System strength
Advanced systems for the most challenging defense technology
Military vehicles should provide the warfighter with tools to accomplish a mission, whether it be in the form of transportation, defense, exportable power, or other vital requirements.

Parker Hannifin offers a broad array of system solutions to enhance the performance of military vehicles, while reducing weight, cost, and other limiting factors.

Parker's technologies range from advanced thermal management solutions that can dramatically optimize power density to filtration systems that can keep crews safe in the most rugged environments, from power drive options that can revolutionize power delivery, to door assist technologies that are compact yet powerful, from seals using advanced materials for reliability and safety, to lightweight fluid conveyance equipment and a variety of other innovative products that can address the toughest defense technology challenges.

With decades of experience on platforms ranging from military ground vehicles and tanks to manned and unmanned aircraft, Parker technology offers solutions to maximize defense vehicles’ effectiveness and performance. So soldiers can maximize theirs.
Systems integration
As a tier-one systems integrator, Parker is a world leader in system solutions. We provide customers with such value-added services as system architecture definition, integration, certification, production, and lifetime customer support.

**Subsystem electronics**
- Extensive offering of rugged hardware for mobile applications
- IQAN and VANSCO vehicle electronic controls:
  - Displays, instrument clusters, controllers, and expansion modules
  - Joysticks and sensor technology
- Vehicle electronic systems meet rugged environmental standards
- System health status and monitoring
- Easy-to-understand fault detection and diagnostics

**Safety system controls**
*Innovative subsystem technology*
- Central tire inflation
- Automatic braking system
- Complete vehicle sensor suite
- Aft steering system
  - Rotary hydraulic actuation
  - Electromechanical or electro-hydraulic linear actuation

**Suspension systems**
*Innovative strut/actuator technology*
- Height management
- Roll and lateral stabilization
- Variable travel
- High response

**Electronic integration control**
- Lane-change stabilization
- Complete system stability

VEHICLE SYSTEMS & SUBSYSTEMS
*New and complete upgrades*
- Electronic controls
- Hydraulics
- Pneumatics
- Fuel
- Thermal management
- Power generation
- Environmental/filtration
- Fluid conveyance
- Seals

Nitrogen-inflated tires maintain inflation pressure longer, provide improved fuel economy, extend tire life, and enhance safety.

IQAN monitor control offers full color display, sunlight-readable TFT screen, graphical programming tools, multi-language support, and four CAN bus ports.

CAN communication: robust communication protocol, widely used and well proven.
Centralized control system
An advanced centralized control system features joystick controls and large LCD screens for display of hydraulic and engine diagnostics and operational modes. Based on powerful, yet simple IQAN software, the Parker control system offers significant benefits, including reduced operator fatigue, improved visibility and data retrieval, and the elimination of mechanical linkages.

Diagnostic & vehicle monitoring
Operation and diagnostic data is displayed on two clear IQAN-powered screens, monitoring such information as vehicle mode, pump and load pressures, fluid temperatures, RPM, oil and fuel levels, filter condition, air pressure, and fault indication.

Cylinders
Ejector, apron, and bump-stop cylinders used advanced rod plating that withstand up to 1,000 hours of salt spray, and improved seals and harness depth for longer equipment life.

Hydraulic pumps
Modern P1 variable displacement pump technology for both the earthmoving and suspension systems provide enhanced efficiency and performance.

Main hydraulic valve
This load-sense pressure-compensated valve provides control of the apron, eject, suspension, bilge pump, and winch functions, using electronic controls and pressure- and flow-limiting technology to reduce heat with variable pressure demands.

Reservoir & filtration
An enhanced aluminum reservoir with a health-monitoring sensor feature and fewer pressure filters has reduced service requirements.

Suspension actuators & accumulators
Offering track-tension and blade-fold control, these hydraulic junction and isolation circuit manifolds have been placed at strategic locations on the M9 ACE, reducing lines and maintenance.

Fluid conveyance system
Featuring enhancements such as the Parker super-tough cover hose – 450 times more abrasion resistant than a standard rubber hose – the new fluid conveyance system includes corrosion-proof stainless-steel connections and tube lines, O-ring-faced seals for better sealing, diagnostic couplings, and Parker tracking system barcode labeling for simple identification and replacement of parts.

Modernizing a classic
Parker’s broad system upgrade to the Marine Corps M9 Armored Combat Earthmover has revolutionized the effectiveness of this critical warfighter vehicle.

