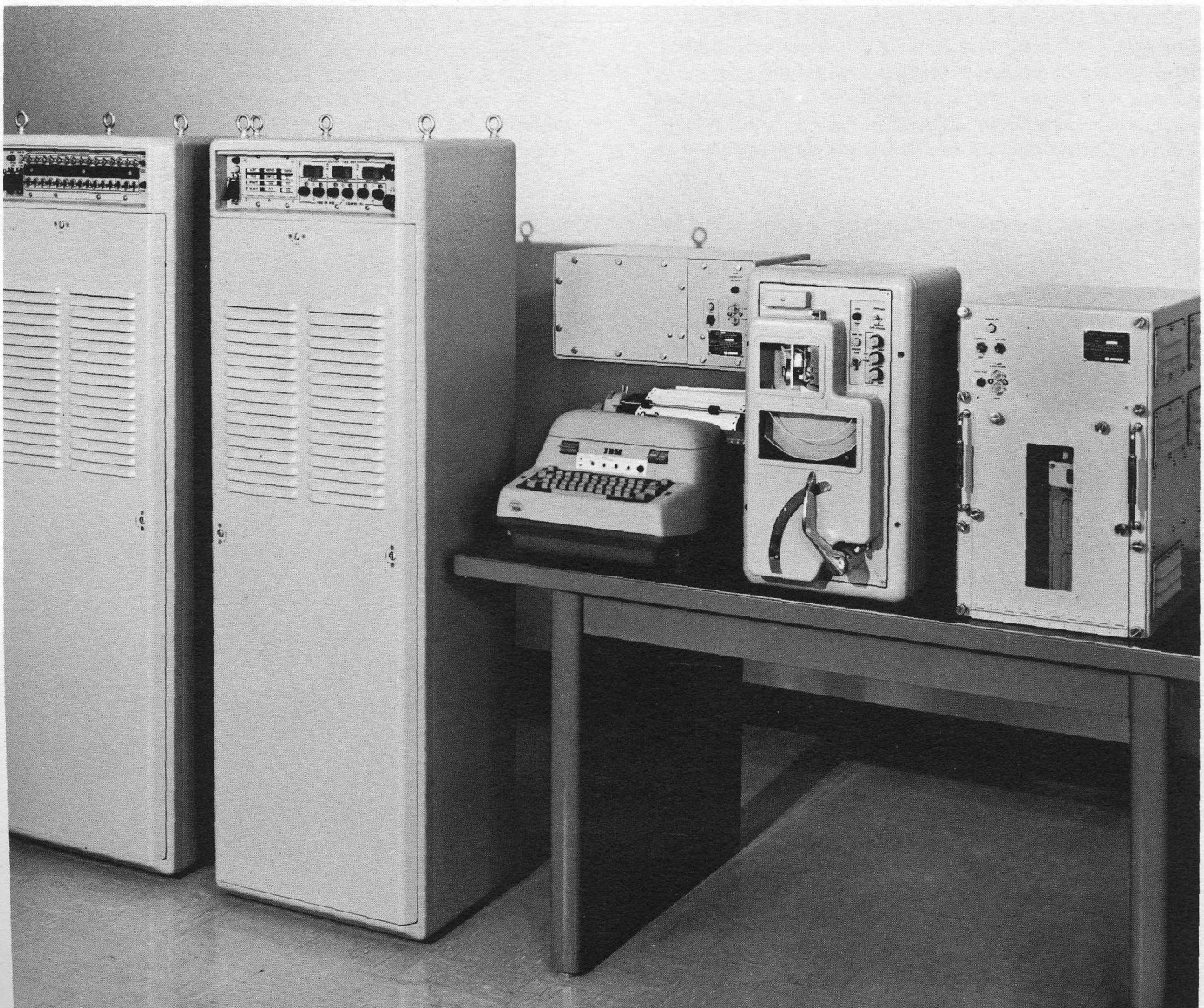


### THE AN/UYK-1

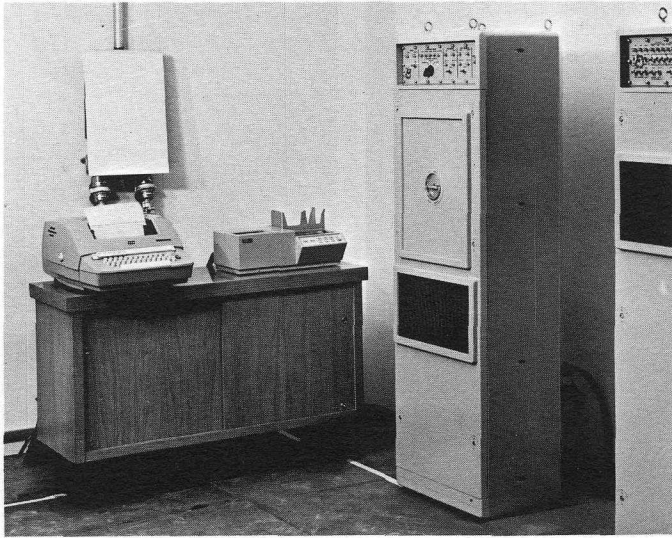
This militarized computer, BR Model 130, was developed under Bureau of Ships sponsorship and adopted as a standard Navy shipboard computer.

The medium-size computer has the same physical characteristics and superior environmental tolerances as the BR Model 133 plus low price. The BR Model 130 has found applications in many real-time systems, including satellite tracking, fire control, simulation, reconnaissance, air defense, small ships data handling, and various aspects of oceanography.

