THE ERA OF OPPORTUNITY

1963

LITTON INDUSTRIES ANNUAL REPORT

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THE ANNUAL REPORT OF LITTON INDUSTRIES, INC.

FOR THE FISCAL YEAR ENDED JULY 31, 1963

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PREFACE

Never in all history have mankind's material opportunities been so limitless. For in the past two decades there has been unleashed a chain-reaction of new concepts and discoveries, new ideas and processes, new materials and products – a chain reaction of ceaseless innovation which is by far the most significant moving force of our times.

In addition to an explosion of knowledge, there are two catalysts which have precipitated the unprecedented Era of Opportunity in which we live. First, man now has the tools. In contrast to the Nineteenth Century machines which relieved man from the extremes of physical labor and multiplied his effectiveness physically, machines of the Twentieth Century free him from mental drudgery and multiply manyfold the effectiveness of his mental as well as his physical labors.

Second, man has perfected a method of approach. Repeatedly during this Era, our technologically oriented organizations have demonstrated that they know how to marshal their resources and talents so that in a reasonable time they can achieve almost any rational goal – on Earth or in Space – that is assigned to them.

Propelled by the chain reaction of discovery and equipped with both the tools and the method of approach, this Era of Opportunity is the most exciting period man has ever experienced. We are caught up in an unprecedented dynamism. The only stillness we find is the calm in the eye of the hurricane . . . the only constant we know is change . . . the only limits to our growth are the limits of our own vision, courage and energy. Instead of any single New World to be explored and developed, we have countless new worlds, all to be developed simultaneously, ranging from the infinitely small – inside the atom – to the infinitely great – Outer Space.

Even within our universe itself, in the worlds we see so readily around us, the opportunities for development are boundless . . . in the Oceans, from which we now reap so little . . . in those great desolate areas of the Earth that as yet yield no products to support our booming populations . . . in the Atmosphere, that medium through which we fly, through which we communicate, and upon which all life is dependent . . . and in the vast and trackless unknown that is Space.

In these yielding worlds of opportunity, Litton Industries has already made significant advances. This past year's progress continues to reflect the presence of the continuing technological revolution and the company's basic commitments to the burgeoning Era of Opportunity. For Litton Industries is a world-wide organization dedicated to utilizing the discoveries of modern science by converting them into useful goods and services–products that bolster the Free World's vital economic base and defend the inflexible ideal of human freedom.

Yet we are, as a company and as a nation, merely at the dawn of the great new Era of Opportunity. For the greatest opportunities still await. We of Litton are committed to respond with the energy, enthusiasm, responsibility and confidence unique unto free men.

FOREWORD

Fiscal year 1963 reflected once again measurable progress in the company's long-term plan to respond to the multitude of opportunities around us with meaningful and practical endeavors. Consequently, the year's summary shows a new and higher level of sales, earnings and total financial strength. For the first time, sales exceeded the half-billion dollar level and, by the close of the year, volume was running at an annual rate of over $600 million. At year end the company had more new facilities and employed more people than ever before. Sales per employee and investment per employee—both were at new highs.

Total sales for the year were $553,146,239, a 40% increase from the $393,807,709 recorded in fiscal 1962. Advanced defense electronic systems accounted for 40% of our total sales; business machines and other office equipment totaled 25%; nuclear submarines and other marine vessels accounted for 15%; electron tubes and precision components equaled 11%; and industrial and professional equipment and services amounted to 9%.

On a different basis of analysis, results for the year showed that products utilized in defense programs accounted for 55% of the fiscal 1963 volume, and industrial-commercial products and services for 45%. The company's expanding role in international business is apparent in that 20%, or well over $100 million of our products during the year were delivered for use outside the United States, while 15% of our products and services originated in other countries.

Earnings for the year rose 43%, to $23,296,107. After payment of preferred dividends, this was equal to $2.29 a share on the 10,145,217 shares of common stock outstanding on July 31. In 1962 the company earned $16,315,952, which amounted to $1.64 a share after the adjustment for a two-for-one stock split in August 1962 and a 2½% stock dividend last December. For the year, net after-tax income amounted to 4.2% of sales.

At year end our general financial condition was stronger than ever before. The ratio of current assets to current liabilities on July 31 was 2.4 to 1. During the year about $11.5 million was charged to expense as depreciation which, along with after-tax earnings, provided a cash flow of almost $35 million for the year. Expenditures for property, plant and equipment other than that added through acquisition totaled approximately $26 million. In the course of the fiscal year the company obtained a $75 million line of credit from a group of banks and negotiated a $50 million long-term loan with a major insurance company. Almost $100 million of this borrowing capacity was still unused and available at year end.

The company's program of internal growth was continued in the development of its own skills, resources and product lines. About two-thirds of the growth achieved in 1963 was derived in this manner, greater than the company's historical average of about 50%.

The company also created opportunities for its own expansion through acquisition. The Components Group complemented its existing skills through the acquisition of Winchester Electronics, Incorporated, producer of a wide variety of electrical connectors for missile and space

equipment and for commercial use. The Systems Group broadened its already highly developed technology through the acquisition of the aerospace research and engineering departments of General Mills, Inc. This group performs advanced research and development in upper atmosphere physics, microbiology, communications sciences, and metallurgy and materials.

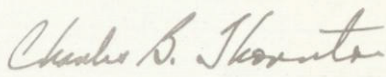
Two other companies with skills and products related to those already possessed by Litton were acquired in fiscal 1963: McKiernan-Terry Corporation, a manufacturer of radar antennas and precision mechanical equipment for use in defense and industry; and Emertron, Inc., whose major products are radar beacons and altimeters, electronic countermeasure systems, airborne fire control computers, simulators, and related equipment for the Free World's defense. Subsequent to the end of the year the company acquired Adler Electronics, Inc., which develops and produces highly advanced telecommunications systems.

At July 31, our total number of plants and laboratories had reached 87, compared with 67 a year earlier. Fifty-seven of these facilities were located in 18 states, and 30 were in 12 other countries around the world. The total space at all of these facilities was almost 7,500,000 square feet; in addition, the company occupied more than 1,000,000 square feet of office and service facility space at year end.

On November 2, 1963, the company will be ten years old. Our sales have grown from $2.9 million in our first fiscal year (a nine-month period) to more than $550 million in the year just ended, and net earnings have risen from $154,000 to more than $23 million in the same period of comparison. At the end of fiscal 1963, the company had 43,417 common shareholders of record and approximately 43,000 employees, both all-time highs.

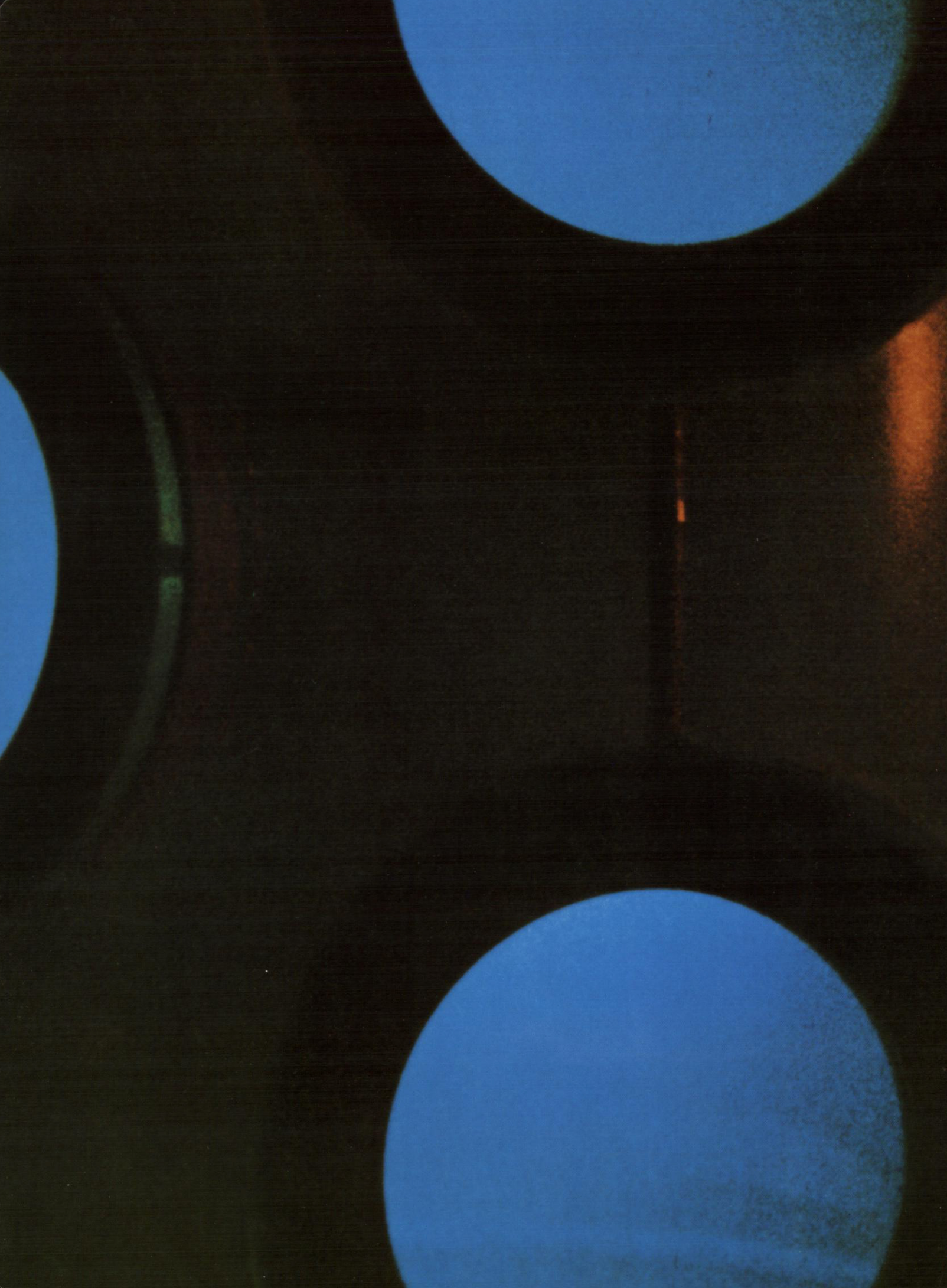
Yet this growth has tapped but a fraction of the potential we see in the broad world of opportunity that surrounds us. The cascading technology of today portends a tomorrow more abundant in the new developments, progress and growth than any era the world has ever known. We are confident the role of Litton Industries will be one of greater contribution to the economy of our society than ever before.

Sincerely yours,



Charles B. Thornton,
Chairman of the Board of Directors

Roy L. Ash, President



CHAPTER I

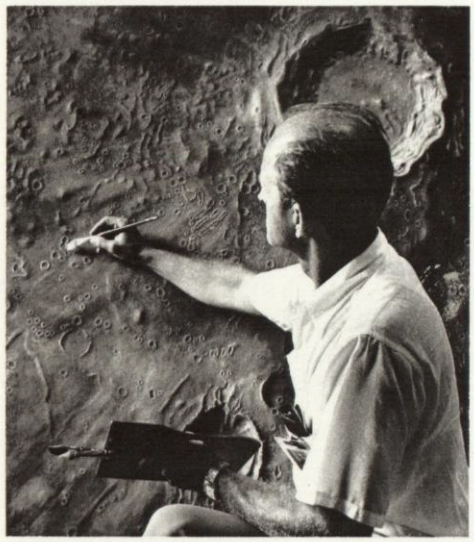
Opportunity and Space

Of all the fields of opportunity, space is physically the largest and the least explored. Already man has responded to its challenges in brief voyages which skirted the edges and, in so doing, he has discovered its hazards. Gradually, as he develops the technology to overcome these perils, he will probe farther and farther into its infinite reaches.

