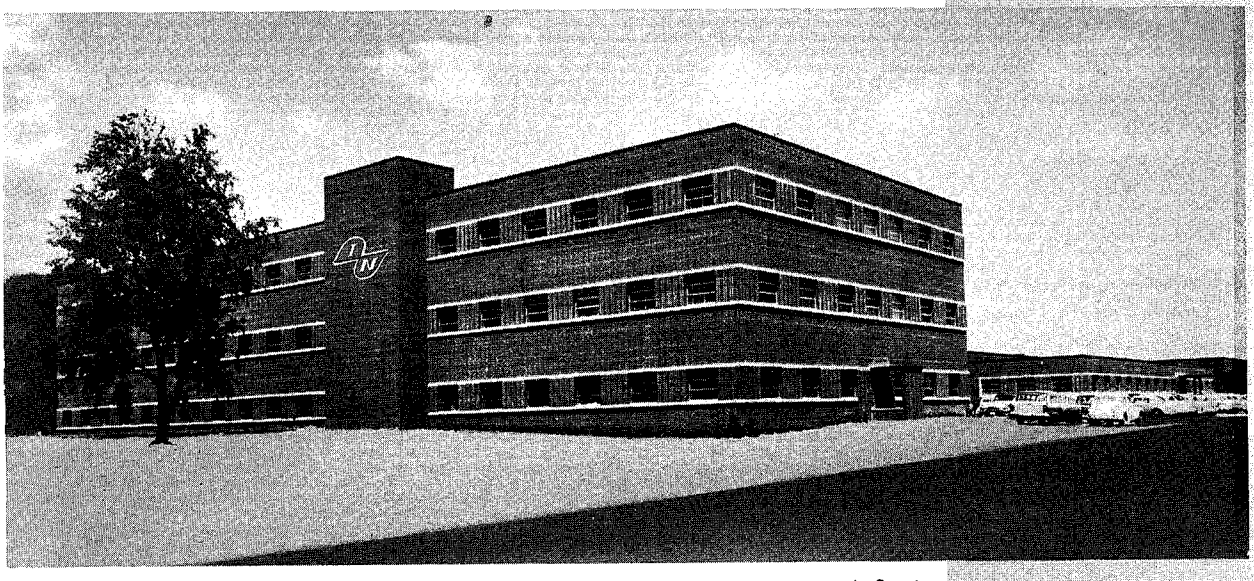
History

Since its inception, in 1950, Industrial Nucleonics Corporation has maintained a position of leadership in the field of industrial measurement and process control, utilizing radioisotopes in conjunction with advanced electronic techniques. The developments of The Corporation in the areas of precise measurement, automatic control, electronic data processing, and analogue simulation have been achieved solely through company sponsored research and development.

The marked growth of Industrial Nucleonics can be attributed to two factors—technical talent effectively managed, and a faculty for transforming an idea into a successful product.



