Tracing & Identifying Objects & People by RFID in Switzerland
David C. Gürlet
14th of November 2013
Swiss Embassy, Paris / F

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About RFIDacademia

Questions

RFID

Business Case Development
Feasibility Studies
Cost/Benefits Analysis
Research + Lab Testing
Vendor-Neutral Consultation
Project Road Map Design
Project Management
Solution Design/Engineering
Software Architecture
Software Development
System Integration
Technical Support (H & S)
Hardware Peripherals
Installation +
Troubleshooting
Training + Certification

RFID LAB
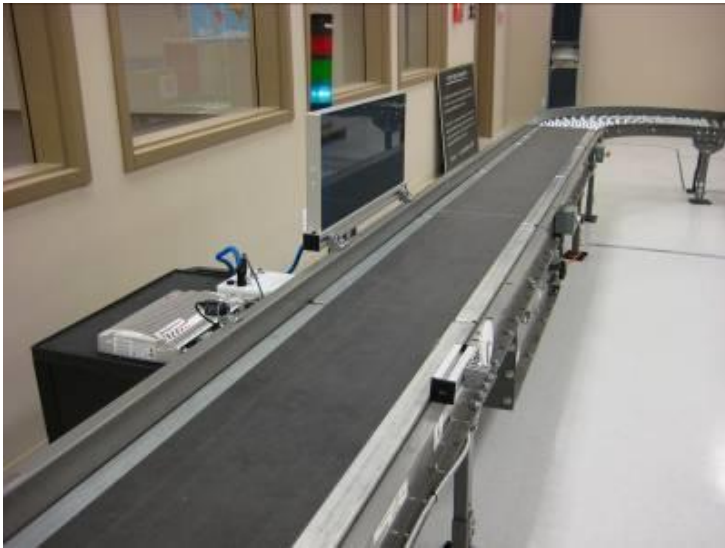
CLASSROOM

Questions

Que signifie RFID / RTLS?

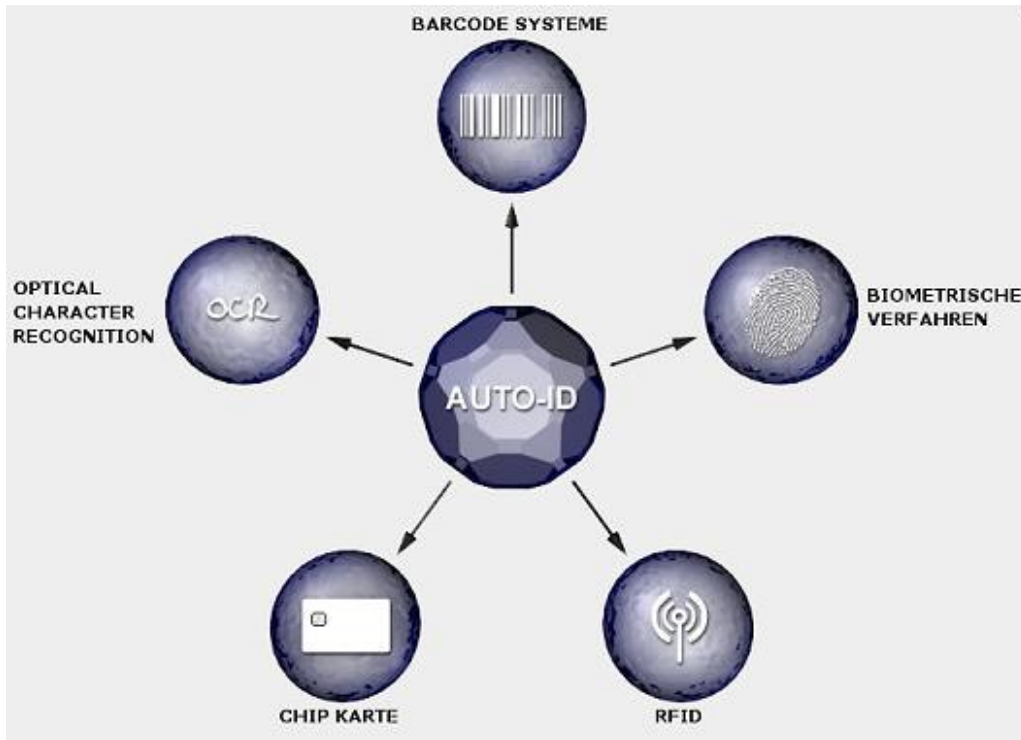**Qui a déjà réalisé un projet complet RFID / RTLS qui est en service?**

Qui a réalisé du profit avec un projet RFID /RTLS?

1. RFID & RTLS – Basics

1.1 What is a RFID?

1. Identification ………… **&** ……..……. **2. Localisation = Positioning**

Positioning :
a. Indoor RTLS
b. Outdoor GPS/Galileo/Glonas
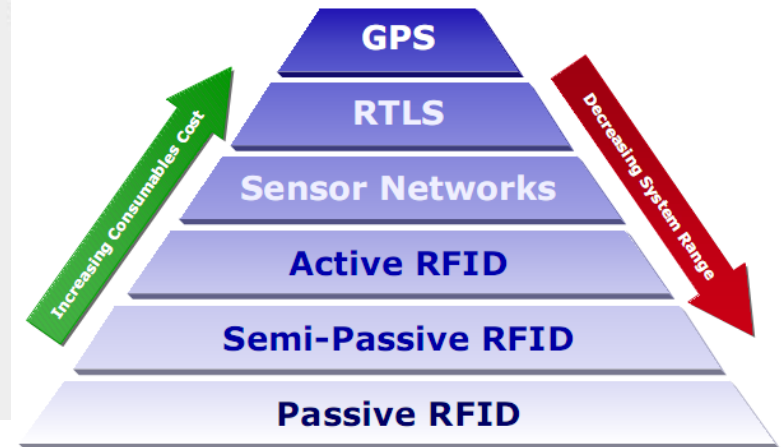
*) and also :
a. IRIS Detection
b. DNA/DNS
c. Handvene-Image

3. Sensoring = Condition Monitoring

1.2 What is a R-T-L-S?

Outdoor

GPS (Global Positioning System)

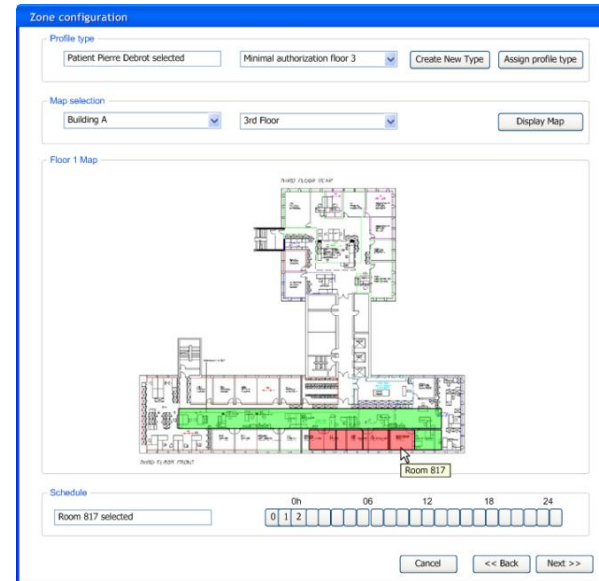|	
USA	= GPS (10 Meters – today/now)
Europe	= GALILEO (1 Meter – available 2018)
Russia	= GLONASS (10 Meters – since 2009)

Triangulation with Satellites
(3 Satellites needed for X/Y, 4 Sat. for X/Y/Z)

Indoor

LPS (Local Positioning System)

A. Active RFID
B. WLAN based LPS
C. UWB based LPS
D. E-INS based
E. GSM or TV-Signal Triangulation

1.3 Differences of RFID vs. RTLS

RFID/RTLS – What's the Difference ?

