CIMS: Centralized Inventory and Maintenance Software

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Executive Overview

Central Contra Costa Transit Authority (commonly known as County Connection or CCCTA) began using its Centralized Inventory and Maintenance Software (CIMS) on July 1, 2012. The system was designed specifically for the management of fleets, vehicles, inventory, and work orders.

There were two primary goals for CIMS: proactive notification of preventive maintenance due, and accurate and simple tracking of every part and minute of service for the life of each vehicle.

The original system included:

- Preventive Maintenance
- Work Orders
- Purchase Orders
- Inventory Management
- Receiving
- Fleet and vehicle administration
- Fueling
- Physical inventory
- Inventory adjustments
- Reporting

After using CIMS for a few months, CCCTA added a Facilities Work Orders module.

Additional system objectives included:

- Minimum training
- Consistency among modules
- Browser-based interface
- Use on tablets (iPads) and desktops

CCCTA contracted with DragonPoint Software, a Rockledge, FL-based software provider founded in 1988, to design, develop, and support CIMS.

Photo by MTAPhotos via Photopin
Consistency Contributes to Ease of Use

Why is CIMS so easy to use?

CIMS was built based to support the way an actual fleet maintenance organization works, so the business process is sound. Training a mechanic? Show him how the application replaces paper work orders. Training a maintenance supervisor? Show him the preventive maintenance schedule. Training your purchasing agent? Show her how parts and purchase orders work together.

Because modules are based on a number of consistent standards, once you know how to use one part of the system, you know how to use all of it.

Each module is based on two primary approaches to presenting information:

- List screens. These are Excel-like lists of information that you can filter by entering criteria into one or more fields.
- Details screens. All details are accessed by choosing a record in the list. Depending on the complexity of the information, details display on the same page as the list or on multiple tabs.

Once you understand how the list and details work, you can work with any module in CIMS.

The proof? After no more than 4 hours of training, mechanics were completing work orders on their iPads.
Work Orders

The challenge was to create screens that do a lot and are easy to use. For example, the Work Orders list (or Find) screen was specifically designed to accomplish all of the following tasks (and more) on one screen.

- Open a specific work order
- View all work orders (open, closed, voided, or all) for a specific vehicle or fleet
- List all work orders created by a specific user
- Look at work orders by class (e.g. maintenance, driver defect card, shop request, road call, accident, etc.)
- Allow managers to review work orders that require approval (“hours approved not WO” and “Needs 2nd WO approval”)
- Allow mechanics to find work orders assigned to them
- Find office supply work orders (“non-vehicle WOs only”)
- Find work orders created during a specific date range
- Identify work orders by specific operations codes, which are created by CCCTA to identify the work to be done (e.g. preventive maintenance B service or window latch repair)
- Any combination of these tasks

To further simplify the process, all the information in the grid (the results of your query) may be exported for analysis in Excel by pressing the Export button. The data that is exported includes the rows in the grid plus additional columns that provide even more information, such as when the record was created and by whom. The ability to find the information you need and export the information to Excel eliminates the need for many “canned” reports. Just as important, you no longer have to contact your software team when you have a unique question such as, “How many work orders did we create for PM B for vehicles in fleet 20 last year?” You can get the information yourself, export it to Excel for analysis or printing, and format it as you like.
The Work Order find/list page is shown below. Information in the grid may be sorted by clicking on the headers of one or more columns to sort the column in ascending or descending order (or removes the column from the sort sequence).
At CCCTA mechanics use iPads to enter information as they’re working on a bus. [Note: Because the system is browser-based, CCCTA successfully tested CIMS on Android and Windows tablet PCs, too.] After they find the correct work order on the List page above, they select the correct row in the grid and press the Display button to get to the details for the work order as shown below.
There are five pages that provide details about each work order (five tabs).

1. **General**: class (e.g. maintenance, road call, etc.), comments, fleet, last work order for the vehicle, mileage, and the operations codes for work to be performed for this work order. Clicking the “Info” vertical tab displays the last fuel information and the next scheduled PM.

2. **History**: lists all work orders for this vehicle. Using radio buttons, you can choose whether to see a shorter list (1 row per work order and operations code), to display the mechanic(s) who worked on each work order or the parts used for each work order, or you may limit the list to a single operations code.