The initial opportunities in space, then, lie in expanding man's capability for space travel and for developing means to overcome the perils of space. Propulsion systems with the power for voyages of weeks, months and even years must be developed. Improved navigation systems must be created for journeys of such long duration and distance. Reliability of the spacecraft and its communications and life support systems must be upgraded. Foolproof methods must be found to protect man against the hazards of radiation and cosmic rays and enable him to rendezvous with other vehicles and space stations. And because of the cost of sending man into space, more and more simulation work must be done on earth to reduce the possibility of error or the failure of a mission. Ultimately, man will have concerned himself with all aspects of the problems related to habitation of a planet other than his own.

The company's broad range of capabilities has enabled it to participate in many phases of the space effort. Our Guidance and Control Systems division, for example, is working under contract from the Air Force Flight Dynamics Laboratory of the Research and Technology division

As man moves farther into the weightless, airless world of space, his need for new means of protection and propulsion becomes vital. Here, seen through the portholes of a vacuum chamber, the soft blue glow of ionized mercury in an electromagnetic field represents an advanced form of space-vehicle thrust power generated by a plasma accelerator at our Beverly Hills Space Sciences Laboratory.



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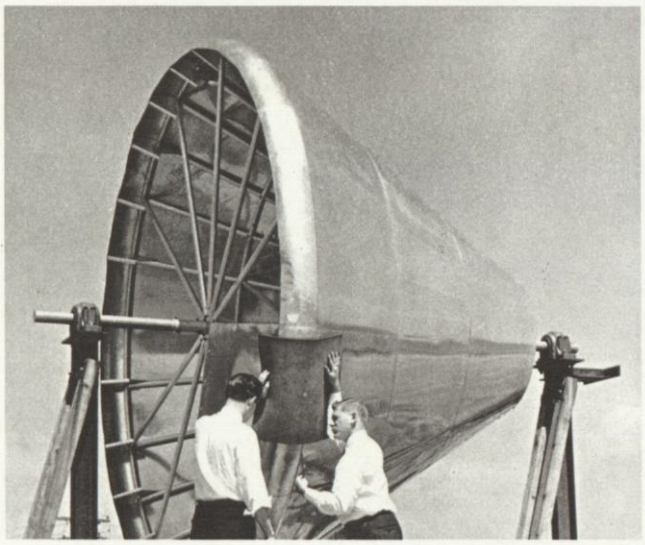
of the Air Force Systems Command to develop an integrated flight control system that will provide the accuracy and reliability required in a space vehicle that must travel millions of miles. Now in the design and development stage, the system will employ data from an inertial reference system and air data sensors to control a manned or unmanned space vehicle from launch through orbit, re-entry, approach and touchdown. Subsystems to be included are an inertial guidance platform one half the size and weight of the platform we now have in quantity production; an air data probe that will provide information throughout the broad spectrum of flight conditions; and a digital computer to provide flight data on demand for astronauts or to generate control signals.

The digital computer, designated the LC-820, can be used in aircraft as well as spacecraft. Capable of performing more than 30 million additions or subtractions per minute, it is the highest performance computer ever built for these applications. The LC-820, developed for the Air Force, makes possible for the first time a completely integrated flight control system for very high performance aircraft. In space flight, the computer will perform functions such as determination of booster engine cutoff, orbit injection, hypersonic air data analysis, re-entry trajectory energy management and path control through the atmosphere.The computer also is required to control the inertial platform during both the alignment and operation phases.

The company also is working intensely to design the protective suits which will be worn by astronauts on extended space journeys. For several years our Space Sciences Laboratory has been active in research and development on space suits, and during fiscal 1963 received a contract from the National Aeronautics and Space Administration to design and build a "hard" space suit for evaluation by NASA. The rigid, articulated suit, based on a design developed earlier by the company, is of a type that is gaining in favor for space missions over the present-day "soft" suits.

While the company is looking ahead to space projects of the future, it is also participating in the Apollo manned lunar landing program which comprises the largest single project in the U. S. space effort today. During the year our Radcom division received a contract to



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design, fabricate and test beacon antennas for the Apollo command module in which the astronauts will ride to the moon and back to earth. These antennas will be the only radiating devices on the Apollo vehicle which will be exposed continuously to the external environment of the atmosphere and space, and consequently must survive all conditions to which the capsule will be subjected. Radcom was awarded the contract for this critical component largely because of its previous performance in designing and manufacturing high temperature antennas for the Gemini two-man space vehicle.

Another of the company's contributions to the Apollo program is being made by our Ingalls division. During fiscal 1963 Ingalls delivered nine more of the giant aluminum Y rings used to bind together the rocket sections of the Saturn V booster, which will serve as the Apollo's booster rocket. To enhance its capability in this type of work, Ingalls installed a 36-foot-long annealing furnace for the 4,000-pound rings.

Our Radcom division, which designed the centrifuge used to train the Project Mercury astronauts, was selected during the year to design the centrifuge in which U. S. astronauts will be prepared for the Apollo voyage and other future space programs. The new centrifuge, to be installed at NASA's Manned Spacecraft Center in Houston, will subject the three-man Apollo crew to forces 30 times the pull of gravity. All anticipated conditions will be simulated in the centrifuge, including abort of the mission on the launching pad, loss of capsule air pressure and the accompanying ballooning of space suits, temperature extremes, and blastoff.

Even after man has navigated space he still must cope with the problem of the searing heat generated by his spacecraft upon re-entering the earth's atmosphere. To duplicate this condition

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1. Finishing touches are applied to the Crater Copernicus in a relief map of the moon produced by the Aero Service division in support of the U.S. space effort.

2. Small beacon antennas, such as the one here against an Apollo capsule mockup, are being developed and manufactured at College Park, Maryland, for space manned vehicles. Four of the antennas will be mounted around the circumference of the capsule's outer skin for radiating signals toward earth, even through re-entry.

3.

on earth for the testing of various shapes and materials considered for future spacecraft requires highly advanced simulation equipment. In fiscal 1963 our Space Sciences Laboratory achieved a milestone in the development of such a device, called a plasma wind tunnel. Laboratory scientists succeeded in accelerating a plasma to re-entry speeds of 8,000 meters per second, or almost 18,000 miles per hour, in the tunnel, a speed never before attained under similar conditions.

The Space Sciences Laboratory, under another Air Force contract, continued development of a plasma thrustor engine for future space vehicles. Such engines will provide the sustained thrust over periods of weeks and months which long-range spacecraft will require.

As a byproduct of these and other plasma physics programs, the Space Sciences Laboratory discovered a process for generating plasma in an electromagnetic field. The company believes the new process holds great promise for new applications in the field of plasma dynamics, both in space vehicle propulsion and in research involving temperatures greater than that of the sun.

In missiles as well as space vehicles, the company has contributed its technological skills to important programs. Our Guidance and Control Systems division, for example, delivered approximately 100 electronic memory systems during the year for installation in the Pershing missile system. The compact memory system, measuring only about one cubic foot, provides all the information necessary to direct the Pershing to its target.

The division also received a contract to develop and produce sealed drum memory units for installation at the underground launching sites for the Minuteman intercontinental ballistic missile. This unit is the nerve center for the intricate array of ground support equipment in the launching area, and requires extreme reliability since Minuteman sites are designed to function for years without inspection or maintenance. Litton was selected to develop the Minuteman electronic memory because of the high reliability of similar systems developed for aircraft.

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3. Potentiometers for high performance aircraft and space vehicles are wire-wound with the aid of optical instruments at the Potentiometer division in Mount Vernon, New York.

In a missile or space vehicle, precision components with high reliability are a vital element. Several Litton divisions, highly skilled in the development and manufacture of these intricate and varied devices, have supplied them for many U.S. missile and space programs.

Our Poly-Scientific division made extensive deliveries of high precision component assemblies for the Polaris missile guidance system during fiscal 1963, and began production of similar assemblies, called slip rings because of their function of providing a sliding, rotary contact for the transfer of electrical current. The Poly-Scientific division also began deliveries of slip ring assemblies for the Gemini space vehicle guidance system, and delivered slip rings for the Apollo vehicle. In addition, Poly-Scientific has developed a slip ring three feet in diameter for use with a huge aerospace simulator at the Air Force's Arnold Engineering Development Center in Tennessee. This will be the biggest product ever developed by the division, and paves the way for further business in missiles, missile launchers and radar pedestals. Slip rings of such size involve a technology almost unique to the Poly-Scientific division.

The Potentiometer division introduced numerous new potentiometers of distinct designs and provided these devices for nearly every U.S. weapon system, tracking station, satellite and missile. The division also delivered units for missile ground support equipment. Additionally, the division entered the field of conductive film potentiometers and now expects orders for this new type of device to increase markedly in the next few years. An outstanding new product added to the Potentiometer division's line of wire-wound products was a potentiometer one-fourth the size of competitive devices, an important development in a phase of electronics technology where small size commands a premium. Designed to operate under extreme conditions, this ultra-small product is expected to have an excellent potential for use in space vehicles and aircraft.

Strong demand for its precision magnetic components in missiles and space vehicles also enabled our Utrad division to record marked sales increases during the year, and sales of Utrad's miniature transformers doubled. The miniature units are now the division's most important product. Also contributing substantially to Utrad's 1963 sales increase was a group of other components: input transformers, interstage transformers, output transformers, reactors, and pulse transformers. These products, which must pass severe testing before delivery, are used in spacecraft and aircraft, such as the Gemini, Apollo and F-111 programs.

The company's advanced technology in the field of radar has enabled it to participate in several phases of the Free World's anti-missile defense program. Our Electron Tube division has been an important factor in this phase of defense for several years, supplying klystrons for the Ballistic Missile Early Warning System (BMEWS) near the Arctic Circle. Early in the fiscal year the Tube division completed deliveries of klystrons for BMEWS, and soon afterward received a major order for a related project in electronic countermeasures which would be used against an aggressor's missiles. The new order is for barratrons, a type of crossed field device developed by the Tube division. Substantial follow-on orders are anticipated for barratrons, a proprietary product, in this program. The Tube division also began the first volume shipments of a new type of backward wave oscillator to the Air Force for use in barrage-type jamming in electronic countermeasure systems. This was one of the division's largest programs during fiscal 1963 and has an excellent growth potential.

