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Mobility for simplicity

Highly flexible application of Remote I/O

Sometimes it only needs the intelligent combination of suitable components in order to come up with an innovative solution to reach new levels of flexibility and efficiency in plant operation. One typical example is a mobile application employed by GlaxoSmithKline (GSK). The solution is based upon the unique set of features offered by Pepperl+Fuchs Remote I/O modules. It fully integrates into the existing process control infrastructure and offers new options for preventive maintenance.

GlaxoSmithKline (GSK) in Cork, Ireland, is a globally positioned pharmaceutical company targeted at improving the quality of human life. The primary focus of GSK centers on development, production and marketing of innovative pharmaceutical products that help millions of people around the world. For their certified production processes, GSK employs advanced process control technologies to ensure the highest level of quality and reliability. Many projects in the process automation field are based upon Emerson Delta V in conjunction with Pepperl+Fuchs Remote I/O.

The Glovebox project

Don Brady is a member of the engineering team at the GSK production plant in Cork, which is directed by Emmet Martin. He was responsible for the Glovebox project of the company and was looking for a solution to provide the ongoing production processes with the highest level of convenience and flexibility. His idea was to develop a fully mobile process control equipment, which allows cost-efficient installation and fast relocation, while meeting all the safety requirements typical of the pharmaceutical industry.

Main task of the system consisted of monitoring and controlling three identical mobile glove boxes, which are randomly used across eight processing vessels. For this purpose, each

glove box was equipped with a small Remote I/O module from Pepperl+Fuchs, which was wired to the respective devices for field instrumentation. After putting the mobile gloveboxes into place, the Remote I/O only needed to be connected to the PROFIBUS by means of an optical PROFIBUS coupler in order to provide communication with a standard Delta V I/O. Each of the vessels featured an analogue output, which was directly connected to the respective terminals of the Delta V and allowed to determine, which glove box was attached to which vessel in order to display the respective user interface and graphics.

Intelligent flexibility for increased efficiency

The new Glovebox solution resulted in a highly scalable and flexible process automation system perfectly matched to the processes employed at the GSK plant in Cork. The system provided a simple and time-saving way to relocate the process control equipment in order to easily adopt the automation system to changing process requirements.

An additional benefit was the automatic adjustment of the user interface to the changed set-up of the system. All graphics and references to the mobile devices are hidden automatically when not in use and automatically re-appear as soon as a new set-up is in place. Relocating the hardware does not require any system changes. There are also no I/O errors, since the solution provides the intelligence to automatically detect the presence of any of the mobile devices.

All components of the system are hot swappable. This also includes the power supplies and represents a vital aspect allowing relocating and maintaining the system without affecting plant operation. Changing a module does not require any manual configuration, since all functions of the module being replaced are automatically transferred to the new one via the gateway. This avoids any configuration errors and prevents the connection of incorrect modules. All circuits are galvanically isolated, while the complete system is based upon a redundant structure, in order to achieve maximum reliability and availability.

Remote I/O with built-in intelligence

One major benefit of the Glovebox system at the GSK plant in Cork is the use of a PROFIBUS communications infrastructure. This not only results in substantial cost savings due to reduced wiring requirements and the elimination of marshaling cabinets. It also offers considerable operating benefits due to centralized engineering and the support of requirements-driven maintenance.

Basically, a Pepperl+Fuchs Remote I/O is an interface component, which is connected to the field devices and transfers their data streams via PROFIBUS to the process control system. Three HART compatible mobile Remote I/O substations of the application are used to

connect all the sensors and actuators being part of the control system. They also offer sufficient space for the pneumatic control valves, which are part of the system. Due to their outstanding built-in intelligence, they are also called intelligent junction boxes. Since they need to operate within the explosion hazardous area, they fully confirm to Zone 1 and Zone 2 specifications.

