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UNIVERSITY OF TEXAS AT DALLAS



**LTV**

LING-TEMCO-VOUGHT, INC.

1963 ANNUAL REPORT



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# FINANCIAL HIGHLIGHTS

FOR THE YEAR ENDED DECEMBER 31:

	1963	1962
Sales . . . . .	\$329,001,855	\$325,439,135
Earnings before taxes and extraordinary charge . . . . .	10,352,957	8,796,824
Earnings before extraordinary charge . . . . .	7,088,602	8,650,069
Per share of common stock* . . . . .	2.44	3.03
Net earnings after extraordinary charge . . . . .	6,186,809	8,650,069
Per share of common stock* . . . . .	2.12	3.03
Dividends paid per share:		
Preferred stock . . . . .	1.35	—
Common stock . . . . .	.125	—

AT YEAR END:

Working capital . . . . .	\$ 38,118,628	\$ 46,268,154
Long-term debt . . . . .	34,591,553	64,198,617
Stockholders' equity . . . . .	32,861,815	26,655,718
Per share of common stock* . . . . .	9.96	7.87
Shares outstanding:		
Common . . . . .	2,824,772	2,783,600
Preferred . . . . .	151,084	151,345
Number of stockholders of record:		
Common . . . . .	16,428	17,795
Preferred . . . . .	4,211	4,685
Number of employees . . . . .	17,533	18,392

\*Based on shares outstanding at year end and after giving effect to dividends earned on preferred stock.

## TO OUR FELLOW LTV STOCKHOLDERS:

Science and engineering dominate LTV's annual report for 1963. This emphasis on activities basic to future achievements seems particularly pertinent at a time when the shifting emphasis in the nation's defense posture has assumed such dramatic proportions. Adjustments now under way in military and space programs will be sharply felt in many areas. LTV is in excellent fighting trim, with an unusually wide base of customers and projects to meet these new challenges, but we are far from complacent. The years ahead will test all of our skill and knowledge — a measure of which you can gain by spending a little time studying this report.

Going into 1964, LTV won a major competition for an aircraft program that could become comparable in scope to the Crusader — the new VAL (A-7A), which is scheduled to supplement and eventually replace the A-4E as the Navy's primary light attack bomber. Streamlining and cost-cutting programs put into effect by the consolidation of Ling-Temco Electronics and Chance Vought 2½ years ago, which resulted in sharply reduced overheads, played a direct part in making LTV strong and competitive enough to capture this important award. Today, LTV stands lean and hard, fully prepared for the austerities needed to make VAL a successful program. To win this hard-fought competition, LTV Vought Aeronautics Division called upon technical and managerial talent from other divisions where needed, and pitted its capabilities against some of the strongest competitors in the aerospace industry. This again emphasized the advantages of a consolidation that already has saved the government and taxpayers millions of dollars, while improving the Company's profitability.

The VAL award, together with the XC-142 tri-service vertical takeoff and landing forward-area transport, makes LTV's position as a manned aircraft producer potentially one of the strongest in the industry. Yet, as you will note from the chart on Page 6, we are far from being reliant solely upon any one product line. This chart and the one on Page 8 graphically illustrate the true nature of LTV's three-dimensional diversification in customers, products, and technologies. It is significant that of LTV's 1963 sales, 33 percent was in electronics, 36 percent in aeronautics, and 24 percent in missiles and space. This fact, when meshed with the Company's good

distribution of customers in the military and space markets, points up LTV's unique ability to cope with rapidly changing markets.

We said during 1963 that we are in a growth frame of mind. To grow from within requires able management, fine technical staffs, and marketing strategy. Research and development forms a main building block. We expended \$9.6 million on research and development in 1962 and increased that approximately 42 percent to \$13.6 million in 1963; we expect to increase again during 1964. Investments in research and development affect current earnings, but most importantly they enhance the continued flow and growth of business and profits in the future. Successful research and development programs can come only from a company that is strongly oriented toward science and engineering. LTV, as you will see in this report, is such a company.

Research and development led to many of the successes of 1963, including VAL, but our most conscientious appraisal of the year is summed up in the phrase: Satisfactory but not satisfying.

It was satisfactory because we maintained sales at a high level, notwithstanding the disposition of several subsidiary companies and product lines, increased our pre-tax earnings, further broadened our base of products and customers, and dramatically improved the balance sheet. We eliminated substantial immediate potential dilution of stockholder equity, reduced short-term debt by one-third, almost halved long-term debt, disposed of additional dissimilar enterprises, and continued to consolidate and streamline the Company's operating structure.

While the achievements of 1963 were significant and forward-moving, we are not satisfied. We intend to do better. To increase profits, while continuing to develop the full potential of our products to the benefit of customers, remains our primary goal. The accomplishments of 1963 point up the soundness of the 1961 merger, as do the interacting benefits and helpful assistance of one operating division to another. However, we are aware that our management and our resources will continue to be fully challenged as LTV strives to improve its performance record. Profitability is never assured, but LTV is prepared to meet these challenges and move ahead toward realization of its goals.

Before ending this message we want to thank the thousands of employees who contributed to these and other LTV successes through their loyalty, initiative, ingenuity, and effective cost-consciousness. We also want to express appreciation to LTV's customers; we highly value our association with the U. S. defense and space agencies and with the thousands of customers who purchase and use LTV's commercial products.

March 11, 1964



James J. Ling  
Chairman of the Board  
and Chief Executive Officer



Gifford K. Johnson  
President  
and Chief Operating Officer

# OPERATING UNITS AND FIELD OFFICES

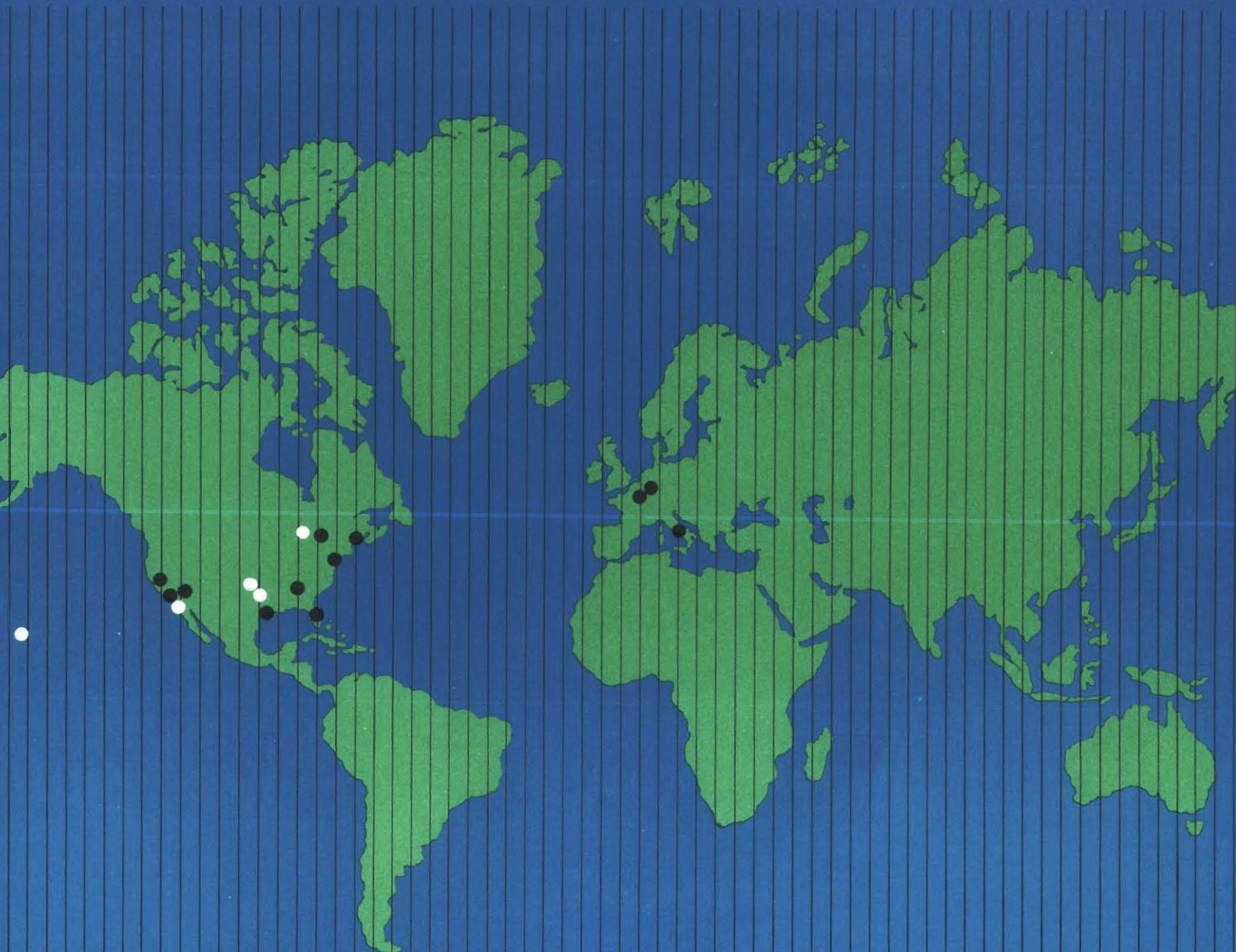
## ● OPERATING UNITS

LTV Altec Division	Anaheim, California	LTV Range Systems Division	Dallas, Texas
LTV Astronautics Division	Dallas, Texas	LTV Temco Aerosystems Division	Greenville, Texas
LTV Continental Electronics Division	Dallas, Texas	LTV University Division	Oklahoma City, Oklahoma
LTV Ling Electronics Division	Anaheim, California	LTV Vought Aeronautics Division	Dallas, Texas
LTV Michigan Division	Warren, Michigan	Kentron Hawaii, Ltd.	Honolulu, Hawaii
LTV Military Electronics Division	Garland, Texas		

