

INDUSTRIAL
NUCLEONICS
CORPORATION

Annual Report Year Ended December 31, 1969

Financial Highlights

Year Ended December 31,	1969	1968	% Increase
Total Operating Revenues	\$ 20,002,379	\$ 17,292,229	+ 15.7%
Net Income	1,916,158	1,426,959	+ 34.3%
Cash Flow	3,211,963	2,540,421	+ 26.4%
Net Working Capital	8,717,253	6,431,624	+ 35.5%
Primary Net Income Per Share	\$ 0.60	\$ 0.48	+ 25.0%

To Our Stockholders and Employees:

Industrial Nucleonics achieved significant objectives in its continuing growth during the fiscal year ended December 31, 1969. In the financial area, our total revenues continued to climb steadily, surpassing the \$20 million mark. From a marketing standpoint, the acceptance of our new systems and products introduced during the year far exceeded expectations. Many new developments in the company's products, systems, and overall operations have occurred. These and other significant matters are discussed in this report.

Financial Summary

Total revenues from sales, services, and leases increased to \$20.0 million from \$17.3 million for the previous year. Before-tax profits on this business were \$3.4 million, up from \$2.2 million in 1968. Operating results yielded profits after taxes of \$1.9 million, compared with \$1.4 million for 1968, an increase of 34 percent. Primary earnings per share reached 60 cents, showing a 25 percent increase over the 48 cents per share for the previous year.

Per share earnings were based on an average of 3.2 million shares outstanding for the period compared with an average of 3.0 million shares outstanding for the year 1968. All figures represent the consolidated performance of Industrial Nucleonics and its subsidiaries stated on the new calendar fiscal year basis.

Broader Company Ownership

Industrial Nucleonics established broader ownership through its first public offering of stock in February, 1969. The underwriting and sale of 390,000 shares of common stock were managed by William Blair & Company of Chicago and involved the participation of 57 other underwriting firms. This stock offering represented the first equity capital to be taken into the company since 1952. Previously our growth had been financed by re-investment of operating returns and borrowings.

Stockholders now number more than 2,500 and are located in some 40 states and 10 foreign countries. Of interest is the fact that more than half of our employees participate in the company as stockholders, the majority of whom purchased stock during the 1969 underwriting.

Industrial Nucleonics stock is traded in the over-the-counter (OTC) market. Daily quotations are



Wilbert E. Chope
Chairman of the Board



David L. Nelson
President

obtainable from national and regional financial publications or from wire services available in many brokerage firms under the OTC symbol "INL."

The company now has greater flexibility for expansion. As in the past, we intend to continue our growth from within. However, we are now in a position to seek compatible outside situations which could provide growth from external expansion as well.

The "Age of Computers"

The 1970's have been characterized as the "Age of Computers." Some 60,000 computers in use primarily for scientific and office applications have already revolutionized procedures in these two areas. A more recent application of computers is for automating manufacturing operations. This third computer area is where we feel Industrial Nucleonics will play its most important role.

Major manufacturing costs are incurred at the factory level in transforming raw materials into finished products. It is also at this level that basic quality is imparted to final products. As computers are used for automation in factory processes, they are linked into corporate-wide management information systems. These systems then tie together the conventional corporate functions of process and quality control, accounting, and management decision, providing management with a unified data and information base.

Industrial Nucleonics has pioneered the development and application of more than 1,800 special-purpose computers in plant automation systems. Our company will continue to spearhead applications of computers in complete factory automation systems and extend these to corporate-wide management information systems. These new large-scale information systems establish a single data base common to the entire corporate business. In so doing, they provide the potential for uniting all functions within a business to work toward common corporate goals.

Acceptance of New AccuRay® APM Systems

Industrial Nucleonics took a major step forward in the spring of 1969 with the introduction of the new AccuRay Process Management systems—more commonly referred to as APM systems. These computer-based systems represent the culmination of a five-year, \$5-million research program and should provide us with a solid growth

base for a number of years to come. New APM systems sell in the range of \$200,000 to \$1 million per installation and are supported by the full services of our 375 marketing and field service personnel.

The response of our customers indicates clearly that there is an extensive need and market for these APM systems. To date, orders have been received for diverse applications in many industries including metals, paper, plastics, rubber, and tobacco. With major capital expenditures becoming more difficult, many companies are looking toward such systems to increase throughput and productivity of existing facilities and at the same time lower costs and increase profits. The new APM systems serve these dual needs well.

Other New Products and Systems

During the last five years, our technological efforts have been concentrated primarily on developing and designing the computer-based APM systems. Related research and development has also been directed toward products which serve as measuring input devices to the company's automation and information systems. A number of new techniques, devices, and systems came into existence during the year. Notable among these were:

1. A pulsed X-ray device for measuring individual plastic or glass bottles and containers;
2. The AccuRay C-700 high-speed automatic controller for the tobacco industry;
3. A fill-level inspection system for examining filled containers;
4. A new moisture measuring system for bulk materials such as cereals, grain, soybeans, tobacco, and coal; and
5. The AccuRay KET* system for inspecting cracks and other flaws in a variety of individually produced products.

During 1969, Industrial Nucleonics also brought to market a line of new ultrasonic devices for measurement of fluid levels and other discontinuities in a variety of chemical, petroleum, and food processes. The new ultrasonic devices provide us with one more basic information input for incorporation into larger systems.

Although all of the above may be used in more complex automation systems, many of them have applications in other fields such as water and air pollution control, metallurgical inspection, and food processing. These new products add to the total potential for our company's systems and services.

*KET is a service mark of Industrial Nucleonics Corporation

Pollution Control

There are analogies between controlling complex industrial processes and controlling environmental pollution. The goal of both is the final quality—quality of manufactured product in one case; quality of environment in the other. Sensitive and accurate measurements are the starting points for both types of control. For over a decade now, Industrial Nucleonics has been applying systems to water reclamation, waste treatment, and industrial effluent processing. Today, municipal works in thirty cities utilize AccuRay systems in their water reclamation operations. Industrial Nucleonics' recent developments of new, high-sensitivity, gaseous measuring devices—some of these developed for this country's space programs—provide opportunities for further penetration into the environmental control field.

No other human activity requires a more extensive systems approach than that of controlling and cleaning up environmental pollution, which knows no municipal, state, or national boundaries. There are adequate challenges for modern systems engineering using computer techniques for both understanding large-scale, gross pollution and doing something about it. Industrial Nucleonics' total systems approach involving sensitive measuring devices and computers should find increasing uses in the fields of pollution control, materials treatment, and water reclamation.

Our Future

We approach 1970 and beyond with optimism. We see great changes coming in the broad range of industries we serve. Never have productivity, cost control, and product quality been so important. Never has management in basic industries expended so much time and energy on these important factors of business success.

The remainder of this decade will provide unlimited potential for imaginative uses of computers and intelligent interpretation of information. There will be rapid growth in the amount, ability, and diversity of services required to maximize the power and performance of complex computer systems. Industrial Nucleonics has the right combination of advanced technologies, capable people, and process experience to serve the markets of the 1970's. In so doing, we believe we shall enhance our own corporate growth and profitability.

Wilbert E. Chope

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Chairman of the Board

David L. Nelson

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President



Industrial Nucleonics headquarters, Columbus, Ohio, located on 45 acres adjacent to The Ohio State University and near Battelle Memorial Institute.

The Markets for AccuRay Systems

Industrial Nucleonics numbers among its customers 69 of the top 100 U.S. companies.

