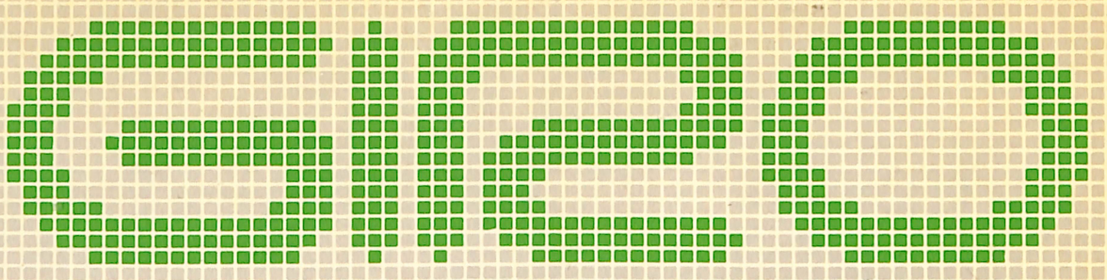


giro

HASTUS

Transit vehicle and crew scheduling system

The *HASTUS* transit vehicle and crew scheduling computer system is recognized world-wide for its effectiveness and flexibility. Currently installed in nearly 20 countries in North America, Europe, Africa, and Asia, *HASTUS* software is a proven time and money saver.

Transit authorities can rely on the power of *HASTUS* optimization routines as well as the software's ease-of-use and wide applicability. In addition, the professional staff at GIRO Inc. back our products with an extensive knowledge of the public transit industry.

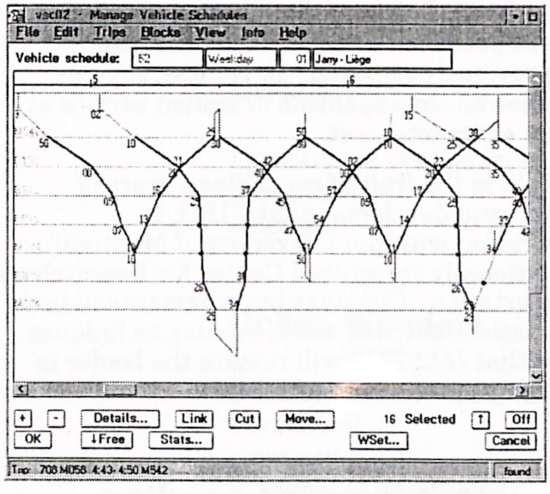
The basic *HASTUS* system provides the tools required for the production of efficient vehicle timetables and operator assignments. Related software offers solutions for passenger information systems and daily transit operations.

The world's most widely-used system

More than 100 bus and rail companies have placed their confidence in GIRO software. *HASTUS* has demonstrated its ability to perform well with different work rules and operating constraints:

- *HASTUS* is used successfully to schedule bus, tram, subway, trolley-bus, and commuter rail systems in cities with varied requirements such as Singapore, Boston, Seattle, Sydney, Tokyo, Barcelona, Stockholm, and Edinburgh.
- *HASTUS* can efficiently support problems of any size. For example, OC Transpo in Ottawa schedules more than 1200 driver shifts simultaneously, while the Los Angeles MTA schedules approximately 4000 operators working out of 18 depots.
- Pricing is based on property size and problem complexity, so even smaller transit properties can benefit from the power of the *HASTUS* family of products.

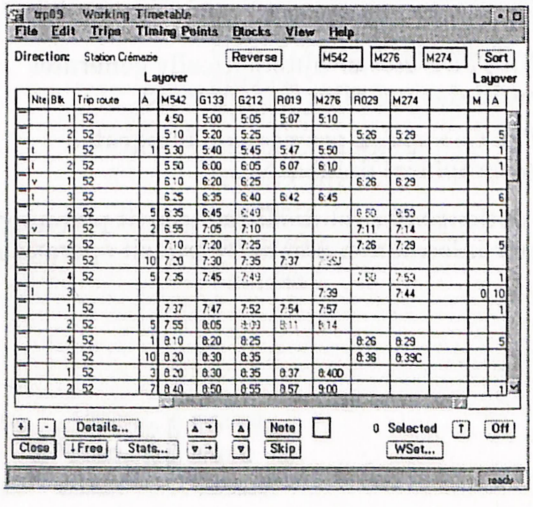
The system supports controlled interlining, varied driver relief practices, complex travel time calculations, multiple driver shift types...and much more!



