NEW APPLICATIONS computer systems at work

edited by Milton G. Bienhoff

Nova Minicomputer "Talks" To Blind

Over 5,000 blind people in the Boston area have a new friend in a talking computer system that allows them to type letter-perfect correspondence, proofread manuscripts, calculate bookkeeping problems, and write computer programs.

The first of these systems, known as an Audio-Response-Time-Shared (ARTS) Service Bureau, is operating at the Protestant Guild for the Blind in Watertown, Mass. It is built around a Data General Corporation Nova 800 minicomputer.

A blind person telephones the Bureau from his office, home or school and transmits information to the computer via the telephone line by using a console resembling a standard typewriter. The talking computer responds to the typist in words and sentences telling him precisely what he has typed or giving him the results of indicated commands or computations.

The operator can request a voice recording, Braille copy, or ink-print copy of the information he has typed. He is also supplied with memory space in the computer where he can store information and recall it at a later date for further changes or additional copies.

For example, a secretary using the ARTS Bureau is provided with a program which allows her to type letters, articles, or other office material. She may proofread her work, make corrections, and request printed copies on office letterhead stationery. A high school or college student uses the Bureau in almost the same way to prepare homework and type papers.

A blind programmer uses the system to type his program on the keyboard console, listening to the voice to discover errors. If he wants to insert new lines or correct statements, he sends them as simple commands and then the changes. When the program is completed, the computer provides a printed copy or a punched card copy for the programmer's employer.

The system, designed by American Systems, Inc. of Watertown, uses a Nova minicomputer to keep costs within reach of the average blind person. A user pays an initial cost of $450 for a console unit, constructed with either a standard or Braille keyboard. He then pays an hourly rate of $1.50 for the use of the computer.

The system can now handle 16 users simultaneously and designers are experimenting with ways to increase this capacity. With a full complement of blind subscribers, the system can pay its own operating costs, assuring users of a permanent, self-sufficient facility.

The idea for the system came from Dr. Kenneth Ingham, now president of American Systems and Director of the ARTS Bureau, when he was completing his doctorate in physics and astrophysics at Brandeis University in Waltham, Mass. Dr. Ingham, who is blind, devised a simple audio system to use as an aid in working with a computer. He then realized how valuable such an aid might be to blind people in any number of professions.

In 1969 Ingham and a group of his colleagues formed American Systems, Inc. to see if they could design and produce audio-response systems for commercial business applications. In 1970 an experimental ARTS system was built at the Massachusetts Institute of Technology, where Ingham was serving as a research associate.

The system developed from this prototype is operating at the Protestant Guild for the Blind; the first blind users are currently being trained to use it. American Systems already has a contract to produce a duplicate of the system for the state of Kentucky and inquiries are coming in from other states and foreign countries.

The ARTS Bureau consists of two interconnected digital computers. The first is an Audio Response Unit (ARU) which receives information from sixteen or more telephone lines and transforms this information immediately into voice in order to play it back to the user. Speech information is stored on a magnetic disc.

The Audio Response Unit transmits information from the user to the applications computer which contains and operates the Service Bureau programs. The basic applications system consists of a Data General Nova 800 with 16K of core memory, a high-speed swapping disc with 512,000 words of memory, and a moving head disc for data storage.

Electronic Analyzer Enhances U.S.C. Med School Teacher-Student Communications

An $80,000 electronic student response system, designed to increase the efficiency of student-teacher communication, is now in operation at the University of Southern California School of Medicine.

The system, recently installed in the Louis B. Mayer Medical Teaching Center, allows individual student participation and response which would otherwise be impossible in the large classroom environment of the 500-seat auditorium.

As questions are presented by the instructor, a push-button device on the arm of 265 seats allows the students to pick one of five possible answers. The device immediately indicates to the student whether he is right or wrong, and indicates to the instructor the percentage of the class responding, and the percentage correct or incorrect for each possible answer.

An electronic scanner collects individual student responses and feeds them to a computer, which analyzes the data and relays it to a teletype. The instructor receives an immediate visual read-out with detailed data analysis of question-by-question performance by individual students and the class as a whole.

Thus the instructor can rapidly assess student understanding of materials presented and identify areas that need reinforcing.

This represents a marked advantage over the traditional method of assessing student comprehension by giving quizzes, which have to be graded and then returned to the student—a tedious process entailing a long time lapse between presentation of the material and the instructor's determining how the material has been assimilated.

As Dr. Phil Manning, of San Marino, Professor of Medicine and Associate Dean for Postgraduate Medical Education noted, "The new system will allow the USC faculty to organize problem-solving sessions with active participation in large groups. These activities have previously been restricted to small groups."

The system was installed by Instructional Industries, Inc., of Ballston Lake, N.Y., an independent affiliate of General Electric and an outgrowth of an educational systems group in the GE research and development center.
Northwest Orient Airlines “Insta-Res”: Computerized Convenience For Customers

Northwest Orient Airlines claims one of the most efficient, advanced, and versatile automated passenger reservations systems in the world.

In addition, the nation’s seventh largest trunk carrier may have carved a unique niche in the airline industry with its data processing operation. The total data processing requirements of NWA, from corporate accounting to reservations, is handled by a pair of UNIVAC 494 computers...housed in the same building, in the same room, operated under a common executive system, with either 494 computer able to run any program on a real-time or batch basis and the flexibility to switch from one to the other.

Northwest’s automated reservation system is called INSTA-RES. Along with complete Passenger Name Records (PNR), INSTA-RES also makes available to reservation and ticket agents throughout the NWA system: the number of seats available, fares, schedules, type of aircraft, connecting flights and even the meals which will be served. Reservations for a trip around the world can be confirmed in a few moments.