Industrial Nucleonics Research Center

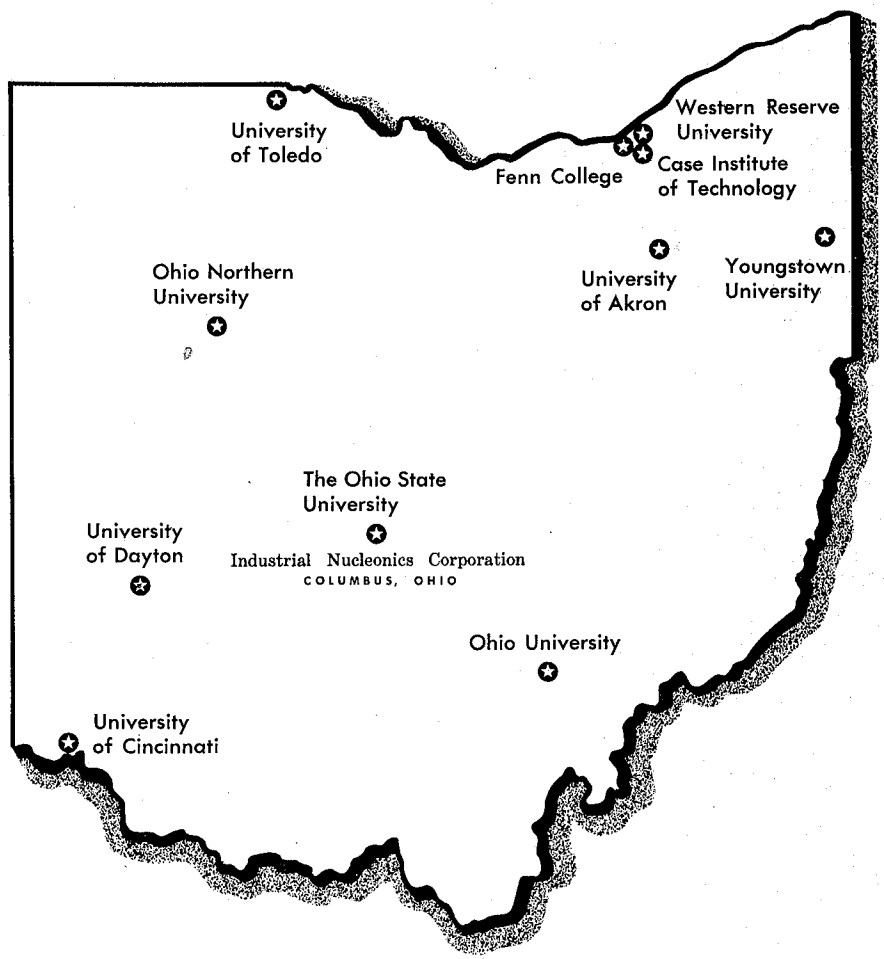
Industrial Nucleonics
CORPORATION

Industrial Nucleonics CORPORATION

History

LOCATED IN TECHNOLOGICAL CENTER

The Industrial Nucleonics Corporation was founded in Columbus, Ohio, in 1950, by a group of young engineer-scientists who desired to "make their mark" in the area of industrial instrumentation. The technical nature of the field The Corporation was specifically entering, that of continuous, non-contacting measurement of industrial processes, made the Central Ohio location desirable because of the availability of engineering and other technical personnel. Since its inception, therefore, Industrial Nucleonics has not only been engineer managed but engineering oriented as well!



Industrial Nucleonics CORPORATION

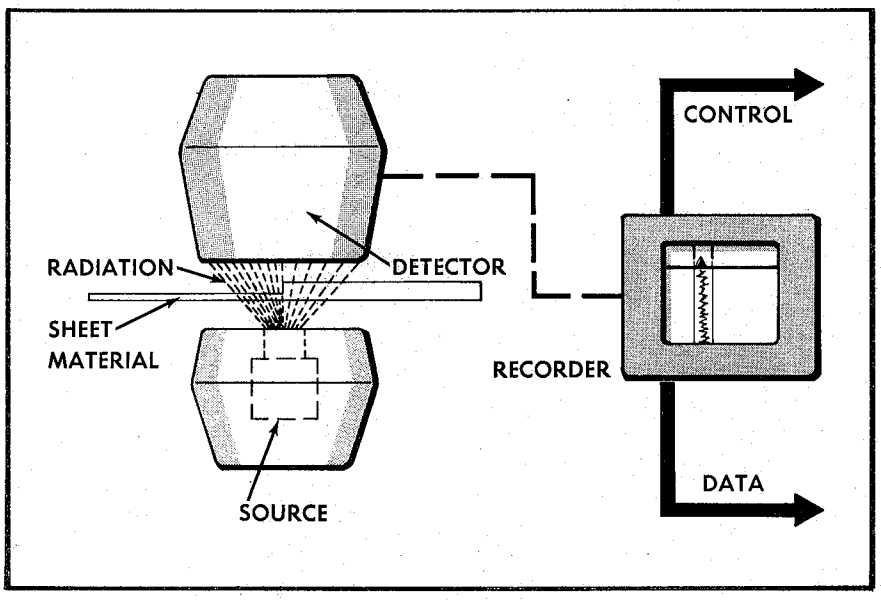
History

NEW FIELD OF RADIATION MEASUREMENT

While the theory of measuring density or weight per unit area by radiation methods was known in laboratory applications prior to 1950, the post war availability of radioisotopes paved the way to new techniques in industrial radiation measurement systems. It should be recalled that the procedure for obtaining the measurement of a continuously processed product such as tire fabric, paper, or sheet metal, during this period, involved making a laboratory measurement of a small sample of the product. Several undesirable factors of the sampling method were:

The sample represented but a small fraction of total production; because of the lapse in time between lab measurement and machine correction the wrong control action was frequently enacted; and, the measurement was obtained by destructive methods.

On the other hand, the AccuRay Measuring Systems developed by Industrial Nucleonics during 1950 enabled industry, for the first time, to obtain a reliable, continuous, *non-contacting*, non-destructive measurement of a product *while it was being manufactured.* Other advantages of radioisotope measuring systems are extraordinary accuracy, a moderate initial cost, low maintenance, and a maximum trouble-free operation.