1. Radio-frequency identification (RFID)

… is the use of an object (typically referred to as an RFID tag) applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader.

2. Real-time locating systems (RTLS)

… are used to track and identify the location of objects in real time using simple, inexpensive nodes (badges/tags) attached to or embedded in objects and devices (readers) that receive the wireless signals from these tags to determine their locations. RTLS typically refers to systems that provide passive or active (automatic) collection of location information.

Source: RFID Journal Live 2012

2. RFID − Standards & Laws

2.1 RFID – Global Standards

RFID Standards Organisations
ISO, GS1/EPC, ATA, AIAG, ANSI, CEPT, ECMA, ETSI, EN

Overview of ISO-Standards see links below…
http://www.rfid-handbook.de/about-rfid/standardization-of-rfid/30-iso-14443-status-2012.html

http://www.rfid-handbook.de/about-rfid/radio-regulation/32-uhf-regulation-outside-europe.html

Links to RFID Standards Organisations
EPC global   http://www.epcglobalinc.org/
GS1   http://www.gs1.org/gsmp/kc
ETSI   http://www.etsi.org/
ISO   http://www.iso.org

2.2 RFID – Swiss Law

Datenschutz und Informationssicherheit aus der Sicht des Datenschützers

Anzuwendende Gesetzesbestimmungen:

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

1

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- ➢ Datenschutzgesetz (DSG)
- ➢ Krankenversicherungsgesetz (KVG)
- ➢ Unfallversicherungsgesetz (UVG
- ➢ Bundesgesetz über die Invalidenversicherung (IVG)
- ➢ Bundesgesetz über die Alters- und Hinterlassenenversicherung (AHVG)
- ➢ Allg. Teil Sozialversicherungsgesetz (ATSG)
- ➢ Strafgesetzbuch (StGB)
- ➢ Zivilgesetzbuch (ZGB)
- ➢ Obligationenrecht (OR)

>3000

2.3 RFID – Swiss Politics

http://www.bag.admin.ch/themen/strahlung/00053/02644/04794/index.html?lang=fr

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
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Office fédéral de

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Maladies et médecine

Assurance-maladie

Denrées alimentaires et les objets usuels

Nutrition et activité physique

Alcool, tabac, drogues, Monitorage des addictions

Rayonnement, radioactivité et son

On en parle

Informations générales

Thérapie et diagnostic

Médecine nucléaire et recherche

Exposition au rayonnement dans un cadre professionnel

Formation en radioprotection

Substances radioactives

Radio

Rejets

Rado

Char
CEM

Page d'accueil > Thèmes > Rayonnement, radioa... > Champs électromagné... > Publications CEM > Nécessité d'action ...

version imprimable

Nécessité d'action en rapport avec la technologie RFID

Rapport élaboré en réponse au postulat Allemann 05.3053 du 9 mars 2005

Le Conseil fédéral a pris connaissance d'un rapport d'experts sur les problèmes liés à l'identification d'objets à distance par voie hertzienne (technologie RFID). Etabli en réponse à un postulat, ce rapport examine les risques liés au rayonnement, au traitement des déchets, à la protection des données et à celle des consommateurs. Il formule des recommandations permettant d'améliorer le cadre général pour une utilisation plus sûre de la technologie RFID.

Rapport

📄 Nécessité d'action en rapport avec la technologie RFID
Dernière modification: 25.06.2008 | Dimension: 558 kb | Typ: PDF

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Département fédéral de l'intérieur DFI
Office fédéral de la santé publique OFSP
Unité de direction Protection des consommateurs

Nécessité d'action en rapport avec la technologie RFID

Rapport élaboré en réponse au postulat Allemann 05.3053 du 9 mars 2005

Auteurs et participants
Office fédéral de la santé publique (OFSP) :
Mirjana Moser, Salome Ryf, Martin Meier, Andrea Nagel
Office fédéral de la communication (OFCOM) :
Rolf Burgherr, Mark Fitzpatrick, Ka Schuppisser, Damien Scherrer
Laboratoire fédéral d'essai des matériaux et de recherche (EMPA) : Lorenz Hilty
Fondation pour la protection des données et la sécurité de l'information : Beat Rudin
Bureau fédéral de la consommation (BFC) : Benno Maurer, Jean-Marc Vögele
Institut suisse des produits thérapeutiques (Swissmedic) : Daniel Reusser
Stiftung Risiko-Dialog : Jaqueline Lätsch
IT'IS Foundation : Niels Kuster, Sven Kühn
Ocha SàRL : David C. Gürlet
Préposé fédéral à la protection des données et à la transparence (PFPDT) : Urs Scherrer
TA-SWISS (Centre d'évaluation des choix technologiques) : Sergio Bellucci, Fulvio Caccia