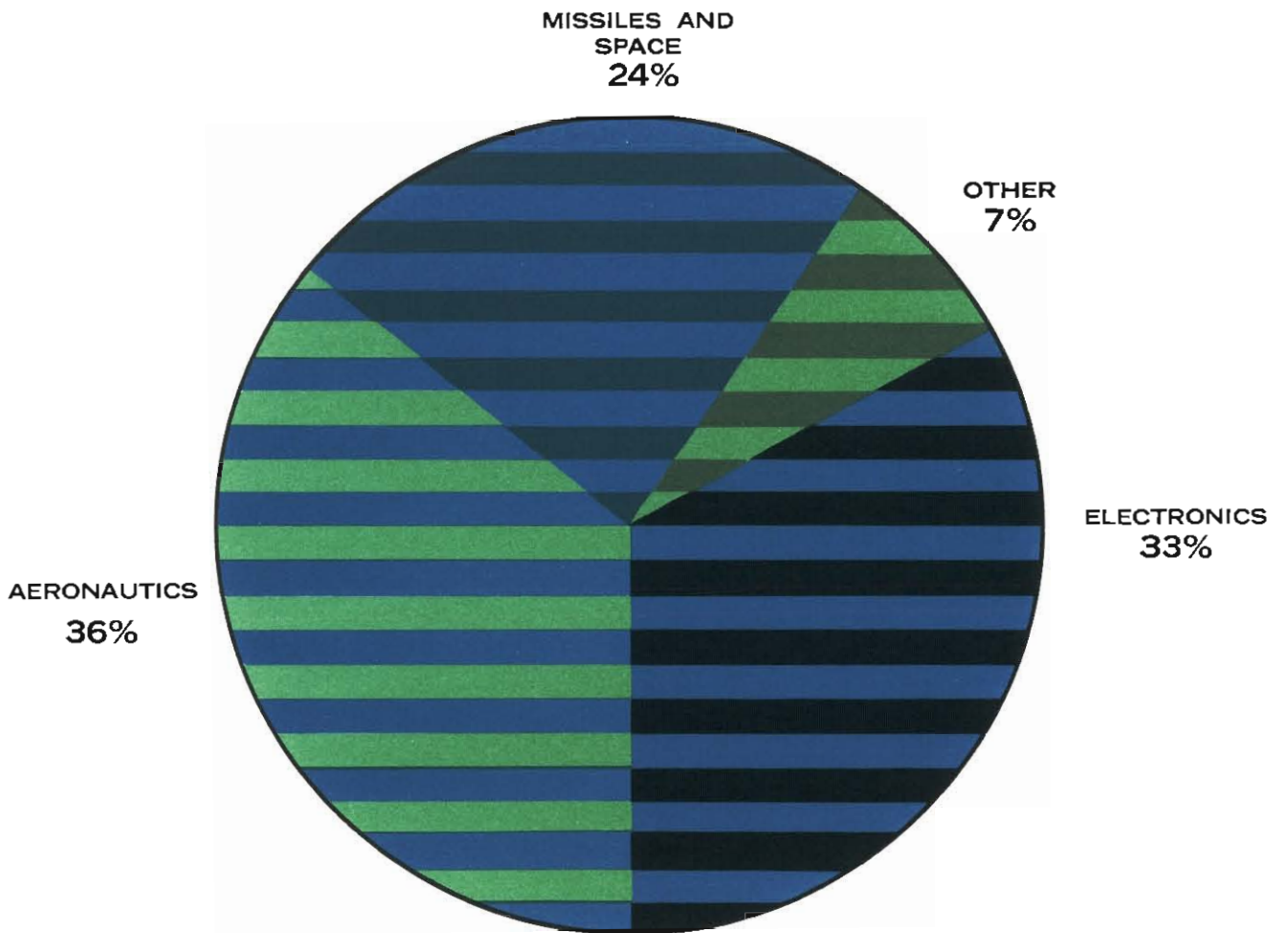
LTV Research Center	Dallas, Texas
— Western Division	Anaheim, California

## ● FIELD OFFICES

LTV Field Office Headquarters	Washington, D.C.
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# 1963 SALES





# CAPABILITIES

LTV has the experience, knowledge, facilities and resources to conceive, design, engineer, manage, manufacture, test and deliver high-quality defense and space systems and associated equipment from prototype to long-production-run quantities in the fields of:

## AERONAUTICS

### AIRCRAFT

SINGLE- OR MULTI-ENGINE

TURBINE, JETPROP, RAMJET  
OR ROCKET POWERED

STANDARD OR V/STOL

ATTACK, FIGHTER, TRAINER  
OR TRANSPORT

### TARGET AND TRAINING DRONES

### AIRFRAME COMPONENTS

### GROUND SUPPORT EQUIPMENT

### FLIGHT, OPERATIONAL AND MAINTENANCE TRAINING DEVICES

## SURFACE VEHICLES

### SPECIAL PURPOSE GROUND VEHICLES

ALL-TERRAIN AND AMPHIBIOUS  
WHEELED OR TRACKED

### GEM VEHICLES

## MISSILES AND SPACE

### MISSILES

SINGLE- OR MULTI-STAGED  
LIQUID, SOLID OR HYBRID  
ROCKET-POWERED

TACTICAL OR STRATEGIC

SURFACE-TO-SURFACE,  
SURFACE-TO-AIR,  
AIR-TO-SURFACE  
OR AIR-TO-AIR

### MISSILE AND SPACE SUPPORT EQUIPMENT

### OPERATION AND MAINTENANCE TRAINING DEVICES

### SPACE LAUNCH VEHICLES

SINGLE- OR MULTI-STAGED  
LIQUID, SOLID OR HYBRID  
ROCKET-POWERED

### PAYLOADS

### PROBES

### SATELLITES

### SPACE STATIONS

### SPACE EXPEDITION VEHICLES AND SYSTEMS

## ELECTRONICS

### AIRBORNE SYSTEMS FOR:

COMMAND AND CONTROL

ELECTRONIC WARFARE

GUIDANCE AND FLIGHT CONTROL

### COMMUNICATION SYSTEMS

ALL FREQUENCIES, SOUND TO LASER

ALL MODES, CQ TO SECURE

ALL POWER LEVELS

### DETECTION, TRACKING AND CATALOGING SYSTEMS

RADAR, INFRARED, LASER AND OTHER

BROAD OR NARROW BEAM

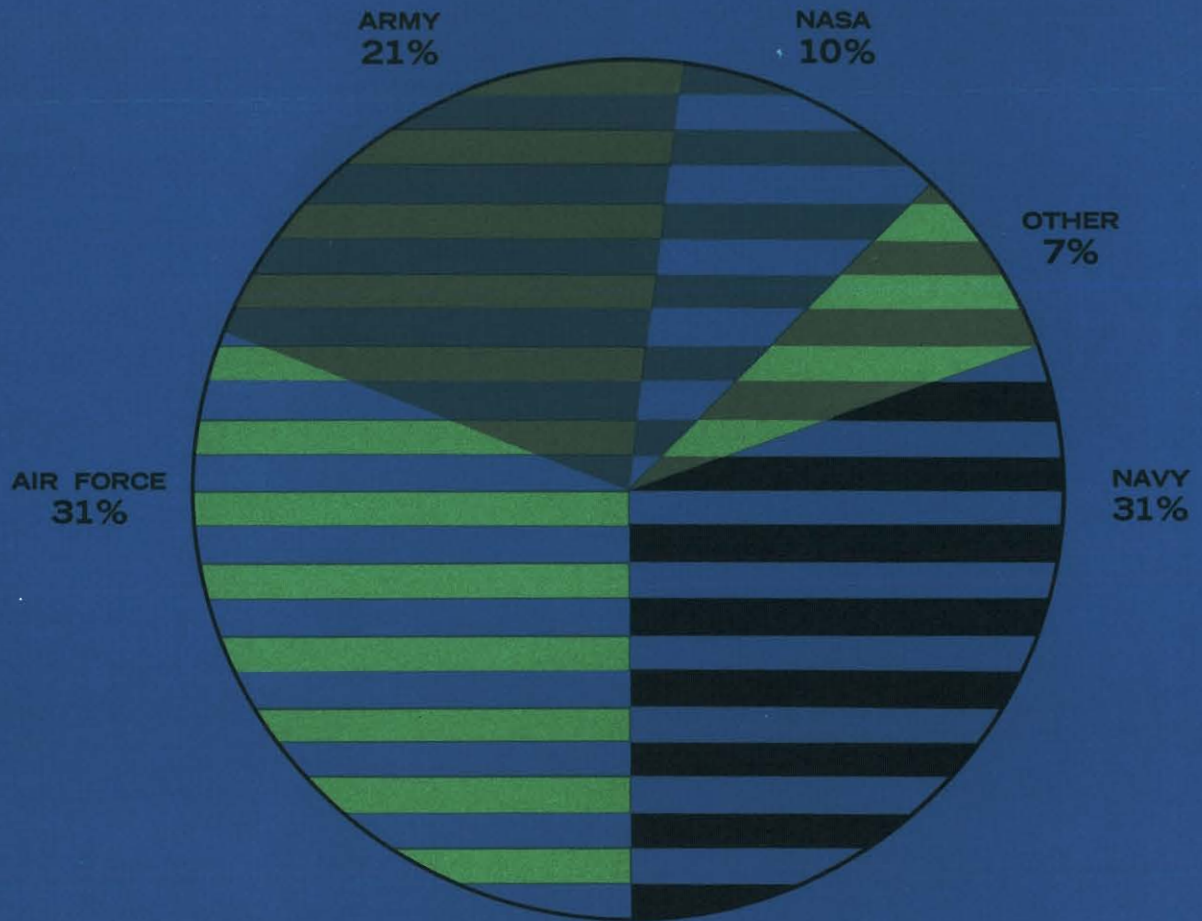
GROSS INFORMATION OR ANALYTICAL

### DISPLAY SYSTEMS

### ENVIRONMENTAL SYSTEMS

### SOUND SYSTEMS

# CURRENT BACKLOG

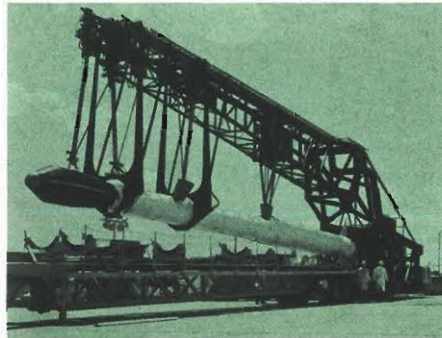


# PRODUCTS AND SERVICES

A-7A (VAL)



Scout Rocket



Electronics Assembly



## AERONAUTICS

Light attack aircraft (VAL) □ Supersonic naval fighter aircraft □ Vertical/Short Takeoff and Landing (V/STOL) transports □ Target and training drone range services □ Advanced aircraft concepts □ Airframe components □ Infrared suppression devices □ Ground support equipment □ Flight, operational and maintenance training devices □ Scale model, structure and material military specifications testing □ Aircraft modification, conversion and maintenance □ Basic and applied research in aerophysics, human engineering, mechanics and materials for advanced aircraft.

## SURFACE VEHICLES

1¼-ton all-terrain military trucks □ Plenum air tread all-terrain military vehicles □ Development of amphibious, ground transportation and special purpose vehicle concepts.

## MISSILES AND SPACE

Tactical battlefield missiles □ Space launch vehicles □ Guidance evaluation missiles □ Classified space payloads □ Development of low-altitude missile concepts □ Upper stage velocity packages □ Development of nuclear-powered missile concepts □ Space maneuvering systems □ Development of aerodynamic and ballistic missile concepts □ Standard space payload packages □ Development of re-entry systems □ Meteorite studies □ Development of astronaut protection, satellite and space station concepts □ Missile and space support equipment □ Handling and launching equipment □ Training devices □ Range services □ Range design □ Shipboard instrumentation design □ Range layout, safety and command-control studies □ Data reduction, film processing and logistic services □ Computer management system services □ Basic and applied research in astrophysics and life sciences for advanced space systems.

