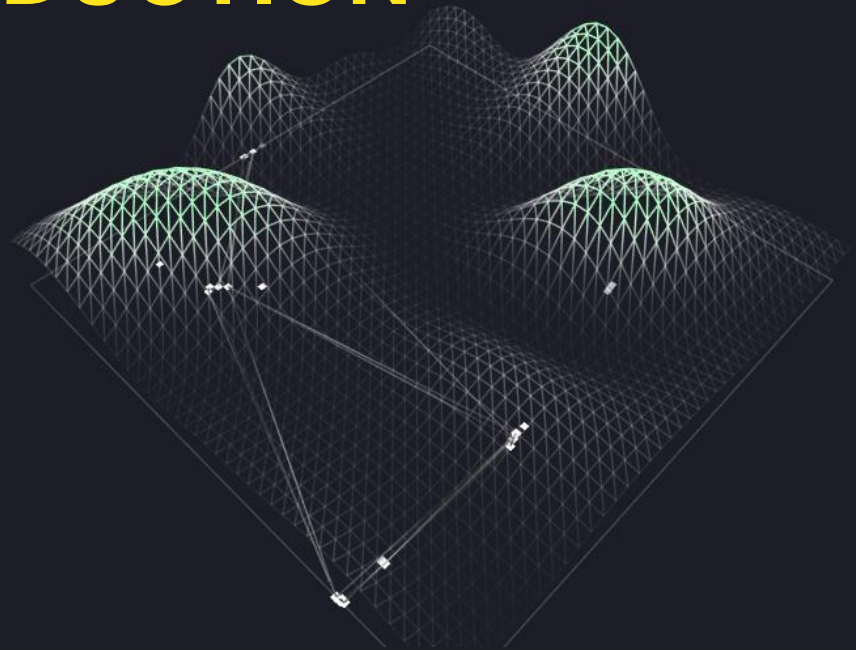


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K E R

# AI LEVERAGED PRODUCTION OPTIMIZATION

Bjarne Grimstad, CTO  
Solution Seeker



# Solution Seeker - A spin-off from the NTNU Center for Integrated operations

- **Solution Seeker AS** is a spin-off NTNU's Center for Integrated Operations (IO Center) and NTNU Engineering Cybernetics
- **Close industry interaction** with oil companies has been a key part of the IO Center approach to understand the actual problems the industry faces
- The theoretical foundation of Solution Seeker's technology is documented in more than **50 scientific publications, 20 Master's degrees and 5 PhDs** since 2007
- **Four patents**, where two have reached national level with outstanding feedback and reviews, and third and fourth patents are pending
- **Several JIP and pilot projects** focusing on R&D, testing and verification of methods



**Center for Integrated Operations in the Petroleum Industry**

**Research partners**

 **NTNU**  
Innovation and Creativity

 **SINTEF**



**Industrial partners**

 **Statoil**

 **BR**  
**PETROBRAS**

 **TOTAL**

 **eni**

 **bp**

 **Shell**

 **GDF SUEZ**

 **ConocoPhillips**

 **IBM**

 **SKF**

 **DNV**

 **KONGSBERG**

 **FMC Technologies**

 **Aker Solutions**

# Solution Seeker – 13 employees and 5 advisors



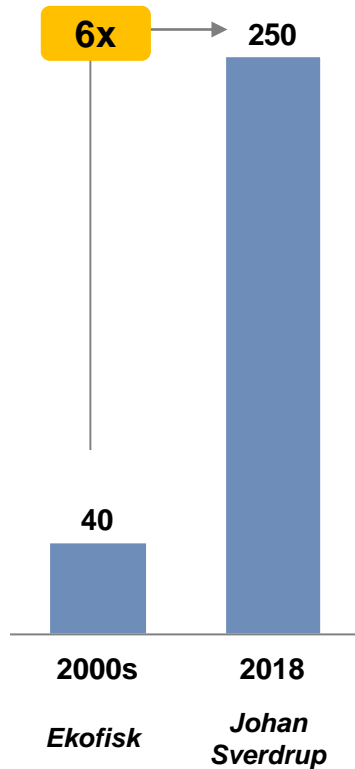
## **Solution Seeker Competence**

Data analysis, machine learning and optimization algorithms applied to petroleum production

# Strong underlying historical growth in the O&G software market

## Main drivers

- 1** Dev'mt in available data  
*Figures in 1000 # of sensors*



**2**

*Big data collection, processing & analysis more feasible now than ever before*

**3**

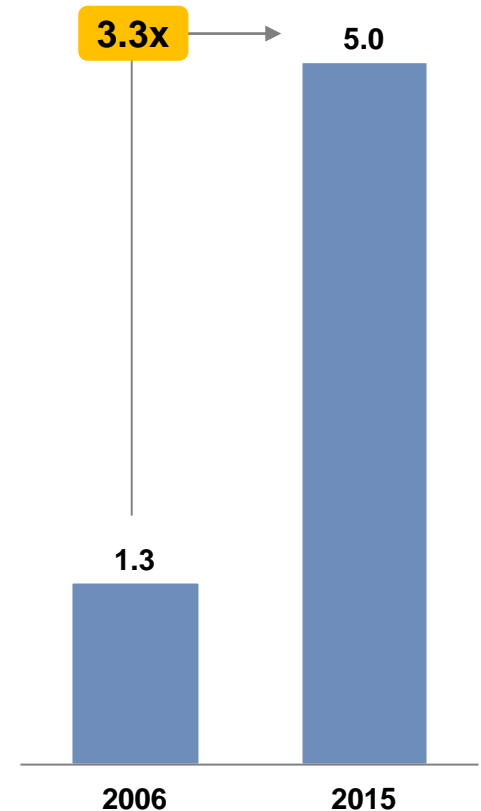
*Increasing field complexity & more demand for tools to squeeze out the last drop of oil*

