The History of MTS Systems Corporation
Research, Inc. builds its new plant in Eden Prairie at the corner of what was Highway 169 and County Road 18. Research, Inc. is still housed in this facility today.

Research, Inc. acquires Monterey Research, Inc. of Monterey, California. The four founders of Monterey Research had been at the missile division of Firestone and left to start Monterey Research, which becomes the foundation for the MTS Shock and Vibration Division.

Research, Inc. goes public with stock offering.

1960s

1962

One of the first ten load frames is shipped to the University of Illinois. Professor JoDean Morrow, an avid user, establishes a relationship with MTS and becomes a key consultant. Morrow shows MTS how to exploit the technologies it has been applying to mechanical structural testing in the field of material testing.

1963

A Materials Test Systems (MTS) Division is formed at Research, Inc. to build and market electrohydraulic test systems. The company now consists of a Controls Division, which deals with temperature-related testing and an MTS Division, which is initially oriented toward material and structural testing. The MTS Division consists of 20 employees selected from the RI staff. As of mid-1999, Neil Petersen is the last original MTSer still with the company.

1965

The MTS Division begins marketing in Europe by exhibiting at Hanover Fair in West Germany. Max Russenburger, a Swiss engineer, attends the fair and later helps MTS develop hydraulic, resonant-fatigue machines.
MTS stock is carried in national over-the-counter listings for the first time. Its NASDAQ trading symbol: MTSC.

MTS opens a sales and service office in Munich, West Germany.

**1970s**

**1970**
MTS acquires Monterey Research Laboratory, Inc. and its line of shock-testing systems from the "new" Research, Inc. With the Monterey Research acquisition, MTS broadens its capabilities into advanced shock testing equipment for such uses as auto safety, crash research, cargo damage testing, and packaging product research. This acquisition provides the basis for the Shock and Vibration Division.

Ruedi Hartmann is the top sales representative in the US. Late in the year, MTS acquires H.R. Hartmann Co. Inc. and begins a transition from external sales reps to an internal sales team. Ruedi becomes MTS sales manager and then one of the company’s first functional vice presidents in 1974.

**1971**
The MTS plant expands to 82,000 sq. ft.

Herbert C. Johnson becomes chairman of the board, George N. Butzow president.

MTS Systems Munich subsidiary is formed; this later becomes MTS Systems, Frankfurt.

MTS-Monterey is consolidated with Minneapolis. Of Monterey’s two dozen employees, about half a dozen move to Minneapolis. Two people who made the move are still at MTS in 1999: John Beal and Dick Strand.

The Minneapolis plant installs a computer-based management system.

MTS designates two vice presidents, R.I. Hannum as v.p. and treasurer, and H.R. Hartmann as v.p. and secretary.

**1972**
MTS establishes a manufacturing, sales, and service subsidiary in West Berlin, Germany—MTS Systems GmbH. A 24,000 sq. ft. plant is acquired in West Berlin.

MTS-Minneapolis changes to a 4-day work week—9.33 hours per day.

MTS forms MTS-Japan, a 50% owned joint venture in Japan with offices in Tokyo. Our joint venture partner is Alan Konno.

**1974**
The plant is expanded from 82,000 to 150,000 sq. ft.

**1975**
Total international new orders equal total domestic new orders for the first time. MTS (Japan) Ltd. becomes a wholly owned subsidiary.

Herb Johnson leaves MTS and joins Data Myte Corporation. George Butzow is elected CEO and chairman of the board.

MTS France becomes a subsidiary.

**1976**
MTS acquires the Motion Systems product line from Washington Scientific Industries (formerly Washington Machine and Tool Works). Washington Scientific was the progenitor to the original Research, Inc., which was in turn the progenitor of MTS Systems Corporation and the present day Research, Inc.

Don Sullivan comes to MTS from Rosemount, Inc. as a vice president.

**1977**
MTS publishes the first issue of “InnerLoop,” a newsletter for employees and their families.

MTS has a 100% stock split.

From 1975 to 1977, employment increases 66%.

As part of an exchange-of-scientists program, Soviet scientists sing folksongs for MTS reps at a party on a Lake Minnetonka houseboat.

**1978**
The Eden Prairie, Minnesota, plant expands to 193,000 sq. ft. It includes the company’s first “hot lunch” cafeteria.

