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## Utilizing Sprouts WSN platform for equipment detection and localization in harsh environments

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**Abstract:** This paper discusses the application of our Wireless Sensor Network platform called Sprouts, to monitor the steel shovel-teeth on shovelling equipment used in oil sands mining operations in Ft. McMurray, Alberta, Canada. If a fallen shovel-tooth reaches the rock crushers, serious damage to the crusher gears is expected. The Sprouts platform is utilized to monitor the viability of the shovel-teeth on the shovel bucket's teeth adapter. In addition, if a shovel-tooth becomes detached, Sprouts is used to estimate its location. By utilizing our Sprouts plug-and-play protocol, we implement a magnetic field and ultrasound distance sensor modules to detect the event of a fallen shovel-tooth. In addition, a wireless power transfer unit and two supplementary antennas are embedded in each shovel-tooth to aid in localizing (using trilateration) the part before it reaches the crusher.