MapInfo GAUSS Case Study
November 2002

MapInfo's Analytical Customer Relationship Management (a-CRM) division has been using a range of Aptech products since December 2000. Compusearch Micromarketing Data and Systems, a Toronto company that was acquired by MapInfo at that time and integrated into the aCRM business unit, had previously been using Aptech products since June 1997. In the years that our Custom Research group has been using GAUSS and other Aptech products, we have experienced a very significant return on our relatively modest investment. We would estimate that our ROI has been in the hundreds of percent.

One of the specialties of our Custom Research group at MapInfo is site evaluation modeling. This is a form of locational analysis that is computationally quite intensive and very well suited to matrix techniques. GAUSS has played a critical role in the development of a custom calibration program that we use to build our models and which yields statistical parameters that drive our site models. A combination of GAUSS and GAUSS Engine Pro has also played a pivotal role in providing our models with a delivery mechanism and thus the ability to be accessed at the client desktop.

In particular, we have used GAUSS Engine Pro to develop some user-friendly software called Branch Manager. The software has been developed in Visual Basic and uses MapInfo MapX as the mapping engine. The Visual Basic module interfaces with GAUSS Engine Pro to trigger all computational operations of the model and the provision of numeric output as displayed in reports generated through Crystal Reports. Site evaluation scenarios are played out graphically through the manipulation of location-specific 'dots' which represent stores or bank branches and which trigger the running of the models.

An interesting topic is the evolution of our Branch Manager application from the drawing board to client sites and the integral role of Aptech's products in this process. Here is a point-by-point description of this evolution and some of the interesting aspects:

1) Long before development on Branch Manager started, we spent a lot of time refining our site models. GAUSS was an indispensable and frequently used tool in this process.

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2) GAUSS was useful in prototyping some of the functionality of Branch Manager. While Branch Manager itself provides a nice graphical interface for the adding/dropping/altering of site facilities, it was easy to prototype some of this functionality in GAUSS and test out the behavior of the models. GAUSS graphics were useful in this regard along with the core functionality of GAUSS.

3) We used the GAUSS library concept to build entire libraries of our own proprietary GAUSS spatial procedures. In devising our main GAUSS programs, we were able to call on these procedures and seamlessly incorporate them into a final compiled GAUSS program that formed the computational basis for Branch Manager.

4) Given that GAUSS had enabled us to thoroughly prototype the modeling side of our solution, our development staff was left to focus mostly on communication issues between GAUSS Engine Pro and Visual Basic. The actual exchange of data between our compiled GAUSS program and the VB implementation of Branch Manager was minimal even though there was a huge amount of complexity associated with each component independently. The whole process was quite convenient since each team member could focus on his own specialty. Were we to have developed the models in Visual Basic, the development process would have been much longer and Branch Manager would have performed at a much lower computational level.

5) In moving data between VB and GAUSS within Branch Manager, we chose for the most part to use GAUSS data sets as an intermediary rather than doing it through RAM alone. GAUSS Engine Pro itself is probably better set up to exchange data with VB via RAM. As a result, we wrote our own custom tools to read and write GAUSS data sets from VB. If Aptech were to develop similar tools, it would be helpful for future development.

6) As well as using GAUSS ENGINE PRO in Branch Manager to calculate the models, we also used GAUSS data sets for data storage. In particular, massive pre-processed drive distance matrices, hundreds of Megs in size were stored in GAUSS format. Distances along road networks were pre-processed for millions of combinations of individual residential areas and existing and potential facility sites. Such precise measurement of distance is critically important for accurate site modeling. The ability to use the SEEKR and READR commands

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in tandem allowed us to surgically and quickly extract the particular drive distances required for a given site evaluation scenario.

For five years, we have been delivering this solution, or close cousins to this solution, mainly to banks and retailers throughout North America. Companies which have benefited from our models and their implementation in GAUSS include: a major national drug store chain in Canada, one of the top ten largest banks in the United States, one of the top five largest banks in Canada, a major financial institution in the province of Quebec and a real estate investment firm in the southeastern United States. Other equally large projects are underway. While Aptech products have clearly assisted MapInfo's a-CRM unit in the development and delivery of high-end modeling solutions, they have also assisted in several internal research initiatives and in the development of MapInfo U.S. data products such as our small area income projections. GAUSS has been an important component of our overall modeling success over a wide range of projects and contexts.

In appraising Aptech's technology offering overall, we need to distinguish between GAUSS, which has been around for years and GAUSS ENGINE PRO, which is a relatively new innovation. GAUSS itself is quite robust, stable and well established. The stability of GAUSS ENGINE PRO has improved dramatically over the recent years. We did have problems with stability early on, but any remaining kinks appear to have been worked out. When deploying GAUSS ENGINE PRO as part of an application, installations are made trickier by the use of Windows environment variables and also a lack of documentation on including GAUSS ENGINE PRO in an installation of an umbrella application like Branch Manager. GAUSS ENGINE PRO could also be enhanced if created in the form of an ActiveX or .NET component rather than as a .DLL. Developers would have an easier time "hooking into" GAUSS ENGINE PRO under such circumstances. Overall though, GAUSS ENGINE PRO is working quite well and is a welcome addition to the Aptech suite of products.

GAUSS allows the user to focus on the statistical or mathematical problem at hand and not on the details of programming the solution. GAUSS is easy to learn and use. The typical GAUSS program is very compact and efficient, the rate of computation is very high and the ability to manipulate large matrices is very powerful. The introduction of GAUSS Engine Pro allows for the integration of GAUSS code with code developed in other languages such as Visual Basic, C++ or

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Java and also the distribution of the overall solution to the client site. GAUSS Engine Pro facilitates a useful division of labor where the people who are into models and mathematics can focus on that aspect through GAUSS, while the people who are into application development and the cutting edge of IT can build applications without worrying about the details of mathematical models. When the two core competencies merge, through a mechanism like GAUSS Engine Pro, the results can be very impressive.

We think our success over the past five years in the field of site evaluation modeling is an excellent testament to the power of Aptech's products. We look forward to working closely with Aptech in the future to come up with even more progressive software and modeling solutions.

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