



Ekahau RTLS

WLAN based Real Time Location and Communication Solution

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System Consultant, central and eastern Europe
Ekahau Inc

Ekahau - Competences

WLAN planning, simulation, analysis and optimization with
Ekahau Site Survey, Ekahau Mobile Survey

WLAN based Real Time Location Solution with
Ekahau RTLS

Inventory, Temperature and Humidity Control with
Ekahau WiFi Tags and Sensors

Asset tracking, staff safety, process visualization and -optimization
in Healthcare, Retail, Mining, Industry, Logistics, Military

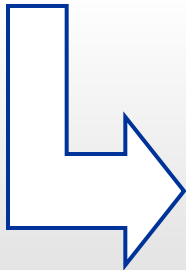


Ekahau - Scientific Background



Ekahau cofounder: Professor Henry Tirri & CoSCo Team

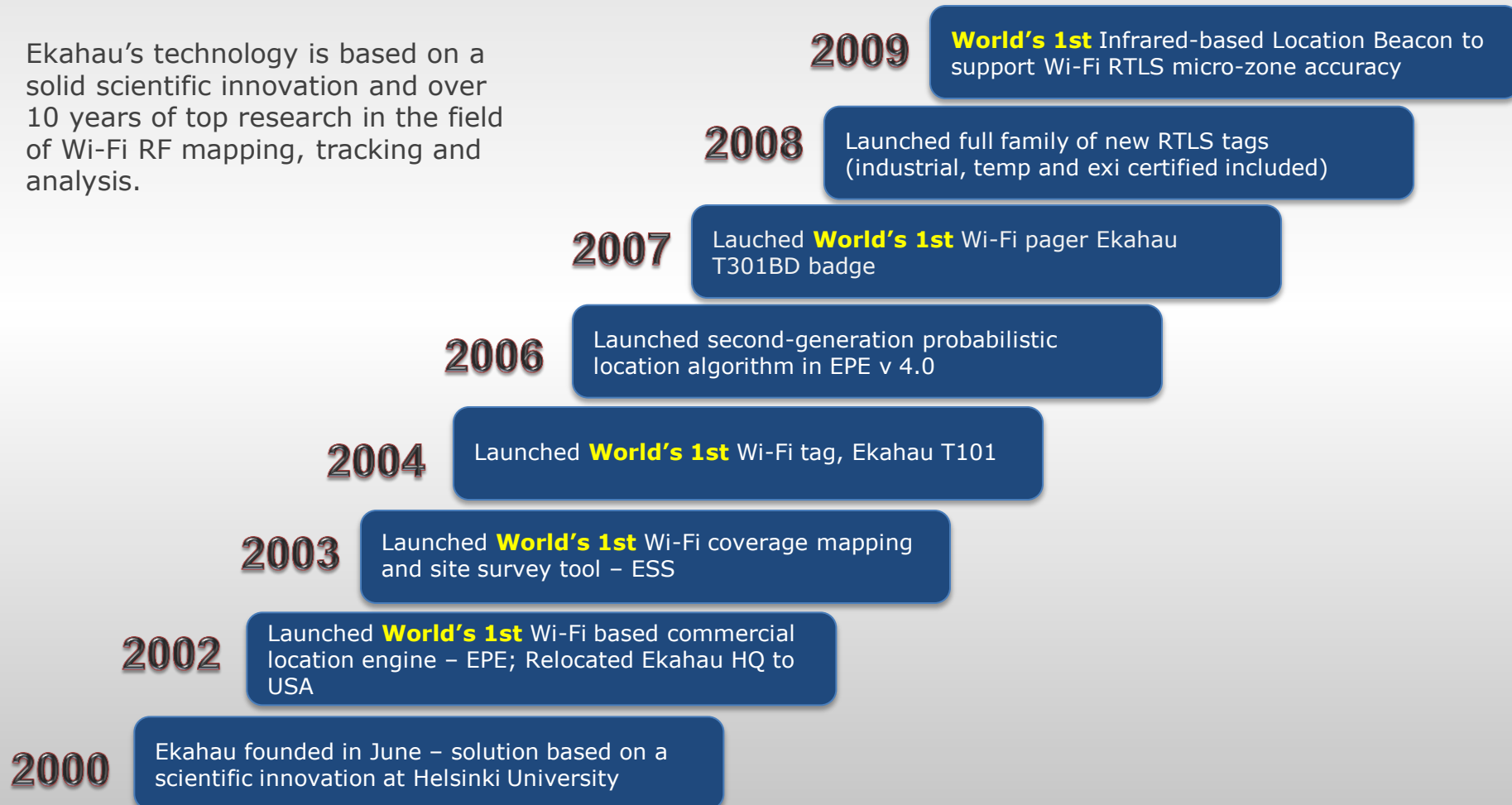
- Nokia Research Fellow (2004-)
- University of Helsinki, Professor (1998-)
- Leiter des CosCo Research Teams – mit Linus Torvalds/LINUX
- Bell Laboratories, Visiting Scientist (1988)
- Stanford University, Visiting Professor (2001-03)
- NASA Ames Research Center, Visiting Scientist (1998)



→ 11 years development, over 40 Mio \$ investment, 12 Patents

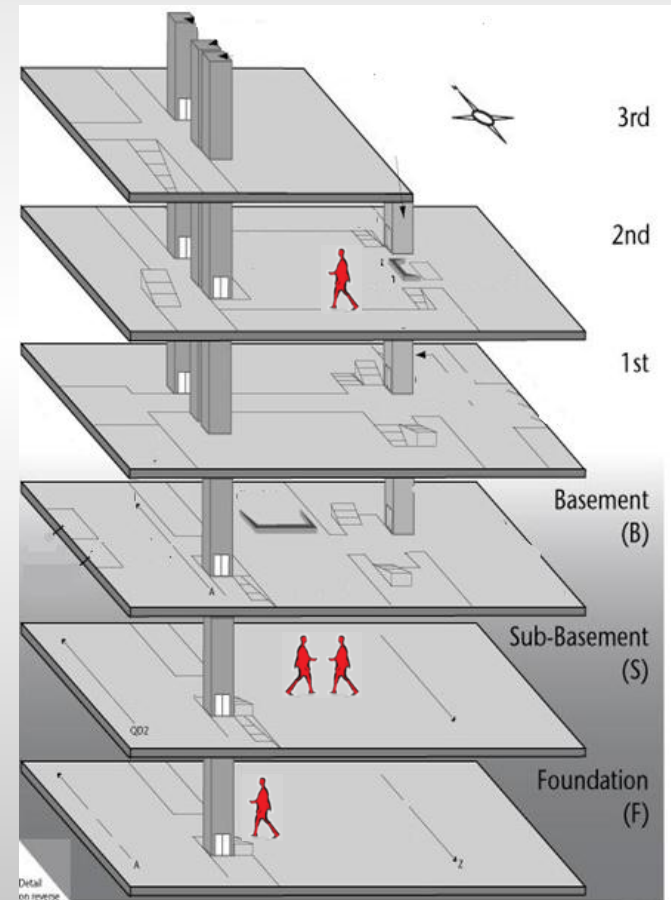
Ekahau Innovation Milestones

Ekahau's technology is based on a solid scientific innovation and over 10 years of top research in the field of Wi-Fi RF mapping, tracking and analysis.