## ELECTRONICS

Airborne and spaceborne equipment for: Anti-submarine warfare\* — Command and control\* — Communications\* — Display\* — Electronic warfare — Flight control and stabilization — Guidance — Instrumentation\* — Mapping — Navigation — Power conversion and control\* — Reconnaissance — Surveillance — Target location — Telemetry\* — Test and checkout\* — Thrust vector control — Tracking and recovery\* — Weapon conditioning and control □ Aerospace antennas and RF distribution systems □ Custom transformers and power devices □ Data handling and processing equipment □ Ground support equipment □ Nuclear research devices □ Radar beacons □ Servo analyzers □ Special magnet coils □ Superpower electronic research devices □ Tape readers □ Communications equipment: Coupling, phasing and switching systems — Frequency devices — Multicouplers — Radar detecting, analyzing and (cont)

\* Also larger land-based equipment

## ELECTRONICS (cont)

cataloging systems and subsystems — Radar transponders — Radio transmitters (all frequencies VLF-UHF, all power levels) — Signal processing devices — Sonar transmitters — Superpower electronic components — Transceivers — VHF and UHF receivers □ Display systems and subsystems: Alpha-numeric status boards—Color generation devices —Combat information center equipment —Copy cameras—Data handling devices — Data input components — Electro-optical projectors — Iconorama Systems — Image interpretation equipment — Large-scale semi-static display subsystems — Two- and three-dimensional display systems — Symbolic indicating devices □ Environmental test equipment: Audio frequency amplifiers — Acoustic drivers—Electrodynamic shakers and thrusters — Electrodynamic vibration test systems — Environmental test instrumentation — Sonic environment test systems — Transducers — Power supplies (AC and DC) — Variable frequency test devices □ Acoustic products: Loudspeakers (all types) — Microphones — Sound amplification systems and subsystems — Public address systems and components — High fidelity sound systems and components — Theater sound systems — Broadcast and

recording studio audio equipment — High intensity sound communications and warning systems — Intercommunication and paging systems and components — Portable soundcasting systems — Telephone line and voice amplifiers — High fidelity speaker cabinets □ Commercial communications products: AM transmitters — Automatic programming and logging systems — Background music systems — Broadcast antennas — Citizens band transmitters and receivers — Closed circuit television cameras, amplifiers, and controls — Educational television systems — Industrial television systems — Lightning protection systems — Marine and police transmitters and receivers — Phasing and switching systems and subsystems — Remote control systems — Shortwave transmitters □ Instrument calibration, maintenance and overhaul services □ Military specification testing □ Integration and installation of airborne and spaceborne electronic systems □ Site evaluation and preparation for large electronic systems □ Installation and testing of electronic equipment □ Operation and maintenance services for electronic equipment and systems □ Basic and applied research in electronics, acoustics, power sources, and nuclear physics

## **SCIENCE AND RESEARCH**

*Successful research and development programs can come only from a company that is strongly oriented toward science and engineering.*

## INTRODUCTION

LTV continued to grow more science and engineering oriented in 1963, and the tempo of this persistent trend continues to accelerate in 1964.

We stand astride an era of revolution in science and engineering. In the past decade alone more basic and applied scientific research has been accomplished than in all previous years in man's history.

In addition to the massive bulk of new knowledge, there is a hotly competitive and ever-quickenning trend to incorporate brand new technologies into hardware in the shortest time possible. Lines dividing the disciplines have blurred, and the creative designer, inventor, or innovator must be versatile as well as specialized.

All of LTV's major activities in electronics and aerospace derive from science and engineering.

Research and development is a first-priority activity at LTV. Every new product is the result of such research and development. Continued development makes each product more capable, smaller, more reliable, lighter, or in other ways more desirable to the customer. The more significant a program is the more likely it is to require the development of new technology and the advancement of the *state-of-the-art*. Research precedes all development work. LTV has a separate research division as well as research functions in each operating division. In addition the company sponsors projects with university research organizations.

LTV's major interests lie in the physical sciences of electronics, nucleonics, astrophysics, aerophysics, and mechanics. Many other branches of physics, even meteorology, receive attention, as do some aspects of chemistry and biology.

On the pages following are discussions of LTV's current science and engineering activities.



## ELECTROMAGNETICS

The electromagnetic frequency spectrum for electronics frequently is divided into six regions — (1) power and telephone, (2) radio wave, (3) microwave, (4) infrared, (5) visible light, and (6) ultraviolet and shorter wavelengths — and LTV is at work in each of these regions.

Certainly the most exciting region for the electronics industry now is visible light. With the laser, new techniques are becoming available to use visible light in electronic applications for deep space communications and tracking, weaponry, and other operations. A beam of light offers high information-carrying capabilities for communications, high energy density for weaponry and machining, narrow beam widths for bearing accuracy and security, narrow frequency bandwidths, and very short wavelengths for high resolution in radar and optical applications. Each frequency band requires the development of sources, detectors, signal processing techniques, instrumentation, and calibration equipment, all new challenges for LTV science and engineering.

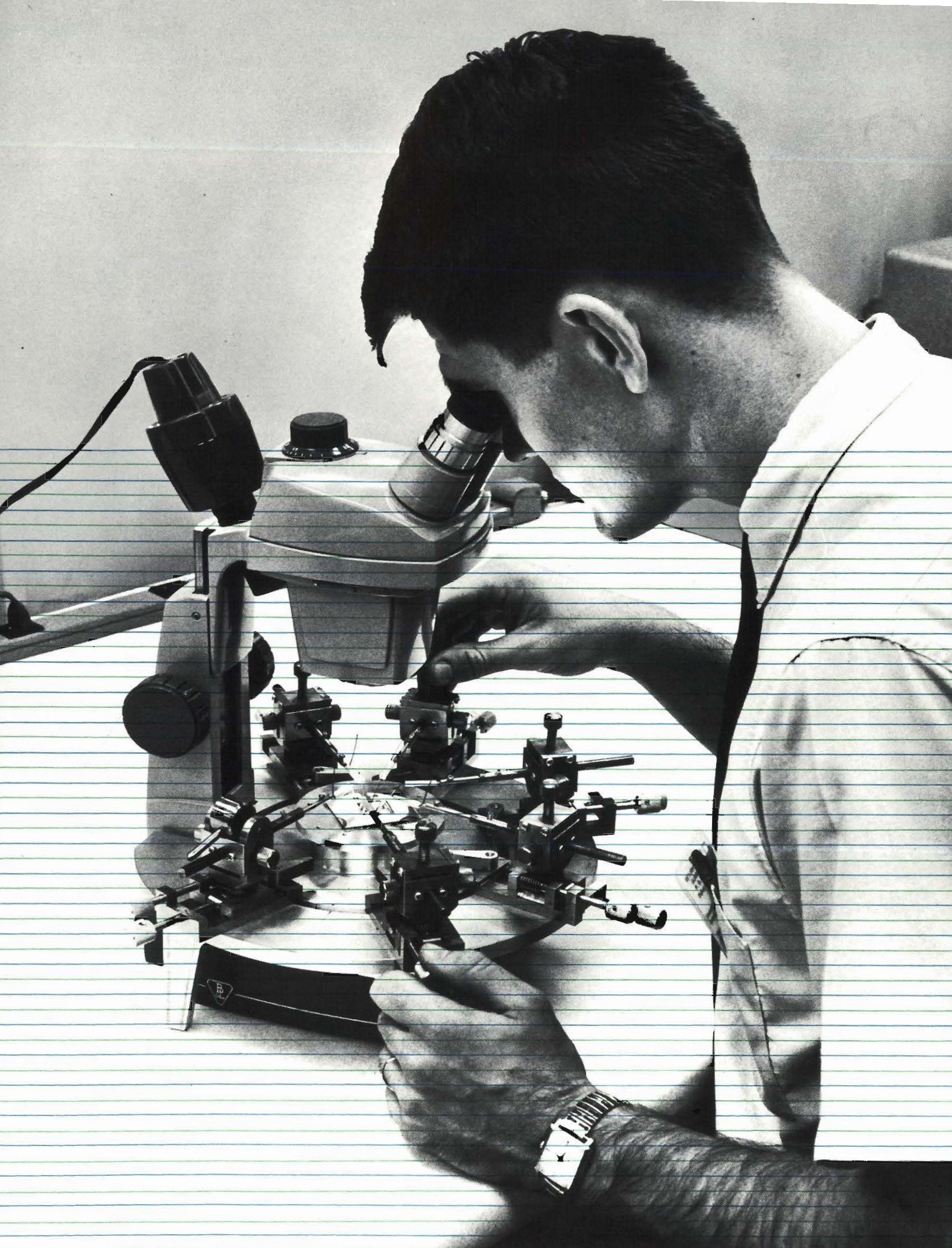
Current studies in quantum electronics in LTV laser laboratories involve better accounting of the parameters of lasers of different materials pumped by various sources at several power levels. Another inquiry seeks additional information about electromagnetic energy conversion from one frequency to another. LTV scientists also are probing other facets of the interactions of energy and matter, in this case to generate microwave power.

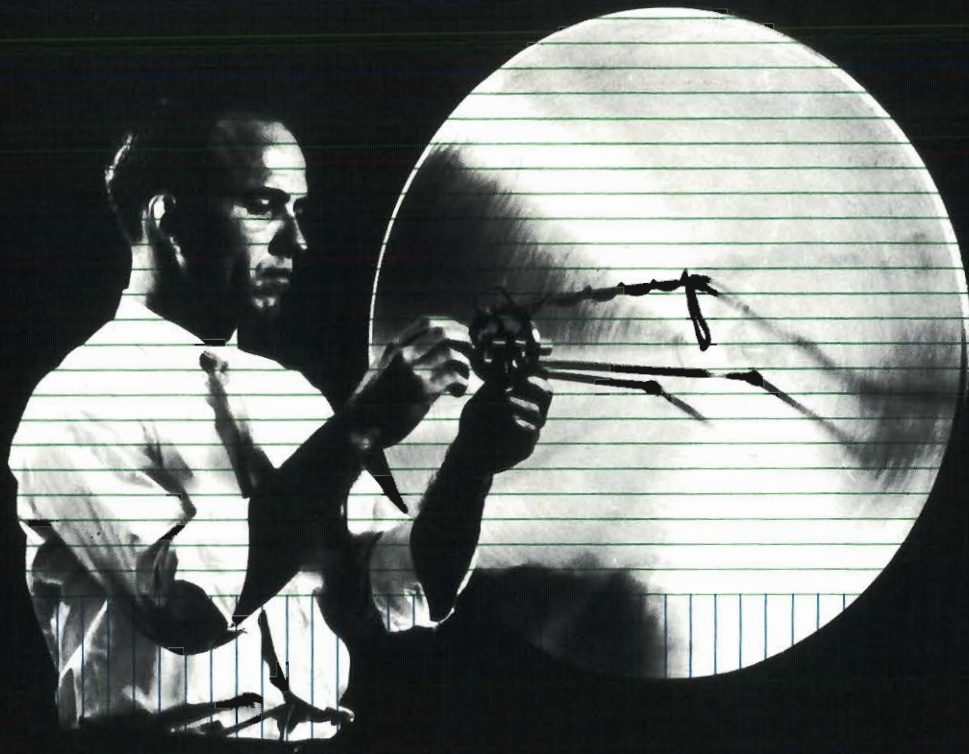
Before the laser breakthrough spurred the industry's interest in the light frequencies, a trend already was well established for new equipment — especially in communications, telemetry, and command and control applications — to be designed for higher and higher frequencies. From the upper end of the radio band through microwaves and into the infrared region there are attractive advantages for many applications. The trend will continue for some time, and LTV will continue to participate in the trend.

