Human Machine Interface Solutions
Taking Control Of Technology
It’s about innovation, quality, technology and problem solving. It’s about understanding customer needs – and future demands – in a complex market, and developing easy to use, high technology systems that can always be relied upon.

Ultra Electronics Measurement Systems Inc. (MSI) is the recognized expert in precision human machine interface (HMI) solutions. We offer the broadest line of products fielded by today’s military and a proven track record of solving customer problems. Since 1960, MSI has provided state of the art technical solutions for virtually every military, commercial and industrial application imaginable, including hand controls/grips, joysticks, trackballs and electronic integrated systems. MSI’s expertise ranges from miniature joystick designs to sophisticated hand control systems for complex military systems; from customized designs to meet individual application challenges to countless off the shelf product variations for commercial and industrial needs.

Our products can be found in manned and unmanned vehicles, helicopters, fixed wing commercial and military aircraft, trainers and simulators, trains, automobiles, submarines, surface vessels, space vehicles, medical systems, movie making and construction equipment, and other applications where precise HMI controls are needed.

Leadership grows out of commitment; a commitment to finding solutions of value for customers and meeting their every need. This has been the focus of MSI for close to a half-century and is what has made us the global leader in HMI solutions.

1964 Introduces the first miniature piezoresistive joystick, followed by the development of the inductive and force type joysticks. For the first time, engineers can incorporate joysticks as cursor control devices with unparalleled precision.

1998 Secures U.S. patent for Hall effect technology. Optimal Hall effect design introduces non-contact transducer technology into a military application, bringing reliability and precision to critical applications.

2003 Licenses industry’s first “sense of touch” HAPTICS technology from Immersion Corp. Industry leading technology dramatically improves user’s tactile interface with the vehicles/equipment they operate.

2004 Receives U.S. patent for MAGTRACK™, a “position integrating” device for harsh environments. Offers completely submersible trackball for marine and amphibious applications.

2004 Develops Hall-effect miniature joysticks, which revolutionizes HMI industry by providing high performance and high reliability at low cost. Provides users with improved options for cursor control in hand control systems.
Services / Capabilities

- ERGONOMIC / HUMAN FACTOR PRODUCTS AND SOLUTIONS
- OFF-THE-SHELF PRODUCT DESIGN AND CUSTOMIZATIONS
- CUSTOMIZED PRODUCT DESIGN
- RAPID PROTOTYPING
- LARGE VOLUME PRODUCTION
- MECHANICAL, ELECTRICAL AND SOFTWARE DESIGN CAPABILITIES
- REVERSE ENGINEERING
- BUILD TO PRINT
- MARKET-BASED R&D
- TECHNOLOGY ANALYSIS
- NEW PRODUCT DEVELOPMENT
- SYSTEMS ENGINEERING
- ESS TESTING
- PRECISION ELECTROMECHANICAL ASSEMBLY
- QUALIFICATION TESTING

2006
Introduces Freedom of Movement Control Unit (FMCU™), first ruggedized gaming style controller for “next generation” military operators. Minimizes training time and offers modular LCD attachment.

2007
Patents the industry’s first Reconfigurable Control (RCC™). This allows quick, in-field replacement or functionality upgrade of grips on hand control units, significantly reducing costly downtime.

2008
Introduces Portable Operator Control System (POCS™) utilizing FMCU™ and Re-Configurable Control (RCC™) technology and giving users the opportunity to control unmanned systems while on the move.

2008
Receives U.S. Application Patent for FMCU™
Manned Vehicles

MSI is the recognized world-class leader in the advanced engineering and manufacture of military “battle worthy” control systems for the manned vehicle market. Our innovative technologies are incorporated into the single and dual handle controls, grips, joysticks and electronic systems we supply for an extensive array of military systems. Our products are typically customized for specific types of vehicle navigation, weapons operation and/or related equipment.