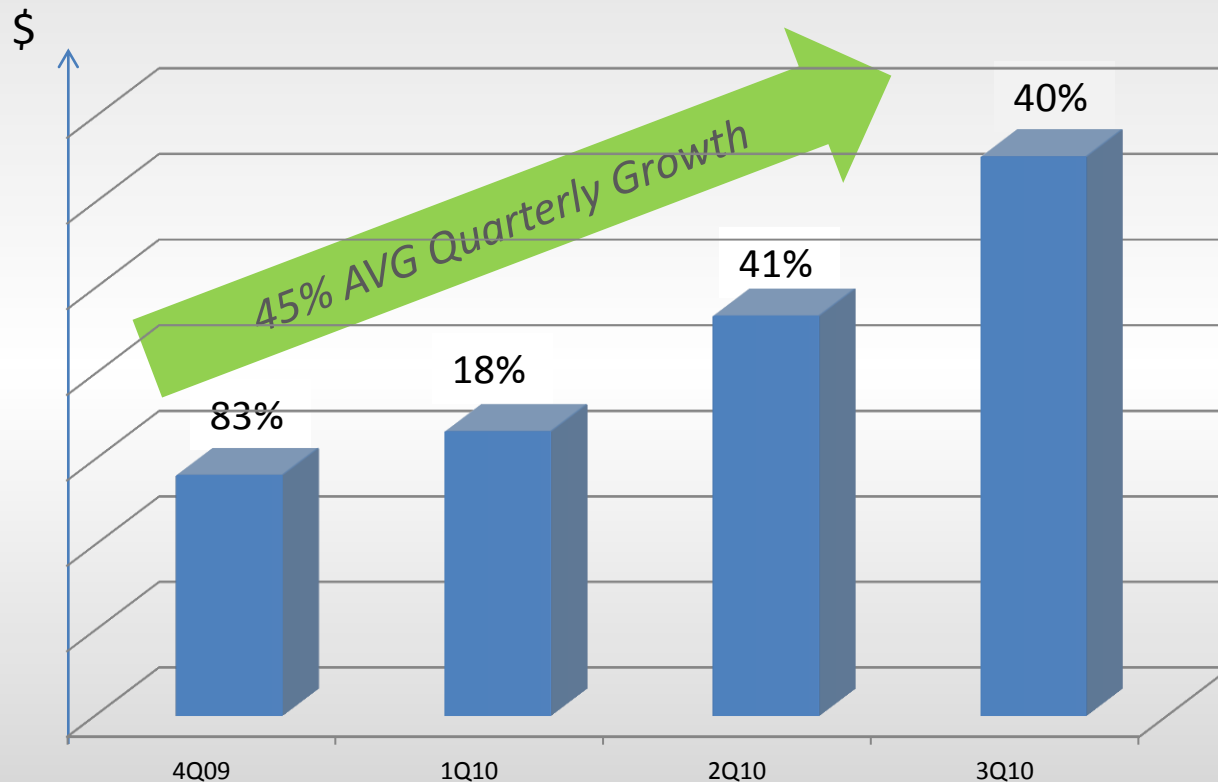


Ekahau Business

- RTLS systems sold in more than 50 countries:
1,500+
- RTLS Sales Growth 2009 -> 2010:
2.3x
- Win-Lose ratio vs. competition (2010):
91%
- Ekahau Site Survey (ESS) licenses sold:
10,000+
- Heatmapper users in 2 years:
~500,000



Ekahau RTLS Solution Sales – Quarterly Growth



As the RTLS market is entering in the mainstream, Ekahau has emerged as the fastest growing RTLS company worldwide.

RTLS applications in hospitals

1. Asset management

- Asset availability
- Maintenance management
- Utilization management
- Theft and loss prevention



2. Staff safety

- Localized mobile emergency calls
- Text messaging and paging



3. Patient safety and comfort

- Emergency call
- Wandering patient alert
- Paging service

4. Process optimization

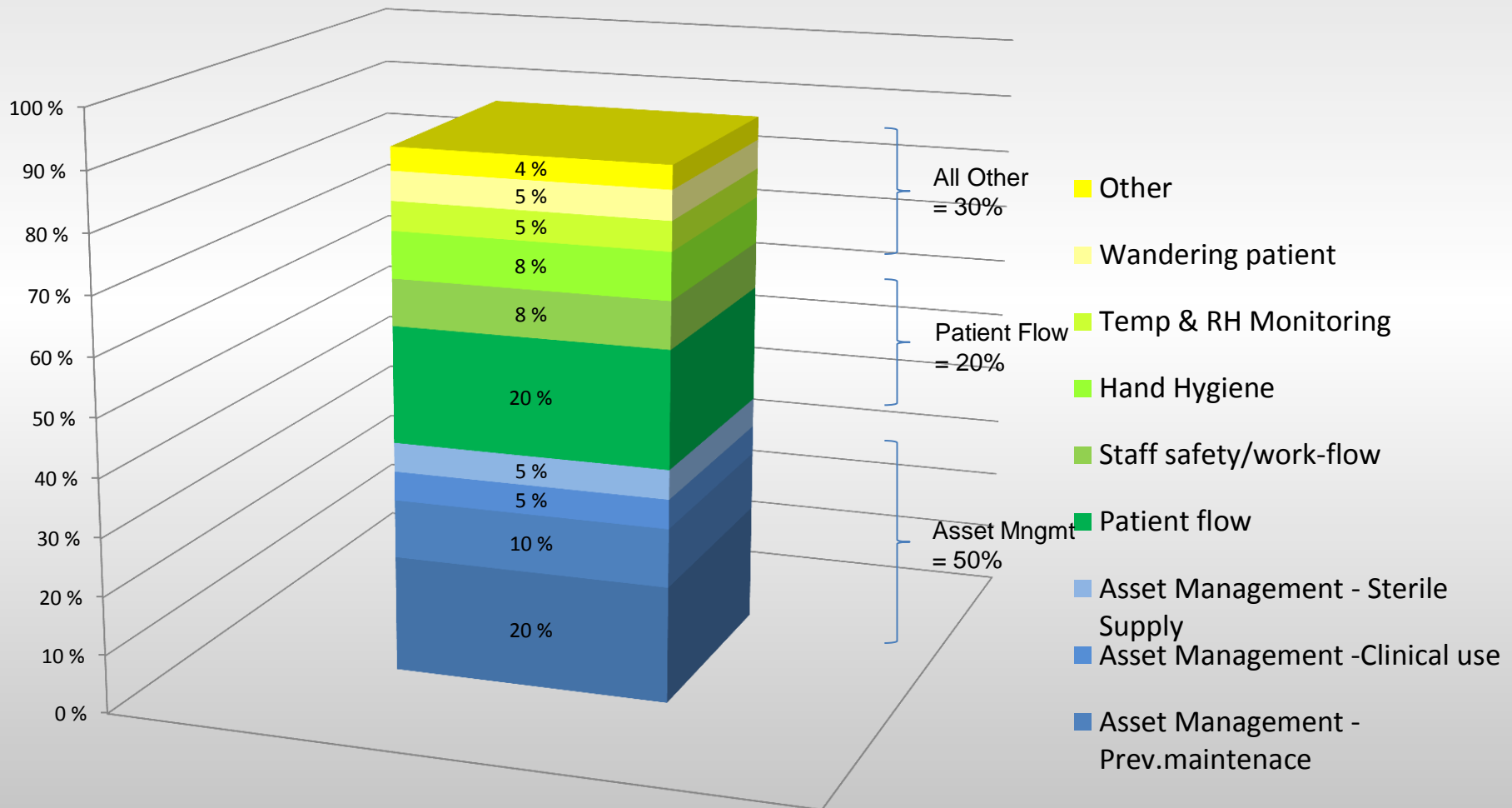
- Room utilization, OR-throughput
- Waiting times, Patient paging...

5. Environmental control

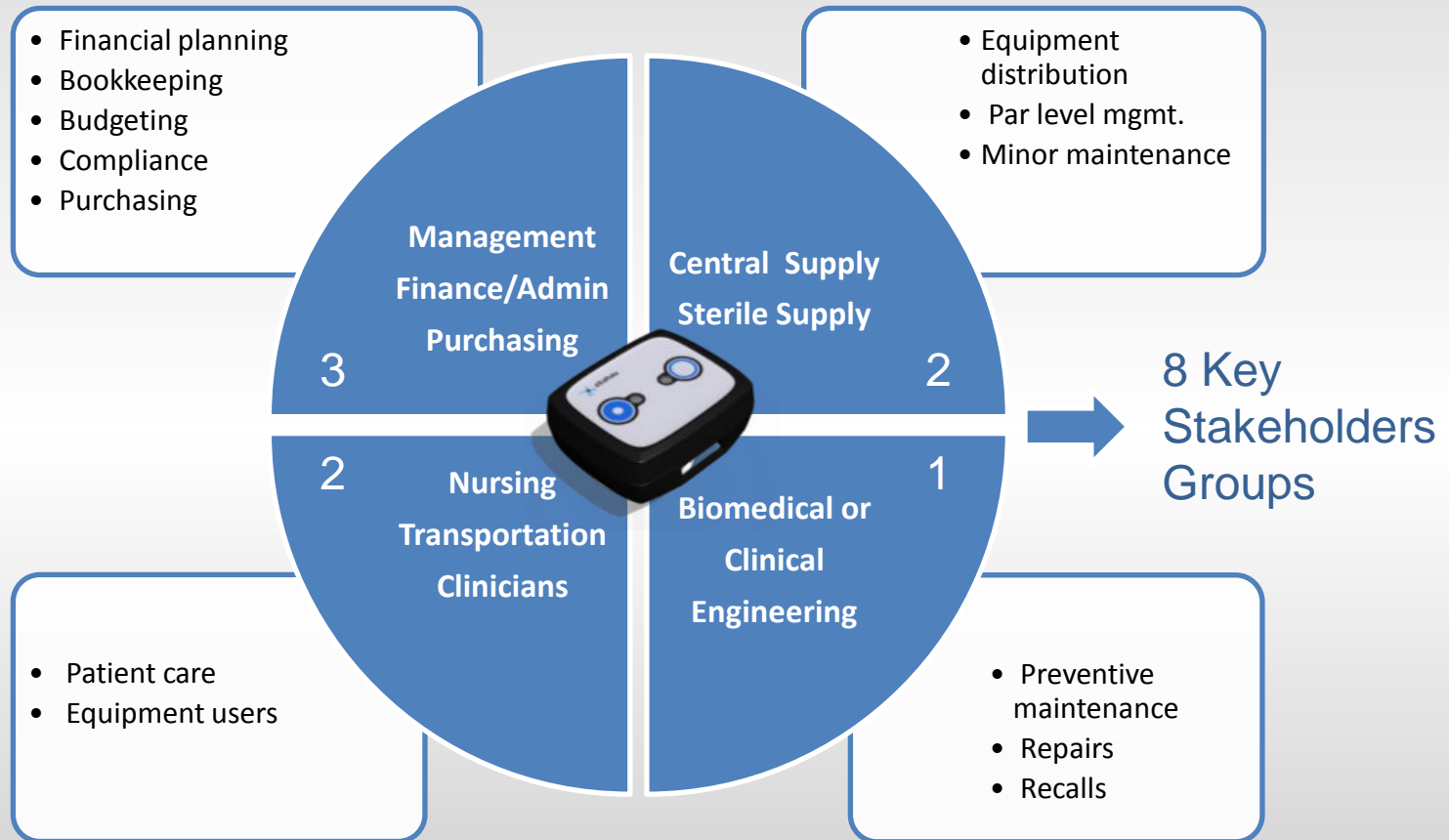
- Temperature control
- Humidity control