The People’s Republic of China market opens up to MTS with a first order for four road simulators and a torsional resonant system.

U.S.S.R. invades Afghanistan, and technology shipments to U.S.S.R. are embargoed by the U.S. government. MTS’s sales in Eastern Bloc countries, some 10-15% of total sales at that time, fall to less than 1% of total sales within six months.

The response to the stock purchase plan is overwhelming. Half the employees participate, buying 42,000 shares.

**1979**
MTS purchases its first two desktop computers—the Apple IIs.

**1980s**

**1980**
A subsidiary, MTS United Kingdom, is established in Gloucester.

An MTS Hong Kong subsidiary is also formed. The main plant is expanded from 193,000 to 293,000 sq. ft.

**1982**
George Butzow is elected chairman of the board and Donald Sullivan is named president.

**1983**
MTS receives its largest order to date, a $9.3 million Laser Articulating Robotics system (LARS) from the U.S. Navy.

Among the new technologies involved: sensing technologies, servoelectric actuation, and laser beam technologies.

**1984**
MTS acquires Temposonic, Inc., Plainview, N.Y., which becomes MTS Sensors Division. With this purchase, MTS adds a new strategic position in the industrial automation market with sales of $3 million.

MTS has a 50% stock split—3:2.

**1985**
Fourteen patents—more than have been awarded in any previous year—are granted to MTS.

MTS acquires Vektronic Manufacturing, Inc., Carlsbad, Calif., which becomes a subsidiary. Vektronic is a startup company building systems for automating the manufacture of wiring harnesses. With this acquisition MTS positions itself in automated electronic production.

MTS opens new sales and service offices in Beijing, PRC, and Gothenburg, Sweden.

The MRPII CINCOM business system is installed in Eden Prairie.
1986
MTS establishes a no-smoking policy.

In the fall of 1986, MTS reaches $100 million in annual sales for the first time.

MTS celebrates its 20th anniversary. The party is held at the international Market Square in Minneapolis. Many of the people who helped build MTS from the beginning attend.

MTS introduces TQM.

All employees attend 2-1/2 day off-site training on quality and meeting customer expectations.

1987
MTS has a 50% stock split. MTS stock market value exceeds $100 million.

Don Sullivan becomes CEO.

1988
MTS sells its Vektronics subsidiary.

Sensors Division and 35 of its employees move to a new 40,000 sq. ft. plant in Cary, North Carolina.

1989
MTS acquires Systems Integration Technology, Inc., SINTECH, a software and electromechanical material test machine company.

MTS acquires H W Hellwig, GmbH-Sensors Technologie, GmbH, Ludenscheid, Germany, which becomes the European headquarters for its sensor business.

The first Quarter-Century Banquet is held on April 21. Charter members are: Dennis Andersen, Bob Arneson, Bernie Bishop, George Butzow, Frank Dalling, Marty Gram, Bob Hansen, Ron Helgeson, Gary Hohage, Larry B. Nelson, Ralph Pulkrabek, Bob Sornsen, Dick Stacey, Fran Thompson, John Tomschin, and Harry Winslow.

1990
MTS expands its Eden Prairie facility to 383,000 sq. ft.

1991
The Sintech Division moves to a 25,000 sq. ft. plant in Cary, North Carolina, next door to the Sensors Division; fifteen employees make the move.

1992
Five TQM Operating Objectives are defined to help employees achieve improved quality and profitability.

MTS Korea is formed as a subsidiary.

Custom Servo Motors, a startup company in New Ulm, Minnesota, is acquired by MTS.

1993
The Machine Controls Division merges with Custom Servo Motors, resulting in a complete line of high-performance MaxPlus™ motors and MotionPlus™ controllers. Custom Servo Motors moves into a new 14,000 sq. ft. facility in New Ulm, Minnesota.

MTS begins catalog sales under the “Test Group” name.

The first MTS Technology Conference and Banquet are held. Impactful innovations are discussed and 23 U.S. Patent plaques are presented from the past three years’ inventions. An award for innovation called the HERB is presented to Herb Johnson, founder and first CEO.

1994
MTS Systems, GmbH sells its old building and moves into a newly acquired 75,000 sq. ft. facility in Berlin.

MTS acquires Adamel-Lhomarghy, a French manufacturer of material testing systems.

