

OPEN SKY VIEW

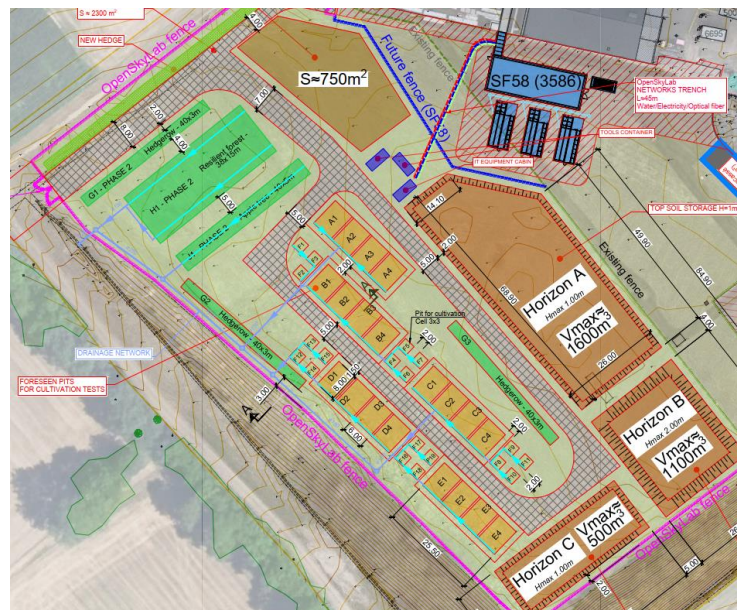
A field monitoring and data acquisition system



OpenSkyLab

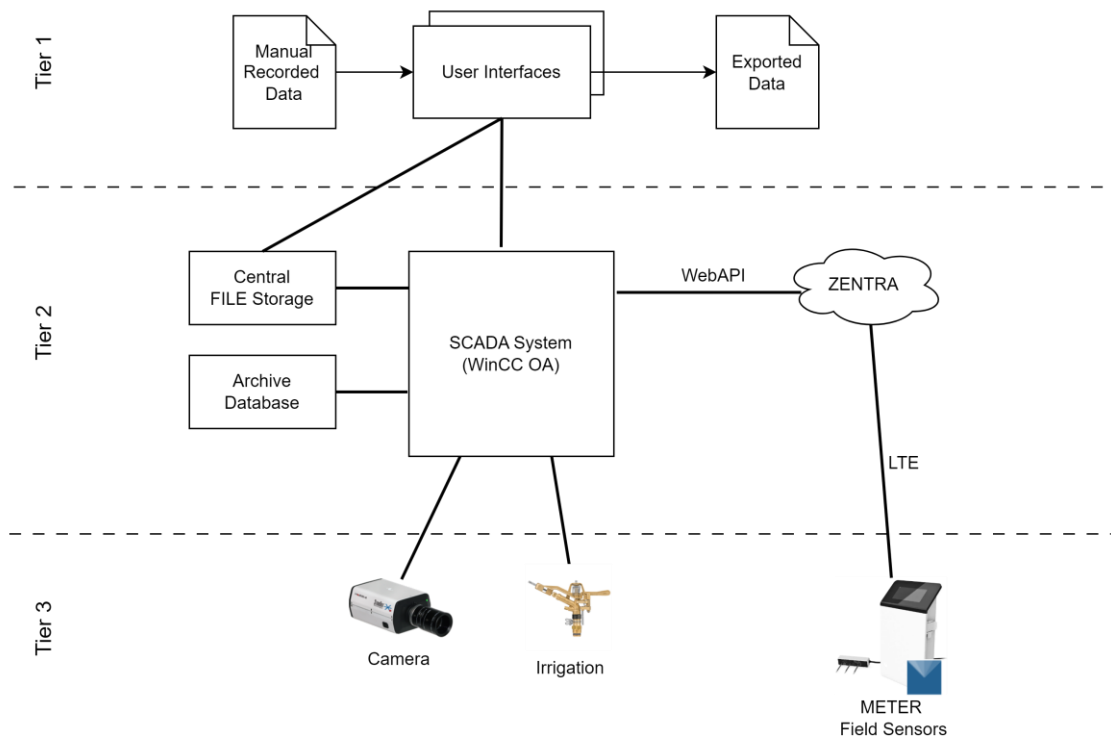
Objectives of OpenSkyView

- Acquisition of online measurements (via active sensors)
- Acquisition of offline measurements (manual measurements, lab reports, etc.)
- Tracking of plot treatment (e.g.: plowing, seeding, adding amendments, etc.)
- Tracking of used seeds and amendments
- Tracking of used machinery
- Storing of timeseries images
 - Automatic via connected IP-Cameras
 - Manual (e.g. taken via the drone)
- Controlling of irrigation system
- Tasklist
- Logbook
- Visualization and export of stored data