Responsabilité
Office fédéral de la santé publique (OFSP) : Mirjana Moser

3. RTLS – Technologies

3. RTLS − Technologies
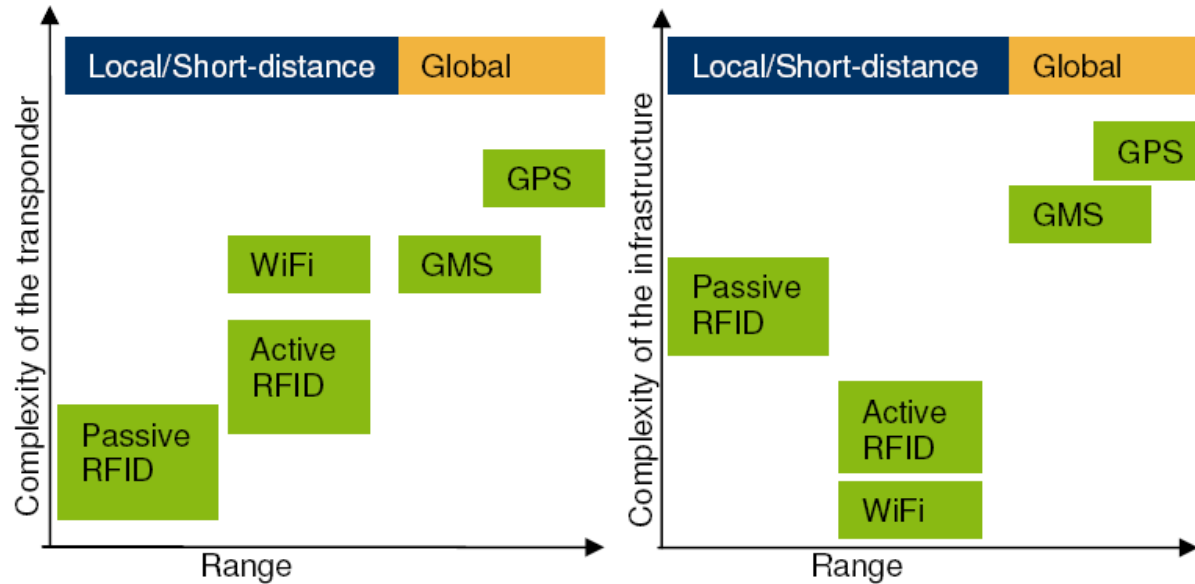
Complexity of the transponders/end devices

Infrastructure complexity

RTLS-Technologies:

1. **Active Tag Localisation**
2. **WLAN-based**
3. **UWB**
4. **e-INS**
5. **Passive Tag Localisation**
6. **Ultra-Sound**
7. **InfraRed**
8. **Combined Technologies**

RTLS is usually referring to indoor tracking or local positioning LPS (contrary to outdoor GPS)

4. RFID & RTLS Applications

Source: Victor Vega, RFID Solutions Marketing Director NXP Semiconductors, RFID Journal Live 2011

4.2 RTLS – Applications
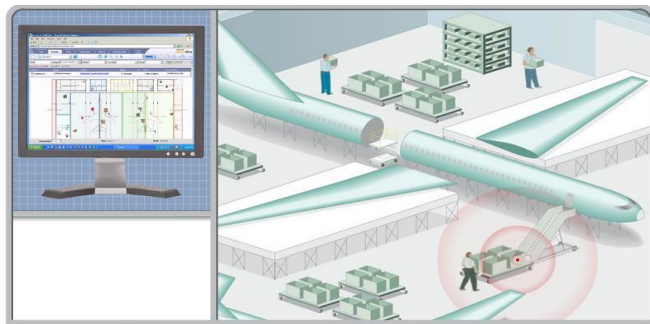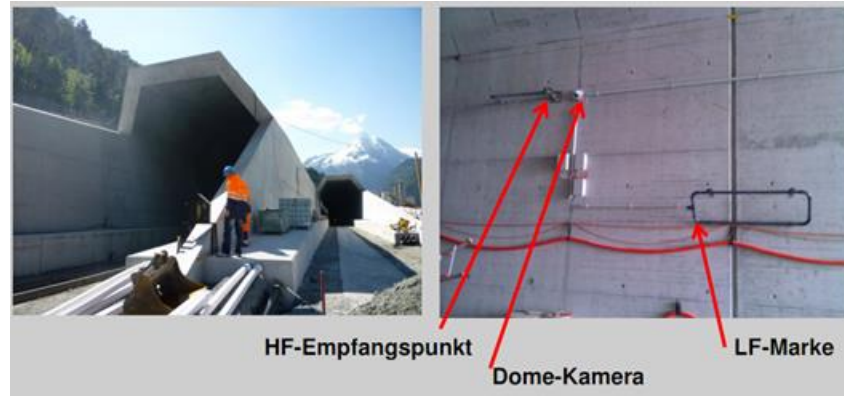
HF-Empfangspunkt   Dome-Kamera   LF-Marke

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4.3.1 Tunnel – Safety

HF-Empfangspunkt · Dome-Kamera · LF-Marke
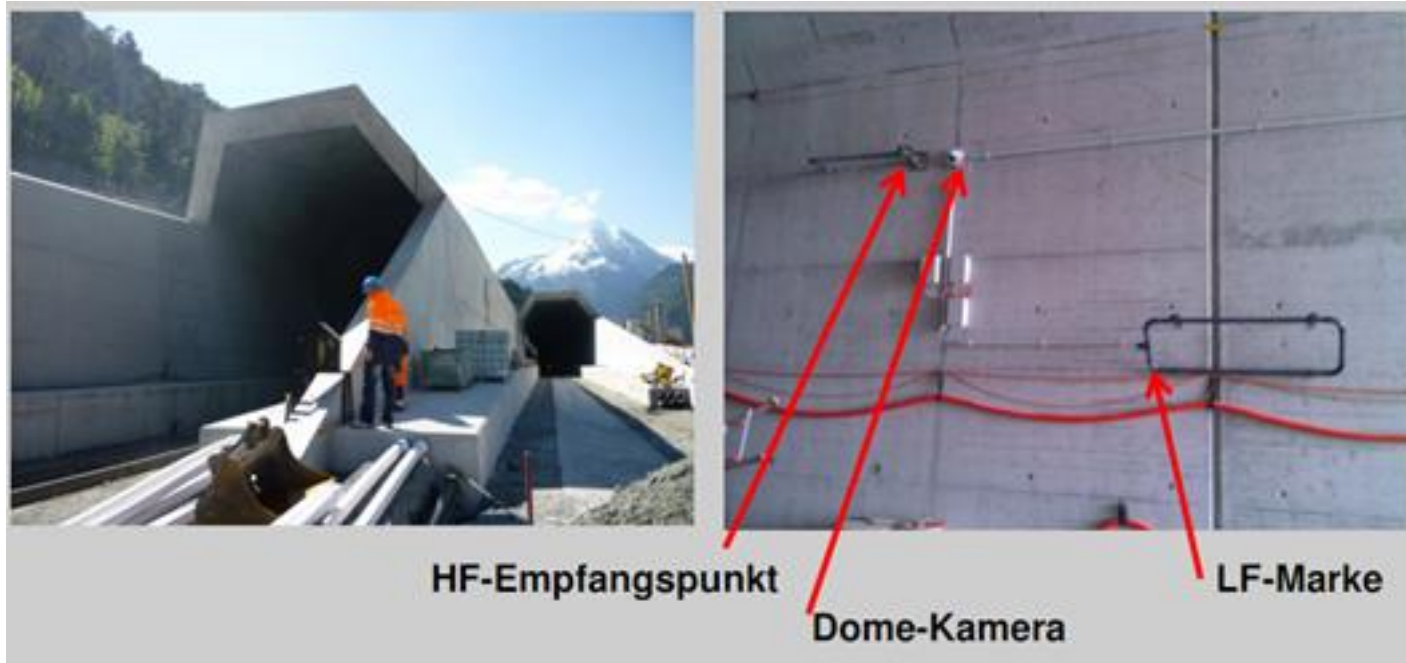
Source: Securiton AG

