Who we are

Responsible for what we deliver.
Professional in what we do.
Considerate in the way we interact.
Proud of our work.

- Established 2006
- Office in Norway/Sandnes
- 40 engineers (majority MSc level)
- ISO 9001 certified in 2013
- Specialists with operational expertise
- Lifetime Extensions of systems and facilities
- System integration and engineering
- epc(ic) delivery, Instrument Aut Telecom
Consulting Services
SAS (ICSS), Telecom, Industrial IT and Change management

Project deliveries
Single discipline EPCI, Alarm Mgt, SAS, Telecom, Industrial IT upgrades. Onshore Operation Centre, Control rooms and Improved Operation. ISO 9001 certified.

Operational support
Alarm system with performance guarantee. SPI (Smart Plant Instrumentation) maintenance

Eldor Technology
Innovative and smart products for the oil & gas market. AlarmTracker Tips-LogMate Epsis-Teambox

Development

Lifetime Extension
Content

• Vision Eldor Technology AS
• Background
• Today´s solution
• User requirements
• Our Approach
• Functional Modelling
• Business Value
• User Interface example
• Team
With the use of **innovative technology** and domain knowledge we shall strengthen safety, improve regularity and **increase production** in the oil and gas industry.
Industrial plants lose 3-8% production due to unplanned upsets.

Source: Abnormal Situation Management Consortium with members from e.g. Chevron, BP, Total, ConocoPhillips, ExxonMobil, Shell, Sasol and Honeywell
50% of unplanned upsets are due to lack of situational awareness

Sources of Abnormal Events

- 90% preventable
- Actions or inactions
- Decision making

- Process: 22%
- People: 36%
- Equipment: 42%
A rational process of management of situations in complex systems involves two phases: Analysis and Action.

Humans tend to violate these principles by making shortcuts based on experience and knowledge.

Lack of informed decisions can lead to suboptimal production, abnormal situations, shutdowns or disasters.

Decision Support Systems that guide the operator thru the process are recommended.
Operator challenges

- Number of systems
- Integration of systems
- Information channels
- Information/ Data Points
- Operators/ Control loops
Our approach

1. **Highlight Root Cause**
   Immediate visualization of the root cause behind the abnormal situation

2. **Consequence Propagation**
   Generation and visualization of possible future development of the abnormal situation

3. **Counter Action Planning**
   Counter Actions to resume to normal process status proposed to the operator dynamically
**Principle**

- Functional Modelling
- Real Time Data
- Rule Based Technology

**CONSEQUENCE**
Future consequences of the abnormal situation provided to the operator in real time

**COUNTER ACTION**
Counter Actions for return to normal situation provided to the operator

**CAUSE**
Root Cause highlighted directly to the operator in real time
A structured representation of a engineered system decomposed to functions.

Functions represented in relation to context and with their interrelations mapped.

Goals, objectives, means, ends and control functions related to functions of systems forms the basis for the modelling.

Designed for fault management of complex systems

Applies to system design and operation
Real Time Data

- Connected to real time data coming from the integrated control and safety systems.

- Vendor neutral connectivity by OPC UA (preferred), OPC DA/AE or by Modbus TCP.

- Digital, analogue and alarm & event data subscription for use in MFM model.

- Real Time data mapped to give feedback to control functions used in the MFM model as evidence.

- Static data (e.g. description, alarm limits, alarm information) used in user interface to generate intelligent messages.
Rule Based Technology

- Product of Artificial Intelligence research (1980-1990) matured into commercial software (offered by e.g. Microsoft, IBM, Red Hat) for business modelling and decision support.

- Used for problem solving with complex decision logic with many conditions and/or many rules and supports high level programming.

- Simple basic architecture including an inference engine and knowledge bases representing facts and rules.

- Inference engine based on the highly efficient “Rete” algorithm for pattern matching.

- Facilitate representation of problem domains with interacting tasks and complex multilevel decision logic.
AlarmTracker Business value

Increase production output by 5%, reduce flaring and increase safety

- **Understand all situations**
  with reduced time to action (Situational awareness)

- **Deal with the cause(s)**
  of the abnormal situation. Not the alarms/symptoms (Root Cause)

- **Developing scenarios**
  from the abnormal situation shown directly (Consequences)

- **Actions recommended**
  to get back to the normal situation (Counter Action Planning)

- **Deal with the upsets up front**
  to avoid shutdown and incidents (Decision Support)
Why Eldor Technology and AlarmTracker

- We have senior personnel
- We have historical integration experience
- We know design and operation
- We rethink and innovate
- We recognize the industry challenges
- We collaborate
<table>
<thead>
<tr>
<th>User Interface</th>
<th>Causes</th>
<th>Consequences</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seawater pipe line blockage</td>
<td>10-SW-SW-FL-3212</td>
<td>Seawater flow rate (low)</td>
<td>Check for blockage at In-let</td>
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<tr>
<td></td>
<td></td>
<td>Circulation missing</td>
<td></td>
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<tr>
<td></td>
<td>10-SW-ET-3270</td>
<td>Seawater Energy transport (low)</td>
<td>Reset Sea Water Circulation Pump</td>
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<td></td>
<td></td>
<td>Heat Exchanger fault</td>
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</tr>
<tr>
<td></td>
<td>10-FW-ET-4570</td>
<td>Fresh water Energy transport (low)</td>
<td>Reduce engine load 30-EG-M-5207</td>
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<td>Heat Exchanger fault</td>
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<tr>
<td></td>
<td>30-EG-O-5207</td>
<td>Engine Overheat</td>
<td>Start Backup Engine 30-EG-M-5208</td>
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<td>Local shutdown</td>
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<tr>
<td></td>
<td>30-PSD-SD-3207</td>
<td>Process Shutdown Level 3</td>
<td>Shut down engine 30-PSD-SD-3207</td>
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<tr>
<td></td>
<td></td>
<td>Local Shutdown</td>
<td></td>
</tr>
</tbody>
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The company’s entrepreneurs

Highly experienced within offshore operations, both in Norway and internationally
Experience from Oil & Gas in general, integrated operations, ICT, and entrepreneurship

Bjarne André Asheim
CEO

Børge Richard Kolstad
Chairman of the Board

Bernt Hjalmar Eldor
Board member and business developer

Ove Heitmann Hansen
Board member

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