Base architecture

Follows a standard industrial 3-Tier architecture



Integrated active Sensors

- ATMOS 41 (weather station)
- TEROS 12 (soil temp. / water content)
- TEROS 21 (soil temp. / matric potential)



TEROS 12



TEROS 21



ATMOS 41 with Data-Logger

Overview

OpenSky View

OpenSky View

Overview

High	New	Update sensor calibration

Overview

Trials

Measurements

Lab Reports

Data Export

Logbook

Picture Store

Tasklist

Irrigation

Catalogs

Seeds

Seed Mix

Fertilizer

Substrate Component

Substrate Mix

Machinery

Alerts

Configuration

Plots

Parameter definitions

Meter Sensors

Cameras

Notifications

Plot #1

Plot 1_Miscanthus

Log

Overview Sensors Manual Parameters Trends Images Agriculture Treatment

Status

Current plantation: None

Top substrate: MM85_C15 (Molasse mix 24 (MM100_2024) and compost)

Bottom substrate: MM99_C01 (Molasse mix 24 (MM100_2024) and compost)

Last treatment: Fertilizing (Manure)

Active trials: None

Physical Dimensions

Size X [m]: 0.00 Y [m]: 0.00

Depth [m]: 0.00

Area [m²]: 0.00

Volume [m³]: 0.00

Plot #1

Plot 1_Miscanthus

Log

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SWC_1_1 (TEROS 12)		SWC_1_2 (TEROS 12)	
SoilWaterContent 1 Plot #1			
Water Content	0.335 m³/m³	Water Content	0.355 m³/m³
Soil Temperature	17.400 °C	Soil Temperature	17.400 °C
Bulk EC	3.817 mS/cm	Bulk EC	3.445 mS/cm
SWP_1_1 (TEROS 21)		SWP_1_2 (TEROS 21)	
SoilWaterPotential 1 Plot #1			
Soil Temperature	17.600 °C	SoilWaterPotential 2 Plot #1	16.500 °C
Matric Potential	-0.100 kPa	Matric Potential	-0.100 kPa

Plot #1

Plot 1_Miscanthus

Log

Overview Sensors Manual Parameters Trends Images Agriculture Treatment

Agriculture Treatments

Time	Type	Comment	Detail	New Treatment
04.04.2025 14:56	SoilTilling	with tractor International 633-SAV8	...	...
03.04.2025 14:56	SoilTilling	-	...	...
02.04.2025 13:00	Fertilizing	Manure	...	...
13.12.2024 17:00	SubstrateExchange	First filling	...	...
13.12.2024 14:00	SubstrateExchange	First filling	...	...

User: OSVAdmin Groups: OSVAdmin V0.11

Manual Data recording

- Manual entering of values
- Import via csv from a LabReport

Plot #1
Plot 1_Miscanthus

Log

Overview Sensors Manual Parameters Trends Images Agriculture Treatment

Latest Values

Class	Name	Unit	Value	Sampletime	Sample Id	Location	Rep.	Hist.	Mod.	New Samples
SoilBiological	FW.g-Epigeic-Juvenile		4.000	02.12.2024 09:13				...	...
SoilBiological	Microbial biomass	µg C/g soil	4.000	10.10.2024 10:15	123	12	...	...	...
SoilBiological	Nitrate leaching loss	Kg/ha/season	2.000	03.02.2025 07:00				...	...
SoilChemical	AL	ppm	4.000	27.11.2024 10:35				...	...

