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## TOP TECH TRENDS IN MATERIALS HANDLING

Lori Bowen Ayre  
Back in Circulation Conference  
October 15, 2012

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The evolution of materials handling technology in libraries

"In the beginning, Ranganathan created the ...."

MH trends are mostly evolutions of some of the materials handling technologies we've known and loved throughout the history of libraries.

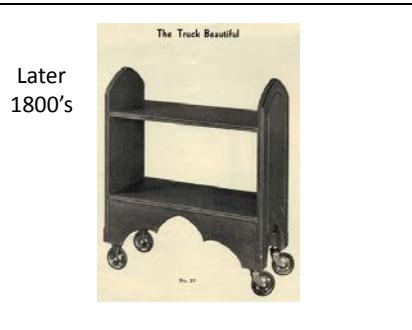
Take for example, the book cart.

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The bookcart has been around as long as libraries. Some of the earliest designs missed the mark but....

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when the “Truck Beautiful” came out. We had a winner.

Photo credit:

<http://libraryhistorybuff.blogspot.com/>

5



So perfect was its design, there were few variations on the “Truck Beautiful”

Photo source: <http://www.shopbrodart.com/>

6



Eventually metal replaced the wood.

Photo source:

<http://www.bookcasesgalore.com/>

7



The book drop bin has not changed much at all either ...

Photo source: <http://khcpl-building-feedback.blogspot.com/>

8



except the classic wood to metal transition.

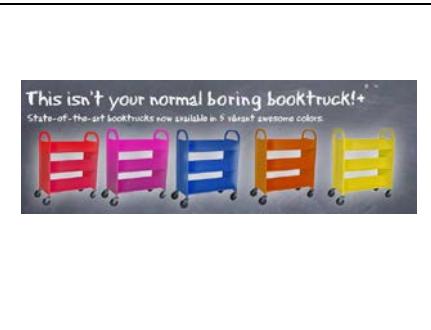
<http://www.kingsley.com/> book drop bin \$1899

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But back to the bookcart for a moment...the metal began painted metal

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And yet more new colors.

Bookcarts became so beloved by librarians that something strange started happening.

Photo source: <http://www.kingsley.com>

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Bookcart Drill Teams were formed.

This depressed our ability to innovate

Photo Source: American Library Association

URL:

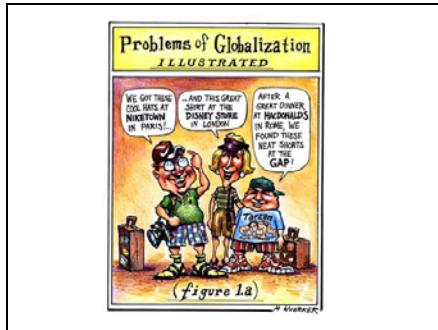
[http://www.flickr.com/photos/ala\\_members/2646368549/sizes/m/in/photostream/](http://www.flickr.com/photos/ala_members/2646368549/sizes/m/in/photostream/)

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We became fiercely protective of book carts

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Thankfully, the globalization of ...everything  
...brought bookcart innovation to the US

Some new variations started turning up.

Photo Source:

[http://comm439fa09.csulb.wikispaces.net/Globa\\_lization](http://comm439fa09.csulb.wikispaces.net/Globa_lization)

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For example the double sided, sloped book cart with snazzy patterned walls

And the skinny book cart! Definitely European, right?

<http://www.hertzfurniture.com/> - double sided sloped

<http://www.workalicious.org/> - skinny

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Other minor innovations followed...

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Even more innovative....the powered book cart and the “big wheel” (voted best in design in 2006 by Library Journal)

<http://www.libraryjournal.com/> - Big Wheel  
Best in recent design solutions 2006

<http://www.kingsley.com/> - Powered cart \$4999

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Powered bin \$8999

Another Kingsley.com photo

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Ergonomic book carts that work with sorters (but don't work for Drill Team)



Finally, something completely different....The Ergo Cart was introduced here in the US by FKI Logistex, now known as Lyngsoe.

As with the other innovations...from Europe (Denmark).

Lyngsoe makes state-of-the-art materials handling systems of which the Ergo Cart is one optional component.

The carts are battery operated so operators (shelvers....pages) can easily raise and lower the shelf.

This brings us to Trend #1

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Trend #1  
**AUTOMATED SORTERS FOR EVERYONE**

### **Trend #1: automated sorters becoming standard issue in libraries**

Old libraries are adding sorters  
New libraries are being build with very extensive sorters that convey items around rooms and up and down several floors.

