

BIOGRAPHICAL INFORMATION

**Pat W. Drinnan
Supervisor, Mapping & Facility Records
FortisAlberta Inc.**

Specific Responsibilities

Pat is the Business Unit owner of the AM/FM System. He is responsible to all end users of the AM/FM system to ensure they can utilize AM/FM to meet their business needs. In this capacity he is the major customer to the IS Department, identifying and supporting changes, new enhancements, applications or functionalities that are required. Pat is Project Manager for the delivery of Fortis AM/FM application. He also, acts as owner for Field View and is responsible for leveraging this technology throughout Fortis T&D field organization.

Past Experiences

Pat has been with FortisAlberta Inc. (formerly TransAlta Utilities, Utilicorp & Aquila) for 34 years in various positions from Engineering Technician to Area Business Supervisor. He spent 20 years in the engineering design sections of FortisAlberta, was involved with the first Automated Mapping system which was started in 1978, as user representative helping with the original specifications. He also, served as user representative to develop the specifications of the AM/FM system from 1986 through to 1988. He then supervised the conversion and migration effort from the AM system to AM/FM from 1988 to 1992. He took over his current role as Supervisor of Fortis AM/FM production system at the end of conversion in January of 1995.

Professional Memberships

Geospatial Information Technology Association

Field Design Using GPS

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ABSTRACT

This presentation will provide an overview of FortisAlberta's mobile solution. The paper will explain how our Field Designers handle new customer requests for service, utilizing GPS and our mobile mapping application. Then, using a combination of intelligent Compatible Units and GPS to accurately capture and record these new customer services. This work is then uploaded directly into our core AMFM master model without any re-draw of these facilities in its exact geographic location. I will also explain and demonstrate how our Field Designers correct or fix our existing master model again, using a handheld GPS unit. They capture a series of waypoints to show where our existing facilities are actually physically located. These are also, digitally uploaded into our core AMFM system to continuously improve our data quality and geographic accuracy.

INTRODUCTION

Fortis is an investor-owned electric utility in Canada that is headquartered in Newfoundland and owns five Electric Utilities in Canada and two in the Caribbean. FortisAlberta has a huge Service Territory with an area of 220,000 square kilometers. It serves 400,000 direct customers and has over 90,000 kilometers of distribution lines. The AM/FM System models FortisAlberta's entire electrical network, in both graphical and pure data representations, with true connectivity. It links installed distribution facilities (185,000 transformers, 900,000 conductor segments and just under 1 million poles), to actual geographical and customer information, within this integrated model. Our AM/FM model contains over 30Gb of electronic corporate information.

The key to any successful software / hardware implementation is having end-user acceptance. This means field staff willingly use the system and actually look for ways to use these tools even more extensively. FortisAlberta has not only succeeded in meeting our intended outcome but has gone beyond our expectations.

The Field Staff have developed a sense of ownership in both the software tools and more importantly the data.

With the implementation of FortisAlberta's mobile technology the paybacks promised in the original business case are now finally starting to be realized. This has drastically improved the image of our AM/FM system. Everyone from Senior Management down now speak in glowing terms of its value and accomplishments. Overnight it has gone from a system that was a deep dark money pit to one of three mission critical enterprise systems that the corporation cannot operate without. The field staff now, utilize this mobile technology as their only source of facility information and have come to trust it completely. If the field staff comes across errors they willingly send in corrections and these corrections are completed immediately for them to see and use. This has created a great deal of faith and ownership in the data by the field staff.

We chose a commercially available Viewer / Red-liner application from Intergraph called FRAMME Field View. This product was enhanced and customized to support a set of specific business workflow requirements for FortisAlberta's field staff. To leverage FortisAlberta's investment in technology even further, we interfaced a hand held GPS unit to our Field View map application. The two handheld GPS manufactures that we standardized on are Magellan and Garmin. Ensuring our interface to the Field View map application worked with both of these. These handheld GPS devices can work stand alone, or interactively with the laptop. They are taken out of the vehicle or mounted in a holder on the dash of the vehicle.

The Mobile technology now provides easy to use functionality, directly into the hands of field staff at job sites remote from the master model. Our delivery includes; the ability to use handheld GPS unit to guide the Field Designer to his required location, ability to locate survey pins and monuments, record new facility locations, measure distances from a GPS point and re-locate existing facilities to match real world coordinates.

LOCATING USING HANDHELD GPS

The Field Designer has two types of locates he may need to perform on a regular basis:

1. Locate new customer site in new or unfamiliar territory.

FortisAlberta has minimized its Field Designer staff and thus requires them to regularly go to adjacent areas to assist with workload peaks. When a Field Designer goes into one of these areas that he is not totally familiar with, he can use the handheld GPS to guide him to the correct location. The Field Designer goes into our Field View map and finds the GPS coordinate of the proposed take-off pole for the new customer service. They then enter this into the handheld GPS and run the GOTO function. He puts the GPS back into the stand on the dash of his vehicle and starts to drive to the location. As he drives, the GPS unit displays the roads, an X at

the final location, along with the distance and direction required to move to this location. This saves the Field Designer valuable time not having to determine where the exact site is, as he can drive right to the location and know he is at the proper site.