RecordManualSample

New Sample Values for Plot #1

Available Parameters

Class	Name	Unit
SoilChemical	Active CaCO ₃	g/m ³
SoilChemical	AL	ppm
SoilChemical	BaCl2-Ca	cmol/kg
SoilChemical	BaCl2-Mg	cmol/kg
SoilChemical	CaCo3	g
SoilChemical	CaCO3	g/m ³
SoilChemical	pH	

Selected Parameters

Name	Unit	Value	Sampletime	Sample Id	Location
BaCl2-Ca	cmol/kg	5.100	01.05.2025 07:00		
BD.1	g/cm ³	0.260	01.05.2025 07:00		

Save Cancel

LabReport
New LabReport

Report creation: 01.05.2025 09:00

Title: LabReport

Description

Attachments
C:/temp/OpenSky/View/testLabReports/labReportShortMultiSampleWithPos.csv

Links

Plots
Plot_6 Plot_7

Available Parameters

Class	Name	Unit
Plant	Bark Structure	
Plant	Leaf Structure	
Plant	SoilBiological	
SoilBiological	SoilBiological	
SoilBiological	SoilBiological	

Selected Parameters

Name	Unit	Value	Sampletime	Sample Id	Location
Total nitrogen	mg/kg	88.800	15.01.2025 00:00	20250115-6-1	Pos1
Total nitrogen	mg/kg	33.300	15.01.2025 00:01	20250115-6-2	Pos2

LoadFile

C:/temp/OpenSky/View/testLabReports/labReportShortMultiSampleWithPos.csv

CSV Separator: ParameterStartColumn: 6

1	2	3	4	5	6	7
SamplingDate	PlotID	SampleNr	OSL ID	Location	Total nitrogen	Total S
20250115	6	1	20250115-6 Pos1		88.8	9.4
20250115	6	1	20250115-6 Pos2		33.3	12.7
20250115	7	1	20250115-7 Pos1		88.8	9.4
20250115	7	1	20250115-7 Pos2		33.3	12.7

OK Cancel

Note: Variables and values shown here are placeholders!

Catalogues

- Seeds
- Seed Mix
- Fertilizer
- Substrate Components
- Substrate Mix
- Machinery

Seeds						
Type	Description	Manufacturer	Batch number	Production date	Attach	Add
UFA Remise en cult	UFA Remise en culture MS Gold	UFA, Switzerland	Reference 1459	01.11.2023	...	Modify
Harly vetch - Vesce	Harly vetch - Vesce velue	NRV, DE02, Germ	DE02-2061181-01V	01.02.2023	...	...
Secale cereale L. P.	Secale cereale L. Protector	HEBH, Hungary	H-23-0070725	01.07.2023	...	Add Attachment
Secale cereale L. P.	Secale cereale L. Protector	HEBH, Hungary	H-23-0070699	01.07.2023	...	...
Brassica rapa L. var	Brassica rapa L. var. silvestr - Buko	DE03, Germany	DE031-0050990-01	01.07.2021	...	...
Sorghum Sudanens	Sorghum Sudanense	Anzora Crop Impr.	AUSA-A2-24.LOT107	01.12.2024	...	...
Avena sativa - Cary	Avena sativa - Caryon	Agroscope, Zurich	ASS-80-Q-000930-1	28.01.2025	...	...
Avena striosa sctw	Avena striosa sctw - Onex	HEBH, Hungary	H-23-0070079	01.01.2023	...	...
Lens nigricans	Lens nigricans	SARL, Renaudat	1.06471.0	01.05.2020	...	...
UFA verbord avec h	UFA verbord avec humus	UFA, Switzerland	Reference = 24700	01.05.2024	...	...
Common vetch - lan	Common vetch - languedoc	Australia	RBL228559	01.01.1970	...	...
Lathyrus sativus	Lathyrus sativus	LUFANRW, DEDLO	486-2018	19.12.2018	...	...
Tribolium incarnatum	Tribolium incarnatum	Fenaco Genossensc	3-2332-69075/0199	01.11.2024	...	...
Tribolium alexandrin	Tribolium alexandrinum	LUFANRW, DEDLO	016-2024	05.01.2024	...	...
UFA Aggrgenie 3 -	UFA Aggrgenie 3 - Couvert cereales	UFA, Switzerland	Reference = 1201	01.05.2023	...	...
Pisum sativum	Pisum sativum	Elita semenarska	a 2-4-126-60205/01	01.08.2023	...	...
Vicia Faba L. Partin	Vicia Faba L. Partim - Noumea	SOC, France	F0254G317210 MB	01.09.2024	...	...
UFA Aggrgenie 11	UFA Aggrgenie 11 BIO 60%	UFA, Switzerland	Reference = 1334	01.06.2023	...	...
Tribolium repens	Tribolium repens	EDSP, Switzerland	IS64ALISA-2004005	01.01.2025	...	...
Lotus corniculatus	Lotus corniculatus	EDSP, Switzerland	CDN-2021-M-061701	01.07.2024	...	...
Miscanthus	Miscanthus rhizomes	Uhlh Freudger, Gal	Harvest20250422	22.04.2025	...	...

