Case Study 2024

Elevating Patient Care With Autonomous Delivery Robots In Healthcare Logistics

CLEVON

Overview

Viljandi Hospital is one of the largest general hospitals in Estonia and the largest employer in the county. With over 1,000 staff, the hospital accommodates more than 77,000 patients each year. The challenge of serving a patient base that exceeds the number of staff highlights the critical need for efficient time management to ensure quality care while maximizing the time available for each patient.

The hospital features a large campus with a main building for general health services and a separate complex dedicated to psychiatric care. However, the two complexes are located 1.6 miles (2.6 km) apart, posing the logistical challenge of efficient and timely deliveries.

In 2023, Viljandi Hospital partnered with Clevon to address these logistical hurdles of connecting its two main complexes. This project introduced the autonomous delivery robot CLEVON 1 to efficiently transport medical samples from the psychiatric care facility directly to the laboratory located in the main building.

The Challenge

Relying on conventional vehicles to transport patient samples was becoming increasingly outdated due to its inefficiency and the environmental concerns it raised.

This traditional approach, while dependable, required a driver, contributed to noise and air pollution, and was out of place amidst the natural surroundings of the hospital's park-like setting.

This was no longer in line with the hospital's commitment to innovation and sustainability, presenting a clear issue that demanded a modern, environmentally friendly solution.

> Clevon is a good example of how the implementation of smart technology supports the smoothness of existing processes. It simplifies the work of our hospital's medical team, allowing our staff to have more time for patient care.

Saima Hinno
Head Nurse
Viljandi Hospital

The Solution

Clevon's autonomous delivery robot became the solution of choice to address these challenges. Designed as a multifunctional platform, it can be adapted to serve the hospital's unique needs of transporting medical samples between the facilities.

CLEVON 1's daily schedule included four trips. Staff place samples in special containers within thermal boxes, ensuring stability and temperature control.

These were then securely loaded into the robot's weatherproof, PIN-protected CargoBox for delivery. Upon arrival, a lab employee retrieves and processes these samples for analysis.

The Autonomous Driving System

The delivery route covered 1.6 miles (2.6 km), included 6 pick-up points and was completed **92% autonomously**. This high degree of autonomy was enabled by Clevon's sophisticated sensor suite equipped with cameras, radars, GNSS (Global Navigation Satellite System), and IMU (Inertial Measurement Unit), ensuring precise navigation and safety.

Over the course of 521 laps, Clevon's technology facilitated significant time savings. With each lap averaging around 15 minutes, this translated to roughly **7,190 minutes saved** that would have otherwise been spent on manual driving.

This substantial reduction in hands-on operation time highlights the effectiveness of integrating such advanced technology in healthcare logistics, freeing the driver to allocate more time to other important duties within the hospital setting.

Clevon is definitely one of the best innovative examples of what and how can be applied in healthcare institutions. Through the use of a robot courier, both Clevon and Viljandi Hospital have also contributed to environmental initiatives and taken a big step towards a green footprint. We definitely wish to continue this and develop it as part of the implementation of the new Viljandi County Hospital and Health Center, which is scheduled to be operational in 2025.

Andrus Plees
Manager of Administrative Services
Viljandi Hospital

Clevon is a reliable and regular connection between the main hospital building and the psychiatry clinic.

Karita Kopp
Leading Bioanalyst
Viljandi Hospital

The Results

For each sample delivered, the hospital staff gained **1 extra minute of time for patient care**, resulting in an additional **19 minutes daily** devoted to patients over 132 days.

The Numbers Behind the Service:

132
days of operation

2500+
samples delivered

521
laps driven in
all weather conditions

92%
autonomy

0
safety incidents

Looking Ahead

Viljandi Hospital is planning to extend the use of autonomous robots to other areas of service. This expansion is driven by the substantial time savings realized during the pilot phase and the visible joy and excitement the robot has brought to the hospital staff and patients, fostering a positive workplace atmosphere.

> Clevon is a delightful and joyful innovation that has helped ensure consistency in transporting analysis materials. A good and trustworthy colleague for our staff!

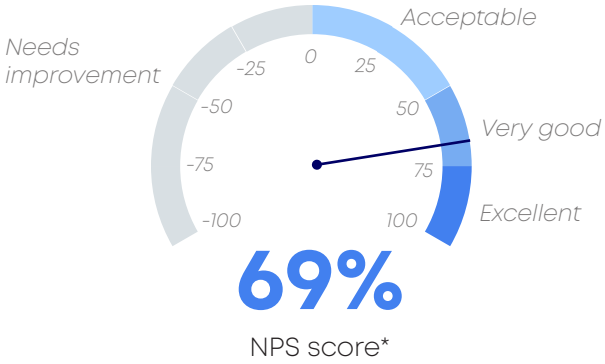
Ilja Tretjakov
Head Nurse of the Psychiatry Clinic
Viljandi Hospital

Staff Feedback

The introduction of the autonomous delivery robot at Viljandi Hospital, affectionately nicknamed '**Timmu**' by the staff, has been met with resounding approval from the staff. With a Net Promoter Score (NPS) of 69%, the system has not only streamlined logistics but has also struck a positive chord with the hospital employees.

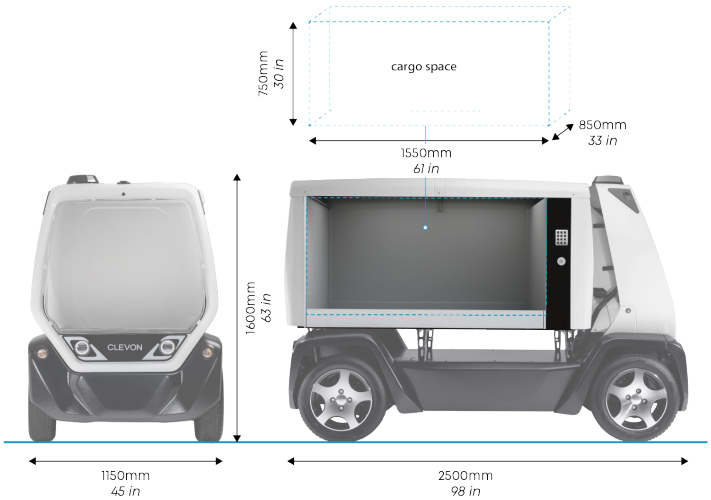
They envision Timmu not just as a carrier of medical samples but also as a valuable asset in delivering patient meals, medications, and various supplies throughout the hospital. By shifting these tasks to robots the hospital anticipates considerable time savings, a reduction in fossil fuel reliance, and a freeing up of workforce resources.

Viljandi Hospital has taken a significant step in its commitment to sustainability and innovation. This move towards more eco-friendly operations has been welcomed by staff who appreciate the system's ease of use and reliability. This shift not only contributes to the hospital's green initiatives but also serves to elevate patient care.



*Net Promoter Score (NPS) is calculated based on customer feedback indicating on a scale of 0 to 10 the probability of recommending the service. The percentage of detractors (below 7) is subtracted from the the percentage of promoters (9 or 10) based on responses, resulting in a score that ranges from -100 to +100.

Top-Application Used in the Project



CargoBox		Cargo space	
Length	1850 mm (73 in)	Depth	850 mm (33 in)
Width	1000 mm (39 in)	Width	1550 mm (61 in)
Height	900 mm (35 in)	Height	750 mm (29 in)
Payload	Up to 100 kg (220 lbs)	Internal volume	1 m³ (35 ft³)