One of the MTS founders, George Butzow, retires from MTS, carrying with him the title of chairman emeritus. Don Sullivan is elected chairman of the board.

The United Kingdom Sales and Service office is the first MTS facility to gain ISO 9002 certification; the manufacturing operations of Sintech, Sensors Division, and Sensors Technologie are the first organizations to become ISO 9001 certified. By 1998, most major MTS facilities around the world are 9001 or 9002 certified.

MTS acquires PowerTek, Inc., a manufacturer of dynamometer and clean-air testing systems for the auto/truck and construction equipment industries.

1995
MTS Sensors Technology, Japan, opens in May.

MTS finalizes an agreement to purchase Gull Engineering, an exclusive extensometer vendor of the company. Gull Engineering was founded by Harry Meline.

MTS acquires Incon, an exclusive power amplifier vendor to the company's Custom Servo Motors subsidiary.

The company's Internet site is launched. And the Intranet is, in effect, born with the development of its first “killer app” - Documents on Demand.

1996
The Advanced Systems Division books a $23.3 million order from the Japanese government for an earthquake simulation system. It is the largest single order received by MTS to that point.

MTS stock splits two for one.

Electronic Product Fabrication moves out of Eden Prairie to a new facility in Chaska.

MTS acquires Bregenhorn-Bütow & Co., of Freiburg, Germany, to become the European headquarters of Custom Servo Motors. The organization is a supplier of low-power electronic servomotors and drives to the European manufacturing market.

1997
MTS France and Adamel-Lhomarghy are combined and become MTS Systems SA (Paris).

Sintech becomes MTD-Raleigh.
In May, MTS breaks ground for the seventh addition to the Eden Prairie facility—a 43,200 sq. ft. project to consist of high bay space.

In November, worldwide employment surpasses 2000 for the first time.

MTS Automotive Sensors, GmbH, is formed.

The AeroMet subsidiary, a contract manufacturing service providing the first commercial application of a new technology called Laser Direct Metal Deposition, is formed.

1998

On February 2, for the second time in two years, MTS stock splits two for one.

Chip Emery is hired from Honeywell, Inc. to be MTS Systems’ president and CEO. Don Sullivan remains chairman of the board.


MTS acquires Performance Controls, Inc., (PCD) of Horsham, Pennsylvania, a manufacturer of high-performance power amplifiers for factory automation and magnetic resonance machine applications. PCD becomes part of the MTS Automation unit, headquartered in New Ulm, Minnesota.

MTS acquires SDRC Noise & Vibration business line and launches the MTS Noise & Vibration division.

MTS reaches agreement with Structural Dynamics Research Corporation (SDRC) to acquire SDRC’s I-DEAS® Test software and noise and vibration services businesses. An SDRC consulting and software support service organization, made up of 38 employees, becomes part of MTS’s new Noise and Vibration Division.

1999

After an intensive 16-month, $13M worldwide development and training initiative, MTS launches its SAP R/3 business information system. This initial phase of the R/3 program includes all customer order entry, manufacturing, financial, and human resources activity functions. Facilities involved include Eden Prairie and Chaska, Minnesota; and Berlin, Germany; with links to operate in Detroit, Michigan; and Raleigh, North Carolina.

Chairman of the Board Don Sullivan retires. Chip Emery is elected Chairman.

MTS merges with DSP Technology, the company’s first acquisition involving another publicly held company. The merger combines DSPT’s state-of-the-art software, data acquisition, and control systems with MTS’s computer-based mechanical design and system integration skills. As a result, MTS now offers customers integrated solutions for engine and powertrain design processes in both the automotive and aerospace advanced research and development markets.

The first worldwide supervisors meeting is hosted by Chip Emery.

The Intranet comes of age and is designated the company’s “primary employee communications vehicle.”

MTS Automation purchases linear motor technology from Airex Corporation, providing an important growth path and a natural extension to the company’s innovative servo technology. Automation also acquires the PowerBlok™ product line from Semipower, Inc., broadening the company’s amplifier product offerings in the high-volume OEM markets.

2000

SAP R/3 version 4.6 is implemented.

MTS establishes a Japan Operations Center in Tokyo, providing space to build component test systems as well as to offer enhanced demo capability, calibration services, and refurbishment work for the region’s customers.