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It began with larger libraries. But the reason it is a trend is because

Pictured here: Minneapolis Public

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sorters are available for smaller libraries to

in terms of volume and space and budget

This one can fit in a 10x10 foot space

Envisionware Whisper Sort

Quiet (< 55 db)

Barcode or RFID

Minimum workroom space required: 7'x7'  
(ideally 10x10)

Expandable up to 250 bins

Approximately \$50,000 with holds handling  
included (and printer)

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Sorters are really catching on because we cannot handle the volume that our bookdrops were designed to handle

Instead of dropping into one bin, you get 3 or more bins worth of holding space

Another reason: even with a three bin sorter, you get all the material separated AT LEAST into

**Return to shelves**

Media

Holds/Exceptions

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**Things to Know About Sorters**

1. Do NOT require RFID – can sort with barcode or RFID
2. Your available space is the only restriction for how many sorts you can have
3. Sorters can drop items into Ergo Carts, Smart Bins, trolleys, delivery totes, and more traditional bins.
4. They are quiet (generally)
5. No special power requirements

**Things to Know About Sorters**

- Do NOT require RFID – can sort with barcode or RFID
- Your available space is the only restriction for how many sorts you can have  
(adding two additional sort points is cheap  
e.g. 5-bin to 7-bin....add \$10,000)
- Sorters can drop items into Ergo Carts, Smart Bins, trolleys, delivery totes, and more traditional bins.
- They are quiet (generally)  
“Whisper Sort 55 decibels – quieter than a person talking on a cell phone”
- No special power requirements

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But how does this stuff get into the sorter?

Patron Induction – replacing that other tried and true technology....the return with book drop bin.

I'm talking about "automated check-in" which is Trend #2

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Trend #2  
**AUTOMATED CHECK-IN BECOMING STANDARD**

### **Trend #2: Automated Check-in Becoming Standard**

Automated check-in is where automated check-out was about 10 years ago.

People are used to self-service.

They prefer it.

And there's lots of benefits to it. Three biggies are...

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People don't like standing in line no matter how friendly the staff is (are?)



Reason 1: People don't like standing in line no matter how friendly the staff is.

Shocking but true.

Photo credit:

<http://karenknowsbest.com/category/returning-books/>

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People like getting items checked in immediately



Reason 2: People like getting items checked in immediately.

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People like getting receipts

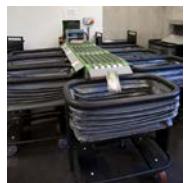


Reason 3: People like getting a receipt when they check-in items.

Verification that they've done their duty.

On to related Trend #3

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AMH System =  
Automated Check-in With Sorting

For simplicity, let's define AMH System as  
automated check-in with sorting

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Trend #3  
**AMH SYSTEMS ARE GETTING BETTER AND CHEAPER**

### **Trend #3: AMH Systems are Getting Better and Cheaper**

Nearly everyone can afford a sorter

Old libraries are adding sorters

New libraries are being built with very extensive sorters

- convey items around rooms and
- up and down several floors

Trend #3 is they are getting better and cheaper....let's talk about **cheaper first**

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### \$65,000 with Automated Check-in

- Equivalent to 1.5 FTE in work performed
- Space required: 8x10



Lyngsoe 3-bin

Approximately \$65,000

- Space required: 8x10
- Lots of discharge options: trolleys, totes (bins), book carts, your own book bins
- One pictured here (Lyngsoe) is “convertible.”
- The totes are on a shelf which can be dropped to make space for more trolleys (for high-volume return days)

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Lots of configuration possibilities even with small 3-bin



Cheaper and **Better**

- All three bin sorters pictured here
- All under \$100,000 (well under)
- including a self-check-in (or two)
- Very flexible in terms of dealing with tricky, small spaces

All three are Lyngsoe systems – a company particularly capable of dealing well with tricky spaces and building excellent products

Benefits of Self-Check-in  
with (at least) 3-bin Sort

1. Items checked in before patron enters library
2. Check-in eliminated from staff workflow
3. Separate ready-to-shelf returns
4. Separate media (protect them from damage)
5. Separate items needing staff (e.g. holds, exceptions)

**Benefits of Self Check-in with at least a  
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### Variations in Automated Check-ins

- Location (inside, outside, foyer)
- Access (restrictions, or not)
- Induction (one-at-a-time, or not)
- Patron interface (touch screen, or not)
- RFID (or not)