Workplace Safety in Tunnels

- **Permanent Monitoring of 1'000 Persons & Objects in Tunnels**
- **Mandown activated Tags & Dome Video Cameras**
- **Alarm with Position and personal Name of Worker**
- **Alarm Escalation to Pagers, GSM-SMS, Email,**
- **Events Database for legal & operational Proof**
- **Save Life's and Equipment !**

4.3.2 Tunnel – GBT (2x57km)

http://www.alptransit.ch/fr/medias/courts-metrages/projet-alptransit-gothard.html

http://www.youtube.com/watch?v=vgDQ4JCKG9l
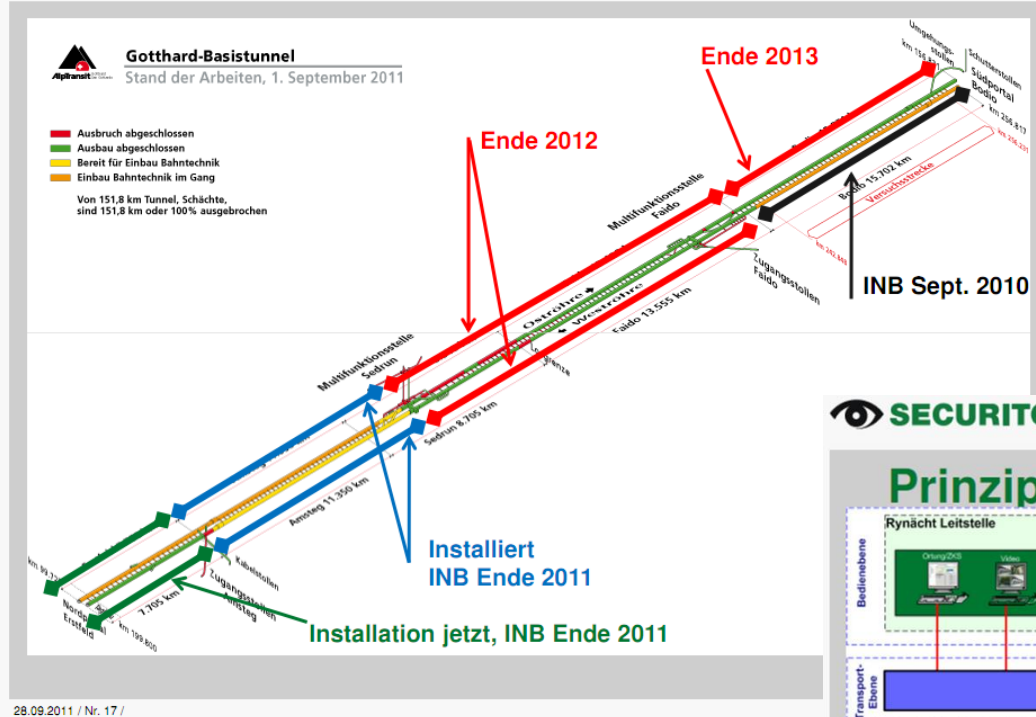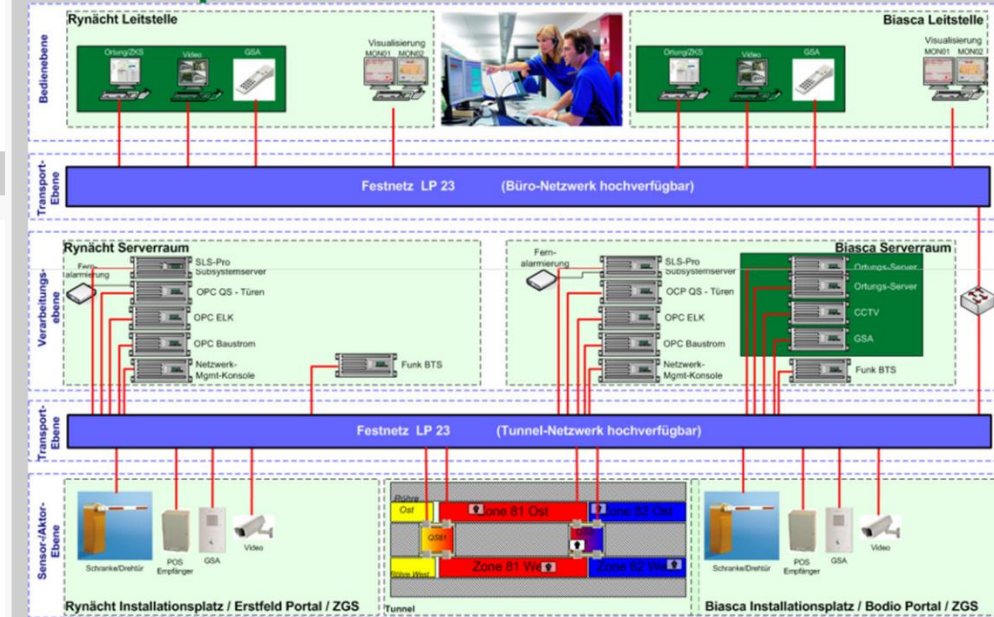
4.4 Healthcare Applications

Nachschubbefüllung im Spital / Heim / Klinik

4.5.1 Bed Management

- **Bed Management at Inselspital, Bern**

  - 45'000 Cleanings / Year
  - 1'600 Beds
  - 1'700 Mattresses
  - 3 Bed centrals
  - 4 stocks
  - ~15 bed types
  - Centralized bed management

  - → Video Tagesschau
  - → Video Process

4.5.2 Bed Management

- **Application field**
  - Hospital Beds
- **Facts**
  - Increasing number of bed cleanings a year
  - Increasing pressure on costs
- **Issue**
  - How to automatically identify beds?
  - How to reproduce the process in software?

- **Solution**
  - Put an active RFID chip on each hospital bed
  - Install readers in the bed centrals and stocks
  - Equip bed centrals with touchscreen terminals
  - Use Bed Management Application