MTS Automation acquires the assets and technology for all motor drive products from SemiPower Systems, Inc., including DriveBlok™, IndexBlok™, SpindleBlok™, and related custom products sold to private label customers. The acquisition provides a complete line of proven Sensorservo® Technology products used in velocity and position controlled applications.

The largest single order ever received by MTS, in terms of total contract value, is awarded by the US Army. The total contract value is $37-million, for the design, development, manufacture, and installation of an advanced roadway simulator at the U.S. Army’s Aberdeen Test Center.

2001

MTS enters into a partnership with Mechanical Dynamics, Inc. and nCode International - to form “The SmartSim Community.” The SmartSim Community promotes the use of an integrated suite of industry-leading test hardware, virtual prototyping software, durability assessment, and information management tools. Used in combination, these tools can dramatically cut the time and cost of vehicle performance evaluation while ensuring the quality of analysis results.

A $13-million order is received from a major international automotive manufacturer for a full suite of vehicle design validation tools—the largest order of its kind in company history. The suite consists of a combination of MTS’s physical testing equipment, specialized software products and dedicated process consulting resources, and software from SmartSim Community members.

A new Performance Management Development System is introduced in Minneapolis that integrates all parts of an employee’s performance.

The Global Business Management System, the name of the project to roll out SAP to our European offices is approved. It is a continuation of the strategy to create a global business infrastructure to manage our business.

The Vehicle Dynamics Division, MIPS, and NVD are re-organized and combined to give MTS a more focused, market-driven approach to the automotive industry. The name of the new group is Integrated Vehicle Dynamics Development. The goal is to provide customers with integrated solutions that offer superior value.

MTS’s Chaska manufacturing facility and organization is acquired by Turtle Mountain Corporation. Chaska continues to provide contract electrical manufacturing services to MTS, allowing MTS to attain greater economies of scale.

MTS’s Automation Division moves into its new 79,000 square-foot facility in New Ulm, Minnesota. All MaxPlus® rotary and linear motors, MaxPlus® analog and digital drives, Sensorservo™ product line, and a variety of special custom amplifiers are manufactured there.

Turtle Mountain Manufacturing Corporation acquires MTS’s Chaska, Minnesota, based electronic circuit board operations.
2002
MTS appoints KPMG LLP as the company’s independent auditor, replacing Arthur Andersen LLP.

AeroMet receives the first award of a $19.4-million multi-year agreement from the U.S. Defense Logistics Agency (DLA) as part of the government’s “Industrial Preparedness Program.” This is the largest award in AeroMet’s history to this point.

2003
MTS divests its Gradient Amplifier business based in Montgomeryville, Pennsylvania.

MTS completes agreements for the sale of its Automation Division based in New Ulm, Minnesota, to Parker Hannifin Corporation.

The company’s test equipment business units are consolidated into the MTS Test organization. The move leverages the company’s expertise in the precise control of forces and motion across targeted ground vehicle, aerospace, materials, and civil engineering markets. The new division together with the Software and Consulting Services Division comprise the company’s Test segment, formerly the Mechanical Testing and Simulation segment.

Two large orders, together totaling in excess of $45 million, are announced. The orders are both multi-year, international contracts for test equipment, test software, and test support, and represent the largest order in MTS history to date.

AeroMet is honored by the DoD with the Defense Manufacturing Technology Achievement Award for the technology transfer and commercialization of Laser Added Manufacturing capability.

Product Milestones

As Research Incorporated

1957 First use at Research Inc. (RI) of hydraulic servovalves. Application: testing helicopter lag dampers. The servovalve was made by Pegasus.

1959 Lockheed Georgia approaches RI to suggest that the electronic controls that RI is already using could be combined with hydraulic actuators to simulate the fatigueing of an aircraft. The resulting project—a fatigue test system for the C130—is RI’s first major electrohydraulic system and the beginning of life testing of aircraft in the U.S.

1960 The LC5131 Load Controller is manufactured (tube type).

1961 First Model S230 solid state (non-tube) is built. (Plug-in cans used as modules.)

1962 Model 401 series Servac is the first printed circuit board servocontroller built. It has single-range capability.

1964 MTS Division of RI installs the first electro-hydraulic road simulator at Cadillac Division of General Motors. This installation is a key project for MTS because it breaks the division out of its previous dependence on government aerospace and defense contracting and opens up the private sector.