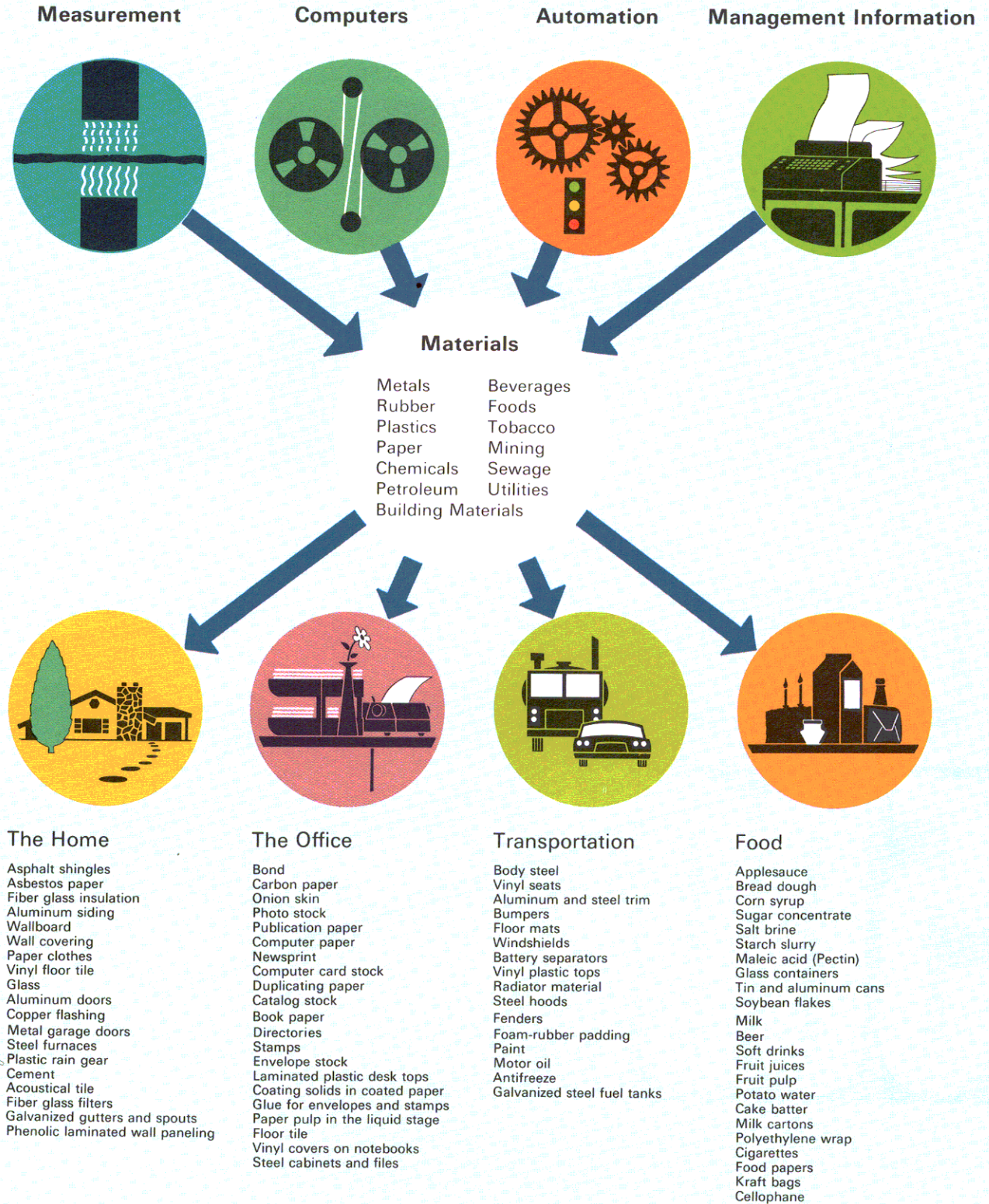


AccuRay automation and information systems are applied to a broad cross section of industry, including top names in American industry. Approximately 70 percent of the top 100 companies in the 1969 *Fortune Directory*, as well as hundreds of smaller producers, employ our systems. AccuRay systems control a wide variety of operations including building materials, rubber products, plastics, steel, nonferrous metals, paper, paperboard, foods, beverages, and tobacco. Other AccuRay systems find increasing use in operations in which materials are processed in a liquid, slurry, or gaseous state. Typical applications of these latter systems include chemical processing, mining and refining, and water pollution control.

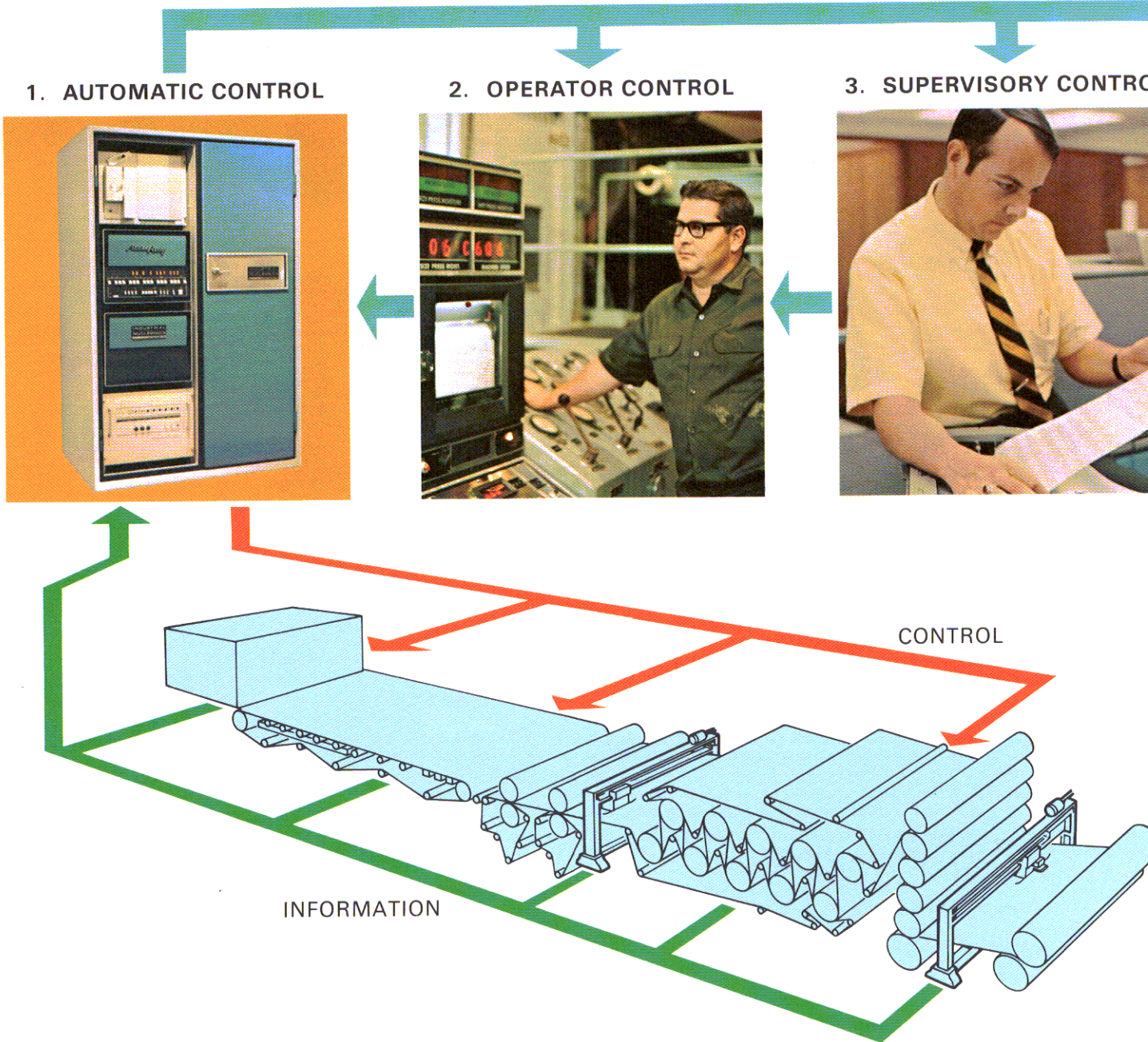
Industry is faced today with an ever-increasing cost-price squeeze. Material, processing, and labor costs continue to rise. In spite of increasing demands for both staple and luxury products, there are definite limitations on price increases that can be taken. Out of necessity, great changes are occurring in the attitudes of a large segment of industry toward cost, quality, and profits. Industry is turning to systems such as those of Industrial Nucleonics to conserve raw materials, provide higher efficiencies, improve quality, and minimize paper work.

Today, well over 9,000 AccuRay systems are utilized by many customers to make better products at lower costs. Many of the products and materials controlled by AccuRay systems find routine use in the home and the office or become part of fabricated products such as automobiles, refrigerators, or television sets. Thus, our systems play a vital role in fighting inflation by resisting cost increases at critical steps in the manufacture of many consumer products.

AccuRay Systems and Services Help Make Everyday Products Better



Computer-Based Automation and Management Information System



The AccuRay APM system illustrated above automates complex paper making operation and supplies information to supervisory and management levels.

4. MANAGEMENT CONTROL



In early 1969, Industrial Nucleonics introduced its AccuRay Process Management (APM) systems. These are computer-based automation and management information systems designed for application to high-volume manufacturing processes. They automate operations of complex processes and supply management with information on cost, efficiency, and product quality.

The APM systems represent the culmination of a five-year, \$5-million development program. They are priced in the range of \$200,000 to \$1 million per installation, depending upon the size and complexity of the customer's manufacturing operation and the amount of process and product information he may require.

• **APM Systems—Four Levels of Control and Information**

APM systems accomplish a high degree of automation based upon real-time, continuous measurements of the customer's products and processes. They supply various levels of management and supervision with important information according to a unified, corporate-wide data base. The APM systems function at four levels of a customer's manufacturing and business operation.

• **Level 1—Automatic Process Control**

Multiple, real-time measurements are made by the measuring and scanning parts of the APM system. Information is then fed back through the APM system which in turn makes automatic adjustments of the process machinery. Through these measuring and automatic control operations, the product and manufacturing process are held to within preset close tolerances. Combinations of different control strategies are available with each APM system—adaptive and predictive control, feed-forward operation, and "on-machine" process modeling.

• **Level 2—Operator Control**

At this level, the machine operator is able to actuate controls on the display panel which cause the overall system to operate automatically or to make major process and product changes when required. The operator at his control station receives visual readout data relating to process performance under automatic control. Such readout indicates when the process is performing well and the product is of high quality. When deviations occur, signals are given for the operator to take action. He applies his years of experience to maximize the performance of the valuable plant and machinery resources entrusted to him.

- **Level 3—Supervisory Control**

Plant supervisory personnel are presented with printed information on the overall status of the manufacturing operations. Emphasis at this level is on process performance, production rates, and product quality. Corrective action involving both men and machines can be promptly taken when key supervisory personnel have such current information. To document product quality, companies are sending their customers a copy of the printed readout sheets pertaining to each major unit of production output.

- **Level 4—Management Control**

At this level, important information is made available on which management may base major decisions. Such information can be transmitted to remote locations within the plant or to an office in another city. Emphasis at the management level is on information such as production costs, overall product quality, and current operating profits. Information from individual APM systems can be further merged into a single corporate-wide information system. In such total management information systems, computed alternatives are presented involving economic trends, market conditions, product demands, and corporate long-range plans.

