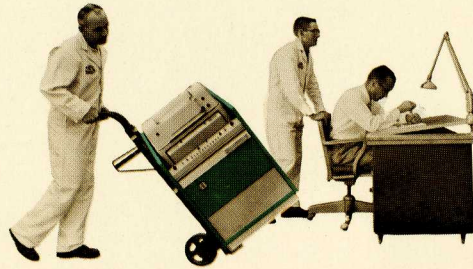


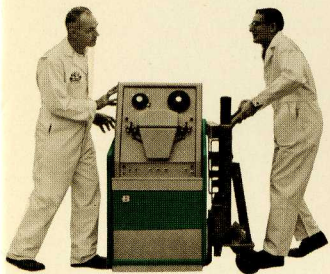
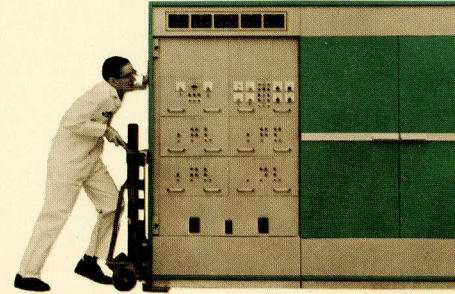
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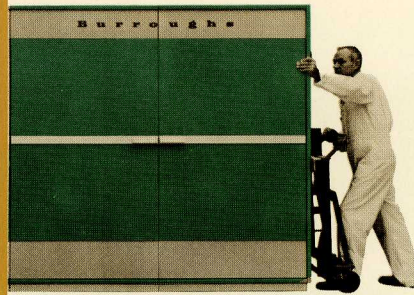
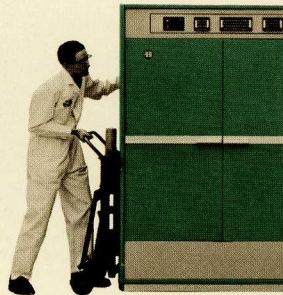
"It's on the way!"



Supervisory Printer Programming Support



High-Speed Photoreader



Full Magnetic Core Memory

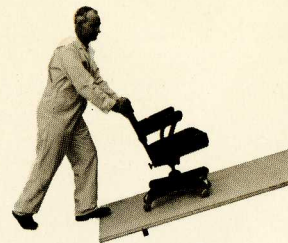


Control Console



Magnetic Tape

SHIPPING →



Inside:

*Burroughs
220
Steps
Out*



Burroughs Corporation

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DECEMBER 1958

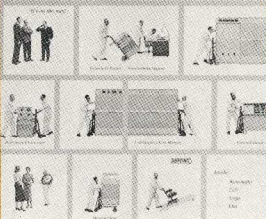


Burroughs Corporation

ELECTRODATA DIVISION
PASADENA, CALIFORNIA

Printed in U. S. A.

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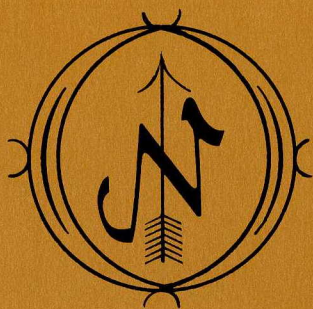


Burroughs Corporation

ON THE COVER—Symbolizing pace being set by the Burroughs 220 is some fast delivery action as ElectroData's Pasadena plant gears to meet the increasing demand for first powerful intermediate-scale computer. Behind-the-scenes story of how 220 is delivering results today begins on page 4.

Canadair computers speed

Decisions for Design



In the first few months' operation, a Burroughs 205 has saved "at least 130,000 engineering and design man-hours" in the development of a super new Canadian submarine-hunter-killer aircraft.

"The savings through use of our computer system may even be greater," Neville P. Shevloff, mathematician in charge of the computing center for Canadair Limited, asserted. "It is difficult to assess all of the advantages but we do know of this one large direct savings involving an aircraft for national defense."

Canadair, Ltd., Canada's largest aircraft builder, used its Burroughs 205 computer system in developing the new CL-28 Argus, a giant 75-ton, four-engine aircraft specifically designed to patrol at low altitudes in mid-ocean for long periods of time. The CL-28 Argus is one of Canada's best defensive weapons in the deadly game of submarine detection and destruction.

Equipped with the latest detection equipment, the Argus is now in service with Canada's RCAF Maritime Air Command. With the development of larger, long-range submarines, atomic submarines and guided missiles that can be launched from submarines many miles at sea against targets hundreds of miles inland, the need for a strong defensive weapon like the Argus becomes great.