HASTUS 5 features graphical scheduling displays

Extensive parameterization permits you to adapt the system to serve your current and future needs.

Standard reports can be employed as is or adapted to meet local needs. Information in the *HASTUS* relational database is available for interfaces with other computer systems as well as for in-house reports and other standard PC applications.



Working timetable

Power to save you time and money

In repeated tests in several countries, *HASTUS* has produced important savings in time and money over both competing systems and manual methods.

- In Montréal, the STCUM achieves savings of $4,000,000 annually; in Calgary an official city report quotes savings of $1,200,000 per year.
- In Los Angeles, the MTA replaced their previous computerized system with *HASTUS* and achieved a 1% system-wide saving within 8 months.
- In Lyon, France, fully automated solutions are produced in a fraction of the time previously required. In Nantes, savings allowed the expansion of transit service at no extra total cost.

HASTUS is the fruit of over fifteen years of research and development at GIRO, in collaboration with the University of Montréal's internationally recognized Center for Research on Transportation. Constant improvements in both optimization methods and computer techniques ensure that *HASTUS* will remain the leader in this highly-specialized field.

An integrated solution

HASTUS offers an integrated transit database and a complete set of application modules:

- *HASTUS-Vehicle* generates vehicle timetables and vehicle schedules; it includes mouse-driven graphical scheduler.
- *HASTUS-Crew* produces legal and efficient crew schedules. Powerful optimization algorithms provide automatic solutions that can be viewed and fine-tuned interactively.
- *HASTUS-Roster* automatically generates multi-day operator assignments.
- The *Geo* option provides an integrated geographical database.

Other options offer solutions for transit planning, customer information and daily transit operations.

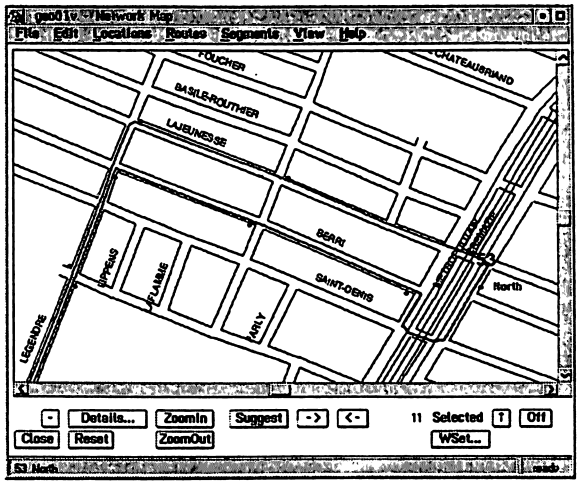
Modern client-server software

HASTUS workstations are standard PCs equipped with OS/2 and Windows NT. It performs equally well with Novell, LAN Manager, LAN Server, and TCP/IP networks or on stand-alone machines.

HASTUS 5 features a fully CUA-compliant graphical user interface as well as an SQL relational database: Microsoft SQL Server, Oracle7, and Sybase are currently supported.

Installation, training, and support

GIRO Inc. ensures that your organization benefits fully from the *HASTUS* system by providing consulting, system configuration, implementation support, and user training services.



Map displays with the Geo option

In addition to adapting the *HASTUS* system to your needs, GIRO Inc. provides quality on-going support by electronic bulletin board, e-mail, fax, telephone, and on-site visits.

The *HASTUS* International Users Group as well as national groups meet regularly to promote exchanges between transit professionals and our staff. Our newsletter, *Software News*, keeps you abreast of on-going *HASTUS* improvements and recent installations.