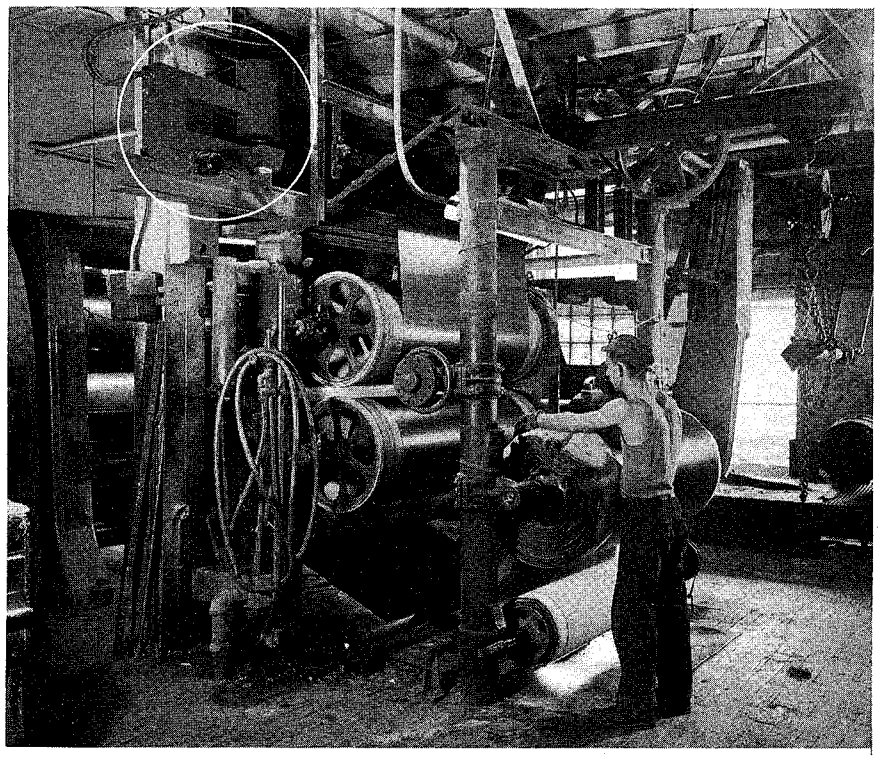


Industrial Nucleonics CORPORATION

History

EQUIPMENT INTRODUCED IN TIRE INDUSTRY

The first product of Industrial Nucleonics Corporation was a gauge to continuously measure the thickness of tire fabric or plies as fabric is coated with rubber on a tire calender. This measurement system was introduced at Mohawk Rubber Company in May of 1951. It is interesting to note that this first AccuRay installation is still in operation at Mohawk's plant despite the industrial environment in which the fairly complex electronic system has been subjected for the past 10 years. Today all major tire manufacturers have purchased multiple installations of Industrial Nucleonics equipment and more than 50% of the tires on the road have been measured and controlled by AccuRay Systems.



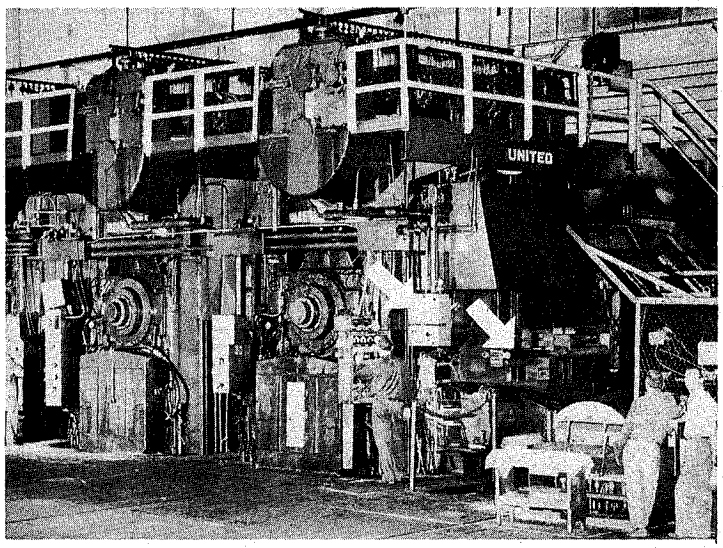
First AccuRay Installation at Mohawk Rubber Company in operation continuously since 1951

Industrial Nucleonics CORPORATION

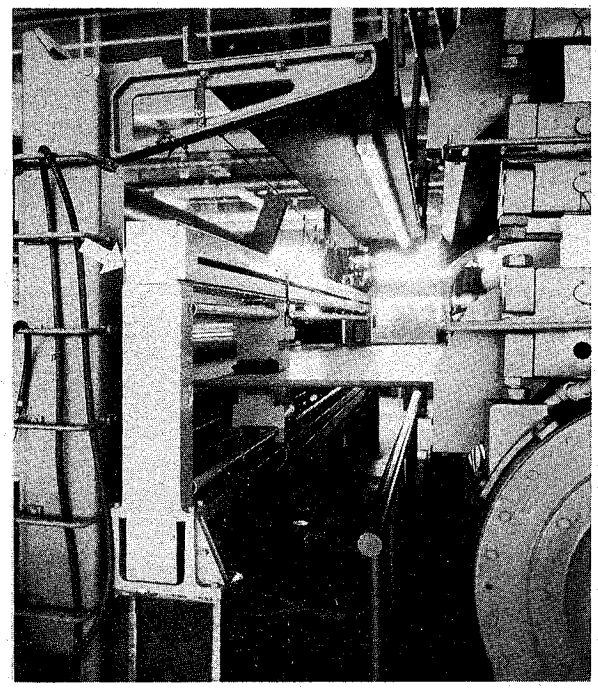
History

EXPANSION INTO OTHER SHEET PRODUCING INDUSTRIES

From the tire industry the company expanded its development of instrumentation into other sheet producing industries. Application engineers and development teams knowledgeable in a specific manufacturing process were assigned to investigate the plastics, paper, and metal industries. In each instance, a complete analysis of the process was initiated to determine manufacturing requirements. For example, in the paper industry, profile or cross sheet variations were of considerable significance. The Industrial Nucleonics systems engineering group responsible for the paper industry developed a method, incorporating specially designed computers, to measure and present these variations in understandable operator terminology. Another development of the company achieved in the same manner was a ratio computer to compare before and after measurements as required in the plating of zinc or in coating and impregnating processes producing sandpaper, laminated plastics and a number of other products.



Automatic control of 3-stand mill at Detroit Steel.



A Measuring Unit scanning paper at Tennessee River Pulp and Paper Co.

