Rail networks in more advanced economies are being stressed with faster trains and heavier loads on freight and passenger lines. This increased physical stress on the rail track integrity required more frequent and more robust inspection with more advanced technologies, including ultrasonics, magnetic induction (or magnetic flux leakage), eddy current sensing and automated visual inspection. However, risk of catastrophic failure still looms in between inspection if the frequency is not adequate.

Stress induced failures or defects in rail track have causes 30% of all train industry accidents. Loading stress on rail tracks induces defects in rail head, rail web and support structure such as footing. Manual and visual inspection cannot find the internal fatigue induced flaws that may be developing inside the steel track or sleepers.

AVANTE Rail Gauge and Rail Integrity Monitoring System includes sensor devices mounted on rail track in even spacing to provide real-time data of gauge distortion in any direction, shock level, and other sensor data to provide real time visibility of rail track integrity. Any exceptions or sudden event of large enough gauge distortion by natural causes such as temperature, earthquake, flash flooding or man-made or stress cracking will be reported in real-time to stakeholders including oncoming train drivers and monitoring control center.

AVANTE Rail Switch Point Monitoring System uses the same AVANTE Sensor Network to communicate in real time: rail switch point position and their physical proximity or errors to the control center as well as other stakeholders.

Real-Time Rail Management with Customer Cargo Tracking

AVANTE Rail Cargo Management is web-based, designed to provide real-time freight visibility for all stakeholders.

AVANTE Rail Operation and Cargo Management System incorporates many advanced technologies besides wagon booking, payment management, train and crew scheduling. The following are currently deployed in Africa with unparalleled cost-effectiveness:

- Industry standard automatic equipment identifier (AEI) system for rolling stock management

- End-of-train-device (ETD) for real-time cargo wagon decoupling alert
- Real-Time Locating and Visibility of the goods being transported
- E-Seal for container wagon, cargo wagon and tanker car security management
- Real time fuel usage monitoring
- Moving block speed monitoring and real-time exception reporting
- Geo-fencing and route conformance for potential diversion issues
- Real-time alerts for any exceptions with geo-tagging via cellular and/or satellite communication
- Web role-based visibility and access to location and conditions of cargo an