1 row per WO-op code
CIMS: Centralized Inventory and Maintenance Software

1 row per mechanic-op code-work order

<table>
<thead>
<tr>
<th>WO #</th>
<th>Vehicle #</th>
<th>Op Code</th>
<th>Description</th>
<th>Created</th>
<th>Closed</th>
<th>Mechanic</th>
<th>Dt Worked</th>
<th>Hrs Worked</th>
<th>Cm for Service</th>
<th>Mechanic Comments</th>
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<td>37905</td>
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<td>1/30/2014</td>
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<td>1582</td>
<td>1/29/2014</td>
<td>0.25</td>
<td>1/29/2014</td>
<td>Brake inspection</td>
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1 row per work order – op code – part

<table>
<thead>
<tr>
<th>WO #</th>
<th>Vehicle #</th>
<th>Op Code</th>
<th>Description</th>
<th>Created</th>
<th>Closed</th>
<th>Part #</th>
<th>Part Desc</th>
<th>$ Each</th>
<th>Qty</th>
<th>WO Comment</th>
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<td>62NTA-6</td>
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<td>4.800</td>
<td>1</td>
<td>TOWED IN F</td>
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<td>82505</td>
<td>AIR SYSTEMS -</td>
<td>1/25/2014</td>
<td>1/27/2014</td>
<td>6091</td>
<td>TAPE, ELECTRICAL</td>
<td>0.900</td>
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1 op code

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<td>0.900</td>
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<td>TOWED IN F</td>
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</table>
3. **PM schedule**: displays the PM schedule for the vehicle’s fleet.

4. **Hours**: mechanics enter the hours worked each day for each op code. By pressing the + Add Time button, a mechanic can enter multiple days of work for each op code. When the work is complete, they enter an OK for service date.

After an op code has been marked OK for service, a supervisor reviews and approves the work and presses the Approve button. When all op codes have been approved, the work order is ready for the two-level supervisory review.
5. **Parts**: each part used for the work order is assigned to the correct op code. The mechanic also records the old and new serial numbers for parts that are uniquely identified in this manner.

CCCTA’s maintenance manager trained all mechanics to use CMIS in short, onsite sessions, and there was almost no learning curve because the screens match the process the mechanics were accustomed to completing on paper.

Due to a frequent request by mechanics to further reduce paper by automating their PM Worksheets, a few months after Go Live, CCCTA requested DragonPoint’s assistance in automating these paper documents.

**Worksheets**

When DragonPoint found that mechanics also used other paper worksheets for different types of operations, we recommended that instead of creating a single-purpose, hardcoded PM Worksheet form, we would provide a way for CCCTA to build an unlimited number of electronic check lists that would be automatically attached to applicable work orders.

Creating a worksheet involves these steps:

1. Choose the worksheet name, operations code that requires it, and the column headings that will be presented to the mechanics.
2. Upload an illustration, instruction sheet, or other diagram that is associated with the sheet.
3. If tasks are to be grouped, enter the group headings (“categories”). (optional)
4. Enter the task number in the sequence in which they should display to mechanics and the text for each.

CCCTA created a worksheet that is required for select preventive maintenance work orders. When the sheet is required, mechanics see a PM Worksheet button on the General tab for the work order.
Clicking the PM Worksheet button displays a new tab listing all the tasks to be completed as shown in the screen below.

Mechanics check off each task as the inspection is complete and notes the tasks that require repairs. Work can be saved as many times as necessary to complete all tasks. Filters near the top of the page allow mechanics to filter the list of more than 100 tasks to show only tasks within a specific category, such as “Bus Exterior” or that they have previously checked, such as “Repair/Replace.”

Pressing the Attachment button displays the attached file in a new tab.

When all tasks are complete, the mechanic presses the Complete button. If a work order requires a worksheet, it cannot be closed until the sheet is complete.
Facilities Work Orders

After using CIMS for about a year, CCCTA requested that DragonPoint develop a Facilities PM and Work Order process that would be very similar to the one used for vehicles. Facilities work orders were built to accommodate preventive maintenance plans for buildings, equipment, and bus stops, and the PM schedules are based on a time interval instead of mileage.

The Locations screen shown below illustrates how the same consistent method of working with information was applied to simple data that could be shown on just one page. Just like on the Work Orders screen, there are fields at the top of the page that may be used to limit the results in the grid. However, instead of opening to detailed pages, the details for any row in the grid are displayed at the bottom of the page. Pressing the Add button clears all fields below the grid so a new record may be added.
The PM schedule shown below indicates that the lights in the admin building should be serviced every 90 days.
Parts

The Parts list (search) page further illustrates the consistency of the pages in CIMS. Query fields are shown at the top of the page and results display in a grid at the bottom of the page.
The details about parts are shown on four tabs.

1. **General**: basic part information including unit of measure and minimum and maximum stock levels display on this tab. When adding a new part, all fields including the part number and description (above the tabs) are blank. The page also provides a mini-report about the part in the read-only fields. For example, the Recent Activity section shows the last PO number, quantity, and date, and the quantity on hand, on order, and consumed displays in the Part Details section of the page.

The gray fields such as average cost on hand, quantity on hand, on order, etc. and the recent Activity section of the page are automatically populated.