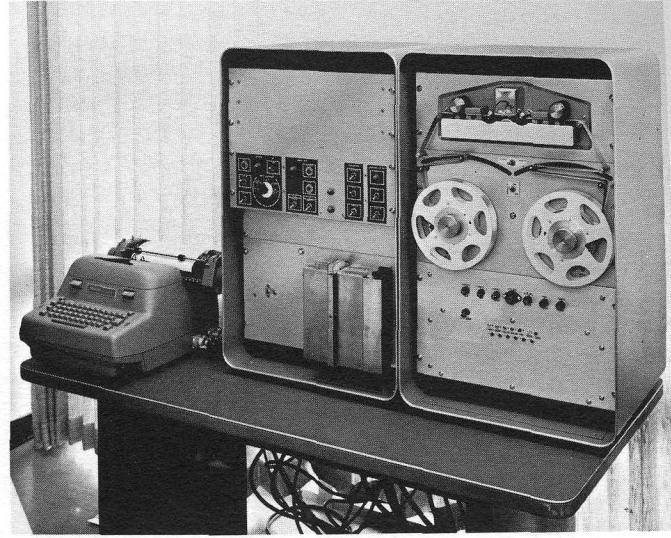
The computer has a 6-usec memory read-write cycle, 8K-word basic core memory (expandable to 32K), interleaved I/O, and real-time interrupts. It is compatible with the Navy Tactical Data System and the greatly simplified hardware accounts largely for the Model 130's low cost and high reliability. One installation in Alaska operated without a failure of any kind for more than 13,000 hours—more than a year beyond the specification requirements. Several applications of the BR Model 130 militarized computer are described in the following paragraphs.