### Variations in Automated Check-ins

#### Locations

- outside wall (in place of or supplementing book drops)
- entry way for 24/7 access
- inside near service desks

#### Access

- no access door (dump)
- button to start process
- require library card to open door or scan library item

#### Feeding

- one-at-a-time (read each bar code or RFID tag) and decide to accept or reject, verify check-in
- dump 'em in (RFID only), may end up getting more than you bargained for, faster

#### Interface

- touch screen with instructions, verify success along the way
- lights (dump now, wait)

#### RFID or bar code or both

- can have bar code reader on top and bottom

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### External Check-ins

What to look for:

- Can you see the screen?
- Access door (UL listed?)
- Ease of use
- Touch screen
- Clear instructions
- Work for your climate?



### External Check-in

Pictured here:

#### Library Mate 2000

- exterior use
- lighted!
- touch screen
- rejects items
- access door

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### Internal Check-ins



### Internal Check-in

Full service (Lyngsoe on left) versus bare-minimum (Kingsley on right)

#### Lyngsoe LibraryMate® 500 (LM500)

- entry-level
- wall-mounted
- internal
- 1,000 library items per hour
- does not reject items
- no receipt functionality
- multiple languages
- barcode and RFID

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Standard Configurations Can Bring the Prices Down



3M FX Model around \$100,000

Cheaper – why?

3M Post-it Note strategy - make something well, standardize and sell a bunch of the exact same thing

3M FX Model - Expandable

- 3M FX 5 Bin Base Model is \$77k
- 3M FX 7 Bin Base Model is \$100k
- staff induction - add \$31k
- Includes installation and a one year warranty.

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Bibliotheca Smart Sort - 7-bin



Don't reinvent the wheel. Trion AG (big sorter company in UK) purchased by Bibliotheca.

Example of a 7-bin sorter from the new Bibliotheca acquisition

\$100,000 range

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**3M Intelligent Return Plus**

- Barcode or RFID
- No touch screen
- \$40,000



UL-Certified  
3M Intelligent Return Plus

Ability to deliver 3-bin sorter and automated check-in for under \$50,000 (cheaper than an employee)

These “budget” sorters don’t include all the self-check-in features mentioned earlier.

For example, they keep the cost down by eliminating the touch screen (extra \$14,000)

3M Intelligent Return (not expandable)

- Cost: \$40,000 including installation and one year warranty, indoor, push button activation (no touch screen)
- EM Re-sensitizing +\$6K
- Outdoor + \$3K
- Touch screen \$14-\$18K (indoor-outdoor)

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**Bibliotheca SmartSort 200**

- No touch screen
- No receipt
- No reject option
- Inside and outside models
- Pricing: \$30K range with 3-bin sorter
- Max of 5 bins



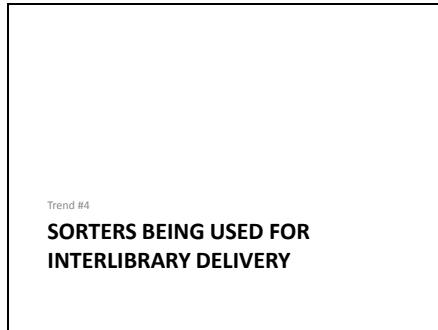
Another budget model, super low-entry level 3-bin from Bibliotheca

SmartSort 200

- No touch screen
- No receipt
- No reject option
- Inside and outside models
- Pricing: \$30K range with 3-bin sorter

There's another application for sorters that don't directly involve patrons....Trend #4

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Trend #4

**SORTERS BEING USED FOR  
INTERLIBRARY DELIVERY**

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**Trend #4: Sorters being used for  
interlibrary delivery**

Interlibrary delivery – almost always sort to “totes”

**Sorting to Delivery Totes**

Cincinnati

Can sort to delivery totes or big bins (trolleys).

It even supports sorting to one side of the tote or the other.

See the drop-down shelf.

Interlibrary sorters can get quite large....

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This is a decent sized interlibrary delivery sorter in Las Vegas.

By Envisionware, not mentioned yet.  
Actually sorter is by P.V. Supa (Finnish)  
but resold by Envisionware.

