

INSTRUMENT TRACEABILITY WITH RFID

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Lille CHRU:

70 hectares
more than 3000 beds
75 operating rooms
12000 employees



PHOTO: GEORGES WALARTIS

Our CSSD (70% of sterilisation activity)

- about 500 trays per day
- 47 employees
- 9 autoclaves
- 4 washer desinfectors
- 1 multichamber washer desinfector
- 1 wash cabin for trolleys and transport boxes



Project :

- one CSSD for the CHRU and 4 other hospitals of the neighbourhood: 50m³ / day including about 1000 trays
- expected opening 1/01/2010

Traceability management:

- Before 2006: with pens and paper!!
- **Need of a computer system for traceability and above all management production**

- Why:

- Traceability: obligatory in France
- Production management critical in such a large CSSD
- tray reconstituting without help of operating room nurses

- How:

- First step: tray traceability
- Second step: instrument traceability

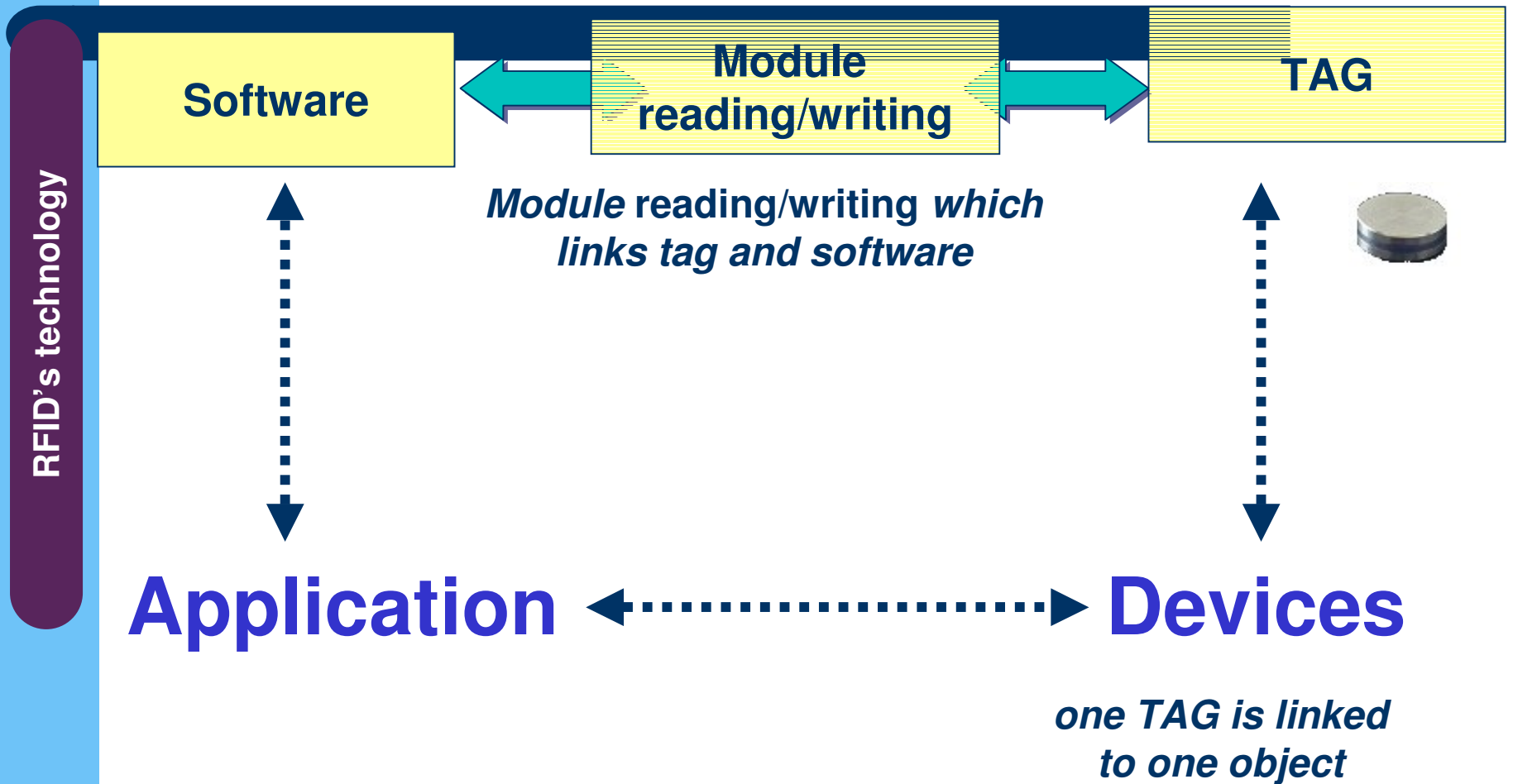
Tray traceability:

- Materials:
  - Software: SEDISTE® (SEDIA)
  - 28 computers without keyboard and mouse
  - Tray tag = RFID selected for easiness and speed of reading (low frequency 125KHz)
  - Readers RFID (pen)

RFID: what is it ???

- **Radio-frequency identification (RFID)** is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags.
- An RFID tag is an object that can be attached to or incorporated into a product, animal, or person for the purpose of identification using radio waves.
- Chip-based RFID tags contain silicon chips and antennas.
- Passive tags require no internal power source, whereas active tags require a power source.

How does it work???



