

## UNIVERSITY HOSPITALS OF LEICESTER NHS LIBRARIES

# Implementing RFID technology for circulation and security into an NHS Library: 2009

---

To: Richard Marriott, Education Infrastructure Advisor, EMHWD

cc: Julia Symons, Business Manager, Directorate of Clinical Education

All Library staff

From: Stuart Glover & Tanya McLaven

Date: June 2009

---

## 1. Introduction

Late in 2008 we had the opportunity to bid for non-recurrent funding to the East Midlands Healthcare Workforce Deanery (EMHWD) for the costs of implementing a Radio Frequency ID (RFID) solution for circulation control (self-issue and return), stock inventory and security in our libraries. We originally intended to use RFID just for circulation control and inventory, keeping our Electromagnetic (EM) security system intact. However, to avoid running two systems simultaneously, combining RFID tagging with EM tattle-taping, we added new RFID security gates to our quotes. By May 2009, we had successfully installed new self-issue terminals, security gates our entire book and audio-visual stock was tagged.

This report outlines the aims of our project, our experience of the tendering process and some of the complexities during the implementation and training phase. The intention of this report is to share our experience with other NHS libraries who may be thinking of similar implementations, identifying questions to ask of suppliers and things to be aware of.

### **1.1. Background**

UHL NHS Library service is based on two sites at the Trust. The two NHS libraries already had 24-hour access and a self issue terminal on each site using our electromagnetic (EM) security system linked to the Heritage Library Management system (LMS). These self-issue terminals were not particularly effective and had broken down on several occasions. Audiovisual stock could not be loaned using this system because of its limitations. Inadequate self-issues (requiring careful placement of the book spine whilst scanning the barcode in order to desensitise the EM tattle-tapes) triggered our alarms and were off-putting to users. Of 31000 book issues / renewals in 2007/08, only 1.8% (553) was done via these self issue terminals. Returns were not possible.

### **1.2. Benefits**

- Having an efficient and reliable issue and renewals system will be of benefit to all library users, especially those who can only come into the libraries when they aren't staffed. Our statistics show that the libraries are both well used out-of-hours.
- More reliable equipment will increase the percentage of self-issues and release staff time for staff development and other aspects of information support.
- The ability to carry out real-time stock-checking will improve collection management and the accuracy of our catalogue. It will also help to make the best use of the finite space for our collections.

## **2. Aims of our RFID project**

- a) To install RFID enabled self-issue terminals at each UHL NHS library site, more effectively managing stock circulation, especially out-of-hours
- b) To use RFID tagging for our security system
- c) To ensure that all existing book and audiovisual stock is tagged with ongoing tagging of journal issues and new stock as received
- d) To use hand-held RFID readers to conduct real-time stock-taking, finding of missing books etc
- e) To explore the benefits to library users and library staff of installing RFID technology

### **2.1. Estimated cost**

Cost estimates were based on a similar system recently installed at the University of Leicester Clinical Sciences Library, the third library supporting staff at UHL. Our original bid overestimated some potential costs but missed out on other essentials e.g. the cost of additional (SIP2) software for our library management system; the costs of tagging existing stock. Overall, the successful bid of just short of £60k was enough to cover everything and also allowed us to extend the project to include security gates at both libraries. Table 1 outlines the key cost elements for this project.

Table 1. Items included in costing for UHL RFID project

SIP2 (Standard Interchange Protocol, v2) software to link Heritage LMS to RFID self-issue terminals	
2 X issue and return unit + delivery and installation	[one per site]
4 X staff workstations for tagging / processing + delivery & installation	[two per site]
25000 Book & 5000 CD-ROM/DVD tags	
2 X sets of security gates for RFID detection [one per site]	
2 X handheld devices for stock checking	[one per site]
contingencies @ 5%	
Costs of tagging existing stock @ cost per item	
+ VAT @ 15%	

### 3. The tender process

Appendices A and B are the criteria for the tender process used and the evaluation of the tenders respectively. The latter is based on the tender criteria and were identified at the start of the process which was managed on our behalf by the Procurement Department at UHL.