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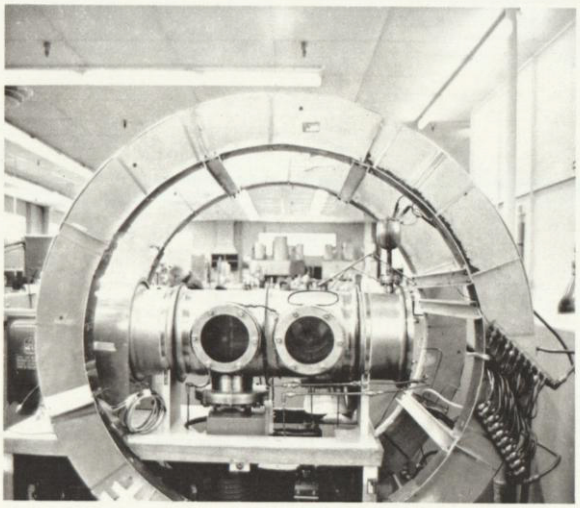
During the year the Electron Tube division received a contract from the U. S. Army Electronics Material Agency at Fort Monmouth, New Jersey, for an electrostatically focused klystron which would become an important component of an advanced space communications system. These tubes have demonstrated that the ratio of power to weight in such tubes can be improved by a factor of five, and the reliability can also be enhanced greatly. Electrostatic focusing eliminates the electromagnets or permanent magnets formerly required to focus the electron beam in high-power klystrons. Recently the division received an order to produce electrostatically focused klystrons for tropospheric communications. Significantly, it marks the entrance of the division into the field of high power microwave communications.

In other programs, the Electron Tube division produced the world's highest power L-band klystron for use in a radar missile tracking system. The microwave tube operates at a peak power of 5,000,000 watts and an average power of 300,000 watts.

The division also delivered the world's largest electron tube, a 13-foot-long unit, capable of 30,000,000 watts of peak power. It is used in special missile re-entry tracking applications.

The versatility of our Radcom division's facsimile equipment was demonstrated during fiscal 1963 in conjunction with several Tiros weather satellite launchings. Radcom facsimile reception

4. Under a plastic canopy protecting against dust, assemblers at Salt Lake City, Utah, produce highly precise electromechanical components for inertial navigation systems.



5.

equipment received clear pictures of cloud formations and other weather developments from cameras mounted in the satellites.

Before sending astronauts to the moon, U. S. space authorities want to learn something of the composition of the lunar surface. For some time this subject has been studied by the Applied Sciences division recently acquired from General Mills, under contract to NASA. At its laboratories in Minneapolis, the division is simulating the effects of billions of years of solar winds on the moon's surface. In this process, called sputtering, ionized gases at low pressure are used to reproduce in 80 hours the equivalent of a billion years of solar wind erosion. The new division also is conducting studies to simulate the environment of space, to determine its effects on satellites and space probes which remain in space for years, and is performing research on the behavior of materials in a simulated space environment.

In support of the Apollo manned lunar landing program, our Aero Service division produced three-dimensional representations of the moon's surface, including a four-foot-square relief model of Crater Copernicus and a more detailed relief model of Hell's Crater. The division also is producing five-foot relief globes of the moon, the earth and Mars for use in orbital flight study programs.

There are a multitude of opportunities in space even though man's probing has barely started. There is the challenge to develop better propulsion units, better space vehicles and components, better navigation and communication systems, improved life support systems, and better means of simulating the environment of space before going there. But this is only the beginning. As man pushes farther into space, more and more needs will become apparent, and more opportunities will be generated. Already deeply involved in production and research for the U.S. space effort, Litton will continue developing new products and technologies enabling man to venture into the frontier land that is space.

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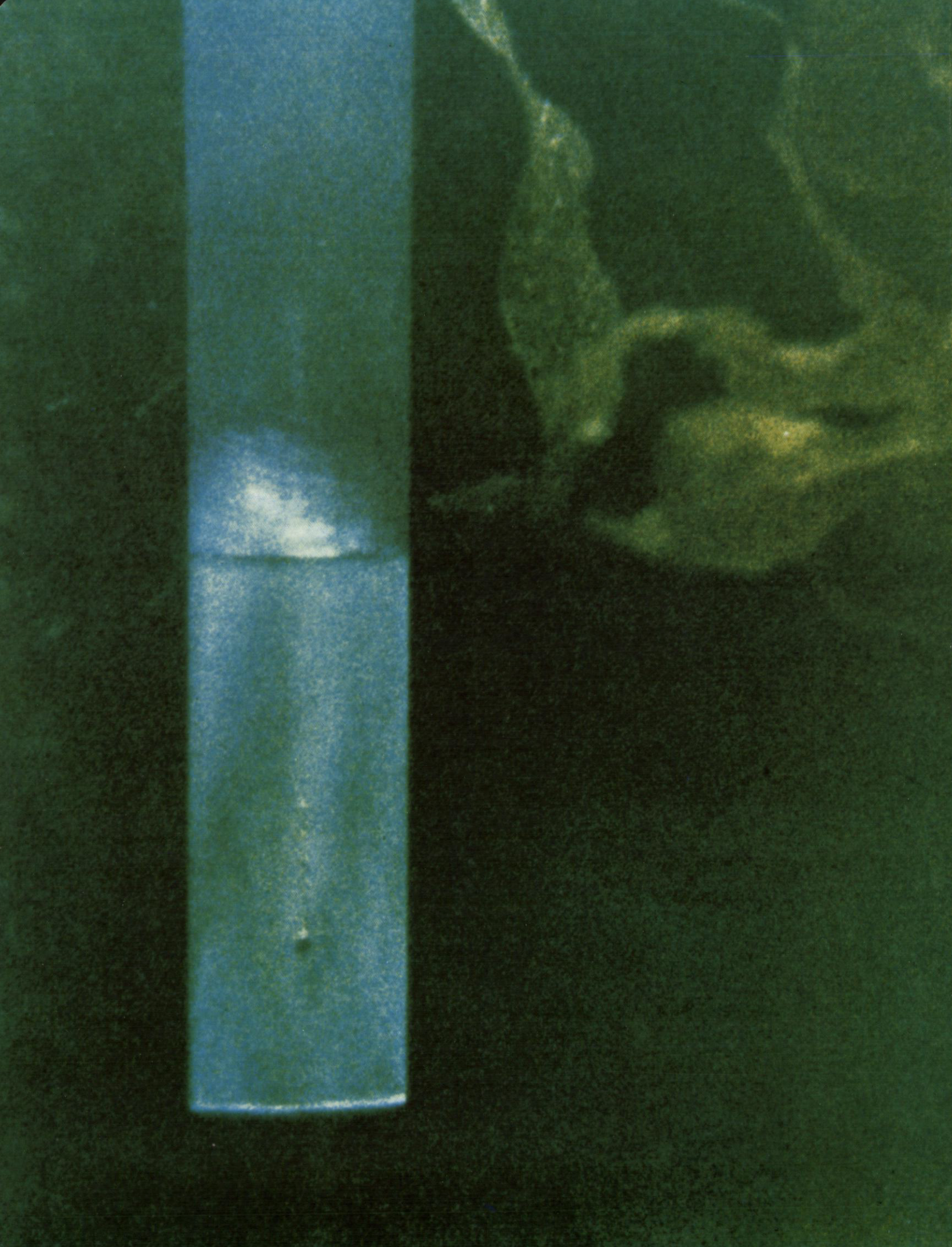
5. Vacuum chamber permits observation of electron beam characteristics in the research laboratory of the Electron Tube division in San Carlos, California.



CHAPTER II

Opportunity in the Sea

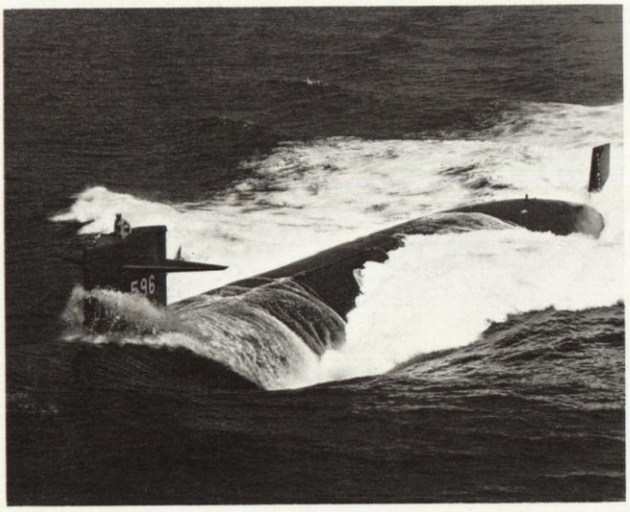
Man, through the ages, has employed the sea to his bountiful advantage. He has used it for travel and trade. He has found it a boundless source of food. He has learned to use it for recreation and enjoyment.

Yet man has only begun to exploit the unlimited opportunities present in this boundless reservoir—a reservoir of foodstuffs and minerals awaiting man's harvesting; of energy awaiting man's harnessing; and of water for irrigation if man will but make it pure. But the opportunity in the sea lies not only in aspects yet to be mastered; there is great opportunity in areas where knowledge already exists. It remains but for greater effort to be expended.

A need exists for better undersea and surface communications equipment—sonar, radar, radio —better navigation equipment, better measurement and exploration equipment, better seagoing vessels to carry the cargoes of commerce and to defend the shores of free countries.

The company is continually exploring the abundant opportunities in the sea, and has been applying its technological skills to the sea in increasing measure. Our divisions are mapping it and probing it. They are making equipment to study it, ships to sail on it for peaceful ventures and ships to keep it safe for such endeavors. They are developing ever better electronic and control systems and equipment for the ships that traverse it, and they are using their advanced techniques and equipment to seek out its riches.

Since antiquity, the ageless sea has been man's pathway around the planet. At once dangerous and benevolent, its floods, ebbs, storms and calms have constantly forced the human need for ever-better seafaring craft — whether for exploration, pleasure, commerce, defense or war. And modern vessels, even out of sight of land and stars, sail in safety because of sophisticated instruments like our Radcom division's electromagnetic logmeter, the world's most accurate system for measuring a ship's speed through water.



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Of major significance in the preservation of the oceans for peaceful pursuits was the delivery by our Ingalls division shortly after the close of the fiscal year of another nuclear attack submarine, the Barb, and the launching during the year of the Dace, another submarine of the same advanced class. Packed with intricate electronic systems installed by Ingalls, these vessels will become part of a force which constitutes the U.S. Navy's prime anti-submarine weapon. In the course of the year Ingalls received a contract from the Navy for two more nuclear attack submarines of an even more advanced model, bringing to eight the number of such vessels Ingalls has delivered or is contracted to complete in the future.

The modern nuclear facilities of Ingalls, which give it the ability to assemble, install and test nuclear reactors, were amply demonstrated in the successful propulsion trials of the Barb.

The Ingalls division also is participating in the Polaris missile program through the construction of surface vessels which serve the submarines equipped with these weapons. Soon after the close of the fiscal year Ingalls completed and delivered to the Navy the Polaris submarine tender U.S.S. Holland, one of the most complex and versatile vessels in the U.S. fleet. The division also received a $35,000,000 contract to build another advanced model of this type vessel. Designed to refuel, supply and repair Polaris submarines in a minimum of time, the Holland has 65 separate and completely equipped laboratories which are able to do almost any job normally performed in a land-based maintenance facility, including the repair of the most sensitive and complex electronic, optical and nuclear equipment.

