latest news

Fruitful HSE dialogue

News

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News 23.11.2007 11:17

English Summary

"In 2005, the value creation potential in integrated operations was estimated at NOK 250 billion. New estimates this autumn have raised the potential to NOK 300 billion - values on a par with finding another major oil field on the Norwegian Shelf. The new OLF report also emphasises the importance of the industry getting into top gear in its work for integrated operations (IO). Too little effort made in this area may cut value creation in half. IO is a combination of new modes of cooperation and new technology. The oil companies as well as the supplier industry have invested heavily in this issue over the last few year, and there is no doubt such investments are profitable: since 2005 the industry has taken out 24 billion in additional value on account of IO. According to the 2005 OLF report, the potential for the period amounted to 37 billion," writes OLFs Director General Per Terje Vold in the editorial.

Mega Market

Scenarios

Work Processes Remodeling

Formel1

5000 dollars – a second.

**Some delays cascade down event chains,
and cause risks in unforeseen manners**

Demands
Simulation Capability

Concurrent Design

NASA..

By Virtualy ensembling everybody, walk trough,
charting up every eventuality.

With thousands of participants,
millions of potential decisions

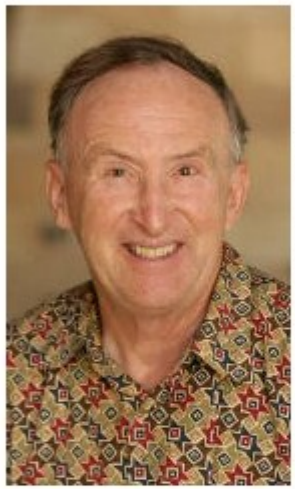
Collaboration tools, in the same virtual environment,
environment built on next generation simulation strength

Demands
Simulation Capability

Integrated Operations

Integrated operations – ideas
Feature Articles, Jan 05 2009 (Digital Energy Journal)

- Speeding up construction of new projects, doing faster modelling and improving reservoir simulation – some of the new ideas discussed at the Trondheim Integrated Operations conference



John Kunz, Executive Director Center for Integrated facility Engineering, Stanford University, shattered the popular wisdom that construction projects need to take 6 years.

Typically, it takes 1 to 6 years for design, and 18 months to build it, he said. "But design can be done in 1 year, and the physics completely allows building in 6 months," he said.

Mr Kunz was actually referring to his work with the US construction industry, not the oil and gas industry, but there's nothing in his work that wouldn't apply to oil and gas.

Projects can be speeded up by improving co-ordination, and developing sophisticated computer models so you can make sure everything will fit as it is supposed to, before you do it.

Work tasks can be intensely scheduled, so people are given computer instruction every morning of what to do.

You can put together 4D (three dimensional images changing over time) animations, which show clearly how the project will come together over time, and help people get a much better feel for how it will develop.

Mr Kunz calls this 'virtual design and construction."

NASA Integrated Operations

Speedup :

- 6 X design phase : 6 yrs = 1
- 3 X construction phase

By Virtual design and construction

Mr Kunz got the inspiration after he saw how NASA plans models of trips to Mars.

One important issue is how fast you can get a response to questions.

People at engineering companies normally take 2 days;
NASA takes about a minute," he said.
I think that's a very important metric."

Virtual Collaboration

Crisis: Can within minutes get 30 engineers
from 10 different places in the world to solve the problem
simultaneously in the same virtual environment

Cut :