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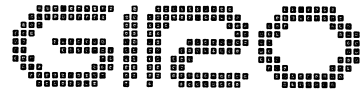
Montréal (Québec) CANADA H3L 3T1
Tel.: (514) 383-0404/Fax: (514) 383-4971
Internet: info@giro.ca

HASTUS customers



Australia

Canberra
Melbourne (2 companies)
Sydney

Austria

Vienna

Belgium

Brussels
De Lijn (5 companies)

Canada

Calgary
Halifax
Hull
Laval
Montréal
Montréal South-Shore
Ottawa
Québec
Sherbrooke

Denmark

Århus
Copenhagen (2 companies)

Finland

Helsinki

France

Aix-en-Provence
Angers
Argenteuil
Brie-Comte-Robert
Caen
Calais
Cergy Pontoise
Dijon
Lille
Lorient

France (contd.)

Lyon
Maubeuge
Montbeliard
Montlhéry
Mulhouse
Nantes
Paris
Rennes
Saint-Jean-de-Braye
Saint-Priest en Jarez
Toulouse
Tours
Valence
Versailles
Villepinte
Vitrolles

Italy

Torino

Japan

Tokyo

Malaysia

Kuala Lumpur

Netherlands

Groningen
Rotterdam
Utrecht
VSN (13 companies)

Norway

Bergen (3 companies)
Oslo
NSB (15 companies)

Singapore

Singapour (2 companies)

South Africa

Northwest Transport
(5 companies)

Spain

Barcelona
Sevilla

Sweden

Linjebuss (2 companies)
Stockholm
Uppsala

United Kingdom

Edinburgh
Eurotunnel
Newcastle
Sheffield (2 companies)

United States

Albuquerque
Birmingham
Boston
Buffalo
Chicago
Cleveland
Los Angeles
New York (2 companies)
Omaha
Providence
Santa Barbara
Santa Cruz
Seattle
Snohomish
Tacoma

(96/08/15)

GIRO

SOFTWARE NEWS

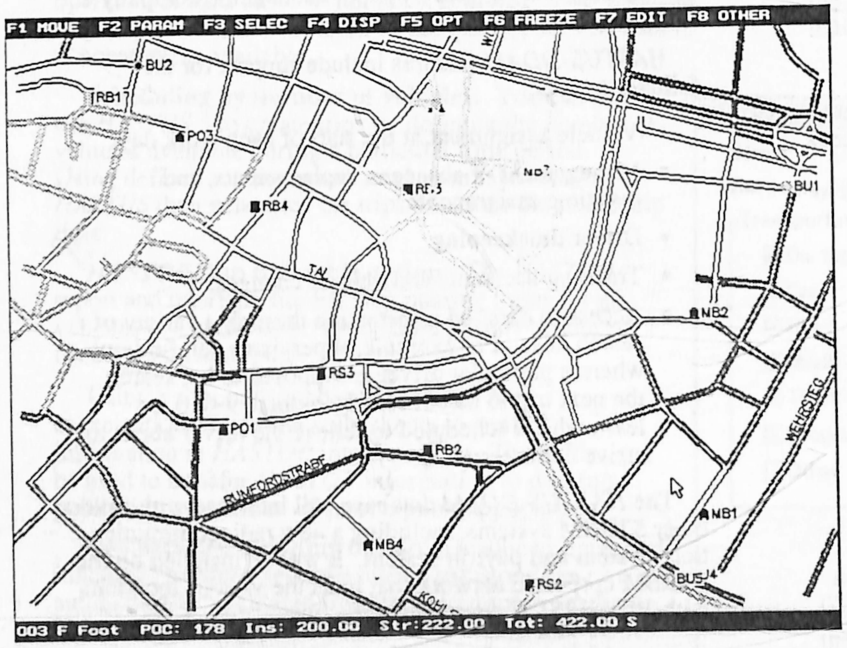
July 1996, Volume 10, Number 2

Deutsche Post AG acquires *Post Cards*

Deutsche Post AG, Germany's postal service, has selected *Post Cards* software to help build and manage mail delivery routes. This decision follows a test completed in 1994 demonstrating that *Post Cards* could improve the efficiency of existing delivery routes while respecting local work rules.

The system will first be implemented in **20** postal stations in the Cologne and Munich areas. This pilot phase will allow Deutsche Post to address data-related issues such as the selection of appropriate geographic database sources and updating tools.

Complete roll-out is expected to begin in 1997 for up to **500** postal stations responsible for operations planning. The Deutsche Post project leader is Dr. Dieter Pütz.