Industrial Nucleonics CORPORATION

History

A LISTING OF COMPANY DEVELOPMENTS FOR THE SHEET MATERIAL PROCESSING INDUSTRIES INCLUDE . . .

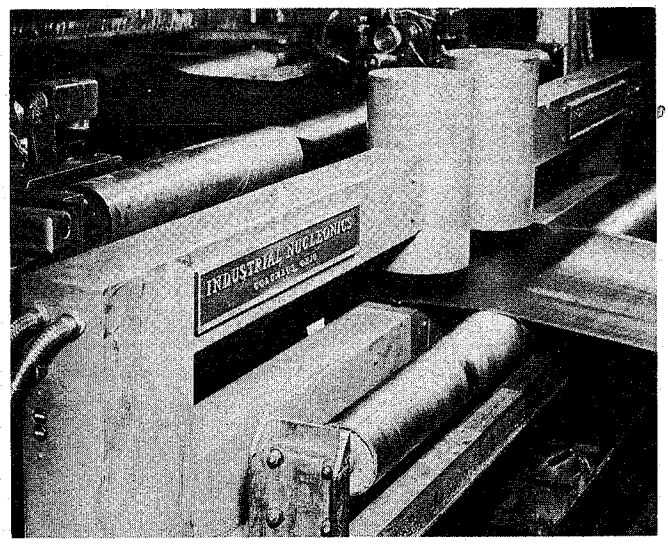
FEATURE, FUNCTION, OR DEVICE	FIRST KNOWN USE
(1) First industrial isotope thickness gauge	May, 1951
(2) First automatic withdrawal-standardization thickness gauge	Mohawk Rubber Company Akron, Ohio – June, 1951
(3) Range switching for simple gauge set up	General Tire and Rubber Co. Akron, Ohio – July, 1951
(4) Traversing of source-detector unit across wide sheets	Goodyear Tire and Rubber Co. Akron, Ohio – Sept., 1951
(5) Source shutter operating upon puncture of source "window"	Mansfield Tire and Rubber Co. Mansfield, Ohio – Oct., 1951
(6) High temperature operation of an isotope radiation thickness gauge	John A. Manning Paper Co. Troy, New York – Nov., 1951
(7) On-line analog computer control of an industrial process	The Formica Company Cincinnati, Ohio – Jan., 1952
(8) First automatic control of a rubber calender	Gates Tire and Rubber Co. Denver, Colorado – Feb., 1952
(9) Automatic control of a plastics calender	Columbus Coated Fabrics Columbus, Ohio – April, 1952
(10) Multiple speed scanning of wide sheets	The Beckett Paper Company Hamilton, Ohio – July, 1953
(11) Linear output reading of thickness gauges	(On all gauges at request of specification) – July, 1953
(12) Measurement of plated and coated metals	Armco Steel Corporation Middletown, Ohio – Dec., 1953
(13) Synchronous cross sheet scanning of multiple source-detector units	The Formica Company Cincinnati, Ohio – Dec., 1954
(14) The widest sheet scanning thickness unit - 305"	Kimberly-Clark Corporation Niagara, Wisc. – April, 1955

Industrial Nucleonics CORPORATION

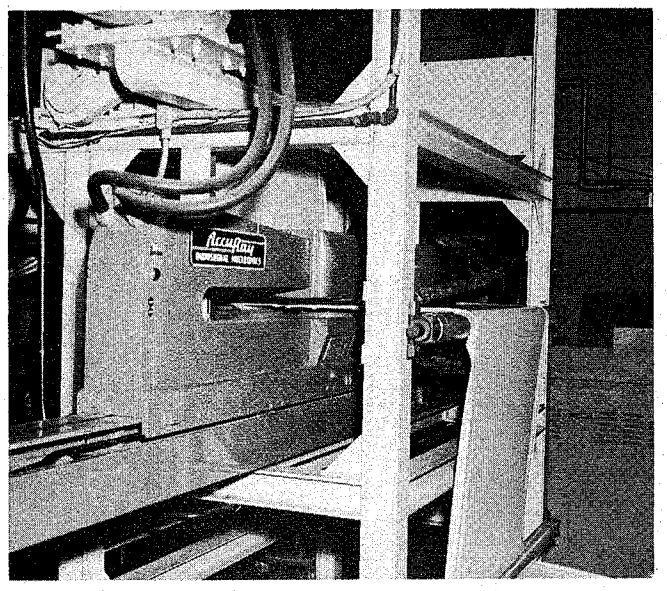
History

DEVELOPMENT OF AUTOMATIC CONTROL

Shortly after introducing the first tire fabric measurement systems in 1951, it became apparent that automatic control of a process was another logical development area for the company. In February of 1952, the company installed its first automatic control system for a tire calender at Gates Tire and Rubber Company in Denver. In April of the same year the first automatic control system of a plastics calender was installed at Columbus Coated Fabrics Company. Today a complete line of AccuRay Systems are in use in the continuous sheet processing industries to control calenders, extruders, rolling mills, paper machines, and converters. According to Dr. Willard Libby, former AEC Commissioner, these systems are saving American industry an estimated $500,000,000 annually in raw material savings, less "down time", faster "start up", and other areas of economic consideration.



