

USAGE REPORT

Vehicle: SRBC 18

Date: 06/03/2026

Location: Valence

Missions: 1

Mission 1

Trial date 2026-03-06

Location Valence, Drome, France

Operator Nicolas

Start time 09:20

End time 11:30

Weather

Precipitation type None

Temperature 20 °C

Sun position Est

Terrain

Slope 3 %

Cross slope 7 %

Soil

Texture Sandy loam

Dominant particle size Gravel 2-20 mm

Moisture condition Friable (optimal)

Crop

Growth stage Soil preparation

Weed pressure 0 %

Planned operation Soil preparation

Adjacent environment

Tall vegetation Yes

Tall buildings No

Metallic structures Yes

Ditch or embankment No

High voltage lines No

Roads No

No network zone	No
Robot configuration	
Robot weight	220 kg
Robot width	1.75 m
<i>Tool</i>	
Tool name	Support à roues avec bineuses (4 dents)
Tool type	Trailed
Tool weight	105 kg
Tool length	1.1 m
Tool width	1.75 m
Tool height	0.6 m
Tool total length	1.1 m
Working depth	0.1 m

Mission presentation

Mission parameters

Task to perform	Binage
Trajectory	rectiligne, square turn
Working speed	2.8 km/h
Mission file	Valence3.json

Organization

<i>Workforce</i>	
Total number of employees	1
Employees on robot task	0
<i>Surface</i>	
Theoretical surface of the plot	0.02 ha
Worked plot surface	0.0309 ha
Plot fragmentation	Consolidated (<0.5 km)