Hospital ROI from RTLS applications

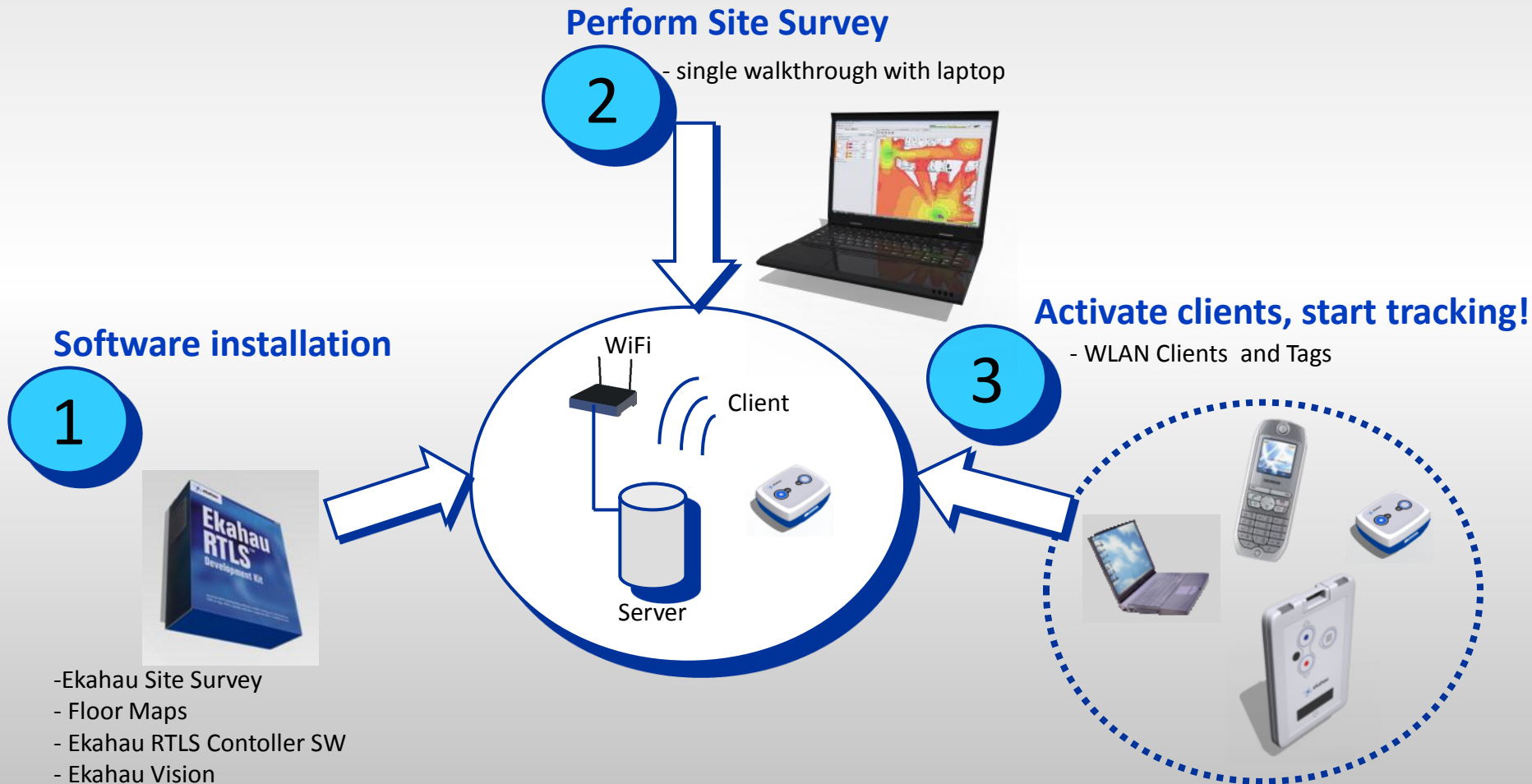


Asset Tracking: Key Stakeholders in Hospital

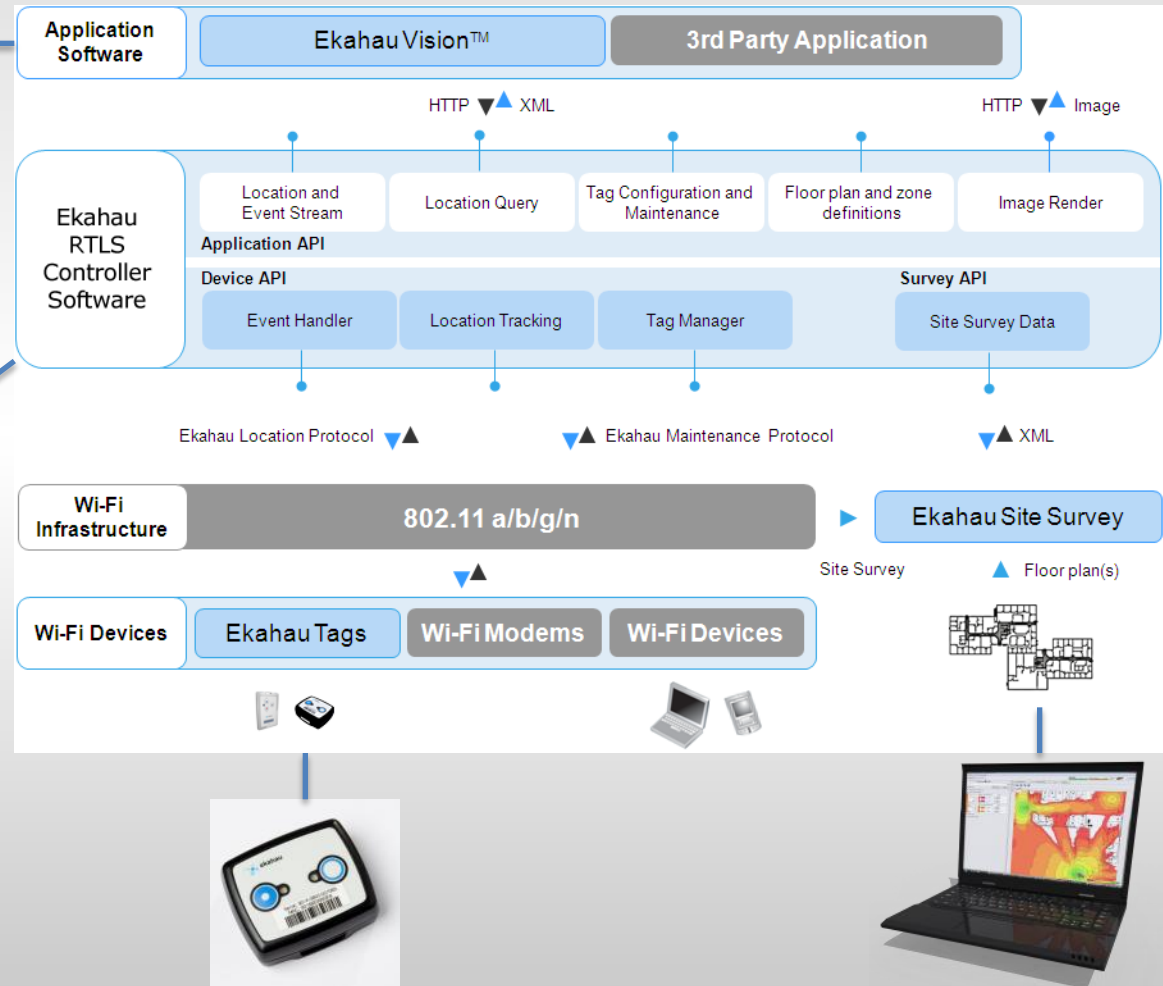


A single tagged item can reduce costs and improve work-flow for a large stakeholder group