First automatic control system for a tire calender installed at Gates Rubber, February 1952



First automatic control system of a plastics Calender - Columbus Coated Fabrics

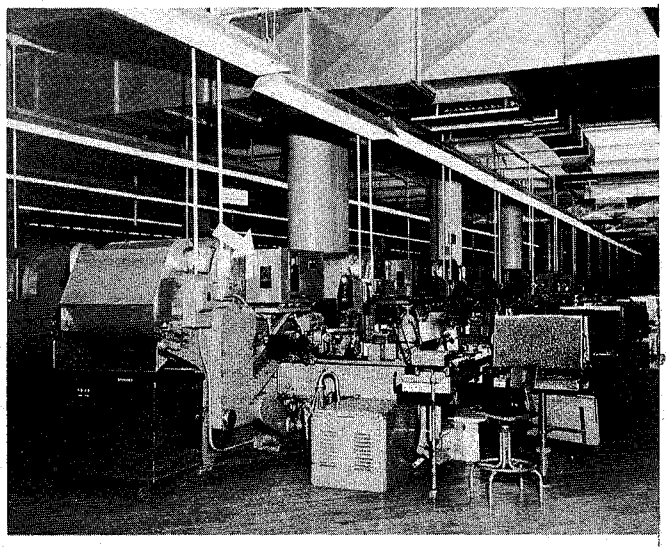
Industrial Nucleonics CORPORATION

History

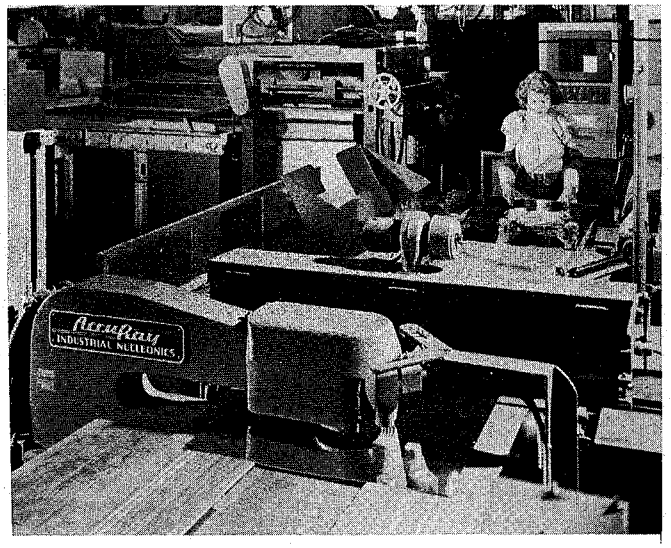
DEVELOPMENT OF CIGARETTE MANUFACTURING CONTROL SYSTEM

In 1954, Industrial Nucleonics undertook the development of a system to continuously measure and control cigarette stock. Within fifteen months a complete process measurement and automatic control system was developed and installed in one of the largest tobacco plants in the country. In the following years, sales of AccuRay equipment resulting from this effort alone became a multi-million dollar operation such that today, with but one exception, every U. S. manufactured cigarette is controlled with an AccuRay System. The results in improved quality and uniformity were so significant that one tobacco manufacturer initiated a $15 million advertising program to announce that his product was manufactured and controlled with AccuRay equipment.

Much of the highly developed plant integrated measurement, control, and data systems found in the tobacco industry today are the result of the work started by Industrial Nucleonics in 1954.



A row of cigarette making machines with each maker equipped with an AccuRay Measurement and Control System.



An AccuRay Sheet Classifying System installed at one of the largest steel mills.

DEVELOPMENT OF CLASSIFYING AND RECLASSIFYING SYSTEMS

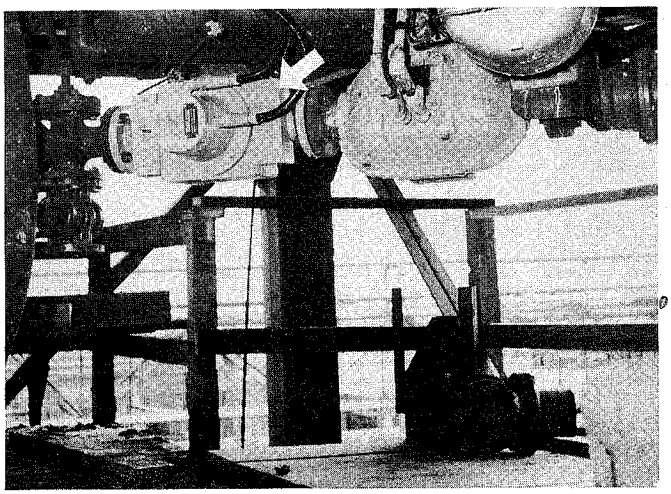
In addition to the types of equipment described above, Industrial Nucleonics has designed and developed classifying equipment to measure weight or thickness and to actuate electro-mechanical systems which automatically sort sheet materials by grade. Also, electronic computing and data reduction systems analyze the process variables and present accurate data concerning process variation for supervision, technical, and quality control purposes.

