CRAY
INTERFACE
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Nights around the table wins contract with the Crown

Midnight to 6 a.m. was dedicated time for a dedicated team who pooled their skills to show the Canadian Government what CRAY systems can really do. With their efforts, Cray won its first contract with the Crown.

"We were the company who really read the proposal, made an accurate interpretation and responded to the needs of the Canadian Government," remarked Bob Walan (Central Region Manager). "The individual creativity and cooperative spirit made this a rewarding experience."

From terminals around the country, Meredith Speers (Region Analyst-Rochester), Bob Wellck (Region Analyst-Boulder), Vince Wayland (Site Analyst Manager-Boulder) and Bob Cox (Region Analyst Manager-Boulder), kept lines tied to CRAY systems at NASA/Ames, UIS and Mendota Heights, tailoring available programs to beat the wall-clock requirements. "A field-developed random I/O program, written by Bob Enk, coupled with multi-streaming of data files enabled us to minimize the clock time," Bob Wellck remarked. "As a result, we beat the competition with times that were exceptionally impressive."

Much of the benchmarking was performed at various locations around the United States. "We often saw the sun rise at NASA/Ames," recalled Bob Cox. "Dave Barker, Jim Weimer, Jim Harrell and Steve Walworth became friendly and familiar faces. We also had the opportunity to work with Rosie Klein and Sandy Knaak in Mendota, who made tremendous contributions to our efforts. Together we made certain that Cray would supply what CMC needed."

The weather forecast system for the Canadian Meteorological Centre (CMC) now depends on the twice daily production of guidance material from computer facilities located just outside Montreal. The history of these facilities reveals three attempts, in less than ten

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In this issue . . .

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Bob Walan (far left) and Rene Copeland (far right) meet with members of the Vector Processing procurement team.

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years, to procure computer capabilities to meet their needs for quality weather forecasting.

Output from the facilities is used by transportation experts for safe navigation, by farmers for crop forecasting and planting guides, by scientists for research in the atmospheric sciences and by civilians for emergency weather predictions. For these reasons, weather simulations must be accurate, useful, understandable and above all, timely.

Forecasts are complex, time-critical applications. They require tremendous operating speeds that allow data to be collected, decoded, analyzed, made into forecasts and transmitted *before* they manifest in the real atmosphere. Weather centrals, therefore, must perform these operations in a fixed amount of wall-clock time.

Data for forecasting is collected from classical ground stations throughout the world for surface observations. Pilots, ships and satellites provide additional, but scattered, readings. In order to collect and analyze this data and determine weather trends, computer facilities must operate on a 24-hour, seven day per-week basis.

A forecast model consists of a collection of mathematical statements which specify the dynamics of the atmosphere. In addition, a set of specialized algorithms parameterize the physics (solar radiation, rainfall, etc.).

Variables such as sea level pressure, sea surface temperature, geopotential heights, winds and moistures, among others, are transformed into a wave representation for use with a spectral forecast model.

A model, known to meteorological experts as an "initial boundary value problem," marches these variables forward in time to achieve a forecast. This process may require hundreds of time steps and is the most computationally intensive portion of the analyst-forecast cycle.

In addition to the spectral wave model, finite difference and finite element models are calculated using three dimensional grids with vast numbers of horizontal and vertical coordinates.

Graphics are also used extensively in weather forecasting models since meteorologists are accustomed to viewing contour plots of weather patterns.

Models cover almost any region: global, hemispheric, or limited-area. The number of data points and the degree of resolution that are possible with a CRAY system enhance the accuracy.

Proving that the CRAY could perform these operations within specified wall-clock times, with the necessary accuracy, was only part of the challenge that won the contract. "It wasn't simply who could provide the best system," explained Rene Copeland (Sales Rep from Chicago and team leader for the Canadian Met order), "but who was the best company for Canada."

Part of the acquisition effort was to procure computing capabilities that would increase at a rate to match growing weather model requirements.

In a tour and presentation in Chippewa Falls, our Canadian customers were shown how CRAY systems would meet their future needs. Les Davis, Steve Chen, Dave Slowinski and Gene Somdahl illustrated the Cray style and showed CMC how CRAY systems will provide them with services in the years to come. Dale Mays showed additional resources with a demonstration of our tape capabilities.