Source: ER Systems SA

Videos →

4.5.3 Bed Management

A complex Process !
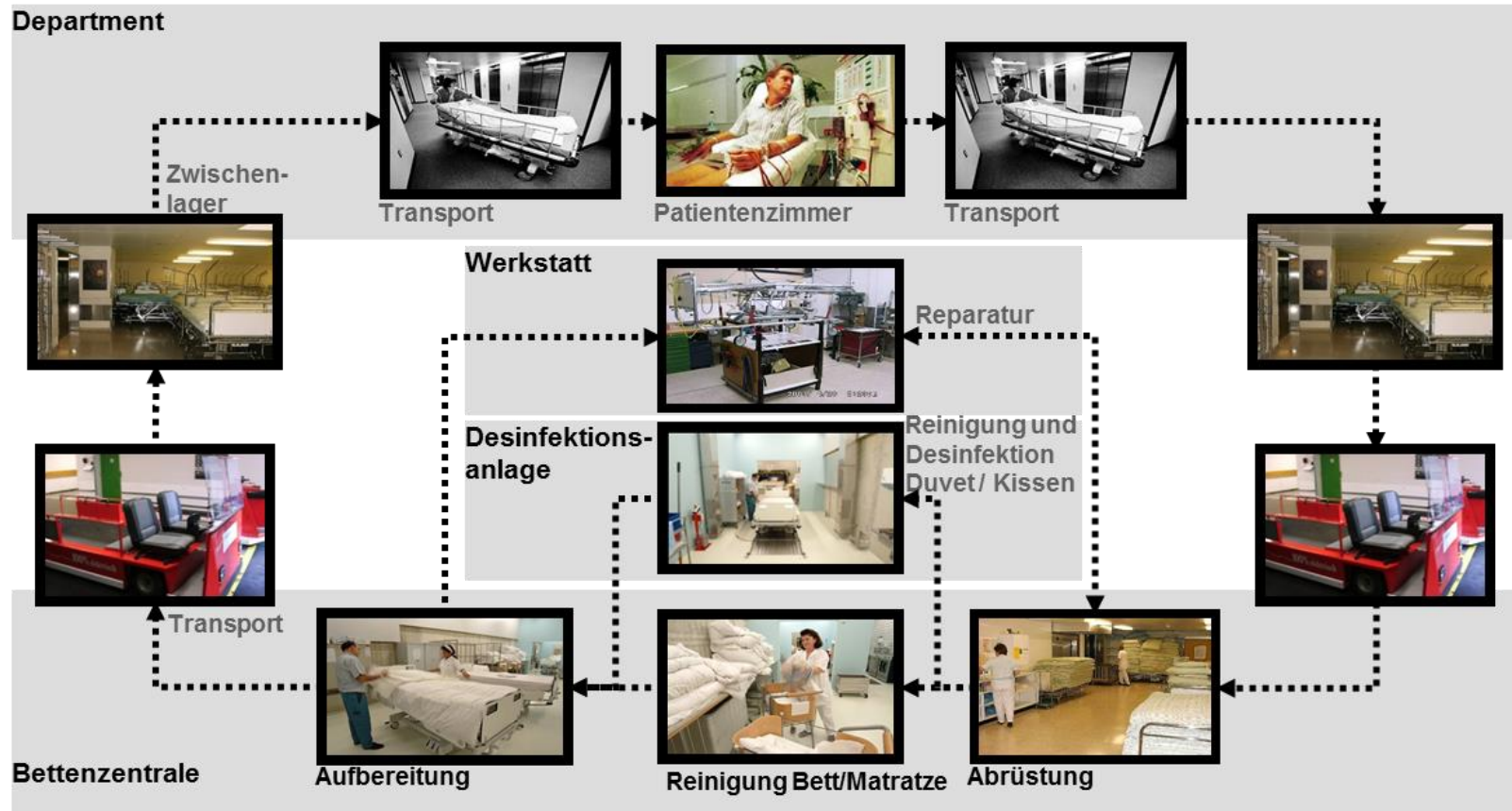
Source: pom+

4.5.4 Bed Management – Results

- **Experiences from Inselspital**

  - Less beds = less dead capital = -300 Beds x 5kCHF = -1.5 Mio
  - Less time needed for accounting and billing
  - Compliance with yearly security check regulations (STK)
  - 20-25% short cleanings, therefore faster process
  - Less cleaning products used → better for environment
  - No need for control rounds to count beds
  - Fully automatic detection, less errors
  - ROI of 200'000 CHF / year

Contact Europe

RFID Academia Europe

Gaichtstrasse 32

2512 Tüscherz-Alfermée

Switzerland

www.RFIDacademia.ch

Tel.   +41 32 323 99 66

Mobile   +41 79 250 22 90

Mail   **guerlet@RFIDacademia.ch**
              dgurlet@RFIDacademia.com

Contact Canada

RFID Academia

9942, chemin de la côté de Liesse

Montréal – QC, Canada H8T 1A1

www.RFIDacademia.com

Tel.   +1-514-631-8282 x 3221

Fax   +1-514-631-9696

Mail   **apalermo@RFIDacademia.com**

Thank you for your attention
Merci pour votre attention
Danke für Ihre Aufmerksamkeit

5. RFID − Future (2019)

5.1 Future of RFID

Leading countries 2009 – 2020

Here comes China
From the IDTechEx RFID Knowledgebase

Number of case studies

Country	Number of case studies
United States	1375
United Kingdom	397
China	303
Germany	224
Japan	190
France	170
Australia	118
Canada	101
Netherlands	93
Italy	87

Consulting – Publications – Conferences
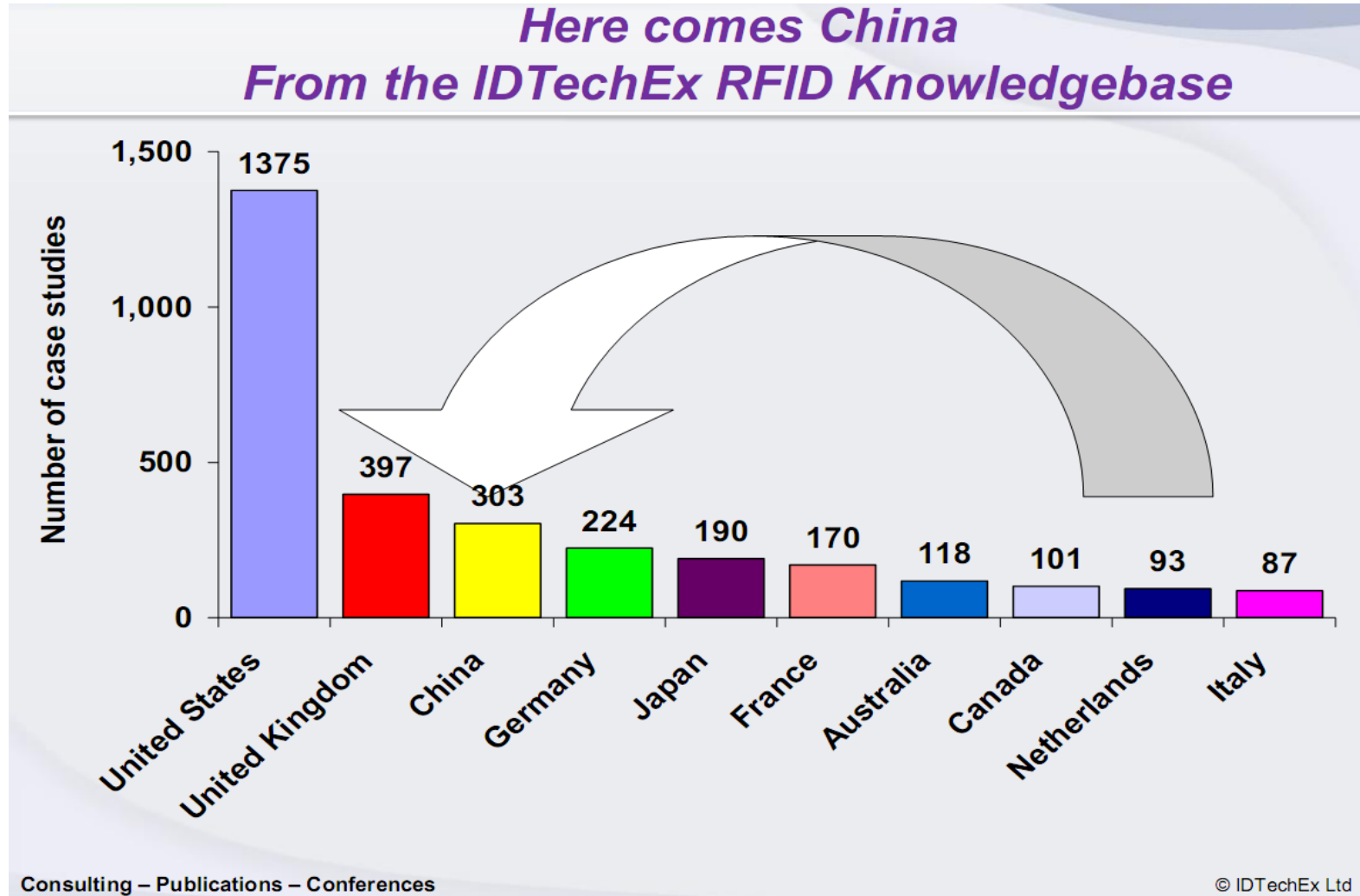
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5.2 Future of RFID