3-Step RTLS Installation

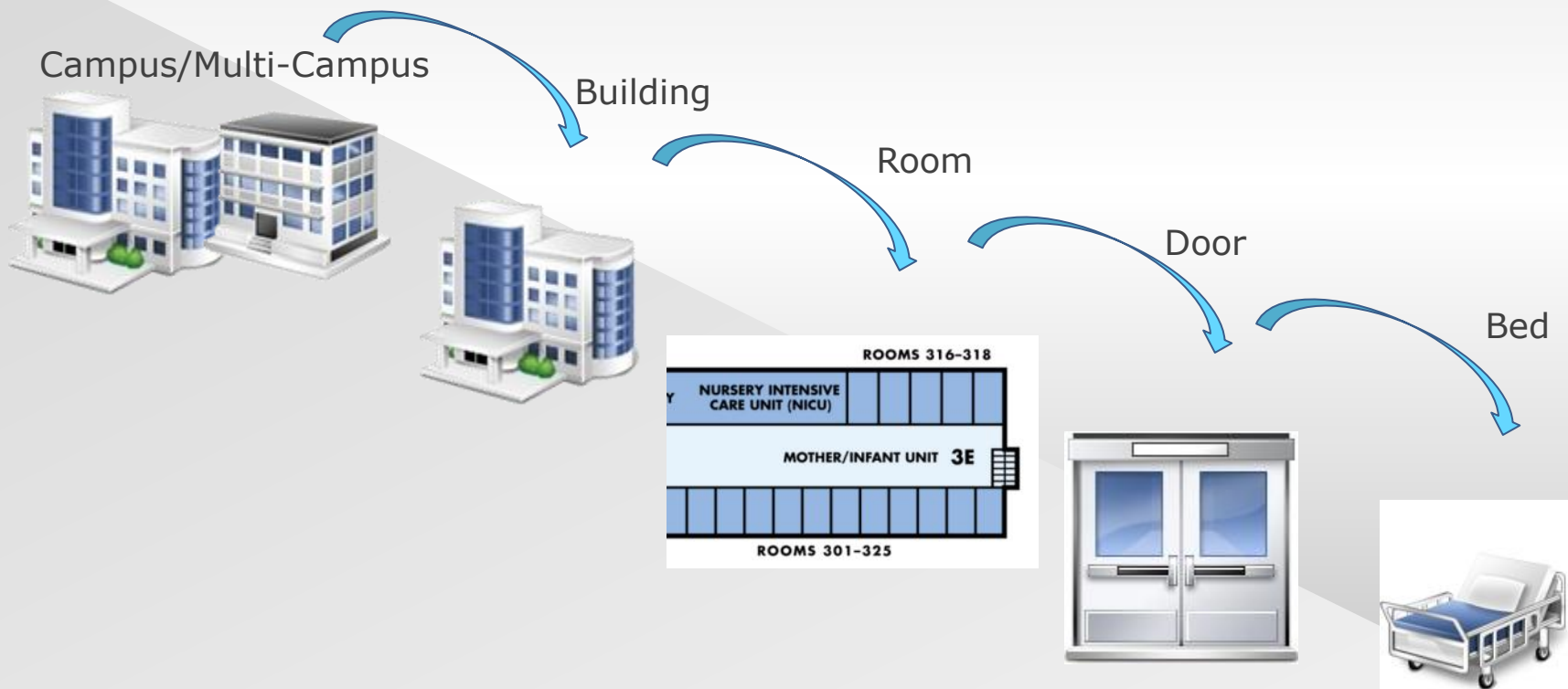


Ekahau RTLS



Ekahau RTLS – full scalability

The only full scalable RTLS solution on the market.



... all leveraging standard WLAN, Ekahau SW and Tags

Assetmanagement



Ekahau T-301-A , Asset WiFi-Tag

Movement sensor for intelligent power management power management
2 exchangeable standard Li-Ion Batteries with up to 5 years battery life

2 call buttons for configurable automated status messages

Programmable LED und buzzer signals

Smart mode using battery saving blink or CCX mode and WPA
for full 2 way communication and remote tag management

Waterproof, several mounting options

Certified version for use in hazardous environments (T301 EX)
IECEX ATEX: II 1 G EEx ia IIc T6



Staff safety and communication

Ekahau T301-BD Personal WiFi Badge

Automated alarms

When motion sensors report no movement for configurable time

Emergency call

Using button press or pull strap

Security zones

Alerting when entering restricted areas

Text messaging

Alerting when entering restricted areas, Emergency calls, task management etc.
10 configurable menu messages

Location tracking

Permanent real time tracking with configurable interval or only in case of emergency call

Rechargeable

Single chargers or wall mountable multi charger for 10 Badges



Patient safety and comfort

T301 W Patient-WiFi-Tag

Automated alarms

When motion sensors report no movement for configurable time

Emergency call

Using button press

Security zones

Alerting when entering restricted or leaving default areas

Paging

Programmable call with LED and vibration alert

Location tracking

Permanent real time tracking with configurable interval or only in case of emergency call

Rechargeable

Single chargers or wall mountable multi charger for 9 tags



Temperature and humidity control

Ekahau TS1 / TS2

- **Wireless temperature sensing for a variety of applications**
- **Up to 3 year battery life with a 15 minute reporting interval**
- **Flashing LED when in alarm**
- **Temperature monitoring and calibration done within Ekahau Vision web application**
- **Programmable alarm limits**
- **Unit samples temperature every 15 seconds or as required for the specific application**
- **External probe options include:**
 - **TP1 Temperature Probe range -112 to 257F / -80 to 125C**
 - **TP2 Temperature Probe range -328 to 302F / -200 to 150C**
- **Local data logging capability: No lost measurements even during network outages**



Temperature and humidity control

Ekahau HS1

- NIST traceable wireless humidity and temperature sensor for a variety of applications
- Up to 3 year battery life with a 15 min reporting interval
- Audible and visual indication when in alarm
- Programmable alarm limits
- Humidity/temperature monitoring and calibration done within Ekahau Vision web application
- Humidity / temperature input sampled every 15 seconds or as required for the specific application
- On-board sensors:
Humidity range: 0% - 100% RH
Temperature range: -40C to +85C
- Local data logging capability: No lost measurement even during network or electricity outages



Ekahau Location Beacon: Adding bed-level accuracy to Wi-Fi RTLS

Ekahau Location Beacon LB 1

- Battery-powered Infrared (IR) transmitters, with unique ID
- Assists Wi-Fi RTLS to reach <1 meter location detection accuracy
- Wall-mount transmitters pointed to a zone, where Ekahau tags will detect the IR signal
- Up to five year battery life, with no cabling or external power – easy to install and move

Unlike competing systems, Ekahau Location Beacon:

- Does **NOT** require cabling to power or POE
- Does **NOT** require data transmission capabilities
- Does **NOT** require complicated electronics (just IR)



Ekahau + Purell: Joint Solution for Infection Prevention

Purell Hand Sanitation Station with embedded Ekahau IR Location Beacon



1 Automatic dispense detection triggers IR beam

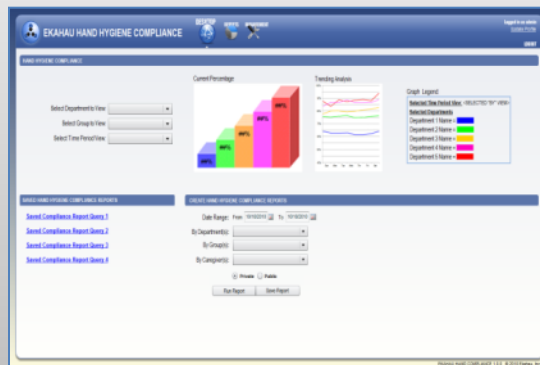
2 Station ID sent to the staff badge using IR



