

USAGE REPORT

Vehicle: SRBC 17

Date: 24/04/2026

Location: SABI AGRI

Missions: 1

Mission 1

Trial date 2026-04-24

Location SABI AGRI, Auvergne, France

Operator Nicolas

Start time 11:00

End time 16:26

Weather

Precipitation type None

Temperature 24 °C

Sun position Zenith

Terrain

Slope 0 %

Cross slope 0 %

Soil

Texture Clay loam

Dominant particle size Stones 20-200 mm

Moisture condition Friable (optimal)

Crop

Species Radis et Carottes

Growth stage Maturity

Weed pressure 50 %

Planned operation Scraping

Adjacent environment

Tall vegetation No

Tall buildings No

Metallic structures Yes

Ditch or embankment Yes

High voltage lines No

Roads	No
No network zone	No
Robot configuration	
Robot weight	280 kg
Robot width	0.64 m
<i>Tool</i>	
Tool name	Bineuse 5 dents
Tool type	Trailed
Tool weight	50 kg
Tool length	1.0 m
Tool width	0.64 m
Tool height	0.6 m
Tool total length	1.1 m
Working depth	0.08 m



Figure 1.1: Mission presentation photo

Mission presentation

Mission parameters

Task to perform	Binage chardons
Trajectory	Rectiligne, square turn
Working speed	1.8 km/h
Mission file	Interrangboucle03.json

Organization

<i>Workforce</i>	
Total number of employees	1
<i>Surface</i>	
	0.08 ha

Theoretical surface of the plot

Worked plot surface 0.0984 ha

Plot fragmentation Consolidated (<0.5 km)