In Navy planning, the sea is a springboard for retaliatory action, and therefore the Navy is building a fleet of assault vessels of modern design, with our Ingalls division playing an important part in the program. In fiscal 1963 Ingalls received contracts to build a new type

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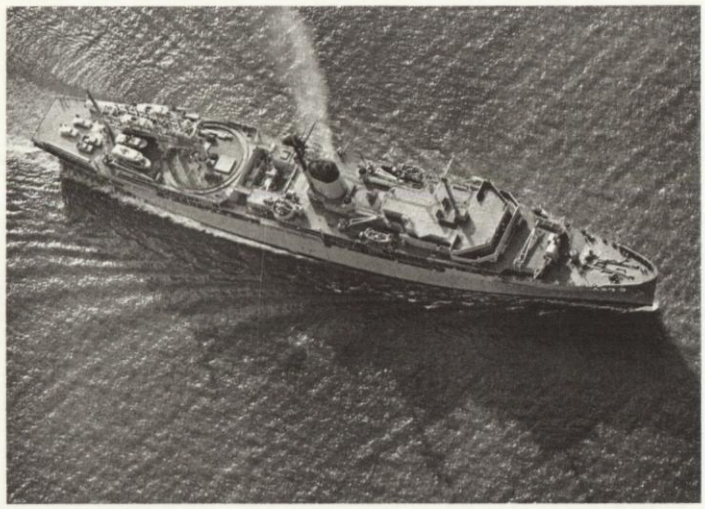
6. The nuclear attack submarine Barb, packed with intricate electronic equipment, roils the sea as it dives during sea trials prior to delivery to the U.S. Navy. Barb was built by the Ingalls division, Pascagoula, Mississippi. The Navy's newest weapons are carried by the new undersea vessel.

7. Compasses and gyro-controlled autopilots, key units of ship control systems, are developed and manufactured at the Hamburg, Germany, plant of the C. Plath Division, which also produces aircraft inertial navigation systems.

7.

amphibious assault ship and two amphibious dock ships for this specialized fleet. The assault ship will be the first of its class to be built by a private shipbuilding facility.

During the year the Ingalls division took a major step to enhance its competitive position as a builder of complex oceangoing vessels. At its Pascagoula, Mississippi facilities, Ingalls installed two new systems which cut costs significantly. One of the processes utilizes 1/100 scale glass negatives of full size templates used to mark off steel plate sections of ships; the images of these negatives are projected in a darkened workroom and traced onto the plate by workmen. The method eliminates the previously used full-scale templates which required extensive storage space and were easily damaged. This process is used for steel plate sections of relatively simple shape. For more intricate, complex shapes, another newly installed system is employed. This second process utilizes the same 1/100 scale glass negatives in conjunction with a machine which precisely scans them and guides cutting torches automatically over steel plate. Ingalls is



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the only private shipbuilding firm in the United States with both of these technologically advanced processes.

Complementing the Ingalls division in its work are several other divisions making a variety of vital components for many types of marine vessels. The Radcom division is particularly active in this field. In the course of the year Radcom made substantial deliveries of its electromagnetic underwater logmeter to the Navy, and received a new contract under which the division will manufacture the complete system of which the logmeter is a part. This intricate system measures a ship's velocity to an accuracy of one-twentieth of one knot.

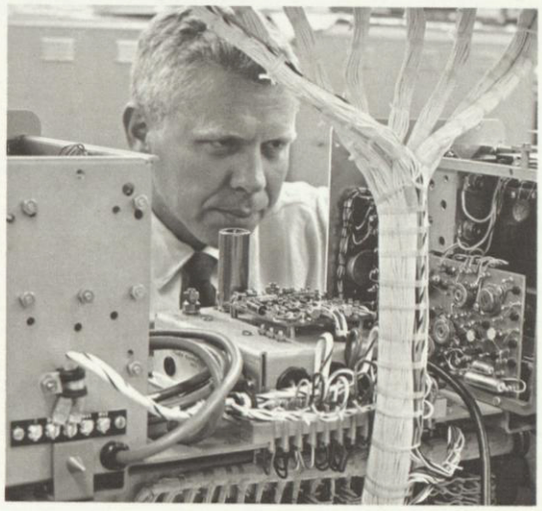
As submarines become more complex and sophisticated, better means of detecting and precisely locating them are needed. During the year the Radcom division completed deliveries of variable depth sonar handling systems under a previous contract, and earned another contract from the Navy to develop and manufacture a new model of this vital anti-submarine detection system, designed for use on destroyers and destroyer escorts.

Under still another Navy contract the Data Systems division is applying its technology in automated pattern recognition techniques to anti-submarine warfare target classification. A system developed by the Data Systems division locates and identifies a distant enemy target which might have gone unnoticed by previous systems. During the first quarter of fiscal 1964 the division delivered a test model of the system to the Navy which began evaluating it with a special task force.

By contract from the U. S. Navy Hydrographic Office, our Radcom division during fiscal 1963 developed and delivered for testing an electronic system which measures the heights of ocean waves. Such equipment is expected to make an important contribution to the understanding of ocean dynamics.

The C. Plath division in Germany, for decades a leader in the field of marine instruments,

8. The U.S.S. Holland, built by the Ingalls division to service Polaris missile submarines at sea, steams into the Gulf of Mexico on its successful sea trials.



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broadened its range of skills in the fiscal year when it began producing aircraft inertial navigation systems. Acquisition of this new technology greatly enhances Plath's capabilities in the technically related field of marine navigation systems.

Beneath the vast reaches of the sea lie large but unlocated deposits of petroleum and natural gas. Our Aero Service division continued its exploratory work in search of these deposits, undertaking a 144,000-square-mile survey of the North Sea. In this project, the largest overwater aerial inventory ever made, another Litton division is also contributing its technology. An inertial navigation system, developed by the Guidance and Control Systems division for this commercial application, has been installed on the aircraft to help guide it on flight lines of unprecedented precision. Readings taken with a magnetometer and other instruments in the aircraft will be compiled into highly specialized magnetic profile analyses and supporting data necessary to the study of the earth's geologic structure beneath the sea. Oil or natural gas discovered beneath the North Sea will be an important contribution to the expanding economy of Free Europe.

In the Middle East, our Western Geophysical division began another extensive hunt for oil beneath the sea shortly after the end of the year. The project, covering 14,440 square miles in the Persian Gulf off the coast of Iran, represents probably the largest single contract for seismic surveying ever awarded. New seismic techniques for probing beneath the ocean floor, developed during the year by Western Geophysical, were primarily responsible for the division's receiving the contract which was financed by 31 oil companies.

The sea has served man for uncounted generations, but man has only begun to develop its potential. Litton already is deeply engaged in providing technology and products for this development, and will continue to probe and study the sea to exploit new opportunities as they unfold.

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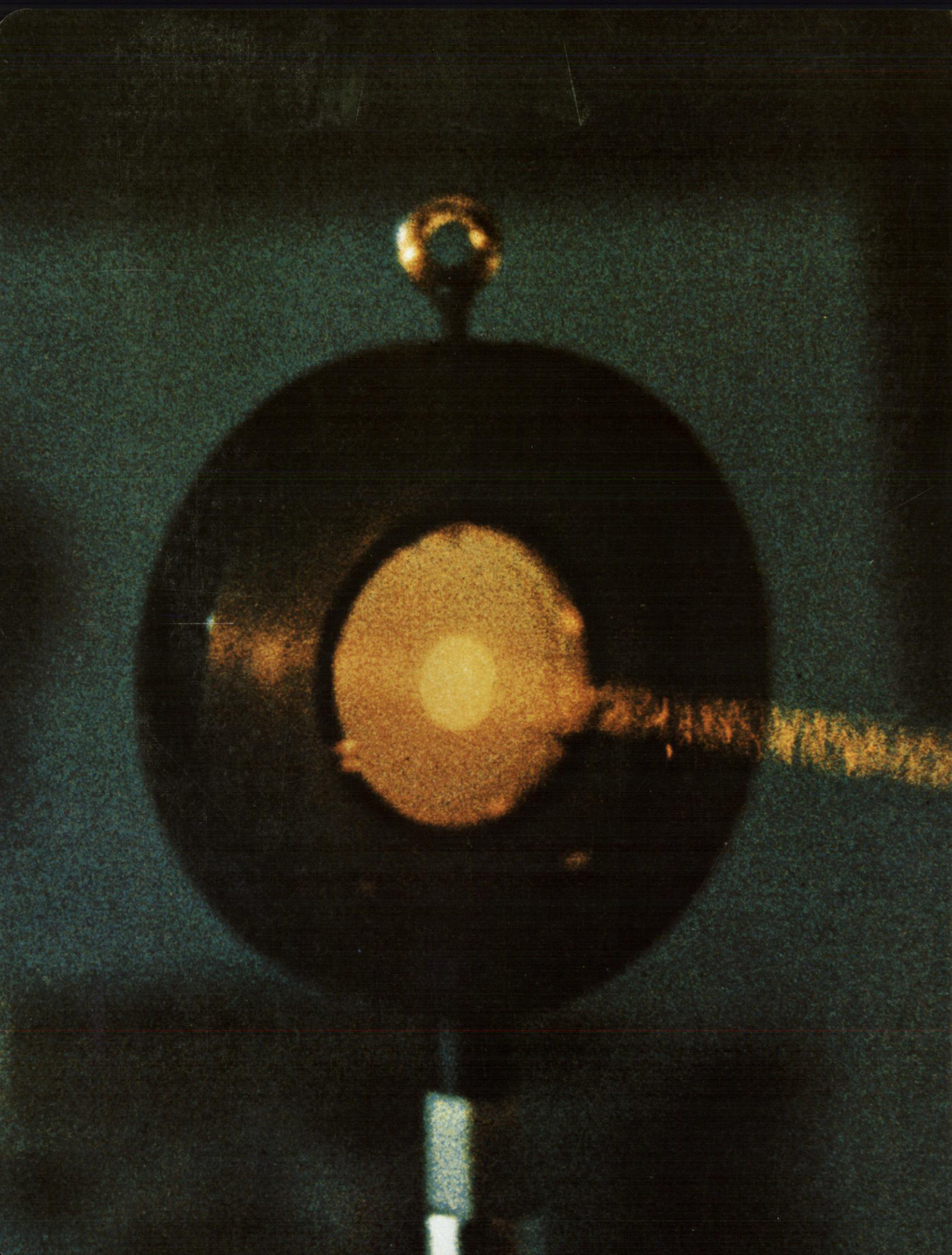
9. Intricate electronic circuits illustrate the precise technology required in shipboard simulator systems built at College Park, Maryland, for training military personnel to perform under modern combat conditions. Conditioning of human operator increases in importance as ship and weapon systems become increasingly complex.



CHAPTER III

Opportunity and the Atmosphere

The atmosphere, like space and the sea, abounds in opportunity. Just as it once challenged man to use its substance to lift him off the earth, so does it now beckon him to design faster and faster vehicles, to travel at speeds far beyond his own reaction time.

Man has learned to use the upper reaches of the atmosphere as a reflector for radio waves. Now he seeks to use it as a medium for still more advanced techniques of communication. And he has learned of the makeup of its elements and the mechanics of its weather. Now he aspires to have the rain fall when and where he wills.