Three potential suppliers were identified and we met with each of them to explore in more detail what was possible and what a solution for UHL libraries might look like. A formal tender document was then created and suppliers were invited to submit bids meeting the specified criteria.

These meetings were essential to our understanding of the technical aspects and the marketplace for RFID. For example, the need for tags compliant with current industry standards was identified so that we could use any tags to that standard and not be tied to a single supplier in the future.

Our Procurement department liaised directly with the suppliers and sent us the proposal documents when available. We used the evaluation tool in Appendix B to evaluate each supplier against our criteria. There was little variation in the values of the bids submitted. We had been assured that cost wouldn't be the only criteria considered but in the event it was the main criteria and we had to argue the case strongly for others, e.g. the design and ease of use of the inventory system, to be recognised. Having a scoring system helped us to identify these important factors and apply a value to them.

## 4. Technical issues

### 4.1. Software

The suppliers that we spoke to during the procurement process told us that we would need Standard Interchange Protocol, version 2 (SIP2) software in order for the self-issue machines to send and receive data from our Library Management System (Heritage).

We found out that SIP2 that is an additional module provided by IS Oxford (suppliers of Heritage). We also found that in addition to costing £1500, which hadn't been in our original project costings, we would need to upgrade Heritage to a more recent version in order for it to be installed.

During our investigations about upgrading Heritage, we found that we would also have to upgrade our version of Heritage Online (OPAC) to work with the newer version of Heritage. Fortunately we started work on this straight away. Having spoken to someone at IS Oxford and taken advice that the Heritage upgrade would need support from our IT department, we logged a call with the helpdesk. Delays in response to this request, despite it being chased up several times, illustrate the importance of having a dedicated IT contact for our library systems. Such upgrades are regular events and need input from someone in the organisational IT department with knowledge of our LMS.

Once the work had been approved by IT the Heritage upgrade could begin. The work was finally assigned to a technician who read the Heritage helpsheets and got to know the system. The upgrade was finally completed with the support of IS Oxford although a further complication was that while our main Heritage files are housed on a local network drive, the files for Heritage Online are hosted on IS Oxford's server so that the work had to be co-ordinated with both UHL IT and IS Oxford Technical Support.

Following the problems with the Heritage upgrade, we went straight into the installation of the SIP2 module. Following discussions with IS Oxford, we decided to do this ourselves as all it required was downloading 3 files onto the Heritage network drive. This part of the work was quite straightforward.

### 4.2. Hardware

Once the RFID hardware had been delivered, we had an agreed time for installation. It is a good idea to plan ahead. Such installations require co-operation from IT departments and, with hindsight, we did not give them enough information. We would recommend early discussions with one contact in IT to deal with the installation and it is very helpful if that person also knows about the Library Management System. Also do not assume it will be straightforward!

The supplier technician who came to install our system was used to working in academic libraries where there are usually library staff whose role it is to manage the library management systems, including server management. In our case, and possibly other NHS libraries, the management of the LMS server is done by our IT department. We don't have direct access or

administrator rights to the correct servers. In the NHS, with IT security as tight as it is, we found problems ensuring that there were people able to provide administration rights at the appropriate times for the software to be installed and for new PCs to be added to the Trust network.

There was also an added complication which was that the suppliers of PCs to our supplier sent the wrong specification computer for the order so that it could not run on the correct operating system for the Trust network. An alternative PC was supplied so installation could continue but this caused more delays in the process.

The final part of installation was the setting up of the hand-held scanner for inventory functions. Again there were technical problems with this because the SD card readers supplied were a new type. They use 3 network drive letters and the supplier technicians were not aware of this. It also caused problems because the letters selected were conflicting with existing UHL network drives.

The RFID technology does work. It is already bringing benefits to the library users and we are getting excellent feedback about it. However for any IT related installation in the future, we need to ensure that we gather as much information as possible well in advance and try to give it to a named contact person within our IT department who knows when the installation will be and is happy to assist, perhaps over a prolonged period.