Trajectory

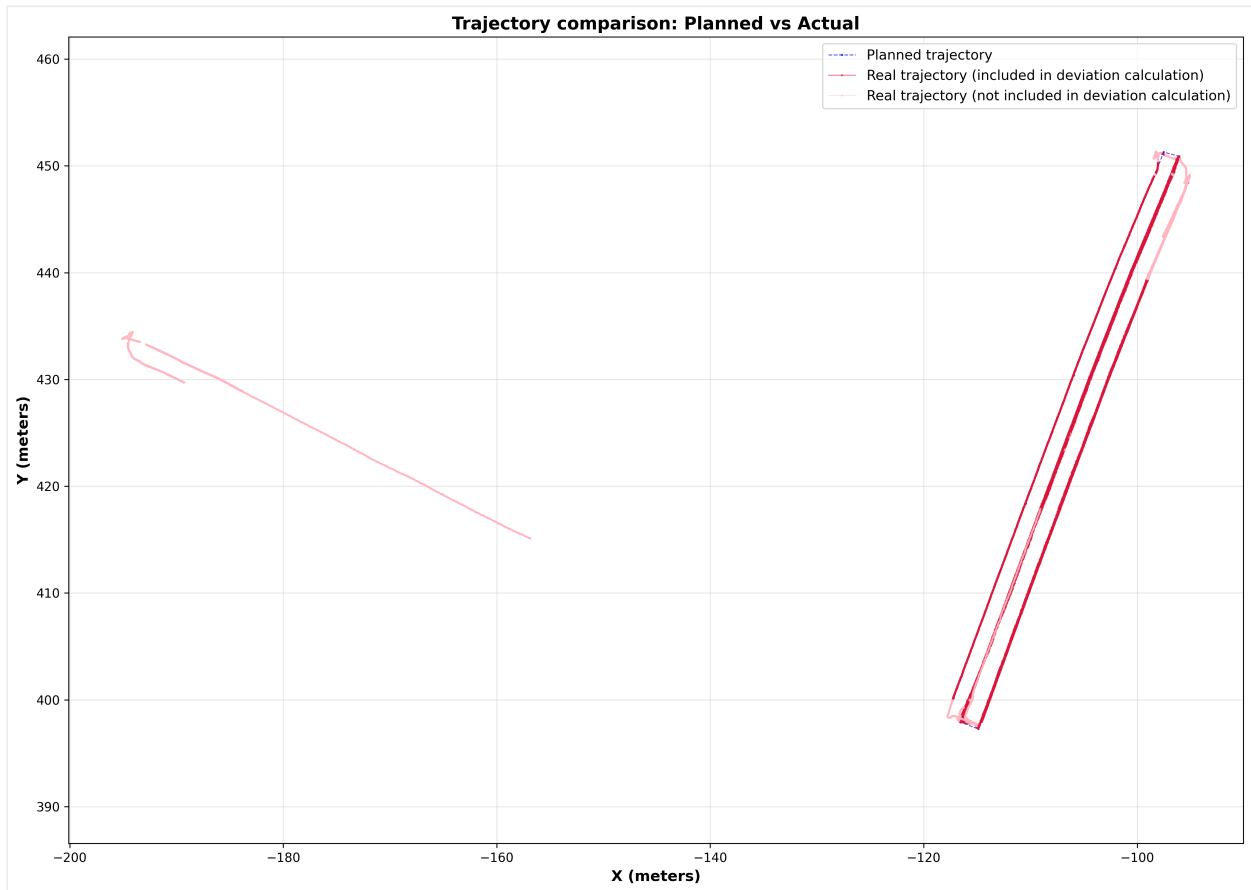


Figure 1.1: Planned vs actual trajectory comparison

Agronomic Summary

Energy per hectare	1.92 kWh/ha
Work rate	0.09 ha/h
Autonomy per battery	1.32 ha/batterie

Time tracking

Tool setup	10 min
GPS connection wait	80 min
Wi-Fi connection wait	0 min
Supervision time	120 min
Travel time	30 min
Restart count	5
Stop count	6

Stop causes	Derive de la trajectoire en devers. Pas de demis tour avec le robot à roues; Pas de correction RTK redémarrage
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Work assessment

Quality assessment	Somewhat dissatisfied
Crop damage	None

Performance Indicators

Agronomic ^[1]

Indicator	Value	Unit
Crop species	N/A	
Growth stage	Soil preparation	
Soil texture	Sandy loam	
Soil moisture	Friable (optimal)	
Weed pressure	0	%
Planned operation	Soil preparation	
Work quality assessment	Somewhat dissatisfied	
Crop damage	None	

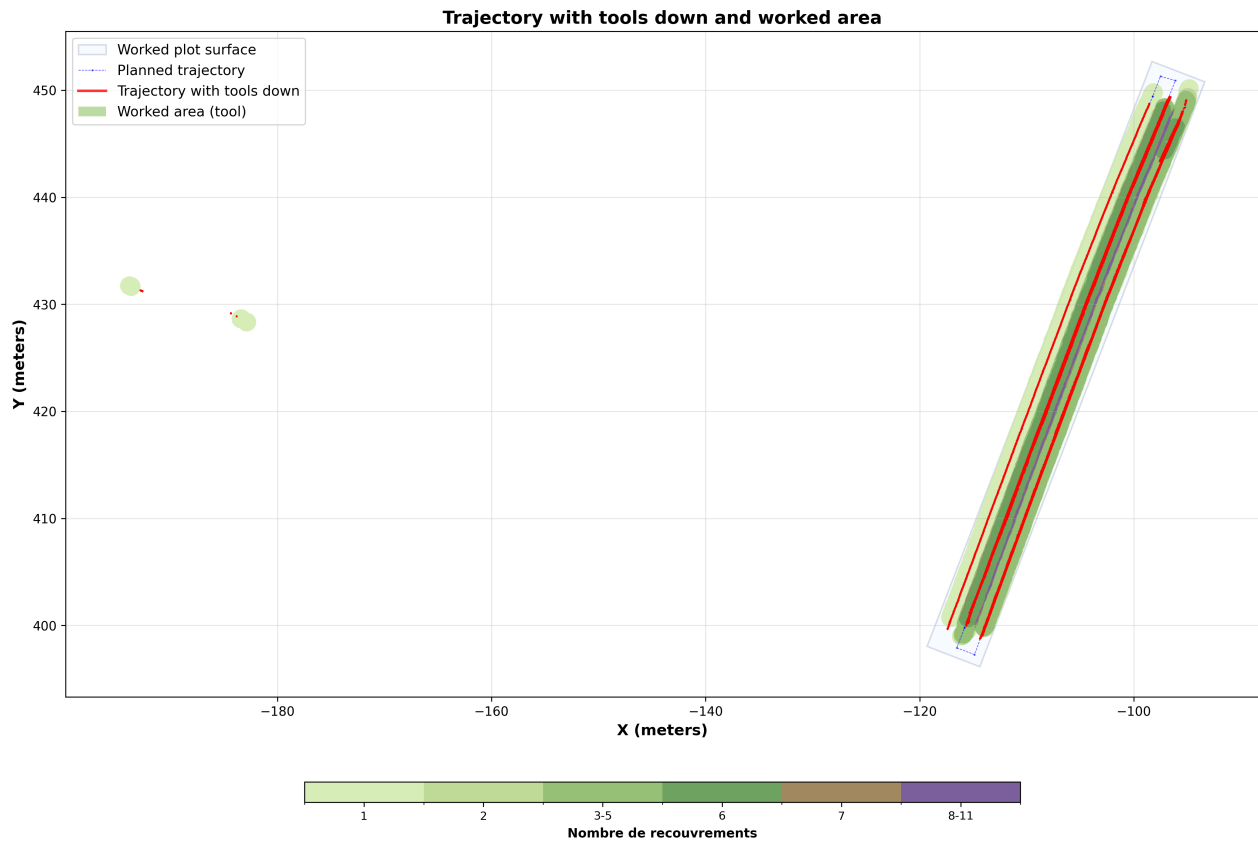
Energy ^[2]