Litton Industries is constantly searching out the new areas of opportunity which result from man's continual pioneering in the technologies of the atmosphere. As new aircraft are developed to fly farther and faster in good weather and bad, one of the most pressing requirements is for more accurate and more reliable navigation systems. Recognizing this need, our Guidance and Control Systems division is developing a new, highly advanced navigation system under a contract received from the U.S. Air Force just after the close of the year. This system, designed for a variety of Air Force aircraft with an urgent requirement for extreme navigation accuracy, combines the principal elements of three proven types of navigation systems – stellar, inertial and doppler, and thus achieves previously unattainable accuracy. A telescope mounted directly on a miniature inertial platform takes sightings on the stars in accordance with instructions sent to it by the system's computer, which has in its memory a detailed catalog of the stars and their continually changing

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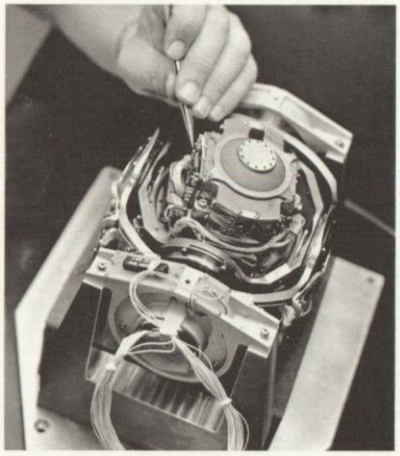
Blanket and breath of earth, the benign atmosphere carries an ever-swelling traffic of messages. New methods of transmission may soon be imperative. To compact his mass of signals, man is looking hopefully to the laser — a device already revolutionizing techniques of surgery, measurement and research. For the coherent light waves of a single laser beam (like that shown here) could conceivably transmit through the atmosphere all the radio, television and telephone signals in use today.



10.

positions. The telescope reports back to the computer with data enabling the navigation system to correct errors which might otherwise build up on long flights. This contract, won in extremely intense competition, also will further develop the Guidance and Control Systems division's competence in the expanding field of precision electro-optical systems.

Another major award received by this division was for the navigation and attack system of the F-111, our nation's next generation of aircraft. Because of its previously demonstrated competence in aircraft navigation systems, the division was selected through competition, prior to the awarding of the prime contract, as the leading candidate for this aspect of the F-111 program.

The company also received a contract during the year for development and fabrication of the intricate computer and display subsystem of the Phoenix weapon system to be installed on the Navy's version of the F-111. This computer will make extensive use of advanced microelectronic circuit techniques and will have an all solid state random access memory of large capacity. Potential production procurements of the Phoenix computer and display subsystem will make the program one of the largest in which the company has been involved.

Development and subsequent widespread use of the LN-3 navigation system in the F-104G and the CF-104 aircraft led to the development by the Guidance and Control Systems division of an even more sophisticated navigation system, the LN-12, for the Air Force's version of the F-4C Phantom II aircraft. The division received a contract for manufacture of these systems and began production of them in fiscal 1963. The division also is well along in the design of the inertial navigation system for the reconnaissance version of the F-4C, and currently is receiving contracts pertaining to reconnaissance versions of the Navy's F-4B aircraft.

Deliveries of inertial guidance systems under contracts previously received reached new highs, and were made at a rate of ten times greater than only three years ago.

The company's navigation and computer systems, long established as superior in military

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10. Engineer adjusts intricate parts of a new, miniaturized stable platform, a vital part of a highly advanced inertial navigation system being developed by the Guidance and Control Systems division for future aircraft and space vehicles. A variety of research programs promises to continue Litton's leadership in this growing technology.

11.

aircraft, are now being used in commercial aircraft. During the year the Guidance and Control Systems division began deliveries of its new central air data computer to the Boeing Company for installation on Model 727 jet airliners. The computers will be installed on all of the 40 Model 727's ordered from Boeing by United Air Lines. The division also delivered the first central air data computer for installation on the French-made Mirage III jet aircraft purchased by Switzerland. This delivery involves the first operational installation of the computer in Europe.

To illustrate that the company's inertial navigation systems are superior in performance to the guidance systems presently used by commercial airliners, especially over water, the Guidance and Control Systems division installed a modified version of its high production inertial guidance system on a Pan American World Airways jet airliner. The Pan American jet flew a total of 90 flights with the system, including more than 50 trans-Atlantic trips. The tests were sponsored by the Federal Aviation Agency which reported excellent results in its evaluation of the Litton system as an aid to long-distance overwater navigation. The system is equally applicable to supersonic aircraft of the future.

As aerial warfare grows more complex, better means of coordinating our defenses are required. To provide this coordination and control, our Data Systems division in past years designed the Marine Tactical Data System (MTDS), widely regarded as the most advanced mobile air control system in the world today. During the year, the division delivered three more units of the MTDS to the Marine Corps. These were the Tactical Air Command Center, which provides overall command and control coordination of all Marine air operations in an area; the Beach Relay which enables the MTDS to communicate and coordinate with Navy fleet elements, and a new radar data processor which enables the system to process data from three-dimensional radars. Environmental tests of these units by the Marine Corps proved highly successful, and the division is now developing an even more advanced version scheduled for delivery in production quantities in 1965.

The Data Systems division also made further deliveries of U. S. Navy Carrier-Based Air-

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11. Gyros used in inertial navigation systems made by the company are readied for the Free World's defense aircraft at the Guidance and Control Systems division's dust-free "clean room" in Beverly Hills, California.

12.

borne Tactical Data Systems, which are installed in the Grumman E-2A aircraft operating from an aircraft carrier. This system, similar to the MTDS, provides the Navy with an automatic airborne combat information center and an early warning capability for fleet air defense. The division has orders for many more of these systems, plus a contract for extensive operational support.

The Data Systems division achieved a major breakthrough during fiscal 1963 in another of its fields, that of reconnaissance systems. For a number of years, the U. S. defense establishment has been seeking a method of processing and evaluating, close to battle areas, the information obtained from the electromagnetic signal emissions of enemy equipment. This information is valuable because it indicates the nature and location of enemy equipment and forces. The only method of accomplishing this vital task has been to send the data back to elaborate ground-based installations for processing. The Data Systems division for the first time proved the feasibility of processing and evaluating such data in a system mounted in an aircraft. The aircraft can then take immediate action against enemy ground forces. Development of this new technique will markedly increase the speed with which U.S. forces can destroy or neutralize enemy forces.

Under an Air Force contract, the Data Systems division also designed and built a new electronic device to scan photographs and automatically identify those showing targets such as airports, industrial complexes and harbors. Construction of fully automated-equipment with expanded capabilities has begun.

The growing demand on the atmosphere for communications has created a pressing need for electronic systems which can process more information through available communications channels. The company's Data Systems division has made major contributions in this field by developing highly advanced equipment to feed transmitters in systems which send countless amounts of information over narrow communication bands. This technology is particularly applicable to the

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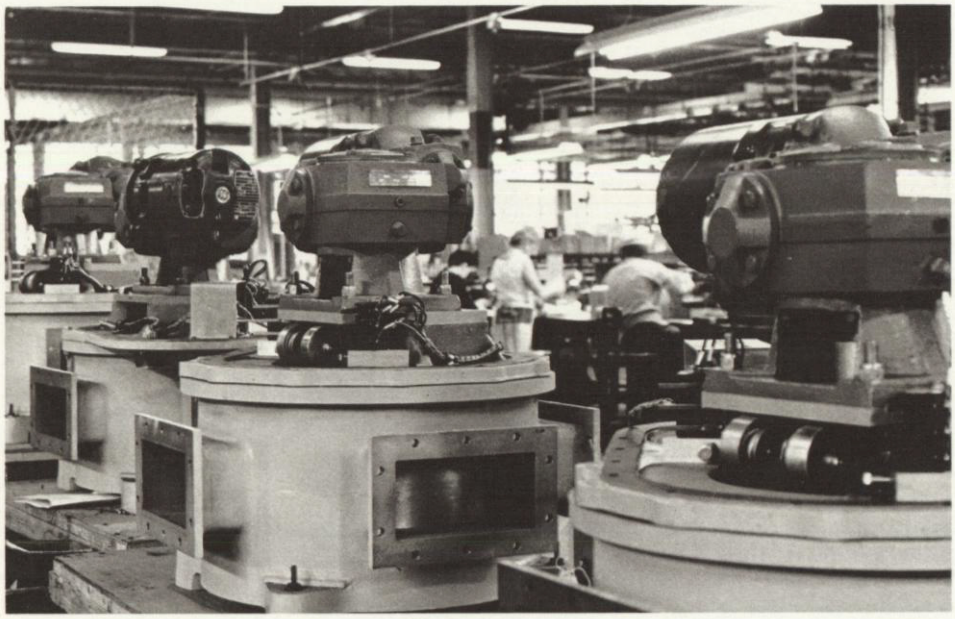
12. An electrodynamically-centered gyroscope that will stabilize the navigation systems of the Free World's most advanced aircraft is tested at the Woodland Hills, California facilities of the Guidance and Control Systems division. New components, circuits and systems are under development.

13. Gyroscopes for inertial navigation systems in NATO fighter aircraft undergo intense testing at new facilities of Litton Systems (Canada), Limited, in Toronto.

13.

area of air traffic control as the skies of the United States and other countries become crowded with a growing number of aircraft. Under contract to the Federal Aviation Agency, the division is developing a communications system which will process large amounts of information transmitted in "bursts" between airports and aircraft. The company believes this high density system could provide a solution to the problem of communicating more frequently with, and controlling, the ever-greater number of aircraft in the skies.

The company continues to expand its role as a major supplier of components for the latest type communications systems. During the year our Airtron division began deliveries under a sizable production order for parametric amplifier assemblies and related electronics to be used in world-



14.

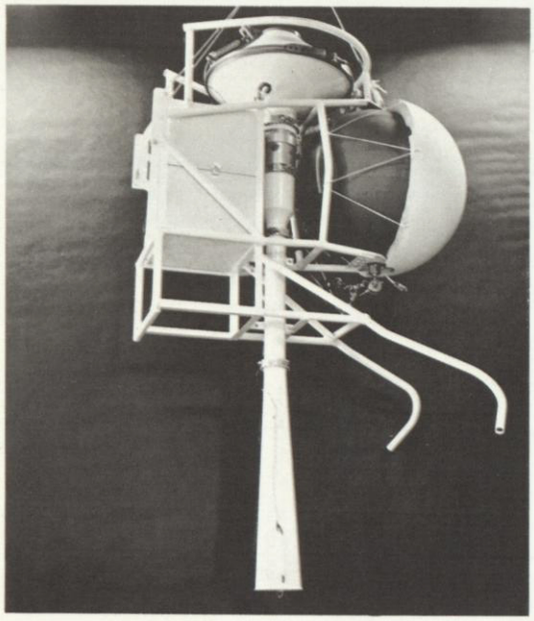
wide tropospheric scatter communication systems. The award was the result of a two-year, company-supported program in solid state materials which put Airtron among the leaders in the rapidly growing field of parametric devices.