Industrial Nucleonics has available the field and headquarters personnel to analyze and simulate overall corporate operations and to design the optimum information systems.

APM-800 and APM-900 Systems

Presently the company's APM systems fall into two categories: the APM-800 series and the APM-900 series.

The APM-800 series incorporates digital computers as basic and integral parts of the measuring, automation, and information processing system. Integrated circuits form the basis for all electronic operations including those of the computers. Full process and systems analysis, computer programming, and systems design are accomplished before the APM-800 systems are shipped from our plant. This allows prompt start-up and early utilization of the APM systems once they are installed. The majority of new APM business has been for the APM-800 series.

The APM-900 series works in conjunction with a time-shared digital computer in situations in which the customer wishes to use the computer

for other business functions. The APM-900 has been designed to be compatible with process computers manufactured by various other companies. In the typical situation, the separate digital computer is first delivered to our plant. Industrial Nucleonics performs the process and systems analysis and programming for that part of the computer system relating to process automation and its resulting management information read-out. Then the computer is reshipped to the customer as part of the complete functioning APM-900 system.

Modular Design of APM Systems

Manufacturing processes vary as to complexity, modes of operation, and products produced. The equipment making up an APM system is designed to consist of (1) modular parts common to many different processes and (2) specially designed additional apparatus unique to each customer's needs.

The software and programming follow a similar approach. Modular computer programs were developed as a result of early process studies made in our computer laboratory. These software programs were based upon prior process knowledge plus actual computer simulations of different basic manufacturing processes.

Industrial Nucleonics now offers a number of proprietary and modular programs which make up the basic software for each APM system. As new systems are designed, special "executive" software programs are developed to tie together and make functional the total operation of the APM system. The customer benefits from an overall APM system customized to his own needs at a price compatible with the economic benefits obtained from his improved manufacturing operations.

Production and Test of APM Systems

The original APM program involved the total redesign of the company's measuring, control, and data systems and the incorporation of these previous functions into a unique computerized system. The resulting APM system drew from advances that the company made in a combination of technical areas including electronics, nucleonics, automation, and computer technology.

Collateral to the equipment and software development was complete redesigning of our own company's inventory, manufacturing, and testing methods. In present production of the APM system, other computers are widely used. For example, instead of working from the conven-

tional circuit diagrams, production technicians now connect and cable the entire system by referring to a computer tabulation listing all system interconnections.

Major equipment components are automatically tested with a computer operated in a diagnostic mode. Final checkout of each APM system utilizes the computer internal to the system itself. If there are remaining faults within the system, the internal computer identifies the fault and types out its nature and location. When the system is totally functional and ready to go, a visual readout is given to this effect.

Acceptance of APM Systems

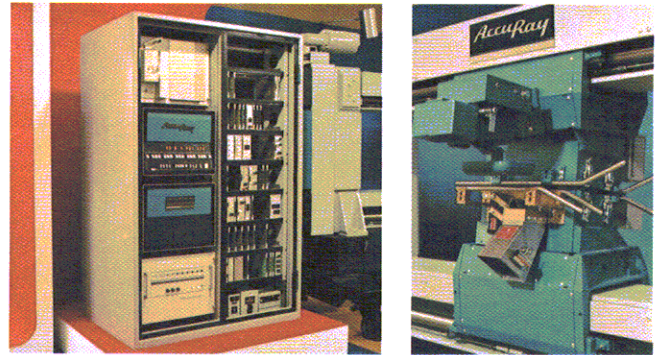
The APM systems are largely responsible for the surge of new business experienced during the latter half of 1969 and continuing today. APM system orders have been received from industries we serve including metals, plastics, paper, rubber, and tobacco.

New developments in APM systems are directed toward both larger and smaller versions. At one extreme, new APM systems are under development for automating plants with multiple individual processing machines and many different processing steps. Emphasis is on providing information to top management levels. In the other direction, development activity is proceeding toward smaller APM systems for processes which have lower dollar throughputs. Both approaches represent ways in which we respond to the great diversity of customers' needs.

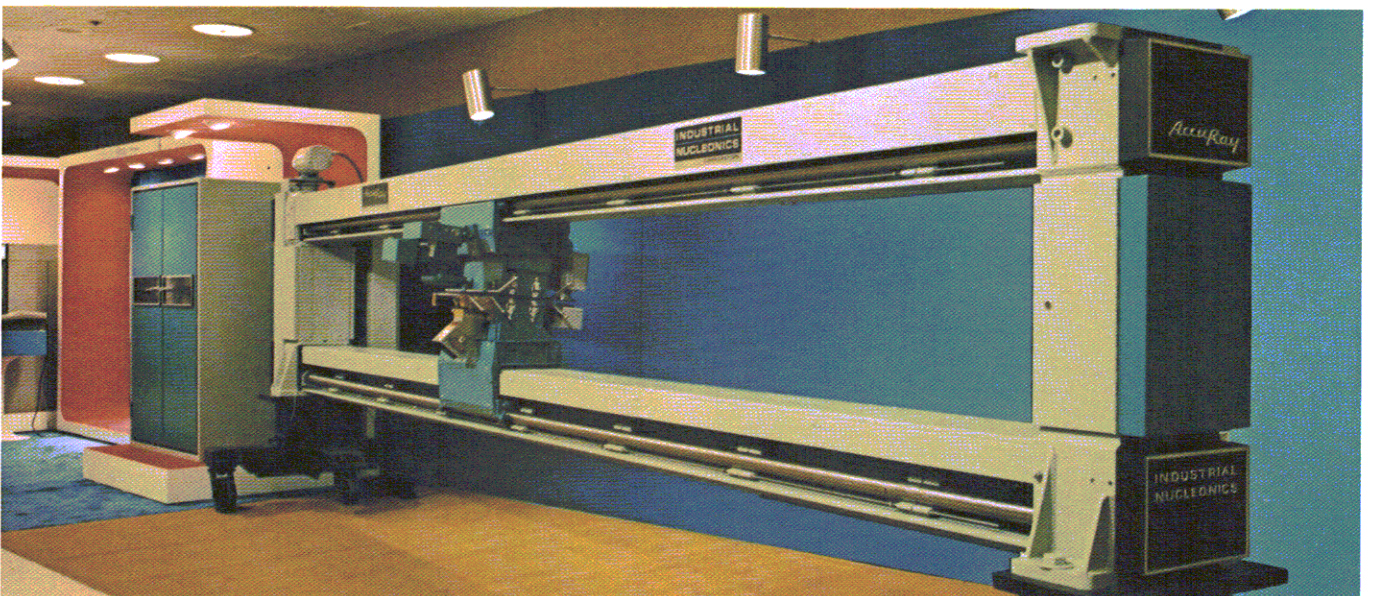
The APM operator station provides lighted color bars, digital and graphic readouts, and set-up panel—making the operator master of his process.



APM system electronics and computers incorporate solid-state, integrated circuits throughout.



Multiple measurements—weight, moisture, temperature, fiber orientation—are made by scanning unit.

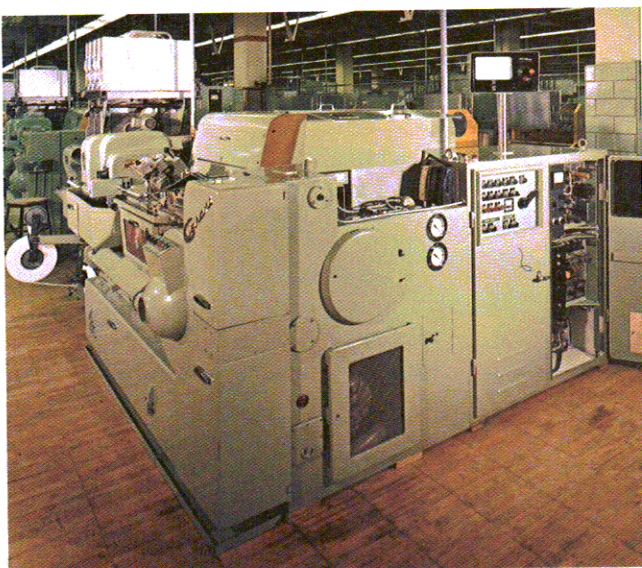
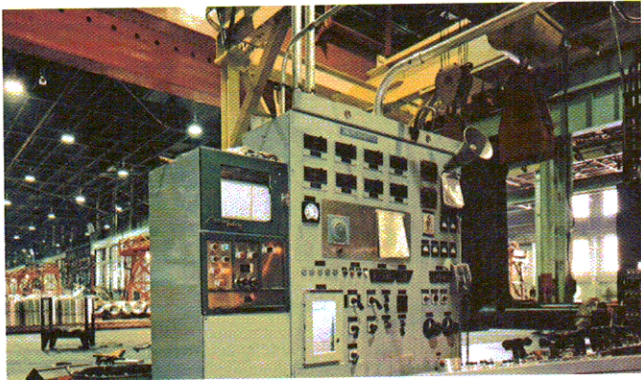


Industrial Nucleonics designs large, stable mechanical structures to permit many measurements to be made across wide sheets.

