IDEATION Q&A

November 2018

WHO IS IDEATION?

Ideation is a Norwegian startup created by a group of senior business and industry leaders with more than 200 years of experience.

WHAT DOES IDEATION DO?

Let's start by saying what we are NOT doing. IDEATION AS is neither a process control company, or a sensor company, or an IT company and we are not a maintenance services company either. IDEATION AS is engaged in developing and manufacturing of devices that have application in Abnormal Condition Detection (ACD). These devices are based on the Internet of Things (IoT) concept and they support condition-based maintenance (CBM) approach in process plants. Most of all, whatever we do we are compelled to make sure that our products are simple and that we simplify our customers' processes. In essence, this is what we stand for.

WHICH INDUSTRY DO YOU SERVE?

Ideation focuses on the Oil & Gas Upstream industry first. We believe that we can make a very big impact on the maintenance cost in this industry and prefer to stay concentrated as we develop the company. Over time however,

we will expand our activities into other industries, they have similar maintenance issues and our solutions are universally applicable.

WHAT IS THE LONG-TERM PLAN?

Ideation's long-term plan is to develop a range of Abnormal Condition Detection devices suitable for a wide spectrum of applications. The devices consulted by handheld devices and the data will be sent to maintenance applications that generate work orders, order parts etc.

The solution advocated by Ideation AS by using CBM Predictor, is indigenous to IoT networks. There are no controllers and/or central control systems. All the necessary functionality is run inside every CBM Predictor and the only additional hardware are standard gateways. The gateways transpose the Bluetooth signal coming from CBM Predictors into a WiFi signal, which is then transmitted to a higher-level business and maintenance systems as either a WiFi signal or via the ethernet connections. If customers rely on operator driven maintenance walk-downs, then the gateways are not necessary as the operator hand-held tablet is used to communicate with the CBM Predictor.

IS IDEATION A SENSOR COMPANY?

No, Ideation is specialized in ACD (abnormal condition detection). The CBM Predictor is only a part of the total solution that we are proposing.

DO I NEED A DCS OR A PLC?

You don't. By releasing maintenance equipment from the bondage of a process network, we make information more easily available to the people

that need it, it is significantly less expensive, simpler and provides a future-proof path as it relies on standard IT infrastructure.

In fact, we are advocating that the new generation of devices that are dedicated to maintenance, rather than process control, should be deployed as IoT (Internet of Things).

WHY INTERNET OF THINGS - IOT?

IoT is a network of physical devices, enabling these devices to communicate and exchange data, following the principles of the internet. IoT is not based on deterministic or syntactic models, but it relies on event-driven architecture. This makes IoT a perfect architecture for the implementation of any kind of condition-based maintenance strategy.

The foundation of IoT is based on the following facts:

- IoT field devices have the communications capabilities that are based on general IT standards of the day and do not require proprietary networks.
- IoT field devices have sensing, processing and storing capabilities, enabling them to analyse data and apply sophisticated logical algorithms. They do not have to communicate with controllers or control systems to get sophisticated algorithms and strategies applied.
- IoT is not a control system, but a communications and exchange network, therefore, there is no need to control anything, but just to route and communicate effectively actionable information.

ARE IDEATION ACD SOLUTIONS PART OF THE BIG DATA STRATEGY?

Yes, absolutely. Big data implies that data streams can be accessed and collected. A variety of equipment in a process plant is mechanical and not connected to a process control network or a general IT network. This non-communicating equipment has no voice and creates a blind spot in the big data strategies. Ideation ACD solutions are focusing precisely on this kind of "dumb" equipment that otherwise would remain outside of the big data strategy.

WHAT IS IDEATION FOCUS FOR FUTURE DEVELOPMENTS?

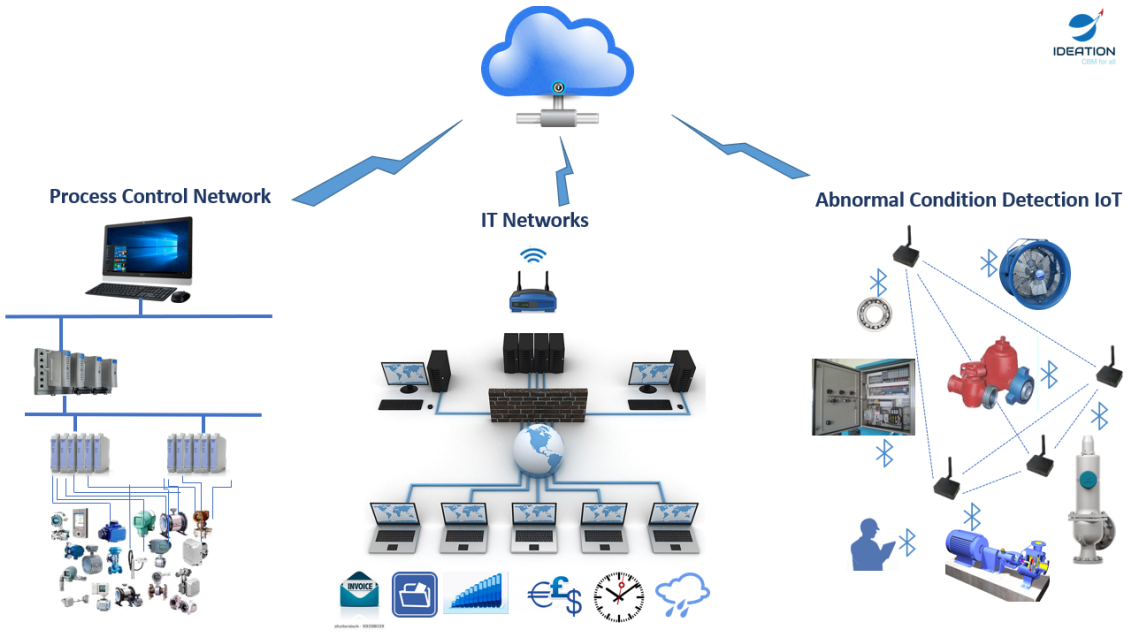
We will continue to develop solutions that are simple and IoT based. As our focus is abnormal condition detection, we believe that we can add the greatest value to both condition-based maintenance and the big data strategies if we continue to focus on non-communicating ("dumb") mechanical equipment and similar applications that otherwise remain excluded from both various process and IT networks.