Substrate Mix Catalog						
Substrate Mixes						
Type	Description	Manufacturer/Origin	Batch number	Production date	Mix/Technique	# Comp
MM100_2024	Molasse mix used for initial installation of plots in2024	Nabaffa	0001	01.01.1970	Nabaffa	2
MM85_C15	Molasse mix 24 (MM100_2024) and compost	Nabaffa	0001	01.01.2024	Nabaffa	2
MM99_C01	Molasse mix 24 (MM100_2024) and compost	Nabaffa	0001	01.01.2024	Nabaffa	2
Topsoil	Horizon A from construction of OpenSkyLab	Nabaffa	0001	01.01.2024	Nabaffa	2
MM95_C05	Molasse mix 24 (MM100_2024) and compost	Nabaffa	0001	01.01.2024	Nabaffa	2
MM70_C30	Molasse mix 24 (MM100_2024) and compost	Nabaffa	0001	01.01.2024	Nabaffa	2
MM75_C15_BP10	Molasse mix 24 (MM100_2024) and compost and treated soil (biopile)	Nabaffa	0001	01.01.2024	Nabaffa	2

View Substrate Mix						
Type:	MM100_2024					
Description:	Molasse mix used for initial installation of plots in2024					
Manufacturer:	Nabaffa					
BatchNumber:	0001					
Production date:	01.01.1970					
Mix/Technique:	Nabaffa					
Components:						
Volume%	Mass%	Component				
33.33	0.00	Sandy molasse 24				
66.66	0.00	Harly molasse 24				

Time series images

OpenSky View

OpenSkyLab

OpenSky View

Picture Store

OSL_CAM01

Time	User	Description
11.04.2025 12:00:00	AutoCapture	
12.04.2025 12:00:00	AutoCapture	
13.04.2025 12:00:00	AutoCapture	
14.04.2025 12:00:01	AutoCapture	
15.04.2025 12:00:00	AutoCapture	
16.04.2025 12:00:00	AutoCapture	
17.04.2025 12:00:00	AutoCapture	
17.04.2025 22:55:00	AutoCapture	
18.04.2025 12:21:00	AutoCapture	
19.04.2025 12:21:00	AutoCapture	
20.04.2025 12:21:00	AutoCapture	
21.04.2025 12:21:00	AutoCapture	
22.04.2025 12:21:00	AutoCapture	
23.04.2025 12:21:00	AutoCapture	
25.04.2025 12:21:00	AutoCapture	
26.04.2025 12:21:00	AutoCapture	
27.04.2025 12:21:00	AutoCapture	
28.04.2025 12:21:00	AutoCapture	
29.04.2025 12:21:00	AutoCapture	
30.04.2025 12:21:00	AutoCapture	
01.05.2025 12:21:00	AutoCapture	
02.05.2025 12:21:00	AutoCapture	
03.05.2025 12:21:00	AutoCapture	
04.05.2025 12:21:00	AutoCapture	
05.05.2025 12:21:00	AutoCapture	
07.05.2025 12:21:00	AutoCapture	
12.05.2025 12:21:00	AutoCapture	
13.05.2025 12:21:00	AutoCapture	
14.05.2025 12:21:00	AutoCapture	

