The World’s largest RFID based hospital installation

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Short introduction to Lyngsoe Systems

IoT system integrator of logistics solutions used in a number of industries

“Our mission is to help companies automate their processes, streamline and develop their businesses through the use of best in class data capture solutions”
Short introduction to Lyngsoe Systems
The next 19 minutes...

- Background
- The Situation
- The Solution
- The Benefits
- The Future
Trends within Danish Healthcare

- Reduction in number of hospitals and beds
- Centralization and specialization
- Fewer hospitals with Emergency Department
- Focus on prehospital emergency care
- Focus on intermediate care
- Number of discharges over the last 8-10 years – slight increase
- Substantial increase in outpatient visits
- Average length of stay is now less than 4 days – huge decrease
- Hospitals to be renovated + new hospitals built (5 billion $ being spent)
Vision of Hospital 4.0

• Basic drivers for running the hospital and achieving efficiency
  • Turning (even more) into digitalization
  • Focusing on logistics
  • Automation (where possible)

• Strategy incepted in the period from 2005-2008
Merging for modern care
Merging for modern care
The Aarhus University Hospital

New University Hospital Aarhus Denmark

- New generation of super-hospitals
- Covering 500,000 m²/124 acres
- Buildings cover 1.25 million m²/309 acres
- 100,000 admitted patients and 900,000 outpatients a year at full capacity
- 35,000 daily transports
- 10,000 employees
The Situation

- Every employee wasted time every day to look after medical equipment and colleagues.
- The process of ordering and collecting beds at wards was too time-consuming and cumbersome.
- Poor capacity management and transportation optimization – no overview of where resources were needed and when.
- Low utilisation of medical equipment and excess purchase of same due to lack of location data.
- Periodic maintenance of medical equipment and other moving objects not at acceptable standards as location was unknown.
Scope

• Systems that **automatically** register **location** and **identity** of a **mobile** object at a known **time**

• Systems able to consume the above mentioned information

• What: eg medical equipment and people
• Where: eg room, warehouse
• When: eg arrival of bed at room
• EPCIS system is technology agnostics and enables integration with multiple technologies.
Built on GS1 Standards

- GTIN - Global Trade Item Number – eg products
- GRAI - Global Returnable Asset Identifier - eg transport cages
- GIAI - Global Individual Asset Identifier – eg ultrasound equipment

Traceability (Location)
- GLN - Global Location Number - each room is given a GLN number, also enabling wayfinding for patients...

Time
- UTC
Examples of use cases

- Quality assurance - to use item identification and localization to support important hospital processes
- Search time reduction - reduction in time used in finding objects and colleagues
- Usage and Capacity Management - effective utilization of space, equipment, beds, consumables etc.
- Transit time reduction & nearest employee handles task - improved, real-time insight in the actual workflows and logistic processes
Use Case: Maintenance

By aggregating items with relevant data of applied maintenance and service, staff members can ensure equipment is “fit” for use and can easily manage maintenance schedules.
Search time reduction

Use Case: Finding co-workers

As much as 50 percent of the time used to search for personnel and items can be cut.
Usage and capacity management

Use Case: Utilization

The movement of devices in the hospital and identifying points of use gives an indication of potential use.

The hospital decides whether to decrease or increase the stock of a given device type or model.

Rooms and areas in the hospital have different use.

A bright color in a storage room or a hallway indicates that the item examined spends most of its time out of use.
Transit time reduction

Use Case: Finding optimal routes through the hospital

The time used moving from point of origin to destination is automatically calculated with optimal transport routes and risk of congestion identified.

By examining heat maps of transit routes, hospital staff can change routes to avoid congested areas.
Nearest employee handles task

Use Case: Find beds that needs cleaning

Categorizing and sorting tasks based on location and type gives staff the possibility to autonomously decide where and when to solve the next task. Unproductive time is reduced when the nearest qualified employee handles a task.

Overview of bed with a given status tells staff where to go and find the next task and plan their work with as little idle time for transit as possible.
Use Case: Find beds that needs cleaning

- Bed touch pad at each bed
- Change status of bed immediately,
- 2 way communication
Clinical Overview
The technical stuff

Hardware

End 2017: 2,406 readers  
- end of 2018: 3500  
- 2019: 4000

End 2017: 5,449 antennas  
- end of 2018: 7500  
- 2019: 9000

Assets

• Expected # of assets tagged 250,000. Tagging process is ramping up – right now around 20,000

• 2 “older” hospitals are moving into new buildings May 2018 at DNU and joins the existing hospital. Assets are identified and tracked in the process
Example of tagged items... so far...

- Trollies, Staff, Phones, Clinical equipment, Beds, IT equipment, Medical devices, Containers, Vehicles, Bicycles, Art, Clothing, Food...
Infrastructure
The Benefits so far...

• Search time reduction - 50% reduction in search time – 6 minutes per day per employee

• Usage and Capacity Management – reduction of beds – 200 pcs x USD 6t each = USD 1,200,000

• Transit time reduction – calculation of optimal transport route

• Nearest employee handles task – 10 minutes saved on average per task

• These benefits all contribute to a more efficient hospital with increased patient safety
Well deserved awards...

“GS1 Healthcare Provider Advisory Council Award 2017”
Best GS1 hospital implementation in the world

“The Jury acknowledged this case to have a strong future vision and to be applicable also for other hospitals and countries”

“RFID & Wireless IoT Research & Solutions Award 2017”
Europe’s most innovative hospital!
The Future

• Expanding with more use cases
• Ambition to share data with other hospitals, creating a standardized information flow
• Possibility to exchange masterdata with suppliers through GS1 GDSN standard
• …and much much more
Questions?