Current studies are being performed to discover advanced techniques and develop new equipment for future requirements in communications, telemetry, and command and control.

*Microscope-equipped manipulator provides technician with tool for working with microcircuits in electronics lab.*







At the other end of the electromagnetic spectrum, very low frequencies provide tremendous advantages in the ability to transmit signals for great distances because of the long wave's ability to follow the curvature of the earth and override interference, including the effects of massive radioactivity. LTV's position of eminence in the VLF field is being protected through research projects in advanced concepts for VLF applications and solid state VLF and LF developments.

## **APPLIED RESEARCH**

Solid state studies are important to all electronic activities today. LTV's applied research in this area is intended to develop advanced microelectronics capabilities with the program aimed at production of smaller, more reliable, better performing microcircuits for many LTV electronic products.

*Iconorama* data display systems already come in all sizes and use such varied techniques as rear projection and folded optics, but microcircuits will make smaller systems possible. Meanwhile, the capabilities in this field are being expanded by research into new display techniques such as photoluminescence.

Control systems are closely related to electronics, and LTV is heavily engaged in this field with products ranging from servo analyzers to thrust vector control devices. LTV's activities in this field are usually considered electromechanical, although the electronic devices associated with fluid injection valves and hydraulic actuators are quite sophisticated. Current research and development projects will further advance LTV's proven competence in this field with control system studies embracing self-adaptive and digital redundant systems for increased reliability.

Guidance is a promising field for LTV. The corporation's long-range research and development program to perfect a proprietary inertial element is reaching the stage of feasibility demonstration. Development of a terrain-matching guidance subsystem and an optical guidance system continues to progress.

*LTV researchers still pioneer new frontiers in ultra-sensitive acoustic devices and high-intensity sound equipment.*

## ACOUSTICS

The power and telephone frequencies are important to LTV, for this is the region of sound. The company's research and development activities in acoustics range from basic instrumentation, providing data that is available nowhere else, to designing loudspeakers.

Unique concepts may provide communications in environments where other techniques cannot be used—in space, on lunar surfaces, underwater. Basic propagation studies and the application of electronics techniques are part and parcel of LTV's investigations.

Research into high-intensity sound, in addition to providing improvements in sonic environment test systems and subsystems, has many applications in flaw detection, sonic cleaning, acoustic welding and soldering, metering, alarm signaling, homogenizing, and batch mixing.

The performance and capabilities of acoustic transducers are being improved with the development of new electrostatic transducer technology.

Acoustical science also is being used in the development of new amplifiers, new air modulators and transducers for sonic environment testing, and new sound systems and components. Related work is devoted to developing improved shakers and instrumentation for vibration environment testing.

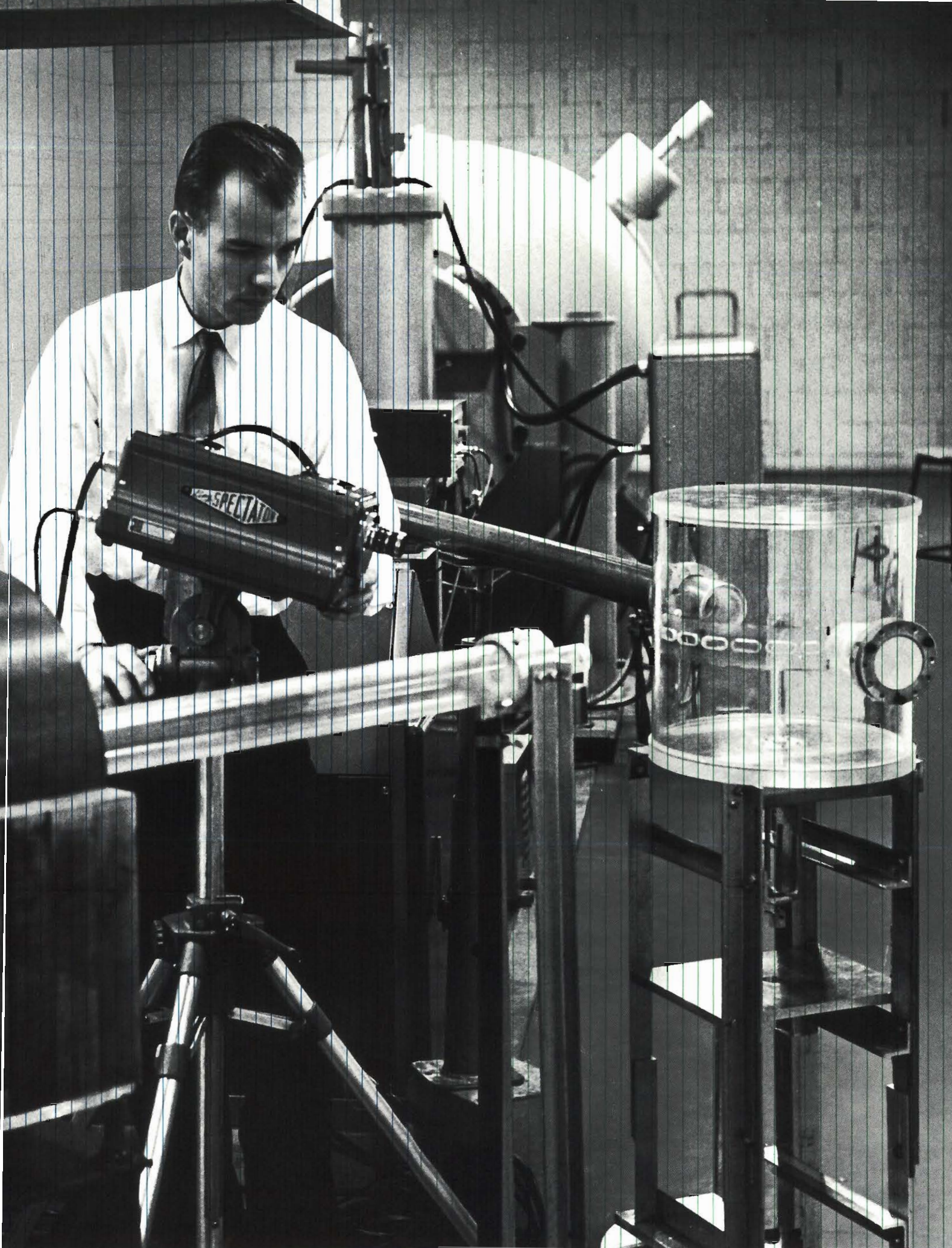
Power devices such as transformers and ac-dc and dc-dc converters also are of significant interest to LTV.

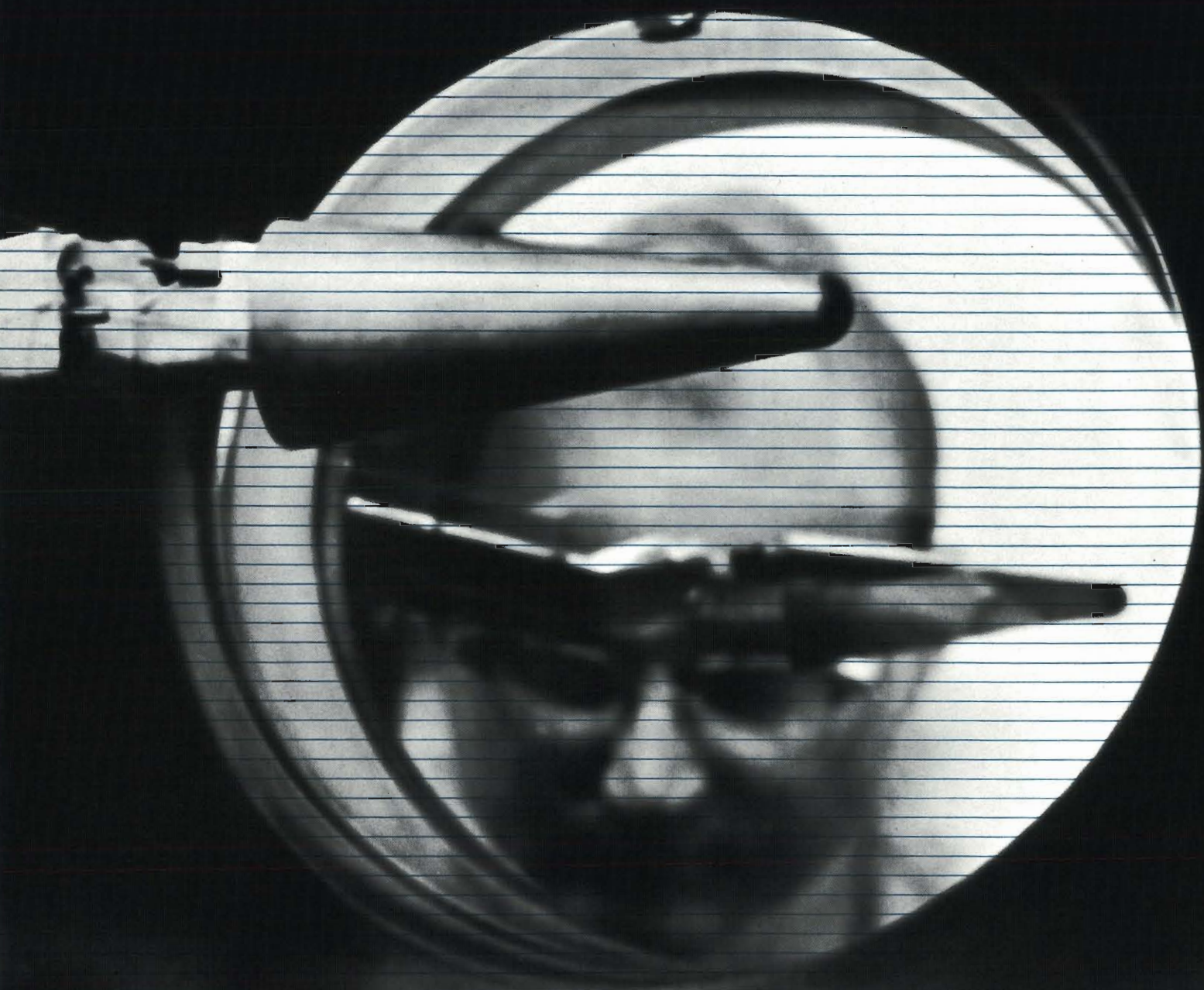
## ENERGY SOURCES

All electronics hardware requires energy sources. Although energy is available in great quantities, in the form of solar, chemical, and nuclear energy, science for a number of years has been seeking more direct and efficient techniques for converting natural energy into electrical energy.

