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## Sensor Aided Manufacturing Project

### *Using the XDK from Bosch for Improved Manufacturing Processes*



#### **Introduction and Challenge**

*The cross functional project team at the production plant in Feuerbach, consisting of Dennis Zinser (Manufacturing), Poschmann Karl-Horst and Frank Slomian (Software and System Engineering for Production Automation), Andreas Thiessen (MES-Systems and BI-Solutions) and Artur Hibert (Feuerbach Plant Sensor UseCase specialist) were facing a challenge in trying to make their production line better. Their goal was to merge data from additional sensors in the production environment, route them through the network and connect them to the existing Manufacturing Execution System (MES). In order to achieve this goal, MES data from the manufacturing was used to apply SAP Hana Data-Analysis to figure out whether you can find a statistical connection between production and process data and line output.*

*Soon, it became obvious that additional data, even from the environment of the production line, was needed (e.g. temperature, pressure, vibration levels, and humidity) to analyze the influences on processes at each production stage.*

#### **Approach**

Mr. Zinser's team required a real-world solution to their real-world issues that would allow them to monitor all the relevant parameters, i.e. internal process data, machine data, and environmental data. Moreover, the solution should offer the

opportunity to recognize trends and patterns in this collected data, and to develop goal-oriented predictive maintenance with specific information on any necessary repairs. Finally, it is supposed to immediately recognize important events and error codes based on the collected parameter data.



## The Role of Bosch Connected Devices and Solutions

Engineers have a wide selection of sensors to choose from. This time, the project team decided on the XDK from BCDS for several reasons.

First, the XDK relies on high-quality sensors from hardware partners such as Bosch Sensortec and Akustica, two Bosch subsidiaries with extensive experience in industrial sensors and audio equipment. By combining our expertise with Bosch Sensortec and Akustica, we enable new value propositions and new ways of creating value.

Second, developers who use the XDK have access to a scalable hardware platform with ready-to-use software. All system components come with drivers and documentation, and even sample projects to show how the system is used. The XDK Workbench development platform is provided free of charge to all XDK users.

### Solutions and Benefits

This Sensor Manufacturing solution shows how factories all over the world could be run in the future. Engineers have all the data they need at their fingertips, but there is still the need to show what can be done with it. Technicians can spot trouble before it develops into a problem and fix things immediately, so that downtime can be eliminated entirely.

The team is currently working with SAP data scientists to predict station downtimes based on the incoming data. They will be able to quickly reduce outages and the associated costs with this model.

The benefits of this approach are clear. Bad luck may mean that a broken part could shut down an entire factory. Excessive strain at one level of the production line can increase maintenance costs overall. The Sensor Manufacturing solution, however, allows workers to plan for and implement a solution at a convenient time, which reduces costs and increases efficiency.

They decided to use the Cross Domain Development Kit (XDK) from Bosch Connected Devices and Solutions (BCDS) to monitor their manufacturing processes precisely.

The XDK contains a complete suite of sensors for the collection of all kinds of data. This includes data relevant to industrial processes, such as temperature, pressure, vibration and more. It also has an easily accessible expansion port that allows other sensors to be added for any other data that may be required.

The use of the XDK also gave them access to a well-maintained software suite, code samples, and documentation, as well as the full support of a developer community.

### Use Case

First of all, the team set up the XDK on the production line and connected it to a Raspberry Pi, which collects data, converts it to a standardized format and uploads it to an Oracle DB. The SAP Business Intelligence system is used for analysis. It collects environmental data on pressure, light, temperature, and humidity.

Furthermore, it collects machine data with vibration sensors, and monitors pneumatic pressure. In order to optimize the process, the process parameters are compared with station events and error codes. All in all, the data help to identify station problems with precise hints for repairs and thus serve as predictive maintenance.

## Conclusion

The XDK from Bosch and other smart devices were put into a real-life manufacturing environment to monitor data and improve processes. The Sensor Manufacturing solution provides environmental, process, and machine data that can be used for analysis and to send alerts.

The XDK is an ideal device for smart industrial applications. Small, robust, and packed with features and sensors, it works just as well in solution prototypes as in the final system. The system described here is already in use to improve processes and reduce outages. BCDS, an IoT expert, is the right partner for sensor-based IoT projects. We increase comfort, security, and productivity as we enable new business models for global markets to improve everyday life.



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## About Bosch Connected Devices and Solutions

*Bosch Connected Devices and Solutions GmbH is based in Reutlingen, Germany and is a 100% owned subsidiary of Robert Bosch GmbH. As an innovative company, it serves the new market for the Internet of Things. We offer compact electronic devices, comprehensive software and end-to-end solutions in many fields of application. Our main businesses are in the areas of Connected Mobility and Industry 4.0 and Logistics. We improve everyday life, increase comfort, security and productivity.*

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