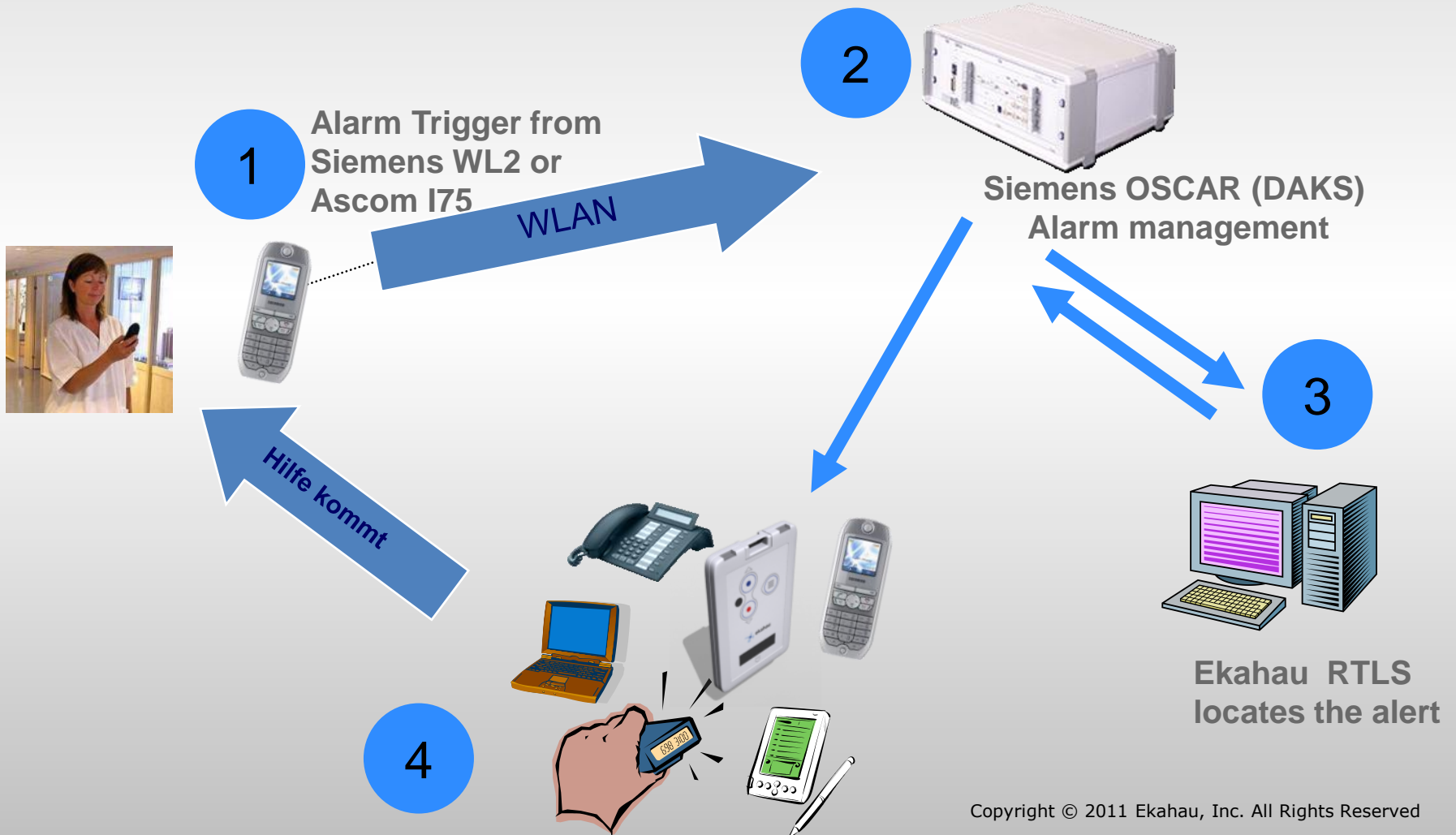
3 Staff member badge displays clean/dirty status

4 Status sent over Wi-Fi to reporting software

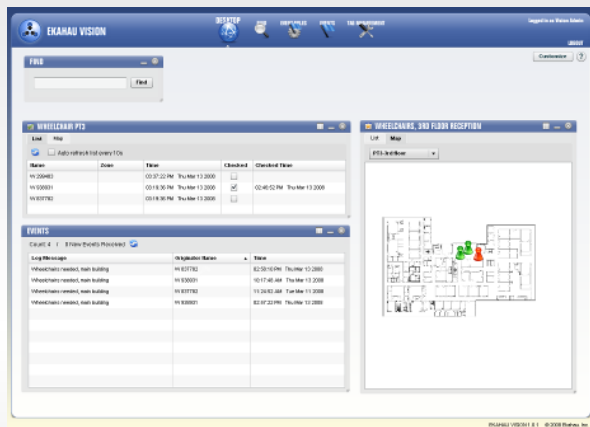
5 Alarm if "Dirty" status detected inside patient room (Wi-FiRTLS)



Integration with phone system and Alarm Management (e.g. Siemens)

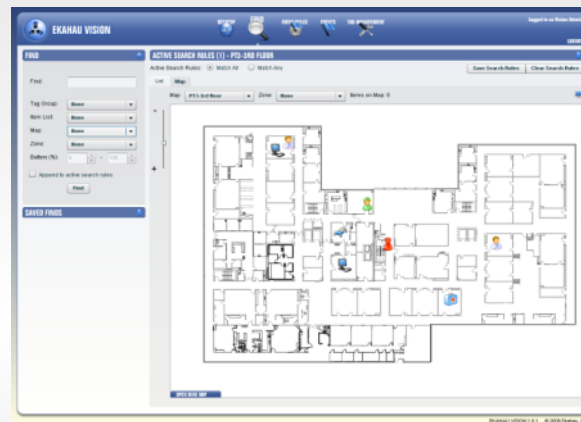


Ekahau Vision Application...



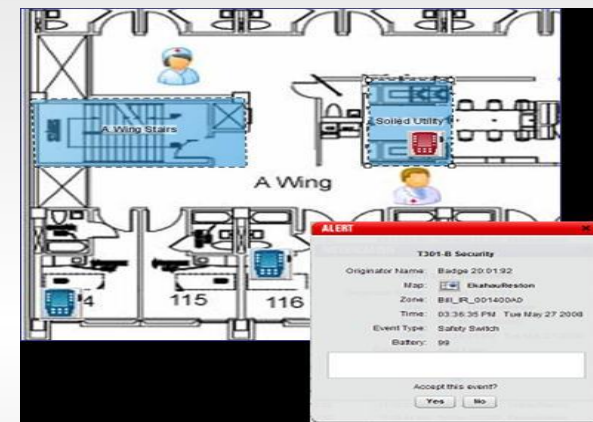
Individual Dashboard

- Events
- Work lists
- Overview



Finding and visualization

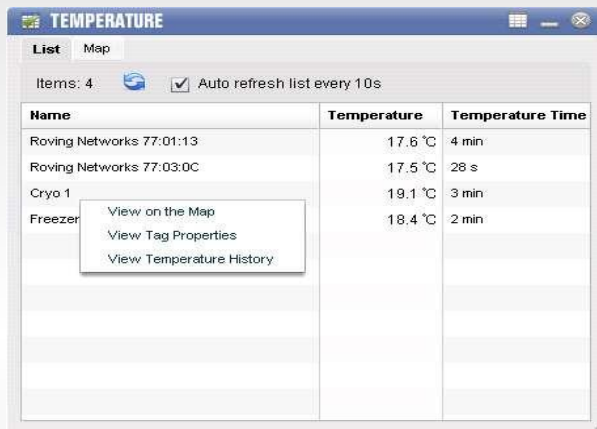
- Intelligent searches
- Real time visualization



Alarming


- Process- and event rules
- Alarm escalation
- Text messaging

...Ekahau Vision Application



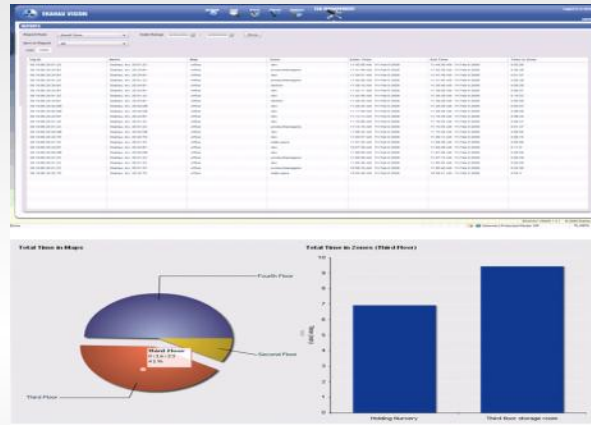
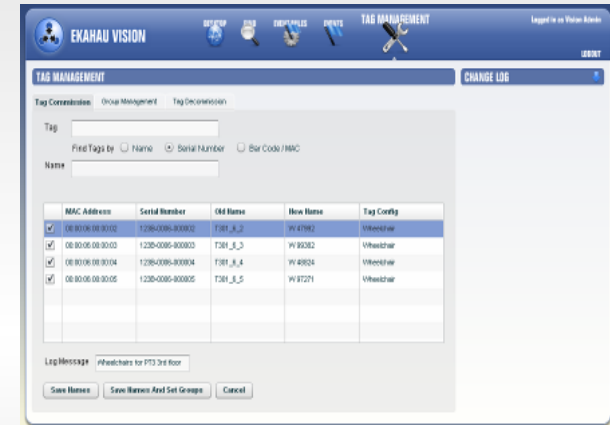
TEMPERATURE