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New York Public Library 132-bin Sorter



- One of the largest in the country is NYPL
- Located in Queens
- Barcode, not RFID
- two-thirds the size of a football field!
- one seven hour shift with the sorter can do an amount of work that used to take two days with three times the staff.
- 24 hour turnaround for all returns and branch requests from service building
- 132 bins

Photo:

<http://www.geekosystem.com/new-york-public-library-sorting-machine/>

King County 150-bin Sorter



The biggest one in the country: King County Library System in Washington state.

- 150 sort destinations with room for 50 more
- Sort 54,000 items a day
- Bar code based: sort via SIP2 connection to ILS

Both NYPL and King County are Lyngsoe.....obviously a big player in the library materials handling market.

I've also mentioned Biblioteca, 3M, and Envisionware. I will talk about Tech-Logic soon and mkSorting....but let's talk about Trend #5

#### **SORT TO LIGHT**

- Manual sorting
- Lights indicate where item goes
- Increases accuracy

**"Label-less Library Logistics...."**

#### **SORT TO LIGHT**

Not a trend but worth knowing about – another solution to the high interlibrary delivery volume libraries are facing

Trend #5

**AMH VENDOR MARKETPLACE  
CONSOLIDATING**

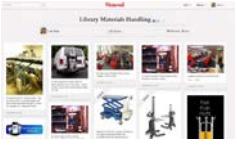
#### **Trend #5 AMH Vendor Marketplace is Consolidating**

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AMH Vendors

- 3M
- Bibliotheca
- Envisionware
- Lyngsoe
- mkSorting
- D-Tech
- Tech-Logic

Watch <http://pinterest.com/loriavre/library-materials-handling/> for new product developments



1. Lyngsoe
2. Bibliotheca
3. 3M
4. Envisionware
5. Tech-Logic
6. mkSorting – kiosks
7. Dtech- new kid from Europe.

Haven't talked about D-Tech, new player, wait and see

Tech-Logic – haven't mentioned because they don't have small systems.

Tend to be custom built and are kinda beefy. But have some unique elements....

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Tech-Logic  
"Serving US  
Libraries Since  
1992"



### Tech-Logic

Big bins that can dump material onto a conveyor and get it sorted (deshingler)

option for minimal staff handling of interlibrary delivery by transporting this "smart bins"

Tech-Logic is the only company that **fine sorts....**

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### Tech-Logic "Book Placer" System



### Tech Logic "Book Placer" System

Seattle Public – you may have seen the video.

Not doing that anymore because it was too slow for their volume.

Stick with Tech-Logic and talk about Trend #6...more self check devices.

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### Trend #6 MORE SELF CHECK DEVICES

### Trend #6: More Ways to do Self Service

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### Tech-Logic MyMobileLibrary



- Mobile self-check-out application
- Uses Boopsie
- Check-out with smartphone
- Requires security kiosk to turn off security

### Tech Logic MyMobileLibrary: App, Powered by Boopsie (Debuted in New Orleans)

- mobile self check-out application
- scan barcode with smartphone's camera to check out
- Works with MyMobileLibrary: Security Kiosk place items on kiosk shelf and the items' RFID theft bits are automatically deactivated if the items have been properly checked out
- Can also manage their library account
- Compatible with Android, BlackBerry, iPhone, and Windows Mobile.

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### Bibliotheca SmartDispenser 200

- Formerly ITG DiscXpress
- 500 discs per tower



Another kind of self-service: Disc dispensers

#### Formerly ITG DiscXpress

- 500 discs per tower
- inside are five carousels containing 125 items each
- Handles multipart sets nicely (up to 5 discs at a time)

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### Expandable to Six Towers



Kiosk + one tower \$13,500

Each tower another \$5,000

\$13,500 500 discs \$27/disc

\$18,500 1000 discs \$18/disc

\$23,500 1500 discs \$16/disc

\$28,500 2000 discs \$14/disc

San Bernardino has one.

Related to these self-service dispensers are kiosks which I'll call Trend #7

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Trend #7

### KIOSKS FILLING A NICHE...BUT EVOLVING

#### Trend #7 Kiosks Filling a Niche

Lots of them seem to be going in

They do fill a niche (cheaper than a library, subway stations, etc)

But, still working out the kinks

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**mk LibDispenser**

- Holds 500 books
- Can have one or two screens
- Can access OPAC



Mk LibDispenser (Milbrae) \$160,000 plus install which can be significant  
Capacity: 500 books

Two models: one or two screens

- Two screens allow a person to browse while another person returns or picks-up items
- Can be more confusing...
- OPAC access (optional)