Designing and developing the CL-28 Argus, largest plane yet built in Canada, was given No. 1 priority at Canadair. The Burroughs computer system was used in all phases of the project to speed design, engineering and production.

Figurative Flight Testing

"Our designers and engineers used it in many steps of the job," Shevloff said. "Computations were checked and rechecked, and we figuratively 'flight-tested' the plane before engineering or production schedules were firmed up?"

Canadair, Ltd.





This mathematical "flight test" enabled Canadair experts to make any necessary changes in the suggested design long before parts of components were built.

Before the Burroughs computer system was installed at Canadair, design and engineering computations were carried out by specialists working manually and aided by mechanical calculating equipment. The computer brought automation to many of the normally repetitive figuring tasks and the speed of electronic computation to others.

Canadair used the computer system on such projects as figuring the efficiencies of propellers, studying cruise, climb and engine performance; stress analysis, flight test data reduction and radar dome calculations. The firm has also used the 205 computer for nuclear reactor design and, in recent months, developed a computer program allied with sales effort that gives quickly figured airline route statistics.

Within a few minutes after sales personnel start talking with the prospective customer for a commercial transport, the computer can give operational cost figures of a Canadair aircraft on the customer's own airline routes.

Jet-Age Data Processing

To speed the evaluation of flight test data, Canadair has installed new Millisadic equipment compatible with the computer. This plan allows automatic recording of flight test data in the plane on magnetic tape. Once on the ground, this tape is converted automatically into Burroughs 205 "language" and fed into the computer. The system eliminates multiple handling of the data before it can be processed by the computer.

Although Shevloff estimated time savings only on the CL-28 Argus, the advantages of the computer system have been or are being used on the development of such new aircraft as the CL-66 "Canadair 540" medium-range,

two-engine, turbo-prop transport (a cousin of the famed Convairliners); the CL-44 four-engine, long-range, turbo-prop transport; and the CL-41 jet powered basic trainer.

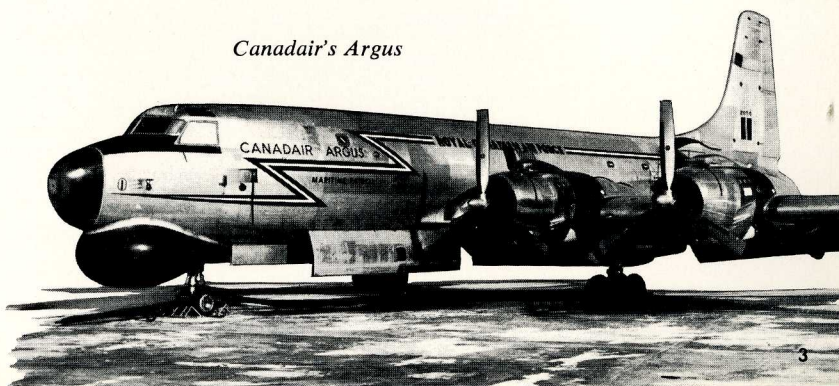
Handling computation for this extensive line of aircraft calls for a large computing center, well equipped and well staffed. Shevloff heads up a staff of 35 experts familiar with electronic equipment and computation. The center is equipped with the Burroughs 205 computer, including punched card input and output, high speed paper tape input and output and two single-reel magnetic tape storage units, apart from large analog and data reduction facilities.

In addition Canadair has installed a Burroughs E101 desk-size computer which engineers have learned to use personally on the everyday problems of design and engineering. The 205 system was installed in January 1957. Expansion of the center has continued since that date.

Main advantages of the electronic system are time savings and the fact that the equipment frees valuable personnel from routine figuring tasks to work on other areas of the project. It has measurably improved engineering efficiency.

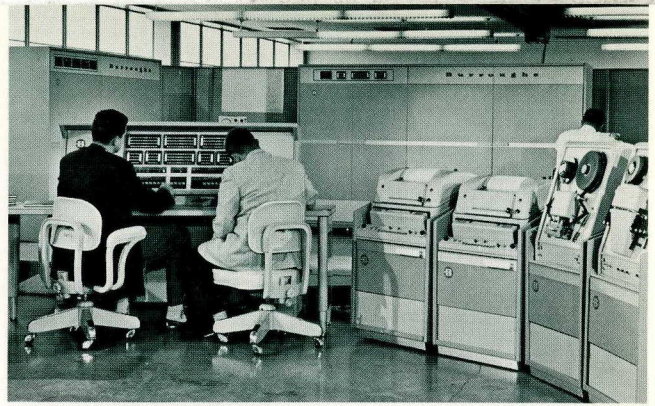
"Designing and building today's aircraft calls for advanced design techniques, excellent production facilities and the proper subsidiary services to make sure our plans are right," Shevloff says. "We feel our computing center more than pays for itself on that basis."