Contract conditions, extending over a 6-1/2 year period, were an intricate part of the procurement process. "The currency exchange rates, import regulations and budget allocation issues that entered into the process were expertly handled by Bill Beim," Rene remarked. Due to a strong sense of nationalism within Canada, purchases are evaluated on the long-term economic impact and overall welfare of the country.

"It was a challenging procurement," Rene recalls, "but our optimal system capabilities, our reputation in the U.K. and our potential for handling the future needs in Canada convinced the Ministry that Cray was, indeed, the best company for Canada."

1982 Profit Sharing Results

At year-end, the Board of Directors reviews our performance against company objectives and determines the amount to pay in distributed and deferred profit sharing. Earnings were less in 1982 and employee's profit-sharing had to be distributed over a larger payroll, which brought the percentage of proceeds down from 1981.

Company goals were not met in two areas for 1982. We did not generate operating income equivalent to 28% of revenue and we did not penetrate the industrial science markets to the extent targeted.

However, due to the state of the economy, in general, and delays in export licenses, the percentage allocated for profit-sharing was not reduced.

Financial

Goal: Generate operating income equivalent to 28% of revenue.
Year-end: Achieved operating income of 22.9% of revenue.

Goal: Keep effective tax rate below 45%.
Year-end: Our effective tax rate for 1982 was 40.4%.

Marketing

Goal: Provide successful installation and acceptance of fifteen new and two used systems.
Year-end: Provided successful installation and acceptance of 15 new and 2 used systems, which includes two in-house systems.

Goal: Penetrate industrial science markets outside petroleum to the extent of six new orders.
Year-end: We did not penetrate the industrial science markets to the extent of our target, but obtained new orders for use solely in graphic simulation.

Goal: Establish a marketing data center to provide resources for benchmarking and software development use.
Year-end: The Mendota Heights computer center is in full use with two CRAY systems, Serial 27 and Serial 101 X-MP.

Production

Goal: Provide sixteen CRAY systems for delivery in 1982.
Year-end: Specifically, we produced fifteen new computer systems in 1982, which was in line with a revised schedule.

Goal: Bring the second printed circuit facility up to production capacity.
Year-end: The new printed circuit facility at Riverside started production in March of 1982.

Software Development

Goal: Begin a new FORTRAN compiler.
Year-end: A new FORTRAN compiler effort was started and continues on schedule.
Goal: Support new X-MP hardware system with compiler and operating system.
Year-end: X-MP hardware documentation, compiler and operating system activities are progressing on schedule. The FORTRAN library supports phase one of the X-MP development plan.

Goal: Enhance the on-line tape capability to provide an interface to the IBM tape catalog process.
Year-end: Software to support the on-line tape capability providing an interface to the IBM tape catalog process was delivered to a customer in December.

Development and Engineering

Goal: Complete testing of Serial 101 X-MP and deliver to Software Development during the third quarter of 1982.
Year-end: System finished checkout in July and was delivered to Mendota Heights in August.

Goal: Complete testing of large buffer memory system in the first quarter of 1982.
Year-end: Completed as scheduled.

Human Resources

Goal: Assure an effective structure for the decentralization of the human resources function.
Year-end: The decentralization model was reviewed and approved by the Operations Committee. Regions became total operating centers on January 1, 1983.

Goal: Provide training and systems to emphasize effective management of performance.
Year-end: 300 hours of management training were given throughout the company in 1982. A development planning guide for managers and proficiencies for field analysts and software jobs have been developed.

Goal: Provide for more employee choice in benefits program.
Year-end: New options for health insurance were established for employees.

Comparison of Profit-Sharing proceeds

1981		1982
$ 33,843,731	Earnings (before taxes)	$ 33,606,630
7.5%	Percent set by Board for Profit-Sharing	7.5%
2,763,280		2,520,497
2,498,281	Amount allocated to U.S.	2,295,165
(90+%)		(90%)
999,312	40% cash payment (60% deferred)	918,066
15,186,492	Payroll on which distribution is based	22,366,876
6.6%	Proceeds per payroll dollar	4.0%

1982 Earnings and revenue announced

The company's unaudited earnings for 1982 were announced on January 30th. They were $19,000,000 equal to $1.38 per share, up from $18,170,000 or $1.32 per share for 1981. Revenue was $141,149,000 compared with $101,642,000 for 1981.