Northwest agents use equipment combining keyboards with television-type screens. Nearly 800 agents sets (UNISCOPE 300) in 32 cities are connected to the central computer facility at the airline’s headquarters.

As the control center for the entire system, the UNIVAC 494 computers work in real time, constantly polling each of the nearly 800 agent sets. A question or a message typed on an agent set sends the inquiry to the nerve center of the system. The computer identifies the question, makes necessary references to the massive data files and in a few milliseconds of a second calculates the answer. It then relays the answer back to the agent set.

Once a passenger has chosen his flight itinerary, all of the passenger’s information such as name, phone contact, etc., is transmitted to the computer to be placed in the official ledger where it is available for future reference from any location in the Northwest system.

Northwest agents can arrange itineraries that include flights between cities anywhere in the world. INSTA-RES provides information on availability of space on not only all of Northwest Orient’s domestic and international flights but also on flights on other airlines. After a reservation on another airline has been confirmed, INSTA-RES automatically sends a computer message to the respective airline, providing each airline with confirmed flight, name, and any other special service that may be required.

Many of the real-time and batch programs formerly handled by UNIVAC 490 computers were integrated into and put on-line on the new U-494 computers. In addition to PNR, the system is used to provide reservations seat inventory, message switching, complete batch data processing, trans-pacific weather analysis and engine condition analysis. These applications, along with many others, constitute the data processing load handled at Northwest’s integrated facility where the computer and remote equipment is valued at $14 million. The U-494 computers have almost 4 million bits of random access memory and 2.5 billion bits of rotating on-line storage. The system currently terminates over 500 remote terminals, including almost 800 UNISCOPE 300’s, 200 teletypewriters, and 46 UNIVAC Pagewriter printers. Northwest’s communications network consists of 29 teletype and 32 high-speed lines which tie the remote terminals from over 70 different worldwide locations to the computer.

Although the size of the system in terms of cost, amount of hardware used and number of remote terminals terminated seems impressive, the most difficult job in putting the system together was the development of the complex software used by the system. The real-time applications alone resulted in the generation of more than 400,000 lines of program coding and required 150 man-years of effort. The system’s team, consisting of Univac and Northwest programmers and specialists from Northwest’s Reservations Department, spent many months working on the complex details involved with serving the domestic and international characteristics of the airline. Special considerations such as working in “real-time” across 14 time zones and the International Date Line were typical of the kinds of problems which had to be solved by the people who designed the system.

The real-time applications programs were written in U-494 assembly language and are controlled by the U-494 OMEGA-TCS operating system. The operating system allows concurrent transaction processing in a multi-program environment.

The batch processing applications are written primarily in COBOL and FORTRAN.

Bay Area Computer Program To Help Fight Smog

San Francisco Bay Area scientists have begun a multi-laboratory research project that may give this region one of the world’s most sophisticated tools for environmentally sound land use planning.

The project is the development of a powerful computer program capable of predicting how a major source of pollution in one part of the Bay Area will affect air quality in any other part.

It is being undertaken jointly by the Lawrence Livermore Laboratory, the Ames Research Center and the Bay Area Air Pollution Control District. Each offers special resources necessary to carry out the multi-faceted project.

The work is supported by a National Science Foundation grant of $657,000 and is expected to last two years.

It will be intended to predict the air quality implications of land uses ranging from building a new industrial complex to shutting down specific freeways during an extreme atmospheric event. It will also be designed to predict how expanding population and commercial development will affect air quality in an inland air basin, such as the Livermore Valley.

Shoffner Taking Stress Out of Truss Building

An IBM System/3 is taking a lot of the stress out of making trusses for one of the Southeast’s largest producers of the popular roofing supports.

“We’re using the IBM system to give us extra control over the key areas of the business, from sales analysis to engineering studies and production orders,” said Carroll Shoffner, president of Shoffner Industries.

“The computer gives us an edge in producing trusses at the right time and getting them to the right place.”

Shoffner’s firm manufactures prefabricated, customized roof trusses, considered stronger and more economical than conventional roof support systems that have to be assembled on site.

The computer, IBM’s low-cost System/3, comes into use when the firm’s salesmen return from calls with orders designating the span, pitch, overhang, load and style of truss required. The order form also shows number of trusses needed (30 for the average-size house) and desired delivery date.

Nova Computer At Marathon Oil’s Florida Fuel Terminal

A wallet-sized plastic card that passes information to a Data General Nova 1200 computer helps provide billing information, loading control, and security at Marathon Oil Company’s wholesale products distribution terminal in Tampa, Florida.

The Nova is part of a system designed for Marathon Oil’s ship-to-shore facilities and for one of several other petroleum companies. The system - which he calls “Truss 1/2 the width of a card” - monitors the flow of fuel from the ship to the terminal. When a tank truck enters the terminal, the driver takes it to the loading position that dispenses the products he wants. (The terminal handles regular, premium, and low-lead gasoline, and fuel oil, and kerosene for Marathon Oil and three other petroleum companies.) He inserts two plastic cards that identify him, the hauler he works for, the company, the customer, and the products the customer is authorized to draw. The driver dials in a five digit bill of lading code. When this information has been validated, the computer activates fuel dispersal circuits, and the driver can begin withdrawing products.

As the truck is being loaded, the Nova monitors the fuel flow, and logs the net and gross gallons in the transaction file. The data from the transaction is compiled by the computer, typed on a teletypewriter, and recorded on punched paper tape.

The paper tape record of transactions is sent daily to Marathon Oil headquarters in Findlay, Ohio, where Marathon customers are billed and daily shipment reports are prepared for the other petroleum companies.