the I.P. Sharp newsletter

MAY/JUNE 1974

The Globe and Mail

TORONTO, FRIDAY, MAY 3, 1974

FRONT PAGE CHALLENGE!

We were featured on the front page of The Globe and Mail on May 3rd in a somewhat dubious story. It seems that we make a portable terminal which hooks up to any old domestic TV set and any old domestic telephone. Furthermore this evil device can be used to access secret data on secret government computers. Our Carleton Place factory was described as a "large old mill" and we make use of this to build (furtively) these dastardly devices.

The article was written by someone called Wayne Cheveldayoff (yes, really) and it must rank quite high on the list of examples of incompetent, inaccurate, misleading and unprofessional journalism.

Secretary takes notes from message projected on television screen connected to remote computer terminal in suitcase. Dialed to computer, telephone (foreground) is linked to portable unit via receiver.

Computers can be robbed

By WAYNE CHEVELDAYOFF
Globe and Mail Reporter

OTTAWA — Governments and businesses across Canada are tightening up the security of their computer systems because unauthorized access to them is costing them many thousands of dollars an-

pany equipment simply by punching the right beep tones on his touch telephone. He then picked up the equipment and sold it through a dummy company.

employee

One such piece of equipment is the IPSA-100, a portable remote computer terminal—made in Canada—that can be carried around in a small suitcase and is compatible with most IBM computers accessible by telephone.

There are similar remote

The most disappointing aspect of the whole story is the fact that no member of the mafia has ordered a terminal. Could it be that all the secret data on all the secret government computers isn't of interest to anyone? Could well be.

MORE POWER TO YOU

SHARP APL users now have a workspace of 80K bytes available to them. This is the result of the latest improvement in our Computer Centre hardware facilities, completed in late April. I. P. Sharp's two IBM 370/145 machines have been upgraded to one megabyte capacity each. On-line storage currently totals 2.4 billion bytes on 24 Memorex 3670 disc drives.

Bill Liddon died suddenly at home on the morning of April 13th. His untimely death at the age of 36 has profoundly shocked us all. Words are insufficient to describe the void he has left in our lives.

Bill joined I. P. Sharp Associates in 1967 and progressively assumed more responsibility in the company. He was an excellent administrator, a genial host, a fine conversationalist and a good friend; he gained the confidence and trust of all those with whom he came in contact. His personality, wisdom, humour and technical competence have been an integral part of the character of the company, and that character will be different without him.

To his wife, Sheila, and his sons, Geoffrey and Peter, we extend our inadequate but heartfelt sympathies.

GAS MANAGEMENT SYSTEM

During the past three years, I. P. Sharp Associates has been working with gas distribution companies, using SHARP APL to develop marketing information systems. The importance of this work led to a natural outcome: the implementation of GMS as an application available to all I. P. Sharp customers. The following article by a current GMS user details the purpose and efficiency of this APL application.

The Marketing Division of National Fuel Gas Company is responsible for maintaining a preference for natural gas, maintaining good customer relations and providing feedback to our management on customer requirements. It has been especially important in this period of limited availability of fuels to keep industrial and commercial customers up-to-date on our sales policy and our projected ability to meet requirements, to assist them in energy conservation and to prepare them for possible future curtailment. It has been equally important to keep our management aware of historical and projected requirements for curtailment planning, regulatory reports, and market identification.

A unique time-sharing data system in APL program language has been developed by I. P. Sharp Associates and National Fuel's Marketing Division. Our Gas Management System (GMS) was conceived as an information system to give us fingertip access to consumption history, limits on consumption, peak demand, and end use data for a group of large volume customers. With GMS we are able to compare actual sales to committed and expected sales with compensation for weather effects and business conditions. Detailed and summary reports are used to evaluate energy conservation programs as well as sales restrictions. We are also able to study the effects of various curtailment alternatives.