Indicator	Value	Unit
SOC at start	66.90	%
SOC at end	53.10	%
Total discharge ^[3] <i>For a battery pack capacity of: 2.54 kWh</i>	14.78	%
Total energy consumed	0.38	kWh
Average power	0.18	kW
Energy per hectare	1.92	kWh/ha
Autonomy per battery <i>Reference battery: 2.54 kWh</i>	1.32	ha/batterie

Work Rate ^[4]

Indicator	Value	Unit
Work rate ^[5]	0.09	ha/h
Area covered ^[6]	0.20	ha
Worked plot surface ^[7]	0.03	ha
Worked area ^[8]	0.11	ha
Effective area ^[9]	0.03	ha

Indicator	Value	Unit
Coverage rate ^[10]	304.30	%
Average speed (km/h)	1.07	km/h
Max speed (km/h)	3.40	km/h



Economic ^[11]

Indicator	Value	Unit
Electricity price	<i>N/A</i>	€/kWh
Labor cost per hour	<i>N/A</i>	€/h
Employees assigned	0	
Labor cost per hectare	<i>N/A</i>	€/ha
Energy cost	<i>N/A</i>	€
Energy cost per hectare	<i>N/A</i>	€/ha
Total cost <i>Prix de l'électricité non disponible dans le COD</i>	<i>N/A</i>	€
Total cost per hectare	<i>N/A</i>	€/ha

Environmental ^[12]

Indicator	Value	Unit
Temperature	20	°C
Precipitation type	None	
CO ₂ emissions ^[13] <i>Emission factor applied: 317 g CO₂ per kWh.</i>	0.12	kg
Plot fragmentation	Consolidated (<0.5 km)	

Mission ^[14]

Indicator	Value	Unit
Planned distance ^[15]	169.61	m
Performed distance ^[16]	1118.88	m
Distance deviation	949.27	m
Performed distance (%)	659.67	%
Mean lateral deviation <i>Without half-turn</i>	4.74	cm
Max lateral deviation <i>Without half-turn</i>	19.98	cm
Mean lateral deviation (tool) <i>Without half-turn, tool distance: 110 cm</i>	7.04	cm
Max lateral deviation (tool) <i>Without half-turn, tool distance: 110 cm</i>	19.99	cm
Worked rows ^[17]	3	

Operational ^[18]

Indicator	Value	Unit
Robot weight	220.00	kg
Tool weight	<i>N/A</i>	kg
Total weight	220.00	kg
Energy per kg per hectare	0.01	kWh/kg/ha
Mean torque at work (% of nominal) ^[19] <i>Reference nominal torque: 2.39 N·m — Number of motors: 4.</i>	30.36	%

Safety ^[20]

Indicator	Value	Unit
Geofencing exits	0	

Indicator	Value	Unit
Time outside geofencing (seconds)	0.00	s
Time outside geofencing (hours)	0.00	h
Local emergency stops	1	
Remote emergency stops	0	
Bumper activations	2	

Reliability ^[21]

Indicator	Value	Unit
Output errors	0	
Input errors	0	
Battery errors	0	
Motor errors	1	
Cylinder errors	2	
Total errors	3	
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)	0.22	s
Cylinder error time (seconds)	0.20	s
Total error time (seconds)	0.42	s
Error rate per hour	1.42	/h
System availability	99.99	%

Localization ^[22]

Indicator	Value	Unit
Localization errors	1	
Error time (seconds)	122.00	s
Error time (hours)	0.03	h

Time ^[23]

Indicator	Value	Unit
Total duration	7628.63	s
Total duration (hours)	2.12	h
Active time	5456.00	s

Indicator	Value	Unit
Active time (hours)	1.52	h
Inactive time	2172.63	s
Inactive time (hours)	0.60	h
Active time (%)	71.52	%
Inactive time (%)	28.48	%

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.