New Technologies for Managing Cotton Modules

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New Seed Cotton Handling and Storage Technology

• New harvesters which form cotton modules onboard have revolutionized the storage and handling of cotton after harvest. RFID tags imbedded in plastic module wrap used on cylindrical or “round” modules contain a serial number unique to each module.

• The use of RFID technology to identify cotton modules has enabled new methods for tracking and managing seed cotton from the field to the gin.
  • Asset tracking
  • Logistical management
  • Product traceability
  • Precision Agriculture

RFID Tags
4x per module
A database of information generated on the harvester for each round module formed.

Data can be downloaded to a USB drive by the operator or wirelessly uploaded to MyJohnDeere.com

Data can be manually retrieved from MyJohnDeere.com or through the use of the John Deere API.

New in MY 2017

- Module Weight
- Seed Cotton Moisture Content
How Do We Maximize Value in the New Module ID System?

• Systems are needed that incorporate module information from the harvester and other scanning locations between the field and module feeder.
  • Bread crumb trail of module location from formation to ginning

• RFID Module Management System Tasks
  • Compile harvest information in database using module SN as the primary key
  • Compile GPS position and time/date data for each time the RFID tag is scanned
    • Harvester – in the field
    • Hand Held Scanner – modules staged in the field for transport
    • Module Truck – loading in the field/unloading at gin yard
    • Yard Truck – loading in the gin yard/unloading at feeder
  • Assign gin “load number” to a group of modules and record associated load weight
  • Produce reports which list the modules and GPS locations for:
    • Modules Harvested
    • Modules ready for transport
    • Modules delivered to gin yard
    • Gin yard inventory
    • Gin Orders – Modules to be Ginned
    • Modules ginned
Electronic Module Management System

Handheld RFID scanner with tablet/phone app. for logging and wireless communication

Scanning staged modules in the field or on the gin yard

Module Truck automated RFID scanning system with wireless communication

Modules scanned during loading in field and unloading at the gin yard

Data on MyJohnDeere.com automatically retrieved over internet by gin using API

Initial harvester scan of RFID tag and association with other data collected by harvester. Wireless transmission to MyJohnDeere.com.

Gin Office
Main Module Management Software

User Reports
Objective of this Work

• Develop a mobile application for use in scanning RFID or 1D/2D module tags and associating GPS position, scan time, and cotton ownership information
  • Can be used after modules are dropped by the harvester or after staging
    • Staging location is useful for transportation logistics
  • Can assign module serial numbers to a “Load” number for use in gin book keeping software
• Bohn Technology Solutions LLC.
• C# Code
• Developed in Xamarin to allow deployment on Android, iOS, and Windows platforms
• App deployed in Android
• Tested on:
  • Samsung Tab A Tablets - 10.1 and 8 in screens
  • LG smart phone - 5.5 in screen
• Hand-held RFID/Barcode Scanner (Bluetooth)
  • TSL 1128 UHF RFID
• 1D/2D barcode scanning using device camera
• Open-source code for free integration into other software
  • MIT License agreement
TSL 1128 Bluetooth UHF RFID Reader

Bluetooth UHF RFID Reader with 2D Imager, UHF antenna, Trigger Handle, Battery, Battery Cover, Micro USB Cable, USB Charger (FCC). Works with Apple iOS (iPad, iPhone, iPod). These units are non-returnable.

$1,119.36  Add to Cart

Free Shipping

Ships Today
Load Scanning Tool

Inventory List Tool
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- Cancel
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Continue Load Scan

Field Settings

Delete S/Ns | Move | Review
Delete All | Renumber | Camera

Modules: 52   Loads: 13

Load 2016002  Modules: 4
Load 2016003  Modules: 4
Load 2016004  Modules: 4
Load 2016005  Modules: 4
Load 2016006  Modules: 4
Load 2016007  Modules: 4
Load 2016008  Modules: 4
Load 2016009  Modules: 4
Load 2016010  Modules: 4
Load 2016011  Modules: 4
Load 2016012  Modules: 4
Load 2016013  Modules: 4

Tap here to add notes...

Start New Load

- 15403712856
- 15403712855
- 15403712852
- 15403712853
Last module: 15408699862
GPS: 33.69351351, -101.82004092
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Modules: 1
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Load List

GROWER: Joe Farmer
FARM: Parker
FIELD: South Pivot

Please see attached load list.

Sent from my Galaxy Tab® A

1 item  (7 KB/24.7 MB)

Transmission-12282016_02_02_25_PM.csv
7 KB
Module Inventory List

Field Settings

Grower:  Bill Henson
Farm:    Drip
Field:   Test project 077
Location: in field

Save  Cancel
| Modules          | 16405947891 | 16405947890 | 16405947889 | 16405947888 | 16405947887 | 16405947886 | 16405947885 | 16405947884 | 16405947883 | 16405947882 | 16405947881 | 16405947880 | 16405947879 | 16405947878 | 16405947877 | 16405947876 | 16405947875 | 16405947874 | 16405947873 | 16405947872 | 16407087803 | 16407087802 | 16407087801 | 16407087800 | 16407087799 | 16407088798 | 16407088797 | 16407088796 |
Scan Settings

Tablet ID: tablet-1

Serial numbers per load: 4

Save

Connection Settings

Connected to: 003627-US-1128

Pair

Refresh

Available devices

003627-US-1128

003648-US-1128

Connect

Disconnect
Data in the .csv file can be easily imported into GIS software.

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*Data from Scan in Field tool*

**The same data structure is used for both scanning tools.**
Yellow Symbols – Module Inventory List Tool

Purple Symbols – Load Scans After Staging

“Load Scan” and “Module Inventory List” Data Displayed on GIS Map
Current Status and Additional Development

• Tools ready for testing and use:
  • Cotton Harvest File Download Utility
    • Available from Cotton Incorporated
  • RFID Module Scan
    • GitHub: Source Code and APK File
      • https://github.com/bohntech/RFIDModuleScan/tree/master/RFIDModuleScan/APK
    • Google Play Store: Search “RFID Cotton Module Scan”

• Work in progress:
  • Additional software to facilitate scanning on module trucks during the loading and unloading processes in the field and at the gin
  • Database software to collect and manage scan data and produce reports for use by ginners and growers
Questions?

John Wanjura
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John.Wanjura@ars.usda.gov