Canadair's Argus





ElectroData General Manager James R. Bradburn and James D. McLean, President, Hoffman Laboratories Division, exchange congratulations prior to first 220 shipment.



220 CONFIDENTIAL

... as deliveries begin, a glance behind the scenes

The "best" computer is always just around the corner. The cost-conscious computer user, however, is more interested in the down-to-earth results he can achieve *now*.

Thus, amidst the easy claims of drawing-board computers, U. S. and Canadian data processing experts are turning to the Burroughs 220—a powerful new system delivering years-ahead results today. The well-balanced system with full magnetic core memory and high-speed input-output subsystems is the latest in a full line of Burroughs electronic equipment—giving new scope and direction to data processing.

Already installed and in volume production, the first intermediate-scale computer with large-scale capabilities brings with it a healthy package of programming, operating and training aids, products of the support program described below.

First Delivery

A healthy, precocious one-year old made its way into the stern and complex world of data processing this fall.

It is the Burroughs 220. Announced a little over a year ago, the high-powered intermediate-scale electronic data processing system made its official debut with installation at Stanford Research Institute by Hoffman Laboratories Division, Hoffman Electronics Corporation.

Other future users of the versatile Burroughs 220 include General Electric, Allstate Insurance, Cornell University, Military Air Transport Service, John Deere Tractor Works, Department of the Interior, Michigan National Bank, Georgia Tech, Upjohn, Dow Chemical.

The Long Countdown

The Hoffman Installation represented the first zero in a countdown that extended back to the 220's inception.

Field Engineering, for instance, began its work long before the prototype was available. The cream of the maintenance crew was early assigned to the development engineering team, learning the 220 inside out... literally. Later these men would establish the 220 Field Engineering training program, which has now been underway a full year.

As 220 production progressed, additional Field Engineers were assigned to Quality Assurance, there to get practical test-floor experience on the new system. Others were busy collecting and organizing the mountains of material necessary for the maintenance manuals, the bible of these apostles of reliability. Another group prepared test routines, now available for all 220 equipment.

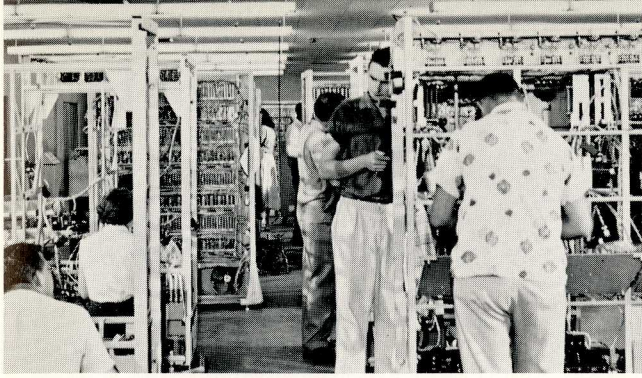
By the time the first 220 was on its way, Field Engineering had amassed an impressive backlog of actual maintenance experience. One system had been under their control for six months. They even arranged to have one system packed, shipped on a 200-mile trial shipment run, and delivered back to them at the plant.

Mathematical Assault

Meanwhile, other sections of ElectroData's marketing task force were beginning their own mathematical assault... establishing training and programming aids which would hasten and ease customer transition to the powerful new computer.

The Applied Mathematics group, for instance, has developed basic function generators, matrix inversion multiplication, transposition and reduction programs in double-precision arithmetic and linear programs, as well as numerous widely used subroutines.

The group has well underway various large programs to accommodate the needs of industries utilizing electron-, neutron- and x-ray-diffraction techniques; several dis-



tillation programs for use by petro-chemical, chemical and naval-stores industries; and a few selected programs for use in civil engineering applications.

Applied Programming, in addition to helping customers get acquainted with the 220, has come up with several assemblers, generators and compilers. These include a simulator program which allows the 220 to tackle problems coded in the language of other medium-scale machines, and several basic utility routines.