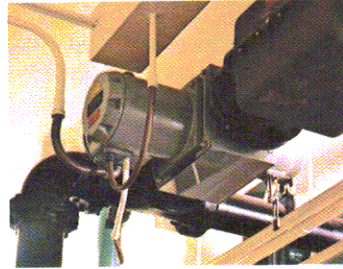
Applications of AccuRay Systems

Industries that utilize AccuRay automation and information systems are generally those that have high raw material and processing costs. Processes in these industries are characterized by high-speed, continuous production and large dollar throughput of finished products. Raw material costs may be as high as 50 percent of the final product selling price. Representative annual throughput costs for high-production processes are: tandem steel rolling, \$50 million; paper making, \$20 million; and rubber tire calendaring, \$8 million. Typical savings in raw materials of 1 to 4 percent can more than pay for an AccuRay automation system in a reasonable period of time—from six months to two years. Leased AccuRay automation-information systems pay for themselves from current earnings and provide the user with a net return over his rental costs.

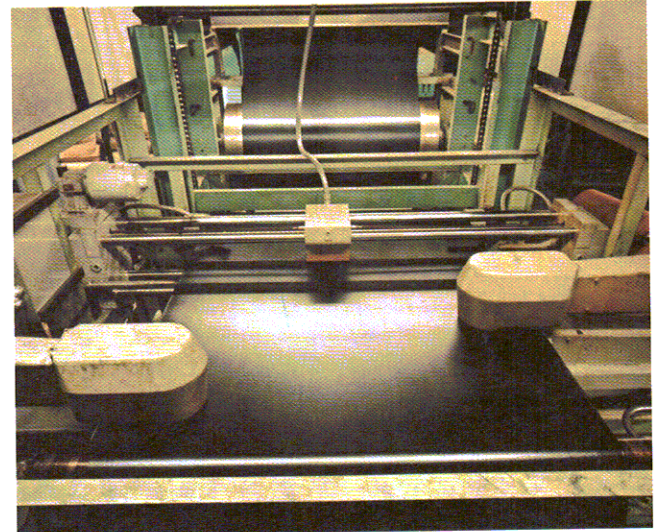
AccuRay automation in aluminum rolling ensures adherence to close tolerances.



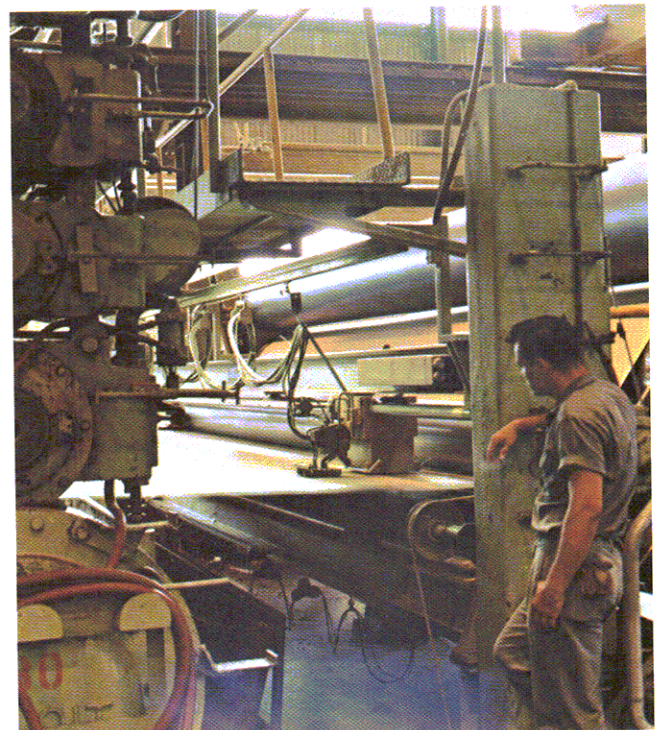
Multiple AccuRay C-700 high-speed controllers tie into central APM systems in tobacco plants.



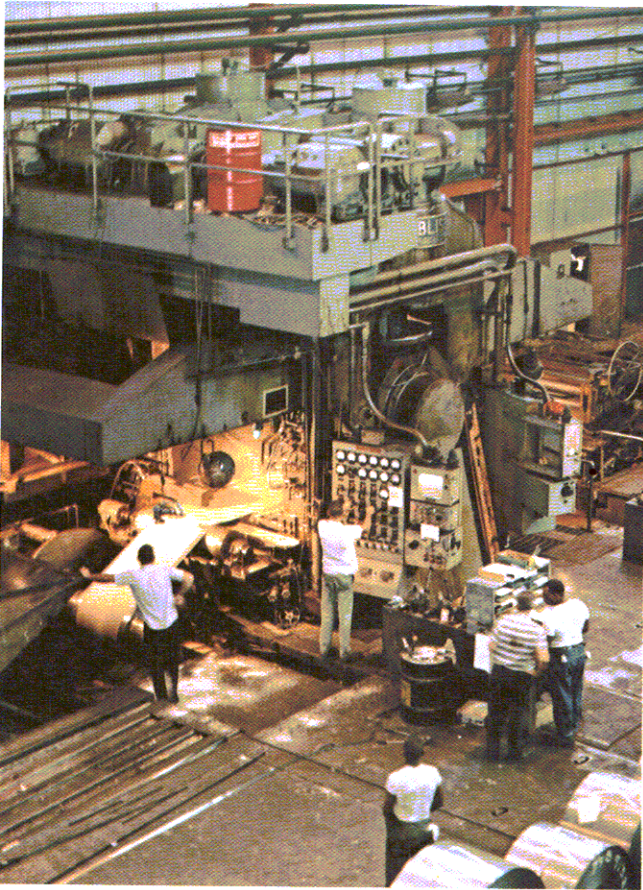
Thirty municipalities utilize AccuRay systems for water reclamation.



AccuRay systems automate many operations in the tire and rubber industry.

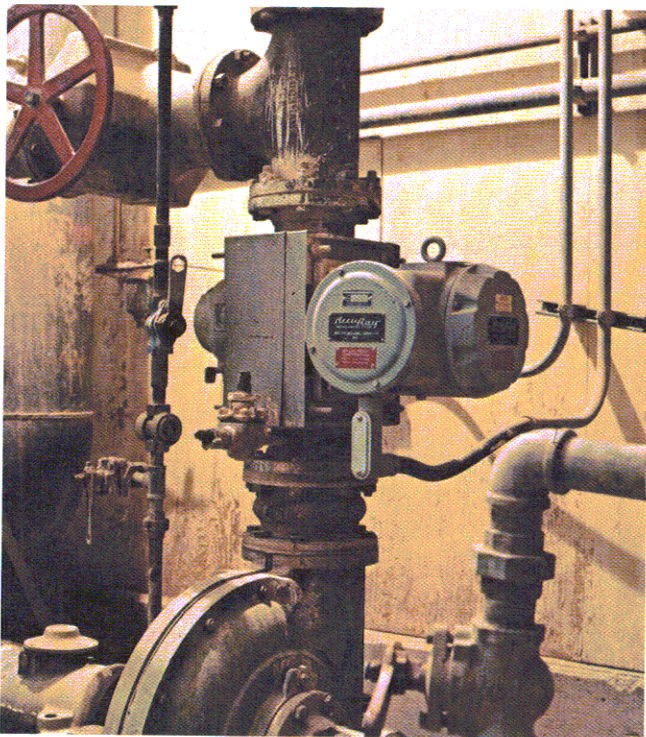


A typical AccuRay paper installation controls an average of \$20 million of annual product throughput.

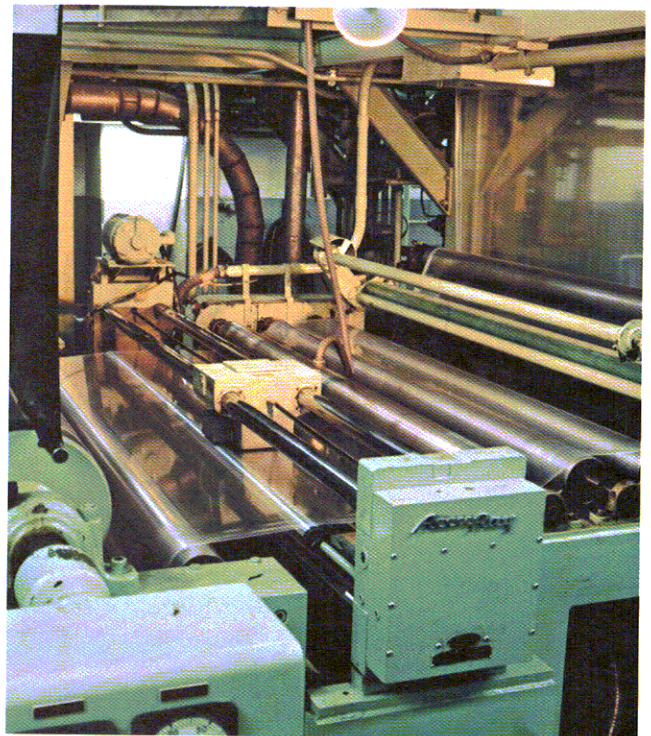


An AccuRay system controls a reversing cold rolling steel mill.

In the food and beverage industries, AccuRay fill-level systems automatically reject improperly filled cans.



Density and composition control provided by AccuRay systems are critical to chemical operations.



AccuRay systems are used extensively in each basic plastics forming process—extruding, calendering, and casting.

Marketing and Field Organizations

The automation and information systems of Industrial Nucleonics are marketed and serviced through our own marketing and field organizations. Many skills and specialties are available within these organizations to ensure that each customer receives maximum results from his AccuRay systems.

Total personnel in these organizations now number 375. Nearly 300 field personnel are deployed throughout the continental United States and Europe such that personnel are within two hours' travel time of over 95 percent of AccuRay installations. Different specialists of the field force develop working relationships at multiple levels within the customer's organization—from top management to the actual operator of the process.

