



# Completely under Control - Gas Supply in Romania

Distributed Control Systems (DCS) is a system that allows an operator at a master facility to monitor and control processes that are distributed among various remote sites. A lot of time and money can be saved using a DCS system by reducing the dependency on additional resources to collect and centralize production and process data. This effect increases the quality of the gas metering stations reports by ensuring accurate, real time and reliable data into the system. Service teams have also to benefit from the system. They now have a clear overview of the most important process equipment status without the need to visit each site for inspection.

In 2006 OMV Petrom started the modernization of the main gas metering stations and with this the implementation of a new and complex DCS system: the Central Control System (CCS), being the first company in Romania to implement and maintain an integrated system at this scale.

The development and implementation of the new DCS solution was done in time and in budget by a joint team of engineers from fiwa)group and B&R Austria and by IT Global Solution and BUGas teams from OMV Petrom. This successful collaboration was essential for the successful integration of the CCS in the existing gas transport - metering system and IT network without any production loss or system vulnerabilities.

## System structure

The entire CCS is based on the innovative and flexible APROL

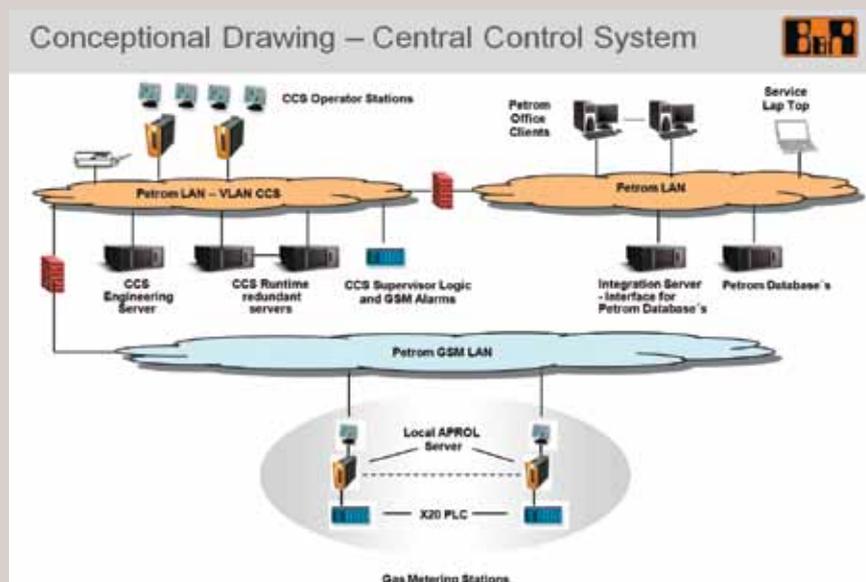


Fig. 1

solution from B&R which can provide a process oriented DCS like functionality at the station level for each gas metering station and more complex data acquisition oriented functionality specific to a SCADA application at the control center level.

With more than 1,000 systems installed across the entire world APROL has proven itself as an advanced and reliable solution, ideal for the challenge posed by a DCS system as complex as the CCS.

APROL is a system for process control based on the Linux operating system from which it inherits great stability in use and advanced security features. It offers a vast array of application for process control and process data manipulation and storage.

For ease of use and integration the entire APROL system natively used TCP/IP communication protocol even

to the stations PLC level. This means that the entire APROL system can use the existing communication infrastructure without any modification.

As for any true DCS application the CCS has to provide round-the-clock functionality even in the event of hardware malfunction or field communication failure. With this in mind the system is designed around a redundant server cluster which houses the Runtime System, the heart of the entire CCS. The redundancy is not limited to the hardware level (to the servers) APROL also provides application level redundancy which means that data loss cannot occur even if a specific application is non-responding.

The Runtime System is the place where all the process data is collected, distributed and stored. Accessing this data is done through the Operator