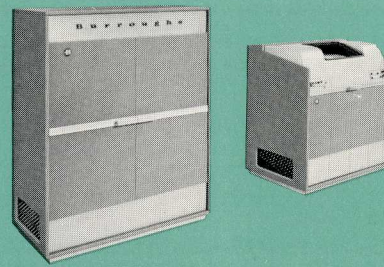
Power Wins Early Praise

Customers and company personnel who have programmed and operated the 220 are enthusiastic in their comments. Power of the 220 command structure, ease of programming and operating have received special praise.

Proceeding in parallel with programming has been a twin-pronged publications and training program. Results so far are several hundred programming course graduates, and what is probably the most complete computer operator's and programmer's manual in the world.

Called "Operational Characteristics of the Burroughs 220"—"Opchars" for short—the thick compilation of data processing erudition includes almost everything but the 220 itself. Also available is an "Introduction to Programming The 220"—aimed at newcomers to programming and the new computer alike.

Little more than a year after its announcement, the Burroughs 220 looms a healthy and impressive reality. No drawing board computer, it brings with it the solid results of a well-established support program—and the concrete core of maintenance, operating and programming experience that is enabling customers across the nation to put the 220 to profitable use today.



Printing Pace-Setter Announced

Another solid-state engineering achievement has been announced by Burroughs. Now in production at Electro-Data Division is the Burroughs 220 High-speed Printer System—capable of printing rates up to 1225 alphanumeric lines and 1500 all-numeric lines per minute.

In addition to unparalleled speed, the new printer features on- or off-line operation, buffer storage and automatic editing... all under plugboard control.

In versatile off-line operation, the system receives data from magnetic tape. One or two Burroughs 220 Magnetic Tape Storage Units may be used. Tape units may easily be arranged so as to allow sharing between on-line and off-line operation and masking of tape handling time.

Housed in the control unit are the magnetic core memory and plugboard editing controls. The 100-word memory, acting as a buffer, allows simultaneous data feeding and final print out. The plugboard feature allows the operator to program the printer system independently of the computer.

Together with field interrogation and character recognition, plugboard controls make it possible to manipulate, edit and merge records without preparing a special tape. Control over the final print out, accomplished by control panel wiring, includes line spacing, skipping and other versatile carriage movement functions.

Logical operations determined by plugboard settings, include selection, special character insertion, zero suppression, character emission and other editing functions.

The actual speed of any print out may be selected according to the nature and use of the final report or listing operation. By manual switch, the operator chooses one of four printing speeds: 624, 720, 1068 and 1225 alphanumeric lines per minute.

Vocabulary of the printer contains 51 solid-face characters which produce highly legible copy in lines of 120 positions. Printing density is 10 characters per inch.

Accommodating 6-part and 3-part standard commercial forms at record speeds, the Burroughs 220 High Speed Printer System is expected to fill a long-felt demand for high volume output in billing, listing, reporting, transfer and inventory operations. For further information, write for Bulletin 5221.

RECENT & RANDOM

BURROUGHS Awarded Sage Systems Contract

The U.S. Air Force has awarded the Burroughs Corporation a \$22,817,000 contract for an additional 32 data processing systems for use in the SAGE continental air defense system.

The new contract brings to 98 the number of data processing systems to be built by Burroughs for the Air Force. The Burroughs contracts cover the equipment, installation, technical data and personnel training, said Paul S. Mirabito, general manager of Burroughs' Defense Contracts Organization.

SAGE (Semi-Automatic Ground Environment) is a nationwide system combining radar, electronic data processing systems and high-speed communication to spot approaching hostile aircraft or missiles, and direct counter-attacks.

The Burroughs equipment processes flight information picked up by outlying radar sites and transmitted to direction centers. There it is coordinated with data from other sites to alert and trigger defensive weapons.

On the Map

JONES



HOGUE



ElectroData Division has widened the scope of its national sales and service coverage with the establishment of two new district offices in Denver and Atlanta.



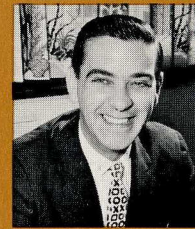
AROUND THE CAPE IN 30 DAYS—Lorry-drawn on last leg of month-long journey, a crated Burroughs 205 heads through Cape Town, South Africa to its new home at nearby Bellville. There the peripatetic computer—first 205 to be shipped overseas—was installed at the headquarters of the South African Life Assurance Company (SANLAM). The system will be used for high-speed policy processing and related accounting work.

Clagget A. Jones, data processing veteran and the recipient of many sales honors, has been named to direct marketing operations in the Southeast.