Total Market
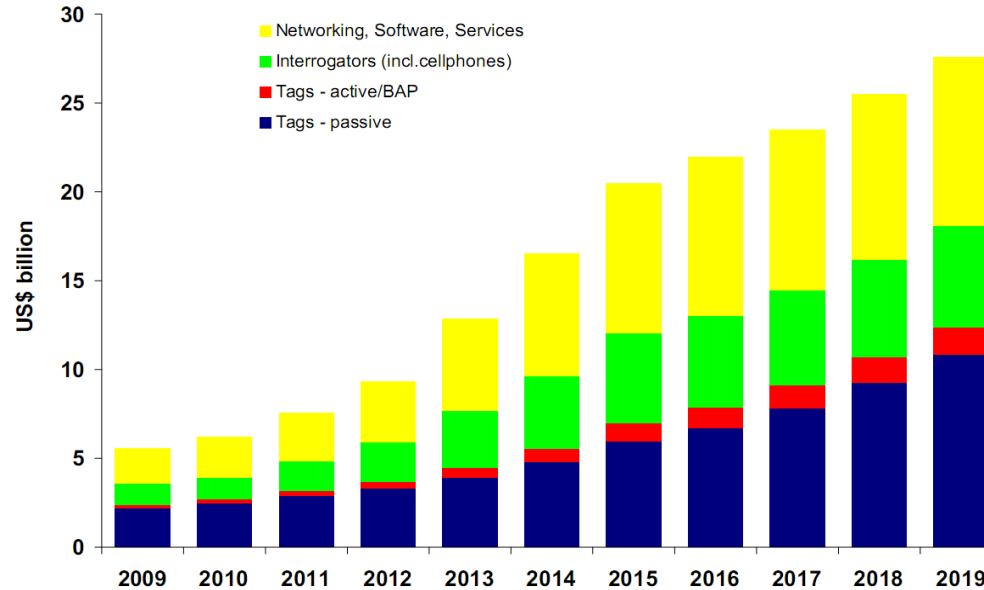
Source IDTechEx

Total market $ bn	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Tags - passive	2.18	2.49	2.88	3.31	3.90	4.81	5.98	6.72	7.83	9.27	10.81
Tags - active/BAP	0.21	0.22	0.28	0.37	0.57	0.75	0.99	1.16	1.26	1.43	1.57
Interrogators (incl. cellphones)	1.20	1.22	1.69	2.25	3.20	4.08	5.09	5.12	5.35	5.47	5.71
Networking, Software, Services	1.97	2.28	2.68	3.38	5.17	6.85	8.38	8.97	9.03	9.33	9.50
Total value $ bn	5.56	6.21	7.53	9.32	12.84	16.49	20.44	21.97	23.47	25.49	27.59

5.3 Future of RFID
of Tags / Application

Legend:
- Other tag applications
- Passport page/secure documents
- People (excluding other sectors)
- Vehicles
- Animals
- Conveyances/Rollcages/ULD/Totes
- Air baggage
- Smart tickets
- Smart cards/payment key fobs
- Retail CPG Pallet/case
- Military
- Archiving (documents/samples)
- Manufacturing parts, tools, assets
- Books
- Postal
- Tires
- Consumer goods
- Retail apparel
- Other Healthcare
- Drugs

Y-axis: Number million (0 to 800,000)
X-axis: 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019

Source IDTechEx

5.4 Future of RFID

Price per passive Tag

Legend:
- Drugs
- Consumer goods
- Books
- Military
- Smart tickets/ banknotes/ secure docs
- Animals
- Passport page
- Other Healthcare
- Tires
- Manufacturing parts, tools
- Retail CPG Pallet/case
- Air baggage
- Vehicles
- Other tag applications
- Retail apparel
- Postal
- Archiving (documents/samples)
- Smart cards/payment key fobs
- Conveyances/Other, Freight
- People (excluding other sectors)

Source IDTechEx

5.5 Future of RFID

Value of passive Tags

Legend (top to bottom):
- Excluded tag applications+
- Passport page
- People (excluding other sectors)
- Vehicles
- Animals
- Conveyances/Other, Freight
- Air baggage
- Smart tickets/ banknotes/ secure docs
- Smart cards/payment key fobs
- Retail CPG Pallet/case
- Military
- Archiving (documents/samples)
- Manufacturing parts, tools
- Books
- Postal
- Tires
- Consumer goods
- Retail apparel
- Other Healthcare
- Drugs

Y-axis: US$ million — 0, 2000, 4000, 6000, 8000, 10000, 12000

X-axis: 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019

Source IDTechEx

5.6 Future of RFID

Price per active Tag

Legend:
- Pharma/Healthcare
- Consumer goods
- Manufacturing parts, tools
- Military
- Shelf Edge Labels
- Vehicles
- Car clickers
- Cold retail supply chain
- Postal
- Archiving (samples)
- Retail CPG Pallet/case
- Conveyances/Rollcages/ULD/Totes
- People (excluding other sectors)
- Other tag applications