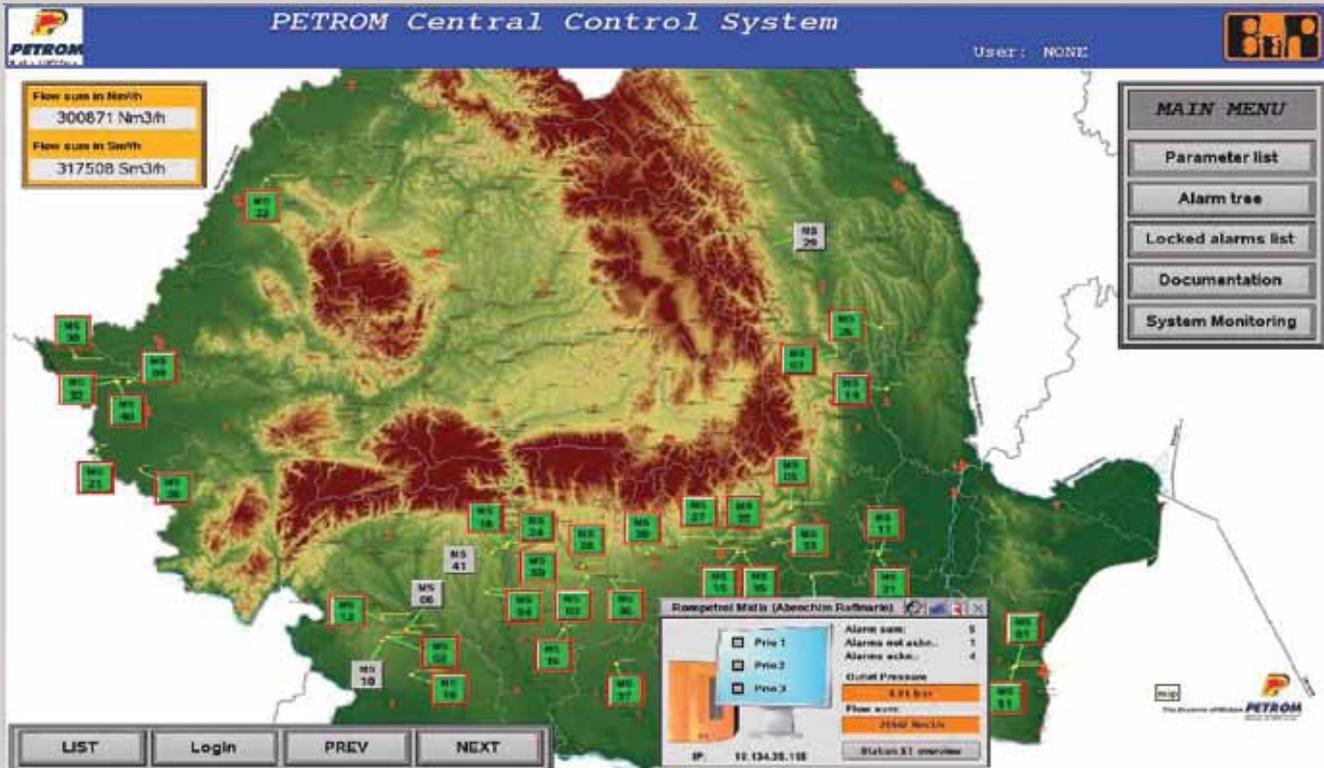


Fig. 2

Stations which have the role of providing human-machine interface.

At the station level each gas metering station is automated using a System 2005 PLC working together with an Automation PC also running APROL. This system alone can control the station by its own in case of communication loss with the main CCS Runtime system. It also provides an operators interface via a touch screen enabling local operators or maintenance crew to directly interact and control the station.

The CCS system also features an Engineering Station which had the initial purpose to configure, deploy and install the entire system. Then its role switched to maintenance and development duties. From the engineering station the entire CCS can be configured and modification can be done anywhere in the system without the need for the engineering team to go to each gas metering station. This way money and time are saved in case that improvements or upgrades are scheduled for the system.

## System functionalities

The Central Control System application was designed to be intuitive and easy to use for the operators. The interface is able to offer an “at a glance” status overview for the entire system directly from the main screen of the application (see Fig. 2). The operators can focus quickly on each alarm obtaining further in-depth information. This enables them to take the appropriate corrective measures by scheduling maintenance tasks, alerting the maintenance/ service team or even remotely controlling the process on each gas metering station.

For each gas metering station in the system there is a Station Overview page (see Fig. 3) which provides detailed information about the status of the equipment, instantaneous process data values, the presence of operators or maintenance team, etc.

All alarms are grouped in three priority classes (1 - 3) according to their severity and in three groups according to the system elements which generate

them (system, communication, logic). This grouping together with advanced filtering and reporting functionalities available in APROL enables operators to quickly identify the source of the alarm and obtain statistic reports about the occurrence of that specific alarm or other alarms related to the same equipment.

A supplementary function is the GSM alarming module which is designed to forward critical CCS and station related alarms to the responsible persons via a commercial GSM network. This way the maintenance team can obtain shorter reaction times to prevent and limit potential destructive events.

## Trends and reports

The system operators have the possibility to obtain trends for virtual all process values of the system. This is an important tool for obtaining statistical data about the evolution of process parameters, functioning

times and reliability of the equipment used. Also for management and planning purposes, advanced report functionality exists, customized for OMV Petrom use, containing all the relevant production and process data for each gas metering station integrated into the system.