## **5. Other issues**

### **5.1. Tagging**

Employing an external company to come into the libraries to tag all our existing book and audiovisual stock was a good decision. This was done quickly and efficiently on both sites, over two weeks, at a cost of 18p per item. To do this work ourselves would have been possible but would have taken much longer alongside the demands of the service, delaying the implementation of self-issue.

### **5.2. Journals**

#### **5.2.1. Tagging**

The cost of retrospectively tagging our journals archive collection was prohibitive, even though many titles are in bound volumes. The tags cost c.17p each plus tagging @ 18p per item. We made a pragmatic decision not to tag our journals archive, only tagging new journal stock as it comes into the library. This protects recent issues, those most likely to disappear. As we move towards electronic provision and electronic archives, this was felt to be the most cost-effective solution. We do have the option to tag journal volumes / issues that are deemed particularly vulnerable.

### **5.2.2. Linking to Heritage**

RFID requires that information about an item is in the tag, linked to Heritage. This is different to an EM system where the tattletape is independent of Heritage. For our book stock, the existing barcode links the RFID tag to the Heritage catalogue and circulation record for the item.

We never used barcodes when receiving our journal issues, so we now note the automatically generated 'U' number when receiving each journal issue. This number identifies the issue within the serials module of Heritage and can be used as an identifier in the tag.

### **5.3. Binding**

Another unforeseen consequence of RFID tagging was the impact on our journal binding policy. New issues each have a tag so to bind them would require all tags to be removed and the final volume to be given a single tag. This would be cumbersome and wasteful so we have taken the decision not to continue to bind our journals. As a large proportion of our journals stock is now online and we have rationalised our collection across two sites, space is not such an issue and this is a reasonable and cost-saving consequence.

### **5.4. Security gates**

Although in the tender document we sought supplier advice for any additional requirements for a complete solution and each supplier had visited our libraries, we did not specify that the security gates should link to our existing CCTV system, so that alarms triggered outside staffed hours could be investigated. This is essential for 24/7 monitoring and we expected it as standard. This was not the case. Additional work had to be done to make these technical links after installation. This could have been avoided if specified at the outset.

We are very happy with the system that we have purchased and it is functioning well. There is just one design flaw in the security gates that we have identified and fed back to the supplier. The security gate counter is positioned very low so that to be read we have to get down on our knees, with our head nearly on the floor. Even then the numbers are not particularly clear. This should be addressed by the supplier as a potential disability discrimination issue.

## **6. Library staff perspectives**

### **6.1. Self-issue**

Those who have had the training on the self issue machine with the supplier representative have found it comprehensive, covering all aspects including the management side of the system e.g. personalisation of messages, statistics. Because of the delays in implementation due to technical issues and that the majority of our staff work part time, the plan for training on operational aspects was more piecemeal than expected. We have formalised the training so that staff are confident with their level of knowledge of it.

## **6.2. Stock control**

The library site managers have received training with the inventory tool for stock control. The training has not been cascaded to the library teams at present as there are problems with Heritage data (classification numbers do not appear in sequence). This issue has yet to be resolved with Heritage.

## **6.3. Practical issues**

As mentioned above, the main practical issue from a library staff perspective is the positioning of the security gate footfall counter. The solution offered by the supplier was additional software, which is still in development, with costs running into thousands for networking the gate counter statistics. We are hoping that the installation engineer can come up with a solution that involves repositioning the counter higher up the gate.

## **6.4. Change management**

Concerns expressed by front-line staff are that self-issue will mean a loss of direct contact with library users and that their role is reduced. This is a valid concern, but we envisage that rather than contact being lost, the type of contact will change; from spending most of their time on the traditional issue and return of items to dealing with the varied enquiries, e.g. electronic resource issues, which are becoming more frequent. Reference enquiries are unlikely to reduce because of self-issue and there will be more time to develop skills in other aspects of library work e.g. information searching, current awareness services, marketing / display work. An expected increase in the availability of elearning at UHL will mean a greater role for library front-line staff in supporting users of our computer suites and accessing elearning. Once the inventory equipment is working effectively and training cascaded, there will be additional tasks related to stock management that will provide job satisfaction as well as a more effective service.

