Sensing a more reliable future

A quarter of the delays in the railroad traffic during winter are caused by frozen track switches. There's already a wide range of chemicals to thaw and keep the ice away, but someone needs to apply them. In this article we'll look into the RADASS and its sensors, that turns "someone" into "something".

The RADASS (Remote Access Dual Automatic Switch Spray) is a system under development, meant to keep track switches automatically thawed and well working. To do so, the system needs to make use of a wide range of sensors.

Sensors that measure the pressure of liquids pumped out to the tracks and making sure the machine stays running.

Sensors that measure the temperature on the tracks or react to precipitation so that ice and snow can be removed.

Sensors that foresee coming weather changes and on which side of the track drift snow will gather.

In the rough railroad environment, containers with liquids need to be kept at a distance from passing trains. Liquids must be pumped from a distance and maintain a high pressure to be evenly applied. A fall in pressure along the transport line can indicate a leakage or the pressure sensor can alert users when containers need to be refilled.

In the rough railroad environment, there is no place for humans. To thaw ice, often traffic needs to be stopped so that personnel can head out to the switch. It's a job that costs society tax-money and travelers even more . Sensors need to measure temperature and maneuverability of the switches, alerting the machine when there is a need to distribute liquids.

In the rough railroad environment, material is often stolen and harmed by intruders. The machine must be discrete, including its sensors. The RADASS implements a discrete weather station to predict snowfall and ice. That way, a coating of the liquid may be sprayed on the track before snow falls on it. It experiments with using accelerometers to measure wind direction and speed, finding new uses for the sensor.

For all its sensors and functions, the machine uses a Raspberry Pi to control valves, pumps and read sensors. With its low power consumption and flexible memory handling, it allows quick configurations and linux user interface. However with the low output power, the sensors and valves will require external power supplies. Luckily the environment is capable to fulfill these needs.

The system is already under prototype testing and in the future statistics will tell how efficient it really is.