An electrochemical research project is concerned with fuel cell research, direct conversion of chemical energy to electricity at high efficiency by means of a compact, portable system with no moving

*Closed-circuit television helps record results of experiments with LTV's Van de Graaff nuclear particle accelerator.*





parts. Applications range from satellite power supplies to vehicle propulsion.

Plasma research, primarily concerned with the properties of high temperature plasmas produced by a plasma arc generator, provides design data to solve problems of re-entry heating of space vehicles as well as data for such applications as plasma power generators and plasma propulsion devices.

LTV electronics research embraces basic molecular and atomic physics, including both the gaseous and solid states of matter.

In molecular electronics one trend takes advantage of the resonant phenomenon of molecules for oscillators, filters, and resonant circuits in the higher frequencies. So electromagnetic properties of matter are being investigated by LTV for phenomena analogous to conventional electronic circuits.

## **NUCLEAR PHYSICS**

The line between nucleonics and electronics can be drawn by few scientists. However, LTV's continuing interest in basic electronics as well as in nuclear-powered aerospace vehicles and the radiation environment of space led to the establishment of separate nuclear research and development capabilities. Many facets of aerospace vehicle operating environments also are being studied.

Closely related to electronics are studies of the fundamental properties of plasma, ionized elemental gases, and computations of the emission and absorption of electromagnetic radiation by plasma.

Capabilities also have been developed and are being expanded in radiation and micrometeoroid detection techniques for protecting satellite and lunar space packages. Studies of Bremsstrahlung, showers of radiation resulting from the impact of electrons on the skin surfaces of space vehicles, bring wide recognition of LTV's involvement in basic science and provide data for the selection of new materials and design of spacecraft. Investigations of reactor radiation effects on various materials and devices, such as several types of electronic circuits and dielectrics, also contribute to other work in electronics and astrophysics.

*LTV's hypersonic wind tunnel provides data about many new designs for re-entry vehicles and other advanced hardware.*

## **ASTROPHYSICS**

Much of the nuclear research patently deals with space environment problems. So does a great deal of the research and development activity in electronics, aerophysics (since space systems must operate first in atmospheric environments), life sciences, mechanics, and materials. LTV conducts numerous research and development projects in astrophysics, many of them connected with the corporation's unique series of space simulators. These investigations range from an analysis of multiple compartment venting to a search for interplanetary and solar trajectory accuracy requirements. Space propulsion and auxiliary power have not been overlooked. LTV anticipated the enlargement of military interest in space and participation in astronomical projects, and the company currently is engaged in more research and development projects in this area than in any other field of astrophysics. These projects are closely related to the evolution of new space launch vehicles, special test vehicles, interceptors, dynamic upper stages, maneuvering units, payload packages and subsystems, recoverable payloads, orbiter-landers, and re-entry vehicles.

Electronic research is especially important to astrophysics because communications, tracking, telemetry, and command and control equipment make up a large percentage of every space system. Obviously, satellites, probes and unmanned space vehicles require large amounts of sophisticated electronic equipment. Materials also are vital to astrophysics because all space systems encounter environments where man and his hardware have not had to function before.

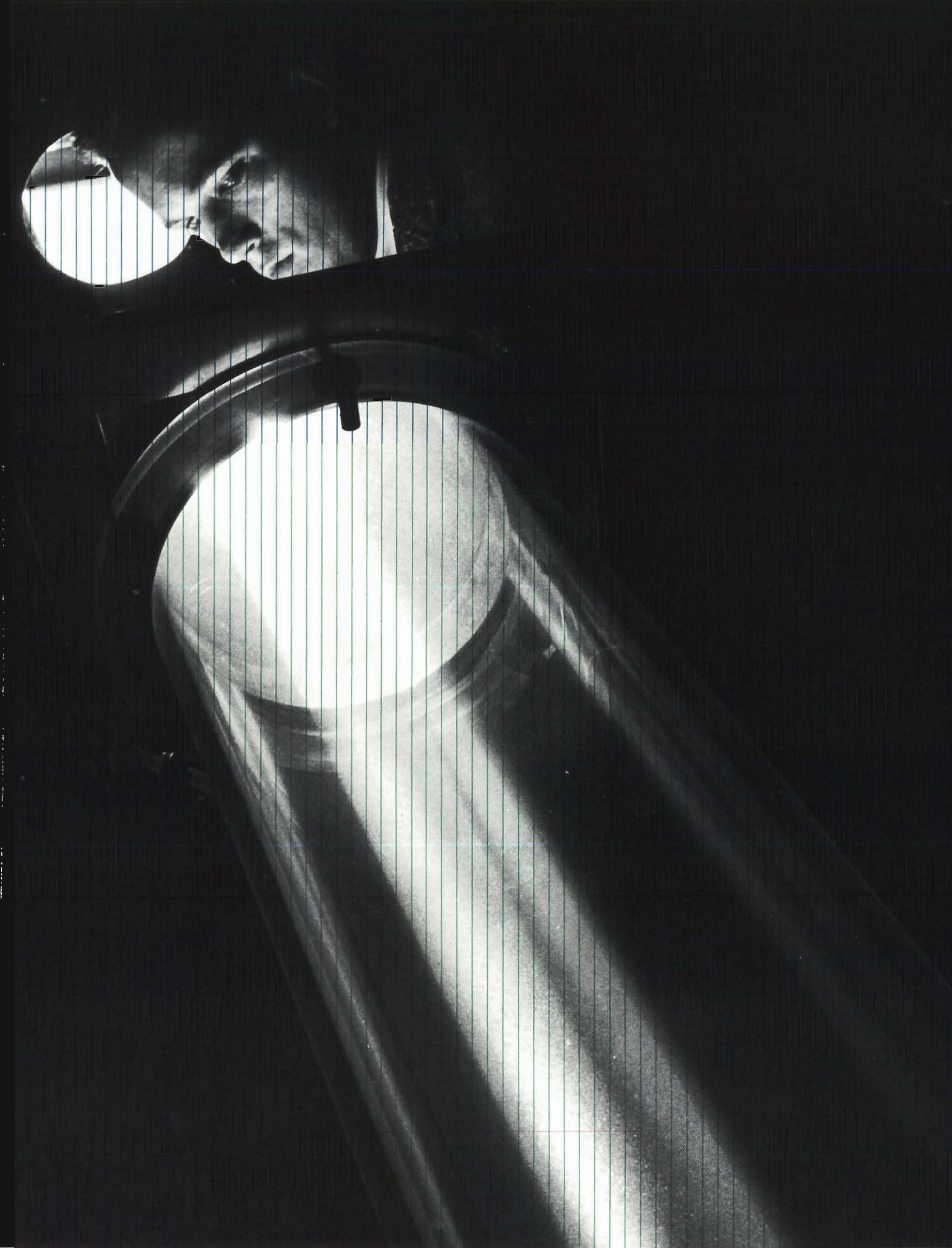
## **AEROPHYSICS**

Astrophysics also benefits from basic and primary studies in aerophysics because of the atmospheric requirements of space hardware mentioned earlier. As one of its oldest activities, the aerophysics research and development capabilities of LTV are nonpareil.

Basic aerophysics research projects embrace such subjects as hypervelocity flight, mechanics of viscous fluids, and the meteorology

*Boundary layer air channel enables LTV scientists and engineers to continue refining knowledge of basic flight phenomena.*







of the upper atmosphere. Data gleaned from these investigations will be used in the continuing development of missiles and aircraft. The goal of aerophysics research and development is meeting the technical requirements for low-altitude and air-to-surface strategic and tactical missiles, V/STOL aircraft, and special-purpose ground vehicles that will account for a good percentage of LTV's business in the near future. The research and development conducted in advance of the preparation of proposals gives LTV a head start in the compilation and writing of cost-effectiveness comparison studies and in program definition assignments. Aerophysics has the same close relationships as astrophysics with electronics, materials, and the life sciences.

## **LIFE SCIENCES**

Concurrently with its research and development activities in the physical sciences, LTV investigates certain facets of the life sciences, too, for men must operate electronics and aerospace hardware. For example, the human engineering of airborne electronic systems must consider structure integrity, location of equipment and controls, personal conveniences, lighting, accessibility, and eye appeal. Many of the same factors affect the design of large ground-based electronic equipment, manned space vehicles, aircraft, and surface vehicles. Space activities require much more basic research in such subjects as the nitrogen metabolism of algae and the toxicity of a high-oxygen/low-pressure atmosphere. Both of these subjects will be of interest to space travelers, since the first is related to the closed ecological system that most astrobiologists deem necessary for prolonged space expeditions, and the second is a probable environmental characteristic of the Gemini and Apollo flights. Research-oriented physicians spark LTV's life science studies.

The close kinship of all LTV research is demonstrated by a current project using acoustic science to develop bio-medical instrumentation for physiological diagnostics, enhancing the corporation's capabilities for executing projects involving space medicine and space communications by unique methods.

LTV's extensive activities in the creation of training devices, materials, and courses for the operation and maintenance of its hardware also are closely related to the life sciences.

*Tests conducted by man in full-pressure suit help develop mobility/dexterity criteria for space systems maintenance.*

## MECHANICS & MATERIALS

Two of the more common physical sciences — mechanics and materials — concern every division of LTV. Realizing this, several years ago the corporation launched a thorough investigation of the formability limits of new metals, plastics, and other materials expected to be used in the Space Age. The Air Force financed the studies which resulted in a massive written report, replete with illustrations, about theoretical formability. This report is now the standard for manufacturing that entails new materials in the electronics/aerospace industries.