AN/BRN-3 Submarine Navigation Sub-System



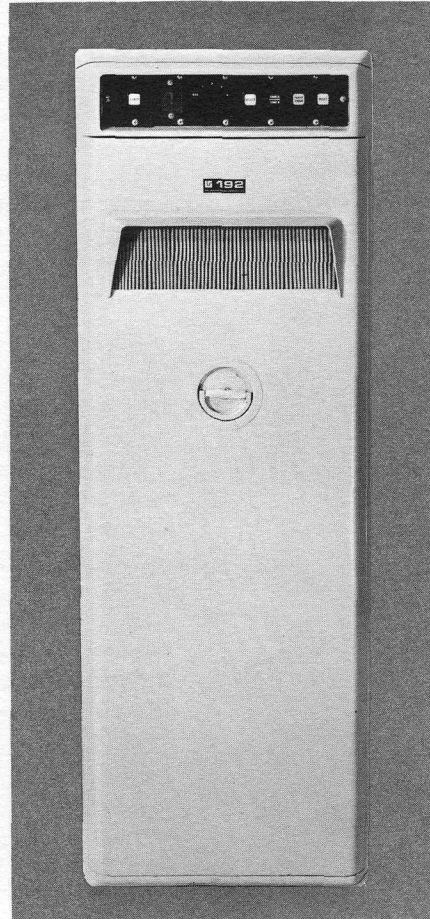
BR-144 Basic I/O Set



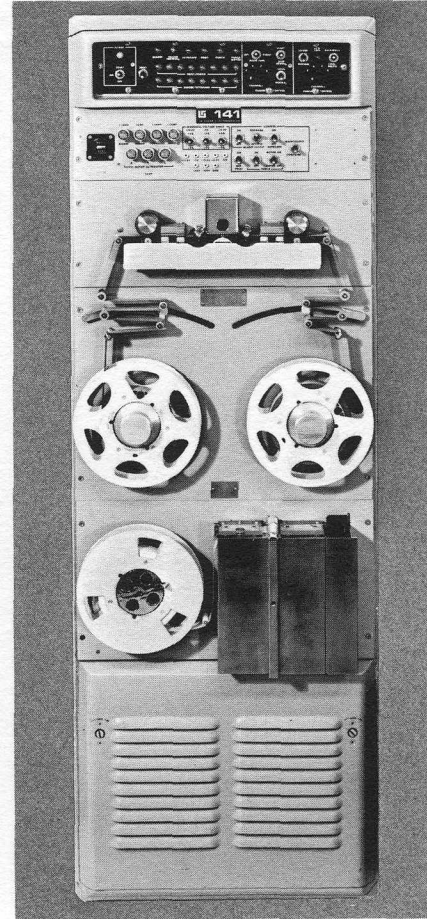
BR-143 Paper Tape I/O Set



BR-170 Magnetic Tape Unit



BR-192 Magnetic Tape Controller



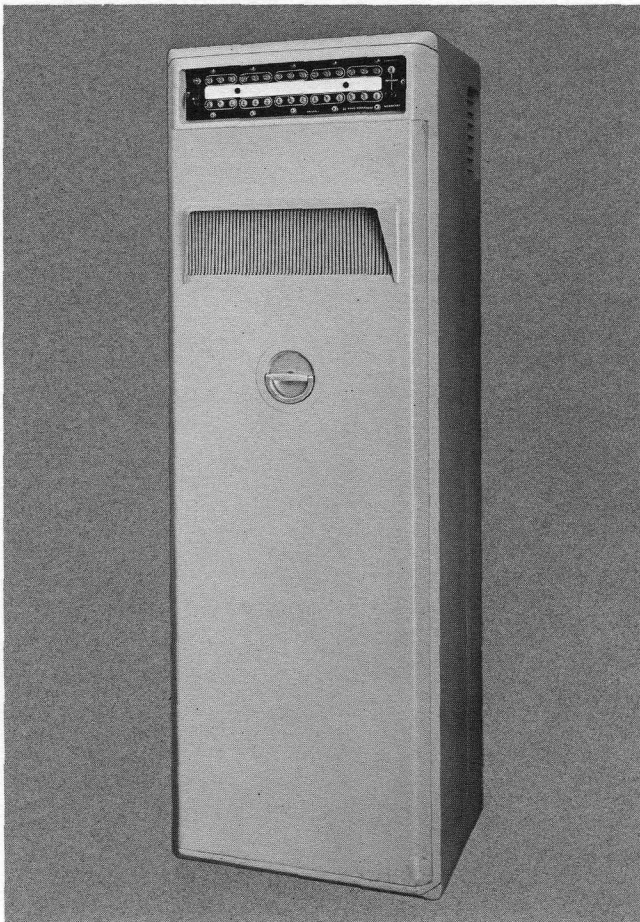
BR-141 Paper Tape I/O Set

**POLARIS NAVIGATION**—A modified Model 130 forms a part of each high-accuracy navigation data processing system used aboard FBM submarines. The computer, designated AN/BRN-3, connects to the submarine's conventional navigation system and to the Doppler receiver. The data processor unit contains digital-to-analog and analog-to-digital conversion circuits necessary to allow the computer to send tracking data to the Doppler receiver that assists it in locking onto a satellite and allows the computer to accept the orbital and Doppler data from the receiver.