The marketing field force is composed of the following groups:

Account Managers are highly trained engineers located throughout the United States, Canada, and Western Europe. They represent the main contacts with present and future customers and work with various decision-making levels. Some account managers are assigned to a given territory by industry while others are assigned to one major account or to a selected number of similar accounts. They are experienced in both the technology and economics of customers' operations. Virtually all have engineering degrees; many have additional degrees in business administration.

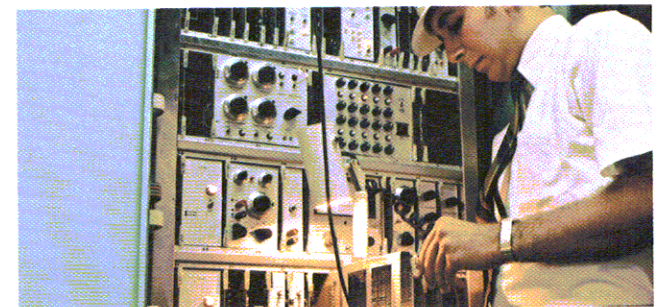
Systems Engineers are company specialists who augment the activities of our account managers. They work with customers in training their personnel, analyzing their systems needs, and documenting savings. They supervise the start-up of new systems and are responsible for ensuring customer satisfaction with technical and economic performance. Systems engineers have educational backgrounds equivalent to those of our account managers.



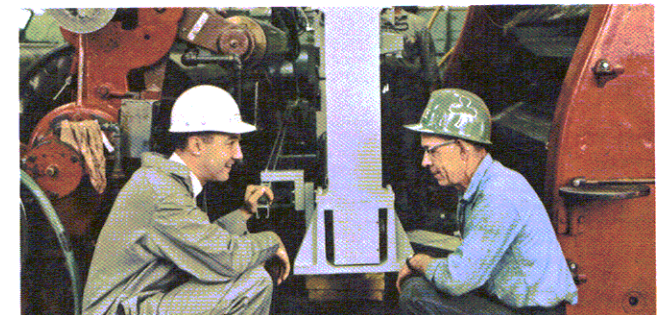
Account Managers are Industrial Nucleonics' main contacts with present and future customers.



Systems Engineers train customers' personnel, analyze their systems needs, and document savings.



Customer-Service Engineers maintain and service AccuRay systems.



Installations Engineers assure prompt and satisfactory installations of AccuRay systems.

Customer-Service Engineers maintain and service AccuRay systems. These engineers devote much of their effort to preventative maintenance which permits AccuRay systems to operate around the clock, day in and day out. In plants with large or multiple installations of AccuRay systems, these engineers are often assigned for full-time duty and referred to as resident engineers. Services of resident engineers can be included in the regular leasing program or contracted separately.

Installations Engineers install AccuRay systems. Some are field based; others are based at the home office and accompany shipments of our automation equipment to assure prompt and satisfactory installations.

Expanding International Support

As the marketplace for our systems expanded beyond the borders of the continental United States and Canada, so did the need for systems support. Since its inception in 1965, the company's International Division has grown to 37 sales, systems, and service personnel located throughout Western Europe. Nearly all are citizens of their native countries who have been trained by Industrial Nucleonics in the United States. Close liaison is maintained by regularly scheduled

visits between our Brussels and home office personnel to guarantee coordinated expansion and practices consistent with those in the United States.

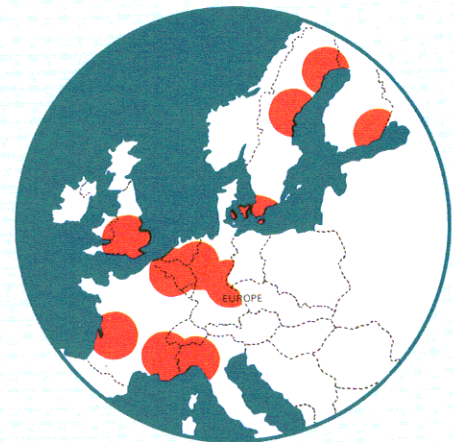
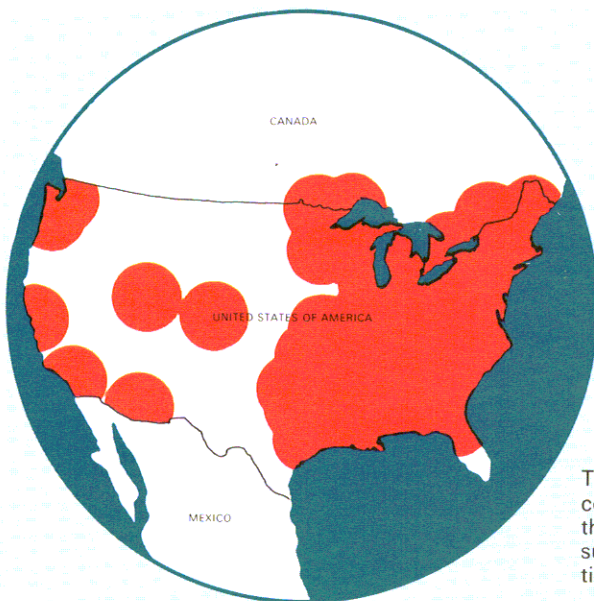
Computer and Systems Services

It is often considered that the service segment will be the most rapidly growing part of the computer and systems industry. Industrial Nucleonics recognized in the early stages of its development that maximum results from large systems could be obtained only when such systems were backed up by competent and readily available personnel. The marketing organization is important for both customer satisfaction and our own corporate expansion.

1. It ensures economic results for the customer; the policy of producing economic results has become the cornerstone of our business.
2. It keeps us attuned to new customer needs and provides a guide to our future product, marketing, and corporate strategy.
3. It provides a reservoir for filling future management positions within Industrial Nucleonics.

Our key marketing and field personnel have ten to fifteen years' experience with us. This organization provides Industrial Nucleonics with one of its major assets for future growth and expansion.

Distribution of Industrial Nucleonics Field Personnel

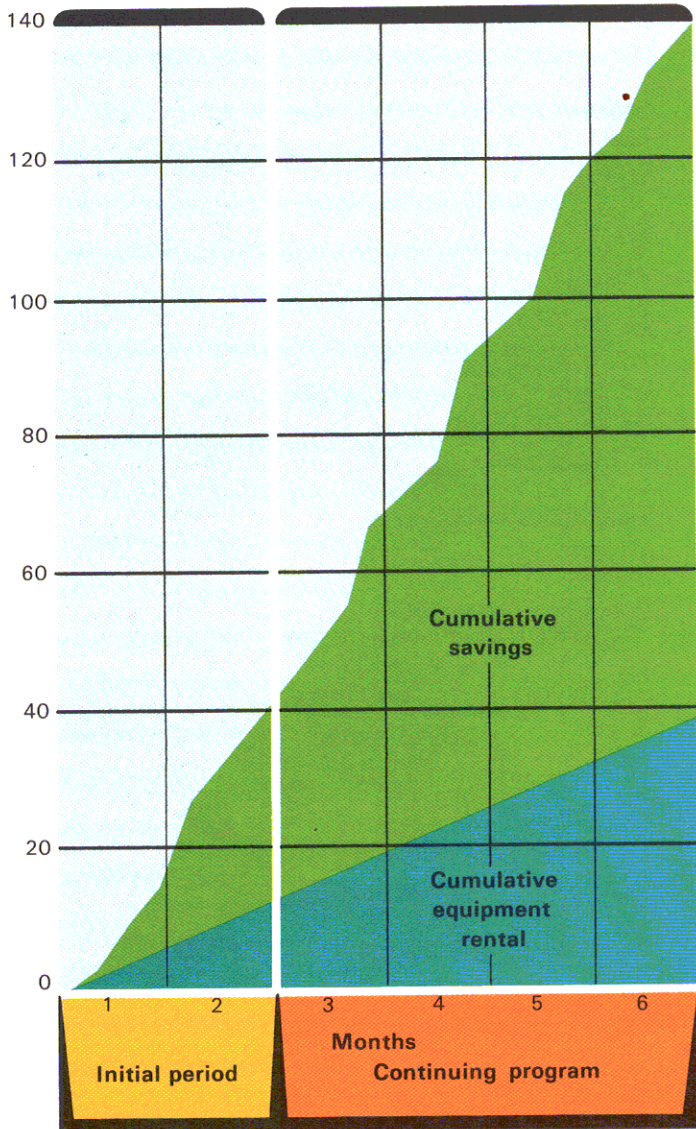


Three hundred Industrial Nucleonics field and consulting personnel are located throughout the United States, Canada, and Western Europe such that personnel are within two hours' travel time of over 95 percent of AccuRay installations.

Leasing

Customer's Savings from AccuRay Leasing Program

Thousands of dollars



Industrial Nucleonics has been a leader in the leasing of automation and information systems to industry. AccuRay systems, many of which are still in operation today, were leased to customers as early as 1955. AccuRay systems now under lease provide a continuing revenue base to our company.

Advantages of Leasing

Leasing provides definite benefits to our customers, among which are:

- AccuRay systems pay for themselves out of the savings resulting from their use.
- A full range of AccuRay services including systems engineering, process analysis, systems design, and computer programming are included as part of each leasing package.
- Complex systems can be installed without the customer's making a major capital investment.
- Customers are assured of the most modern, reliable, and time-proven systems, thereby eliminating concern over obsolescence.