PictureStore

New Picture for Plot_1_Sensors

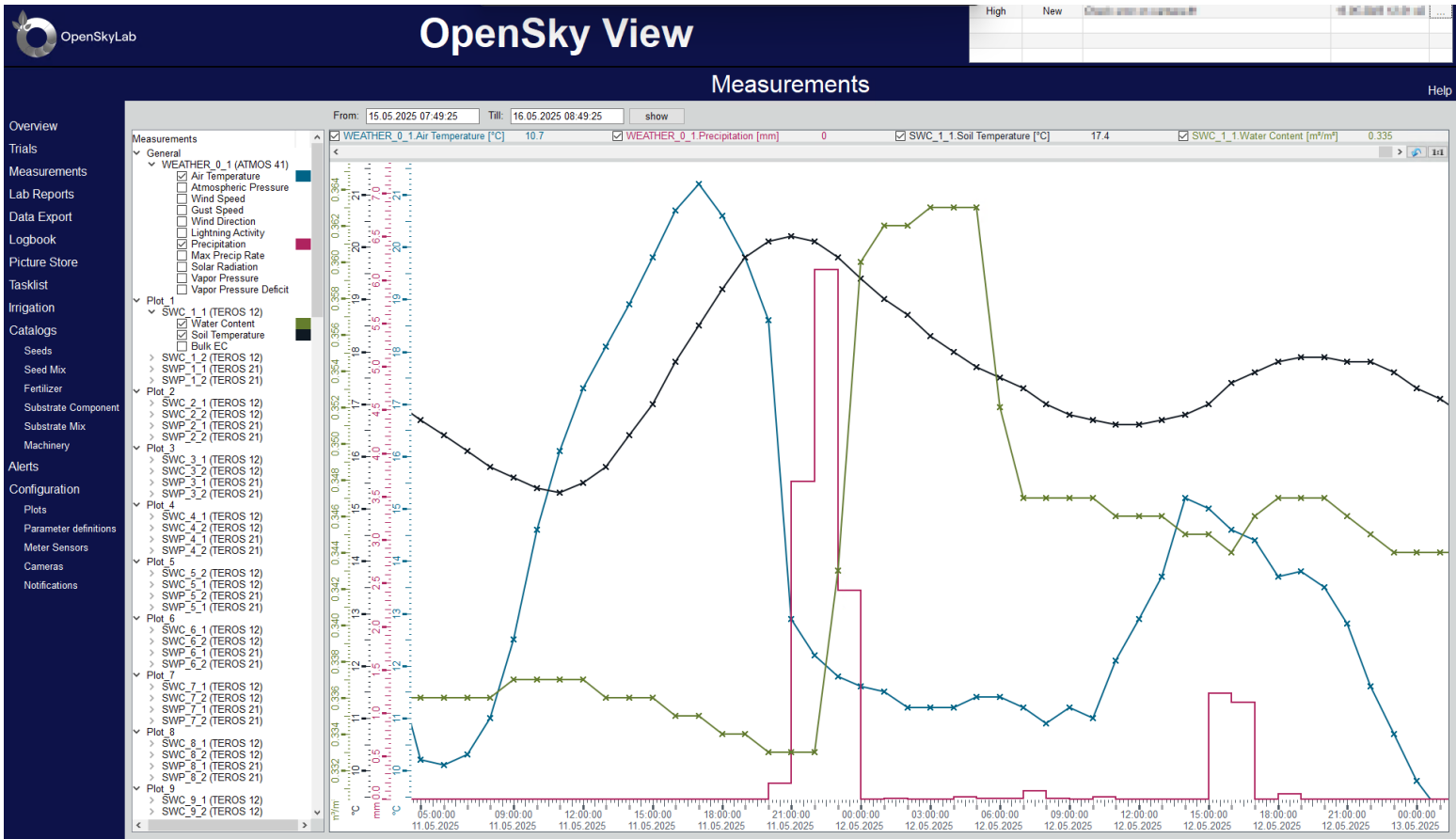
Selected file: //eosproject-smb/eos/project/o/opensky-laboratory/OpenSkyView/ovs/Uploads/4_ovs_pictures4upload/Sensor_installation/Cem foto/20250211_142029.jpg

Acquisition time: 11.02.2025 14:20:29

Description: Sensor installation

Save Close

Data visualization



Data export

- Selection of time range
- Selection of Plots
- Selection of Parameters
- Export in csv files

OpenSky View
Data Export

Range Select
From: 01.04.2025 09:00 Till: 01.05.2025 10:00

Number	Description
1	Plot 1_Miscanthus
2	Plot 2_CoverCrop
3	Plot 3_Pasture
4	Plot 4_Kernza
5	Plot 5_Pasture
6	Plot 6_Miscanthus
7	Plot 7_Kernza
8	Plot 8_CoverCrop
9	Plot 9_CoverCrop
10	Plot 10_Kernza
11	Plot 11_Miscanthus
12	Plot 12_Pasture
13	Plot 13_Kernza
14	Plot 14_CoverCrop
15	Plot 15_Miscanthus
16	Plot 16_Pasture
17	Plot 17_Pasture
18	Plot 18_Miscanthus
19	Plot 19_Kernza
20	Plot 20_CoverCrop
21	Plot 21_Pasture
22	Plot 22_Blank
23	Plot 23_Pasture
24	Plot 24_Pasture
25	Plot 25_Pasture
26	Plot 26_Pasture
27	Plot 27_Pasture
28	Plot 28_Pasture
29	Plot 29_Pasture
30	Plot 30_Pasture
31	Plot 31_Pasture
32	Plot 32_Miscanthus
33	Plot 33_Kernza
34	Plot 34_Pasture
35	Plot 35_CoverCrop
36	Plot 36_Pasture
37	Plot 37_Pasture
38	Plot 38_Pasture
39	Plot 39_Pasture