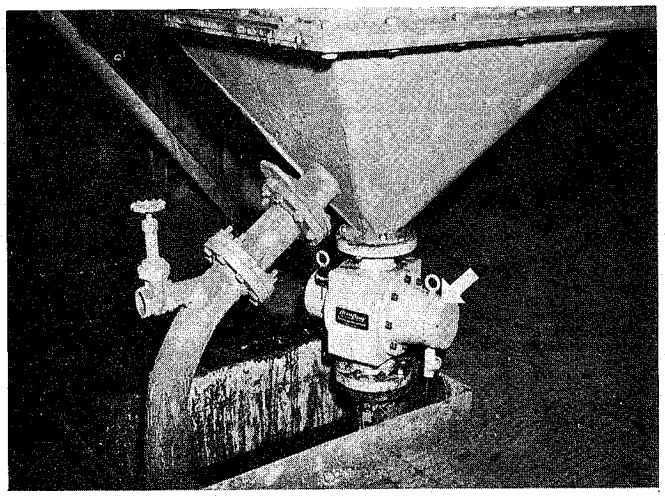
Industrial Nucleonics CORPORATION

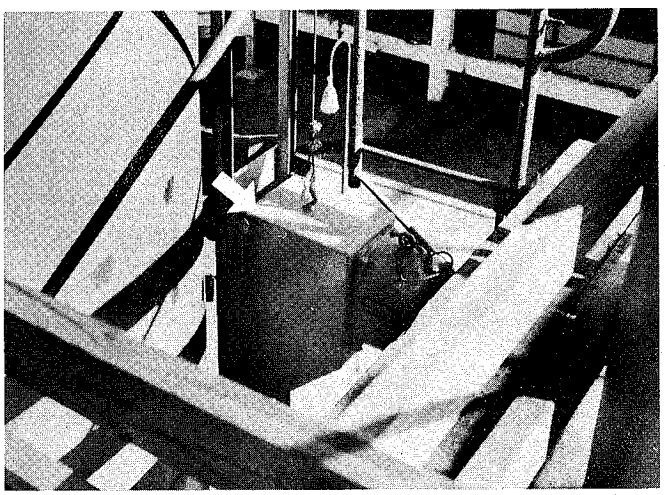
History

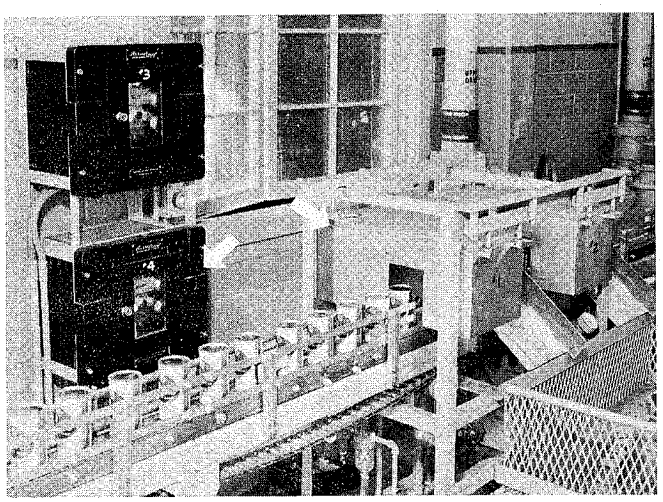
A COMPLETE LINE OF FLUID PROCESS CONTROL SYSTEMS DEVELOPED

During 1956, a New Products Division was established to develop radiation measurement and control systems for fluid process industries. Included among the new instruments developed during 1956 and 1957 were AccuRay Systems to measure and control density, level, mass flow, can fill, and pipewall thickness. Today AccuRay Systems for continuous processes are operating successfully in the petroleum, chemical, food, missile, cement, brewing, mining, distilling, rubber, plastics, coal, explosive, soft drink, soap making, glass, powder, roofing, abrasive, electrical, and construction industries. Many of these industries, for the first time, are receiving the full benefits of continuous, non-contacting, non-destructive measurement and control, thus insuring a better quality product at substantial savings in materials.