- Physical Transportation
- Response Time
- Risk
- Cost

- *Offshore*
- *SubSea*
- *Nuclear*
- *Space*

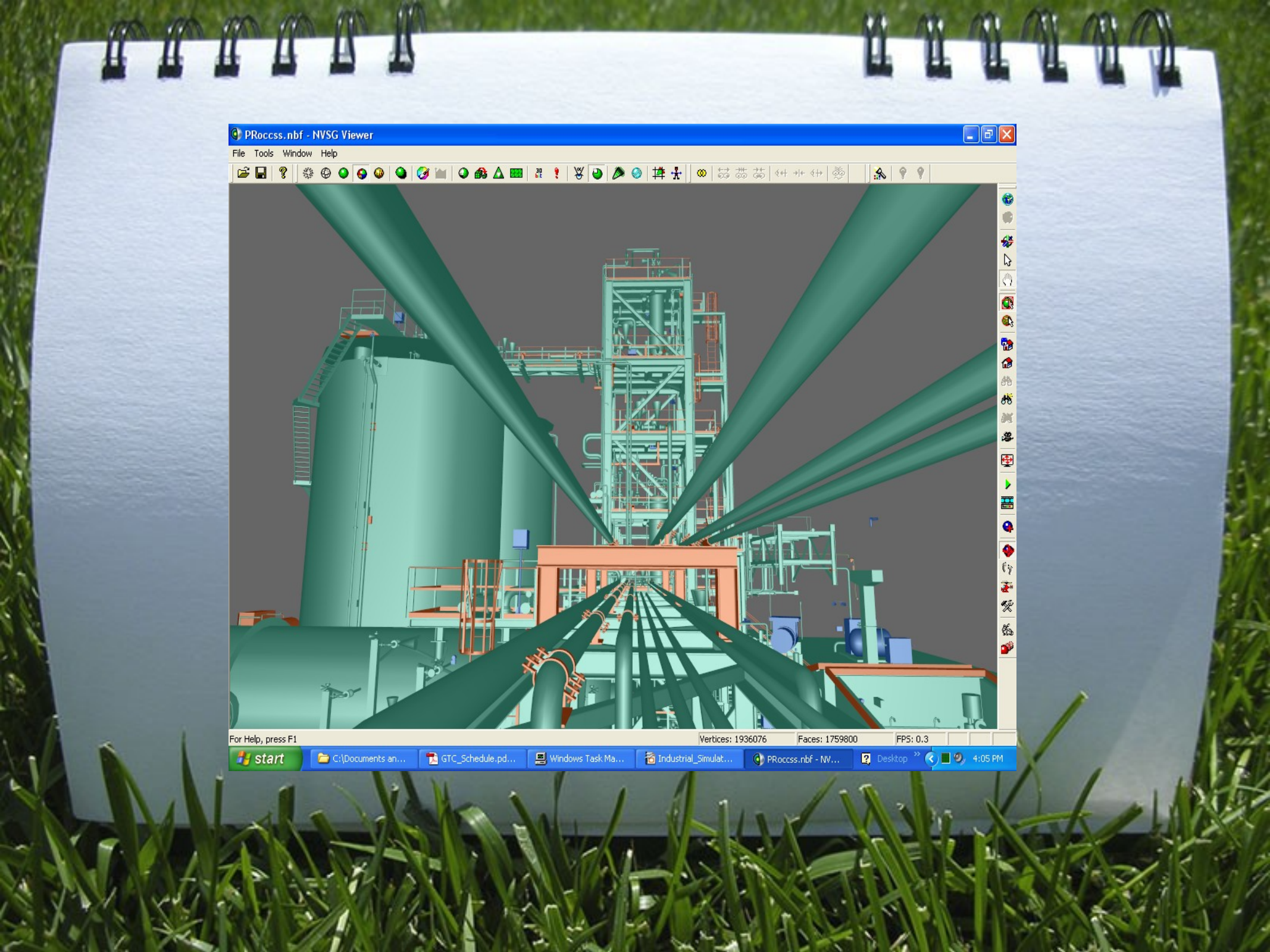
Demands
Simulation Capability

Stormfjord Capability

Ability to visualize Oilplatforms as realtime simulations.
Shown at Siggraph 2009 - as Nvidia's centerpiece.

Colloborative, like a SecondWorld for industry.

- Access to all Oil-rigs in Norwegian sector. (80% world)
- Full C++ code
- Cuda bridge
- Physx bridge
- LabView bridge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It All hinges on
Simulation Capability

Next Generation Use Cases

Dynamic Simulation

- **Auto Physics - For Mechanics. Drill Deck**
  Time slider - virtual drill deck - play rec remodel

- **Robotic Prototyping – Multi Agent Simulation**

Next Generation Use Cases

Real Time Steering

- Virtual Drilling – 15 next seconds – real-time steering.
- Shut down simulation – Extreme Permutational Space

Next Generation Use Cases

Full plant 3D flow

- **Full plant - and plant networks - visualization & simulation**
- **Fault detection - 100.000 Real-Time Sensors**

Pressure - Phase - Temperature - Vibration

Global Consortium

If you are a developer interested in these use cases,
Stormfjord with partners are establishing a Global Consortium of Oil&Gas companies, to lead in development and application of next generation tools.

The primary motivation for members to join the initiative is to:

- Access bleeding edge technology at low cost.
- Decreased time to market.
- Access to industrial data.
- Access a previously inaccessible customer base.
- Partake in development of novel technology.
- Be partner in a global infrastructure, ecosystem, and marketplace.
- Decreasing operational and hardware cost by cost sharing.