Select	Type
<input checked="" type="checkbox"/>	Weather SENSOR
<input checked="" type="checkbox"/>	Air Temperature
<input checked="" type="checkbox"/>	Atmospheric Pressure
<input checked="" type="checkbox"/>	Wind Speed
<input checked="" type="checkbox"/>	Wind Direction
<input checked="" type="checkbox"/>	Lightning Activity
<input checked="" type="checkbox"/>	Precipitation
<input checked="" type="checkbox"/>	Max. Precip. Rate
<input checked="" type="checkbox"/>	Solar Radiation
<input checked="" type="checkbox"/>	Vapor Pressure
<input checked="" type="checkbox"/>	Vapor Pressure Deficit
<input checked="" type="checkbox"/>	SoilWaterContent SENSOR
<input checked="" type="checkbox"/>	SoilWaterPotential SENSOR
<input checked="" type="checkbox"/>	SoilChemical MANUAL SAMPLE
<input checked="" type="checkbox"/>	SoilPhysical MANUAL SAMPLE
<input checked="" type="checkbox"/>	SoilBiological MANUAL SAMPLE
<input checked="" type="checkbox"/>	Plant MANUAL SAMPLE
<input checked="" type="checkbox"/>	Picture PICTURE STORE
<input checked="" type="checkbox"/>	Treatments AGRICULTURE TREATMENT
<input checked="" type="checkbox"/>	Logbook LOGBOOK
<input checked="" type="checkbox"/>	Tasklist TASKLIST

Start Export

```

1 TimeComp,WEATHER_0_1,Air Temperature [°C],WEATHER_0_1,Atmospheric Pressure [hPa],WEATHER_0_1,Wind Speed [m/s],WEATHER_0_1,Out
2 2025.04.01 14:00:00,000,8,85.14,101.32,95.40,0,0,471.14,0.997,0.471,0.371,0.38,9.7,10.4,193,3.892,10.4,8.2,-0.1,-0.1
3 2025.04.01 15:00:00,000,10,3,85.33,5.07,12.52,41,0,0,696.3,0.602,0.65,0.37,0.38,10.2,10.3,4.135,3.851,10.5,10.7,-0.1,-0.1
4 2025.04.01 16:00:00,000,10,3,85.29,5.45,13.07,33,0,0,850,0.626,0.69,0.37,0.379,10.4,10.7,4.132,3.832,10.8,11.3,-0.1,-0.1
5 2025.04.01 18:00:00,000,10,95,17.5,05,10,23,184,0,0,0,124.8,0.65,0.6,0.369,0.379,11,11.3,4.131,3.817,11.3,12.1,-0.1,-0.1
6 2025.04.01 21:00:00,000,7,8,95.26,2.17,5.49,16,0,0,0,8,0.767,0.29,0.369,0.379,11.6,11.7,4.149,3.832,11.8,11.9,-0.1,-0.1
7 2025.04.01 22:00:00,000,7,7,95.32,2.99,6.72,29,0,0,0,0,716,0.33,0.369,0.379,11.5,11.6,4.159,3.842,11.8,11.6,-0.1,-0.1
8 2025.04.02 02:00:00,000,4,3,95.46,1.35,3.24,25,0,0,0,0,489,0.3,0.369,0.379,10.7,10.9,4.15,3.846,11.10,10.4,-0.1,-0.1
9 2025.04.02 03:00:00,000,4,3,95.46,1.06,1.81,337,0,0,0,0.632,0.2,0.369,0.379,10.5,10.7,4.191,3.866,10.9,9.9,-0.1,-0.1
10 2025.04.02 04:00:00,000,3,95.48,1.43,2.89,342,0,0,0,0,614,0.14,0.369,0.38,10.3,10.5,4.191,3.866,10.9,9.9,-0.1,-0.1
11 2025.04.02 05:00:00,000,2,7,95.44,1.4,2.23,247,0,0,0,0,611,0.13,0.369,0.38,10.1,10.3,4.193,3.866,10.7,9.6,-0.1,-0.1
12 2025.04.02 14:00:00,000,10,1,65.46,2.47,5.84,76,0,0,0,810,7.0,0.874,0.346,0.37,0.381,4.2,4.3,4.172,3.831,4.6,4.6,-0.1,-0.1
    
```