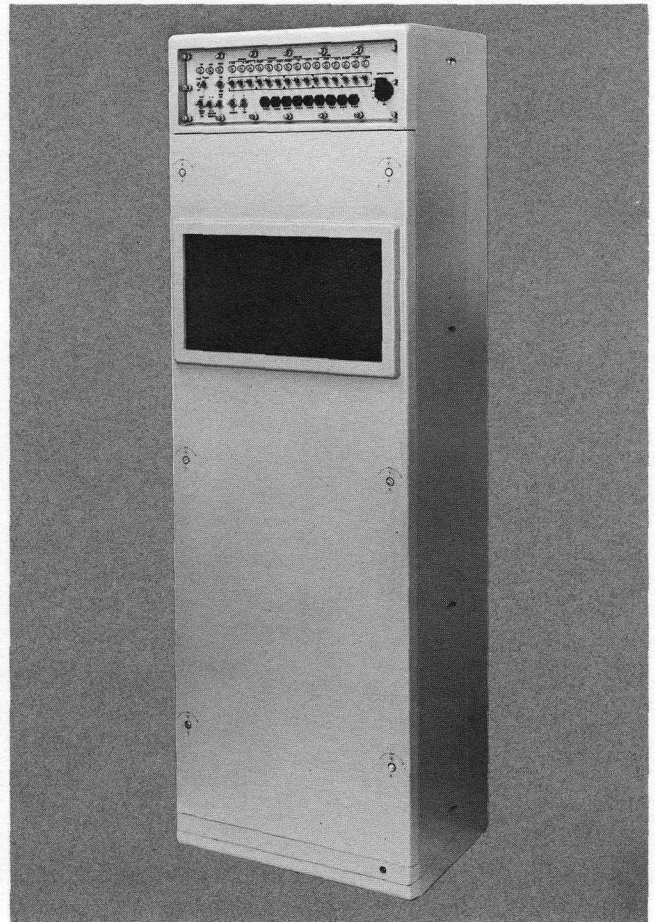
**RADAR TRACKING**—The Automatic Radar Chain Acquisition System updates tracking radars with more precise acquisition information for continuous and uninterrupted target tracking. The system includes six range tracking and computing centers fitted with a tracking radar, a Bunker-Ramo computer system, and related data translation equipment. Designate data are used to

compute target range, azimuth, and elevation for pointing the site's radar antenna. When the target is acquired, high-resolution radar data are used by the computer to generate updated information that is available for use by any other site in the system. Target position is plotted in real time. The computer also performs site diagnostic and self-slew tests to relieve the central computer during pre-launch checks. During overall system checks, the computer responds to designate data from the central computer and calculates the range, azimuth, and elevation designations for its particular site.

**AIR DEFENSE COMMAND INFORMATION**—A Bunker-Ramo data processing and display system is used as a command information system rather than an interceptor control system. The computer serves as the central data processor at the ADC sites. Input data are in the form of Teletype messages from sites and associated radar. Principal outputs are for large-screen and tabular readout displays.