Trajectory

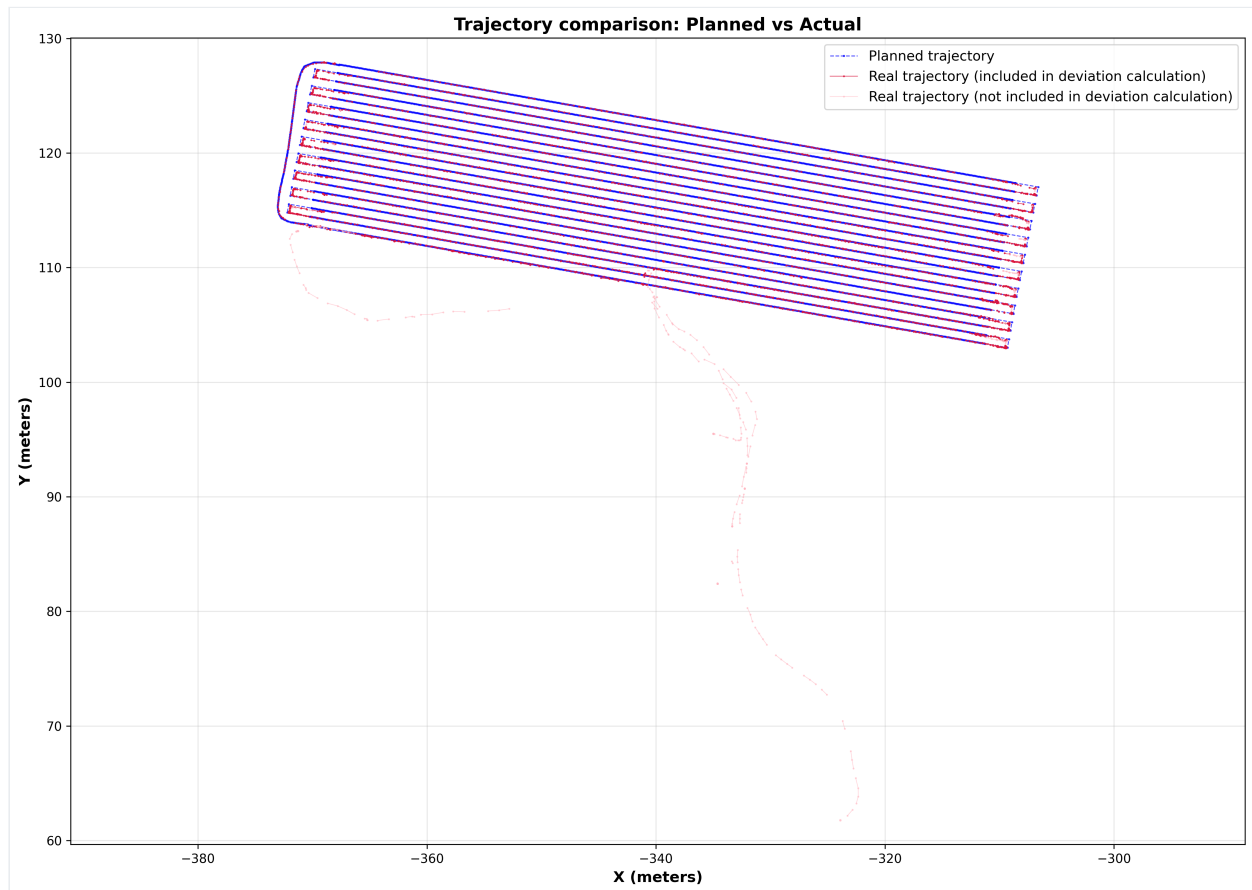


Figure 1.1: Planned vs actual trajectory comparison

Agronomic Summary

Energy per hectare 9.32 kWh/ha

Work rate 0.04 ha/h

Autonomy per battery 0.27 ha/batterie

Time tracking

Tool setup 30 min

GPS connection wait 50 min

Wi-Fi connection wait 0 min

Supervision time 120 min

Travel time 20 min

Restart count 10

Stop count	10
Stop causes	sortie du demis-tour; arrêt opérateur réglage outils; arrêt opérateur réglage lateral deviation
Work assessment	
Quality assessment	Generally satisfied
Crop damage	Low



Performance Indicators

Agronomic ^[1]

Indicator	Value	Unit
Crop species	Radis et Carottes	
Growth stage	Maturity	
Soil texture	Clay loam	
Soil moisture	Friable (optimal)	
Weed pressure	50	%
Planned operation	Scraping	
Work quality assessment	Generally satisfied	
Crop damage	Low	

Energy ^[2]

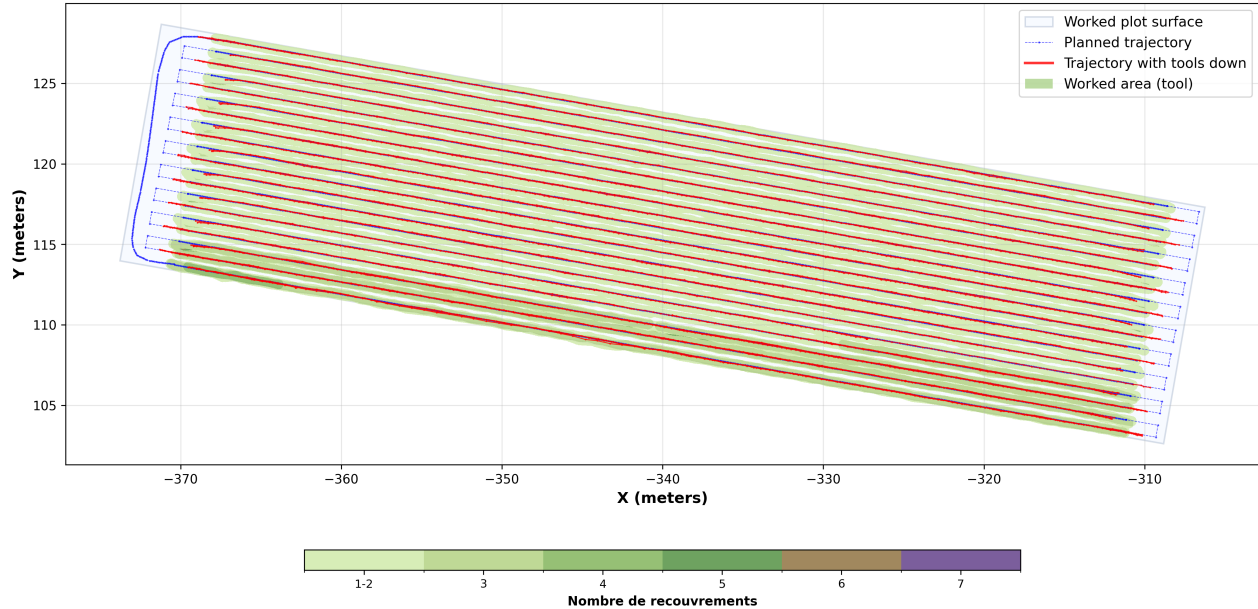
Indicator	Value	Unit
SOC at start	70.90	%
SOC at end	34.90	%
Total discharge ^[3] <i>For a battery pack capacity of: 2.54 kWh</i>	71.81	%
Total energy consumed	1.83	kWh

Indicator	Value	Unit
Average power	0.36	kW
Energy per hectare	9.32	kWh/ha
Autonomy per battery <i>Reference battery: 2.54 kWh</i>	0.27	ha/batterie

Work Rate ^[4]

Indicator	Value	Unit
Work rate ^[5]	0.04	ha/h
Area covered ^[6]	0.20	ha
Worked plot surface ^[7]	0.10	ha
Worked area ^[8]	0.17	ha
Effective area ^[9]	0.08	ha
Coverage rate ^[10]	101.12	%
Average speed (km/h)	1.06	km/h
Max speed (km/h)	3.60	km/h

Trajectory with tools down and worked area



Economic ^[11]

Indicator	Value	Unit
Electricity price	0.19	€/kWh
Labor cost per hour	18.00	€/h
Employees assigned	0	

Indicator	Value	Unit
Labor cost per hectare	0.00	€/ha
Energy cost	0.35	€
Energy cost per hectare	1.77	€/ha
Total cost	0.35	€
Total cost per hectare	1.77	€/ha

Environmental ^[12]