Improved reliability and decreased size in complex electronic systems was made possible by the U. S. Engineering division with its introduction of entirely new types of weldable and multi-layer circuits. Market acceptance of these products was immediate and enthusiastic. Demand for shaft encoders, for several years a product of the Guidance and Control Systems Division, increased so markedly the company found it highly advantageous to establish this operation as a separate division capable of generating still further sales to other manufacturers while continuing to satisfy intra-company needs.

The Radcom division, producer of the identification antennas used at every major airport in the United States, received a contract for 17 of such air traffic control beacon antennas for use at airports in Canada. While the value of the contract was not large, it represented the opening of a new market for these Radcom products.

During the year Radcom also received a contract to build a broadband curtain antenna 350 feet high and 300 feet wide for the Voice of America to beam radio broadcasts in Europe, Africa, the Mediterranean area and South America. The antenna, to operate at a million watts of power, will be the first steerable antenna at this strength.

As demands on present communications systems increase, science is looking hopefully at the laser as a more efficient means of transmitting the ever-growing volume of messages generated throughout the world each day. The company is using its broad technological skills to advance the state of laser development. The Electron Tube division, for example, introduced a commercially available gaseous state laser especially suited for colleges and industrial laboratories. These groups



15.

can use the device for demonstrating the laser phenomenon, for developing their own advanced communications systems and for similar applications. The coherent light source of the Tube division's laser operates in the visual and near infra-red regions.

The Electron Tube and Airtron divisions collaborated on the successful operation of a calcium tungstate laser, with the Electron Tube division providing the laser pump and Airtron the crystal. The two divisions are now collaborating on perfecting materials for continuous wave laser energy which is considered the most promising mode for future communications systems.

Although man has been exploring the atmosphere for centuries, he continues to add to his store of knowledge about it. The Applied Science division, acquired from General Mills, plays an important role in this exploration. The new Litton division produces a variety of lighter-than-air vehicles and conducts flight programs to collect meteorological data, nuclear weapon debris, and cosmic ray data. It also is engaged in programs to test the high altitude performance of such equipment as solar batteries and sun trackers, and designs and produces detection and data collection devices for high altitude use.

From its lower extremity to its thin upper limits, the atmosphere is rich with opportunity. Better aircraft, better aircraft components, improved communications and control systems, more simulator systems for new uses and refined versions of existing systems – these are but a few of the areas offering an interesting and profitable challenge. As man learns more about the atmosphere, still more opportunities become apparent. By continuing to advance and broaden its fund of technological knowledge the company is extending its participation in this field.

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14. Mechanical switches for microwave communications systems approach completion at the Airtron division's Morris Plains, New Jersey facility.

15. One of the precision instruments developed in Minneapolis for high altitude radioactive particle sampling.

CHAPTER IV

Opportunity on Earth

Man has tapped the resources of the earth in countless ways since the beginning of recorded history. He has mined the riches of the deep places. He has built shelters from the timber and the clay, and lighted lamps with the oil. Almost everywhere he has reached out, man has found opportunity in the raw materials of the earth and has used them to improve his standard of living.

Yet man knows there is still much opportunity to be found in the earth. Large deposits of petroleum, ore and minerals lie dormant beneath its surface, awaiting those with the skills to locate and extract them. In the emerging new nations of the world, where much of these riches exist, avenues for their transportation must be laid out and developed. Systems must be developed to make present means of transportation more efficient. And, while man is harvesting and carrying to market the raw materials he finds near the earth's surface, he is also seeking to learn more about its inner composition and turn these discoveries to his gainful advantage. The company is using its technology to exploit these areas of opportunity to the fullest.

Armed with its highly advanced electronic equipment and techniques, the company stepped up its service in the global search for additional natural resources and for the economic development of the emerging new nations of the world. Our Aero Service division undertook aerial mapping and exploration assignments in 32 countries around the world during fiscal 1963. It completed more than 100 separate water resources and soils study surveys in the Middle East,

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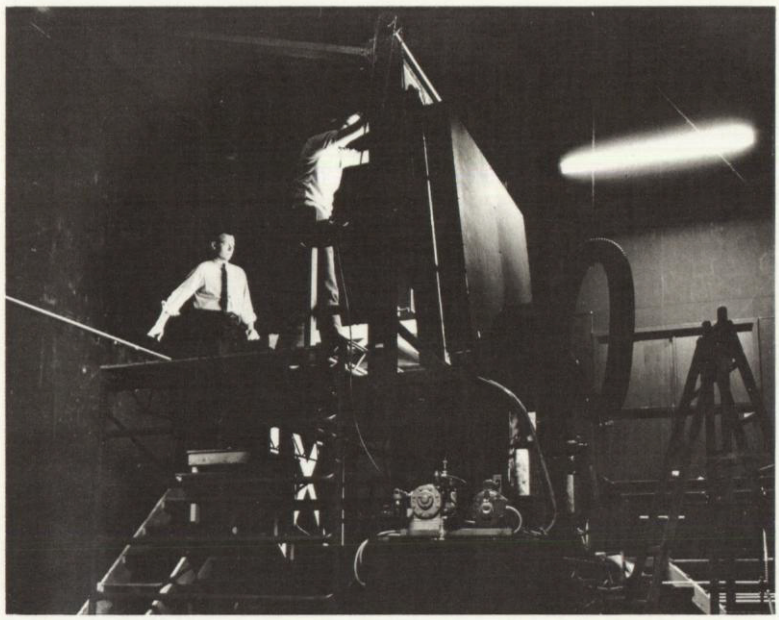
Despite ages of digging, mining and tapping, earth still holds countless mysteries locked beneath its life-sustaining surface. But man is steadily probing farther through the planet's crust, withdrawing samples like this one drilled from deep beneath the Pacific Ocean floor under 11,700 feet of water. In extending similar investigative operations, scientific enterprises (among them our Western Geophysical division) will expand man's knowledge and improve his use of the substances of a fruitful earth.



16.

South America and the Iberian peninsula of Spain, and launched programs to develop the resources of Nigeria, Chile, Spain and British Guiana.

In its search for petroleum, minerals and radioactive elements, Aero flew more than 500,000 miles performing airborne magnetometer, scintillation counter and electromagnetic surveys in both hemispheres. The division also conducted extensive exploration for base metals with ground crews in the United States, Canada, Ireland, Chile, Bechuanaland and Rhodesia.

In these projects Aero not only gathers basic data such as photographs and magnetic readings, but also performs the vital functions of integrated, objective interpretation and evaluation of the information obtained. The many countries and large industries benefiting from these services thus obtain much valuable data they can use for economically sound projects which then can be implemented rapidly. Aero also applied its skills in the United States and Latin America to make property inventories, the results of which are employed to achieve more equitable taxation and to develop national programs for better use of land.

In another form of exploration, the techniques and experience developed by our Western Geophysical division in more than a million line-miles of searching for oil are being applied to Project Mohole, a scientific program which seeks to make a major breakthrough in knowledge of the earth's composition. The aim of the Mohole project is to drill through the earth's crust and into its previously unexplored mantle, which comprises seven-eighths of its mass. Because the crust is much thinner under the sea, the drilling will be done there by specially designed

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16. Giant camera at Philadelphia, Pennsylvania, produces the precise photo needed for radar maps to train military jet pilots. Camera is mounted on 100-ton concrete slab for stability.

17. The most advanced techniques of seismology and the mass-production efficiency of modern industry are employed to map the earth's structure for the oil seeker or the scientist. Here, scientists of our Western Geophysical division plot cross-sections for Project Mohole from seismograms taken of the Barracuda Fault east of Antigua in the Lesser Antilles.

17.

oceangoing vessels. Western Geophysical performed extensive seismic surveys during the year to pinpoint the drilling site, and made the deepest reflection penetration ever made into the earth off the continental shelf. The penetration below the ocean floor ranged from two to three miles in water depths of two to more than five miles. These reflection sections, so far as can be determined,

were the clearest, sharpest and most penetrating ever obtained in the "deep ocean."

The Mohole project is expected to provide information of great value for scientific and practical applications. Scientists expect to learn much about the origins of the earth, including the formation of the continents and the oceans. The oil and mining industries stand to benefit from new information about the formation of oil and mineral deposits and from new techniques for drilling and logging. Experience and data gained in the project will assist in development of equipment and vehicles needed to exploit the resources of the earth that lie under the sea.

Western Geophysical also was active in 18 countries during the year in its continuing program to assist oil companies to find new petroleum deposits. Western Geophysical parties, equipped with the newest, most advanced electronic seismic instruments, undertook programs for the first time in Australia, the Aden Protectorate, Kuwait, and West Pakistan.

To complement the advanced seismic instruments it uses in the field, Western Geophysical designed, built and put into operation during the year a seismic data processing analog computer which is capable of a multitude of data processing tasks. This proprietary device, in operation in Western Geophysical's facility at Shreveport, Louisiana, greatly enhances the seismic signals brought back on magnetic tape from explorations in remote areas of the globe. The computer is capable of handling an unprecedented number of these magnetic tapes every thirty days.

When natural resources such as petroleum and ore are extracted from the earth, one of the most common means of hauling them to market is the railroads. Here, also, the company is utilizing its technological skills to help the railroads make their operations even more economical. In the course of the year the Radcom division made substantial further deliveries of its Lodar system to the Southern Railway. The Lodar system records train operating data such as time, acceleration, shock, speed, throttle setting and brake power. This information helps determine the optimum settings of various controls for greater efficiency and safety of operations. In the event of an accident, the Lodar system would provide a record which would help in determining the cause and thereby assist in preventing similar mishaps. The Lodar system installations of the Southern Railway have now proved the practical applicability of electronic systems to railroad operations. Lodar and similar equipment will be a key part of what ultimately may be completely automated railroad systems.

In preparing the foodstuffs yielded up by the earth, man progressed from the open fire through the wood stove to the gas and electric range. Now he has applied a completely new method of preparing his food: microwave energy. For several years the company, through its Electron Tube division, has manufactured components for microwave cooking equipment. Soon after the close of the fiscal year, the company formed a new division, the Atherton division, to develop, manufacture, and market end equipment for institutional and commercial cooking and heating of food and for various industrial applications. Use of microwave ovens for food preparation has increased markedly in recent years because of several advantages it has demonstrated over conventional cooking equipment. Food cooks thoroughly and more rapidly by microwave while the oven itself remains cool. It is possible to use paper, glass and plastic as cooking containers. Drying, curing and forming of certain industrial products can be achieved much more rapidly and more economically than by conventional means. Facilities for the new division have been estab-

18.

lished initially in the San Francisco Bay area, and its first products will be manufactured during fiscal 1964.

For scores of years man has known how to take raw materials from the earth and create new substances superior to those offered by nature. Now he has learned to go a step further by duplicating, at a tremendously accelerated pace, nature's way of creating raw materials such as the crystals used in advanced electronic equipment. In its modern laboratories, our Airtron division is not only performing this duplication, but also is creating new materials essential to the development of improved and more advanced electronics equipment, especially in the field of communications. In addition to its production of standard crystals for a wide variety of uses, Airtron also performed new materials research under five development contracts: from the Office of Naval Research for the growth of ruby laser crystals from molten salt flux; from the Air Force Aeronautical Systems Division for growing zinc oxide single crystals, for hydrothermal growth of large ruby crystals, and for growth of large specially-shaped yttrium iron garnet crystals; and from the Navy Bureau of Ships for development of high-power polycrystalline ferrite materials for use in phase shifters.