1966 The Model 425 is added to give multiple ranges to the Model 401 Servac.

First servocommanded spinning rotary actuator used in a four square drive shaft test system installed at Saginaw Steering Division of GM.

1966 First system at Ford Dearborn to replicate field recorded vertical durability schedules with direct spindle coupled actuators.

1967 Smooth column clamps are developed and go on to become an industry standard.

1968 MTS develops the first computer controlled material test system. Based on a DEC PDP-8 computer, the system simultaneously performs data processing and system control in real time. Among its new capabilities: test modes can now be changed in response to changes in the specimen during testing. The system computer is less powerful than some of 1990’s pocket calculators.

The first earthquake simulator is installed at the University of Illinois.

1969 The 440 line of electronics is introduced. This third-generation controller is a real advance in modularity and design flexibility, particularly in multichannel applications. The 440 and its predecessors, the Servac and the 406, are still in use 25 years later.

The 311/312 standardized material testing systems are introduced. These are the first pre-engineered systems that allow “canned” proposals to shorten lead times between the RFQ, quoting, and delivery order.

Large 4 channel 500 Hz 30,000 lbf electrohydraulic shaker system installed at Lawrence Radiation Labs, Livermore, California.

1970 The Standard 810 materials test architecture is developed. Consisting of inventoried system components, the 810 is the first system to shorten lead time between order and delivery.

The Model 251 high performance Servovalve is developed. The new valve expands the frequency range of stresses that can be simulated.

The Model 443.11 Controller is introduced to satisfy customer requirements for vibration and structural testing. Its architecture is similar to the Model 442.11.

1971 The Model 406.11 Servo Controller is introduced as a low-cost servocontroller. The product line lives on for 22 years.

Age of Freedom control (DOFC) development begins. This key control system coordinates the motion of multiple actuators connected to one fixture that would otherwise work against each other. DOFC enhances a system’s ability to adapt straight-line actuator motion required by an application; e.g. to control pitch and roll by coordinating the motion of multiple vertical actuators. DOFC initial application: earthquake simulators. The same technology is later used in Flexmatix compression molding presses.

The Materials Test Language (MTL) software language is introduced. The PDQ-based language provides the customer with a high-level language that they can use to do their own programming. Before MTL is developed, programs must be written in assembly language.

First 326 Series 3 axis real time spindle coupled durability system delivered to Volvo, Sweden.

1973 MTS-Basic development begins as a replacement for MTL. It is developed to provide customers a friendly language they can use to program for themselves. MTS-Basic today contains over 400 different statements, four times the number contained in the average data management version of Basic.

MTS builds its first production machines for manufacturing:

• production line equipment to test auto bumper shocks absorbers for the Mustang II, Comet, Maverick, and Pinto.
• the HydraKupper forming press-the company’s first production machine, the HydraKupper spawns many technical innovations through the 1970s such as in seals, filtration, and controllers-to meet the demands of millions of cycles on the factory floor.

MTS builds the world’s largest, most advanced computer-controlled earthquake simulator for the U.S. Army Corp of Engineers Construction Research Laboratory (CERL). Designed to evaluate the ability of structures and products to withstand seismic disturbances, the machine can subject a 12-ton mass to 40 gravities of force.
MTS installs its first complete wave generator system at Oregon State University. MTS previously only supplied components to the prime contractor for a project in Holland.

1974 A Model 450 Servo Controller is offered for multichannel applications.

1976 In September, MTS receives its largest contract to date: to build a mine roof simulator for the U.S. Department of the Interior’s Bureau of Mines. The roof simulator system tests roof supports for the use in a new longwall mining system which "walks" into a vein of coal and allows the mine roof to collapse safely behind it. Among the project's technical challenges is the geometrically largest and heaviest loading requirements of any simulator MTS has built.

1977 Remote Parameter Control™ (RPC™) technology is developed for the Truck and Coach Division of General Motors. Its new control capabilities enable a test system to reprogram itself to compensate for mechanical play in the linkages between actuators and test specimens. RPC technology is particularly valuable in road simulator applications.

Three orders for rail car simulators, each in excess of $1 million, establish the railroad market for MTS. Three-variable control is developed. This basic architecture combines three commands—stroke, velocity, and acceleration—to widen the band of frequencies over which accurate closed-loop control can be expected. Its first application: a tuned Mass Damper System (TMD) to control motion in skyscrapers. Its first earthquake simulation application is for AMN, Italy, in 1980. Three-variable control is also a key control system for shock and vibration systems.