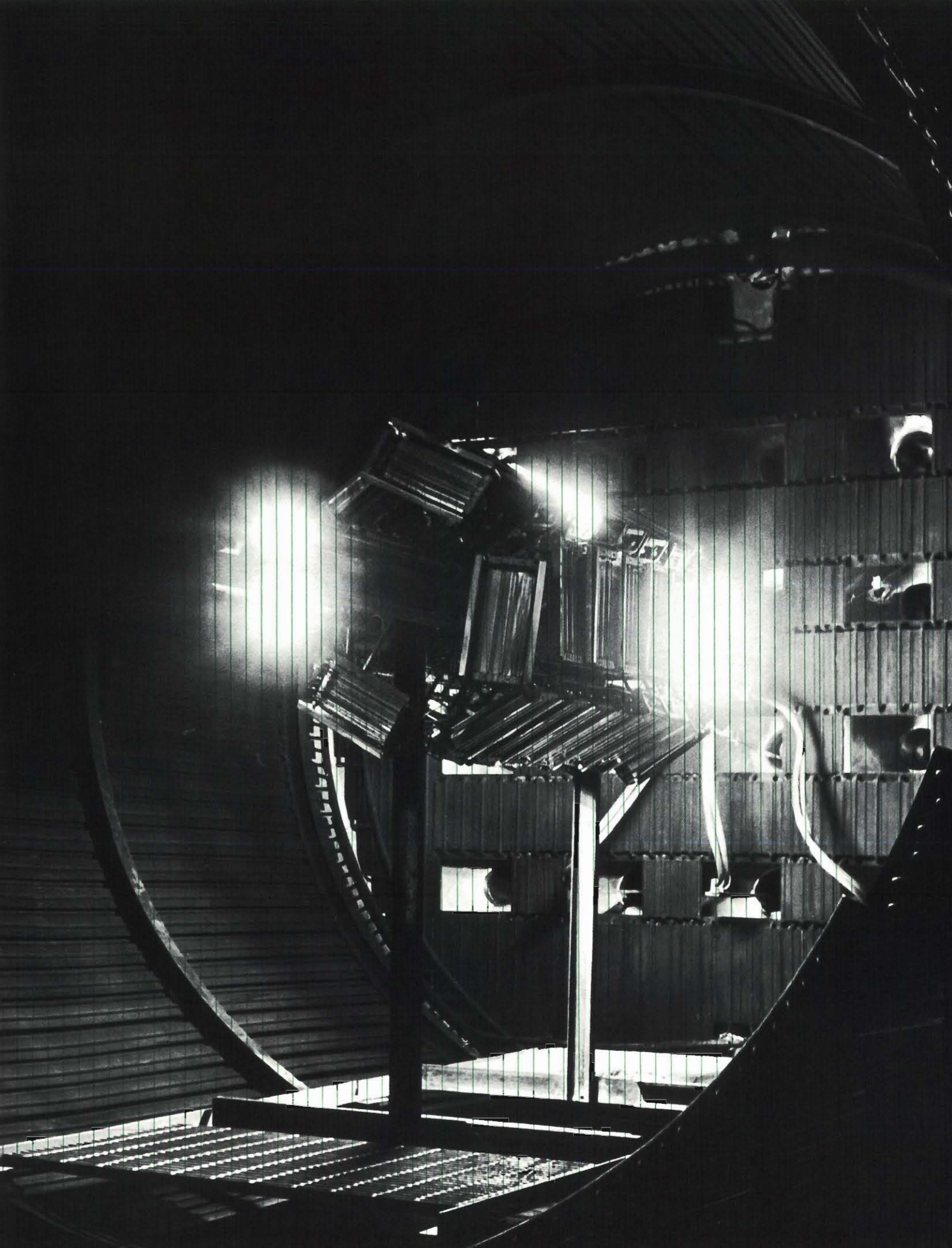
In materials technology the search is for solid state diffusion bonding techniques for joining superalloy, refractory metals, and other new high temperature materials, such as Rene'41, thoria dispersed nickel, columbium, and vanadium alloys; for brazing processes to join these and other metals at 2500°F; for coatings to provide oxidation protection; for better understanding of when and why metals fracture, and the involvement of creep, vibration, high strain rate (or acceleration), fatigue, and stress corrosion. Other related research and development projects will seek super insulation materials, lighter-weight structural materials, and pressurized membrane materials.

It is in the area of materials that most of LTV's activities in chemistry are generated. Each of the materials labs is equipped with a chemical laboratory. Chemistry also plays an important role in the use of plastics and ceramics at LTV.

LTV Graphite resulted from research and development in the materials area, and limited production of this new product is scheduled this year. Meanwhile basic materials research of the same type — studies of the synthesis of more advanced graphites, of graphite coatings and alloys, of the synthesis of other polymeric molecular solids — continues and may result in other discoveries as great in potential as the new LTV Graphite.

Every new LTV product, every LTV sale results from activities in science and technology.

*New materials run the gamut of temperature and vacuum condition tests in the company's space environment simulator.*







# SEVEN YEARS OF GROWTH

	1957*	1958*	1959	1960**	1961***	1962	1963
Sales . . . . .	\$3,970,420	\$6,923,167	\$48,086,785	\$148,447,484	\$192,847,111	\$325,439,135	\$329,001,855
Earnings (loss)							
Before taxes . . . . .	621,851	452,161	3,139,639	5,737,132	(14,526,897)	8,796,824	10,352,957
After taxes . . . . .	308,485	227,161	1,866,466	3,051,172	(13,158,591)	8,650,069	6,186,809 †
Stockholders' equity . . . . .	1,406,901	2,695,379	9,792,609	28,532,956	17,916,594	26,655,718	32,861,815
Employment — total . . . . .	280	800	2,500	10,303	18,729	18,392	17,533
Employment — engineers and scientists . . . . .	35	60	180	1,040	2,700	3,700	4,000
Shares outstanding . . . . .	873,752	950,095	1,610,762	2,553,040	2,775,185	2,783,600	2,824,772
Per common share † †							
Earnings (loss) . . . . .	\$ .35	\$ .21	\$1.13	\$1.20	\$(4.74)	\$3.03	\$2.12 †
Book value . . . . .	1.61	1.94	6.06	8.95	4.79	7.87	9.96

\* Year ended July 31.

\*\* Includes full year operations of Temco Aircraft Corporation acquired in July 1960 as a pooling of interests.

\*\*\*Includes operations of Chance Vought Corporation for four month period subsequent to its acquisition in August 1961.

† After extraordinary charge of \$901,793, or 32¢ per share.

†† Based on shares outstanding at year end and after giving effect to preferred dividends.

From a relatively small electronics company in 1957, LTV has grown through acquisition and development of new products and markets to become a major factor in the electronics/aerospace industry. In this seven year period, sales have multiplied eighty times, net earnings and

stockholders' equity more than twenty times. Total employment has increased to more than sixty times the 1957 level and, even more significant, the number of engineers and scientists has increased more than one hundred times.





## 1963 IN REVIEW

**SALES** — Net sales for the year amounted to \$329,001,855 compared with \$325,439,135 in 1962. Prime and sub-contracts with Department of Defense, NASA and other U. S. government agencies accounted for approximately 87% of 1963 sales, with commercial customers and foreign government agencies accounting for the remaining 13%. By major product lines, 1963 sales were divided as follows:

Aeronautics . . . . .	36%
Electronics . . . . .	33
Missiles and space . . . . .	24
Other . . . . .	7

**EARNINGS** — Earnings before an extraordinary charge totaled \$7,088,602. After allowing for preferred dividends of \$203,963, these earnings are equivalent to \$2.44 per share of common stock outstanding at year end. An extraordinary charge reduced earnings by \$901,793, or 32¢ per share, leaving net earnings, after the extraordinary charge, of \$2.12 per share.

Earnings before taxes and the extraordinary charge were \$10,352,957 for the year. This compares with \$8,796,824 in 1962, when no federal tax on income was required because of a tax loss carryforward from 1961. The balance of that loss carryforward has been applied against 1963 earnings.

Attention is directed to the chart appearing on the opposite page for a seven-year history of earnings and other pertinent data.

**RESEARCH AND DEVELOPMENT** — Research and development expenditures on government and commercial programs continued their upward trend, amounting to \$13,641,000, compared with \$9,583,000 in 1962. 1964 expenditures are expected to be even higher. Justification of this increasing emphasis on research and development is found in the growing number of new products successfully introduced and competitions for important government programs which have been won by LTV as a result of research and development, coupled with knowledgeable market research and sales efforts.

**DIVIDENDS** — A special cash dividend of 12½¢ per share was paid to common shareholders in October 1963. In accordance with plans announced at that time, the Board of Directors, at a meeting on February 25, 1964, established a policy of regular quarterly cash dividends of 12½¢ per share, equal to an annual rate of 50¢ per share. The first such regular quarterly dividend will be paid March 25, 1964, to shareholders of record on March 6.

Dividends of \$1.35 per share, which had accrued on the Company's 4½% Series A preferred stock on the basis of 1962 earnings, were paid to preferred shareholders in May 1963. Dividends of the same amount earned in 1963 will be paid March 23, 1964, to preferred shareholders of record March 6.

**STOCKHOLDERS' EQUITY** — Stockholders' equity again climbed sharply to \$32,861,815 at 1963

year end, compared with \$26,655,718 a year earlier. Equity per common share rose to \$9.96 from \$7.87 at the end of 1962.

**DEBT REDUCTION** — Good progress was made in the reduction of long-term debt during 1963. Outstanding long-term debt was cut from \$64,198,617 at the beginning of the year to \$34,591,553 at year end, a reduction of approximately 46%. This reduction, together with the increase in stockholders' equity, resulted in a significant improvement in the ratio of long-term debt to equity, which at December 31, 1963, was 1.05 to 1, as contrasted with 2.41 to 1 a year ago.

The reduction in debt was also an important step in realizing another objective, that of minimizing dilution of common shares outstanding. The debenture refunding program announced early in 1963 was successfully carried out, resulting in the elimination of approximately 220,000 shares from potential dilution. In November 1963, four long-term debt issues totaling \$27,029,880 were called for redemption, including \$17,907,880 of 4¾% debentures convertible at \$18 per share, and \$1,562,000 of 5¼% debentures convertible at \$25.75 per share. Only 50,569 shares of common stock were issued on conversion of \$915,480 of the 4¾% debentures, the balance being redeemed. Consequently, approximately 1,060,000 additional shares of potential dilution

were eliminated through this redemption with an increase of only 1.8% in shares outstanding.

**WORKING CAPITAL** — Net working capital declined to \$38,118,628 at December 31, 1963, from \$46,268,154 at the end of 1962, largely due to the use of some working capital funds for a portion of the long-term debt retirement. Working capital remains quite satisfactory, however, and short-term bank borrowings were reduced to \$26,800,000 at year end from \$39,000,000 at the end of 1962. These bank borrowings are unsecured and are under a loan agreement entered into in June 1963, providing for borrowings of up to \$40,000,000.

**FACILITIES** — Outlays for modernization and replacement of plant and equipment amounted to \$4,783,000 in 1963. Depreciation and amortization for the year totaled \$5,693,061.

In December 1963, the Company sold certain machinery and equipment and immediately leased it back for periods of 5 and 10 years, with options to renew for like periods. Proceeds of this sale were used in connection with the redemption of long-term debt.