List Map

Items: 4  Auto refresh list every 10s

Name	Temperature	Temperature Time
Roving Networks 77:01:13	17.6 °C	4 min
Roving Networks 77:03:0C	17.5 °C	28 s
Cryo 1	19.1 °C	3 min
Freezer	18.4 °C	2 min

- View on the Map
- View Tag Properties
- View Temperature History

EKAHAU VISION

Tag Management

Tag Configuration Group Management Tag Discussion

Tag

Find Tags by Name Serial Number Bar Code/MAC

Name

MAC Address	Serial Number	Old Name	New Name	Tag Config
<input checked="" type="checkbox"/> 08:00:00:00:00:01	1234-0000-000001	T301_A_2	W11761	Vibetstraw
<input checked="" type="checkbox"/> 08:00:00:00:00:02	1234-0000-000002	T301_A_3	W19332	Vibetstraw
<input checked="" type="checkbox"/> 08:00:00:00:00:04	1234-0000-000004	T301_A_4	W14954	Vibetstraw
<input checked="" type="checkbox"/> 08:00:00:00:00:05	1234-0000-000005	T301_A_5	W17271	Vibetstraw

Log Message #Peelers for PT3 3rd floor

Save Names Save Names And Set Groups Cancel

Temperature and humidity control

- history documentation
- alerting

Analysis

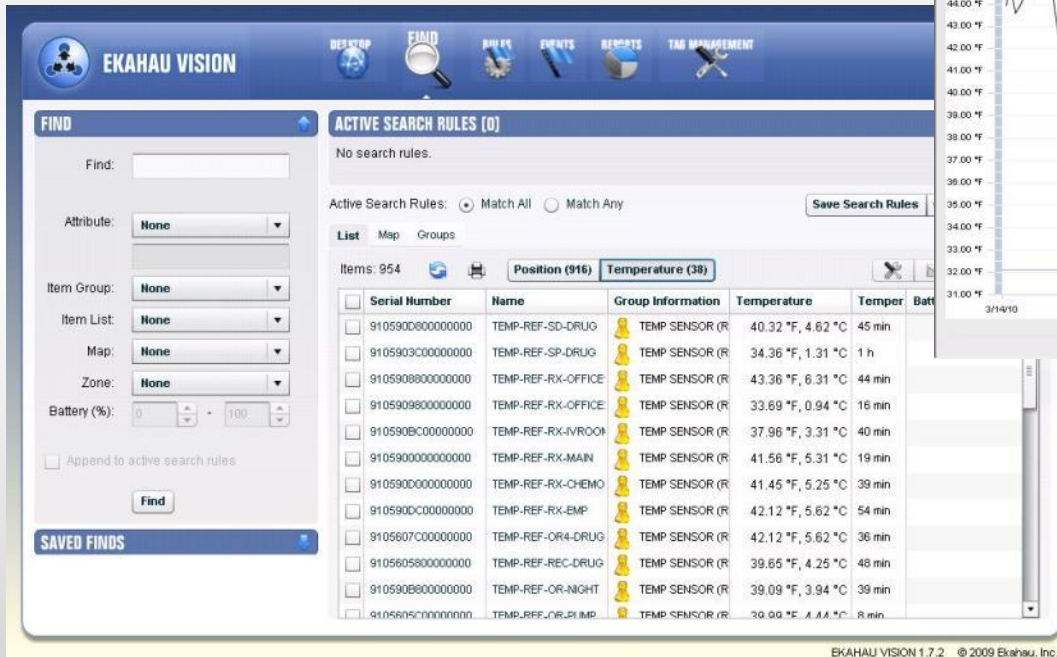
- Dwell time
- Room usage
- Inventory
- Events

Tag management

- individual naming
- groups
- colors, symbols

Wireless Temperature and Humidity Monitoring

Wireless Monitoring and Alerts
 For Temperature and Humidity
 = Zero Manual Labor



EKAHAU VISION

DESKTOP FIND RULES EVENTS REPORTS TAB MANAGEMENT

FIND

Find:

Attribute: **None**

Item Group: **None**

Item List: **None**

Map: **None**

Zone: **None**

Battery (%): -

Append to active search rules

Find

ACTIVE SEARCH RULES (0)

No search rules.

Active Search Rules: Match All Match Any

Save Search Rules

List Map Groups

Items: 954 **Position (916)** **Temperature (38)**

Serial Number	Name	Group Information	Temperature	Temper	Batt
<input type="checkbox"/> 910590D600000000	TEMP-REF-SD-DRUG	TEMP SENSOR (R)	40.32 °F, 4.62 °C	45 min	
<input type="checkbox"/> 9105903C00000000	TEMP-REF-SP-DRUG	TEMP SENSOR (R)	34.36 °F, 1.31 °C	1 h	
<input type="checkbox"/> 9105908000000000	TEMP-REF-RX-OFFICE	TEMP SENSOR (R)	43.36 °F, 6.31 °C	44 min	
<input type="checkbox"/> 9105909800000000	TEMP-REF-RX-OFFICE	TEMP SENSOR (R)	33.69 °F, 0.94 °C	16 min	
<input type="checkbox"/> 910590BC00000000	TEMP-REF-RX-IVROOM	TEMP SENSOR (R)	37.98 °F, 3.31 °C	40 min	
<input type="checkbox"/> 9105900000000000	TEMP-REF-RX-MAIN	TEMP SENSOR (R)	41.56 °F, 5.31 °C	19 min	
<input type="checkbox"/> 9105900000000000	TEMP-REF-RX-CHEMO	TEMP SENSOR (R)	41.45 °F, 5.25 °C	39 min	
<input type="checkbox"/> 910590DC00000000	TEMP-REF-RX-EMP	TEMP SENSOR (R)	42.12 °F, 5.62 °C	54 min	
<input type="checkbox"/> 9105907C00000000	TEMP-REF-OR4-DRUG	TEMP SENSOR (R)	42.12 °F, 5.62 °C	36 min	
<input type="checkbox"/> 9105605800000000	TEMP-REF-REC-DRUG	TEMP SENSOR (R)	39.65 °F, 4.25 °C	48 min	
<input type="checkbox"/> 910590E800000000	TEMP-REF-OR-NIGHT	TEMP SENSOR (R)	39.09 °F, 3.94 °C	39 min	
<input type="checkbox"/> 9105605C00000000	TEMP-REF-OR-21IMP	TEMP SENSOR (R)	30.00 °F, 1.11 °C	8 min	

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Fully automated JCAHO compliant documentation.



Monitor & alert: Freezers, Drug cabinets, Blood banks, Warming cabinets, Cold rooms, etc

OR process optimization

Customer:

- MIC Berlin, Prof. Abri
Clinic for Minimal Invasive Surgery

Problem:

- The OR is the most expensive resource of the hospital. Efficient utilization is mission critical.
- OR planning and optimization needs exact real time visibility of patient and process status.

Solution:

- The workflow (Ward-OR-Ward) is being tracked automatically.
- OR Management (Karl Storz, OR1 ORchestrion) receives automated timestamps, adapts the daily plan accordingly and provides data for later analysis and optimization.



Patient and staff safety

Customer:

- University Hospital Innsbruck

Problem:

- Staff safety in psychiatry required
- Emergency calls in daycare required
- Protection of wandering patients required

Solution:

- Emergency calls with pull strap at Ekahau T301 BD Display Pager
- Protection of wandering patients with Ekahau T301 W WLAN wristband tags
- Automated location tracking with Ekahau RTLS
- Alarm management and escalation via ITH Icoserve ProAct



Staff safety and asset tracking



Customer:

- Westküstenklinikum Heide
- ca. 600 Beds, 2000 Staff
- Siemens WLAN

Problem:

- Staff face dangerous situations in psychiatry and during night shifts.
- Wheelchairs need to be searched and collected frequently or get lost completely.

Solution:

- Ekahau T301 Display Badges for pull strap emergency alerts and alarm text messages e.g.: „Alert, nurse Betty, waiting area, 3rd floor“
- Ekahau T301 Asset tags for tracking Wheelchairs. List and map views with Ekahau Vision allow easy finding and collection. Alerts when leaving default area help protect them.