Complex routing requirements

Post Cards was developed by GIRO Enterprises in collaboration with Canada Post Corporation and Montréal universities. It is specifically designed to create and optimize routes for street-by-street delivery operations. These "arc-routing" problems are considerably more complex than the more common point-to-point routing applications.

Post Cards features map-based interactive tools along with unique optimization algorithms. These include an optimal route sequencing function that can determine the best route start and end points, as well as where servicing both sides of a street (zigzagging) is more efficient than serving one side at a time.

Not unlike public transit schedules, letter carrier workdays are characterized by multiple tasks: mail sort and preparation, transportation between postal stations and service sectors, bag refills, etc. Detailed statistics are maintained for each task and specific work rules apply.

The amount of data and the various constraints make it very difficult to plan efficient routes manually. This is especially true when the workload fluctuates due to changes in delivery volumes, modifications in operating practices, and the introduction of new technologies such as automatic sorting.

Adapted to German context

In addition to delivering the basic software, GIRO will adapt the system to the German context, for example:

- Support for up to three delivery modes (foot, bicycle, and motorized), each with a corresponding set of parameters to account for specific servicing speeds, weight limits, bag refill times, etc.
- Mixed mode servicing or "park and loop" routes. This is especially relevant in non-urban areas, where motorized vehicles are used to travel between built-up areas. Letter carriers park their vehicles, deliver the mail on foot, and return to the vehicles to travel to the next area.
- Interactive functions to select specific relay boxes or "shops" for bag refills, as well as to specify the exact itinerary to and from this relay point.

Post Cards in Canada and Europe

In Canada, over **100** routing officers at Canada Post Corporation utilize *Post Cards* throughout the country. The system is also employed in pilot projects and tests in several other European countries. For more information, please contact **Marc Dupont** or **Jean-Marc Rousseau** at GIRO.

Transit companies turn to *HASTUS 5*

Sweden's Linjebuss

Linjebuss, a private bus operator that provides service in Sweden, Denmark, Belgium, and Finland, recently acquired the *HASTUS* vehicle and crew scheduling system for certain operations in Sweden.

Linjebuss operates more than **2,250** vehicles under contracts from a large number of local government organizations. Competition for contracts is strong, and Linjebuss is constantly seeking ways to reduce costs through increased efficiency.

In their 1995 Annual Report, Linjebuss states that the average prices proposed by bus operators for tendered service in Sweden has dropped by 25% to 30% since 1989. In Helsinki, the decrease is 30% over a period of two years. With tendering, the local government authority requests proposals to operate a certain amount of service in a given geographical area.

The goal of *HASTUS* is to maintain customer service levels while reducing both vehicle requirements and labor hours and costs. This is done using a series of interactive scheduling tools as well as powerful optimization procedures.

NSB in Norway

The 15 bus operating companies affiliated with NSB, the Norwegian national railway, have purchased several *HASTUS* 5 modules.

NSB companies operate bus routes throughout southern Norway, with an approximate total of **1,200** vehicles in peak service. The goal of the company is to reduce operating costs through *HASTUS* optimization functions, as well as to make scheduling information more readily available to customers, managers, and operating personnel.

The installation will include the following *HASTUS* modules:

- *HASTUS-Vehicle* to describe the route network, create timetables, and build efficient bus schedules.
- *HASTUS-Crew* to create daily driver assignments for driving work and other activities.
- *HASTUS-Roster* to build periodic driver schedules that respect requirements for days-off, minimum and maximum hours per week, etc.
- *HASTUS-DDAM* to manage daily variations to the planned schedules and to provide information to the payroll system.

The installations will be on a series of local and wide-area networks, one per company, based on the Microsoft Windows NT operating system and the Oracle7 relational database.

HASTUS is the most widely-used system of its kind, with installations in **11** European countries and in more than **120** transit companies world-wide. In Norway, NSB joins the Oslo transit company and **three** companies in Bergen that are already *HASTUS* customers.

STL in Laval

The STL provides service to Laval, a city of about 310,000 people just north of Montréal. This transit company operates routes within Laval, and between Laval and Montréal, with a fleet of approximately **220** buses.