Different types of RFID tag:

- Low-frequency :
  - LF: 125 - 134.2 kHz (reserved for animals) and 140 - 148.5 kHz
- High-frequency : HF: 13.56 MHz
- Some standards have been made regarding RFID technology especially ISO 18000





The tag is read at each step of the sterilisation process:

- Reading is easy: at about 10 cm
- Even on wet or dirty tag
- Tray name checkable by operator

Balance after 10 months:

- Completely positive
- Easy
- Quick
- Only one problem: reader with line
- We are waiting for without line readers

RFID is a success for trays

- Second step is to mark every instrument with a RFID tag

Interest of instrument traceability :

- Comply with French regulation regarding Health safety
- Improve global organisation regarding instruments :
  - In CSSD : facilitate trays reconstitution
  - In operating departments: best knowledge of instruments turnover and traceability of fixings and losses

Goals:

- To use the instruments tags only for the step of tray reconstitution.

Why RFID??

- RFID = selected because of :
    - the tag chip can store data (2Kbits) ability to read and write
    - Life time (similar to the instrument)
    - Same readers for instruments and trays
    - Reading speed: intense activity : losing time for the reading of the tag is inconceivable
    - as an innovative project it benefits from European aid grant.
    - Now providers of orthopedic equipments and implants are beginning to tag their MD with RFID
- ➡ For us the most fitted system

Issues??

- Lack of experience and studies in the field of sterilization
(in the other fields RFID is going to be the main way of tracing)
- Lack of producers interested
- Cost
- Find a RFID tag which can resist in sterilisation environment : high temperature, high pressure, ultra sonics, baths in detergent desinfectant oft repeated.....
- How put a RFID tag on each instrument??

First experimentation:

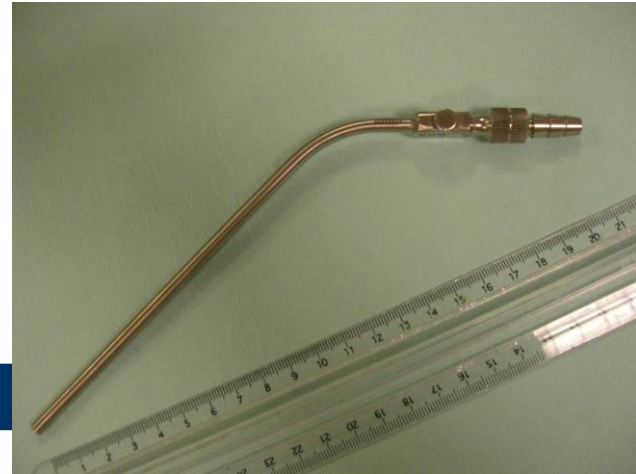


- The tag:
  - Metal tag manufactured by MBBS
  - The only one on market prescribed for instruments
  - The chip (and antenna) is in a watertight steel protector
  - $\varnothing$ 7.4 x 2.6 mm
  - Low frequency (125KHz)
- Have to be attached by sealing to instrument
- 2 trays completely tagged with 50 instruments each one

Need of Working on with users :

- To determine tag location on instrument
- marking management
- trays composition: keep out old and non often used instruments
- Don't forget to tag spare instruments in case of loose or during fixing....
- For the new instruments: producers are now quite ready to sale tagged instruments

Results



it works!!!

1. Put all the instruments of the tray on the table
2. Read all the tags : less than 1 minute for 50 instruments
3. The software informs the operator :
  - if a instrument is not a component of the tray
  - At the end if the tray is uncomplete (list of the missing instruments) or complete

Comparison of reconstitution times (averages) for a tray called “Tréphine” (brain surgery) composed of about 50 instruments (none of the instruments is missing)

	With instruction sheet (list + picture)	reading the RFID tags
Experienced CSSD agent	15 minutes	10 Minutes
New CSSD agent	25 minutes	10 Minutes
Operating nurse using the tray with the surgeon	15 minutes	10 Minutes

Benefits:

- Saving time:
  - for the reconstitution :30%
  - in learning reconstitution for new CSSD agents or new trays
- Saving cost:
  - Trays can be recomposed by less qualified people than operating nurses
- Better knowledge of instruments turnover leading to purchasing optimisation
- Quality improvement:
  - less errors in reconstitution

But.....

- Impossible to seal tags ourselves
- in manufactories (instruments producers)
- Chip size : too large for micro instruments
- it lasts 4 days between sending and getting back instruments
- Impossible to send all in one time
- Cost 6-7 euros for each instrument
- We have 2300 trays to tag....
- Conclusion : very difficult to manage in a large CSSD, but much easier in a little CSSD

New experimentations to lead:

- Ask chip producers to work with us to find a solution to attached the tag (or chip) ourselves in the CSSD.
- Idea = to stick
- Issue: glue is generally removed by ultrasonics
- Attempts with several types of glue (one or two components)



Results:

- Impossible to find a glue that resists to ultrasonics and sterilisation
-

Conclusion:

- Instrument Traceability with RFID tag : it works
- Advantages compared to datamatrix :
  - Life time (2500 cycles = about 10 years)
  - Storing data especially usefull for traceability of fixing and maintenance
  - Easiness of reading ➡➡ saving time
- RFID is THE main type of traceability for tomorrow in the field of sterilisation like it is THE main type of traceability in others fields like industry or large scale distribution

Conclusion:

- Encourage to lead attempts too
- Convinced that RFID is the good choice even if difficult to attach it on instruments
- New in the field of sterilization, but producers will be soon more interested if a lot of hospitals ask them
- It is important to initiate studies in the sterilisation field especially by providing financial data to give proof of the profitability and to encourage investment by other hospitals.

**Thank You for your attention/
Danke sehr für Ihre Aufmerksamkeit**

If you need more explanations or you want to
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