



Universal Tilt Sensor (UTS-ID) for Impact and IoT technology

Stable Multi-Axis Control and Smart Impact Detection for Mobile Equipment



ENGINEERING YOUR SUCCESS.

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Stable Multi-Axis Control for Mobile Equipment



The design and deployment of aerial lifts, truck-mounted cranes, telehandlers, scissor lifts, forklifts, manlifts and other modes of vehicular material handling demands two requirements above all others:

- Safety for the operators
- Operational integrity for the vehicles

Achieving these dual goals requires constant monitoring of impact event and unsafe conditions. The first quarter of the 20th century saw the advent of the first analog technologies to measure acceleration. Some of the early adopters of this technology were aircraft, elevators, steam turbine manufacturers...and for many years the use of this technology was confined to R&D labs. It would take many decades before this sensing technology could be packaged and commercialized so it may find its true call on mainstream, everyday equipment.

By the last decades of the 20th Century, electronic controllers had made their appearance and were able to process these acceleration and vibration signals, activating sound or visual light indicators, to provide machine operators feedback on the stability or excessive use of the equipment. Many of today's material handlers continue to rely on such electronically powered alert systems.

But with the advent of the Internet of Things (IoT) and the near-limitless interconnectivity possibilities it presents, a seismic shift has occurred in material handling controls. Parker's Universal Tilt Sensor for Impact Detection (UTS-ID) technology integrated with Parker's IoT system, was specifically designed to optimize operator and load safety while facilitating interconnectivity.

Open Protocol

Universal Tilt Sensors for Impact Detection (UTS-ID) operate over a CAN bus connection using an industry-standard SAE J1939 communication protocol and an integral Deutsch DT four-pin connector. With UTS-ID, OEM designers can deploy one product to achieve single, dual or three-axis mobile control, while its plug-and-play

connectivity to a full range of Parker hydraulic, electronic control components and cloud-based solutions, ensures system-compatible data collection, vital signal monitoring, alerts, asset location as well as historical event reconstruction. The UTS-ID is IoT (Internet of Things) ready and can be integrated with Parker Mobile IoT solution or any third party IoT system.

Compact and Versatile

The UTS (Universal Tilt Sensor) technology features a low-profile form and three slightly offset mounting holes around its diameter that make it easy to install and remove, even in challenging field conditions. This fool-proof mounting profile ensures the UTS is properly and consistently mounted across a vast array of machines, while enabling a full range of horizontal, vertical, and angular mounting positions.



Robust and Reliable Sensor

The UTS-ID has a glass-filled, hybrid plastic construction for sturdiness and corrosion resistance. The sensor is very robust and able to withstand rugged applications. For moisture protection the

enclosure is sealed against harsh environments using spin-weld technology. These features give the sensor IP69k protection for exposed outdoor applications when mounted right side up and an IP68 rating when mounted up-side down. Additionally, the

UTS-ID design has a high level of EMI protection, providing effective insulation against electromagnetic and electrostatic interference, meeting, or exceeding ISO EMI and ESD standards.

UTS-ID and IoT Technology in Action

UTS-ID

Impact Thresholds
Noise Minimum
Intensity Setup



Impact Detection

Forces
Orientation
Time
Location



Alerts

Alert History
Email/SMS



Impact Reports

Events
Heat Map
Trends



Smart Sensor

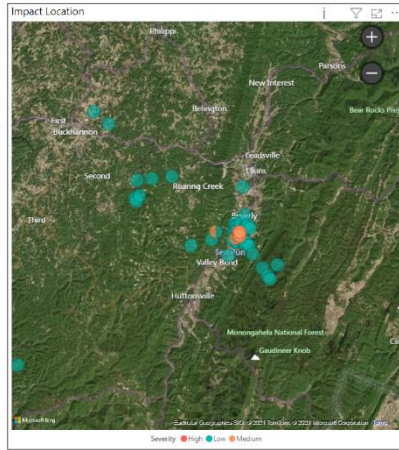
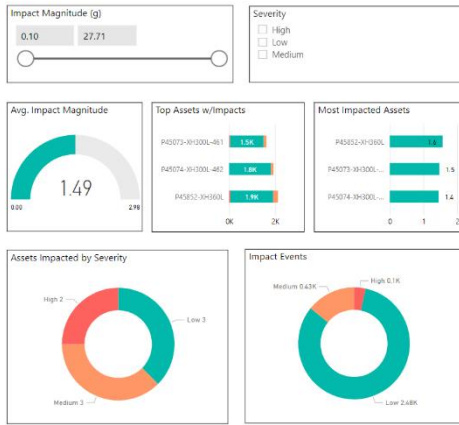
UTS-ID uses MEMS technology to provide a multi-axis acceleration sensor optimized for mobile hydraulic applications. The UTS-ID accelerometers are used to calculate changes in orientation with respect to gravity to compute and communicate impact events. The sensor communicates over CAN bus using SAE J1939 protocol and has an integral Deutsch connector.

Advanced Impact Algorithm

The UTS-ID comes standard with 3-axis acceleration detection and advanced algorithm to determine impact events. The smart sensor is responsible for filtering the impact events, by tracking the orientation of the sensor, combining the accelerometer and gyro readings. The sensor can also be configured to smooth out the potentially noisy acceleration signal.

