UTC Project Information	
Project Title	MPC-549 – Benefit Cost Analysis of Railroad Track Monitoring Using Sensors On-Board Revenue Service Trains
University	North Dakota State University
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Start and End Dates	December 1, 2017 to July 31, 2022
Brief Description of Research Project	This study will develop, implement, and evaluate a benefit cost analysis (BCA) method to assess the benefits and costs of implementing an autonomous track geometry monitoring system to screen the network for faults during normal train operations. The BCA will quantify and monetize all potential costs and benefits of the technology deployment. Cost estimates will include research to obtain volume dependent pricing for equipment from key manufacturers of all the required system components. A complete autonomous track geometry monitoring system will include wireless sensors, energy harvesting devices, wireless access points, cloud computing resources, and maintenance. Costs such as a first installation may be one-time and other costs such as wide-area network communications and a cloud-service subscription may be recurring. Hence, some of the cost changes may be non-linear over time because of technology commoditization and the dynamic costs for cloud computing services. Quantifying the benefits will involve research and analysis to estimate time and monetary savings for track inspections and the reduction of track closures. Other potential benefits are from derailment risk

	reduction due to more regular inspections. The study will also describe any benefits that are not quantifiable in monetary terms, such as the use of standard web interface tools, the convenience of data visualization, and the modernization of asset management systems that incorporate the technology. In addition, this study will conduct an uncertainty and sensitivity analysis of the BCA under various scenarios proposed by Federal Railroad Administration (FRA) stakeholders.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	
Impacts/Benefits of Implementation (actual, not anticipated)	
Web Links • Reports • Project Website	