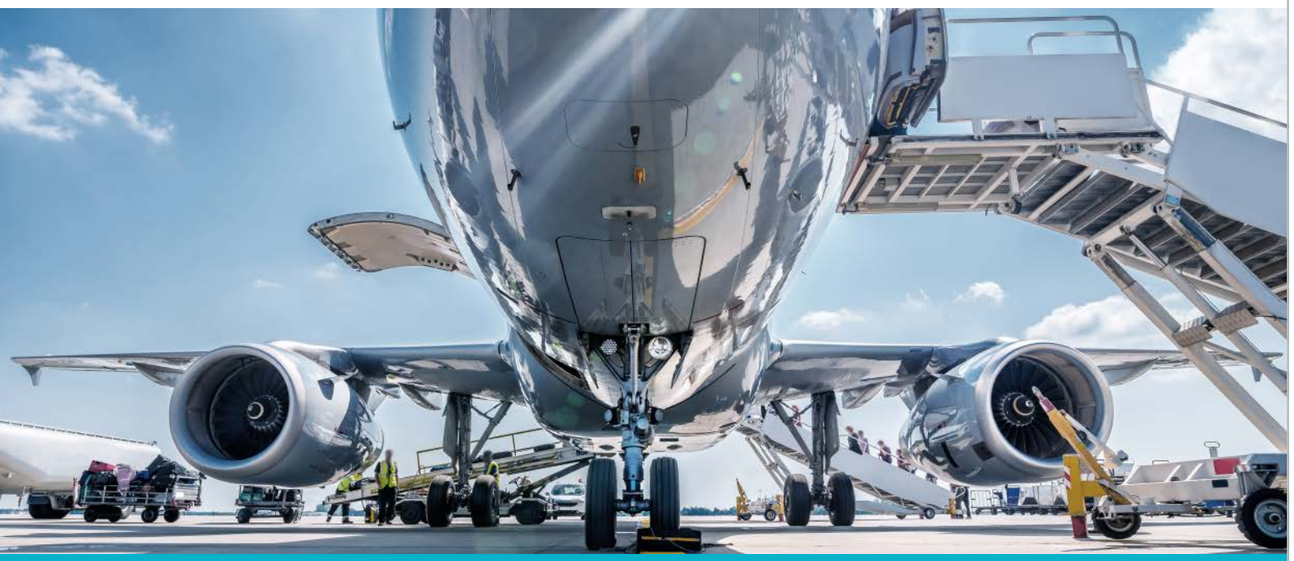
Eckelmann Group



Hydrantenbetriebsgesellschaft (HBG) | Case Study (Intra-)Logistics

Eckelmann engineers get planes off the ground: highly available multi-station control system for refueling

For this project, the required high availability was the central issue. The control system has been developed and maintained since 1988 — now in its third generation. It enables the refueling of aircraft at Frankfurt Airport via a pipeline system approximately 60 kilometers long. Probably the largest gas station in Germany.

"For over 30 years, we have ensured the high availability of the refueling system for over 500 daily starts, in close cooperation with Eckelmann engineering expertise."

Roger Koch-Lindauer | Technical Director Hydranten-Betriebs OHG

Objective

A highly available multi-station management system was required for

- the visualization of the plant status for the pipeline system on the airport apron.
- the visualization of the large tanks in the tank farm as well as the supply pipelines.
- the operation and control of the plant.
- the control and evaluation of highly innovative leak detection procedures for the entire pipeline network.

The Customer

Hydranten-Betriebs OHG (HBG) based in Frankfurt/ Main operates a tank farm and a transfer route.
This supplies the kerosene to the airlines whose aircraft are refueled in Frankfurt.

Performance by Eckelmann

- Development of the system, now in its third generation — large parts were newly developed.
- Supply of hardware and software.
- Service and system maintenance with short response times.
- The software used is a combination of standard software (for visualization) and custom software (for leak detection and facility control).
- The functional redundancy required for high availability is ensured by multi-parallel ope ration of computers and interfaces. These are Eckelmann developments.
- The control systems were tested and commissioned with the involvement of TÜV.

Application

The apron guidance system manages the kerosene distribution through a redundant pipeline system, transporting the kerosene with the necessary pressure.

Equipped with monitored distribution shafts spread across the airport, it enables parallel refueling via refueling connections, called pits. These pits connect the hydrant system to the refueling vehicle. The kerosene is pumped from the pipeline system into the aircraft by service vehicles (dispensers), and the amount of kerosene pumped is recorded.
The system is divided into about 200 pipeline sections, each of which can be shut off at both ends by special valves.

This topology ensures that parts of the facility can be closed without restricting the entire system. To ensure supply, the pipeline system is also designed redundantly, so that a withdrawal point can always be reached from two sides and via several routes.

The system has two different leak detection methods, which can highly accurately verify tightness through pressure and temperature observation and targeted pressure build-up and release. The variability of the kerosene pressure analogous to temperature fluctuations is taken into account.

The control room is staffed 24/7 in shifts. From the control room, the apron guidance system is managed by several redundant computers. The connection between the control room and the apron is also redundant. This ensures high system availability in all areas.

Additionally, Eckelmann automated the control system for the tank farm. Kerosene arrives via pipelines and is stored in large tanks. The introduction and removal are carried out by pumps into the apron; the pressure in the system is kept constant, while the pump performance is automatically adjusted as needed.

Pipeline System	Starts	Tank Capacity	Measuring Points
60 km	**555 am Tag**	**186 m²**	**3,700**

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Special Features

- The technical specialty is the high availability of the system.
- Lifecycle management: over 30 years of support and further development of the plant. During this time, three system generations were completely redeveloped and migrated during ongoing operations.

Do you have any questions?

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