During the year, the Company's newly formed LTV Michigan Division began operations in the Army-owned Michigan Army Missile Plant near Detroit. Development work on the new Lance battlefield missile for the Army is continuing at this new location and production of this important missile system will make LTV Michigan one of the Company's major

areas of operation. Also under development there for the U. S. Army is the XM561 1¼ ton truck.

Another important move in 1963 was that of LTV University Division (formerly University Loudspeakers) which moved its operations from White Plains, New York, to a new 100,000 square foot factory in Oklahoma City. This new facility provides LTV University with the most modern, semi-automated and self-contained loudspeaker plant in the industry.

As a further step in consolidating operations in order to achieve operating economies, the Display Systems Plant of LTV Military Electronics Division (formerly Temco Electronics Division) was moved from Culver City, California, to the main plant of LTV Military Electronics in Garland, Texas, where production of Iconorama data display systems is continuing and expanding.

**DISPOSITIONS** — The Company's announced program for disposition of unrelated subsidiaries and product lines was continued during 1963 with the sale of United Electronics Company, Harbor Boat Building Company and the LTV Industrial Division. This program will be essentially complete on consummation of the pending sale of Ed Friedrich, Incorporated and Friedrich Refrigerators Incorporated.

**ORGANIZATIONAL CHANGES** — The elimination of units not basically related to the electronics/aerospace industries was accompanied by steps to streamline and strengthen the Company's organiza-

tion to provide for optimum growth in these selected industries and to permit maximum operating economies. These steps included the elimination of the headquarters administrative functions and names of the Chance Vought Corp. Division and the Temco Electronics & Missiles Co. Division, thereby achieving important cost savings with the consolidation of accounting and other administrative functions previously performed by those divisions into LTV Corporate headquarters. In addition, most divisions were assigned new names to more clearly identify them as LTV operating units, and certain subsidiary companies were grouped and given LTV divisional designations. A list of operating units and their new designations appears on page 5 of this report.

**EMPLOYEE RELATIONS** — Favorable labor agreements were reached during 1963 with bargaining units at several divisions of LTV. Most important of these was at LTV Michigan Division where the Company was successful in negotiating an aerospace-type contract with the UAW, one particularly well suited to our industry and our company. New agreements were also negotiated at LTV Altec Division and LTV University Division.

The total number of employees at December 31, 1963, was 17,533, compared with 18,392 at 1962 year end. This reduction, however, is largely attributable to the disposition of certain subsidiaries and product lines during 1963, and the current employment figure shows very little change from the aggregate 1962 total for comparable operating units.

CONSOLIDATED BALANCE SHEET  
LING-TEMCO-VOUGHT, INC. AND SUBSIDIARIES

ASSETS

CURRENT ASSETS	December 31	
	1963	1962
Cash and U. S. Government securities . . . . .	\$ 12,135,581	\$ 9,846,586
Notes and accounts receivable, less allowances (1963 — \$927,200; 1962 — \$1,330,827) for doubtful receivables . . . . .	23,204,582	28,809,359
Unreimbursed costs and fees under cost type contracts . . . . .	26,467,134	33,699,820
Inventories, less progress payments received — Note B . . . . .	43,947,745	43,539,954
Prepaid expenses . . . . .	1,075,749	822,906
TOTAL CURRENT ASSETS	\$106,830,791	\$116,718,625
INVESTMENTS AND OTHER ASSETS		
Investments in and advances to affiliated companies and, in 1962, unconsolidated subsidiaries . . . . .	\$ 494,003	\$ 3,489,227
Notes and accounts receivable and other investments, less allowances (1963 — \$2,830,971; 1962 — \$595,072) for doubtful receivables . . . . .	9,805,780	5,421,416
Excess of investment in subsidiaries over net assets acquired, patents and trademarks, less amortization . . . . .	2,635,423	2,814,435
Unamortized debt expense . . . . .	260,775	320,631
TOTAL INVESTMENTS AND OTHER ASSETS	\$ 13,195,981	\$ 12,045,709
PROPERTY, PLANT, AND EQUIPMENT — Note E		
Land, buildings, machinery and equipment — at cost . . . . .	\$ 33,254,756	\$ 51,171,697
Less allowances for depreciation . . . . .	12,401,555	15,710,394
TOTAL PROPERTIES — NET	\$ 20,853,201	\$ 35,461,303
	\$140,879,973	\$164,225,637

## LIABILITIES AND STOCKHOLDERS' EQUITY

	December 31	
	1963	1962
<b>CURRENT LIABILITIES</b>		
Notes payable to banks — Note C . . . . .	\$ 26,800,000	\$ 39,000,000
Accounts payable . . . . .	27,484,380	17,351,108
Accrued compensation, taxes, interest, etc. . . . .	12,344,099	13,625,039
Federal and state taxes on income — estimated . . . . .	2,077,360	—
Current portion of long-term debt — Note D . . . . .	6,324	474,324
TOTAL CURRENT LIABILITIES	\$ 68,712,163	\$ 70,450,471
LONG-TERM DEBT — Note D . . . . .	34,591,553	64,198,617
<b>RESERVES AND DEFERRED CREDIT</b>		
Reserve for deferred federal taxes on income . . . . .	\$ 1,141,612	\$ 528,813
Reserve for possible future losses arising from adjustment or disposition of assets . . . . .	1,392,018	2,392,018
Deferred credit — Note E . . . . .	2,180,812	—
TOTAL RESERVES AND DEFERRED CREDIT	\$ 4,714,442	\$ 2,920,831
<b>STOCKHOLDERS' EQUITY</b>		
Preferred stock, par value \$30 — Notes F and H: Authorized 1,000,000 shares; issued 1963 — 151,084 shares; 1962 — 151,345 shares . . . . .	\$ 4,532,520	\$ 4,540,350
Common stock, par value \$0.50 — Notes F, G and H: Authorized 9,000,000 shares; issued 1963 — 2,834,430 shares; 1962 — 2,783,600 shares . . . . .	1,417,215	1,391,800
Capital surplus — Note I . . . . .	6,791,991	5,908,054
Retained earnings — Note D . . . . .	20,451,951	14,815,514
	\$ 33,193,677	\$ 26,655,718
Less cost of common stock (9,658 shares) in treasury . . . . .	331,862	—
TOTAL STOCKHOLDERS' EQUITY	\$ 32,861,815	\$ 26,655,718
COMMITMENTS AND CONTINGENCIES — Note J		
	\$140,879,973	\$164,225,637
See notes to financial statements.		

# STATEMENT OF CONSOLIDATED INCOME AND RETAINED EARNINGS

LING-TEMCO-VOUGHT, INC. AND SUBSIDIARIES

	Year Ended December 31	
	1963	1962
Net sales, including costs and fees under cost type contracts . . . . .	\$329,001,855	\$325,439,135
Other income . . . . .	2,292,522	590,840
	<u>\$331,294,377</u>	<u>\$326,029,975</u>
Costs and expenses:		
Manufacturing costs, selling, administrative and general expenses . . . . .	\$316,218,860	\$311,193,861
Interest expense . . . . .	4,639,357	5,820,490
Other expenses . . . . .	83,203	218,800
	<u>\$320,941,420</u>	<u>\$317,233,151</u>
INCOME BEFORE TAXES ON INCOME AND EXTRAORDINARY CHARGE	\$ 10,352,957	\$ 8,796,824
Federal, state, and foreign taxes on income — estimated — Note L . . . . .	3,264,355	146,755
INCOME BEFORE EXTRAORDINARY CHARGE	\$ 7,088,602	\$ 8,650,069
<i>Per common share at year end</i>	\$2.44	\$3.03
Provision for loss on notes receivable related to discontinued operations and other non-recurring charges, less \$1,058,627 applicable income tax credits . . . . .	901,793	—
NET INCOME	\$ 6,186,809	\$ 8,650,069
<i>Per common share at year end</i>	\$2.12	\$3.03
Retained earnings at beginning of year . . . . .	14,815,514	6,165,445
	<u>\$ 21,002,323</u>	<u>\$ 14,815,514</u>
Dividends paid:		
On preferred stock — Note F . . . . .	\$ 203,722	\$ —
On common stock — \$0.125 a share . . . . .	346,650	—
	<u>\$ 550,372</u>	<u>\$ —</u>
RETAINED EARNINGS AT END OF YEAR — Note D	\$ 20,451,951	\$ 14,815,514

Provision for depreciation and amortization:  
1963 — \$5,693,061; 1962 — \$5,652,124.

See notes to financial statements.

# NOTES TO FINANCIAL STATEMENTS

## Note A — Principles of Consolidation

The consolidated financial statements include the accounts of the Company and its subsidiaries. Upon consolidation, all inter-company accounts and transactions have been eliminated.

## Note B — Inventories

The inventories are stated generally at average or accumulated costs, not in excess of market, and are detailed as follows:

	1963	1962
Finished products . . . . .	\$ 6,345,694	\$ 4,874,735
Fixed price contracts, etc. in progress . . . . .	58,595,221	51,148,595
Raw materials and purchased parts . . . . .	14,703,633	15,545,511
	<u>\$79,644,548</u>	<u>\$71,568,841</u>
Less progress payments received . . . . .	35,696,803	28,028,887
	<u>\$43,947,745</u>	<u>\$43,539,954</u>

## Note C — Loan Agreement with Banks

Under the terms of a loan agreement expiring May 31, 1964, the Company may borrow up to \$40,000,000. At December 31, 1963, \$26,800,000 of such borrowings were outstanding. The agreement, as amended, contains requirements covering maintenance of working capital, net worth, and other matters.

## Note D — Long-term Debt and Dividend Restrictions

Long-term debt due beyond one year comprises the following:

	1963	1962
5½% Subordinated convertible debentures due September 1, 1976 . . . . .	\$10,820,600	\$53,097,800
5½% Subordinated debentures due September 1, 1976 . . . . .	23,736,460	—
5¼% Convertible subordinated debentures . . . . .	—	3,500,000
6¼% Senior notes . . . . .	—	5,000,000
5½% First mortgage sinking fund bonds . . . . .	—	2,560,000
Sundry mortgage notes payable . . . . .	34,493	40,817
	<u>\$34,591,553</u>	<u>\$64,198,617</u>

The debentures require a prepayment of \$1,646,140 in 1968 and annual prepayments of \$2,130,000 beginning in 1969.

In December 1963, debt in the amount of \$26,114,400 was redeemed and \$915,480 of debentures were converted into common stock.

The indentures pertaining to long-term debt, among other things, contain certain restrictions as to the payment of dividends. Under the provisions of such indentures, consolidated retained earnings in the amount of \$3,627,935 were available for payment of dividends at December 31, 1963.