The STL recently acquired *HASTUS 5* to help plan and optimize vehicle and crew schedules. The installation also includes the ***Geo*** mapping option, as well as ***Bid*** to manage the driver assignment process.

HASTUS is now used by all the major transit authorities in Québec province. These include Québec City's **STCUQ**, Montréal's **STCUM**, Montréal South Shore's **STRSM**, the **STO** with headquarters in Hull, and the **CMTS** in Sherbrooke.

Dispatch system for Montréal South Shore

The **STRSM**, serving Montréal's South Shore, is one of the original *HASTUS* customers. The STRSM provides service to several communities south of the St-Lawrence river, with a total population of nearly 350,000.

GIRO has been awarded a contract to install version 5 of our *HASTUS-DDAM* module for daily transit operations. This system will be used by supervisors at the company's two garages and three major terminals.

HASTUS-DDAM features include support for the following tasks:

- Vehicle assignment at the start of each work day.
- Management of absences, replacements, and overtime assignments.
- Driver timekeeping.
- Tracking accidents and vehicle changes.
- Access to detailed information through a variety of search keys. For example, supervisors can find out where a particular driver is supposed to be, search the next trip to be covered by vehicle 9-010, or learn who is scheduled to relieve the driver about to arrive at the terminal.

The *HASTUS-DDAM* database will interface with several other STRSM systems, including a new radiocommunications system and payroll system. It will be installed on the STRSM corporate network that links the various locations with T1 and ISDN communication lines.

Upgrades

Several important *HASTUS* customers have recently confirmed upgrades to *HASTUS 5* often adding new modules:

- Montréal's STCUM
- Lyon's STL
- Barcelona's TMB
- Stockholm's SL Buss
- Torino's ATM

New features in *HASTUS* V52R1

The latest release of *HASTUS*, V52R1, offers a series of new features and general improvements:

Numbering: Over the years, transit companies have developed many varied and imaginative numbering schemes to identify duties, pieces of work, trips, blocks, and vehicle tasks.

The renumber function in *HASTUS* has been generalized so you can apply numbering schemes that respect your particular conventions. For example, blocks can be prefixed with the route, division name, or a specified string. Numbers can be reset or be unique for each different route, division, or based on specified characteristics.

Place capacities: In several cities, space can be a problem at certain layover locations. The new place capacity function can be used to validate the number of vehicles laid over at any time during the day at a particular place, and can display times and places where a specified capacity has been exceeded.

Crew bases: This concept is often used in railway scheduling since the drivers may report to work at a major station rather than at the garage where the vehicles are stabled. This feature facilitates control over travel times and restrictions on the minimum and maximum number of operators at each base. With bus scheduling, crew bases are normally at the same location as the garage, but this feature is nonetheless available.

Scheduling by number of vehicles: You can now use *HASTUS 5* to create trips by defining the number of vehicles available during a particular time period. Using defined run times and minimum layovers, *HASTUS* then generates the trips based on the round-trip time.

***HASTOP* stop timetable option:** The *HASTOP* report and interface file list stop passing times for all vehicles at a given stop. A separate page is produced for each stop and route.

Using a simple formatting language, each organization can define style sheets to control information in *HASTOP* interface files. These files can be used to transfer *HASTOP* information to desktop publishing systems or other computer applications.

***Geo* network mapping option:** Deadhead times and itineraries between selected places and stops can now be automatically calculated from the geographic database. You can minimize distances or times taking into account permitted vehicle types, turning restrictions, one-way streets, and average commercial speeds by street class.

This option facilitates construction of the large deadhead matrixes often required for interlining.

Roster and days-off: You can now fix duties and days-off in specific roster days before using automatic roster-building commands.

A full description of all changes is available to *HASTUS* customers. Please contact your project manager or send us a message by e-mail at **info@giro.ca**.