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**Evanced BranchAnywhere**

- 220 books or 500 CD/DVDs
- 24/7
- RFID required
- Walk-up service only
- Returns are re-shelved



\$140,000

- 1<sup>st</sup> customer went live 1/26/12 (and they're happy!)
- 220 books or 500 CD/DVDs
- 24/7
- RFID required
- Walk-up service only

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**Bokomaten**

- Holds 400 items
- Contra Costa's Library-a-Go-Go



\$140,000

1<sup>st</sup> install: Pittsburg Point BART Library-A-Go-Go

- Targeting > 20 miles from a library outlet and commuters
- Very popular
- Hasn't been easy going: lots of fiddling required (thanks Contra Costa!)
- Signing up lots of new patrons

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### Envisionware 24-Hour Library

- Holds 400 items
- Can dispense holds, check out items found in kiosk, take any returns.
- Doesn't refill itself...



Another Envisionware product...like sorters which were from PV Supa, this product is from a Chinese company but now resold by Envisionware

Claim to fame: simpler but not cheaper

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### Brodart Lending Library

- Doesn't accept returns
- Staff must handle check-in and restocking



Slightly different from "kiosks" are the candy machine style...see something you like? You can get it.

\$20,000

Connect to ILS (or not)

- If not, batch updates to ILS required

Don't accept returns so labor intensive  
But they're a hit!

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### Tech Logic Media Surfer



- For lending iPads pre-configured with content
- System resets each iPad to library settings upon return so customers can use them as they wish

### Brand new product from Tech Logic: MediaSurfer

- libraries manage content and configuration
- patrons can also download whatever they wish during their use of the device
- Upon return, system wipes all activity and downloads and restores the device to the default (library) configuration
- Credit card swipe is optional

Let's talk about RFID for a moment and Trend #8

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### Trend #8: New Products/Services from RFID

RFID isn't now used this way but it has the potential to change a lot of our workflows

Some of the products above only work with RFID (e.g. the kiosks) but there are other opportunities you haven't seen yet.

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#### "RFID Tunnel"

- Used in UK, but not here (yet).
- Put your box of stuff from B&T in the tunnel and everything inside gets checked in. (up to 50 items)
- \$11K

From Bibliotheca

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#### Another new thing from Bibliotheca – SmartStock 600

- Fits onto existing library shelves
- Includes antenna every foot plus reader at the end of the section
- Connected to ILS via LAN
- Powered by Ethernet
- Pricing may change but now approximately \$250 per 3' section

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### Ability to Perform More Functions Without ILS Connectivity

- Interlibrary sorting based on “next location” field on RFID tag
- Capture ILL transaction info directly from tag
- Track multi-part sets
- Security works between different library systems

Also see Label-Less Library Logistics: Implementing Labor-Saving Practices in Massachusetts’ High-Volume Resource Sharing System Available from <http://bit.ly/vFYDQM>

Other items for RFID... reasons for new opportunities with RFID are the newly adopted standards

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### RFID Innovation Relies Upon Standards Compliance

- What standard?
  - ISO 28560-2
  - Adopted by NISO March, 2012
- Why it matters
  - Do more with RFID tags
  - RFID Interoperability
- More info in RFID available at <http://galecia.com/content/rfid>



- What’s New
  - ISO 28560-2 US Data Profile
- Why it matters
  - Do more with RFID tags
  - RFID Interoperability!

<http://galecia.com/presentations/>

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### More Info

- More AMH information available at <http://galecia.com/content/automated-materials-handling>
- Check out some AMH videos at <http://bit.ly/R6tW7i>

More info on AMH on my website

Also see some fun AMH videos

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## QUESTIONS?

Feel free to contact me at  
[lori.ayre@galecia.com](mailto:lori.ayre@galecia.com)  
(707) 763-6869

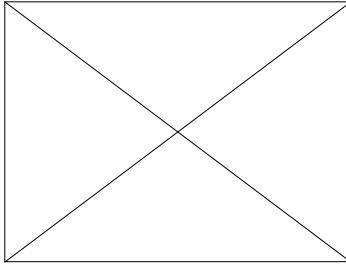


Feel free to contact me:  
[lori.ayre@galecia.com](mailto:lori.ayre@galecia.com), (707) 763-6869  
<http://galecia.com>

Check out some related videos at  
<http://www.youtube.com/user/loriayre/featured>

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San Francisco Public Library



San Francisco Public Library Book  
Return  
<http://www.youtube.com/watch?v=Q2TklIULYpJs>