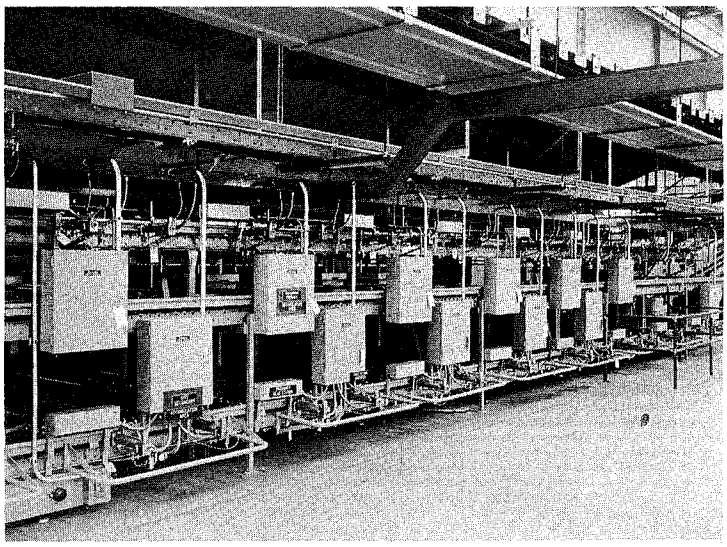


Industrial Nucleonics CORPORATION

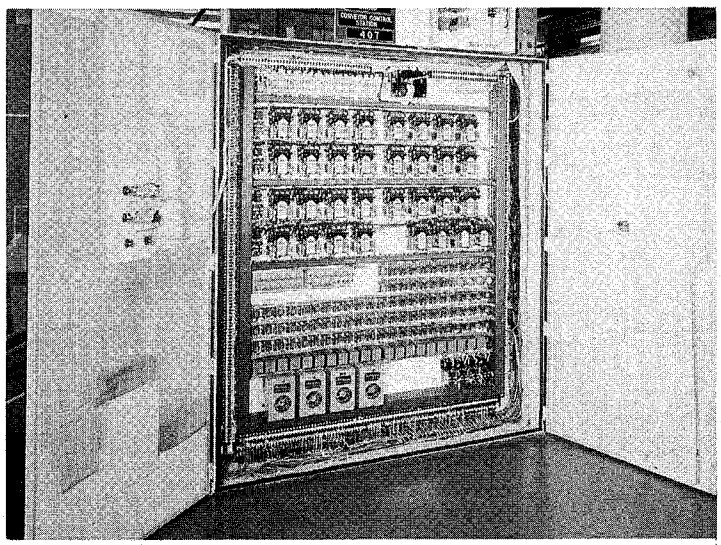
History

DEVELOPMENT OF AUTOMATED CONVEYOR CONTROL AND MAIL HANDLING FOR U. S. POST OFFICE

In 1958 the company undertook contracts with the U.S. Post Office in the post office automation program. Since that time over $7 million in post automation projects have been accomplished in the Washington, D. C., Philadelphia, Chicago, Detroit, and Pittsburgh post offices. For some of these installations Industrial Nucleonics has provided sensor, computing, and control equipment, and in others it has been the prime contractor for the entire system.



View of incoming primary and city secondary flat storage area showing read stations and diverters.



Typical Control Cabinet for Conveyors at letter sorting machines. Read station control cabinet mounted on top of large cabinet.

Industrial Nucleonics CORPORATION

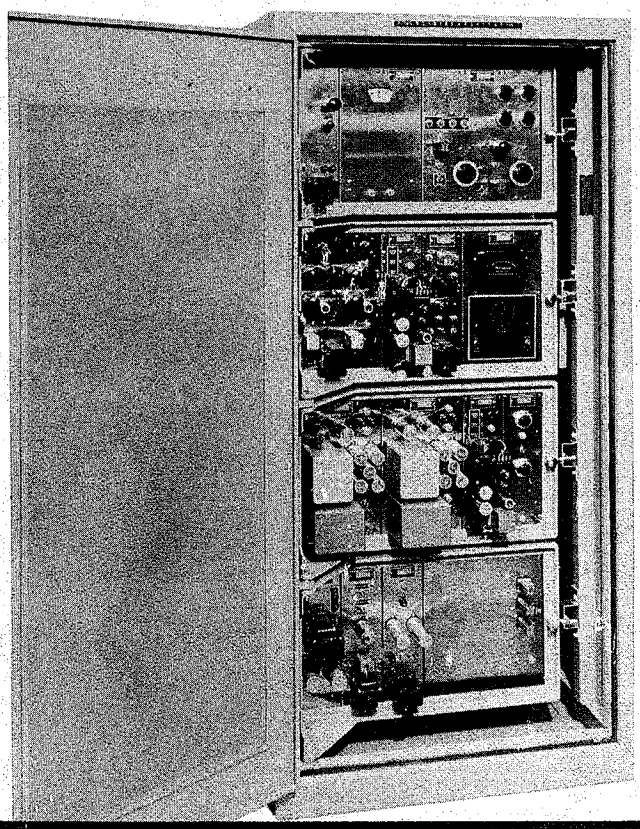
History

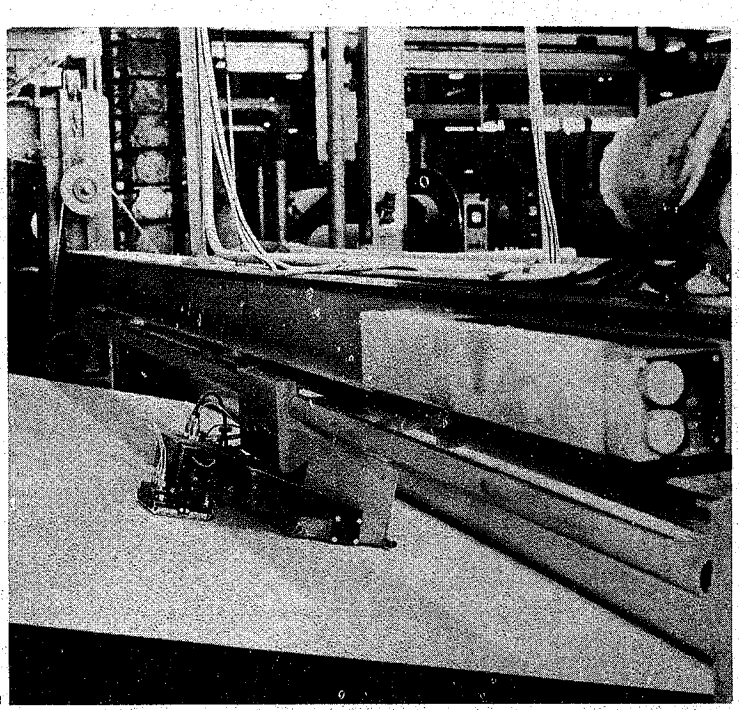
MOISTRON MEASUREMENT SYSTEMS

During the period of 1953 to 1961, the company conducted an applied research program to develop a continuous, on-machine moisture measuring system for use in the paper industry. This system, called the AccuRay MOISTRON System, was introduced in the Spring of 1961 as equipment compatible with the company's AccuRay Basis Weight Control System, widely used in the paper industry.