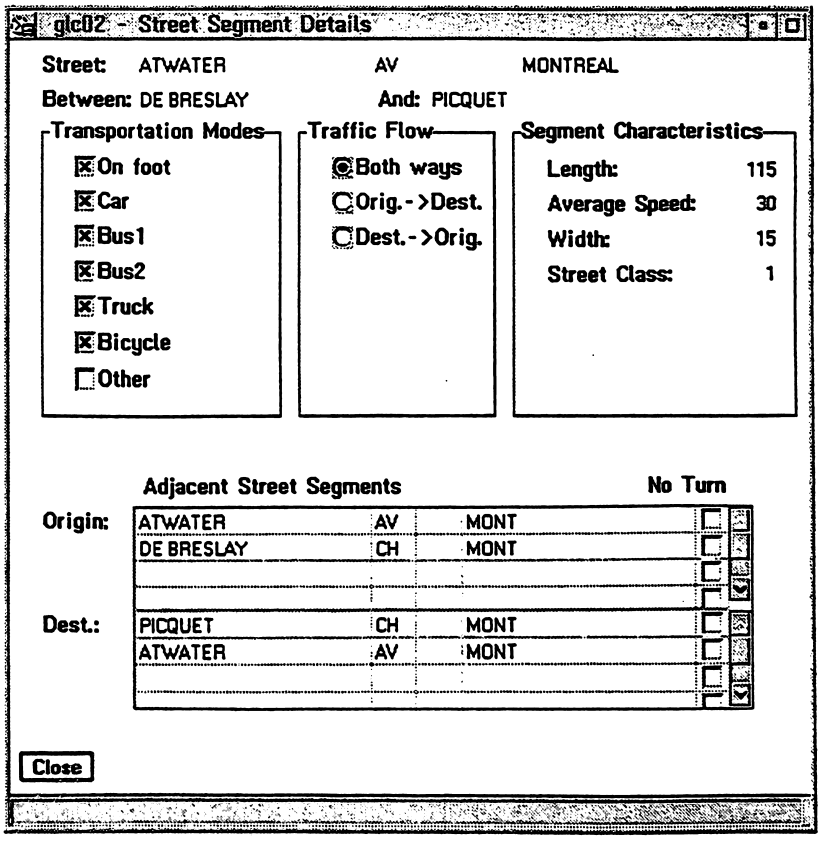
Features that are planned for the next release of *HASTUS 5* in August include:

Support for Windows NT: Windows NT from Microsoft has become the choice of many organizations that seek a true 32-bit operating system while maintaining access to popular Windows desktop applications. More robust than Windows 3.1 and Windows 95, Windows NT is preferred for complex applications like *HASTUS-Vehicle* and *HASTUS-Crew*, and where reliability is essential, as with *HASTUS-DDAM*.

Industry analysts are in general agreement that Windows NT is now one of the most popular desktop systems for corporate users. GIRO expects NT to become, over the next year or so, a major delivery platform for new and upgrade projects. The NT version of *HASTUS* is currently being tested at GIRO and at selected customer sites.

Graphical reports: The presentation of many *HASTUS* reports will be improved over the next few releases. Support for various character sets and other printing effects such as proportional fonts will be included in V52R2. A related feature is the ability to print *HASTUS* vehicle and crew scheduling graphs on laser and inkjet printers.

Both features will be based on standard printer drivers included with the operating system (NT or OS/2), increasing the number of devices supported and facilitating maintenance.



The Geo option provides details on traffic restrictions and can estimate deadhead travel times.

GIRO Inc., 75 Port-Royal Street East, Suite 500, Montréal (Québec) H3L 3T1 Tel.: (514) 383-0404/Fax: (514) 383-4971

Users Group in Montréal in September

The 1996 Users Group (**September 25 to 27**) will feature training, information, and workshop sessions of interest to all *HASTUS* users, as well as transit managers and staff involved in planning, scheduling, customer information, and garage operations.

- Fine-tune your *HASTUS* skills and knowledge through workshops and training session.
- Learn about new *HASTUS* features such as geographic displays, attribute formulas, graphical reports, and the day exception feature.
- Learn about current projects and how *HASTUS* is being used to improve transit efficiency around the world.
- Participate in round-tables on such topics as how to select and train schedulers.

International meeting

The meeting is open to existing customers as well as to transit officials interested in learning more about our software products and their use by transit organizations around the world.

With the exception of customer presentations, most sessions will be repeated in English and French. Regional special interest groups may of course hold sessions in other languages.

Each session will feature both invited and informal interventions from experienced *HASTUS* users. Please let us know if you have special interests or experiences you are willing to share.