2. Locate Survey Pins or Monuments.

If the Field Designer needs to confirm where a survey pin or monument is, he can do this now quite simply, instead of needing a survey crew with transit and chains. Using the landbase within the Field View map the Field Designer finds the GPS coordinate for the survey pin he is looking for. They then enter this into the handheld GPS and run the GOTO function again. They now can walk to the Survey Pin site using the handheld GPS to guide them as it tells them the distance and direction to the pin. Once they are at the location within a 1 to 3 meter radius they can find the pin using a normal survey Pin Locator. This eliminates the major costs of sending a survey crew to determine the alignment and saves time allowing us to provide better customer service. This also confirms our exact alignment ensuring that we do not encroach on other's property, or if there is no alternative, we know a land person must contact the landowner for an easement.

NEW CUSTOMER SERVICE REQUESTS

With a new customer request that is either very complex, dealing with cross country alignments or the customer has many possible routes or locations our Field Designer will be sent to meet on site with the customer. The Field Designer will look at the site and alternatives with the customer taking 'waypoints' on his handheld GPS of all potential pole and guy locations or if UG trench location, brushing locations, building corners and finally service mast location. Then back in the Field Designers truck the GPS unit is connected to their laptop via the serial port and the waypoints are loaded into the Field View map. This shows both the Field Designer and the Customer a view of where these locations are on their property and what the overall service will look like. If there were multiple alternatives each can be very simply measured and the customer can be aware of the distances and costs involved when making the decision as to which route or design to agree upon.

Once the customer decides on the route and agrees to the costs, the Field Designer will stake the service. Again using the handheld GPS to take a GPS coordinate reading at each stake. This ensures that the locations are accurate to normally within 1m of its real world location. Again taking the handheld GPS and attaching it to the laptop in the truck the 'waypoints' are loaded into the Field View map.

INTELLIGENT DIGITAL DATA

After the 'waypoints have been loaded from the handheld GPS unit into the Field View mapping program, these points are used to place the new facilities. We have a function in Field View that allows the Field Designer to build a construction print while at the same time capturing the facility information for our one master model. This function prompts the Field Designer to enter the pole information (height, class, set depth, span length and structure number), next he picks one or many of our compatible units (CU) to build the structure that is required. Once all CU's are entered the Field View system will prompt the Field Designer to place the structure where it is actually located. He will do this by placing it on the 'waypoint that was loaded from the handheld GPS unit. If the Field Designer has chosen CU's that require additional symbols or information such as guys, switches or transformers the Field View system will prompt the user to add attributes and confirm or adjust the placement location of each symbol. Once all the structures are placed the Field Designer has a useable construction print and the data can be digitally loaded directly into our AMFM system and one master model. This eliminates the need for someone in the head office to locate the service and re-draw all of these facilities again. It also, ensures that they are exactly where the handheld GPS unit located each stake.

Once uploaded into the AMFM system the data can be digitally transferred to SAP and the material ordered and shipped to the Service Point office. All of this electronic data is based upon on the design that originated on site by the Field Designer with only a few key strokes or buttons to push.

CAPTURING ACCESS INFORMATION

If the access into a new customer site is not going to be obvious we have built another function the interfaces the handheld GPS unit with the Field View map to capture an access road.

The GPS unit is placed in its cradle on the dash and connected to the laptop again via the Serial or USB port. In the Field View program the Start GPS logging is enabled, then under the Redline pulldown the function called 'Locate Road by GPS' is started and a dialogue box appears. By clicking the left mouse button the access road is started then driving slowly and clicking the mouse at each change of direction you are building/creating the centerline for the access road you are driving on. Once you complete the access road you hit the 'Done button' and Field View creates a thick line of your chosen color, using the exact route in the 'real world' that you have just driven.

This new access road can be used just for the construction crew if it is a trial or landowner preferred driving route. However, if it was a permanent access road it can be digitally uploaded into the AMFM system and kept in the permanent landbase for all future access to the area.

CORRECTING EXISTING DATA

Another major benefit of interfacing the handheld GPS unit and the Field View mapping system is to correct our existing data. The Field Designers if they come across facilities that are in the wrong location, can have it corrected very simply and easily. The Field Designer takes the handheld GPS unit and records 'waypoints' at the 'real world' location for each pole and guy. The Field Designer then places the GPS unit in its cradle on the dash and connects it to the laptop again via the Serial or USB port. The 'waypoints' are uploaded into Field View and then some simple dumb text is recorded to describe the changes required. The Field Designer then sends the Field View packet to the server. By picking the correction option the packet is placed into a directory that the Data Integrity team looks at daily. The Data Integrity team has committed to a 24 to 48 hour turn around on these changes. Field View data is cut from our AMFM system master model nightly, so once the changes have been made it is available for everyone in the corporation to see. This ensures that the accuracy of our AMFM master model is continuously improved.