IoT Connectivity

Perhaps most exciting of all are the possibilities for using UTS-ID and its integration with IoT technology. The sensor and IoT systems communicate over an industry-standard J1939 protocol, also a plug-and-play IoT gateway and integration with controllers allows for data collection and reporting to a cloud-based solution, available over PC or mobile devices.



time, and impact severity. These business intelligence reports present summary statistics over an impact detection dashboard, that often includes impact location heatmaps, top impacted assets, impact event counts, average impact magnitude, impact severities and more. Users can select specific assets in their fleet to validate performance. Comparative charts are available to evaluate impact trends, ranking the least and most impacted assets. Impact reports gets the digital information in your hands to improve safety, support warranty claims, or help improve driving performance.



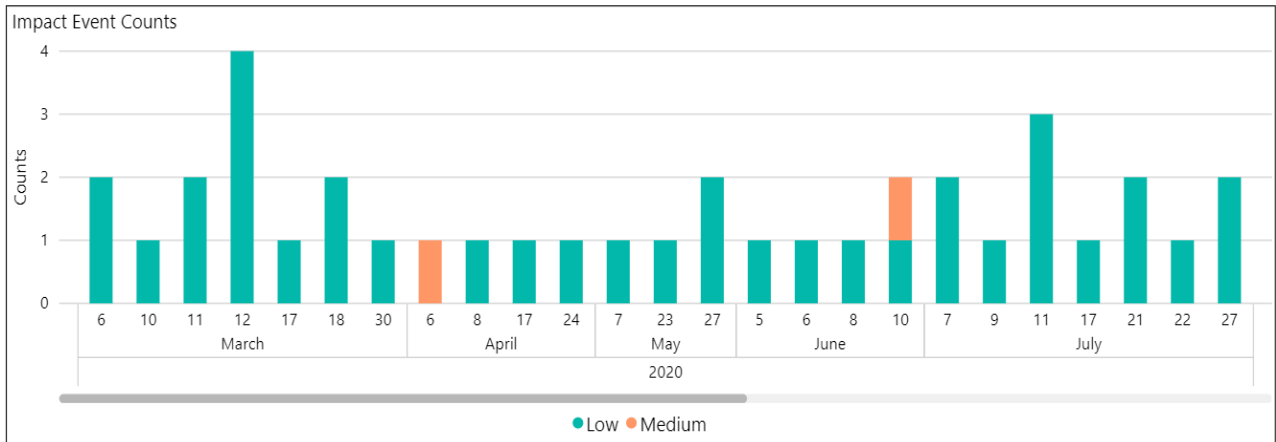
Impact Alerts and Notifications

IoT systems allow users to configure impacts alerts for based on acceleration forces. OEMs and Fleet Owners can monitor impact signals from the sensor, including magnitude, 3-axis orientation, 3- axis acceleration and set specific threshold values in the cloud,

generating alert notifications on any important impact condition. Notifications are pushed to a PC or mobile devices via email, or SMS.

Impact Reports

UTS-ID integration with IoT allows users to review impact historical data on a PC or mobile device. Impact reports consolidate all events gathered from the sensor, including location,



Imagine...

Aerial devices using UTS-ID for impact or acceleration detection during boom elevation, will be able to transmit functional behavior back to an OEM design team, which they can use to analyze safety-related trends and improve next-generation vehicles...



Refuse trucks, dump trucks or forestry equipment operating on neighborhood roads or work sites, transmitting individual route profiles and critical impact events back to the home office to identify problem areas and improve safety, training, and emergency response services...



Material handlers transmitting information on operator behavior to spot and intervene when irresponsible handling repeatedly requires override intervention...

Every **mobile hydraulic vehicle's** field performance being monitored by OEMs to facilitate warranty reviews and reduce liability...



As more and more components and processes attempt to leverage the IoT, Parker UTS technology will become a drop-down configurable component within an increasingly complex, interconnected system that:

- Promotes operator safety
- Optimizes equipment performance
- Provides comprehensive reporting for analysis and improvement
- Increases productivity through predictable maintenance and improved uptime
- Improves customer satisfaction and loyalty through proactive data-driven service engagement
- Selectively shares data across distribution and supply channels

Get Connected

UTS technology and IoT connects seamlessly with an extensive line of Parker electronic system products and solutions, including mobile master controllers, displays, mobile sensors, operator controls, IQAN controllers and displays, accelerating the development and deployment cycles for industrial mobile vehicles.

For information on the UTS-ID sensor, please visit: <https://ph.parker.com/us/en/uts-id>

About Parker

As the leading global provider of fully integrated hydraulic systems and advanced hydromechanical and electromechanical subsystems and components, the Parker Electronic Motion and Controls Division is ideally positioned to provide the engineering and IoT expertise, precision manufacturing and reliable distribution network needed by Mobile Equipment OEMs and their customers to meet the challenges of the digital age.

About the Authors

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Hector Rodriguez is Parker IoT product manager for the Electronic Motion and Controls Division, Parker Hannifin Corporation. Hector has extensive experience in IoT platforms and engineering solutions. Hector's helped connect assets and develop remote monitoring solutions for multiple automotive and trucking OEMs, Rental and Leasing companies