The advancement of man's civilization has depended in large part on what he has taken from the earth, how he has used its substances, and what he has learned from it. Countless further opportunities still exist, and many others will arise. The company will continue to use its capabilities for helping exploit the natural resources of the earth, while also seeking out and profiting from the myriad of opportunities stemming indirectly from it.

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18. Thermal radiation studies with the objective of developing new materials are among the many research projects being conducted at the newly acquired Applied Science Division, Minneapolis, Minnesota.

CHAPTER V

The Business of Opportunity

In creating opportunity or finding it, in pursuing opportunity and exploiting it – wherever his enterprise may take him – man has developed an elaborate and complex structure of mores and customs, laws and regulations, channels and networks known as the economy. In this labyrinth of human activity, man has instituted systems and procedures for the recording, storing, retrieving, transfering, communicating and analyzing of the ever-increasing quantities of information that the operation of his economy generates and requires.

Litton has identified in this activity many opportunities for the development, manufacture and sale of means to make easier, faster – or often to make possible – the fulfilling of these needs and desires.

High on the list of modern equipment currently available to commerce and industry for helping with the problems of business data handling is a product of our Business Machines Group, the Monrobot XI computer. This compact, desk-size computer has proved itself capable of performing a broad range of duties, and it has been installed in a wide variety of organizations, from large missile builders to small manufacturers of plastics and tile, from Federal Government agencies to insurance companies to dairies and soft drink bottlers. Oil companies have found the Monrobot XI ideally suited for invoicing, computing taxes, making out billing records and inventories, and for other accounting duties. During the fiscal year, 60 more units were ordered by oil companies alone, helping make the Monrobot XI the most widely used small scale business

The extent to which man benefits from his material opportunities will always parallel his efficiency in the business environment. As fields of opportunity grow broader, so the tools of management should be bettered. Symbolic of healthy progress is the silicon wafer here being baked into growth by the hellish heat of an induction coil. The wafer will perhaps become part of an advanced, microminiaturized integrated circuit for fine computing and calculating business machines.

19.

computer in the world. By year end, the total of Monrobot computers delivered or on order had nearly reached the 500 mark.

The Monrobot XI's versatility was further broadened when the Monroe division developed a new memory drum with twice the memory capacity of the standard drum. The flexibility of the computer was expanded also by the introduction of the Monro-Card magnetic record card and the Monro-Card processor. The Monro-Card is the size and shape of an ordinary tabulating card but it stores data magnetically, which makes possible 10 to 15 times the capacity of a standard, 80-column punched card. The Monro-Card processor, an additional input-output device for the Monrobot XI, makes it possible to increase processing speed and reduce computer running time by 25%. Development of these new products for use with the Monrobot XI brings automatic magnetic input and output capability into the small computer price range for the first time.

The company took still further steps during the year to broaden the capabilities and range of applications for the Monrobot XI by developing "packaged," or predesigned, programs for several types of business concerns. These programs are designed specifically for each type of business, eliminating the need for costly individual computer programming.

Sales of the new Monroe Mach 1.07 printing calculator introduced early in the year contributed in substantial measure toward the record high sales and earnings achieved by the Business Machines Group in fiscal 1963. The calculator's 15-digit capacity is greater than that of any other printing calculator, and the machine is fully automatic. Long a leader in rotary calculators, Monroe introduced several new rotary models to expand and complement its existing product line. Among them were the Monroe-Matic 8F-213, the most compact fully automatic calculator ever offered, and three new models designed specifically for statistical work.

Early in the year the Monroe/Sweda division introduced the Dataregister, a 30-total point-of-sale recorder, compact enough to be installed in conventional checkstands and cashier stations without alteration of existing fixtures. Initial response to the Dataregister indicated strong potential demand. A large supermarket chain in the United States ordered the Dataregister for a

19. Cash registers marketed by Monroe/Sweda and used in commerce around the world are assembled in Stockholm, Sweden by the Svenska Dataregister division.

20.

new chain of non-food stores it is opening, and one of the largest U.S. motel chains ordered Dataregisters for 100 of its locations. Demand also grew for other point-of-sale cash register systems made by Monroe/Sweda; one retail chain alone ordered 1,000 point-of-sale machines during the year. Use of point-of-sale equipment by a variety of retailers was encouraged by development of packaged programs for drug stores, department stores, and variety stores. These standard programs, as with computers, eliminate the need for preparation of a new program for each individual business, making it economically practical for small retailers to install the system.

In recognition of the constantly increasing potential market for business forms and recording and reproduction papers for business use, the Business Machines Group established a new division to produce a broad line of electrosensitive, thermosensitive and other specially treated papers. The division, Communication Papers, Inc., is located in a new 70,000-square-foot plant in Moosic, Pennsylvania. Later CPI's extensive production capacity will be used to produce allied paper products to serve broader aspects of the world's growing business community.

The Business Machines Group, which already offers, through its various divisions, sales and service in 94 countries of the Free World, took another step to broaden the market for its products. In five U. S. cities, the Group opened sales offices which make available, in one central location, the products of all of its divisions: Monroe calculators and other business machines; Monroe/Sweda point-of-sale equipment; A. Kimball merchandise tags and tag punching and marking machines; Eureka Specialty Printing business forms; and a variety of other products.

Two other divisions of the Business Machines Group took steps to enhance their competitive positions in fiscal 1963. Integrated Data Processing, also known as IDP, made significant sales gains by developing new programs for specific areas of business and commerce, and further expanded its coast-to-coast network of service offices with the opening of a new branch in Atlanta, Georgia. The Cole Steel Equipment division broadened its product line with the introduction of a new series of contemporary style office equipment.

The company also has pursued the opportunities that exist in the field of medical equipment.

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20. Modern production techniques are necessary to fill the needs of the world's commerce. Twenty calculators are tested simultaneously from a central quality control console at Amsterdam.

21.

Our Fritz Hellige division in Freiburg, Germany, long noted for its medical electronic recording equipment, introduced several important new products in the fiscal year. Among them were a 12-channel electroencephalograph which can be attached to a patient's brain during surgery to report instantly and automatically the action of the brain, and an intra-cardiac phonocardiograph, which makes it possible to observe and record certain phenomena inside the heart simultaneously with pressure measurement.

The Data/Log MC 10-40 printer, introduced in fiscal 1963 by our Monroe division, also found a strong demand in the medical electronics field. The radiation counter industry is standardizing on this machine, the world's fastest data printer, since it makes it possible for the industry's high-speed solid state pulse analyzers to operate at their maximum capacities.

The company continued and broadened its participation in the growing consumer goods market of the electronics industry. Our Triad Transformer division received a contract to supply 350,000 transformers a year for equipment made by a major electronics concern. Triad will supply these precision magnetic components for high quality consumer entertainment devices.

The Westrex Recording division, whose systems for recording phonograph records have long been the most widely used in the recording industry, began development during the year of a new model of its StereoDisk Recorder for making stereophonic records. The new model will provide improved uniformity of high frequency response and enhanced dynamic stability.

From the world of commerce to the area of man's health to the arena of his entertainment, the opportunities are infinite. By recognizing new opportunities and creating others, the company will continue to be a leader in the development of advanced products and services for the Business of Opportunity.

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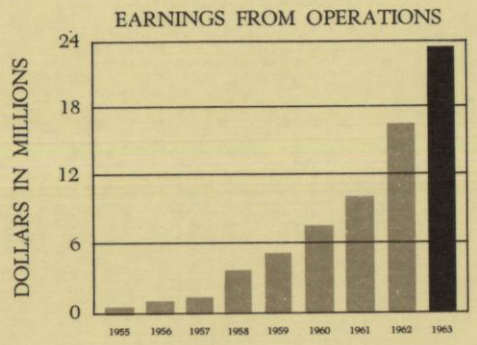
21. The Monrobot XI developed and manufactured by the Monroe division aids in many of the documenting activities in a variety of operations and is now the most widely applied small business computer. Prior to shipment it is carefully tested at the Monroe division plant in Orange, New Jersey.

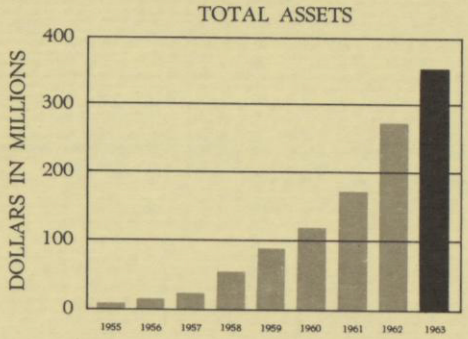
Financial Statements

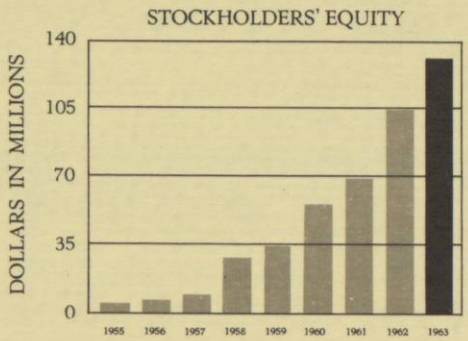


HIGHLIGHTS OF NINE YEARS' OPERATIONS

Fiscal Years Ended July 31

	1963	*1962*	*1961*
Operating Results			
Sales and service revenues	$553,146,239	$393,807,709	$250,114,456
Earnings before taxes on income	43,796,403	30,849,499	19,687,457
Federal and foreign taxes on income	20,500,296	14,533,547	9,529,134
Net earnings	23,296,107	16,315,952	10,158,323
Per common share outstanding at year-end**	2.29	1.64	1.09
Depreciation	11,467,000	8,527,000	5,131,267
Financial Postion (Year-End)			
Net working capital	$151,350,137	$113,478,440	$ 73,631,064
Property, plant and equipment—at cost	140,975,286	106,787,138	60,860,252
Accumulated depreciation	55,085,040	43,820,326	22,987,124
Net property, plant and equipment	85,890,246	62,966,812	37,873,128
Total assets	354,945,287	269,491,286	172,771,125
Stockholders' equity	121,967,925	102,934,058	63,730,972
General Statistics (Year-End)			
Shares of common stock outstanding**	10,145,217	9,909,407	9,178,834
Number of stockholders of record	43,417	32,755	21,936
Number of employees	43,000	37,700	23,000





1960	*1959*	*1958*	*1957*	*1956*	*1955*
$187,761,242	$125,525,561	$83,155,473	$28,130,603	$14,920,050	$8,898,797
15,365,182	10,805,756*	7,044,437	3,232,493	1,995,703	679,413
7,910,328	5,851,725	3,342,234	1,426,000	976,000	243,000
7,454,854	4,954,031*	3,702,203	1,806,493	1,019,703	436,413
.82	.62*	.48	.34	.22	.10
3,213,720	2,235,128	2,090,083	693,218	430,607	340,000
$ 53,846,309	$ 38,741,071	$23,117,831	$ 6,731,958	$ 2,655,003	$1,130,111
41,545,708	29,633,695	22,781,070	7,277,766	4,648,181	3,632,193
17,563,971	11,850,224	7,915,605	1,939,535	1,144,109	788,231
23,981,737	17,783,471	14,865,465	5,338,231	3,504,072	2,843,962
119,004,373	83,254,170	57,750,861	16,823,383	10,826,182	7,647,918
50,568,249	34,546,600	27,994,799	7,785,419	4,533,177	3,442,160
8,956,719	7,737,261	7,467,908	5,271,749	4,622,035	4,267,760
16,322	8,589	5,801	4,500	3,000	1,700
17,400	12,400	8,600	2,700	2,000	1,100

*Excluding special income credit of $1,021,000 or 13¢ a share.
**Adjusted for stock dividends and stock splits.