The system operates through a terminal which connects via telephone to an on-line computer. Additions and changes to existing data are accomplished in brief "conversational" sessions with the terminal. We can add a new line of gas applications data to a customer's file in a few seconds without card punching. It is this simplicity which keeps the files accurate and useful. Our customers' inquiries are answered quickly and confidently. Reports can be printed on our terminal or on I. P. Sharp's high speed printer. Our management gets reports without delay and if the request is for other than a standard report, we generally get same day service from the programming specialists at I. P. Sharp.

One of our most useful reports is the Customer Information Report. It is based on monthly consumption history and the gas applications data which our customers have compiled at our request. .... A Usage Report is prepared monthly using process and heating factors to compare actual consumption to base year consumption, and to base year consumption corrected for weather. The Usage Report is available for the current month or the year-to-date and in detailed or summary form. Several reports are available to list the various data in the

Customer Information Report, but the Federal Power Commission report that sorts customers, equipment type, and the estimated annual volume by F.P.C. priorities of service, is one of the most important. The summary form of the F.P.C. report gives monthly volumes for any given period. The format is one which we hope will be acceptable to all our suppliers and regulators, but the Gas Management System has the flexibility to provide any required format.

GMS has been economical as well as effective and flexible. The total cost of the system for the approximately 200 customers filed to date has been less than the cost of one full-time clerk. The principal advantage, however, has been to free marketing personnel from much of the clerical work which has interfered with essential customer contact.

Sample report:

NORTH AMERICAN GAS CO.
CUSTOMER INFORMATION REPORT

DATE: JUN 4, 1974

CUSTOMER: ROSS METAL CO.
372 SUNNYSIDE
NEW YORK

ACCOUNT NUMBER: 1990993843
SIC NUMBER: 3361
RECORD NUMBER: 5

REGULATOR AND METER INFO:

REVENUE CLASS: 13
ANNIV. MONTH: MAY

	BASE HEAT	YEAR PROCESS	VOLUME TOTAL
ANNUAL...	40,342	87,396	127,738 MCF
FACTOR...	5.8 MCF/DD	239.4 MCF/DAY	

GAS APPLICATIONS DATA

EQUIPMENT	CURT. STEP	F.P.C. PRIOR.	NO. UNITS	CFH INPUT	*EST. ANNUAL MCF* HEAT	PROCESS	PCT.OF TOTAL	ALT. FUEL	DATE TURNED ON	**USAGE FACTORS** HEAT MCF/DD	PROCESS MCF/DAY
1-WATER HEATERS	6	2.5	4	528		1113	0.9				3.0
2-SPACE HEATING FURNACES	6	2.3	1	1250	1349		1.1			0.2	
3-BOILERS	6	2.3	3	5600	2231	6268	6.7			0.3	17.2
4-INFRA-RED HEATERS	6	2.3	27	1660	1791		1.4			0.3	
5-UNIT HEATERS	6	2.3	26	6065	6543		5.1			0.9	
7-MAKE-UP AIR DIRECT FIRED	6	2.3	12	26350	28428		22.3			4.1	
8-AIR CONDITIONER;REFRIGERATOR	6	2.5	7	955		2013	1.6				5.5
10-INCINERATORS(SOL,LIQ,FUME)	6	2.5	1	896		1888	1.5				5.2
12-HEAT TREATING (GENERAL)	6	2.5	6	2540		5353	4.2				14.7
21-MELTING UNITS(REVERB;CRUC)	6	2.5	43	33574		70761	55.4				193.9
TOTALS:			130	79418	40342	87396	100.0			5.8	239.4

CONSUMPTION (MCF):

