

University Hospital Bonn

The TranspoNet pneumatic tube system ensures fast and safe transportation of medication, blood samples, and documents. It substantially contributes to patient safety by reducing the time before diagnosis and treatment start, as well as minimizing error rates with fewer manual steps. Thanks to RFID technology for delivery tracking and stations that meet different requirements, TranspoNet is flexible and can be adapted to any institution and its particular needs.





University Hospital Bonn (UKB) is one of the leading healthcare institutions in Germany. Internationally, it is regarded as a prestigious top hospital.

Around **500,000 patients** are treated at UKB every year. **With more than 1,300 beds and roughly 9,500 employees**, it offers comprehensive care. The Case Mix Index for UKB is the second highest in Germany, illustrating the complexity and variety of cases treated.

On January 1, 2001, University Hospital Bonn (UKB) was founded as an independent institution under public law, replacing previous healthcare institutions of the University of Bonn. The hospital is responsible for various healthcare-related tasks, such as specialized high-performance and public healthcare. UKB also ensures a tight link between healthcare and the research and education facility at the medical faculty of the University of Bonn.

With around 38 clinics and 31 institutes, UKB is a center of **medical excellence and innovation**. Thanks to continuous investments in digitization, automation, research, and education, UKB always stays up to date in terms of medical science and technology.

An efficient transportation system is crucial to make intralogistics work on a campus of such size. The Swisslog Healthcare pneumatic tube system is a reliable, automated solution for different clinical areas. TranspoNet contributes to patient safety and elevated standards in medical care.



The challenge at UKB

Before the pneumatic tube system was installed, transports on campus were mainly covered with vehicles. It was not uncommon to lose goods because they had fallen under the seat, for example. The **human factor** in this kind of transport is enormous, making the process error-prone. Also, the **time required** was significant: The driver had to drive to the pick-up location, get the goods from inside the building, get back to the vehicle, and drive to the drop-off location to distribute the deliveries. This time-consuming and error-prone process is especially concerning when it comes to goods that are needed urgently, such as frozen sections, blood products, and lab samples.

The logistic process of planning a pneumatic tube system is challenging in many ways. In general, it takes about five years, depending on hospital needs and structure. UKB is characterized by its **constantly evolving campus** structure with future buildings and requirements that needed to be taken into account during the planning phase in order to work out a suitable basic structure. This leads to a long project duration, different stakeholders in the hospital, and different members in the planning team.

The solution

Beginning of the project and feasibility study

The project "**pneumatic tube system**" was initiated in 2012. A **feasibility study**, conducted by the UKB process management, evidently showed that a pneumatic tube system can meet requirements for transportation and would bring along **decisive advantages in regard to clinical intralogistics**.

- Faster transportation processes
- Less error-prone
- Higher transportation frequency

The long planning and construction period is due to the **complexity of the system and its integration into existing buildings**, during which the clinical workflows were not supposed to be disturbed.



Critical areas and holistic planning

From the beginning, it was clear that the system would not only transport **blood samples but also blood products, medication, and other clinical goods**. The project was always viewed holistically, keeping future requirements and the growing campus structure in mind. First, critical areas, such as **operating rooms, blood bank, central lab, pathology, and new hospital buildings** were connected. **Transportation speed**, the right **amount**, and the right **timing** are especially decisive for critical transports.

Collaboration and planning

UKB worked closely with Ramboll, specialized in engineering, architecture, and management, and Swisslog Healthcare, experts in automation. The internal team was a key factor for the successful completion of the project: the members were aware of **processes on campus** and the **stakeholders' requirements**.

Transportation network and speed

The pneumatic tube system ensures deliveries can be sent to and received by stations **in the same building and across the whole campus.** The network is a ring to achieve redundancies; in case of failure, the system remains operable. Several **transfer units** are installed at logistically important locations on campus.

Insensitive goods are transported at 6 m/s, while blood products and lab samples are sent at 3 m/s (slow transport) to avoid hemolysis.



System overview



Stations

automated OpenLog unloading stations

Transfer units

Automation with OpenLog

In 2019, UKB installed the first automated lab station OpenLog. Now, five of them are distributed on campus to facilitate workflows in areas with a high sample throughput: microbiology, blood bank, and central laboratory. The station replaces manual emptying of carriers and prevents wrist health issues employees might suffer from due to frequently opening carriers by hand.

Empty carriers and transponders

Empty carriers are automatically sent back to the respective departments, manual handling is no longer necessary. Via a shortcut, staff can request additional carriers from decentralized storage locations. Transponders in the carrier save information such as home address or varying data to partially automate the process of sending back empty carriers and to facilitate documentation and proof of deliveries.



Results and advantages

The TranspoNet pneumatic tube system at UKB enables transports 24/7, with technology that is always up to date. Staff at the hospital consider the transportation system a useful addition to their institution.

Introduction and training

In the beginning, users tended to commit errors such as wrapping goods the wrong way or entering an incorrect address. Human errors at one of the biggest employers in the region can never be avoided completely, not even with automation: **new employees** must be trained in how to use the system correctly. The human touch remains an irreplaceable factor for healthcare, and even though TranspoNet is highly automated, mistakes sometimes are made when staff use the system. Those mistakes can be avoided by offering **regular training sessions**.

Efficiency and patient safety

The TranspoNet system **reduced transportation times considerably** and improved efficiency in intralogistics. As a result, **samples and medication are transported in a safe and reliable manner. Patient safety** has been improved as manual steps are reduced and critical transport is completely automated. Fewer lost samples in the lab and increased reliability in general contribute to this positive development.

Workload reduction

Implementing OpenLog stations **reduced the workload of employees** and convinced from an **ergonomic point of view.** Employees in areas with high sample throughput benefit from automatic handling and don't risk straining their wrist and developing serious health issues.

Modern employer

By continuously modernizing and automating internal processes, UKB performs as a modern employer which is always up to date and offers a **progressive technical working environment** to its professionals.



«We are very happy with the pneumatic tube system. We save lots of time and manpower. Also, errors have decreased.»

Charlotte Kaspari
Head of Facility Management at UKB

Conclusion and prospects

Automating intralogistic transportation processes at University Hospital is a long-term project, evolving with the campus structure. Just like the hospital itself, the **TranspoNet system adapts to new requirements**. Ongoing modernizations and innovations in transportation make the system ready for the future and impact efficiency and patient safety.



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