Innovation is a key driver to success in this market, where applications require extremely reliable, rugged, high fidelity HMI control systems. MSI brings proven strengths to the military marketplace, including unmatched precision, field proven reliability, MIL Spec environmental testing and hands-on human factors experience.
- Stryker ATGM, Cupola
- Kongsberg/Stryker Remote Weapon Station
- U.S. Army Kongsberg CROWS II
- LAV & LAV-AD, ASLAV, NZLAV
- M1A1 & M1A2 Abrams
- Expeditionary Fighting Vehicle (EFV)
- M2A2 ODS, M2A3 Bradley
- ITSS
- Grizzly/Crusader
- K1A2 Main Battle Tank
- Korean K-9 Howitzer
- CRS-3
- U.S. Army CROWS

- APC
- Avenger Upgrade
- Electric Boat NSSN
- Virginia Class Submarine Helm Control
- LCS
- FLIR controls
- Kaman SH-2G Super Sea Sprite
- Eurofighter 2000
- C-130 Trackhandle
- Phalanx
- V200
- TGTS
- MK-46
- GAU-19
- BAE HAWK

- Crows I Stryker Remote Weapon Station Control Grip 1505 Series
- Stryker Cupola Control 460 Series
- 3-Axis Electronically Dampered Virginia Class Submarine Fly-By-Wire Helm Control 546 Series
- Stryker ATGM Control 540 Series
- Re-Configurable Control (RCC™) 502 Series
Unmanned Vehicles

As military payloads become increasingly complex, new technologies grow ever more critical to the marketplace. MSI is a proven leader in the design and manufacture of flight controls, payload controls, custom control panels and systems for a wide range of unmanned aircraft, ground vehicles and vessels utilizing both single and dual axis type hand controls, joysticks and trackballs.

Our products have been tested in the harshest environments and designed based on “human factors experience.” They offer a powerful array of advantages, including precision performance, advanced engineering and rugged reliability, while featuring non-contact transducers and gaming style controller technologies.
Mission Controls

MSI hand controls, grips, trackballs, joysticks and electronic systems provide controls solutions for a broad spectrum of high integrity land, naval and air defense missions, including equipment found on armored vehicles, submarines, naval vessels and fixed and rotary wing aircraft. MSI is recognized for its ability to design ergonomic systems for operators of numerous types of equipment such as payload controls, FLIR control units and other similar integral hand control applications, as well as for fire control panels and various control consoles.

With its commitment to innovation, precision, rugged reliability and the “human factors expertise,” MSI has shown a unique ability to incorporate and simplify many complex functions into a small package, as well as offer a variety of interface options.

- CH-47D CAAS
- LRAS3
- ITAS
- VENOM
- ISIS
- STARS ATC
- FAA ATC
- SLQ-32 & SOS-56 Sonar
- JSTARS
- B-52
- UYQ-70 Workstation
- UYQ-21 Workstation
- TOW missile
- C1 & VCC 80
- Land Warrior Dismount Soldier
- Digital Cockpit Cursor Controls
- Q70 Navy Aegis Defense Systems
- Nimrod
- Phalanx
- Patriot missile
- Harpoon missile
- S-3
- Video Tracker
- Le Clerc
- PBISA
- EA-6B ICAP III
- P-3 Maverick
- LEADIR
- EOSS
- LAVA
- C130 gunship
- U.S. Army TAPO
- TAPO FLIR
- 1505 Series
- Space Shuttle Rotational Control 544 Series
- Stars Panel Mount Trackball
MSI joysticks and hand controls have become the popular choice for an unlimited number of commercial and industrial applications. Wherever steering, power, positioning or tracking controls are needed – from the mobile hydraulics market (agriculture, off-highway, construction, mining and a variety of man-lift operations) to the medical and healthcare industry (medical procedure equipment, robotic surgery, X-ray machines, wheelchairs and surgery simulators) – MSI human interface controls are enabling systems to perform better and to be more productive.

MSI creates reliable and precision joystick technology that translates into controls that are lighter weight, with a smaller footprint and that are field tested in tough environments. Our engineering designs use patented non-contacting Hall effect and/or magneto resistive sensor technology to detect and transmit position, and offer unique “quick change” ReConfigurable Control (RCC™) capabilities.

Long the leader in hand control systems for the military, MSI is fast becoming the supplier of choice for commercial and industrial joystick technology.
High fidelity simulation training saves time, money and lives. These vital and sophisticated applications utilize the same form, feel and function as the tactical controls used on the actual platform. MSI is in the forefront of the military simulation market, offering HMI control systems for fixed and rotary wing aircraft, manned and unmanned military vehicles, radar controls, imaging equipment and missile firing applications.