## **6.4. Personal Identification Numbers (PINs)**

Although not essential we decided to require the use of a library account PIN to be able to self-issue. Our front-line staff now provide a PIN on registration and encourage self-issue. PINs have been available for some time and allow users to manage their own accounts remotely through the web OPAC. Self-issue is likely to have the benefit of increasing user uptake of a PIN and they have more reasons to remember it!

## **7. Conclusion**

Revisiting the aims of this RFID project:

- a) To install RFID enabled self-issue terminals at each UHL NHS library site, more effectively managing stock circulation, especially out-of-hours

Anecdotally, it is already clear that users like and are using our new self-issue terminals. They can now return as well as issue items out of hours – ideal for night workers. Data at the end of our first year is likely to confirm an increase in the percentage of issues done in this way.

- b) To use RFID tagging for our security system

RFID has the potential to provide us with specific information about the items triggering the alarm system. An added benefit is that we no longer have an EM system and concerns about the affect of strong magnets at the issue desk on videos or users bank cards

- c) To ensure that all existing book and audiovisual stock is tagged with ongoing tagging of journal issues and new stock as received

This was achieved remarkably easily with the help of an external contractor – well worth it. We have changed our working practices slightly to accommodate the new system for ongoing receipts, but have not had to manage the capacity issues of trying to do this all ourselves.

- d) To use hand-held RFID readers to conduct real-time stock-taking, finding of missing books etc

To date this is still a work-in-progress due to some incompatibilities with Heritage data, but will be resolved. This has the potential to realise the greatest benefits for the library staff and the service.

- e) To explore the benefits to library users and library staff of installing RFID technology

The benefits for users, staff and stock management as outlined in section 1.2 will be evaluated in our Annual Report for 2010



## APPENDIX A

### Tender proposal

This tender document requests quotes for all equipment and associated costs for two options:

- A. Full RFID for security, circulation and inventory**
- B. RFID for circulation and inventory only, working in conjunction with our current Electromagnetic (EM) security system.**

This will include as a minimum some or all of the following:

- 1.1. The installation of RFID enabled self-issue terminals at each UHL NHS library site. Two required in total
- 1.2. The provision of two single isle gates, RFID or hybrid RFID/EM
- 1.3. The provision of two sets of 'tagging' equipment for staff use on each site. Four required in total
- 1.4. The provision of two hand-held RFID readers to conduct real-time stock-taking and inventory
- 1.5. The associated costs of delivery and installation
- 1.6. The costs of 25000 book and 5000 multimedia tags
- 1.7. The associated equipment, training and licensing
- 1.8. The cost of tagging our existing stock (approx 22000 items)

Supplier recommendations sought for additional equipment / software

### 2. Back ground

UHL NHS Library service is based on two sites at the Trust:

Education Centre Library  
Leicester General Hospital  
Gwendolen Rd  
Leicester LE5 4PW  
Tel: 0116 2588124

Education Centre Library  
Glenfield Hospital  
Grobby Rd  
Leicester LE3 9QP  
Tel: 0116 2592303

The two NHS libraries currently have 24-hour access and a self issue terminal on each site. This equipment uses scanned barcodes for issuing books to users and has an electromagnetic (EM) security system.

The library management system at UHL Libraries is Heritage from IS Oxford which uses the Standard Interchange Protocol, version 2 (SIP2) to provide a common language with self-issue machines. Any device that uses SIP2 over TCP/IP should be able to talk to the Heritage Self-service module.

The library collection is a 'steady state' collection of approximately 22,000 items which will need tagging, with approximately 2,000 new items added per year.

### **3. Requirements**

#### **3.1. Design**

##### **3.1.1. *Self-issue terminals***

Modern, stylish, attractive.

Customisable screen to meet our library branding needs

Ability to post messages to the screen

User-friendly & intuitive to use, requiring little extra user instruction.

Minimal peripheral equipment required.