Assettracking



Customer:

- University of Kentucky Medical Center
- 473 Beds, Emergency centre
- WLAN coverage: 130.000 m² Campus

Problem

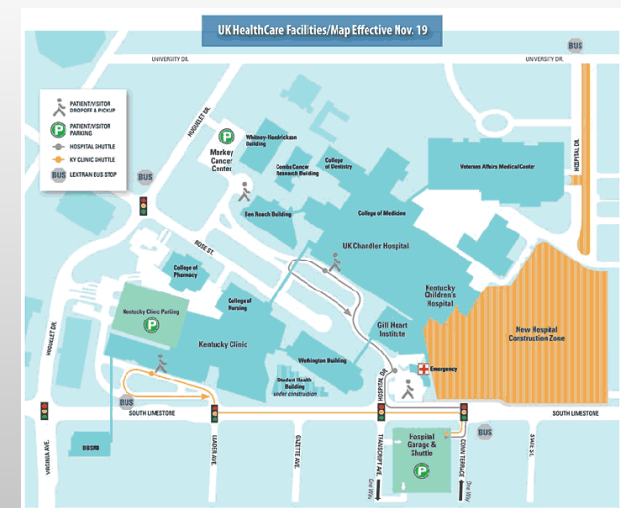
- Too many high value infusion pumps in stock and poorly utilized

Solution:

- 2600+ T301A Tags for asset tracking
- In use since Mai 2008

ROI:

- Savings through reduced leasing contracts (as presented by customer):
 - 2008 rental cost: \$400,000
 - 2009 estimated rental cost: \$48,000
 - Annual savings: \$352,000
 - Ekahau RTLS cost: \$200,000
 - **ROI in the first 12 months: \$152,000**



Assettracking



Customer:

- Carolina Health System
- 6 Hospitals spread over Carolina
300000m² , 5000+ Beds

Ekahau RTLS:

- 4000+ T-301 Tags
- 90 % installed by customer themselves
- One central server for all campuses

Requirements:

- Tracking of infusion pumps and ventilators

ROI:

- Balanced availability and utilization of assets throughout the entire enterprise
- Capital savings through reduced purchases and leasing contracts
- Improved maintenance management

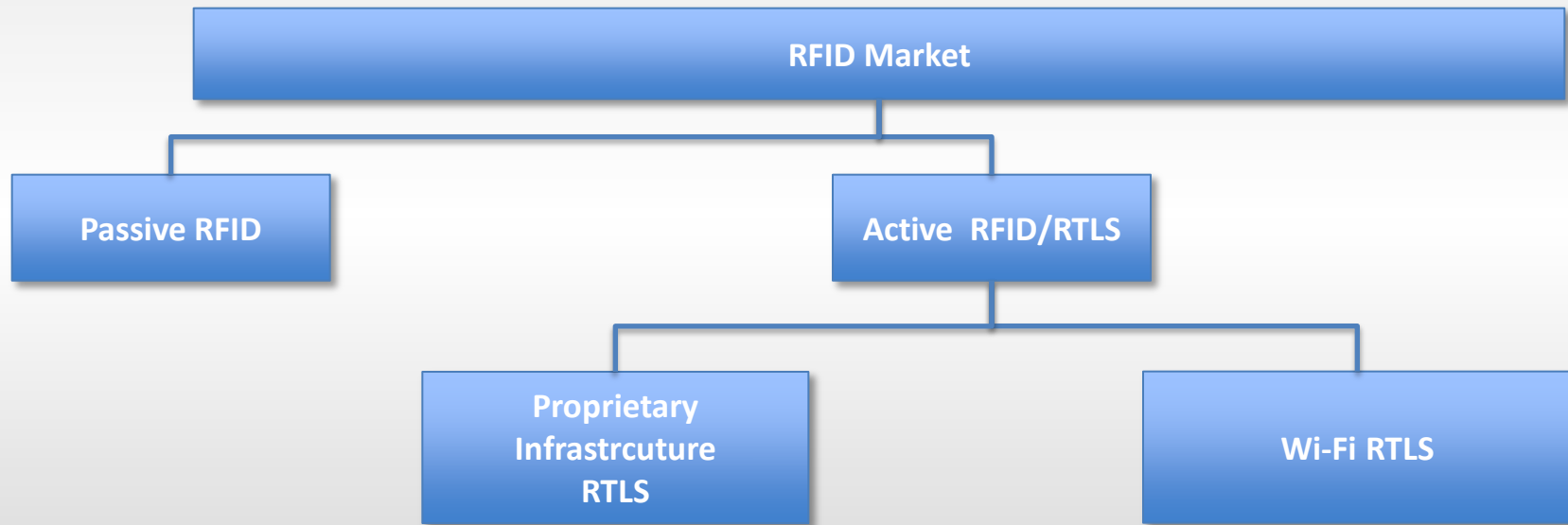


Case: OSUMC results of using RTLS (Cisco + Ekahau)

Department	ROI Drivers	Team Rating for the RTLS System	Savings/annual
Materials Systems	<ul style="list-style-type: none"> ▪ Reduction of lost equipment ▪ Reduction of leased equipment ▪ Work-flow savings 	10+	\$89,000 \$14,600
Perioperative Services	<ul style="list-style-type: none"> ▪ Eliminating the cost of old RTLS ▪ Work-flow savings 	8	\$120,000 \$48,600
Respiratory Therapy	<ul style="list-style-type: none"> • Work-flow savings related to daily searches of biPap equipment 	10	\$36,500
The James	<ul style="list-style-type: none"> • Work-flow savings in daily search of equipment/beds 	9	\$60,800
TOTAL	ALL 1st YEAR APPS	9+	\$365,000

Source: January 2011 OSUMC Biomed Department's analysis on RTLS ROI based on the first 10 month use in 2010

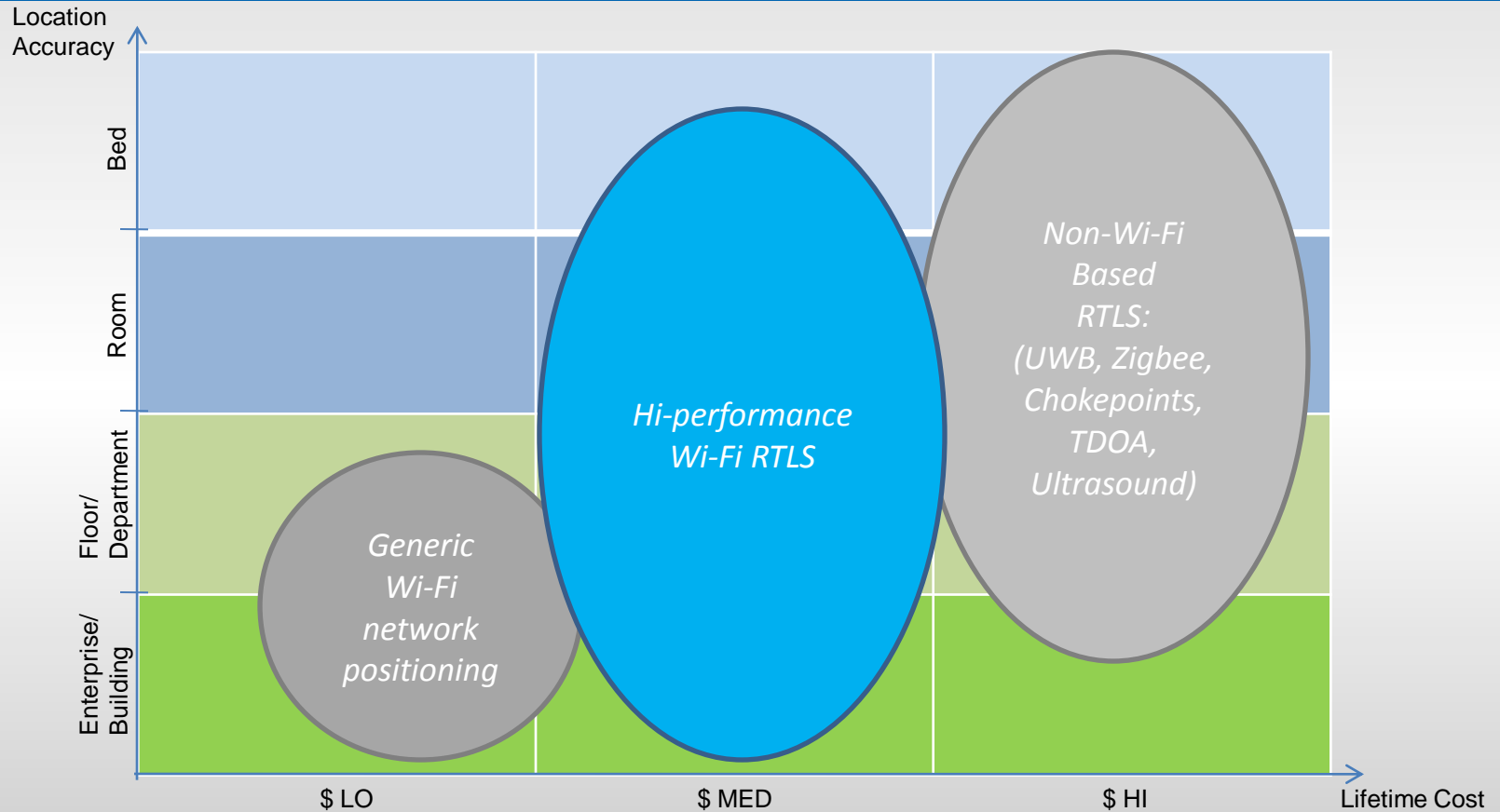
RFID vs RTLS



Location?