After a new part is saved, it may be renamed, with the original number saved as an alternate.
2. **Activity:** The screen below automatically displays all activity for the part. The list may be filtered by date or by type of activity. Receiving and consumption (parts used on work orders) records are shown below, and purchase order, invoicing, adjustments, and parts issue (reserved) records may be included by checking the boxes and pressing the Filter button. The ability to export the information in the grid to Excel is another way that any user may create his/her own query such as, “On which work orders did we use this part during the last 6 months,” which avoids the need for a custom report.
3. Last 60 Months: this tab automatically displays the quantity consumed in a graph and as a data list.

4. Vendors: The Vendors tab displays the part price and the vendor’s part number for all vendors that supply the part. When a part is added to a PO, the vendor’s part pricing is used as a default (if pricing exists). After the PO is generated, the last PO number and price are automatically updated on the Vendors page below.
Purchase Orders

CIMS is built around a tight integration of parts through the purchase orders, receiving, work order processes, and inventory adjustment (physical inventory) processes.

1. Parts are ordered on purchase orders.
2. Parts are received against a purchase order line item, and the receiving record becomes an “inventory bucket” for first in – first out consumption of parts.
3. Parts are consumed as they are used for work orders.
4. Parts counts are increased or decreased by conducting a physical count (of one, many, or all parts). The adjustment consumes parts or creates a new inventory bucket that applies standard business rules to the transaction.

Consistent with other functions in CIMS, purchase orders are listed on the screen shown below, which allows authorized users to search by PO number, vendor, part, or created date.
Details about each PO are shown on two tabs.

1. General: displays the vendor and associated information, order date, and line items (one per part). To automatically email approved POs to vendors, enter the email address and check the Email PO box. Receiving records are entered on the same screen in the PO Lines section by typing in the quantity received (and date, if not today) and saving. Multiple shipments against a PO line may be received by using the +Add Receiving button to create a new row for each shipment.

Clicking the vertical Shipping tab allows purchasing to change the ship-to address and enter any special shipping instructions for the PO.
2. **Invoicing**: CCCTA manually enters invoice numbers, dates, and amounts (as provided by accounting) on the page shown below. CIMS automatically updates the inventory value of a part if the invoice amount is different than the PO amount.

![Invoicing Screen](image)

**Automatic Reorder**

CIMS includes an Automatic Reorder function that identifies all parts for which the on-hand quantity plus the on-order quantity is less than the minimum quantity required. This Automatic Reorder process allows purchasing to quickly create a batch of POs to the last vendor from which each part was purchased at the last cost paid; if necessary, purchasing may choose to change the vendor, cost, and order quantity for one or more parts.

The Preview PO button opens a report that shows how parts would be grouped by vendor to create POs.

The Release POs button automatically generates a PO with one or more parts to each vendor; the POs may be printed from the standard Purchase Orders pages or automatically sent to vendors who are set up to receive POs via email.
The Automatic Reorder page is shown below.

Other Information

Employees: CIMS also tracks information about employees, including department, grade, driver’s license, last DOT physical, emergency contact, pay rate, shift, and address and other contact information.

Security: authorized administrative users may grant system access to all or some employees. Employees authorized to use the system as assigned appropriate security rights; for example, mechanics may be limited to only the work order screens, and purchasing employees may be restricted to only parts pages.

Administrative Information: records that display in drop down list boxes may be created by authorized users, and you may create administrative users with access to a specific sub-set of the admin functions. For example, a maintenance admin user may be able to add new class and operations codes but not new part product class types.
**Reports:** in addition to the query/list pages that allow users to create their own Excel reports, CIMS includes more than 20 reports including the PM schedule, work order costs (labor, materials), purchase order lists (created, received, invoiced), and vehicle reports (last fueled, fuel history, cost per mile). Many reports are available by general ledger period, allowing easy access to information such as “which vehicle parts were used in fiscal year 2014 period 1?”

Some of the reports included with CIMS:

- Preventive Maintenance Due
- Work Order Labor and Material Cost
- General Ledger Activity Report by period or fiscal year
- Parts on Purchase Orders
- Parts Received
- Parts Invoiced
- Vehicle Fuel Results
- Last Fueled by Vehicle
- Work Order Parts
- Fueling Fleet Statistics

**Conclusion**

CIMS is a fully-functional asset management system that was designed specifically for a public transportation agency. Unlike a standard off the shelf software package, CIMS is built to include the EXACT functionality you need and ONLY the functionality you need.

The system was built using standard Microsoft tools (C# and SQL Server). It has been optimized for Mozilla FireFox and works with many other browsers such as Internet Explorer and Chrome.

Because this is a custom application, it is generally simple to add new features and enhancements such as the addition of new fields, changing labels on screens, and creating new reports.

Call today – 877.542.0657 – for more information about customizing CIMS to meet your organization’s specific requirements!
About DragonPoint

DragonPoint has more than 25 years of experience designing, developing, enhancing, and integrating custom software systems.

Call DragonPoint today at 877.542.0657 to talk about your software needs and get expert assistance for your business!

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