## Note E — Sale and Leaseback

During December 1963, certain items of machinery and equipment were sold and leased back by the Company under two leases for periods of five and ten years with options to renew for like periods. Proceeds from the sale were applied in redemption of long-term debt on December 27, 1963. The gain resulting from the sale, after reduction for redemption premiums and expense relative to debt redeemed, all net of income tax effect, is being amortized over the terms of the leases.

## Note F — 4½% Series A Preferred Stock

There are 1,000,000 shares of Series preferred stock, \$30 par value, authorized, of which 252,000 shares of 4½% Series A preferred stock were authorized at December 31, 1963. The preferred stock is convertible into common stock on a share-for-share basis to June 30, 1965, and on a reduced basis thereafter. The stock is subject to redemption on and after July 1, 1965, at 105% of par value plus accumulated unpaid dividends, and is required to be redeemed on July 1, 1970.

Each share of preferred stock is entitled to receive cash dividends to the extent consolidated net income exceeds \$2 per share on common stock outstanding on the last day of each year, limited in any year to 4½% of its par value of \$30. Dividends are cumulative and payable before any dividends may be paid on common stock. Dividends earned in 1962 were declared and paid during 1963. At December 31, 1963, accumulated unpaid dividends (earned in 1963) amounted to \$203,963.

## Note G — Common Stock Reserved

At December 31, 1963, the Company had reserved shares of its common stock as follows (reference is made to Note H concerning shares of capital stock reserved for option plans):

RESERVED FOR	NUMBER OF SHARES	PRICE PER SHARE	
Conversion of 5½% debentures . . .	313,641	\$34.50	(1)
Warrants expiring December 1, 1969, issued with 6¼% senior notes . . .	{ 53,589 15,254	30.79 32.45	{ (2)
Warrants expiring August 31, 1966, issued in connection with purchase of Chance Vought assets . . . . .	{244,128 244,128	30.00 40.00	
Conversion of preferred stock into common stock . . . . .	151,084		(3)

- (1) Conversion price of 5½% debentures is \$39.20 after August 31, 1966. Such prices are subject to adjustments for anti-dilution provisions.
- (2) Exercise price for certain warrants (15,254 shares) issued with 6¼% senior notes is \$37.28 after December 1, 1964. Such prices are subject to adjustments for anti-dilution provisions.
- (3) Exclusive of additional shares which may become reserved upon exercise of preferred stock options.

#### Note H — Options to Purchase Common and Preferred Stock

The Company has a plan, adopted in 1957, for granting restricted stock options to officers and employees of the Company and its subsidiaries. Under the plan, options may be granted at a price not lower than 85% of market price at date of grant and the terms of such options may range from a minimum of two years to a maximum of ten years from date of grant. As amended in 1963, under certain circumstances, the option prices of outstanding options may be reduced to a price which is not less than 85% of market value at the date of modification and the option periods may be extended for one year. Options are outstanding under two other restricted stock option plans which were assumed in connection with the acquisition of Temco Aircraft Corporation and the purchase of the assets of Chance Vought Corporation in 1960 and 1961, respectively. No additional options will be granted under the Temco plan or the Chance Vought plan. At December 31, 1963, the Company had reserved under all plans an aggregate of 276,923 shares of common stock and 5,672 shares of 4½% Series A preferred stock, of which 262,736 common shares and all of the reserved preferred shares were issuable at option prices aggregating \$3,578,633. Under the plans during 1963, options for 110,914 shares of common and 7,480 shares of preferred were cancelled or forfeited, exercise prices of options previously granted for 105,566 shares of common and 3,548 shares of preferred were reduced in accordance with the aforementioned amendment, and options were granted for 143,454 shares of common stock at option prices aggregating \$1,852,037. Unoptioned shares under the plans at December 31, 1963, aggregated 14,187 shares of common stock.

#### Note I — Capital Surplus

	1963	1962
Balance at beginning of year . . . . .	\$5,908,054	\$5,752,556
Excess of principal amount of subordinated convertible debentures over par value of common shares issued in conversion, less applicable debenture issue expense . . .	876,304	—
Excess of par value of preferred stock over par value of common shares issued in conversion . . . . .	7,633	70,947
Excess of proceeds over par value of common and preferred stock sold under option plans . . . . .	—	84,551
Balance at end of year . . . . .	<u>\$6,791,991</u>	<u>\$5,908,054</u>

#### Note J — Commitments and Contingencies

A major portion of sales is subject to renegotiation and other price adjustments. Renegotiation proceedings under the Renegotiation Act of 1951 have been completed for all years through 1962. A refund (net of applicable federal income tax credits) of \$1,003,790 was assessed for the year 1953 and suit has been filed in the Tax Court of the United States to eliminate this assessment. Subsequent to December 31, 1963, certain other price adjustments have been proposed. Such renegotiation assessment and other adjustments, in the opinion of management, are without merit, and no provision has been made for this contingency.

The Companies were contingently liable for customer indebtedness guarantees and/or repurchase agreements aggregating approximately \$1,400,000 at December 31, 1963.

The Company has agreed to indemnify bonding companies for losses, if any, under bonds covering the performance of certain contracts by two corporations in which the Company has a financial interest. As of December 31, 1963, the face amount of such bonds aggregated approximately \$3,800,000. No payment has been made under such agreements and none is anticipated.

Substantial portions of plant facilities and certain machinery and equipment are leased from the United States Government and others. The annual minimum rental obligations of the Company under leases in effect December 31, 1963, which expire more than three years after that date approximate \$4,700,000 in 1964, from \$4,300,000 to \$3,900,000 for the next four years, and from \$1,500,000 to \$1,400,000 for the succeeding five years. In addition, the Company has agreed to lease office space in a building to be occupied during 1964, for a period of twenty-three years, at an annual rental of \$616,000, and to lease additional space in such building in the event that lease contracts therefor do not exceed a minimum required annual rental. However, the Company intends to sublease to others a large portion of this space.

#### Note K — Pension Plans

The presently estimated annual cost of pension plans, as amended, amounts to approximately \$6,400,000. Consulting actuaries have advised the Company that the unfunded past service liability under the plans at December 31, 1963, was not material.

#### Note L — Federal Income Taxes

The income tax provision for the year ended December 31, 1963, is after taking into consideration the remaining loss carryforward available for application against 1963 income.

Investment tax credit in the amount of \$284,000, representing 48% of the total credit, has been applied as a reduction of the income tax provision for 1963, and the remaining 52% portion, less amortization, has been reflected as deferred federal income taxes applicable to subsequent periods.

#### Note M — Subsequent Event

During January 1964 the Company agreed to sell all of the outstanding stock of its wholly-owned subsidiaries Ed Friedrich, Incorporated and Friedrich Refrigerators Incorporated for a consideration consisting of cash, short-term notes and stock of the purchaser. As a condition of that sale, the Company has agreed to guarantee for a period of one year short-term bank borrowings of Friedrich up to a maximum amount of \$5,500,000. Advances to Friedrich amounting to approximately \$4,300,000 as of December 31, 1963, will be repaid to the Company from initial proceeds of such borrowings.



## ERNST &amp; ERNST

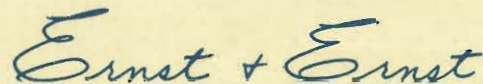
720 CORRIGAN TOWER BUILDING

DALLAS, TEXAS 75201

To the Stockholders and Board of Directors,  
Ling-Temco-Vought, Inc.,  
Dallas, Texas.

We have examined the consolidated balance sheet of Ling-Temco-Vought, Inc. and subsidiaries as of December 31, 1963, and the related statement of consolidated income and retained earnings 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. It was not practicable to confirm by direct correspondence amounts receivable from United States Government departments, but we satisfied ourselves as to such amounts by means of other auditing procedures.

In our opinion, the accompanying balance sheet and statement of income and retained earnings present fairly the consolidated financial position of Ling-Temco-Vought, Inc. and subsidiaries at December 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.

The signature is written in a cursive, blue ink style. It consists of the word "Ernst" followed by a plus sign and another "Ernst". The letters are fluid and connected, with a prominent loop at the end of the second "Ernst".

Dallas, Texas  
February 24, 1964

## **TRANSFER AGENTS**

Republic National Bank of Dallas, Dallas, Texas  
The Chase Manhattan Bank, New York, New York  
Bank of America National Trust and Savings  
Association, Los Angeles, California

## **REGISTRARS**

First National Bank in Dallas, Dallas, Texas  
Bankers Trust Company, New York, New York

## **TRUSTEES, CONVERSION AND PAYING AGENTS**

5½% Subordinated Convertible Debentures and  
5½% Subordinated Debentures:

Bank of America National Trust and Savings  
Association, Los Angeles, California

## **AUDITORS**

Ernst & Ernst  
Common Stock and Debentures listed on the  
New York Stock Exchange.

## DIRECTORS

James J. Ling*	Chairman of the Board and Chief Executive Officer	O. R. Moore	Chairman of the Board, American Security Insurance Company, Atlanta, Georgia
Robert McCulloch*	Chairman of the Executive Committee	William H. Osborn, Jr.	Partner, Lehman Brothers, New York, New York
R. C. Blaylock	Vice President and Technical Director	Troy V. Post	Chairman of the Board and President, Greatamerica Corporation, Dallas, Texas
D. H. Byrd †	D. H. Byrd Enterprises, Dallas, Texas	L. T. Potter*	President, Lone Star Gas Company, Dallas, Texas
V. A. Davidson, M.D.*	Investments, Dallas, Texas	Clyde Skeen*	Executive Vice President
Robert B. Gilmore †	President, DeGolyer and MacNaughton, Dallas, Texas	W. P. Thayer*	Senior Vice President
LeVan Griffis, Ph.D.	Vice President, Southwest Research Institute — Houston, Houston, Texas	James O. Weldon	Vice President and General Manager of LTV Continental Electronics Division
Gifford K. Johnson*	President and Chief Operating Officer		

\* Executive Committee † Executive Committee Alternate Members

## OFFICERS

James J. Ling	Chairman of the Board and Chief Executive Officer	J. Russell Clark	Vice President and General Manager of LTV Vought Aeronautics Division
Robert McCulloch	Chairman of the Executive Committee	D. G. Gilmore	Vice President and Operations Manager of LTV Vought Aeronautics Division
Gifford K. Johnson	President and Chief Operating Officer	W. Robert Kiefer	Vice President and General Manager of LTV Michigan Division
Clyde Skeen	Executive Vice President	Forbes Mann	Vice President — Government and Foreign Relations
W. P. Thayer	Senior Vice President	Richard J. Flynn	Vice President
R. C. Blaylock	Vice President and Technical Director	Harry E. Kay	Secretary and General Counsel
James O. Weldon	Vice President and General Manager of LTV Continental Electronics Division	Bernard L. Brown	Treasurer
E. Fred Buehring	Vice President and General Manager of LTV Temco Aerosystems Division	E. J. Tanner	Controller



**LTV** LING-TEMCO-VOUGHT, INC.  
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