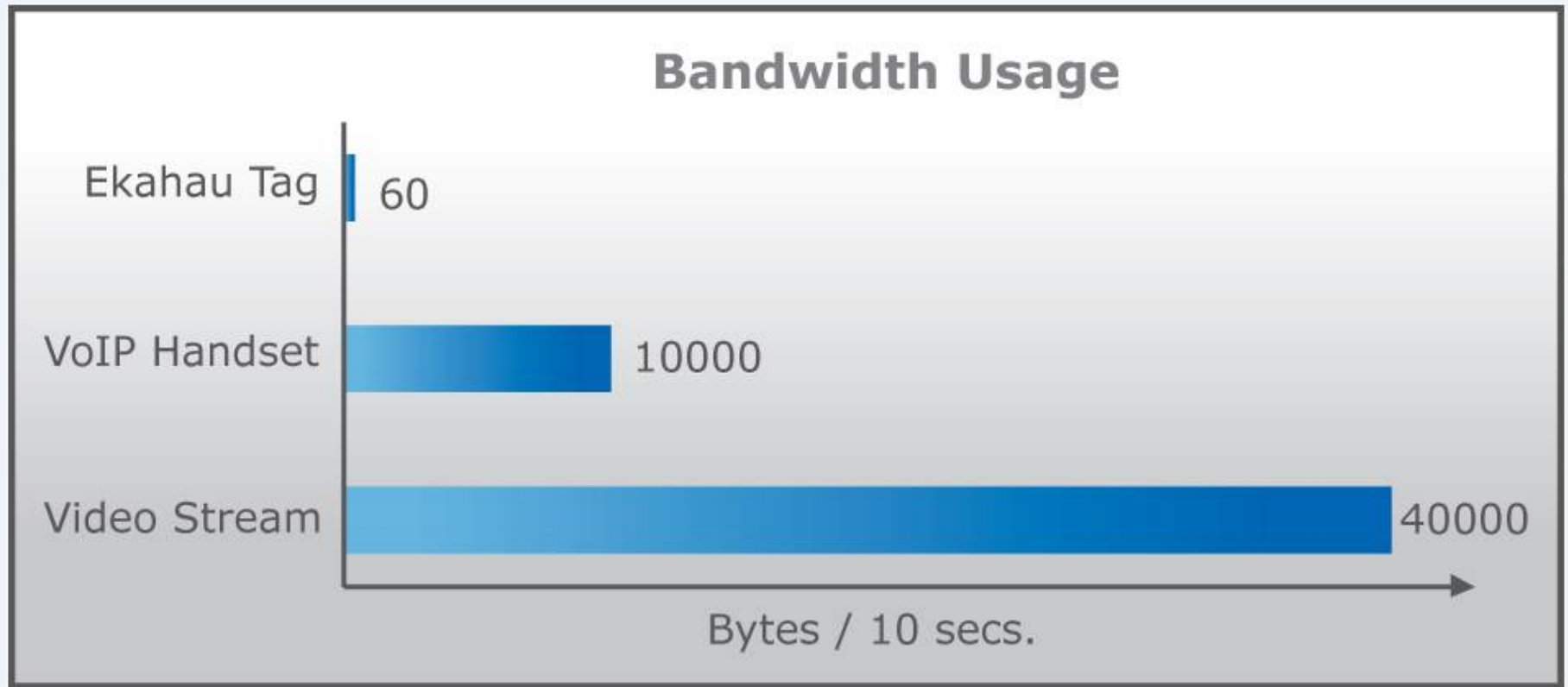
- RFID = Last-known location
- RTLS = Real-time location

Cost vs. Performance



Wi-Fi RTLS enables positive ROI
faster than any other RTLS technology

Wi-Fi RTLS – NO Impact on Bandwidth



RTLS quality differentiation...

No expensive and disruptive installation and cabling required. Easy to install in a couple of hours per department while continuing daily routine.



Fully WiFi compatible. Basically all standard WiFi Networks usable. (Even older WLAN access points, mesh APs, mixed installations) Future proof and vendor independent.



Easy life demonstration available.



Usable indoors and outdoors campuswide or even over distributed campuses.



Reliable floorlevel resolution (with pure WiFi solution and without additional gates etc.



Close to roomlevel accuracy with voice over WiFi grade network without additional HW.



Reliable room level, bed level or mikro zone accuracy available with cheap, easy to install IR solution without any additional cabling, or networktechnology.



Are specialised site survey RF-fingerprinting algorithm, rail tracking logic, normalisation and error filtering being used to optimize the accuracy and avoid errors.



... RTLS quality differentiation...

Are specialized tools for RTLS optimized WLAN planning offered? Can the location accuracy be tested, analysed and demonstrated and documented prior to RTLS installation?	✓
Broad choice of wifi tags for different use cases (asset tracking, staff safety, patient tracking, temperature and humidity control, emergency calls, paging, text messaging) available.	✓
Tags allow full bidirectional WiFi communication for flexible use cases, dynamic over the air configuration, central tag management.	✓
Tags support also battery saving blink modes like Aruba, Aerohive, Cisco CCX, Motorola, Meru	✓

... RTLS quality differentiation

Rechargeable tags for real time tracking and communication as well as tags with exchangeable batteries for up to 5 year maintenance free usage are available.



No proprietary radio exciter that may interfere with medical devices are being used.



An open, well documented and easy to use API to attach any 3rd party application is included.



An easy to use, web based user interface is available for quick and easy turn key solution without the need for additional SW integration.



Tracking of standard WLAN Clients (WLAN Phone, Barcodescanner, Laptop, PDA) is supported. A clear strategy how to prohibit unauthorised tracking of staff or visitors is included.



The solution is fully scalable from 1 to 10.000s of objects . Customers only pay for the number of tracked items and can include as many buildings, campuses, AP, Controller etc.as needed, without additional licensing.



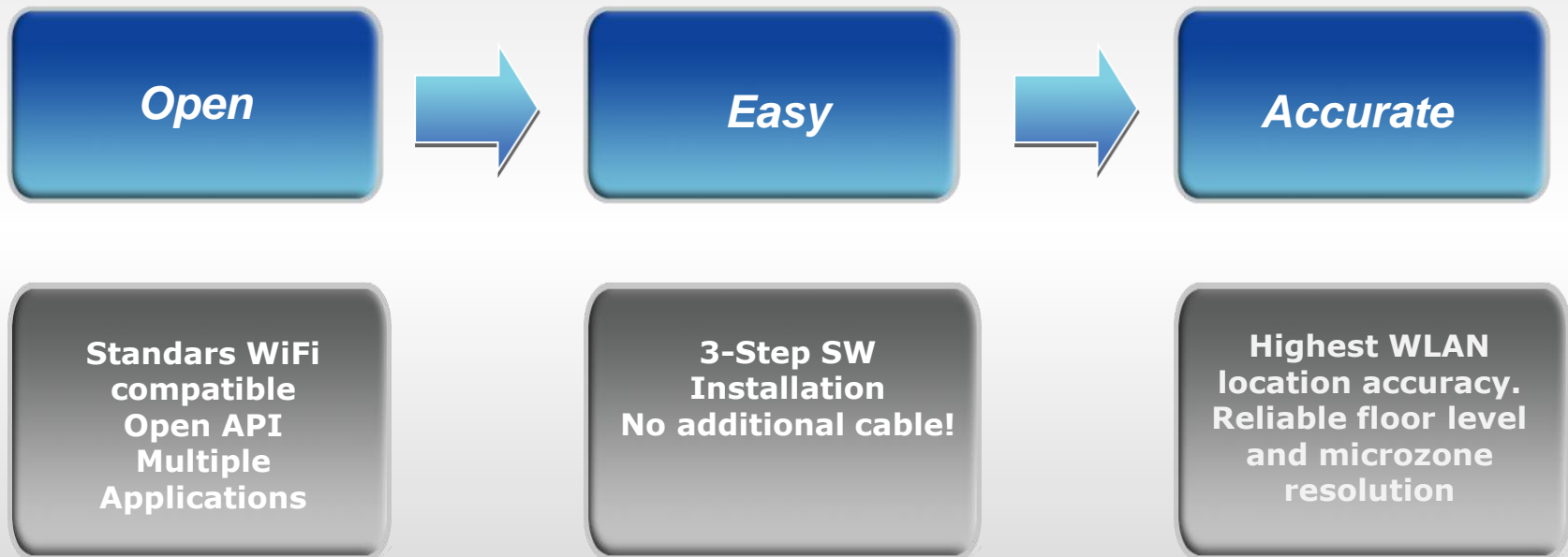
A money back guaranty is offered and allows extensive pilot installations without big risk.



Worldwide Healthcare Customer and Partner Examples



Ekahau advantage - Open Easy Accurate



Thank you!

I am available for questions and discussion now or via e-mail, phone or in a personal meeting or workshop.

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Please find further details at

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