SKIF

MONITORING
PLUS

CONTROL THE TRAFFIC

Full control of
grain harvesting

Implementation of the grain harvesting control project

CONTROL OBJECTIVES:

- Monitoring the equipment location and fuel consumption;

- Monitoring the units and assemblies condition of grain harvesting equipment at all stages of work;

- Organization of the algorithm for monitoring the equipment operation when grain harvesting at the following stages:

- **Field** - permission to discharge grain out the harvesters only into certain vehicles

- **Elevator** - permission to enter the territory only for certain vehicles;

- **Weight** - collection of information on the grain weight from a particular vehicle and transferring this information to the control center.

01

Control of the harvesters operation during grain harvesting

THE FOLLOWING PARAMETERS ARE CONTROLLED DURING THE HARVESTER OPERATION:

- Turning on the header;
- Header position - lifted/lowered;
- Control of operation in a specified geographic zone. When leaving the geographic zone - an alarm message with a possibility of automatically locking the header is formed;
- Emergency oil pressure in the hydraulic system - an alarm message with a possibility of automatically locking the header or the engine is automatically formed;
- Grain hopper fullness - 75%;
- Grain hopper fullness - 100%;

01

Control of the harvesters operation during grain harvesting

THE FOLLOWING PARAMETERS ARE CONTROLLED DURING THE HARVESTER OPERATION:

- Full control of the drivers' work, strict observance of route schedule;
- Identification and prevention of different violations and abuses;
- Support of continuous communication between the driver and the controller;
- Reduction of expenses on fuel and lubricant;
- Maintenance of proper staff discipline;
- Opportunity for operational and strategic planning of vehicle work;
- An increase in the efficiency of vehicle use.

01

Hopper filling 100%

Hopper filling 75%

Turning on the unloading auger

Turning on the header

Header position - lifted/lowered

Emergency oil level in hydraulic system

Control of operation in a specified geographic zone (geographic zone)

M+

01

Control of the harvesters operation during grain discharging

M+

TAG IDENTIFIED

If active tag is identified:

- A command to unlock the unloading auger is automatically generated;
- When the unloading auger is turned on/off, a message and a photo of the place where the grain is discharged are transmitted.
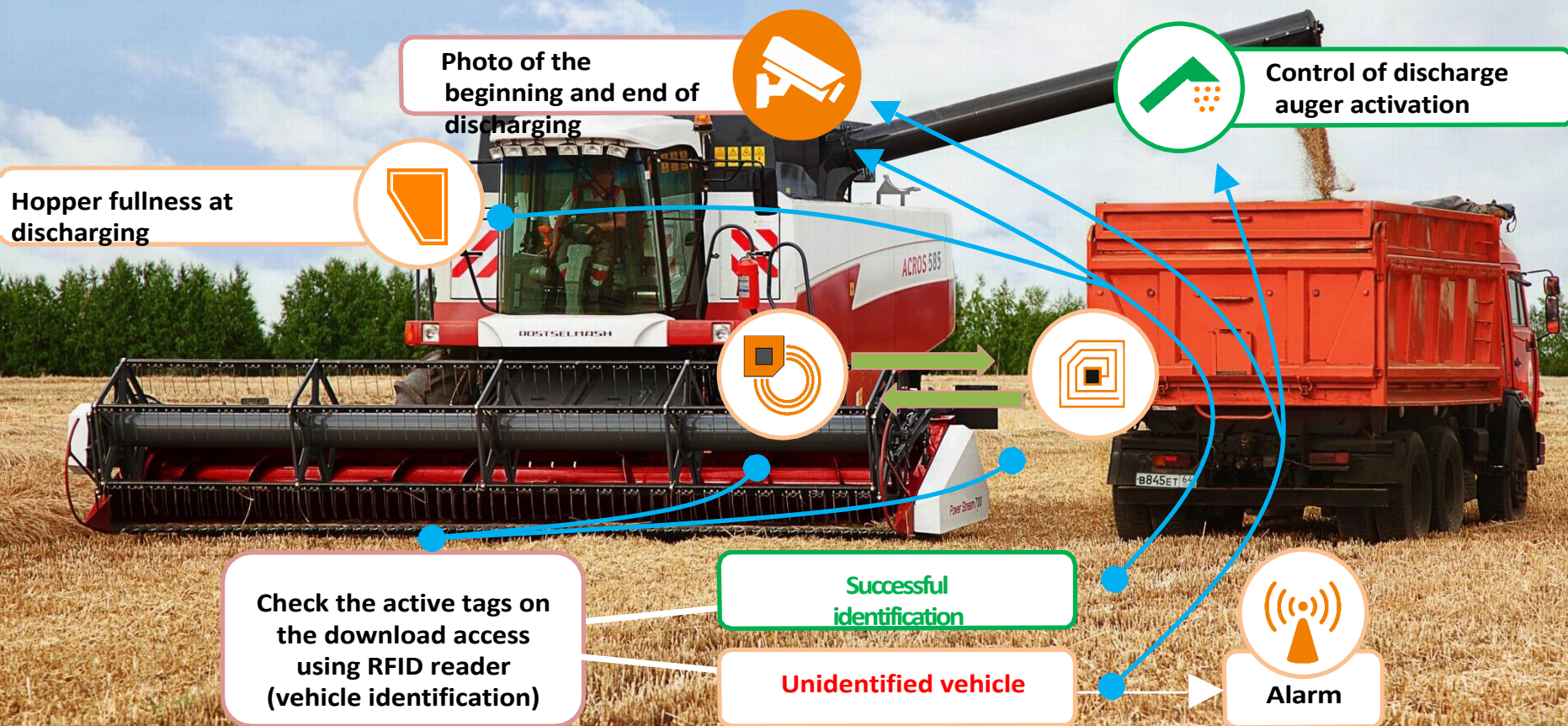
Parameter control:

- Turning on the unloading auger;
- Control of operation in a specified geographic zone.
- Emergency oil pressure in the hydraulic system - an alarm message is formed;
- Grain hopper fullness - 75%;
- Grain hopper fullness - 100%.

TAG NOT IDENTIFIED

If active tag (end of discharging) is absent/or identification is lost:

- A command to block the unloading auger is automatically generated;
- Photo of the place where the grain is discharged and the alarm message about an attempt to turn on the unloading auger is transmitted.

02

Photo of the beginning and end of discharging

Control of discharge auger activation

Hopper fullness at discharging

Check the active tags on the download access using RFID reader (vehicle identification)

Successful identification

Unidentified vehicle

Alarm

Entrance to the elevator

Photo

Identification

Data transfer to the control center

03

Control of vehicle discharging

**4.1. IDENTIFICATION OF ACTIVE TAG
WHEN VEHICLE ENTERS THE SCALES BEFORE UNLOADING**

- The "take a photo" command is automatically generated;
- Gross weighting;
- Sending data to the control center.

**4.2. IDENTIFICATION OF ACTIVE TAG WHEN
VEHICLE ENTERS FOR UNLOADING**

- The "take a photo" command is automatically generated;
- Sending data to the control center.

**4.3. IDENTIFICATION OF ACTIVE TAG WHEN VEHICLE ENTERS THE
SCALES AFTER UNLOADING**

- The "take a photo" command is automatically generated;
- Net weighting;
- Sending data to the control center.

Data transfer to the control center

Photo

Identification

Weight control

4.1. Weighing of loaded vehicle

04

Data transfer to the control center

Photo

Identification

4.2. Unloading

04

Data transfer to the control center

Photo

Identification

Weight control

4.1. Weighing of empty vehicle

04

Photo

Data transfer to the control center

Identification

5. Vehicle exit

05

Control parameter

Excessive play under the cylinder

Controller is missing!

Grain hopper is open

Straw rack is full

Grain hopper 70%

Disable cylinder control

Grain hopper 100%

Cylinder is on

The unloading auger drive is turned on while discharge pipe is stowed

Discharge pipe is on

Extra parameters

- Cylinder speed;
- In vehicle network emergency voltage;
- Emergency oil temperature in the tank;
- Incidental pressure in the pneumatic system;
- Emergency oil level in the oil tank;
- In vehicle network emergency voltage;
- No messages from the engine;
- Fuel reserve;
- Maintenance interval -1;
- Air filter is clogged;
- Maintenance interval -2;
- Engine maintenance;
- Maintenance interval -3;
- Engine maintenance timer;

Extra parameters

- Cylinder speed below normal;
- Fan speed below normal;
- Traveling speed;
- Hooper manhole is open;
- Pressure filter of the hydraulic system of the cylindrical jacks is clogged.
- Engine hours with thresher on.

Conclusions

THE USE OF MONITORING SYSTEMS ENABLES:

- To implement high-quality and multi-layered control of the equipment operation in all operating modes;
- To reduce the number of additions whilst conducting the field work, thus reducing the production cost of these works and the influence of human factor (collective collusion, fuel and lubricants, fertilizers theft, etc.) on the final result;
- To analyze the equipment operation based on the ratio of costs (fuel and lubricants, service life, etc.) and results obtained during cultivation of fields (number of harvested crops), to select the optimal models of agricultural machinery for performing different types of work.
- To remotely check engines, units and assemblies to optimize human and material resources when troubleshooting in the field;
- To predict scheduled maintenance to prevent unscheduled equipment repairs.

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