AccuRay Leasing Corporation

In 1962, a wholly-owned subsidiary of Industrial Nucleonics, AccuRay Leasing Corporation, was organized for the purpose of leasing AccuRay systems and providing a spectrum of

This actual case study of an Industrial Nucleonics system shows that cumulative savings far exceed the cumulative rental for the AccuRay system. Savings were realized through increased productivity and more effective raw material usage. Improved product quality was an added dividend.

services to our customers. Presently this corporation has approximately \$27 million worth of automation-information systems, valued at the original selling price, under lease to customers in industry.

Leasing Programs

AccuRay Leasing Corporation offers leasing plans designed to meet the specific needs of each customer. These programs subdivide into two classifications: (1) short-term leases for terms of one or three years with a provision for a one-year notice of cancellation, and (2) long-term leases for terms of five, eight, or ten years.

AccuRay automation and information systems, once installed, become an integral part of the customer's total operating process. Our experience indicates that in most cases the AccuRay system stays in place for many years beyond the nominal term of the lease.

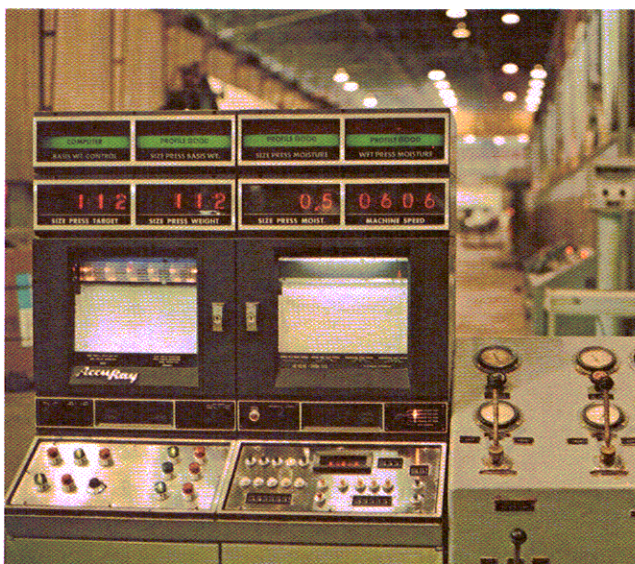
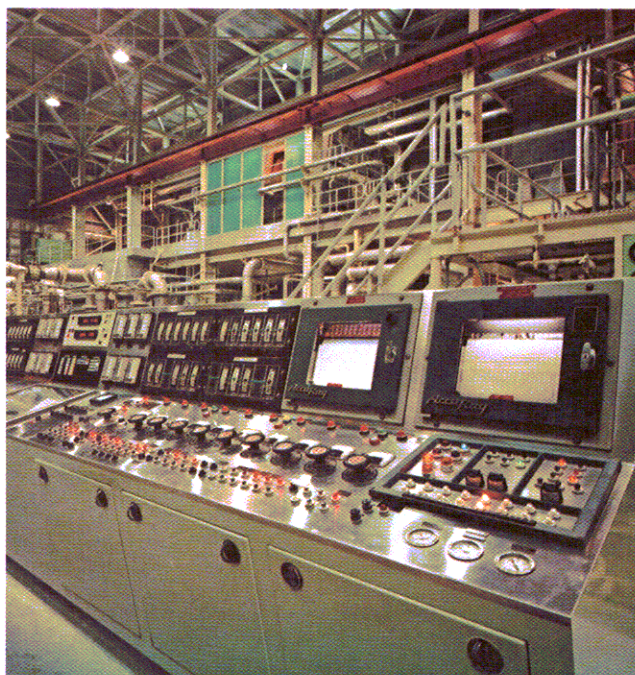
Joint Ventures

Our programs related to short-term leases are aided by two joint ventures. AccuRay automation and information systems manufactured by Industrial Nucleonics are purchased by the joint ventures and then leased to AccuRay Leasing Corporation for subsequent rental to customers.

One joint venture is between AccuRay Leasing Corporation and the St. Paul Leasing Company, a subsidiary of the St. Paul Companies of St. Paul, Minnesota. Fostoria-AccuRay is the other, formed in 1968 between AccuRay Leasing Corporation and Fostoria-Leasco, Inc., of Fostoria, Ohio.

These joint ventures permit us to recognize the manufacturing profit for the sale of our systems and maintain a substantial operating lease program. Since AccuRay Leasing Corporation is a 40 percent owner of each joint venture, we receive a proportionate amount of the future joint venture profits and equipment residual values.

AccuRay Leasing Corporation offers leasing plans designed to meet specific needs of each customer.



Under leasing programs, customers are assured of the most modern, reliable, and time-proven automation-information systems.

Computer and Management Sciences

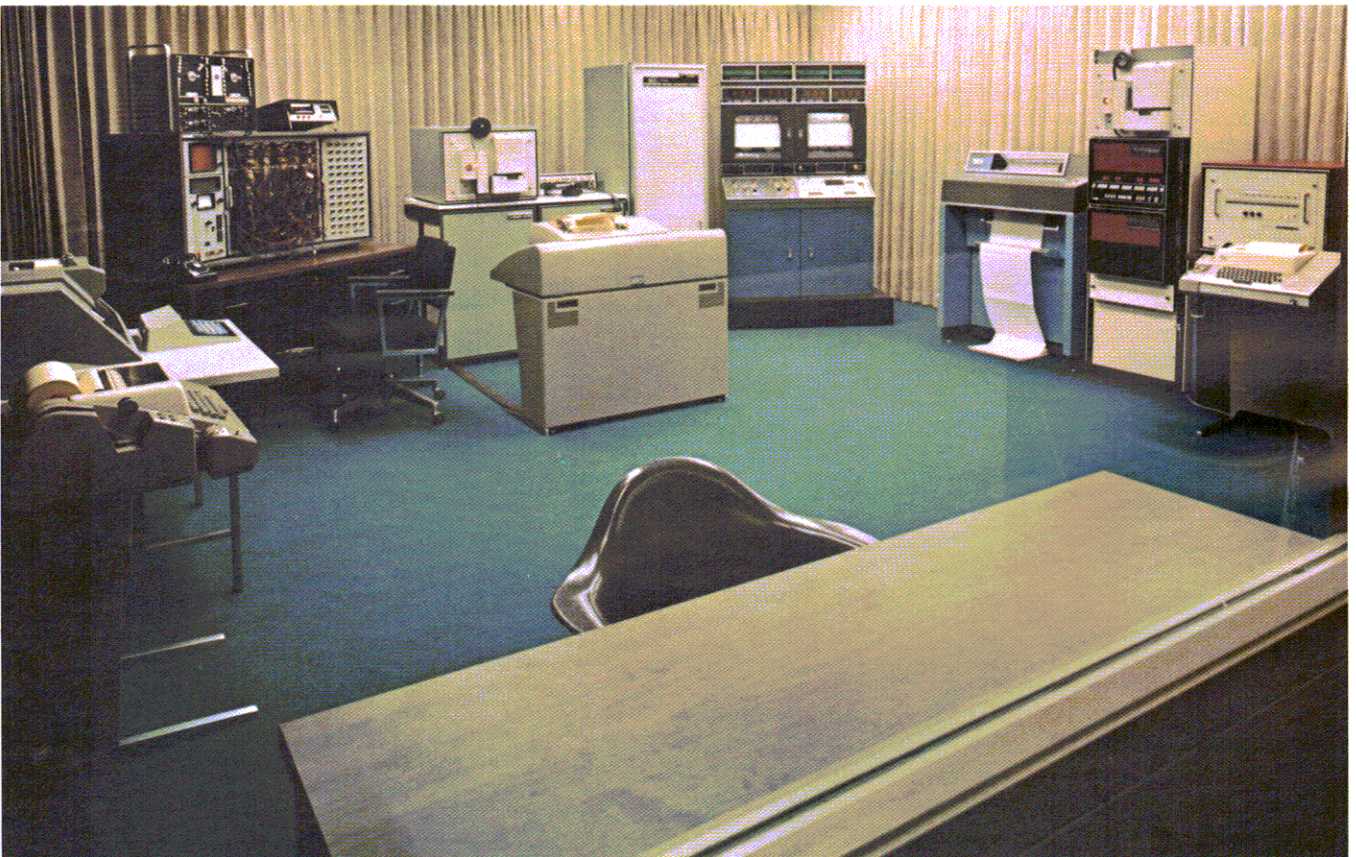
Personnel in the computer sciences laboratory have diverse backgrounds in systems, programming, and computer technology.



Future advances in the fields of computer automation and management information systems are being spearheaded by our computer and management sciences personnel.

Computer Sciences

The computer sciences laboratory analyzes industrial processes, simulates these processes with a computer model, and develops the optimum control and data strategy for each APM system. The laboratory is manned by systems, computer, and programming engineers—all at the



The computer sciences laboratory analyzes and simulates customers' processes and develops optimum control strategies for each APM system.

M.S. or Ph.D. levels. They are augmented by university and industrial consultants with a variety of backgrounds—industrial processing, computer sciences, hybrid computer techniques, and computer programming.

Personnel in this organization are responsible for developing the proprietary, modular computer programs which are used with APM systems. These modular programs are based upon knowledge of each customer's process and are incorporated in the total system program to provide optimum automatic control and data processing. Thus each new APM system is preprogrammed and ready to function when it leaves our manufacturing facilities.

New work of the computer sciences laboratory is directed toward developing more extensive versions of APM systems. These systems—applied, for example, in the tobacco industry—tie together multiple installations of AccuRay measuring and control equipment to automatic inspection and materials handling operations. Simultaneously, a communications network transmits data to a management information center.