Y-axis: US Cents (0 – 4500)
X-axis: 2009 – 2019
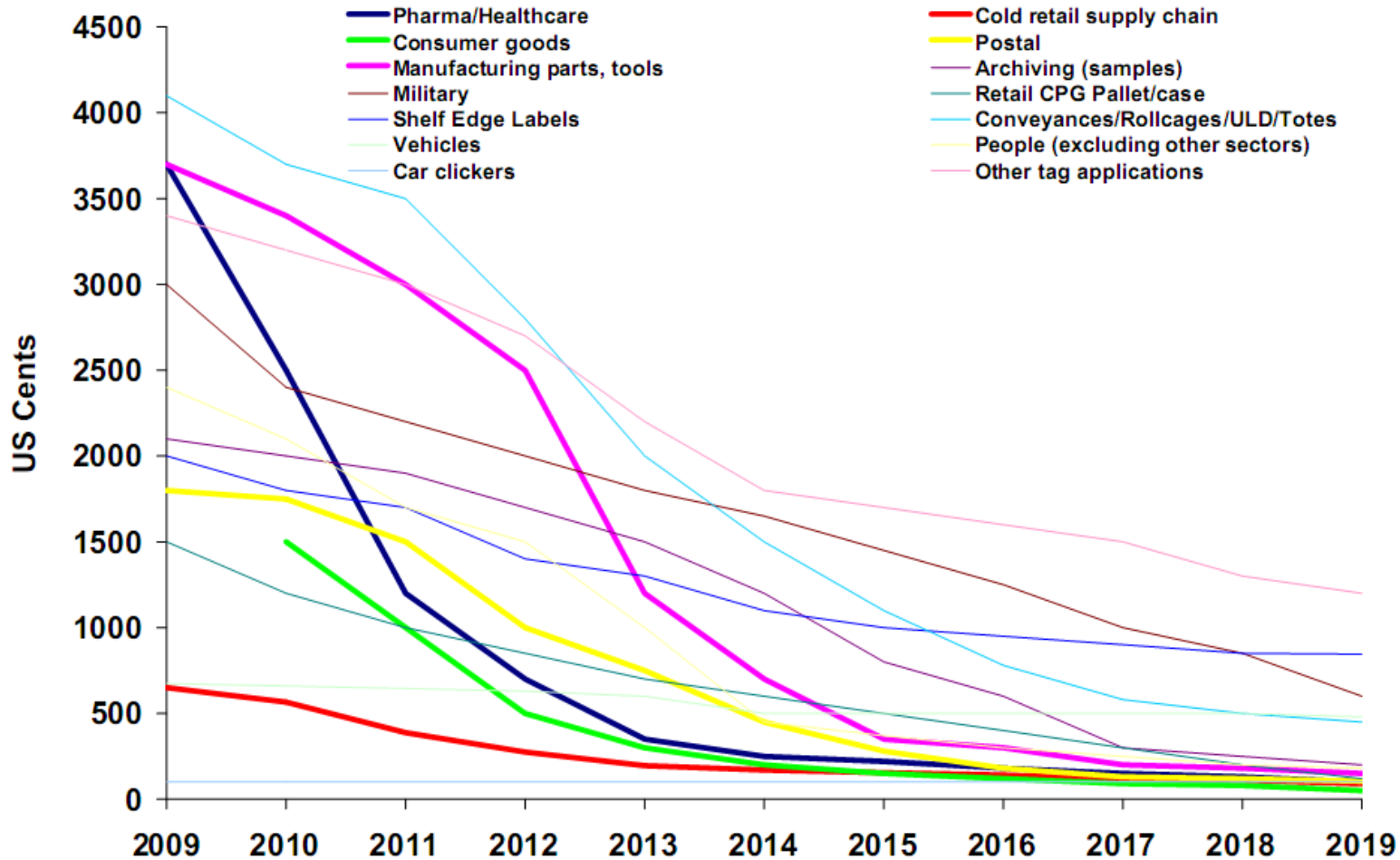
Source IDTechEx

5.7 Future of RFID

Value of active Tags

Chart legend (top to bottom):
- Other tag applications
- Car clickers
- People (excluding other sectors)
- Vehicles
- Conveyances/Rollcages/ULD/Totes
- Shelf Edge Labels
- Retail CPG Pallet/case
- Military
- Archiving (samples)
- Manufacturing parts, tools
- Postal
- Consumer goods
- Cold retail supply chain
- Pharma/Healthcare

Y-axis: Number million (0 to 900)

