Grower Field Tracking and Reporting System

WHITE PAPER

RFID 4u®
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INTRODUCTION

One of the most difficult tasks growers face today is the inability to collect the field data in a timely manner and make that data available to management.

The field data can range from tracking hours worked, personnel assignment to different tasks, accuracy of task performed, to tracking seed, produce, materials and equipment used, transportation, etc.

Lack of proper visibility into the field operations increases cost by overcharged hours, misplaced assets, inefficient communication and extended timelines.

Solution Overview

The Grower Field Tracking and Reporting System (GTS) addresses this issue by providing the capability to collect field data on the go, via an iOS or Android device, and send that data to the cloud.

The data is then made available to anyone with an Internet browser and secure logon. The data is represented in dashboards, Excel worksheets and PDF reports.

TABLE OF CONTENTS

1. SOLUTION OVERVIEW .............................................................................................................. 4
2. MOBILE TASK SYSTEM ............................................................................................................. 4
   Secure Logon and Task Assignment...................... 4
   Main Menu................................................................. 5
   Current Tasks............................................................. 5
   Adding a New Task ..................................................... 6
   Field Location ............................................................ 9
3. HOME SYSTEM ....................................................................................................................... 9
   Dashboards............................................................... 9
   Reports........................................................................ 13
4. BENEFITS ............................................................................................................................... 13
1. SOLUTION OVERVIEW

Grower Field Tracking and Reporting System (GTS) consists of a Cloud based Home System (built on RFID4U’s TAGMATIKS Rapid RFID Deployment Platform) and mobile device (an iOS or Android) Task System. The Cloud based Home System provides the overall management and control of the application, the data repositories, dashboard and reporting.

The Task System captures and manages the field data, which include Task data, crews assigned to those Tasks and the accumulated man hours for each field. Tasks for each of the field activities, e.g. planting, inspections, rogueing, harvesting, etc., can be created by the field managers and assigned to the field personnel. This provides a schedule of Tasks for each person. This Task list can be modified or changed, on the fly, through the creation of new Tasks, on the iOS or Android device, by the field personnel or the field managers.

The historical transaction data is, automatically, downloaded to the iOS or Android device so the field personnel have access to all the field data.

Additionally, GTS interfaces with the corporate systems to automatically download required field and crop data and to upload the collected data to the various business applications.

Each task can automatically include field location verification. If the field personnel are at the wrong location, a warning message is displayed. In addition, the system can also provide driving directions to each field.

2. MOBILE TASK SYSTEM

Secure Logon and Task Assignment

Two sets of personnel security tables have been created to provide access control and task assignment management. Both together control what an individual can see on the device screen and what task can be seen or assigned to.

The first set of tables provide encrypted and secure logins with ID and password.

The second set of tables controls what each individual is authorized to perform and which tasks he/she can assign.
Main Menu
After login, the main menu reveals a list of the Task System functions.

Current Tasks
All Tasks are controlled by individual, location and function and are executed on the mobile device. The data collected on the mobile devices is collected via direct entry and pull down lists. All data is edited and verified. Date entries can be controlled and edited based upon business rules. Task screens provide the capability to, directly from the mobile device, send SMS or e-mails and call the personnel.

The list of current assigned tasks is accessed through Tasks in the main menu. The tasks are color coded, where red means that the Task is completed, green means that the Task is not started yet and yellow signifies that the Task is in progress.
Adding a New Task

The following Tasks were created for a corn seed producer. Adding additional Tasks and functionality is a straight forward process. New Task can be added directly from the main menu.

The individual Tasks currently included in the GTS include:

- **Bag Inspection** – Track and verify the seed bag type and count, which is delivered to the field and planted. This verification can be accomplished through a physical count or scanning via bar code or RFID.

- **Field Inspection** – Provides the key background information from corporate systems and all data collected from previous inspections. Identifies and edits data to be collected. The Select Quality Comments allows the user to add comments regarding quality.
• **Quality Control (QC) Inspection** – Provides the key background information from corporate systems and all data collected from previous inspections. Identifies and edits data to be collected. Created automatically upon completion of the particular task or manually by authorized personnel.

• **Rogueing** – Provides the key background information from corporate systems, accumulated man hours and total number of Rogueing Tasks performed. Allows identification and collection of number of workers. The accumulated man hours are calculated and added to Total Accumulated Rogueing man hours. The critical rogueing data is collected via the mobile device. When creating Rogueing task, you must select a location where it is to be performed (Select Lot), Date and assign the Crew.