Tasklist / Logbook

OpenSky View

Overview

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- Substrate Component
- Substrate Mix
- Machinery
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- Meter Sensors
- Cameras
- Notifications

High New Check error on camera #1 15.05.2025 12:21:42

OpenSky View

Tasks

Show Tasks: Open

State	Prio	Task name	Created	Deadline	User	Assigned User	Plot	Trial	New Task
Todo	Medium	put cables in the ground	16.02.2025						
InWork	Low	install sensors	16.02.2025						
Todo	Low	top up plot and install sensors	16.02.2025						
Todo	Low	top up plot and install sensors	16.02.2025						
Todo	Low	top up plot and install sensors	16.02.2025						
Todo	Low	top up plot and install sensors	16.02.2025						
Todo	Low	top up plot and install sensors	16.02.2025						
Todo	Low	top up plot and install sensors	16.02.2025						
New	NA	Freeze preparation - Water system	14.04.2025						
New	High	Check error on camera #1	15.05.2025						

install sensors

State: InWork Assigned User: [User] Modify Task

Description: install and connect sensors in plot 41

Attachments: File, Links, Link

Comments:

Time	User	Comment
16.02.2025 22:29:14	[User]	Taskstate changed to: Todo
03.04.2025 17:45:43	[User]	sensors prepared and connected
03.04.2025 17:45:49	[User]	Taskstate changed to: InWork
03.04.2025 22:23:32	[User]	Assigned user set to: cst

OpenSky View

Logbook

From: 14.2025 9:06 To: Now Log.level: *
 Till: 16.5.2025 9:06 To: Now Plot ID: *
 User: * Trial ID: *

Filter

Time	User	Level	Plot	Trial	Text	Attach	Links	New Log
30.04.2025 18:05:11	[User]	Info	45		29/04/2025: removed inferecessences of Bumia orientalis surrounding plot 43, (2 people, 0.5 h)			
30.04.2025 18:01:54	[User]	Info		1	29/04/2025: Miscanthus plantation on plots 1, 6, 11, 15, 18 and 32, manual, 249 m2 plots, ca 40 linear meters on hedgerows, (4 people, 7 h)			
25.04.2025 13:05:51	[User]	Info	46		25/04/2025: removed inferecessences			
14.04.2025 10:58:42	[User]	Info			10/04/2025: Field planting - pass			
14.04.2025 10:53:58	[User]	Info	41		07/04/2025: Shrub planting in cell			
14.04.2025 10:35:32	[User]	Info	41		08/04/2025: Shrub planting by S			
14.04.2025 10:34:22	[User]	Info	42		08/04/2025: Vines, Olive and appl			
14.04.2025 10:33:21	[User]	Info	41		7/04/2024: Shrub planting by Sor			
07.04.2025 13:30:24	[User]	Info			03/04/2024 afternoon: "Horse plat			
07.04.2025 13:27:48	[User]	Info			03/04/2024 morning: Rotowator pa			
02.04.2025 17:33:25	[User]	Info	43		Planting of shrubs and trees finalz			
02.04.2025 17:32:37	[User]	Info	40		Planting of shrubs and trees finalz			
02.04.2025 17:29:42	[User]	Info			Manual application of manure (2 k			
01.04.2025 09:42:50	[User]	Info			Drone flight for data measurement			

New Logbook Entry

Log.level: Info Time: 01.05.2025 08:08:00 Plots: 1, 21 Trial ID: []

Text: Warn
Error
Fatal

Attachments: []

Links: []

Save Cancel

User: [User] Groups: OSVAdmin

Current status

- System in production since beginning of 2025
- 46 individual plots defined
- 169 active sensors installed
- 30 Data-Logger installed
- One IP-Camera integrated
- Integration of irrigation system ongoing
- Integration of multispectral images ongoing





Thank you for your attention!



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