

# LOADERS WORK DETECTION



Customer  
Rusagro  
Country  
Russia



## PROJECT DESCRIPTION

As part of supplied raw material accounting process structuring, Rusagro needed to ensure:

- Loader online monitoring
- Automatic recognition of loader track type
- Active work detection the beet pile field
- Row material measured weight distribution in terms of piles and supply periods

Accumulated historical data was processed with two developed algorithms:

- **Classic deterministic algorithm**  
Each track point is affiliated with a certain pile geofence. Distance to hydrochannel is also calculated. Active work periods are calculated on the basis of geofence visiting and hydrochannel approaching frequency.
- **Machine learning**  
Machine learning predictive model is trained on historical data using the platform in-built machine learning tools. It detects loader availability for each recent data point. This approach uses only loader track data and doesn't depend on geofence rendering quality.

## HARDWARE / DEVICES

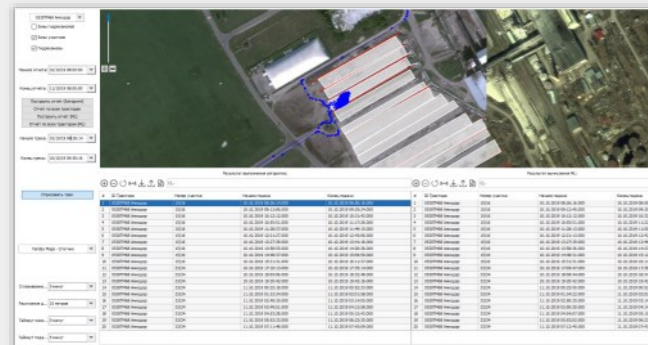
Loaders were equipped with GPS-trackers and connected to the platform using AggreGate Fleet Manager.

## BENEFITS

Advantages of the two approaches taken together ensure high precision of loader work period determination. This data is then used to distribute raw material weight by time periods and piles.

### SOLUTION

### Fleet Management



# PILES AUTOMATIC VENTILATION CONTROL

Customer  
Rusagro  
Country  
Russia



## PROJECT DESCRIPTION

To ensure ideal storage conditions of sugar beet, Rusagro needed to implement:

- Ventilation equipment remote control
- Automatic ventilation sensitive to pile temperature
- Historical analysis of ventilation equipment operation

## HARDWARE / DEVICES

Ventilation system was accomplished with a controller and additional edge equipment. The controller was connected to central AggreGate server (pile heat monitoring function) using Modbus TCP via installed Wi-Fi bridge.

All necessary data was collected in one environment: pile temperature measurements, ambient temperature, ventilation equipment current information and historical data. This made it possible to develop and implement several automatic control algorithms.

All historic data is stored in the database and is available for analysis with the help of build-in reporting tools.

## BENEFITS

- Raw material ideal storage temperature monitoring and maintenance (from +2 to +6)
- Reducing the risks of raw materials freezing by blocking ventilation operation at an ambient temperature below +1
- Ability to switch the installation control to remote manual mode

### SOLUTION

### IoT Platform

