GE Transportation -

A Leader in Transforming Rail

EXECUTIVE SUMMARY

For more than a century, GE Transportation has been solving the world's toughest rail challenges. Along with producing a succession of world-class locomotives, GE Transportation's constant progress has produced innovations that railroads use to move goods and people safely around the world.

Vital to the United States' economic strength, freight railroads move 42% of U.S. freight, carrying countless products and materials like milk, scrap iron, grains, fruits and vegetables, textiles and automobiles. Knowing that the United States' already-taxed freight requirement will double in the next 25 years, railroads are looking for ways to increase capacity by increasing speed and efficiency.

THE CHALLENGE

Increase railroad capacity.

THE SOLUTION

Movement Planner System

The railroad equivalent of an air-traffic control system, Movement Planner System is breakthrough technology enabling more locomotives to run on the same railroad at faster speeds and with greater efficiency — without laying new track. This revolutionary product is the latest example of how GE Transportation's $4 billion-a-year software and solutions services businesses are helping customers improve productivity.

Ecomagination[SM] qualified, Movement Planner System integrates railroad logistics with traffic-control systems and considers multiple factors such as train schedules, traffic-control systems and train movements relative to each other. The software then develops an optimized traffic plan for the trains, even down to the best speed at which to travel to keep the flow going throughout the railroad.

Ecomagination is GE's initiative to bring to market new technologies that will help customers meet their most pressing environmental challenges.

RESULTS

Productivity and environmental gains along with savings of millions of dollars in capital and expense.

With Movement Planner System, railroads could expect velocity increases of approximately 10%. That is typically equal to three or four miles per hour in increased speed. Every one mile per hour faster a freight train travels, a railroad can save up to $200 million a year in capital and expenses in certain instances. By maximizing existing railroad resources, Movement Planner System also improves railroad crew management availability.

Movement Planner System Capabilities

Addressing a full range of planning needs from offline analyses to real-time scheduling and execution, Movement Planner System uses a simulation based planning system that integrates the physical network model to compute running times between stations and forecasts arrival times at scheduled stops independent of scheduled times.

Whether used online to forecast performance against schedule or offline in service design mode to benchmark schedules against projected train performance, each configuration uses the same infrastructure model.

Operating in offline mode, the software recommends solutions using "what-if" analysis and time-schedule verification, all while identifying conflicts. These recommendations consider customers' priorities and contractual incentives.

After optimizing the train's movements based on consist, route and track characteristics, Movement Planner System selects the optimal route by evaluating alternative trip plans, taking into consideration the railway operator's business objectives.

This innovative technology then provides the real-time plan for up to the next eight to 12 hours, predicting all "up-to-minutes" train trip plans within the planning territory based on realtime calculations.

Features

- Real-time network train movement planning
- Routes management and planning
- Maintenance and constraints
- Conflicts detection
- Conflicts resolution
- Business objectives-based optimization
- "What if" decision supporting

- Interactive train graph
- Automatic route setting
- Capacity planning

Proof of Performance with Norfolk Southern Railroad

GE Transportation recognized that to develop such sophisticated software, it would need a partner. Facing capacity issues, Norfolk Southern Railroad understood that complex railroad traffic technology would be a necessity as business increased and the population expanded. The partnership was formed.

Norfolk Southern Railroad operates approximately 20,000 route miles in 22 states and the District of Columbia, provides connections to other rail carriers and serves every major container port in the eastern U.S.

The early results of this partnership were so dramatic that Norfolk Southern Railroad will implement Movement Planner System along its entire 22-state rail network in 2012. In this application, the software will help the railroad gain a competitive advantage as it increases the average network speed train velocity by 10 to 20%, representing a significant opportunity for cost savings and train delay reductions.

ABOUT GE TRANSPORTATION

Established more than 100 years ago, GE Transportation, a unit of General Electric Company (NYSE: GE), is a global technology leader and supplier to the railroad, marine, drilling, mining and wind power industries. GE Transportation provides freight and passenger locomotives, signaling and communications systems, information technology solutions, marine engines, motorized drive systems for mining trucks and drills, high-quality replacement parts and value-added services. GE Transportation employs approximately 10,000 employees worldwide.

ABOUT THE INDUSTRIAL INTERNET CONSORTIUM

A founding member, General Electric has been a member of the Industrial Internet Consortium (IIC) since December, 2013. The Industrial Internet Consortium is a global public-private organization of over 140 members, formed to accelerate the development, adoption and wide-spread use of interconnected machines and devices, intelligent analytics, and people at work. Founded by AT&T, Cisco, General Electric, IBM and Intel in March 2014, the Industrial Internet Consortium catalyzes and coordinates the priorities and enabling technologies of the Industrial Internet. Visit www.iiconsortium.org.