Tuned Mass Dampers systems for the John Hancock Tower and Citicorp Center, New York are accepted. Wavemaker equipment for the U.S. Naval Academy is dedicated. The most sophisticated wave research facility in the world, this project along with the TMDs, provided work for many MTS employees during the recession of the mid-1970s.

1978 Development of the Flat-Trac® system begins. The first order for the system, from Goodyear, is written in the fall of 1978. Developing the Flat-Trac system enhances the company’s abilities in multiaxis sensing. The hydrodynamic bearing used to support the flat surface is a technical enhancement as well. Although they had already decided to buy a competitor’s machine, General Motors becomes convinced that MTS knows more about belt tracking—MTS gets the order.

Evolving from the HydraKupper, a concept for a completely new compression molding process emerges which automates and improves the quality of “fiber-glass composite panels” for automobiles. In a joint development effort with GM, MTS drives the Sheet Molding Compound (SMC) concept until 1987, when GM decides not to internally manufacture outer car panels with the SMC process.

Two products for use on the factory floor as well as in the lab are introduced: the Optical Grid Analyzer and the Sheet Metal Formability test system.

1980 MTS gets its first order for a compression molding press from GM.

1981 The Model 445.11 Controller offers improved automation features. The first digital control demonstration is conducted.

1982 The first MTS robot prototype is developed. This development, which builds on technology from road simulators, advances a number of key technologies. It enhances servocontrol of mass-loaded systems through new control compensations; it generates a patented wrist design; it enhances the ability to do on-the-fly mathematical transformation; and it evolves a new one-piece, triaxial load cell.

MTS introduces the Model 448.82 and 448.85 Controllers as part of the new 880 line of equipment. It is called our third-generation controller and includes crosshead load cell and integral actuator design. Called the Greenhills project, it is sold as the "Cadillac" of our systems.

The first MTS press for fabricating composite body parts is delivered. The design, which generates 12 patents, builds upon and enhances multiple MTS technologies from degree of freedom control to column clamping.

1983 The 880 Materials Test System is introduced. This system incorporates many new technologies such as integrated load cells and actuators and the extensive use of microprocessor technologies. This automated offering positions MTS as the leading technology supplier of standard dynamic material test systems and forms the base for nearly all MTS custom systems.

The first bionix axial-torsional system is sold for testing orthopedic medical devices.

The 445.11 Controller is removed from our product offering list. The 448.85 Controller replaces it.

IHI, Japan, buys the first six-degree-of-freedom earthquake simulator.

1984 "R&D Magazine" recognizes the Oral Environment “chewing machine” simulator as one of the year’s 100 most innovative products.

1985 The new 810 is introduced. Replacing the old 810 with hybrid analog/digital control, this system becomes the workhorse of material test systems. By the end of FY86, 120 systems are sold and its 458 Controller is retrofitted to 70 MTS and competitor test systems.

The Model 100 Light Manufacturing Tool (LMT), a triaxial system replacing the previous biaxial system. The automated offering positions MTS as the leading technology supplier of standard dynamic material test systems and forms the base for nearly all MTS custom systems.

The first MTS press for fabricating composite body parts is delivered. The design, which generates 12 patents, builds upon and enhances multiple MTS technologies from degree of freedom control to column clamping.

1986 Pseudodynamics (a new technique for earthquake testing) is used for the first time.

The torsional dynamics division is formed to develop a market for MTS in spinning torsional vibration, power transmission dynamometry, and related fields.

1990 MTS introduces the newest digital technology called TestStar®. It offers controllers electronics that use a PC to run the customer's test.

1991 MTS ships the first TestStar system.

The first Aero-90™ aircraft structural test control system is for AMN, Villaroche, France.

1992 The first hip simulator, designed to evaluate the wear resistance of an artificial hip ball in its cup, is sold to Howmedica.

1993 The Flat-Trac Roadway Simulator is recognized by "R&D Magazine" as one of the 100 most innovative products of the year.

The LT420 level gauge goes from conception to market in only four months, significantly expanding the available market for Level Plus® products.

