

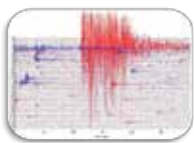
DRILLING MONITORING SYSTEM



MANAGING DRILLING HAZARDS WITH THE TRIDEC SYSTEM

Offshore or on land - drilling has a paramount role in human interaction with the geological sphere. Broad examples are exploration and exploitation of oil & gas, extraction of minerals and water, retrieval of geothermal energy or the controlled underground storage of liquids and gases. Additionally, scientific drilling is crucial for our understanding of many Earth processes. However, boring holes into the crust of the Earth often enough nearly leads to a catastrophe because of technical, material, and human limits. Typical and frequent critical situations while drilling are stuck pipe, pump start-up, ream & wash, kick, or circulation loss.

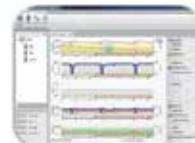
It is of utmost importance to prevent the crew from injury, the environment from pollution, and the equipment from damage during the whole drilling process. Based on a novel message oriented software architecture, the TRIDEC consortium has developed a new type of drilling monitoring system. It provides the drilling crew on the rig as well as the monitoring crew in the data centre with all necessary information in order to instantly alert them of possibly critical situations. Resilient real-time data analytics, scalability of the system with an option of easy expansion, and the support of very large numbers of samples per sec are defining key features of the TRIDEC monitoring system.



1. Monitoring:

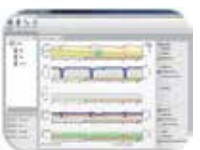
Digital sensor data streams and additional well related information in proper formats are delivered in real-time. (Geo-) physically motivated features are calculated

from pre-processed raw-data and visualised in an end-user friendly manner to allow for a comprehensive situation overview and visual trend analysis.



3. Crisis Prediction and Prevention:

Predicting the probability for an upcoming critical borehole condition is necessary for applying remedies at an early stage. Ideally, evolving crises can be completely prevented by the recommendation of efficient and economically feasible countermeasures.



2. Drilling State Classification:

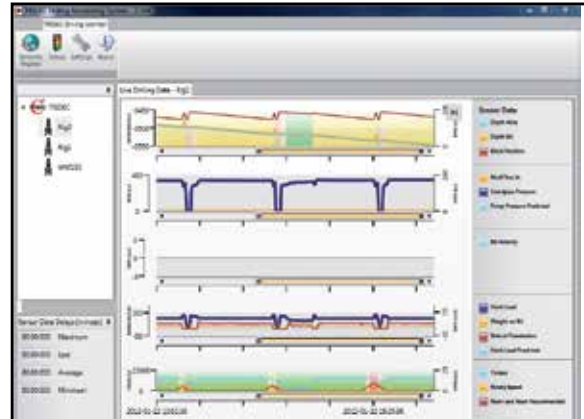
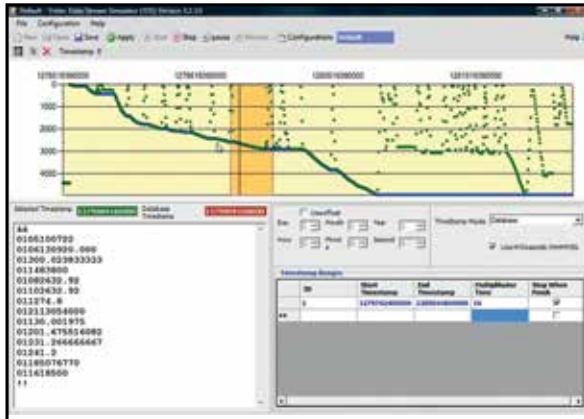
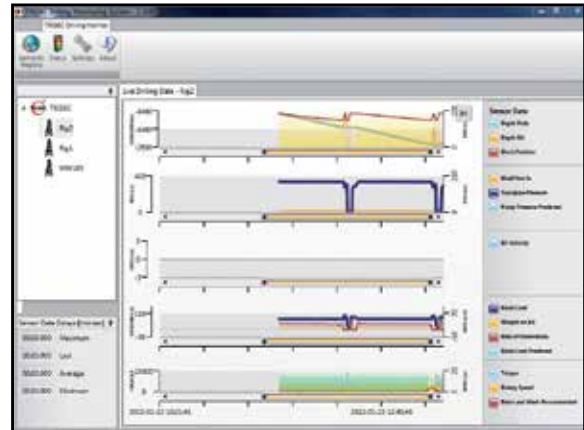
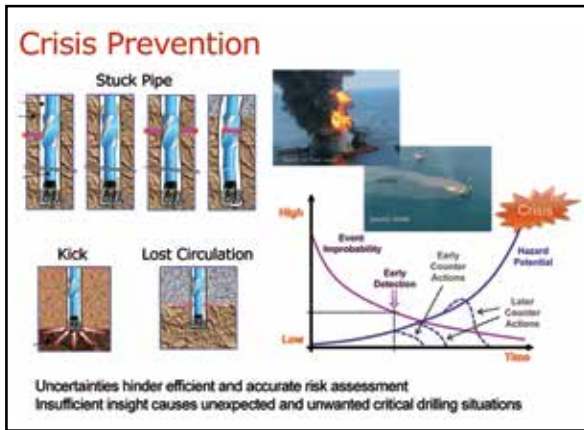
Real-time classification of on-going drilling operations is a crucial requirement for situation specific identification of emerging critical states and their hazard potential. Sufficient

information about actual drilling state allows for focusing on relevant features only and reduces runtime effort and complexity of the prediction process for future borehole conditions.



4. Planning:

TRIDEC supports the monitoring of planning deviations by integrating well planned and real-time decision support. This significantly reduces the associated risks. Finally, it enables a better integration of current drilling practices with geological models.



Contact

**JOANNEUM RESEARCH
Forschungsgesellschaft mbH
DIGITAL – Institute for Information
and Communication Technologies**

Steyrergasse 17,
8010 Graz, AUSTRIA

phone: +43 316 876-1153
general fax: +43 316 876-1191
e-mail: herwig.zeiner@joanneum.at
web: www.joanneum.at/digital

TRIDEC Monitoring System

TRIDEC system is delivering information on how a possible critical situation can be managed. The maintainability of the system is ensured with a strong focus on configuration and support of administrators by considering usability issues. This in particular enables the system to swiftly integrate new sensor data streams and to update new event detection models as soon as they become available.

On Site Instruction and Training

On site instruction for the Operations Centre personnel on the system use and maintenance will be provided by the TRIDEC consortium. Additionally, several schemes of training courses ranging from system setup, usage and adaptation or software enhancement are available.



The research leading to these results has received funding from the European Community's Seventh Framework Programme (ICT-2009.4.3 Intelligent Information Management) under grant agreement no. 258723, TRIDEC.