WHAT IS ABNORMAL CONDITION DETECTION (ACD)

Abnormal Condition Detection (ACD) is relatively new concept. It measures signal from a sensor, just like any process control device, such as transmitter, but it does not transmit this signal. It performs all the calculations immediately in the device, and if certain conditions are met, it sends a signal

as a piece of information to trigger a specific action (a work order, for example).

Ideation adopted ACD, but not as part of any proprietary process control network. We utilize IoT and standard IT solutions, thus creating a separate standard network. A typical depiction of ACD, vs. other networks in the enterprise can be depicted as follows:



HOW DOES THE CBM PREDICTOR FOR PROCESS SAFETY VALVES (PSV) WORK?

IDEATION is introducing the first (CBM Predictor) of a wide range of revolutionary **state of the art IoT solutions at ONS**. These easy and affordable solutions are designed to solve real problems in the condition-based maintenance world and create a high return on investment for industrial applications. The first commercially available solution is called the

CBM Predictor and its aimed to provide condition-based maintenance support for Process Safety Valves.

Currently, all PSVs are standalone mechanical devices that are not networked or wired in any fashion. If the PSVs were equipped with a sensor that monitors for the pop and leak sounds, the operators would save significantly on maintenance costs and reduce risks of environmental violations and suboptimal performance. However, the sensors on PSVs should not be wired (too expensive for the retrofits and greenfield sites) and they should have communications capabilities. The communication should be enabled to either be triggered by a maintenance operator (regular maintenance walk-down practises), or it should be unsolicited and initiated in the case of a sudden pop and/or leak.

IDEATION AS developed a device called CBM Predictor, it combines the necessary MEMS sensors with the communications capabilities. The device is battery powered and easily clamped onto any PSV. It is a typical “fit and forget” kind of device that does not require operators to either maintain them or understand the principles of operation. It runs unsupervised sophisticated algorithms that monitor for the pop and leak sounds. Once detected, it wirelessly communicates with the cloud to trigger work orders for further inspection and/or remedial actions.

IS THE IDEATION CONCEPT UNIQUE?

Currently there are no comparable products on the market. The only competing products are various vibration transmitters. However, all of them need to be a part of proprietary process networks and usually have very limited capabilities of communicating with a higher-level maintenance and business systems.

CBM Predictor is not part of any process control network. It is a **modern and true IoT** (Internet of Things) type of a device that relies on standard IT

infrastructure. It is easy to install, embraces simplicity and takes advantage of the ubiquitous IT standards. The device is affordable, requires no incremental IT infrastructure and is designed to operate onshore, offshore and in a variety of applications and industrial environments. Regardless whether the application is related to an offshore platform, power plant, or any other industrial facility, CBM Predictor will fulfil the function and enable condition-based maintenance to be applied to a maximum effect and a benefit for the operator.

HOW MATURE IS THE TECHNOLOGY?

Abnormal condition detection is not a new technology, it has been used to monitor costly mechanical devices for many years. Ideation's uniqueness comes from combining long tested and proven principles with modern but proven IoT networking philosophies and state of the art, off the shelve components that are used in millions of applications.

This allows for driving the intelligence closer to the to be monitored equipment and thus avoids the need for interval-based polling of the data of these systems. Instead of asking the equipment for all the data, this off the shelve components have enough brain power to interpret the gathered data locally and only inform you about the abnormal conditions only.

HOW MANY INSTALLATIONS ARE THERE?

Ideation introduced the **CBM Predictor for PSV's** at ONS in Norway. It is our first Abnormal Condition Detection solution in a wide range of planned applications. We have just finalized the final testing for production and are actively talking to a select group of customers to help us validate the

maintenance cost savings that we have calculated. These ROI proofs will help us tremendously to accelerate the commercialization. We will ramp up production for wide distribution of the CBM PREDICTOR for PSV's by the mid of 2019. Our preliminary forecast is to launch two applications every year, development of this application pipeline is well underway.

HOW DO I CONTACT IDEATION?

Have a look at www.ideationcbm.com, there you will find all contact names and e-mail addresses.

The web site also contains information and downloadable white papers on the where what and how of the company-the industry and world class maintenance, we keep the site updated and we will soon add plenty of new market data and customer feedback from the ONS introduction effort.