The U.S. Army Corps of Engineers Construction Research Laboratory (CERL) contracts with MTS to upgrade the earthquake simulator we provided them in 1973. Upon completion, it is again considered the country's most advanced earthquake simulator, with a triaxial system replacing the previous biaxial system. The Model 407 single channel, portable Servo Controller is introduced as a replacement for the 406. The first 858 Mini Bionix® Tabletop Servohydraulic System for low-force testing is sold; later it becomes the base system for applications in many other markets.

1994 FlexTest™ II digital controls system is launched with options for general purpose, multistation testing and single station, dedicated systems control.

1995 The first medical profiler system is sold to Howmedica.

Sensors Technology develops SARA, a custom integrated circuit allowing high-resolution sensor readings without recirculation (recirculation is multiple pulsed of the waveguide for each reading). The first Aero-90 LT Test System is delivered to Dowty Aerospace.

1996 RPC III Analysis and Control software is the first MTS product to be launched on the Intel PC, Microsoft Windows NT platforms, leading the way for all MTS controls and analysis products.

Thirty-two percent of the year's revenues come from new products or technologies introduced within the past three years—an all-time "entrepreneurizing and market creation" record.

The Tytron™ system is introduced. This system was developed for testing materials and packages used in microelectronics, as well as for general material testing on tiny specimens or soft tissues, such as an artificial ligament used in the biomaterials area.

Custom Servo Motors introduces the MaxPlus™ 12-inch servomotor, delivering up to 90 horsepower of continuous torque. The MaxPlus 12-inch motor is the most powerful, high-performance, permanent-magnet, brushless servomotor on the market, creating significant new opportunities in the automation of industrial processes.

1997 The MTS Engineering Office®-NVH applications suite is introduced to extend VOD road simulation systems with noise, vibration, and deflection shapes measurement and animation.

The $23.3-million earthquake order received from Japan’s Ministry of Construction in 1996—the largest single order ever received by MTS to-date and the largest seismic system ever installed, capable of shaking 300-ton specimens—is accepted in 1997, within 13 months of receipt of the order.

Temposonics® linear displacement sensors are designed to be fully modular, allowing quicker, more efficient introduction of new products. A new grounding and shielding scheme is also introduced.
TempoSonic III versions are introduced to be electronically compatible with the increasingly popular DeviceNet™ (in the U.S.) and Profibus™ (in Europe) field-device communication protocols.

The Spinning Wheel Integrated Force Transducer (SWIFT™) is introduced, significantly simplifying data acquisition and simulation testing of automobiles.

The TestStar II digital controller is introduced and shipped. It is designed for single channel, single axis testing and represents new universal conditioners and an implementation of a software platform used on multiple products.

Wholly owned subsidiary AeroMet is founded upon technology that produces high-quality titanium structures using a laser and titanium powder.

**1998** Advantage™ Wedge Action Grips are introduced. It is the result of the first international product consolidation effort between Paris, Raleigh, and Minneapolis. Each division had their own version of a mechanical wedge grip, creating overlap and inefficiency. Instron® had long held this market; they were even selling their grips on competitors’ systems. The Advantage grips proved that MTS Minneapolis can make a very functional competitive product in the electromechanical market while maintaining a high margin.

The new TempoSonic Auto-SE sensors provide cost reductions of up to 90% and the opportunity to provide sensors to a vast array of new markets and applications, such as medical diagnosis, agricultural machines, appliances, exercise equipment, aeronautics, mobile equipment, etc. The non-contact Auto-SE sensors do not wear, are easily protected from the elements, and have a long life expectancy with virtually no maintenance requirements.

Fatigue and fracture software applications are released for TestStar II and TestStar IIIs platforms by using newly developed control platform interface (CPI) libraries. The CPI libraries allow all fatigue and fracture applications to be based on the same underlying code, minimizing maintenance and maximizing common features. CPI libraries are also used to port the TestWorks® controller to TestStar II and TestStar IIIs controller platforms.

The Tytron 250 system is introduced as a significant re-design from the product that originated in 1996. It improves on the original by offering improved air bearing configuration and performance, frame alignment, vibration absorbing construction, ease of assembly, and reduced cost. The Tytron system was the first and remains the only linear-motor based material testing machine on the market. No other machine can achieve its dynamic performance at low forces and displacements.

The new 329 6DOF Road Simulator Corer is unveiled, offering major improvements in road simulation testing, and providing an important link between physical testing and virtual testing and modeling.

