BUNKER-RAMO NEWSLETTER

FEBRUARY 1964

Left
Dr. Simon Ramo
President

Right
Mr. George M. Bunker
Chairman of the Board

On January 24, 1964 Martin Marietta Corporation and Thompson Ramo Wooldridge Inc. announced the formation of The Bunker-Ramo Corporation, a jointly-owned company engaged in the design and installation of electronic control systems for government and industry.

The Bunker-Ramo Corporation has acquired the products, resources, facilities and staffs of the Computer Division of Thompson Ramo Wooldridge Inc. at Canoga Park, California, and the Electronic Systems and Products Division, one of Martin Marietta Corporation's units at Baltimore, Maryland.

"DISTRIBUTED MANAGEMENT" VIA ELECTRONIC CONTROL SYSTEMS

Electronic control systems enable human managers to optimize the functioning of complex physical processes and information flow. This is done by using electronic devices to extend the capabilities of senses; using digital computers to extend the capabilities of the mind; and, by means of pre-planned standards and decision criteria built into the system, distributing human judgment and intelligence into every detail of the process.

The translation of user requirements into practical systems calls for use of the most advanced techniques in computer design, programming, multi-level priority scheduling, failure-proof safety provisions, analog/digital conversion, and systems engineering based on an intimate understanding of each particular operation.

An advanced technique of central importance is that of "on-line" control. This means that the system continuously monitors and evaluates the process, and through feedback loops makes minute-by-minute adjustments so that when the operation is complete, it yields the optimum result. On-line control makes it possible to solve problems that must be solved correctly the first time or the whole effort may be wasted. Such might be the case in controlling complex in-flight maneuvers of spacecraft; making the final guidance systems settings for an interplanetary vehicle; or processing information for an industrial manager or a military commander as he needs it and calls for it. On-line operation speeds up a process by eliminating the delays involved in transferring data to special equipment for analysis. It also enables managers to refine their techniques and to implement highly sophisticated management concepts involving the interplay of physical events with quality control, profit objectives, market conditions, availability and price of raw materials and other considerations. On-line electronic control systems are indispensable to many processes because even the most experienced operators cannot take into account all the complex interrelationships among these factors.

The digital computer plays a central role in control systems because it can accept and operate on thousands of inputs a second, can make use of every interrelationship and then adjust controls for the most profitable operation.

BUNKER-RAMO SYSTEMS

The Bunker-Ramo Corporation pioneered the now rapidly expanding field of closed loop computer-controlled industrial processes—and continues to lead, world-wide, in the number of installations. A growing roster of customers in a variety of industries, including chemicals and petrochemicals, cement, power, steel, and paper, are now enjoying the benefits of greater productivity and profitability that result from closed loop electronic control. Reliability of these systems exceeds 99 per cent in more than one million hours of on-line use.

Bunker-Ramo's interests and capabilities encompass physical environments ranging from the ocean depths to outer space. Now under development for the Navy is a new generation of deep-operating air transportable sonars that will give greatly increased protection to the fleet against high speed enemy submarines. For NASA, Bunker-Ramo is manufacturing horizon sensors for the huge Saturn space booster.

Between these two environmental extremes of space and the deep ocean, Bunker-Ramo is developing a command and control system for the Air Force's Mobile Medium Range Ballistic Missile, several classified electronic warfare projects for the Army, and is now installing a weapon status control and reporting system for the Supreme Allied Command in Europe.

BUNKER-RAMO PRODUCTS

The Bunker-Ramo TRW-130 (AN/UYK-1) digital computer is now firmly established as government standard equipment and is the most widely used medium-scale military computer on the market today. At the end of 1963, 160 AN/UYK-1's had been ordered and 118 delivered. A second generation medium-scale computer, the TRW-133, was recently introduced for applications requiring its three-times-faster speed. Research and development continues on new design concepts for future computers, techniques and components.

Bunker-Ramo consoles which permit two-way communication between human operators and a computer data base are operational in the Air Force 473L Headquarters Command Post and in other command/control installations.

Representative Industrial Installations

Customer	*Application*
Badische Anilin und Soda-Fabrik AG, Germany	Control of hydrocarbon oxidation processing
Columbia Broadcasting System	TV network and program switching
Douglas Aircraft Company	Missile sub-system testing
Gulf Oil Corporation	Control of fluid catalytic cracking unit
Kureha Chemical Company, Japan	Control of vinyl chloride processing
Monsanto Chemical Company	Control of ammonia synthesis
Riverside Cement Company	Control of kiln and blending of dry process cement
Santa Monica Outlook	Control of automatic typesetting machines
Sunray-DX Oil Company	Control of crude oil distillation
Tennessee Valley Authority	Control of boiler-turbine generator units
Texaco Incorporated	Control of catalytic polymerization and fluid catalytic cracking
U. S. Steel Corporation	Control of basic oxygen furnaces

Representative Military & Government Programs

Customer	*Application*
U. S. Navy	On-line processing for Polaris navigation system Format and code conversion Submarine detection devices and systems Infrared tail warning system in aircraft Audio programmed checkout Navigation, communications and ship control systems Distance measuring equipment Oceanographic survey data reduction Missile fire control system
Department of Defense	Over-all design for National Military Command System Support Center
National Aeronautics and Space Administration	On-line real time remote site data reduction for the Mercury program Horizon sensors in satellite launch vehicles
U. S. Air Force	Large scale multi-computer complex On-line computer system for photographic intelligence data reduction On-line computation of scientific problems Automatic abstracting experiments Computer aided language analysis Weapon status control and reporting system Command and control system for Mobile Medium Range Ballistic Missiles
U. S. Army	Air Defense Systems located throughout the United States and in Europe Electronic warfare Systems analysis of tactical army command control information systems (CCIS-70) Automatic map compilation

Officers and Directors of The Bunker-Ramo Corporation

George M. Bunker | Simon Ramo | Milton E. Mohr | Charles D. Manhart | Charles R. Allen | John D. Wright | Joseph E. Muckley | Everett H. Pixley | William B. Bergen

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Simon Ramo, President
Milton E. Mohr, Vice President
Charles D. Manhart, Vice President
Charles R. Allen, Vice President

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Joseph E. Muckley (Vice President – Finance Martin Marietta)
Everett H. Pixley (retired Vice President, Mellon National Bank)
William B. Bergen (President, Martin Co.)

THE BUNKER-RAMO CORPORATION
A jointly-owned company of Thompson Ramo Wooldridge Inc. and Martin Marietta Corporation
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