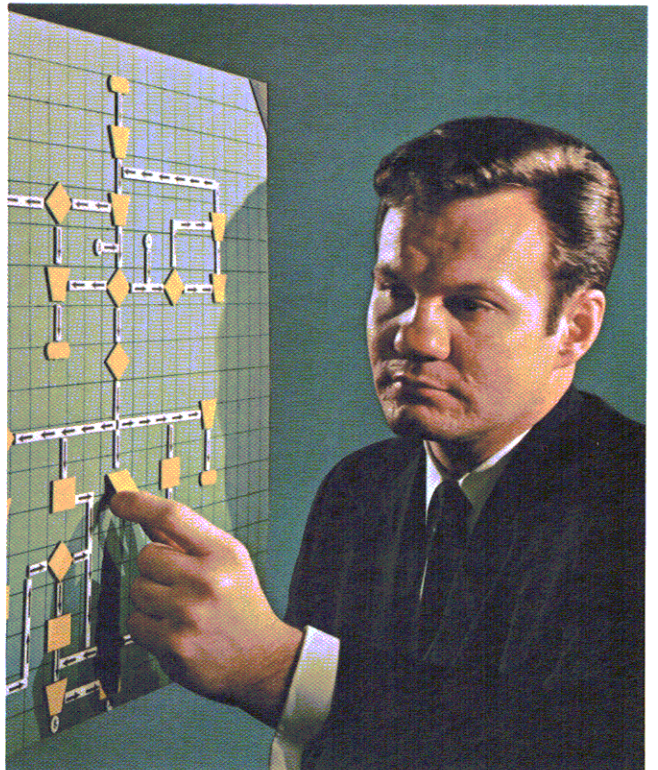
Management Sciences

Personnel within the area of management sciences provide consulting and design services relating to corporate-wide information systems. The goal of such activities is to establish a uniform data base for the diverse functions within a given customer's company. Systems are designed in which production, quality, and cost information is presented in computer reports to various management levels. Specialists within this division have backgrounds in fields such as accounting, computer sciences, systems analysis, and industrial engineering.

Contracts have been received for overall operational analyses of customers' businesses and for design of corporate-wide information systems. Groundwork is also laid for the ultimate introduction of APM systems.

Management sciences personnel are also available for consulting with our field personnel and customers. The combination of Industrial Nuclear field and home office experts provides industry with a complete systems approach to automation and information handling.

Management sciences experts develop corporate-wide information systems which provide production, cost, quality, and profit data.



An overall operational analysis is made of each customer's operation before information systems are specified and designed.

Our People

Industrial Nucleonics' most important asset is its capable and dedicated personnel. During our history, our people have enabled us to pursue advanced technologies, to effect creative marketing techniques, and to utilize sophisticated manufacturing procedures. Under the guidance of an innovative and experienced management team, optimum performance of every individual has become the key for a successful corporate operation.

Technical Capability

Impressive technical backgrounds are prevalent at Industrial Nucleonics where 80 percent of the college graduates have degrees in engineering, physics, or mathematics. In addition, some 110 advanced degrees at the master's and doctoral levels have been earned by our people. These educational accomplishments, combined with a wealth of experience and industry knowledge, provide us with a strong base for future expansion in advanced technologies.

Business Knowledge

Industrial Nucleonics has been successful in attracting personnel with a unique combination of technical and business education for positions throughout the company. About 50 of our management and professional personnel have master's degrees in business administration in addition to an undergraduate degree in science or engineer-

ing. These business and industrial management graduates have been drawn from leading educational institutions. Business capability, coupled with technical know-how, has been one of the primary factors contributing to our growth.

Creativity

Patents, publications, and awards bring frequent recognition to our personnel. However, the real evidence of employee ingenuity and creativity is reflected in each AccuRay system produced and its resulting performance. No two customers' needs are the same, and each solution is the outcome of the creative endeavor of many individuals in a team effort.

Innovative Management

A statistical profile as of December 31, 1969, shows a total employment of 868 people, of which 482 are serving the company in a professional capacity. Maximum employee development and coordination of individual effort in accordance with established corporate objectives represent the challenge of our management. The success of our operations to date leads us to believe that we have one of the most outstanding and innovative management teams in the field of automation and information processing. The experience and competence of this team, coupled with an understanding of customers' needs, is the foundation of our future growth.



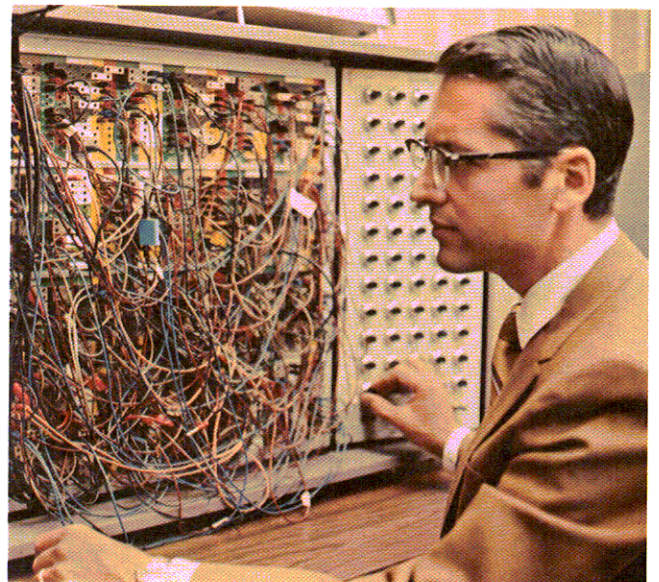
Development of the new APM systems introduced in 1969 required the creative endeavor of many individuals in a team effort.

Research and Development

Industrial Nucleonics invests annually \$2.5 million in research, development, and related technological activities. Technical activities are concentrated in four separate but related technologies: (1) nucleonics, (2) electronics, (3) automation systems, and (4) computers. During the past five years, our major technological efforts have been devoted to developing the APM systems. The successful completion of these developments places the company in an entirely different perspective—from the standpoint of expanded markets, new technologies, and new engineering and manufacturing methods.



Information specialists perform basic investigations to determine suitability of new measuring principles for applications in automation-information systems.



Some of the basic new techniques developed under the APM program are being utilized for designing additional new products.

New Products

We have utilized some of the basic new techniques developed under the APM program for designing additional new products which have markets of their own. For example, the AccuRay C-700 high-speed cigarette control system is basically a special-purpose digital computer. In addition to automatically controlling the cigarette making machine, the C-700 system inspects individual cigarettes for flaws and rejects defective ones. Multiple AccuRay C-700 controllers installed on separate processes in turn become part of a communications link to supply information to a central plant APM system.

A new bulk moisture measuring system has been tested which has applications to accurate measurements of moisture in bulk materials such as cereals, grain, soybeans, tobacco, and coal. In many processes, the precise control of moisture is both an economic and quality consideration.

Other new products recently tested or introduced are: (1) a fill-level inspection system for examining filled containers, (2) a pulsed X-ray device for measuring individual plastic or glass bottles, and (3) a new line of ultrasonic level and measuring devices for the chemical, petroleum, and food industries.

Contracts were received for developing, constructing, and operating facilities to apply the company's AccuRay KET systems which inspect individual parts and items for cracks and other flaws with a sensitivity over 500 times greater than had been previously obtained. In actual operation of KET systems during the year, it was found that not only could discrete items such as turbine blades and aircraft bearings be inspected for flaws, but that a prediction could be made of the actual remaining life for which the part would be functional.

New techniques and products, such as the KET system and the X-ray bottle measuring device, open up market opportunities in manufacturing operations for individually produced items. Previously, AccuRay systems have been used primarily for continuous processing operations.

Basic Investigations

Information is the basic ingredient for all control—both business and process. Each year we devote research to new measuring principles that show promise as "information inputs" for automation and data handling systems. Investigations cover numerous basic physical principles

such as beta-, gamma-, and X-ray absorption and reflection, optical scanning, infrared and radio-frequency interactions with materials, and ultrasonic effects. These principles are under study as future input devices to measure chemical composition, hardness, thickness, strength, and crystalline properties of manufactured products.

Contract Research

The company created a Federal Systems Division originally to provide a continuing input of new technology. Emphasis in recent years has been on high-technology programs with potential applications to new commercial and industrial markets. During the past year, a number of the basic technologies developed under this division have been converted to new products or commercial processes. The KET program for measuring flaws and cracks in materials and the pulsed X-ray system for measuring plastic and glass bottles are two examples. In fact, the improved pulsed X-ray source was originally investigated for a tracking and distance measuring system for maintaining helicopters in formation.

During the year, field tests were run on a sulfur dioxide smoke and gas monitoring system. Original investigation of the unique principles applied was covered under an early AEC contract. The sulfur dioxide monitor and other similar sensitive measuring devices offer promise of being powerful aids in the control of air pollution.

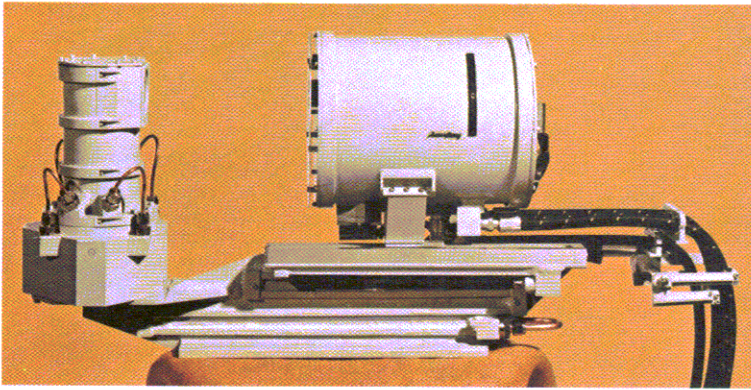
Patents and Recognition

Creativity is important to our continued technological leadership and corporate growth. As recognition of technological excellence, Industrial Nucleonics received in 1969 its third Industrial Research, Inc., IR-100 award for the advances made in nondestructive measurements with the AccuRay KET systems.