While the system scope is primarily for process supervision and control a direct interface link was incorporated to facilitate the transfer of fiscal and production data to an external database belonging to the responsible departments. This provides a streamlined, on-time and error free communication with those departments.

## Company information



**Founded:** 1972  
**Employees:** 180  
**Revenue:** 18 Mio. EUR (engineering)  
**Location:** Germany, Austria, Romania, China

**Products:** B&R Partner in Romania, Pre-Vent Control Valves  
**Services:** All-in-one well-founded professional engineering and design within the sectors of process automation, process control, measurement and control technology, weighing technology, environmental and water technology, electrical planning, facility services technology, communication and safety technology as well as software development for pharmaceutical industry, environmental technology, food industry, steel industry, chemical and petrochemical industry.

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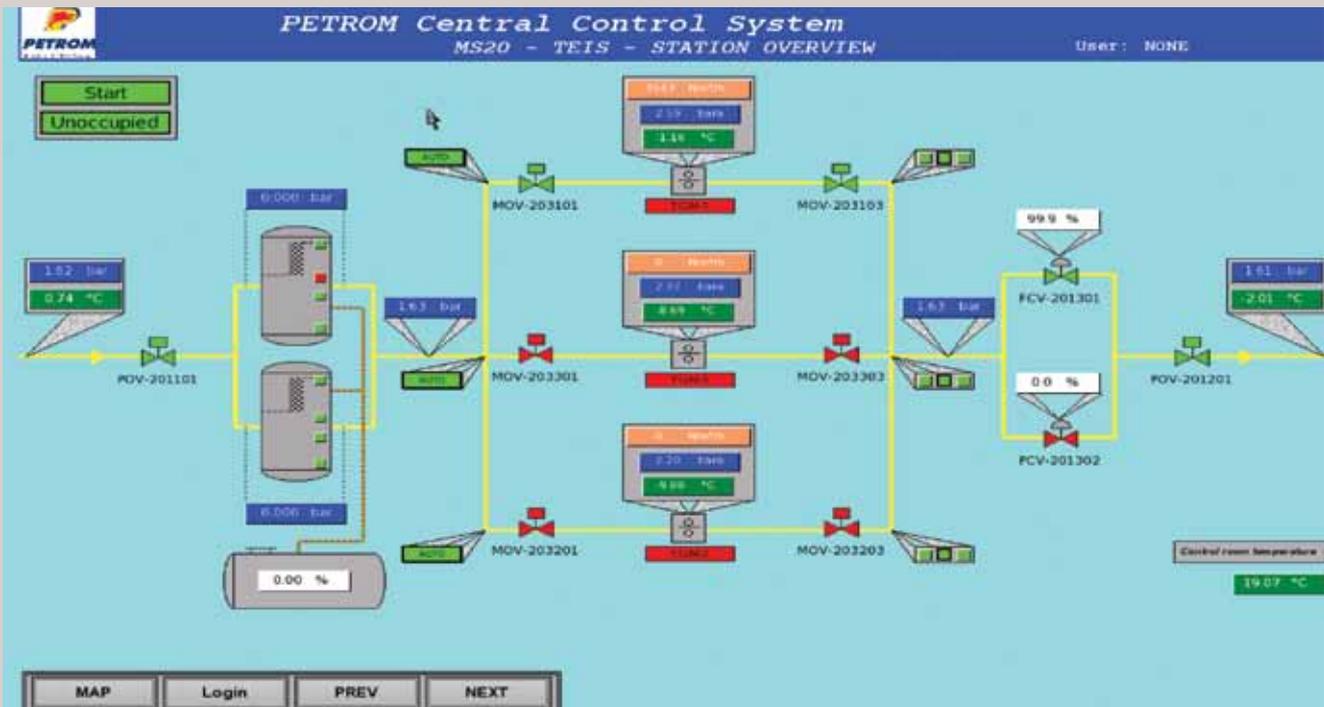


Fig. 3

## Security

While the security of the network and communications is realized by OMV Petrom, the internal security needs of the CCS are realized by a layered user based access. The layered system allows each operator to access only the information it need to perform

its duties.

Each command issued, login and document access are logged into the system and are accessible to certain certified user by the Audit Trail application, which is part of APROL.

To protect the system the servers are running a RAID system to prevent data loss due to hardware malfunction. Also a weekly backup is done automatically

by the system to all its essential data and settings which provide an up to date restore point if needed.

Since its implementation OMV Petrom Central Control System has proven to be a reliable tool which has improved the maintenance process, provided shorter reaction times and a more solid and faster data gathering and manipulation medium.