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Environmental & filtration systems
Designed to withstand harsh battlefield conditions, as well as chemical, biological, radiation, and nuclear washdowns

- **CBRN regenerative filter**
  - Electronically controlled dual canister filters
  - Meets a wide range of airflow requirements
  - Continuously regenerates
  - No requirement for canister replacement

- **CBRN single-pass filter**
  - Compact high performance
  - CBRN filtration system
  - Utilizes the existing approved M48 cartridge
  - Easily integrated into any platform
  - Provides 100 CFM of clean air

- **CBRN environmental and overpressure seals**
  - Advanced materials and technology can withstand harsh battle environments and CBRN washdowns
  - Accurately maintains cab overpressure to ensure safe crew atmospheres

- **Dual system fuel management**
  - Broad product line of smart pumps, valves, and filters
    - Smart, brushless line of pumps, hydraulic and fuel filters, level-control valves, isolation valves, combination water separator smart pumps, electronic controller systems, and fire retardant systems
    - Designed to provide diagnostic information to vehicle system health monitoring
    - Provides increased survivability

- **Water purification**
  - Providing disaster relief units to NASA, FEMA, EPA, and military units
    - Ease of deployment and operation
    - Self-contained power supply
    - Transportable by air or truck
    - Ruggedly built to withstand harsh environments
    - Effectively treats seawater and fresh water contaminated with nuclear, biological, or chemical agents
    - System options: 200 to 250,000 gallons per day (smallest system in a back-pack format)
**Advanced thermal management**
Increasing power density while decreasing size and total systems cost

**COTS multi-phase cooling**

*High-power electronics: IGBT, SCR, batteries, ultra capacitors, traction motors*
- High-density, direct-contact cooling using latent heat-transfer and cold-plate form factors
- 3kW – 300kW+ heat rejection capability for both mobile and stationary systems
- Enables 40% increase in power density in the same space
- Reduction in total system weight and volume
- Uses dielectric fluid R134a, currently in U.S. Army logistics for A/C systems
- Fits into existing packaging schemes
- No antifreeze, no biocides, no maintenance system
- Compatible with:
  - Military two-level maintenance protocol
  - Military technology upgrade insertion program

**Liquid flow-through chassis and heat-rejection systems**

*Enclosures, cold plates, and heat exchangers*
- Highly efficient heat-removal capability for SWaP savings
- Provides flexibility of local or remote heat rejection
- Designed for harsh military applications
- Handles a broad range of temperatures: -55°C to 71°C
- Enables use of conduction-cooled electronics into extended-temperature environments
- Improves reliability and survivability
- Supports 3U/6U VME, VXs, VPX

**Vetronics and mission processor cooling systems**

*SprayCool® direct-spray enclosures*
- Rugged, self-contained, sealed enclosures (environmental isolation)
- Designed for harsh military applications
- Handles a broad range of temperatures: -65°C to 71°C
- Improves electronics reliability and survivability
- Enables use of any electronics (commercial, industrial, rugged)
- SWaP savings enabled by extremely efficient heat-removal capability
- Handles board power levels from 0 to 500 watts per slot
- Supports 3U/6U VME, cPCI, VXH, VPX

**Liquid-cooled cold plate and spray modules**

*High-power electronics: radar, EW, power electronics*
- Internal geometries and/or atomizer configurations optimize performance (uniform surface temperature, pressure drop, etc.)
- Can be used with a variety of fluids including PAO, EGW, PGW, refrigerants, etc.
- Design can include single- and two-phase liquid to advantage of latent heat of vaporization
- Very configurable and scalable from inches to almost four feet
- Individual cold plates already dissipating upwards of 5kW each

**Hydraulic and electric fan systems**

*For engine compartment cooling*
- Remote mounting provides increased air flow and reduced noise
- Variable fan speed to conserve power
- Greater cooling at low to medium engine speed
- Reversing fan purges clogged radiators
- Fans can be stopped for fording requirement
- Single or multiple fan options
- Power-dense fan-cooling subsystems or full vehicle system capability
- All electric, no potential hydraulic or fire hazard
- Frees up engine horsepower
- 24 up to 600 vDC system
Power generation systems
Multiple drive options for export power

- **Custom hydraulics**
  - Alternator-generator drives
  - Constant RPM regardless of engine RPM
  - Constant high-amperage output

- **Silent-drive hydraulics**
  - Battery-powered hydraulics
  - Charging in one assembly

- **High-voltage 460 VAC systems**
  - 10 KW – 300 KW
  - Precision two-phase liquid cooling with 90% efficiency

Winch systems
Integrated, lightweight hydraulic and electric options

- Parker and Warn have teamed up to provide a totally integrated solution to support systems in the field with a lightweight, heavy-duty winch assembly powered largely by vehicle hydraulics
- A world leader in orbit-style, low-speed, high-torque hydraulic motors and an expert in hydraulic power, Parker offers winch technology that meets the most demanding challenges
- Parker offers integrated solutions with optimum performance over a full line of vehicle platforms

**PHASE I**
- **Engine-driven power system**
  - Retrofitable to existing vehicle platforms
  - Engine fan-belt driven
  - 300-pound system
  - High voltage
  - 30KW power
  - Hydraulic-driven direct belt drive

