

Based on the example of an installation at an Austrian university

Case Study: Microbots for educational institutions





Hardware Robot Sweeper 8

Fleet Management FieldBots OS



The challenge

The aim is to automate the cleaning of long university corridor and thus relieve the hard-working Strabag PFS labor force of simple tasks such as vacuuming the short-pile carpet. The night-time operation times should not disturb the students and academic staff in their work.

Facts

- Installation: Q1 2024
- Country: Austria
- Cleaning Partner: Strabag PFS
- Dealer Partner: Lloyd
- Robots: 20x Robot Sweeper 8





Setup

- No other robots from other manufacturers are used at this site
- Due to the carpeted floor, Strabag decided to use a fleet of robot sweepers 8
- Relatively narrow rooms, such as corridors, require a little more time for a successful installation
- Main challenge was to integrate the robots into the university's network. Missing certificates or (incorrectly set) firewalls can often be the reason for difficulties during installation.



20 Robot Sweeper 8 for an Austrian university The handy robot hoover is inexpensive and yet amazingly powerful



Setup

Takeaways:

- Check upfront if **wifi is accessible**
- Have a **technical contact on standby** on setup day in case problems do occur
- If possible, define the installation locations in advance using a detailed building plan. Escape routes in particular must not be blocked under any circumstances.



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Setup phase

Constant monitoring has also proven to be indispensable for continuous cleaning success in this case. Particularly in the setup phase, feedback from robots can be used to create virtual walls or set up no-go areas so that robots are not blocked or cannot find their way back to the base station.

Takeaway:

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- Although there is an specific setup date, there should also be a **setup phase** that is clearly communicated to the customer
- This setup phase extends to **1-2 weeks** after the actual launch
- A **clearly defined person in charge** is needed to take care of optimization in the initial phase

Status	
Stuck	6/18/2024 7:04 AM
🔴 Paused	6/18/2024 7:04 AM
Stuck	6/18/2024 7:02 AM
Not Reachable	6/18/2024 7:01 AM
Stuck	6/18/2024 6:54 AM
Not Reachable	6/18/2024 6:53 AM
Stuck	6/18/2024 6:46 AM
Not Reachable	6/18/2024 6:44 AM
Stuck	6/18/2024 6:41 AM

Before optimizing the map for one of the robots

Status	
Charging	6/20/2024 3:24 AM
Looking for base	6/19/2024 11:38 PM
🛑 Cleaning	6/19/2024 10:00 PM
Ready	6/19/2024 10:00 PM
🛑 Cleaning	6/19/2024 10:00 PM
🛑 Cleaning	6/19/2024 10:00 PM
Ready	6/18/2024 10:30 AM
Charging	6/18/2024 7:10 AM
A Not Dooobabla	

Premises for use in semi-public spaces

Special aspects for educational institutions

The installation and operation of FM robots at educational institutions such as universities offers **excellent dividends, both economically and in terms of quality.** Of course, there are also aspects that should be taken into account. Here are the most important ones from our point of view:

- Cleaning only during **appropriate (night) times** so as not to disturb students and teachers
- FieldBots OS theft protection has been activated for robots, which is also indicated by stickers on the devices
- Use of a **cameraless robot** to **ensure privacy and data protection**. The Robot Sweeper 8 detects its environment using LiDAR
- Not all university premises are suitable for cleaning due to stairs or chairs that are too low. In this use case, we deliberately focussed on cleaning one type of room, namely short corridors
- The **possibility of vandalism** in semi-public spaces supports the idea of multiple but **inexpensive** and **possibly easily replaceable** / repairable robots



What we have already learnt from the mission

Learnings: Scheduling

Thanks to the function in FieldBots OS that allows **different maps to be stored for start times**, the range could be increased by optimising the positioning of the station. This means that the robot cleans the corridor to the left of the docking station one night and to the right of the docking station the next.

Takeaway

• Split maps, especially for corridors, so that your robot can use a full battery charge for one direction. After charging, it can clean the opposite direction of the corridor during subsequent use. This saves hardware and therefore costs.

14:00			
15:00			
16:00			
17:00			
18:00			
19:00			
20:00			
21:00			
22:00	22:00	22:00	22:00

Smart Scheduling

Smart scheduling is not just about setting a start time, but also about assigning different cleaning areas.

What we have already learnt from the mission

Learnings: Is theft a real problem?

Contrary to our initial expectations, theft or vandalism was not a problem, even though the robots were freely accessible. The biggest incident was eyes glued onto a robot. The students were much more interested in the large-scale use of robots. They had also long been familiar with the hardware in its current form from their private environment.

At the beginning we noticed that the robots were **sometimes activated manually** during the day. This was seen in FieldBots in the historical cleaning runs. This **unauthorized usage stopped after a short time**.



Anti-theft measures These stickers were applied by Strabag



What we have already learnt from the mission

Learnings: Is theft a real problem?

Takeaways

- **Stickers** draw attention to the fact that theft will result in the robot not working.
- The **anti-theft function** was activated by FieldBots OS.



Anti-theft measures These stickers were applied by Strabag



Automatic map creation and manual optimization

Example of maps

On the following pages we have added 2 exemplary maps created automatically by Robot Sweeper 8. These maps are fully editable with FieldBots OS and allow virtual walls, no go-areas, area and spot-cleaning.

As previously mentioned, robots were sometimes assigned several maps. They were cleaned one after the other on consecutive nights. This increased the efficiency of a robot and thus reduced hardware costs.

Takeaway

- The **step-by-step adaptation** of the automatically generated maps is essential
- Although experienced users can anticipate spatial difficulties during cleaning and prevent them by taking countermeasures, actual live use will always reveal obstacles that were not previously considered
- Virtual walls or no-go areas can solve almost all problems during use.



Example of Maps

Map 1

On this map, room 1 was excluded from cleaning by a no-go area. In room 2, the user knew how to help himself with two virtual walls so that the door area could still be cleaned.





Example of Maps

Map 2

The blue lines of map 2 show the systematic cleaning paths of the Robot Sweeper 8.

The shape of the corridor has been virtually straightened by virtual walls so that the device does not get stuck on bulges or e.g. radiator niches. It also prevented robots from driving into offices if, for example, doors were left open.



What about efficiency?

Performance

Thanks to FieldBots OS, not only the performance of one robot but also that of the entire fleet can be measured. The dashboard provides the user with all the key indicators for the performance and efficiency of their fleet. The following also applies here: KPIs can be greatly increased by continuously optimising maps, schedules and installation locations.



Performance of the last 7 days

FieldBots OS enables continuous monitoring and a complete cleaning history



Our learnings broken down

Results

The use of microbots in semi-public spaces such as universities harbors great potential for cleaning companies and the institutions themselves.

Possible obstacles to their use could either be eliminated, such as integration into the university network, or did not arise in the first place, such as theft or vandalism.

The appointment of a project and optimisation manager as well as the clear communication of a setup phase lasting several weeks proved to be decisive for a successful introduction. The continuous optimisation of robot use by adapting maps and cleaning cycles is the greatest lever for the successful use of microbots.

Microbots, such as the Robot Sweeper 8, are easier to replace due to their affordable prices and are already familiar to the public from their own households.



Meet the Squad

Your Contact

We look forward to your contact.



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FieldBots

Let's automate cleaning together.