**4**

*Integrated operations requiring software solutions to enable cross functional work streams*

## O&G software market dev'mt

*Figures in bUSD*



# Five live installations and increasing field experience – verifying value potential



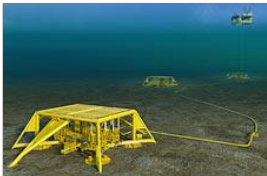
Gas-lift optimization, bottleneck balancing, well testing, uncertainty estimation, and data visualization

 ConocoPhillips



Daily production optimization, deduction test optimization, change assessment and data visualization

 ENGIE



Daily production optimization, deduction test optimization, change assessment and data visualization

 wintershall



Advanced analytics, change assessment, uncertainty estimation, and data visualization

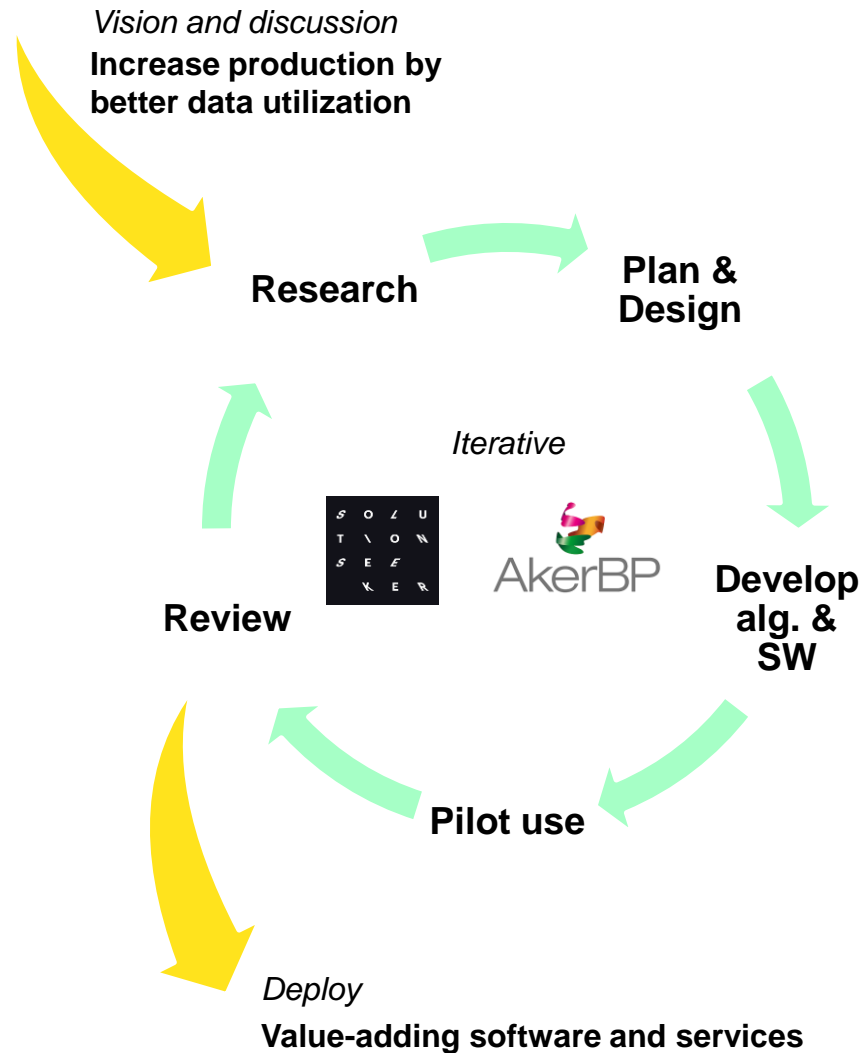
 Lundin  
Norway



Daily production optimization, advanced analytics, slug handling and optimization

 AkerBP

# Agile process to increased production



# Real Time Data Mining, Machine Learning and Optimization

High value results for oil companies

**Increased production**  
through production recommendations and increased situational awareness

Our unique competence

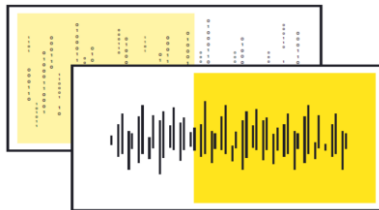
**Solution Seeker Competence**  
optimization algorithms applied to petroleum production, driven by real time data analytics and machine learning systems

Production-Compass AI

**Data Mining**

**Machine Learning**

**Optimization**



- Thousands of historical and live production data series automatically and continuously mined and analysed



- Machine learning models identifies field behaviour and relations, and enables estimation of parameters, correlations and quantification of uncertainty



- Provide real-time and actionable advice to production engineers

**Technology protected by six patents**

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**THANK YOU**

[www.solutionseeker.no](http://www.solutionseeker.no)