Fourth quarter net earnings were $12,167,000 or $.87 per share on revenue of $62,657,000. This compared with 1981 net earnings of $8,007,000 or $.58 per share on revenue of $39,991,000.

"Revenue growth for the year was 39% while net earnings grew 5%," remarked John Rollwagen. "Several factors contributed to the slower growth in earnings, including our decision in September to reduce the price on the CRAY-1/S to bring it in-line with the newly introduced CRAY-1/M. In addition, engineering and development costs for the CRAY-2 were higher than anticipated."

John noted that net earnings for 1982 benefited from a reduction of approximately 3.5% in the effective tax rate, due principally to research and development tax credits.

Both revenue and costs were affected in 1982 by delays in export licenses to France. With recent license approval, shipment will be carried out in 1983.

	1982*	1981
Revenue	141,149	101,642
Cost and expenses	108,898	71,192
Operating income	32,251	30,450
Other income (deductions)	(364)	2,020
Earnings before income taxes	31,887	32,470
Provisions for income taxes	(12,887)	(14,330)
Net earnings	19,000	18,170
Earnings per common and common equivalent shares	1.38	1.32
Average number of common and common equivalent shares outstanding	13,809	13,781

*12 months ending December 31, 1982, in thousands except earnings per share data.

And what about 1983? Profit Sharing Objectives

Financial

- Generate operating income equivalent to 30% of revenue.
- Keep effective tax rate below 42.5%.
- Achieve return on average stockholder equity of at least 20%.

Development and Engineering

- Complete on-going projects for new product and I.C. developments.
- Complete various enhancement projects for existing projects, including data streaming with interface and disk development projects.
- Provide continuation engineering and maintenance on all products.

Manufacturing

- With continued emphasis on reliability and quality control measures, produce new systems, including S Series, X-MP's and M Series models.
- Through manufacturing efforts, increase gross margins on completed products.

Marketing

- Provide successful installation and acceptance of both new and used systems to meet 1983 revenue objectives.
- Continue to promote contracts and applications for the industrial science marketplace including automotive, chemical, circuit design or aerospace users.

Software Development

- Provide an operating system and FORTRAN compiler which demonstrates the hardware capabilities of new products.
- Through direct Software Development involvement, enhance customer satisfaction with software products.

Human Resources

- Provide training and organizational systems to emphasize effective management of performance throughout the company.
- Communicate, implement and improve corporate responsiveness to divisions on staffing, EEO and relocation concerns.

Act Affirmative

Fact: Unemployment among minorities is twice that of whites in the same age category.

Fact: Considering equality in education, occupation and position, women still earn only 41-66% of the average male income.

Fact: Only 11% of the labor force is black. Hispanics occupy 4.1%, Asian Americans occupy .8% and American Indians only .4% of the U.S. labor force.

The general status of women and minorities in the U.S. labor force is not an enviable one. Time after time, statistics show unexplainable differences. These differences generate much concern over both overt and unintentional practices that limit employment opportunities.

To ensure that each person receives basic civil rights, the government has established programs to enforce equality in labor practices.

One of these programs involves an executive order issued in 1965 (amended in 1968 and 1977) requiring all federal contractors and subcontractors to develop affirmative action programs.

The agencies regulating fair employment programs have clear goals: 1) to increase job opportunities, 2) to make program administration more responsive to the problems of protected classes and 3) to improve effectiveness by coordinating regulations, guidelines and administration.

Equal employment opportunity (EEO) is a policy of nondiscrimination. It requires that personnel practices guarantee the same opportunities to all individuals regardless of their race, color, religion, sex, age, national origin, handicaps or other factors. These factors, by law, cannot be used to exclude individuals from participating in an employment system.

Nondiscrimination alone, however, is not affirmative action. Affirmative action (AA) puts "teeth" into EEO laws by requiring an employer to take specific steps to remedy the present effects of past practices. Guidelines are developed to ensure that a well-balanced and representative work force will be achieved.