In its annual financial statements the Company consistently reports the operations of businesses acquired under the pooling of interests concept from the beginning of the year in which the acquisition occurs. On the basis of including operations of pooled businesses prior to their years of acquisition, sales for the fiscal years ended July 31, 1962, 1961, 1960, and 1959 would have been $425,640,000, $304,053,000, $260,350,000, and $206,669,000, respectively. Related net earnings from operations and earnings per common share for these periods would have been $16,889,000, $11,861,000, $10,700,000, $9,483,000 and $1.66, $1.19, $1.08, $1.05, respectively.

LITTON INDUSTRIES, INC. AND SUBSIDIARY COMPANIES

CONSOLIDATED STATEMENT OF EARNINGS

Year Ended July 31, 1963

Sales and service revenues		$553,146,239
Costs and expenses (including depreciation of $11,467,000):		
Cost of sales	$413,890,117	
Selling, general and administrative	90,546,832	
Interest	4,912,887	509,349,836
Earnings before taxes on income		43,796,403
Federal and foreign taxes on income		20,500,296
Net earnings		$ 23,296,107

See notes to financial statements

CONSOLIDATED STATEMENT OF EARNINGS RETAINED IN THE BUSINESS

Year Ended July 31, 1963

Balance at beginning of year:		
Litton Industries, Inc. and subsidiary companies		$ 49,572,984
Companies acquired – accounted for as poolings of interests		5,133,268
		54,706,252
Net earnings for the year		23,296,107
		78,002,359
Deduct:		
Premium on redemption of convertible subordinated debentures	$ 1,706,607	
Cash dividends on voting preferred stock – $5 a share	63,493	
Cash dividend paid prior to acquisition by a company acquired in a pooling of interests	57,823	
Market value of 2½% stock dividend	12,741,341	14,569,264
Balance at end of year		$ 63,433,095

CONSOLIDATED STATEMENT OF ADDITIONAL PAID-IN CAPITAL

Year Ended July 31, 1963

Balance at beginning of year:	
Litton Industries, Inc. and subsidiary companies	$ 47,246,717
Companies acquired – accounted for as poolings of interests	(9,677,602)
	37,569,115
Excess of market value of stock dividend over par value of common stock issued	12,497,260
Excess of market value over par value of common stock and principal amount of debentures issued to purchase businesses	1,870,000
Excess of principal amount of debentures and voting preferred stock converted over par value of common stock issued	27,895
	51,964,270
Deduct transfer to common stock in connection with two-for-one stock split	4,833,857
Balance at end of year	$ 47,130,413

See notes to financial statements

LITTON INDUSTRIES, INC. AND SUBSIDIARY COMPANIES

CONSOLIDATED BALANCE SHEET JULY 31, 1963

ASSETS

Current Assets:		
Cash and marketable securities of $13,736,370 at cost (approximate market value)		$ 27,695,302
Accounts receivable:		
Trade accounts	$134,569,307	
Reimbursable unbilled expenditures under government contracts	7,371,903	141,941,210
Inventories, at lower of cost or market, less progress billings of $56,441,000		86,663,729
Prepaid expenses		3,455,039
Total Current Assets		259,755,280
Investments		2,577,813
Property, Plant and Equipment — at cost:		
Land	5,848,034	
Buildings	42,039,937	
Machinery and equipment	93,087,315	
	140,975,286	
Less accumulated depreciation	55,085,040	85,890,246
Other Assets:		
Patents	354,917	
Excess of cost of businesses acquired over related net assets	4,799,159	
Other	1,567,872	6,721,948
		$354,945,287

See notes to financial statements.

LIABILITIES AND STOCKHOLDERS' EQUITY

Current Liabilities:

Notes payable			$ 17,306,300
Accounts payable			49,116,833
Payrolls and related expenses			24,200,002
Federal and foreign taxes on income			16,643,918
Current portion of long-term debt			1,138,090
Total Current Liabilities			108,405,143
Long-Term Liabilities (Note B)			43,597,012
Deferred Service Contract and Other Income			9,669,107
Convertible Subordinated Debentures (Note C)			71,306,100
Stockholders' Equity (Note D):			
Capital stock:			
Voting preferred, convertible, 5% cumulative, par value $100 a share: Authorized 160,000 shares Issued and outstanding 12,592 shares		$ 1,259,200	
Common, par value $1 a share: Authorized 17,000,000 shares Issued and outstanding 10,145,217 shares		10,145,217	
Additional paid-in capital		47,130,413	
Earnings retained in the business	$100,292,961		
Less amounts transferred to paid-in capital for stock dividends paid	36,859,866	63,433,095	121,967,925
			$354,945,287

NOTES TO FINANCIAL STATEMENTS

Year Ended July 31, 1963

NOTE A — Principles of Consolidation

The accounts of the Company and its wholly-owned subsidiaries have been consolidated in the accompanying financial statements.

As of August 1, 1962, the Company purchased the net assets of McKiernan-Terry Corporation. The operations of McKiernan-Terry have been included since date of acquisition.

During the year ended July 31, 1963, the Company also acquired the net assets of Emertron, Inc. and Winchester Electronics, Incorporated, and completed the acquisition of all the outstanding stock of Svenska Dataregister A. B. These acquisitions have been accounted for as poolings of interests.

NOTE B — Long-term Liabilities

Long-term liabilities consisted of the following:

Long-term debt:	
Notes payable to insurance companies	$30,818,076
Other	5,156,026
	35,974,102
Less current portion	1,138,090
	34,836,012
Deferred federal and foreign taxes on income	8,761,000
	$43,597,012

Notes payable to insurance companies included a $25,000,000 note payable issued under a note agreement providing for total borrowings of $50,000,000, total annual sinking fund payments of $2,750,000 commencing December 1, 1968, a final maturity date of December 1, 1984 and interest at 4½%; the remaining $25,000,000 was received October 3, 1963 and was added to the general funds of the Company. The balance of notes payable to insurance companies consisted of $2,725,000 due May 1, 1971, payable at the rate of $325,000 annually with interest at 3⅜%, and $3,093,076 due January 1, 1977, payable at the rate of $200,000 annually with interest at 5.35%.

Under the various borrowing agreements the Company has agreed to maintain certain ratios of assets to debt and stockholders' equity to debt. The Company is in compliance with the terms of the agreements.

NOTE C — Convertible Subordinated Debentures:

Convertible subordinated debentures were as follows:

3½% due April 1, 1987, issued 1962 and 1963	$62,054,100
5¼% due December 1, 1974, issued 1959	4,105,000
4¾% due June 1, 1974, issued 1959	4,700,000
5% due September 1, 1965, issued 1955	447,000
	$71,306,100

The debentures are convertible into common stock of the Company at conversion prices as follows: 3½% debentures — $80 per share until April 1, 1972, $85 per share until April 1, 1982, $90 per share thereafter; 5¼% debentures — $40 per share; 4¾% debentures — $32.50 per share; 5% debentures — $3.06 per share. These conversion prices are subject to antidilution provisions.

The Company has agreed to retire annually principal amount of debentures as follows: 3½% debentures — $2,461,000 commencing April 1, 1972; 5¼% debentures — $600,000 commencing December 1, 1965; 4¾% debentures — $470,000 commencing June 1, 1965; 5% debentures — $150,000 commencing September 1, 1958. Required annual retirements of the 5¼% and the 5% debentures have been met through December 1, 1967 and September 1, 1964, respectively.

The debentures are subordinated to all existing debt and future debt of the Company with limited exceptions. The Company is in compliance with the terms of the debentures.

NOTE D — Stockholders' Equity

At July 31, 1963, there were reserved 1,169,109 common shares for conversion of debentures and 91,571 common shares for conversion of preferred stock. In the event of conversion of the debentures, savings in interest would be $2,633,006. Conversion of the preferred stock increases earnings available for common stock $62,960.

In addition, under certain acquisition agreements shares are to be issued as additional consideration for businesses acquired. The number of shares to be issued is dependent, among other things, upon future earnings of acquired businesses and future market value of Litton stock. Based upon estimates of earnings and present market value, the maximum number of shares which could be issued as additional consideration is approximately 225,000.

Under terms of the Company's borrowing agreements, consolidated earnings retained in the business of approximately $21,366,000 are available for cash dividends on common stock at July 31, 1963.

On August 6, 1963, the Board of Directors of the Company declared a common stock dividend of 2½% payable November 1, 1963 to holders of record of such common stock at the close of business October 18, 1963. This transaction has not been reflected in the financial statements.

On August 6, 1963, the voting preferred stock was called for redemption on September 6, 1963 at a price of $102. Prior to September 6, 1963, all of the voting preferred stock was converted into 91,571 shares of common stock at $13.75 a common share. These conversions have not been reflected in the financial statements.

At a special meeting held on September 16, 1963, the stockholders of the Company approved an amendment to the Certificate of Incorporation authorizing the issuance of a new $5 par value voting preferred stock, which shall be convertible into common stock on a share-for-share basis. The one-for-one conversion price is subject to antidilution provisions. At the time of issuance of each series of the new preferred stock, the Board of Directors of the Company may fix, among other things, the dividends payable thereon and the times and prices of redemption.

NOTE E — Contingent Liabilities

Approximately 50% of the Company's sales for the current year are subject to the Renegotiation Act of 1951. Adequate provision has been made for possible refunds.

Annual rentals under long-term leases are approximately $2,700,000 plus property taxes and insurance in some instances.

TOUCHE, ROSS, BAILEY & SMART

CERTIFIED PUBLIC ACCOUNTANTS

3350 Wilshire Boulevard
Los Angeles 5, California

October 11, 1963

Board of Directors
Litton Industries, Inc.
Beverly Hills, California

We have examined the consolidated balance sheet of Litton Industries, Inc. and subsidiary companies as of July 31, 1963, and the related statements of earnings, earnings retained in the business, and additional paid-in capital for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the financial statements referred to above present fairly the consolidated financial position of Litton Industries, Inc. and its subsidiary companies at July 31, 1963, and the consolidated results of their operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Touche, Ross, Bailey & Smart

Certified Public Accountants

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LITTON INDUSTRIES, INC.

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CORPORATE OFFICES

336 North Foothill Road
Beverly Hills, California

TRANSFER AGENTS

Morgan Guaranty Trust Company of New York
30 West Broadway
New York 15, New York

United California Bank
108 West Sixth Street
Los Angeles 54, California

REGISTRARS

Chemical Bank New York Trust Company
20 Pine Street
New York 15, New York

Security First National Bank
124 West Fourth Street
Los Angeles 13, California