

Case Study - Rolling Stock GPS System

The rail division of a global mining company recently implemented GPS hardware and software on the locomotive fleet and on some specialist track vehicles. One of the problems encountered by the system was the unreliable GPS signal which was experienced when rolling stock travelled close to major infrastructure such as the maintenance sheds. The system also lacked good reporting and spatial visualisation capabilities which led to decision support issues. Examples of these issues included the ability to locate and determine locomotive and track vehicle activity and utilisation metrics.

Following a tender process SATEVA was selected to develop the Rolling Stock GPS System to address these issues. By developing the new Rolling Stock GPS System, the client realised a number of benefits which included:

- Increased ability to locate locomotives and track vehicles,
- Improved utilisation and activity metrics for rolling stock,
- Increased ability to analyse handover wait times between different business units, and
- Improved decision support in the areas of train scheduling and maintenance.

The new system integrates with the existing GPS tracking solution and algorithms were written that use the last valid position of a vehicle to correct the GPS coordinates before storing the corrected rolling stock location into a database that tracks over 200 million positions per annum. The system was designed to handle failures in the GPS tracking solution and reprocesses historical GPS data when the GPS tracking solution is back online.

SATEVA also built a Microsoft Windows based client application consisting of a Google Earth plug-in to visualise the rail network and rolling stock locations. This visualisation capability allows users to view live and historical rolling stock movements and also play-back movements over specific periods of time. A reporting capability is provided that allows users to execute and save reports regarding the activity, utilisation, and handover wait times associated with specific rolling stock.

The Rolling Stock GPS System was developed using Microsoft C#.Net, WPF, Google Earth, SQL Server Reporting Services, and Oracle. The company's rail network model was imported and a coordinate conversion capability was developed to allow rolling stock locations to be displayed in Google Earth.

SATEVA is a technology consulting firm based in Perth, Western Australia. SATEVA specialises in providing technology consulting services to the mining, metals, and rail industries. Our company provides project management, business analysis, IT architecture, and application delivery services. SATEVA specialises in building IT solutions in areas such as exploration, mine geology, grade control, planning, rail systems, ore tracking, inventory management, reconciliation, and data management.