Indicator	Value	Unit
Temperature	24	°C
Precipitation type	None	
CO ₂ emissions ^[13] <i>Emission factor applied: 317 g CO₂ per kWh.</i>	0.58	kg
Plot fragmentation	Consolidated (<0.5 km)	

Mission ^[14]

Indicator	Value	Unit
Planned distance ^[15]	1308.97	m
Performed distance ^[16]	3064.04	m
Distance deviation	1755.06	m
Performed distance (%)	234.08	%
Mean lateral deviation <i>Without half-turn</i>	5.03	cm
Max lateral deviation <i>Without half-turn</i>	19.96	cm
Mean lateral deviation (tool) <i>Without half-turn, tool distance: 110 cm</i>	5.69	cm
Max lateral deviation (tool) <i>Without half-turn, tool distance: 110 cm</i>	19.99	cm
Worked rows ^[17]	21	

Operational ^[18]

Indicator	Value	Unit
Robot weight	280.00	kg
Tool weight	50.00	kg
Total weight	330.00	kg

Indicator	Value	Unit
Energy per kg per hectare	0.03	kWh/kg/ha
Mean torque at work (% of nominal) ^[19] <i>Reference nominal torque: 2.39 N·m — Number of motors: 2.</i>	53.17	%

Safety ^[20]

Indicator	Value	Unit
Geofencing exits	3	
Time outside geofencing (seconds)	762.99	s
Time outside geofencing (hours)	0.21	h
Local emergency stops	0	
Remote emergency stops	0	
Bumper activations	0	

Reliability ^[21]

Indicator	Value	Unit
Output errors	0	
Input errors	0	
Battery errors	0	
Motor errors	15	
Cylinder errors	7	
Total errors	22	
Output error time (seconds)	0.00	s
Input error time (seconds)	0.00	s
Battery error time (seconds)	0.00	s
Motor error time (seconds)	27.51	s
Cylinder error time (seconds)	49.81	s
Total error time (seconds)	53.43	s
Error rate per hour	4.53	/h
System availability	99.69	%

Localization ^[22]

Indicator	Value	Unit
Localization errors	12	
Error time (seconds)	3812.56	s

Indicator	Value	Unit
Error time (hours)	1.06	h

Time ^[23]

Indicator	Value	Unit
Total duration	17482.40	s
Total duration (hours)	4.86	h
Active time	12821.46	s
Active time (hours)	3.56	h
Inactive time	4660.94	s
Inactive time (hours)	1.29	h
Active time (%)	73.34	%
Inactive time (%)	26.66	%

Descriptions of indicators

Bracketed numbers refer to definitions, assumptions and sources listed below.

- [1] Agronomic indicator: value from the recorded crop trial context.
- [2] Energy indicator: derived from electrical measurements, consumption and SOC logged during the mission.
- [3] Total discharge (%): energy consumed during the mission (change in cumulative energy, in kWh) divided by nominal battery pack capacity (kWh), multiplied by 100. This indicator does not use start or end SOC; reference pack capacity is stated in the note when known.
- [4] Work-rate indicator: derived from worked areas, speeds and time on field.
- [5] Work rate: amount of work completed per unit of time, in ha/h. Hourly rate = area covered (ha) ÷ total mission duration (h).
- [6] Area covered: this is the area swept by the robot = cumulative odometric distance × robot width.
- [7] Worked plot surface: area of the plot worked by the robot. It is modeled as an oriented bounding box (OBB) with a margin equal to half the robot width around the planned trajectory that was worked.
- [8] Worked area: area processed by the implement (tool width × path length with implement lowered). Each pass counts; overlaps add up.
- [9] Effective area: area worked by the implement excluding overlaps.
- [10] Coverage rate: ratio of worked area to effective area. $(\text{worked area} - \text{effective area}) / \text{effective area} \times 100$. A high value indicates many passes over the same zones.
- [11] Economic indicator: computed from cost settings and mission energy/time aggregates.
- [12] Environmental indicator: derived from weather context or consumption using the documented method.
- [13] CO₂ emissions from grid electricity consumed during the mission (kWh × 0.317 kg/kWh). Source: French Ministry for Ecological Transition — Key Climate Figures (digital edition), chapter on GHG emissions from industry / electricity production (statistiques.developpement-durable.gouv.fr).
- [14] Mission indicator: derived from actual path, plan and computed geometric deviations.
- [15] Theoretical mission distance: cumulative length of the planned trajectory from the mission JSON file. Does not match the robot's actual path.
- [16] Distance actually traveled by the robot. May include movement before the mission effectively starts and after it ends, depending on the recorded data.
- [17] Number of distinct rows worked (tool lowered).
- [18] Operational indicator: derived from kinematics, implement data or documented masses.
- [19] Mean absolute motor torque only when the tool is lowered, as a percentage of the motors' nominal torque.
- [20] Safety indicator: derived from safety-related events and durations.
- [21] Reliability indicator: derived from fault codes and error time per subsystem.
- [22] Localization indicator: derived from localization faults or downtime during the mission.
- [23] Time indicator: derived from timestamps and activity states during the mission.