MSI designs controls that offer a level of realism that “puts you in the vehicle” and in the operational environment, providing the performance and rugged reliability needed for a wide variety of gunners, commanders, pilots and operators of vehicles and systems on the ground, at sea and in the air.

- F-22 HOTAS
- USAF DMT HOTAS
- F-15, F-16, F-18 HOTAS
- CCTT
- AGTS
- STRYKER
- M1A2 Gunners and Commanders Controls
- M2A3 Gunners and Commanders Controls
- FSCS / Tracer
- Space Shuttle Manipulator
- Flyboxes
- Pilot Screening (BATS)
- M60 Tank
- LAV25
- JSF Stick Base
- SAC
- VTI Program – Hall-effect
- AVCATT
- UKCATT
- T-39
MSI has a dedicated engineering focus on generating value-added Electronic Systems Solutions (ESS) for the military marketplace. Utilizing an array of industry leading technologies, we provide customers with systems that incorporate a broad range of HMI devices, giving them a powerful competitive advantage within their own markets. These electronic system solutions include custom control consoles/bullnose panels, overhead panels, electronic packages, flat panels and portable operator control systems.

MSI creates systems that offer high value and leading edge capabilities to end users. We combine our ergonomic expertise with advanced ESS technologies – for example, ReConfigurable Controls (RCC™), capabilities, our patented Hall effect designs and VR3 haptic technology (licensed from Immersion Corp.) – to provide electronic systems that are rugged, reliable and precise, while meeting the unique needs of each customer.
Ultra Electronics is a group of advanced technology businesses that design, manufacture and support electronic and electromechanical systems and subsystems. The individual capabilities of each of its companies can be utilized to provide MSI customers with a consolidated solution to challenging application problems. For more information on Ultra Electronics, its companies and their capabilities, visit www.ultra-electronics.com.

| ULTRA BUSINESSES | Active noise and vibration control systems | Cockpit indication and display equipment | Command control and information systems | Cryptographic equipment | Data fusion systems | Data link systems | Electro-thermal protection systems | Environmental monitoring systems | Human machine interface equipment | Mission computer | Multi-function consoles | Nuclear power conversion and control | Radar communication systems | Radar warning systems | Radars | Sensor data link | Ship's mission systems | Stabilised sensor platforms | Surveillance and tracking systems | Tactical data links | Telecommunications equipment | Voice, video, radio, and data communications equipment |
|-------------------|------------------------------------------|----------------------------------------|-----------------------------------------|------------------------|-------------------|------------------|----------------------------------|--------------------------------|---------------------------------|------------------|----------------------|-------------------------------|-----------------------------|-------------------|-------------|-----------------|-----------------------------|-------------------------|-----------------------------|-----------------------------|--------------------------------|
| Advanced Tactical Systems | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Airport Systems | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Command & Control Systems | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Controls | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Criticon | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Datel | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| DNE Technologies | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Electrics | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| EMS | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Flightline Systems | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Manufacturing & Card Systems | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Maritime Systems | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| MSI | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Ocean Systems | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| PMES | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Precision Air Systems | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| ProLogic | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Sonar & Communication Systems | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| Tactical Communication Systems | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
| USSI | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ | ⋄ |
Standard Product Line

MSI offers a wide range of standard products that can be customized to meet specific operational requirements for virtually any military application.

**Miniature Force Joysticks**
- 462/465/467/469/470/475/485 Series

**Fingertip Displacement Joysticks**
- 500/501/5000 Series Patented Hall Effect Joysticks

**Large Force Joysticks**
- 430/436/446 Series

**Control Grips**
- 150S/151S Series Aluminum
- 1522 Series Custom Aluminum
- 1600/1600C Series Plastic
- fMCU™ Series Gaming Style

**Trackballs**
- 621/622/625/626/XRT Series

**Large Displacement Joysticks/Hand Controls**
- 502/503/504 Series Patented Hall Effect Joysticks/Controls
- 540/542/546/547 Series Potentiometer Joysticks/Controls
- 541 Series 1-Axis Potentiometer Joysticks/Throttles

**Interfaces (for all products)**
- USB/CANBus/Serial (RS232, RS422, RS 485)/PS2/1553/Firewire/Spacewire

**Electronic Systems Solutions (ESS)**
- Consoles; Bullnose Panels;
  Custom Panels; Flat Panels
- Electronic Systems; Control Systems;
  Portable Systems