



One of Europe's busiest airports turns to Tennant's Autonomous robots for smarter, more efficient cleaning

BACKGROUND: CLEANLINESS AT THE PUSH OF A BUTTON—ROBOTS KEEP THE AIRPORT SPOTLESS

As one of Europe's largest air transport hubs, Frankfurt Airport serves as a key gateway for international travel. With an area of 2,300 hectares, two terminals and four runways, it handled more than 61.6 million passengers in 2024, with peak days exceeding 200,000 travelers. Maintaining cleanliness across such a vast and high-traffic environment is a constant challenge.

To meet these demands, Fraport Facility Services GmbH, responsible for cleaning Terminal 1 at Frankfurt Airport and employing approximately 800 people, introduced autonomous cleaning robots in 2024. This scalable, technology-driven solution aims to enhance efficiency, support sustainability goals, and maintain a consistently high standard of cleanliness throughout the airport.

THE CLEANLINESS CHALLENGE: MEETING HIGH STANDARDS IN A 24/7 ENVIRONMENT

Maintaining cleanliness at an international aviation hub like Frankfurt requires a very complex and resource-intensive operation. Main challenges include:

- Expansive Terminal Areas: Terminal 1 alone covers over 500,000 square meters—equivalent to 70 football fields—with polished natural stone floors that require frequent, thorough cleaning.
- High Passenger Traffic: Cleaning must be carried out seamlessly and safely in a highly dynamic environment, without disrupting airport operations.
- Labour Constraints: Recruiting and retaining skilled cleaning staff remains an industry-wide challenge.
- Sustainability Targets: Reducing water and chemical consumption is a high priority for Fraport.



Recognizing these operational pressures, Fraport sought an advanced, autonomous cleaning solution that would deliver high-quality, repeatable results every day, allowing staff to focus on specialized tasks like deep cleaning and sanitizing.

CHOOSING THE RIGHT SOLUTION: WHY TENNANT'S AMRs STOOD OUT

Fraport initially tested multiple autonomous cleaning robots from various manufacturers—however, none fully met the airport's complex requirements.

After extensive trials, Tennant's autonomous cleaning robots emerged as the preferred solution. In particular, the T16AMR stood out for its dual-mode operation—allowing both autonomous and manual control—as well as its comprehensive technical support.

“Over the years, we’ve tested various robotic cleaning solutions, but all had limitations in terms of flexibility, usability, or technical support. Tennant’s T16AMR impressed us with its versatility, seamlessly integrating into our workflows.”

— Mathias Dudek, Managing Director,
Fraport Facility Services



SEAMLESS INTEGRATION—ROLLING OUT AUTONOMOUS CLEANING AT FRANKFURT AIRPORT

To support their long-established fleet of manually operated cleaning machines, Fraport selected two different models from Tennant's autonomous range: the T16AMR and the X4 ROVR. Both models are powered by BrainOS®, a leading AI-powered automation platform developed by Brain Corp.

- T16AMR: A highly flexible scrubber that operates both manually and autonomously—ideal for Frankfurt's multi-level terminal layout, wide concourses, and high-traffic areas.
- X4 ROVR: A compact, highly manoeuvrable unit, specifically designed for smaller and congested areas requiring detailed cleaning.

"Fraport's decision to choose Tennant's robotic cleaning solutions, powered by Brain Corp's advanced AI, was based on key priorities: best-in-class cleaning performance, comprehensive support, high safety standards, and strict data security protocols. These elements are critical in an airport environment."

— Michel Spruijt, President, Brain Corp International

RESULTS YOU CAN SEE: CONSISTENT QUALITY AND ENHANCED EFFICIENCY

Traditional manual cleaning is often inconsistent and varies based on individual effort. By contrast, Tennant's robotic cleaning machines deliver repeatable, high-quality results—every day, consistently. Since their deployment at the Frankfurt Airport, these AMRs have:

- Cleaned over 1.6 million square meters in just six months—equivalent to more than 220 football fields.
- Operated primarily during off-peak hours, ensuring uninterrupted cleaning schedules.
- Maintained a consistently high standard of cleaning without disrupting passenger flow.



MAXIMIZING HUMAN POTENTIAL: HOW AMRs SUPPORT CLEANING TEAMS

The introduction of autonomous cleaning robots has transformed workforce deployment, allowing employees to focus on higher-value tasks rather than repetitive floor cleaning.

- AMRs support, rather than replace, human staff, improving overall efficiency.
- Cleaning teams can now focus on spot cleaning and specialized tasks like deep cleaning and sanitization of high-contact areas.
- Training and onboarding were straightforward, with strong supplier support ensuring a smooth transition.

"It's been incredible to see how well our team has adapted to the AMRs. One of our night shift employees, who initially had no robotics background, is now acting as an informal trainer—helping colleagues understand the technology and make the most of it."

— Felix Hofferberth, Project Lead, Fraport Facility Services



MORE THAN JUST A MACHINE—A COMPREHENSIVE CLEANING SOLUTION

Tennant's robotic systems offer much more than cleaning—they provide a fully integrated solution with training, maintenance, and real-time monitoring.

- Tennant's ec-H2O NanoClean® technology, which reduces water consumption while offering a detergent-free cleaning, aligns with Fraport's sustainability goals.
- Strict data security protocols ensure that all AMR data is stored safely within the EU.
- BrainOS® automation provides digital logs for precise documentation and proof of cleaning schedules.

ENGAGING PASSENGERS: MAKING TECHNOLOGY A RECOGNIZABLE PART OF THE AIRPORT EXPERIENCE

Frankfurt Airport passengers, who had the opportunity of seeing Tennant AMRs at work, have responded positively to the presence of autonomous cleaners, with many engaging directly with the technology.

- Passengers frequently take photos of the robots.
- Seasonal decorations (e.g., Christmas-themed wraps) have made the machines a recognizable part of the airport's daily operations.

"Passengers love the robots. Children, in particular, enjoy watching them and often wave—it leaves a positive, lasting impression and enhances the airport experience."

— Mathias Dudek, Managing Director,
Fraport Facility Services

BEYOND CLEANING—A FULL-SERVICE APPROACH WITH TENNANT'S ROBOTIC SOLUTIONS

Building on the success of its initial robotic deployment, Fraport is now planning to expand its fleet of autonomous cleaning machines in 2025 and beyond.

"Autonomous cleaning is the future. Based on our positive experience so far, we are actively working to integrate even more robotic solutions into airport operations."

— Mathias Dudek, Managing Director,
Fraport Facility Services

CONCLUSION

The deployment of Tennant's autonomous cleaning robots at Frankfurt Airport highlights the transformative power of robotics in facility management. By optimizing workforce allocation, ensuring consistently high cleaning standards, and supporting sustainability initiatives, Fraport has set a new benchmark for smart airport operations.

With ongoing expansion of its robotic fleet and a commitment to refining automation strategies, Fraport Facility Services GmbH remains at the forefront of innovation in airport management.