MONTH	*** CONSUMPTION HISTORY *** 1970	1971	1972	1973	1974	BASE YEAR	** CUMULATIVE VARIANCE ANALYSIS (1974) ** MTH.	BASE	ACTUAL	VAR.	%VAR.
JANUARY	13,778	13,757	13,251	14,949	14,589	14,567	NOV	11,682	9,287	-2,395	-20.5
FEBRUARY	12,058	13,881	13,910	16,748	17,310	13,842	DEC	25,519	21,871	-3,648	-14.3
MARCH	11,512	11,203	12,955	12,712	14,568	13,142	JAN	40,086	36,460	-3,626	-9.0
APRIL	10,222	11,056	10,084	11,540	14,141	10,852	FEB	53,928	53,770	-158	-0.3
MAY	6,887	7,572	7,533	9,651	13,743	9,261	MAR	67,070	68,338	1,268	1.9
JUNE	6,504	6,392	6,350	7,341		7,754	APR	77,922	82,479	4,557	5.8
JULY	6,556	5,920	5,709	7,225		7,425	MAY	87,183	96,222	9,039	10.4
AUGUST	4,631	4,430	4,299	6,005		7,536	JUN	94,937			
SEPTEMBER	6,188	5,661	6,806	7,821		8,113	JUL	102,362			
OCTOBER	6,304	5,787	7,738	7,888		9,727	AUG	109,898			
NOVEMBER	7,594	7,947	11,416	9,287		11,682	SEP	118,011			
DECEMBER	12,316	11,110	14,442	12,584		13,837	OCT	127,738			
YEAR TOTAL	104,550	104,716	114,493	123,751	74,351	127,738					

BASE PERIOD SUMMARY:	EXPECTED	ACTUAL	VARIANCE	%VAR.
VOLUME.....	87,183	96,222	9,039	10.4
DEGREE DAYS...	6,370	5,796	-574	-9.0

APLX-11 SEASONAL ADJUSTMENT PROGRAM

I. P. Sharp Associates has implemented in SHARP APL the U.S. Department of Commerce Seasonal Adjustment Program (X-11 variant). It will analyze monthly time series of 36 months or more in length and determines seasonality factors, trend cycles, irregular elements as well as the final adjusted time series. The refined time series can be used for forecasting and planning and the pattern indices developed by the program can be applied to put the forecasts on the same basis as the raw data.

APLX-11 is comparatively easy to use in that all it requires is the specification of the time series in question and the desired elements of output. The user can request a standard output package which includes the original series, several elements of the final refined data, and some graphs; the output is designed for transmission to a terminal. However, the user can specify non-standard elements of output and can direct the output to the high speed printer at the Computer Centre.

APLX-11 can be accessed by any SHARP APL user from Public Library 82 *INFO*. For user instructions, the function *BASIC* that is resident in that library should be executed. For full user documentation, the function *COMPLETE* should be executed.

NEW OFFICE ADDRESSES

I.P. Sharp has been on the move again. Our VANCOUVER office has taken larger premises at:

Suite 604, 1112 West Pender St.
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In the U.S., a change and an addition:

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St. Louis Park,
Minn. 55416
(612) 374-9406

CHICAGO - 5490 South Shore Dr.
Chicago
Illinois 60615
(312) 922-5510

APL COURSES

Courses in SHARP APL are held every month in Toronto and Ottawa, and as required in other branch offices. A course is usually five days in duration, with morning lectures and afternoon terminal sessions. The following courses will be held in July.

Ottawa: July 8-12
210 Gladstone Avenue, Suite 2003

Toronto: July 15-19
145 King St. West, Suite 1400

Contact your local I. P. Sharp office for additional information and course dates.

'SARP' AIR TRAFFIC CONTROL SYSTEM

Air Traffic Control (ATC) is one of the many varied fields in which I. P. Sharp Associates has demonstrated its special systems expertise. A project of particular importance was the development of an ATC system in The Netherlands. Not only was this project successfully implemented, it was also completed on time and within budget, a remarkable achievement for such a major undertaking. The system is described in the following article.

The Signaal Automatic Radar Processing (SARP) system is a real-time ATC system to facilitate the control of aircraft within the Amsterdam terminal movements area. The main contractor was Hollandse Signaalapparaten (SIGNAAL), a subsidiary of Philips. They were responsible for delivery of the complete system, including installation and the relevant services.

The responsibilities of Intersystems, the Dutch subsidiary of I. P. Sharp Associates, included the design and production of all the applications software and of the real-time supervisor, simulation testing, all levels of system integration, and installation and maintenance of the software. The application software had to be integrated with the hardware produced by SIGNAAL, in which all duplication facilities were catered for.