Tolerance for capturing item information wide enough to accommodate users who do not position items exactly

Freestanding or mounted on high level desks for standing use (already in place)

If a hybrid system, able to read our current (Telepen) barcodes

##### **3.1.2. *Tagging terminals***

Size compatible with standard PC space requirement

Minimal peripheral equipment required

Intuitive to use

##### **3.1.3. *Hand-held RFID readers***

Lightweight

Minimal peripheral equipment required

Intuitive to use

#### **3.2. Performance**

##### **3.2.1. *Self-issue terminals***

Seamless integration with the Heritage library management system using SIP2

Will issue, return or renew items quickly and efficiently

Can cope with a combination of these functions for a single user in the same 'session'

Can do all of the above for books of all shapes and sizes

Can do all of the above for items in alternative formats e.g.

DVDs inside plastic cases, without the need to open or position the item in very specific ways

##### **3.2.2. *Tagging terminals***

Enables tagging of items quickly and efficiently

Seamless integration with the Heritage library management system using SIP2

Tags all formats with the same ease

Allows staff to return/renew items and desensitise them without user barcode

##### **3.2.3. *Hand-held RFID readers***

Able to capture item data from the shelf without the need to open books etc

Captures data from all items with a single 'pass' of the stock

Able to identify misplaced books

- Able to identify books that are out of sequence
- Able to identify un-discharged stock
- Other inventory reporting
- Able to carry out more than one task with a single 'pass' of the stock

### 3.3. **Costs**

- Competitive capital costs
- Competitive ongoing cost e.g. tags, maintenance, licensing
- Tags compliant with standard ISO 15693 (to be integrated into ISO 18000-3) – so that we could use any tags to that standard

## 4. **Outputs**

### 4.1. **Essentials**

#### **Delivery of all equipment to UHL site by 30<sup>th</sup> march 2009**

- Total solution within budget
- Installation of all equipment no later than two weeks following delivery
- Initial training sessions for staff on each site delivered within two weeks of installation
- Seamless integration with the Heritage library management system using SIP2
- Can cope with a combination of functions for a single user in the same 'session'
- Can do all circulation functions for books and other materials of all shapes and sizes without the need to open book or container
- Tagging equipment enables tagging quickly and efficiently for all formats
- Flexible and effective inventory software as per list
- Delivers a complete solution (full RFID or hybrid)
- Ongoing support / maintenance at reasonable cost

### 4.2. **Desirables**

- User-friendly & intuitive to use, requiring little extra user instruction
- Tolerance for capturing item information wide enough to accommodate users who do not position items exactly
- Minimal peripheral equipment required.
- Able to provide us with case studies / contacts from other NHS Libraries they have supplied

## APPENDIX B

### Tender evaluation criteria

Score 1 – 5 as follows and X3 for essential criteria and x2 for desirable

1 = unacceptable

2 = poor

3 = average

4 = good

5 = excellent

<b>Essential criteria Score x 3</b>			
Delivery of all equipment to UHL site by 30 <sup>th</sup> march 2009			
Total solution within budget			
Installation of all equipment no later than two weeks following delivery			
Initial training sessions for staff on each site delivered within two weeks of installation			
Seamless integration with the Heritage library management system using SIP2			
Attractive and ergonomically sound equipment			
Can cope with a combination of functions for a single user in the same 'session'			
Can do all circulation functions for books and other materials of all shapes and sizes without the need to open book or container			
Tagging equipment enables tagging quickly and efficiently for all formats			
Minimum number of processing tasks required e.g. passes of the hand held scanner			
Flexible, easy to use, lightweight and effective inventory equipment			
Delivers a complete solution (full RFID or hybrid)			
Ongoing support / maintenance at reasonable cost			
<b>Desirable Criteria Score x 2</b>			
User-friendly & intuitive to use, requiring little extra user instruction			
Screen customisable with the ability to post changeable messages for users			
Tolerance for capturing item information wide enough to accommodate users who do not position items exactly			
Minimal peripheral equipment required			
Able to provide us with case studies / contacts from other NHS Libraries they have supplied			
<b>TOTAL</b>			