In introducing the MOISTRON System, the company presented a completely new electronic technique utilizing a dual frequency design to eliminate the effects of composition, pressure, and temperature to obtain a true moisture measurement.

Since its introduction, the AccuRay MOISTRON System has been accepted in the paper industry and we are now widening this technique to apply it to other industries.





AccuRay

Industrial Nucleonics Corporation

History

GOVERNMENT CONTRACTS PERFORMED BY THE COMPANY

Contract Number: DS-36-039 SC-5505
Date of contract: February 14, 1951
Agency: Signal Corps Procurement Agency
Amount of contract: $6,995.75
Furnished: Radiac Detector ET-66 (xe-2/00)

Prime contract number (held by General Electric Co.)
W-31-109 Eng. 52 Sub-contract number: K-122
Date of sub-contract: June 15, 1951
Agency: Atomic Energy Commission
Security classification: Restricted
Amount of sub-contract: $35,552.72
Furnished: Development and construction of a beta gauge for measuring thin walled tubing

Contract number: CCA-33382
Date of contract: December 31, 1957
Agency: Civil Aeronautics Administration
Amount of contract: $27,497.61
Furnished: Receiver selectors and mixing panels (4 channel)

Sub-contract number: 203-9130-40971 on prime contracts NOA(5) (55) 272 and NOA (5) (55) 186
Date of sub-contract: August 14, 1957
Agency: U. S. Navy
Amount of sub-contract: $30,586.00
Furnished: Potentiometer transducers

Contract number: POD-M-1004(RE)
Date: May 23, 1958
Agency: U. S. Post Office Department
Amount: $977,000.00
Furnished: Subcontractor Control Portion Mail-Flo System, 4th Floor, Chicago Main Post Office

Contract number: POD-M-1000(RE)
Date: March 28, 1958
Agency: U. S. Post Office Department
Amount: $538,897.00
Furnished: Subcontractor Control Portion, Mail-Flo System, City Post Office, Washington, D. C.

GOVERNMENT CONTRACTS

Contract number: 9-1-9726
Date: June 30, 1959
Agency: U. S. Post Office Department
Amount: $2,257,400.00
Furnished: Prime Contractor - Mail-Flo System, 8th and 9th Floors, Chicago Main Post Office

Contract number: 9-1-9751
Date: June 30, 1959
Agency: $817,293.00
Furnished: Prime Contractor - Mail-Flo System, Pittsburgh Post Office

Contract number: 6-1-3704
Date: November 12, 1959
Agency: U. S. Post Office Department
Amount: $102,785.00
Furnished: Prime Contractor - Mail-Flo System, 1st Floor, Chicago Main Post Office

Contract number: 6-1-9995
Date: June 24, 1960
Agency: U. S. Post Office Department
Amount: $2,463,000.00
Furnished: Prime Contractor - Tray Conveyor System, New Fort Street Post Office, Detroit, Michigan

Contract number: 6-1-9883
Date: June 22, 1960
Agency: U. S. Post Office Department
Amount: $522,436.00
Furnished: Prime Contractor - Tray Conveyor System New Post Office, Philadelphia, Pennsylvania

Industrial Nucleonics CORPORATION

History

The following standard INDUSTRIAL NUCLEONICS EQUIPMENT is in service in government installations:

AGENCY	LOCATION	QUANTITY	USE
U. S. Bureau of Mines	Schuylkill Haven, Pa.	1	Density - heavy media separation
U. S. Army	Ft. Belvoir, Va.	1	Pipewall Thickness
U. S. Navy	Navy Yard Brooklyn	1	Pipewall Thickness
	Navy Yard Norfolk	1	Pipewall Thickness
U. S. Bureau of Engraving	Washington, D. C.	12	Postage Stamp Gum Coating
A. E. C.	Oak Ridge, Tenn.	1	Level, Classroom instruction
A. E. C.	Grand Junction, Colorado	1	Level, Uranium ore in drums
A. E. C.	Oak Ridge, Tenn.	1	Pipewall Thickness
U. S. Navy	Indian Head, Md.	1	Density - slurry of propellant
M. S. A.	Calberg, Pa.	2	Level, Liquid Sodium
U. S. Navy	Navy Yard Philadelphia	1	Level, Condensate in steam catapult accumulation

Industrial Nucleonics CORPORATION

History

From the foregoing it is seen that the company, in the short span of 11 years, has established itself firmly in the field of industrial instrumentation by creating products and markets unknown in 1950. In this period, the technological team has been expanded and developed to the point where it comprises one of the most knowledgeable groups in the world in the area of applying advanced electronic and nucleonic techniques to process instrumentation.