In the work environment, this includes awareness of possible discriminatory practices in recruitment, selection, placement, testing, systems of transfer, training, promotion, seniority, lines of progression and other basic terms or conditions of employment.

Mary McDiarmid, Human Resources Manager, is the company's appointed Affirmative Action Officer. Her responsibilities include monitoring all Equal Opportunity activities and reporting the effectiveness of our Affirmative Action program on a monthly basis. This includes recommendations for necessary action to ensure attainment of our objectives.

Through a complex process and analysis, Cray sets goals to fill deficiency areas for various protected classes in several different job groups. Each region is responsible for fulfilling individual goals.

This responsibility is carried through by supervisors and managers in all locations who guard against discriminatory practices for their specific work groups.

"Cray's affirmative action practices are designed to achieve more than fundamental adherence to government regulations," Mary remarked. "With this program, we hope to provide the company and each individual with a well-rounded work environment, which is enhanced by a diverse employee population."

Sexual harrassment is a violation of the 1964 Civil Rights Act.

When is an act considered sexual harrassment?

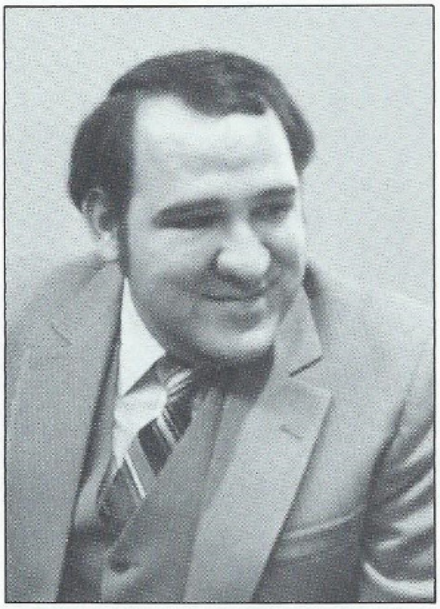
- If submission is either an explicit or implicit condition of employment.
- If submission or rejection is used as basis for an employment decision; or
- If the conduct has the effect of substantially interfering with work performance or creating an intimidating, hostile or offensive work environment.

In 1980 alone, approximately 1,300 sexual harrassment charges were filed with the Equal Employment Opportunity Commission (EEOC) by both men and women. This constitutes 7% of all EEO charges.

If you feel you are being sexually harrassed and talking to the person doesn't resolve the problem, you should immediately discuss the situation with your supervisor or a member of the human resources group.

Completing our Regions

James Robello, Business Controls Manager for the Western Region in Pleasanton, CA.



Al Czenski, Business Controls Manager for the Petroleum Region in Houston, TX.

As many are aware, the Regions became total operating centers in January of this year. As the arrangement takes hold, the Regions are forming skilled and dynamic teams.

Strong marketing, maintenance and software support continue to be vital parts of our region activities. With our decentralized structure, however, new and greater responsibilities are extending to our region offices.

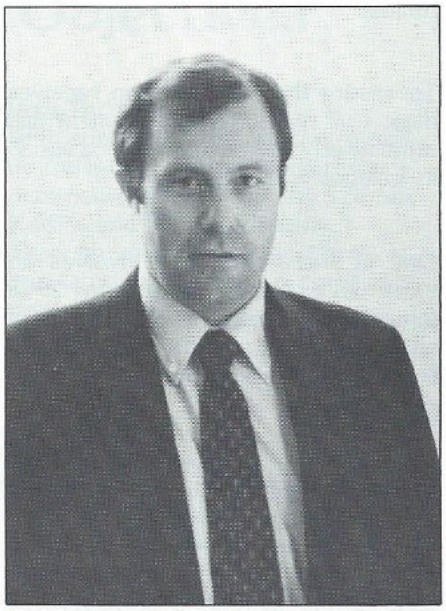
The move toward region profit centers created a need for the new positions filled by our Business Controls Managers. Financial reporting is their key responsibility. As the regions become more firmly established in their new operating structure, the Business Controls Managers will have increased responsibility for human resources, training and administrative needs in their individual regions.