**PHASE II**
- **Micro-turbine power system**
  - Retrofitable to existing vehicle platforms
  - 200-pound system
  - 40KW quiet power
  - Small package
  - Isolated from engine
  - Same fuel supply as engine
  - No parasitic drain on vehicle power train
Door, hatch, & turret assist systems
Small, lightweight, and powerful

- Uniquely powerful, yet compact enough to fit within armored doors
- Electrohydraulic and pneumatic subsystem solutions available
- Both provide lightweight and reliable low-noise operation
- Subsystem content tailored for specific applications
- Crush prevention technologies incorporated to enhance warfighter safety

Power steering systems
Featuring Intellinder™ absolute position sensor

- Monitors linear position in applications requiring intelligent system control
- Four redundant sensors for improved reliability and safety
- Easy adaptability for reduced engineering and installation costs
- Absolute and immediate position-sensing technology for optimum safety

Sealing in safety
The best defense against water and dust intrusion, Parker seals offer low permeation, EMI shielding capability, NBC wash-down resistance, and low complexity

VISION SYSTEMS
Platforms
- Thermal imaging systems
- Range finders
- Target-acquisition designators
- Binoculars and monoculars
- Eye protection
- Flashlights
Applications
- Housings
- Eye pieces
- Battery covers
- Lens caps
- Rubber armor

SOLDIER COMFORT AND PROTECTION
Platforms
- Hydration systems
- Chemical/biological protection
Applications
- Caps
- Tubing
- Gas masks
- Grips

WEAPONS
Platforms
- Grenades
- Missiles
Applications
- Handles
- Bases

ELECTRONICS
Platforms
- Radios
- Headsets
- GPS systems
- Detection
- Ruggedized computers
Applications
- Housings
- Keypad covers
- Antenna covers
- Rubber armor
Integrated fluid connector systems

Streamline development and speed manufacturing with industry’s broadest family of products, designed to work together as an integrated system

As the world’s largest manufacturer of fluid connectors, Parker offers a complete range of commercial, off-the-shelf (COTS) products for tactical and combat vehicles. Our fluid connectors are engineered, manufactured, and tested to work as an integrated system, delivering exceptional quality and reliability that you can count on.

Formed hydraulic hose
- Eliminates hose/tubing combinations
- Color coding available
- 50% reduction in installation time

Aluminum adapters
- 65% lighter than steel and stainless steel fittings
- Superior corrosion resistance to salt spray

Engine coolant hose
- Replaces formed hose
- Extremely flexible
- Easy routing

Silicon heater hose
- Lightweight, extremely flexible
- Meets SAE J20R3 Class A to +350°F (176°C)
- Meets SAE J30R7/R14t2 and EPA/CARB
- Qualified with Parker push-to-connect SAE J2044 / J2045 fittings

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Aluminum adapters
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- Superior corrosion resistance to salt spray

Push-to-connect hydraulic hose/tube connections
- Compatible with any existing O-ring face-seal fitting
- Wrenchless assembly
- Can be disconnected with a standard wrench
- Separable non-welded piping solution
- Carbon steel and stainless steel
- Separable non-welded piping solution
- XTR coating provides more than seven times the SAE standard of corrosion protection
- Withstands nitrogen-based fertilizers and other harsh chemicals

Hose for transmission & fuel
- Lightweight aluminum fittings
- Easy to install, flexible

Air brake harnesses
- Turn-key installation
- Color coding available
- 50% reduction in installation time

Hose for air brakes
- Lightweight aluminum fittings
- Easy to install, flexible

Thermal bypass valves
- Warms up hydraulic and transmission oil on cold starts
- Pressure relief to prevent over-pressurizing the cooler
- Lightweight aluminum construction

Aluminum quick couplings
- Shorten engine change-out time
- Reduce fluid loss in the system
- Flush-face, non-spill options

Aluminum swing check valves
- Lightweight check-valve option
- Low crack pressure with good flow performance

Hose for air brakes
- Lightweight aluminum fittings
- Easy to install, flexible
Parker Hannifin Corporation
The world leader in motion and control

The world’s leading diversified manufacturer of motion and control technologies and systems, Parker Hannifin is providing precision-engineered solutions to address the challenges of human kind, including food, water, infrastructure, transportation, life sciences, environment, defense, and energy, for a wide variety of mobile, industrial, and aerospace markets.

- **$12 billion** in revenue
- **861,000** products sold
- **468,000** customers
- **58,000** employees
- **13,000** distribution/MRO outlets worldwide
- **1,100** markets
- **142** divisions
- **46** countries

AEROSPACE

AUTOMATION

CLIMATE & INDUSTRIAL CONTROLS

Filtration

FLUID CONNECTORS

HYDRAULICS

INSTRUMENTATION

SEAL