Recent studies in the field of Air Traffic Control have suggested that a large proportion of reported near-misses are attributable to incorrect identification of aircraft "blips" on the controller's radar display. One of the prime functions of SARP is to display beside each aircraft position an alpha-numeric label which identifies the aircraft by means of its radio callsign, e.g. AC529. In addition to providing the callsign, this label indicates the aircraft's current altitude, the altitude to which it is cleared, its calculated speed, instructed speed and possibly the aircraft type and instructed heading.

The SARP system hardware includes two SIGNAAL computers, operating in parallel, either one of which (the Master) may control the system at a given time, while the other acts as a hot standby, ready to take over in the event of a failure in the Master or one of its peripherals. Each computer has 48K words of memory (24-bit word size), a drum for bulk storage, and its own communication channels for input of radar data and controller keyboard actions, and for output of data to the displays. The system includes 6 radar displays for presenting aircraft positions to the controllers, 7 alpha-numeric displays for presenting flight plan data ("flight progress strips"), and controller input devices such as lightpens, joysticks, special function keys, alpha-numeric keyboards and teletypes.

The two main streams of data passing through the system are flight plan data and radar data. Before take-off, each pilot has to file a "flight plan" containing such information as aircraft callsign, departure airport, the route to be followed, destination, type of aircraft, estimated time of arrival/departure, requested altitude and cruising speed, and information on the equipment carried. This flight plan is stored on the SARP drums and automatically "activated" (read into core memory) some minutes before the estimated time of arrival or departure. Flight plan data is automatically presented at the appropriate time on each of the 7 alpha-

numeric displays, which can display up to 32 lines of 64 characters each; and it may be updated during the course of the flight by controllers using their special function and alpha-numeric keyboards.

Radar data is received from the video extractors over 2400 baud lines, and is used for "tracking" aircraft within about 60 miles radius of Amsterdam airport. The tracking process consists essentially of maintaining within core memory a record of the current position, speed and identity of aircraft within the SARP radar coverage. Aircraft current positions and velocities are used to predict aircraft positions at the next antenna revolution, in order that radar returns can be correlated with known tracks. This correlation process, together with the automatic or manual correlation of aircraft tracks with aircraft flight plans, provides the means whereby information labels can be displayed alongside aircraft positions on the radar displays, as described above.

The radar data includes both "primary" and "secondary" radar returns. In a primary radar system, pulse trains transmitted from a rotating antenna are reflected from an aircraft. The range of the target is derived from the time taken for the reflection to reach the radar site, and the bearing is determined from the direction in which the radar is pointing when an echo is received. Such a system is limited in range and is prone to spurious responses from weather disturbances and bird migrations.

Today, almost every commercial aircraft is equipped with a secondary radar "transponder". This is a device fitted to the fuselage which, when triggered by interrogation from a secondary radar on the ground, transmits coded responses which provide the identification and altitude of the aircraft. The SARP software performs automatic tracking of both primary and secondary radar targets.

Compared with the ATC systems currently operating in other countries, the SARP system is fairly sophisticated. For example, it provides a number of enhancements not originally included in the ARTS III system used for terminal area control at the high-density airports in the U.S. These additionals facilities include:

1) Two central processors operating in parallel, to provide an on-line system back-up;
2) Display of flight plan data on electronic displays instead of paper strips;
3) Tracking of primary radar targets as well as secondary;
4) More flight plan data displayed on the radar display;
5) Two-colour displays.

The SARP system was provisionally accepted by The Netherlands Aviation Authority in August 1973 one month prior to contract schedule. Subsequently Intersystems carried out a series of modifications to the application software to implement design changes which had become necessary or desirable during initial implementation. These have also been completed on schedule and the system was finally accepted in January, 1974.

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Update

- ☐ Please amend my mailing address as indicated.
- ☐ Add to your mailing list the following name(s).
- ☐ Send me SHARP APL manuals and product literature as listed.

☐ Note my comments: _____

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