BR-130 Digital Computer



BR-133 Digital Computer

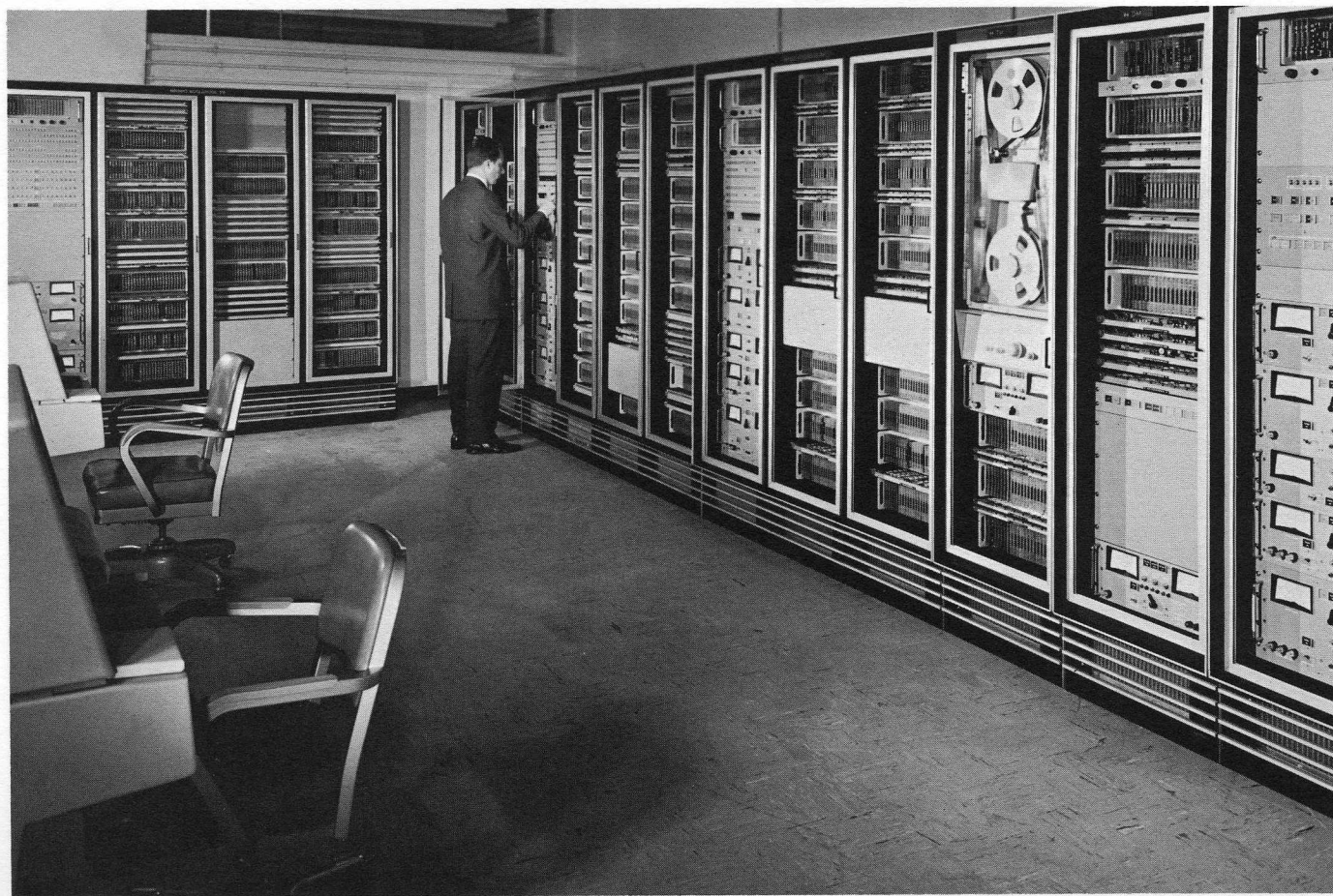
### THE AN/FSQ-27

Bunker-Ramo designed and developed the AN/FSQ-27, an advanced, large-scale intelligence ground data processing system for the Air Force. The center of this system was a "polymorphic" central processor that satisfied system requirements for continuous operation, simultaneous execution of multiple problems, high throughput time, low-cost expansion, extreme flexibility, and continuous real-time service to individual operators.

The polymorphic approach to the design of multi-computer complexes was based on the division of labor, and step-by-step delegation of authority among various module types. The interconnections between modules were made automatically through a passive matrix type switch, which permitted the exact system modules required for a particular job to communicate directly with each other.

One of the computers in a polymorphic system was designated as the executive computer with responsibility for automatically carrying out the master control program. This involved assigning and scheduling problems or portions of problems to the appropriate modules, establishing priorities and arbitrating priority conflicts, and reassigning jobs when one module malfunctioned and its workload had to be transferred to other modules. New modules could be added to the system through the matrix switch without disrupting a pre-existing setup.

A feature of the matrix switch and its controls of special interest to military users was the ability to preempt connections for restricted uses, such as might be needed for certain channels that must be militarily or administratively secure.



AN/FSQ-27 Intelligence Data Processing System

## CONTROL COMPUTERS

Bunker-Ramo's personnel helped to produce the first electronic system for full on-line, closed-loop control of an industrial process. The 300 Series Computers (Models 300, 330 and 340) are used in the control of process operations in the petroleum, cement, paper, steel, chemical, electrical energy generation, and other industries.

The most experienced operators cannot take into account all the complex interrelationships between process variables and consistently set controls at proper settings. The computer can perform thousands of operations a second to adjust controller setpoints for optimum operations—without fatigue and distraction.

As early as 1955, Bunker-Ramo personnel recognized and began work on that concept and the first control computer went on line in 1959. Bunker-Ramo installed approximately 65 systems in the next five years. In 1964, Bunker-Ramo ceased production of all commercial computers, licensed another manufacturer to use its patents, but retained key personnel who pioneered in automatic control.

Although man will be an important component in command/control systems for many years, the computer control system will perform an increasing number of tasks. The automation of routine tasks and the collection of analog information and conversion into binary digital data are recognizable requirements in many command/control systems.

A Bunker-Ramo computer was used to collect and process meteorological and geophysical data for USAF. Airborne in a Boeing 707 jet, the computer took geophysical data from sensors, reduced the data in real time, and displayed the results during flight for on-line weather forecasts.

At the FAA's Experimental Center, a Bunker-Ramo computer was used extensively to simulate complex air traffic control problems as early as 1959.

An aircraft manufacturer used a control computer system in closed-loop developmental testing of hydraulic components of missile subsystems. The computer fed test signals to missile controls, sampled and analyzed responses of missile control surfaces, and printed out test results.



BR-340 Process Control Computer