All regions are headed by Region Managers. Reporting to them is a management team consisting of Business Controls, Analyst and Field Engineering Managers. Two regions have Site Analyst Managers, and one region has a District Manager reporting to the Field Engineering Manager.

"The difference in customer base around the country requires regions to operate with some autonomy," remarked Bruce Kasson (Vice President, U.S. Sales). "The regions differ to reflect the needs of their particular location."

"It is an exciting structure," he added, "and it should provide increased responsiveness to our customers at the region level."

John Howland, Business Controls Manager of the Central Region in Boulder, CO.



Dave Svendsen, Business Controls Manager for the Eastern Region in Silver Springs, Maryland.

Eastern Region left to right: John Stephens (Region Analyst Manager), Ed Masi (Region Manager) and Doug Wheeland (Field Engineering Manager).

Central Region left to right: John Howland (Business Controls Manager), Roger Brown (Field Engineering Manager), Bob Walan (Region Manager, Bob Cox (Region Analyst Manager) and Vince Wayland (Site Analyst Manager). Ron Lansing (not pictured) is the District Field Engineering Manager.

Petroleum Region left to right: Larry Stewart (Region Analyst Manager), George Stephenson (Region Manager) and Al Czenski (Business Controls Manager). Ray Ellison (Field Engineering Manager), is not pictured.

Western Region left to right: James Robello (Business Controls Manager), Howard Watts (Region Analyst Manager), Joan Franz (Site Analyst Manager) and Mike Wilhelm (Region Manager). Joel Newsom (Field Engineering Manager) is not pictured.

Corporate Register

French export license approved

On February 15th, Cray announced the order of a CRAY-1 S/1000 to an association of French education and government research organizations.

The system will be temporarily installed at CISI in February. CISI is a service bureau that installed its own CRAY-1 in 1981.

Later in 1983, the system will be moved to a new computer center at L'Ecole Polytechnique, an engineering school in the Paris area. Also using the CRAY system will be the National Ministry for Education, the National Ministry of Transport (which includes the Meteorological Weather Bureau), the National Center for Scientific Research (NRS), the National Office for Aerospace Research (ONERA) and the National Institute of Research and Automation (INRIA).

This is one of two systems detained by export licenses in 1982.

News from the Computer Center

A new version of the remote communications software was implemented on February 21st. This new capability allows the remote communications processor (COMTEN) to support dial-in capabilities to both the IBM 4341 and the AMDAHL V78 by means of 'switch characters'. A set of procedures for dial-in users under the new version can be obtained by calling Jurgen Seeman in Mendota Heights, extension 3040.

Cray Research and Harris Corporation announce joint development of supercomputer circuits

Harris Microwave Semiconductor, Inc., a subsidiary of Harris Corporation, has signed an agreement with Cray Research for a joint program to explore the use of gallium arsenide (GaAs) integrated circuits in supercomputers. Under the agreement, Cray and Harris Microwave will develop, concurrently, several types of GaAs circuits using compatible designs and processes.

Harris Microwave Semiconductor, based in Milpitas, California, specializes in the development and manufacturing of GaAs products for communication and information processing application.

Commenting on the agreement, John Rollwagen said, "In the realm of supercomputer architectures, it seems that the speed limitations of silicon are now being reached. The trend there is for greater densities, without significant changes in speed. Consequently, newer technologies, like gallium arsenide, are being explored. GaAs seems to be the technology of the future as far as speed goes, but it will be coupled with other technologies as well, such as CMOS."

Upcoming events

The following list of events are scheduled for 1983. If you would like more information on any of these programs, contact Mary Amiot in Mendota Heights, or for the technical symposium, Keith Johansen in Mpls.

- Cray User Group Meeting
  Oxford Moat House
  Oxford, England
  April 19-22
- International Analyst Meeting
  L'Hotel Sofitel
  Minneapolis, MN
  May 2-5
- 2nd Annual Technical Symposium
  Minnesuing, WI
  June 21-24
- International EIC Meeting
  L'Hotel Sofitel
  Minneapolis, MN
  July 25-28
- Cray User Group Meeting
  Pittsburgh, PA
  October 4-6

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