• **Detasseling** – Provides the key background information from corporate systems, accumulated man hours and total number of Detasseling Tasks performed. Allows identification and collection of number of workers. The accumulated man hours are calculated and added to Total Accumulated Detasseling man hours. The critical detasseling data is collected via the mobile device. The Detasseling Task completion triggers the automatic creation of a QC Task and personnel assignment. The task assignment works...
exactly the same as for the Rogueing. If two tasks are scheduled for the same date and lot with the same crew, then the user is provided a message.

- **Harvesting** – Tracks and verifies the harvest activity including harvest dates and yields. The harvested crops can be labeled and tracked by bar code or RFID.

The system also provides these functions:

- **Crew Time and Attendance Tracking (Crew T/A)** – Provides capability to track individual crew member via bar code or RFID. Each crew member is logged in or out, individually, as they board the bus or clock out for lunch, breaks, etc. The entire bus can, also, be logged in or out with a single transaction. The login and logout data is automatically uploaded to Payroll for pay calculations.

- **Change Crew** – Allows individual Crew assignment to change and multiple crews to be assigned to the same task.

- **Reschedule Tasks** – Allows individual Tasks to be rescheduled.
• **Inquiry** – Provides a complete detail for a particular lot on one screen.

• **Driving Directions** – Transfers field polygon coordinates to the iOS or Android mapping and driving direction applications.

In addition to the activity tracking and data collection functions identified above, the system provides for overall tracking of field crops for GMO, red flagging, QC inspection, chemical application and field re-entry dates.

**Field Location**

GTS provides a capability to verify location of each field. This is achieved by creating a Google Earth polygon for each field, which then allows physical location verification (via the iOS or Android device) of the field personnel to ensure they are at the correct field.

**3. HOME SYSTEM**

The GTS system creates a number of real-time dashboards and reports, that are updated automatically, from the Task data. These dashboards and reports reside in the Cloud and are updated as data is entered in the Cloud Home system or the Task data from the iOS and Android devices.

**Dashboards**

Most dashboards can be exported to Excel or PDF format. The current dashboards include:

- Main Dashboard
- Metrics
- Task
- Admin
- Locations
Main Dashboard - provides an overview of the whole operation. It shows the overview of tasks, locations, users and reports. It also includes calendar with color-coded task status and a To Do List which includes all tasks assigned and not yet completed.

Metrics Dashboard - creates and displays the various performance metrics established by management. Here we have for instance Planting, Rogueing, Detasseling, QC Inspection and Harvest Metrics.
Below is an example of a Rogueing Metrics Dashboard.

The Task Dashboard provides insight into all tasks in the system and has separate dashboard for more detailed view of:

- Existing tasks
- Bag inspection
- Rogueing
- Inspection
- Detassle
- QC Inspection
- Crew Hours
- There is also an option to assign a new task and manually edit a crew.

Below is an example of the Existing Tasks Dashboard.
Example of the QC Inspection Task Dashboard.

Through an Admin screen, a system administrator is allowed to add new users, view existing users and configure user roles. Below is an example of User Role Configuration, which specifies who is allowed to create or assign specific tasks.

<table>
<thead>
<tr>
<th>User Role Config</th>
<th>Admin</th>
<th>Production Manager</th>
<th>Field Manager</th>
<th>Inspector (R)</th>
<th>Crew</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create Planting Task</td>
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<td>Create Harvesting Task</td>
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<td>Assign to Inspection Task</td>
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<td>Assign to Detasseling Task</td>
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<td>Assign to Harvesting Task</td>
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<td>Assign to QC Inspection</td>
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<tr>
<td>Add User</td>
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</tbody>
</table>
Reports

Reports can be generated in any format including Excel and PDF. They are automatically distributed to the end user via a production and distribution schedule and can, also, be distributed “on demand”.

The current reports include:

- Tasks List
- Variety Report
- Grower Report
- Crew T/A Summary
- Lot/Location Summary

This is an example of a report related to a specific lot. It can be optionally filtered also by grower or variety.

4. BENEFITS

The GTS provides a complete visibility of field operations for increased operational efficiency, personnel task assignment and time tracking, inventory planning and tracking, quality control, streamlined business process and increased production.