X-axis: 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019

Source IDTechEx

5.8 Future of RFID
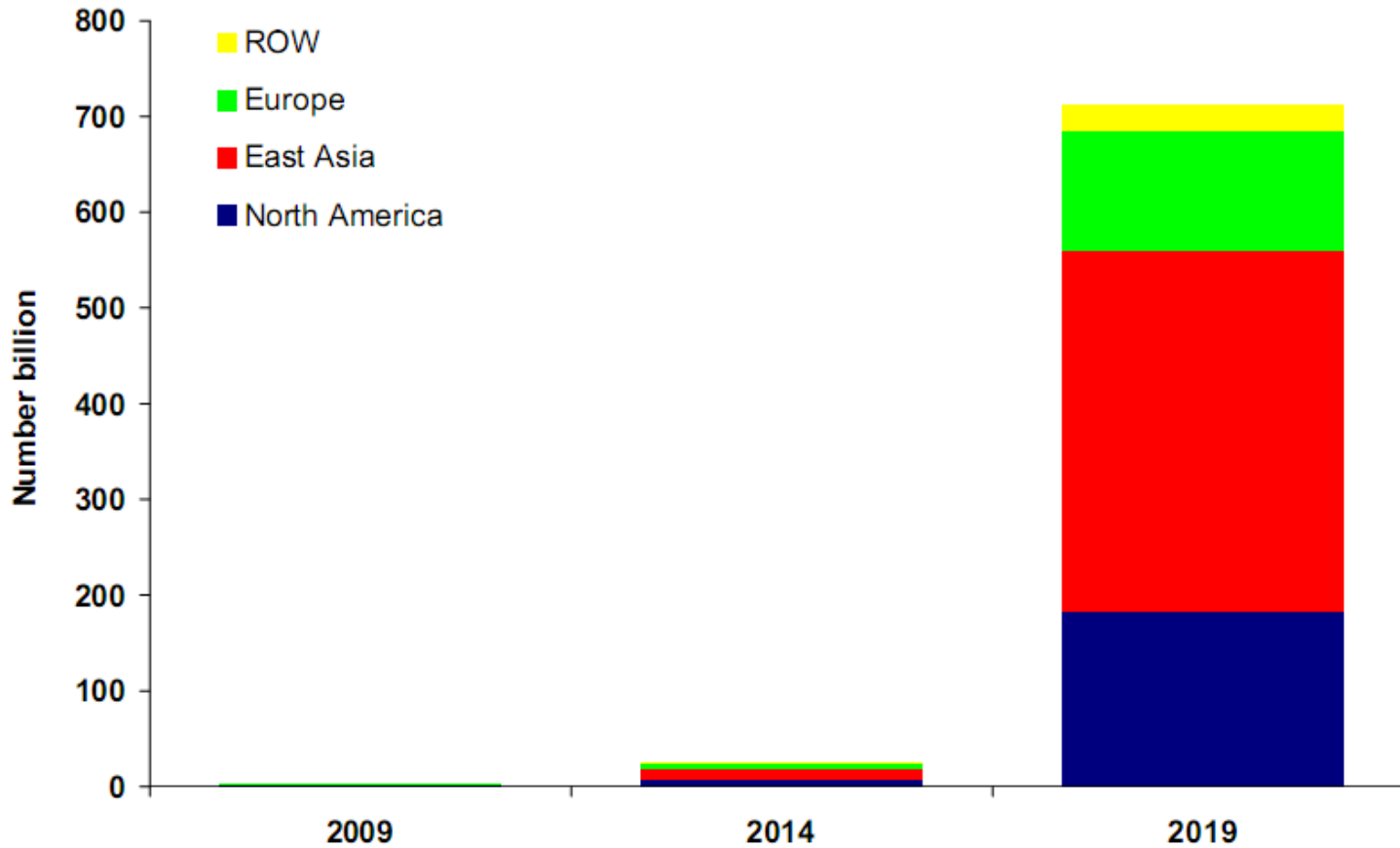
Number of Tags / Region

Source IDTechEx

6. RFID – Links

6.1.1 RFID – Organisations

Globale Links

RFID Journal .... **http://www.rfidjournal.com/**

GS1 global **http://www.gs1.org/**

NFC Forum global .... **http://www.nfc-forum.org/home/**

AIM Global …. **http://www.aim.org**

Canada Links

RFID Academia Canada .... **http://www.rfidacademia.com**

Swiss - Canadian Chamber of Commerce .... **http://www.canswiss.ch/**

RFID Szene Schweiz

RFIDacademia Europe …. **http://www.rfidacademia.ch**

SwissTnet …. **http://www.swisst.net**

SwissTnet / Sektion 51
http://www.swisst.net/cms/v1/index.php?option=com_dbquery&Itemid=42&task=ExecuteQuery&qid=5

GS1 Schweiz **http://gs1.ch/de/index.php**

Smartcard Forum Schweiz .... **http://www.smartcard-forum.ch/**

6.1.2 RFID – Organisations

RFID Szene International
RFID Journal .... **http://www.rfidjournal.com/**
Map of global RFID-Deployements .... **http://www.rfidjournalevents.com/map.php**
RFID Atlas (Übersicht RFID-Projekte) .... **http://www.rfidatlas.de/**
Discover RFID .... **http://www.discoverrfid.org/**
Database der RFID-Tags / Hersteller .... **http://www.veryfields.net/**

Europe
RFID-in-Europe (ex. RACE Projekt Europa) .... **http://www.rfidineurope.eu/**
Europe's Informations Society ….
http://ec.europa.eu/information_society/policy/rfid/index_en.htm

France
Centre National RFID (CNRFID) Français .... **http://www.centrenational-rfid.com/**

UK
RFID Competence Center UK .... **http://www.rfidc.com**

6.1.3 RFID – Organisations

Germany

RFID-Ready (Germany) .... **http://www.rfid-ready.de/**
RFID-im-Blick (Germany) .... **http://www.rfid-im-blick.de/**
GS1 Deutschland **http://www.gs1-germany.de**

RFID Handbuch (Finkenzeller) .... **http://rfid-handbook.de/download.html**
RFID Handbuch Forum / Blog .... **http://rfid-handbook.de/forum/index.php**

RFID Standards

EPC Global …. **http://www.gs1.org/epcglobal**

ISO .... **http://www.iso.org/**
CEN …. **http://www.cen.eu**
ETSI …. **www.etsi.org**

Database of major RFID standards worldwide …. **www.grifs-project.eu/db**

Overview of GS1-RFID-Standards ….
http://www.gs1.org/docs/epcglobal/UHF_Regulations.pdf

6.2 RFID – Portals

RFID Solutions Online: provides its readers with news and insight into RFID Solutions News and information .... **http://www.rfidsolutionsonline.com**

rfid-chips.net Wissenswertes rund um die Übertragung von Identifikationsmerkmalen via Funk (Radio Frequency IDentification / RFID) – einer Schlüsseltechnologie der Zukunft. rfid-chips.net ist ein redaktionelles Angebot der Kommunikationsagentur Schrader …. **http://www.rfid-chips.net**

Informationen für interessierte Verbraucher .... **http://www.rfidabc.de**
Fachinformationen rund um RFID .... **http://www.info-rfid.de**

RFID Ready …. **http://www.rfid-ready.de**
RFID Solutions Online …. **http://www.rfidsolutionsonline.com**
RFID-Exchange …. **www.rfidexchange.com**
RFID Gazette …. **www.rfidgazette.org**
RFID IDTechEx …. **www.idtechex.com**

6.3 RFID – Videos

1. EU RFID Future .... **http://www.youtube.com/watch?v=Zg1VKJUrxi4&feature=related**
2. METRO Future Store .... **http://www.youtube.com/watch?v=4Zj7txoDxbE&feature=related**
3. IBM Clipped Tag .... **http://www.youtube.com/watch?v=95VOxKp0s74&feature=related**
4. IBM Transport OFF Track .... **http://www.youtube.com/watch?v=oAvQcYcvyaw&NR=1**
5. IBM RFID Shopping .... **http://www.youtube.com/watch?v=_xNhL39uD7I&feature=related**
6. METRO Future Store .... **http://www.youtube.com/watch?v=gUcuqhduWao&feature=related**
7. ubisense Videos (BMW, Dementia Detector, Tennis Training, etc.) ....
   http://www.ubisense.net/en/resources/videos.html
8. Lufthansa Hamburg (Maintenance, Frankfurt Cargo)
   http://www.youtube.com/watch?v=HNte3k0pluY&feature=related
9. WaveMark Hospital Inventory
   http://www.youtube.com/watch?v=Nv4twfQ83cU&feature=related
10. Liberty Bed Management .... **http://www.youtube.com/watch?v=81QktaEwux8**
11. SFDRS Tagesschau Inselspital Bettenmanagement
    http://www.youtube.com/watch?v=nvlXp9xxkKY&feature=related
12. EKAHAU Active Site Survey WiFi
    http://www.youtube.com/watch?v=96RZJTESwZA&feature=related and Positioning Engine
    http://www.youtube.com/watch?v=5_pzXiOR1mw
13. ODIN IATA Baggage Tag (worst video) .... **http://www.youtube.com/watch?v=ojWipyCw-N0**
14. Aeroscout Asset Management @ Hospital Video
    http://www.aeroscout.com/flash/NewHC/start.html
15. Grosi Turbo-Shopping .... **http://www.youtube.com/watch?v=sDyqhcy1L-0**
16. Mojix and Sea-Logistics .... **http://www.youtube.com/watch?v=jHiyeQrqc0k&feature=relmfu**