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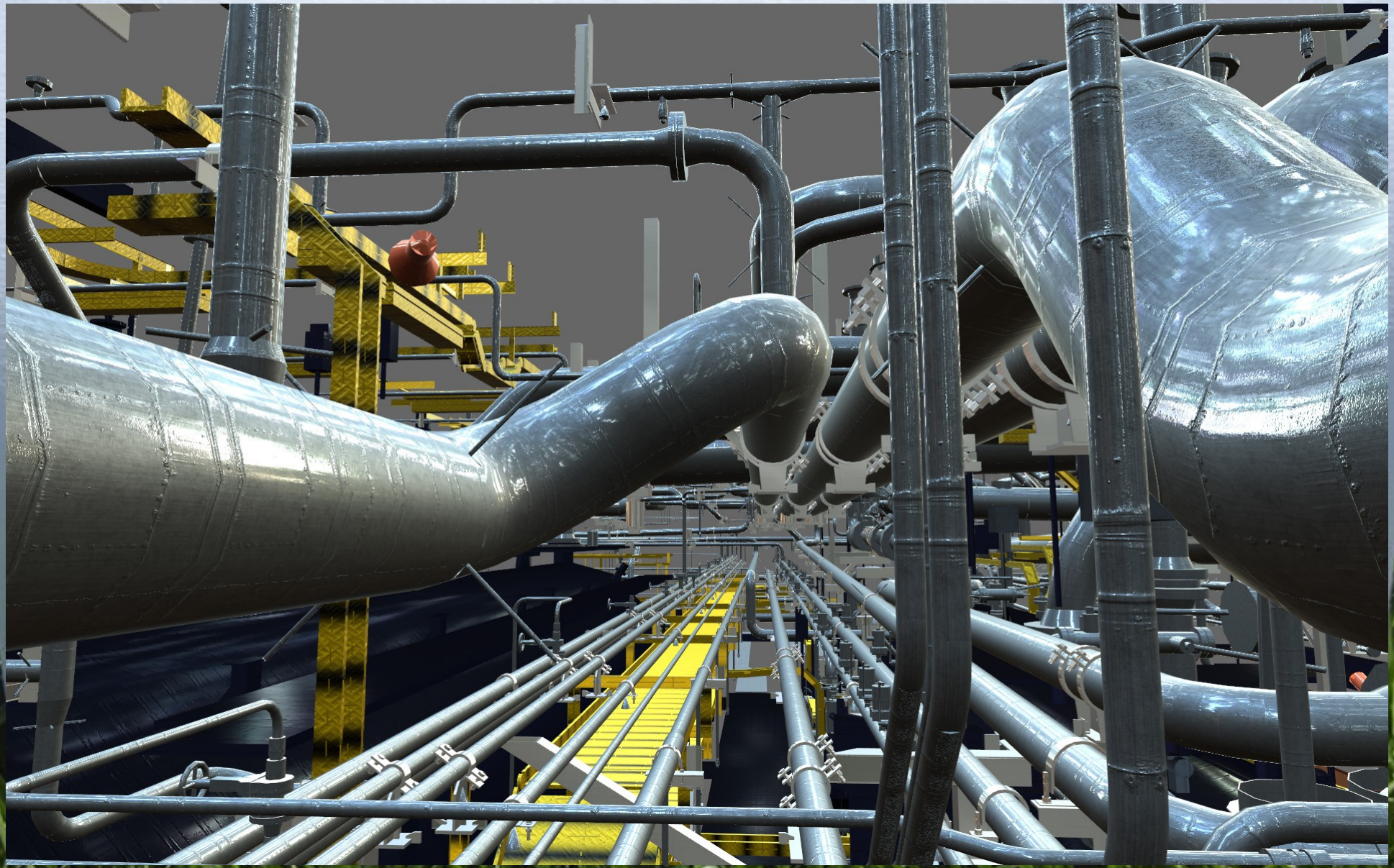
Industrial Simulation



Why Norway & StatoilHydro

StatoilHydro is World leader in 3D use
- 1500 engineers working on the cad models - Daily !
StatoilHydro 13th biggest Oil company

CEO of StatoilHydro, Helge Lund - Stated :

”StatoilHydro aims to be a global leader in integrated operations.

- Everything on an Oil rig is to be accompanied by a 3D model
- All operations is to be planned in total detail

- Offshore as A forerunner for space, nuclear, subsea

- Norway as sandbox for new technology, 5-10 yrs in front - appliance of it