Preventive Maintenance

HART field devices can be configured and parameterized independently of the control communication protocol, using PACTware as a separate engineering tool. For this purpose, HART devices support the open, non-proprietary FDT concept and can be connected to the Remote I/O via the PROFIBUS infrastructure of the process control system. Utilizing specific DVP1 features of PROFIBUS, PACTware uses time slots between plant control communication and therefore does not interfere with normal plant operation. PROFIBUS DPV1 services allow on-demand access to all device-specific parameters of HART field devices via the FDT/DTM concept.

The HART protocol enjoys increased popularity within the process industry, since it allows online monitoring field device parameters directly from the control room. This feature can be used for preventive maintenance and offers an ideal means to stretch regular maintenance intervals for reduced operating costs. HART secondary variables can also be included into the process data exchange and used for control tasks. Since the introduction of WirelessHART, the HART protocol can even be used in connection with wireless devices.

Proven key technology

The engineering team at GSK was supported by Pepperl+Fuchs specialists from the early design stage all the way to factory acceptance test, installation and commissioning. They expressed full satisfaction with the results, especially pointing out to the substantial cost savings during installation and the truly simple operation. Ongoing plant operation has fulfilled all expectations and continues to demonstrate the outstanding reliability of the solution. For this reason, GSK has decided to continue using the Remote I/O technology from Pepperl+Fuchs for future projects.

Key words: Pepperl+Fuchs, GlaxoSmithKline, Remote I/O, operationally proven, integration in the process control system, FDT, preventive maintenance, intelligent junction boxes, mobile equipment

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Fig. 1: Eye catcher

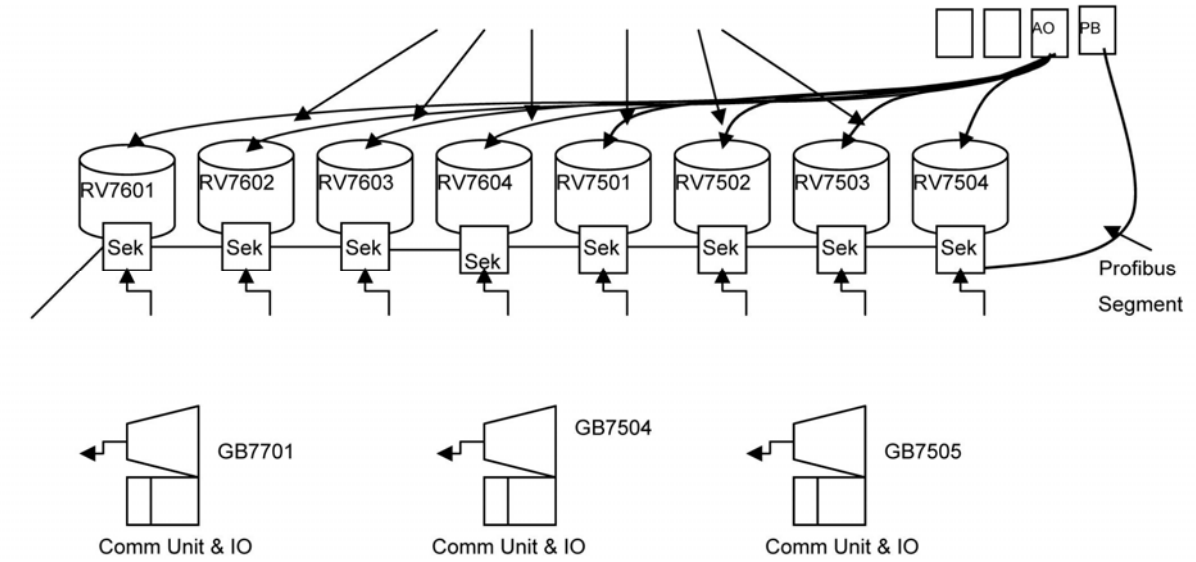

Fig. 1: Eight vessels can be connected to three mobile Remote I/O stations as required

Fig. 2: Remote I/O acting as an intelligent junction box