The Atlanta office—located at 961 W. Peachtree Street, N.W.—is responsible for sales and service of Burroughs E101, 205 and 220 computers in Georgia, North and South Carolina, Florida, Alabama and eastern Tennessee.

The Denver office, serving the Rocky Mountain area, is in charge of Charles V. Hoge, most recently a resident sales representative in that city. Denver will serve as the focal point for ElectroData marketing activities in Colorado, Utah, lower Wyoming, the northeast corner of Nevada and most of New Mexico.

Establishment of the two new offices brings to 22 the total number of District and Regional headquarters maintained by Burroughs' ElectroData Division in the U.S. and Canada.



RESCA



BENCOTER

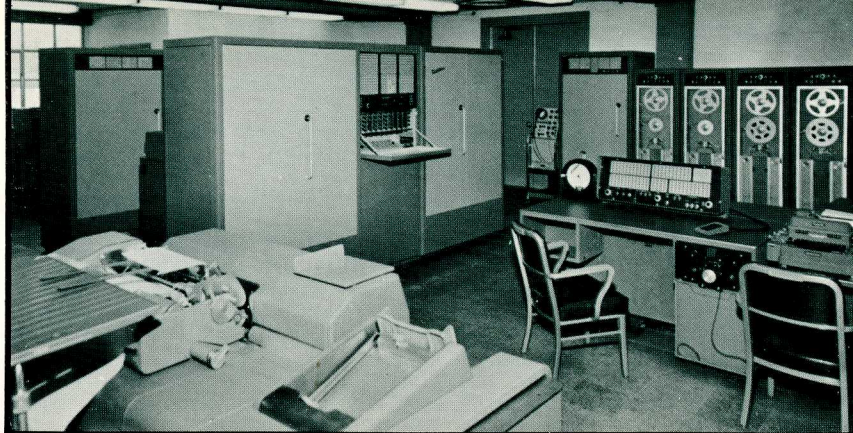
To New Sales Posts

Recently named as sales manager of ElectroData's New York District Office is Joseph A. Resca. Formerly manager of the Dallas District office, Resca joined Burroughs in 1955. He is an engineering graduate of Yale University.

Succeeding Resca in Dallas is Donald L. Bencoter, formerly a top salesman in the Detroit office. Bencoter joined Burroughs in 1948 and served as senior sales and special account representative before joining the ElectroData Division as a sales representative in 1957. He is a business administration graduate of Michigan State University.

H. A. Hatch

J. W. Clyde



AUTOMATION AT ARGONAUT

With Burroughs 205

A little over a century ago, ambitious bands of prospectors known as Argonauts crowded into California seeking its gold. Today, Argonaut Insurance Company relives the lusty tradition of its 49er namesakes.

Argonaut's quietly informal Monterey-colonial headquarters houses one of the youngest and fastest growing of the nation's insurance companies.

Founded in 1948 by H. A. Hatch, Argonaut Insurance Exchange began life with an investment of \$200,000 and a staff of seven. Today, Argonaut Insurance Company and Argonaut Underwriters Insurance Company, has combined assets of over \$26,000,000 and employs more than 300.

It was soon apparent that existing tabulating procedures could not long keep up with such break-neck growth. Always on the alert for improved methods, Argonaut initiated with Stanford Research Institute a joint feasibility study in early 1954. It was completed in October of that year.

SRI was then commissioned to accept bids from major manufacturers. The bids were completed in 1955, and early in 1956 Argonaut ordered a Burroughs 205. Input-output flexibility and magnetic tape file capacity were the factors favoring ElectroData, which installed the system in April of '57.

Confident of its ability to put the machine to immediate and effective use—and conscious of cost saving—Argonaut purchased its 205.

The system includes the computer, control console with photoreader, power supply, Flexowriter, magnetic tape control with six reel units, and Cardatron with one input and two output stations.

Organizing the Future

At the time the order was placed, Argonaut organized its data processing team under the direction of Controller J. W. Clyde. The original 12 members were chosen according to the results of SRI-administered aptitude tests and their knowledge of the company's applications. The group began by carefully laying out an overall integrated data processing plan into which the individual program pieces would later be fitted.

By mid-1958, the 205 was handling Argonaut's policy writing, payroll solicitation, billing, issuance of claim checks, and preparation of accounting and statistical reports.

First applications centered around the Workman's Compensation insurance offered by Argonaut in 18 states. Premiums for the policies are based on the insured's payroll,

multiplied by a rate determined by the work classification.