The conference hotel, the Holiday Inn Select, is located in the heart of Montréal's Chinatown district, a short walk or metro ride from Old Montréal, the Latin Quarter, and the downtown shopping areas.

For a detailed program, call or write **Lyne Gauthier**, e-mail lyneg@giro.ca, or visit our web site at fttp://www.giro.ca.

Transit on the Internet

More and more transit organizations are turning to the Internet to publish general and timetable-related information. These sites take many different forms as transit providers and their customers explore the possibilities of this new medium.

Some interesting sites include **ACTION** in Canberra, where schedules from their most recent "Bus Book" are displayed. **Metro Transit** in Halifax also offers detailed schedules. From California, **Santa Cruz Transit** presents schedules and maps with a downloadable viewer.

GIRO's own page at **www.giro.ca** provides product information, e-mail support, details of Users Group meetings, as well as links to the above and other transit sites.

The use of the Internet in transit is one of the topics that will be explored at our upcoming Users Group meeting in September.

Upcoming events

- The upcoming **APTA** conference and exposition, October 7 to 9 in Anaheim, California, promises to be one of the largest ever. See us at booth 1505 in the Compu-Trans section.
- The annual **CUTA** conference and exposition will be held this year in Vancouver from November 17 to 19.
- The city of Rouen will host this year's **UTP Conference** from November 27 to 29. The UTP is the French transit association.

GCL calls upon *GeoRoute-Distribution*

GCL, a recently formed logistics and consulting firm based in Montréal, has acquired the *GeoRoute-Distribution* software to provide route optimization services to its clients.

GCL staff members previously collaborated with GIRO Enterprises' LOGIROUTE Group on several routing projects. GCL provides expertise in the overall flow of goods from the suppliers, through the processing plant and warehouse, and on to the customers.

GeoRoute-Distribution proposes efficient routes for pick-up and delivery of various goods, including newspapers, milk, bread, priority mail, etc. The routes can be based on specific orders, regular servicing calendars, or a combination of these. One-way streets, turning restrictions, time constraints at customer locations, and vehicle capacities, as well as key work rules, are taken into account.

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GIRO Enterprises Inc.

Advanced software for improved productivity

GIRO Enterprises Inc. provides computer software and related consulting services for transportation applications. The group is composed of **GIRO Inc.**, a developer of public transit scheduling systems, and **LOGIROUTE Computer Systems Inc.**, active in the area of routing and scheduling software.

HASTUS for transit scheduling

Organizations in North America, Europe, Asia-Pacific and Africa rely on GIRO products and expertise to help achieve gains in productivity and customer service.

The prize-winning *HASTUS* system helps schedule the mass transit systems of cities around the world: Los Angeles, Boston, Montréal, Sydney, Brussels, Stockholm, Lyon, Barcelona, Singapore and Edinburgh to name but a few.

HASTUS offers advanced optimization techniques to produce efficient schedules for both vehicles and drivers. *HASTUS* can significantly reduce operating costs while reducing the time required to generate new schedules.

Other public transit solutions

To complement the basic *HASTUS* system, GIRO offers several related modules:

- *Geo* provides mapping capabilities, including accurate time and distance calculations over the street network
- *HASTUS-DDAM* helps streamline daily transit operations such as managing absences, replacements, and overtime distribution.
- *HASTINFO* provides customer information on schedules and itineraries.
- *GIRO/ACCES* is an automated scheduling system for transit for the disabled.

Routing and scheduling

LOGIROUTE offers the *GeoRoute* family of software to build and optimize routes in varied contexts:

- *Post Cards* for postal delivery.
- *GeoRoute-Municipal* for refuse collection, street cleaning and snow removal.
- *GeoRoute-Distribution* for pick-up and delivery applications.
- *GeoBus* for school transportation.

All of these products are based on a geographic database, and thus take into account the details of the street network such as one-way streets, traffic restrictions and commercial speeds.

Internationally-recognized expertise

GIRO offers a unique combination of expertise in operations research, computer technology, geographic information systems and transportation. We invest heavily in research and development activities to remain at the forefront of our chosen areas.

Our international outlook has produced systems that are flexible, multilingual, and readily adaptable to differing contexts.

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