MTS delivers the first production order of the passenger car size SWIFT sensor to Chrysler Canada.

**1999** The Alliance™ load frame is introduced—the first 100 kip capacity tabletop electromechanical product available from MTS. It combines the attributes of two distinct product platforms into one product. Improved performance specifications, the introduction of self-ID transducers, and new high performance electronics, all packaged in a modern design, combine to improve MTS’s electromechanical competitiveness worldwide.

The MTS TestWorks 4 material testing software is offered. It is a stand-alone package that allows the user to develop test methods, run tests, analyze data, and report results, all available within one simple-to-use interface. TestWorks software is used to test such materials as plastics, metals, ceramics, fasteners, rubber, textiles, and composites.

Collaboration by MTS and Paw-Taw-John results in a new generation, closed-loop control system, the ServoSensor®. It offers a more compact package at lower total cost while cutting response time to half that of other industrial closed-loop systems. It capitalizes on smaller, more powerful microprocessors and advances in surface-mount technology to eliminate the need for an external controller. For the first time it is possible to fit the servocontroller, drive module, and sensor electronics in the sensor head.

The 359 tabletop Load Frame is introduced and consolidated into the 858 Mini Bionix and TableTop applications. This design provides axial and lateral stiffness improvements, longer strokes, increased dynamic performance, and more compact packaging.

MTS introduces the first liquid level gauge in the industry with a flexible, removable waveguide and integral electronics with volume strapping conversion. The new M-Series gauges incorporate the latest developments in the SARA chip and the new SE2 waveguide. The M-series will take the SE2 to new applications with a removable/flexible version for lengths greater than 10 feet.

The 505 SilentFlo™ power unit is introduced. The technology addresses evolving customer demands for employee-friendly, aesthetically pleasing designs and is available in cost-controlled standard configurations.

Porsche AG accepts its first MTS K&C (Kinematics and Compliance) test system.

MTS’s SWIFT™ wheel force measurement system is recognized by R&D Magazine as one of 1999’s 100 most technologically significant achievements.

MTS delivers its first Wind Tunnel Rolling Road System to a Formula 1 customer.

**2000** The first AeroPro SDAC Systems are delivered to Honda and Lockheed Martin.

MTS commissions its first production linear friction welder, designed to weld titanium fan blades onto aircraft jet engine compressor discs. A second, larger linear friction welder is commissioned in 2001.

MTS books an order for the Aberdeen Test Center RoadWay Simulator to test military multi-axle vehicles with and without trailers. At $38 million, this is MTS’s largest order received to date.

A key controller is introduced under two brand names—TestStar IIm for the infrastructure material test market and FlexTest GT for the vehicle component test market. This multi-channel, multi-station controller is to prove very popular with customers and to be the most broadly used and flexible controller available.

**2001** MTS builds the first Flat-Trac LTR Tire Test System that extends the product family to light truck and racing tire testing. The significant new capability features lateral force capability of 30000 N, roadway speed to 200mph, and wheel torque to 5000 Nm.

The National Advanced Driving Simulator (NADS) is commissioned at the University of Iowa. NADS is the largest and most advanced driving simulator in the world. The MTS motion system features a hexapod capable of carrying a full-size passenger car on top of a 64x64 foot x-y table.

MTS delivers 28 servo valves to the NIED project in Japan. These are the world’s largest servo valves with a flow rate of 15,000 liters/minute. The NIED earthquake simulator will be able to shake a four-story, 1200-ton building on its 15x20 meter table.

MTS receives a $9.8-million contract from Sauber Aerodynamics Ltd, the aerodynamic testing arm of the Formula 1 team Sauber Petronas of Switzerland. The contract is for the design, development, manufacture, and installation of a Wind Tunnel Rolling Road and Model Motion System. The system is to be used for aerodynamic testing of full-size Formula 1 racers and model scale cars at speeds up to 180 mph.

**2002** The MTS Model 353 High Frequency Multi-Axial Simulation Table (MAST™) is named one of the top ten new technical achievements introduced at the year’s SAE Congress in Detroit. The high frequency MAST uses a unique, patent pending design to attain six degree of freedom vibration up to 500Hz for both durability and noise and vibration testing. The FlexTest SE digital controller is introduced in 2002, giving suppliers new options for conducting a variety of simple tests and the flexibility to upgrade easily when their needs become more complex.