Biggest job was setting up on magnetic tape a history-file for each policy. Because other jobs would stem from file maintenance, most of the early programming effort went into establishing the file and developing techniques for updating it. This done, the data processing team could proceed with the bread and butter applications.

Byproducts of the daily file maintenance for 18,000 active policies including billing and creation of a suspense file—a diary of the payroll information requests sent to employer-policyholders. The suspense file is automatically updated as the required information is returned. When there is no response after a certain period of time, the suspense file is relieved and second, third, or pre-cancellation notices automatically printed.

Ready in the near future will be a program for computing unearned premium reserves. Other pieces of the overall integrated data processing plan will follow, including some highly-sophisticated operations research work.

205 Serves Expansion, Speeds Service

Of the role being played by the 205 in Argonaut's drive to the top, Controller Clyde notes: "Because of its capacity to assume more and more of our paper work, we are now able to provide better service than ever before for our producers and policyholders. This modern system also enables us to expand our business volume with only a small increase in cost."

From humble beginnings in a two-room office in downtown San Francisco, Argonaut has emerged in ten years as a national insurance leader. The company's family of coverages now includes workman's compensation, liability, automobile, group accident and sickness, major medical, and unemployment compensation disability insurance. Earned premiums from these various protection plans totalled over \$22,600,000 in 1957.

That year—a particularly eventful one for Argonaut—saw opening of the modern \$700,000 home office in Menlo Park, conversion of Argonaut Exchange to a stock company, with full ownership vested in the policyholders... and installation of the Burroughs 205.

Perhaps the best key to this modern corporate Frank Merriwell story is found in a statement by President Hatch: "We outdo what we promise. We don't outpromise what we do."

In such a company, the Burroughs 205 has found ready acceptance.



Pasteurized Data Processing

Located within one of the many laboratories that comprise the Hughes Aircraft Company's Culver City, California plant, a Burroughs E101 is helping speed America's defense program.

The E101 is the basic computing tool of the Data Reduction Lab., serving 17 departments of the Airborne Systems Laboratory, which creates and continually improves Hughes airborne armament-control systems and guided missiles for defense against supersonic, high-altitude aircraft.

Highlight of the Data Reduction Lab's work is "pasteurized data processing"—a highly mechanized on-line paper-tape tie-in of the E101 with oscillograph and film record readers and an automatic plotter.

Here's how it works.

Raw flight test data comes in as a series of wobbly lines on an oscillograph record. The long record roll is fed into a special reader, where an operator positions crosswires over key points on the record. A push of a button, and the digital values of that point are recorded on perforated paper tape.

After the whole record has thus been digitally recorded, the tape is fed into the E101, which beats the data against the appropriate pre-pinned program. The reduced output data again takes the form of perforated paper tape, which this time is taken to another reader, which feeds through a converter for output to an automatic plotter.

On-Line Error Reduction

Such on-line data handling not only saves time but cuts the chances of error. E101 output data which requires further large-scale system processing is translated into punched-card form.

Serving engineering specialists in 17 departments is a good test of the E101's versatility. Besides reduction of flight test data for systems evaluation, the busy computer tackles jobs for such departments as computer controls, radar, communications, electronic tube research, ground systems and human engineering.

The applications range from the relatively simple job of establishing wire resistance-temperature relationship tables to highly sophisticated second order non-linear differential equations.

One job calls for statistical analysis of simulated flight data. Flight conditions, set up in a simulator, produce responses in the form of voltages, which are recorded on oscillograph records. These are hand-analyzed and recorded, then translated by the Data Reduction team for input to the E101, which submits the data to mean and standard deviation calculations.

Another application: correcting data from fan capacity performance tests to standard atmospheric and temperature conditions. Flight Pattern data is also fed into the E101, where it is computed and checked prior to paper tape input to the Hughes Digitair, airborne digital computer for controlling aircraft flight.

Job-Shop Operation

Data Reduction Facilities supervisor Claude Walker characterizes his versatile, wide-ranging operation as a "job shop," with no one application accounting for a large proportion of computer time.

All of Walker's staff of 10 operate the E101, with four people designated as programmers. Over the first six months of operation, they had logged an average seven hours a day on the desk-size handyman.

In pre-E101 days, the Data Reduction staff used seven desk calculators, tried to get an engineer's problem solved within a week. Now, next-day service is typical.

Hughes' Airborne Systems Laboratories, creator of the Hughes Armament Control System carried by all USAF all-weather interceptors is playing an ever-expanding part in our nation's defense plans. The Burroughs E101 is sharing in that important work.