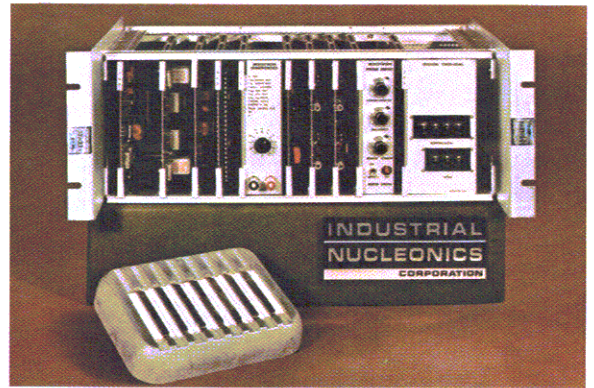
The company's scientific personnel received further recognition for their novel and unique developments by the granting of 56 new patents this year, bringing the total to 445 U. S. and foreign patents. The patents, issued or applied for, are broadly divided among areas of technology including automation systems, information data devices, measuring instruments, aerospace systems, sensitive detecting devices, small signal measuring circuits, and computers.

The company intends to continue its policy of encouraging creativity and maintaining a vigorous patent program to protect its intellectual attainments.

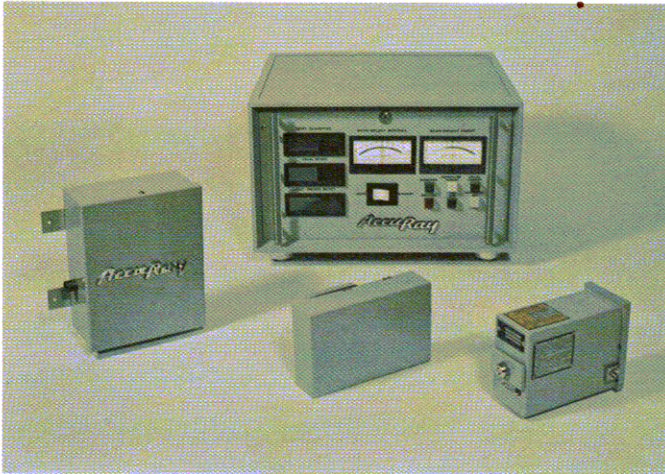
AccuRay pulsed X-ray device measures individual plastic or glass bottles.



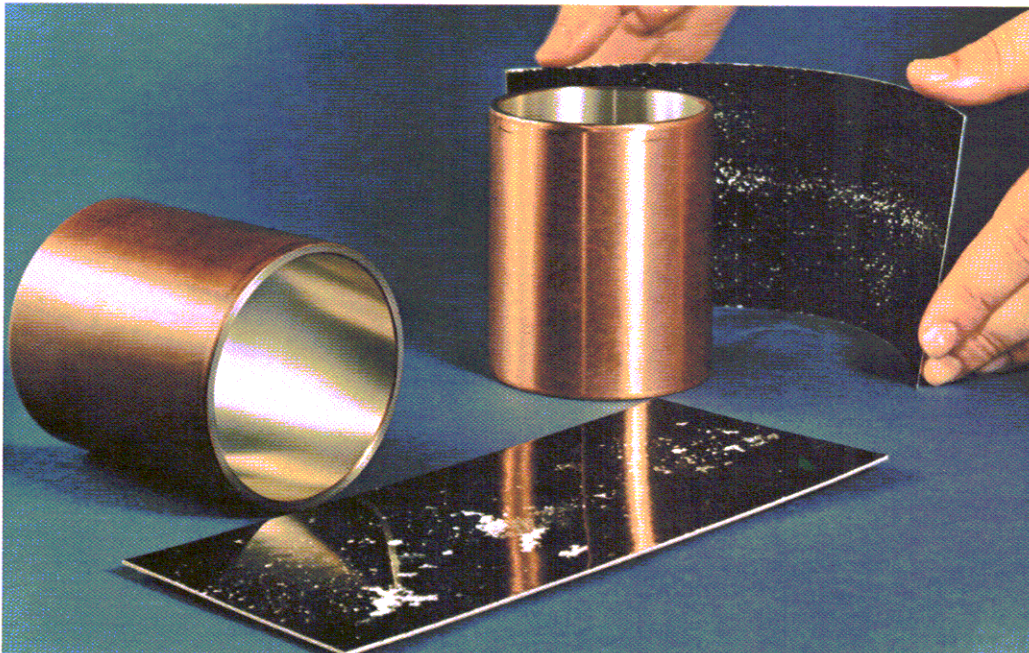
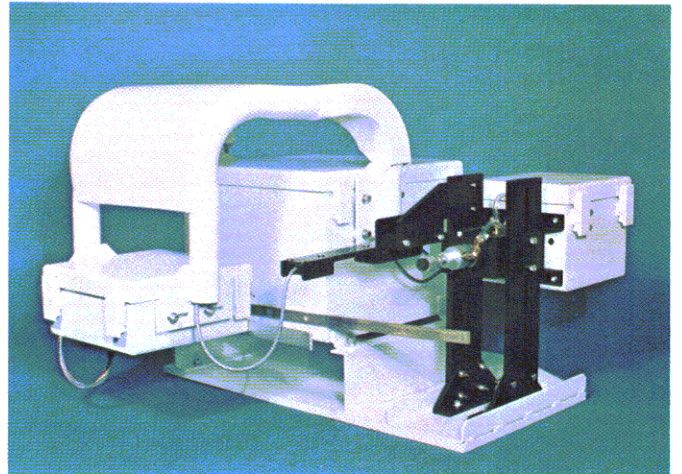
A new bulk moisture system measures moisture in cereals, grain, soybeans, and tobacco.



The new AccuRay C-700 tobacco control system feeds a central plant APM system.



Rapid and highly reliable inspection of filled containers is now possible with latest AccuRay fill-level system.



AccuRay KET system, recipient of 1969 IR-100 award, has a sensitivity over 500 times greater than that of conventional inspection techniques.

Officers and Managers of Principal Subsidiaries

Industrial Nucleonics Corporation

Research and development, marketing, and manufacturing company incorporated in Ohio

Wilbert E. Chope Chairman of the Board	William M. Ryan General Manager, Industrial Systems Division
David L. Nelson President	Charles O. Badgett General Manager, Process Industries Division
H. Roy Chope Executive Vice President	John E. DeWitt General Manager, Tobacco Industry Division
James E. Reider Vice President—General Manager	Ernest D. Jernigan General Manager, Federal Systems Division
Robert E. Swenson Vice President, Finance —Treasurer	William L. Adams Manager, Industrial Systems Research and Development Department
Carl J. Cooperrider Secretary	Paul H. Troutman Manager, New Product Development Department
Walter H. Canter, Jr. Vice President, Manufacturing	Philip J. Robinson Manager, Administration
Willard C. Hays Vice President, Marketing	
George I. Doering Vice President—General Manager, Paper Industry Division	

AccuRay Leasing Corporation

Wilbert E. Chope
President

Christopher J. Campbell
Vice President

Carl J. Cooperrider
Vice President—Secretary

John M. Braasch
Treasurer—General Manager,
Information Services Division

Donald D. Danison
General Manager,
AccuRay Services Division

AccuRay Europe, S.A.

Vincent R. Benya
Directeur Generale

Alan R. Brennecke
Assistant Manager

Auditor

Arthur Andersen & Company
Columbus, Ohio 43215

Transfer Agent

First National Bank of Chicago
Chicago, Illinois 60670

Registrar

Harris Trust and Savings Bank
Chicago, Illinois 60690

Directors and Officers

Industrial Nucleonics Corporation

The parent company incorporated in Delaware



Edward McC. Blair



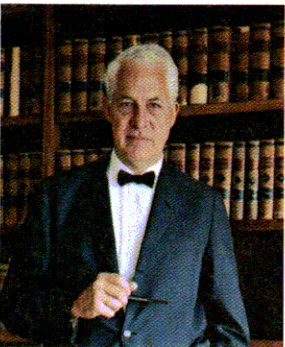
Gordon B. Carson



Wilbert E. Chope



H. Roy Chope



John Eckler



David L. Nelson



Robert E. Swenson



George B. Young

*Edward McC. Blair
Managing Partner of William Blair & Company

*Gordon B. Carson
Vice President of Business and Finance
The Ohio State University

*Wilbert E. Chope
Chairman of the Board of
Industrial Nucleonics

*H. Roy Chope
Executive Vice President of
Industrial Nucleonics
National President of Tau Beta Pi
Director of U.S. Chamber of Commerce

*John Eckler
Partner in law firm of Bricker,
Evatt, Barton and Eckler

*David L. Nelson
President of Industrial Nucleonics

*Robert E. Swenson
Vice President, Finance, and
Treasurer of Industrial Nucleonics

*George B. Young
Director of Chrysler Corporation
Director of First National Bank
of Chicago

Carl J. Cooperrider
Secretary of Industrial Nucleonics

*Directors