

# Computer control for higher returns

Ad de Koning  
HortiMaX





# Automation of process control Switch Box

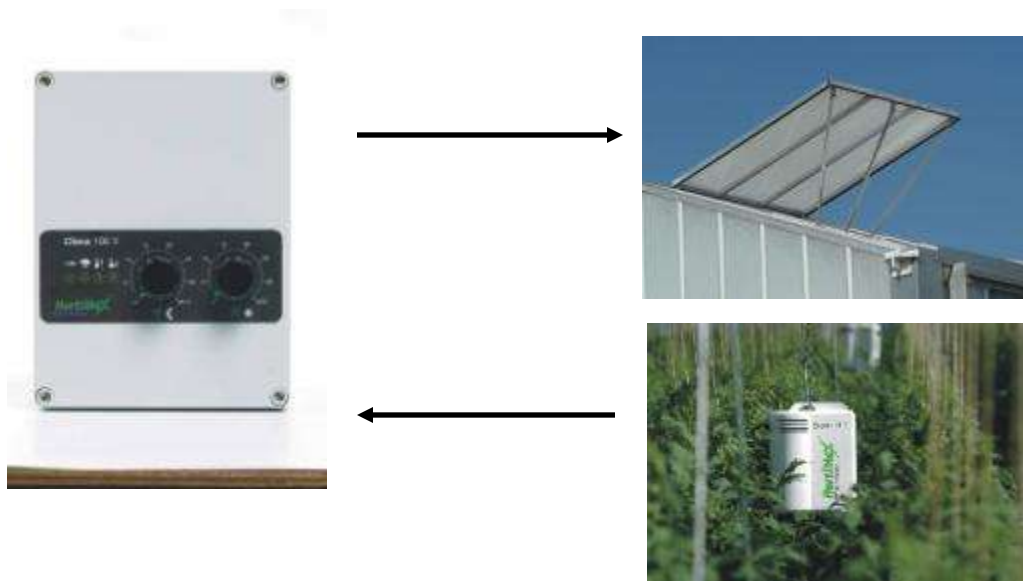


**saves labour**



# Automation of process control

## Analogue control



**saves labour**  
**more precise control**  
**based on measurement**



# Automation of process control Computer control



**saves labour  
precise control  
based on measurement  
including outside conditions  
detailed control**



# Computer control PC operation





# Computer control Remote access







# Computer control

## Detailed alarms



Setpoints - MultiMa XP : Riscaldamento in generale

Base | Sorveglianza di sicurezza | Ore | Influenza delle radiazioni | Influenza all'esterno | Influenza dell'umidità | Lettura

	Reparto 1	Reparto 2	Reparto 3	Reparto 4	Reparto 5	Reparto 6
Temperatura della serra [°C]	27.2	22.2	22.4	22.3	22.1	22.3
Umidità dell'aria [%]	64	97	97	87	88	81
RH Too Low Alarm Threshold [%]	10	10	10	10	10	10
Deficit idrico [g/kg]	8.40	0.44	0.44	2.35	2.07	3.29
HD Too High Alarm Threshold [g/kg]	-	-	-	-	-	-
Concentrazione di CO2 [ppm]	625	625	625	392	392	436
UR calcolata (RC) [%]	88	80	88	88	88	88
Deficit idrico calcolato (RC) [g/kg]						

Chiamate d'allarme

Stato	Momento	Messaggio	Categoria	Regolazione	Regolatore	Conferma
Attivo	19-9-2011 13.23.22	La temperatura della serra è troppo alta! {3751: 27.0 [°C], Temperatura della serra: 27.2 [°C]}	Reparto 1	Reparto	MultiMa XP	Visto





# Computer control

## Learning from historical data tables



Tabella giornaliera - Media Reparto 1-3

8-11-2010

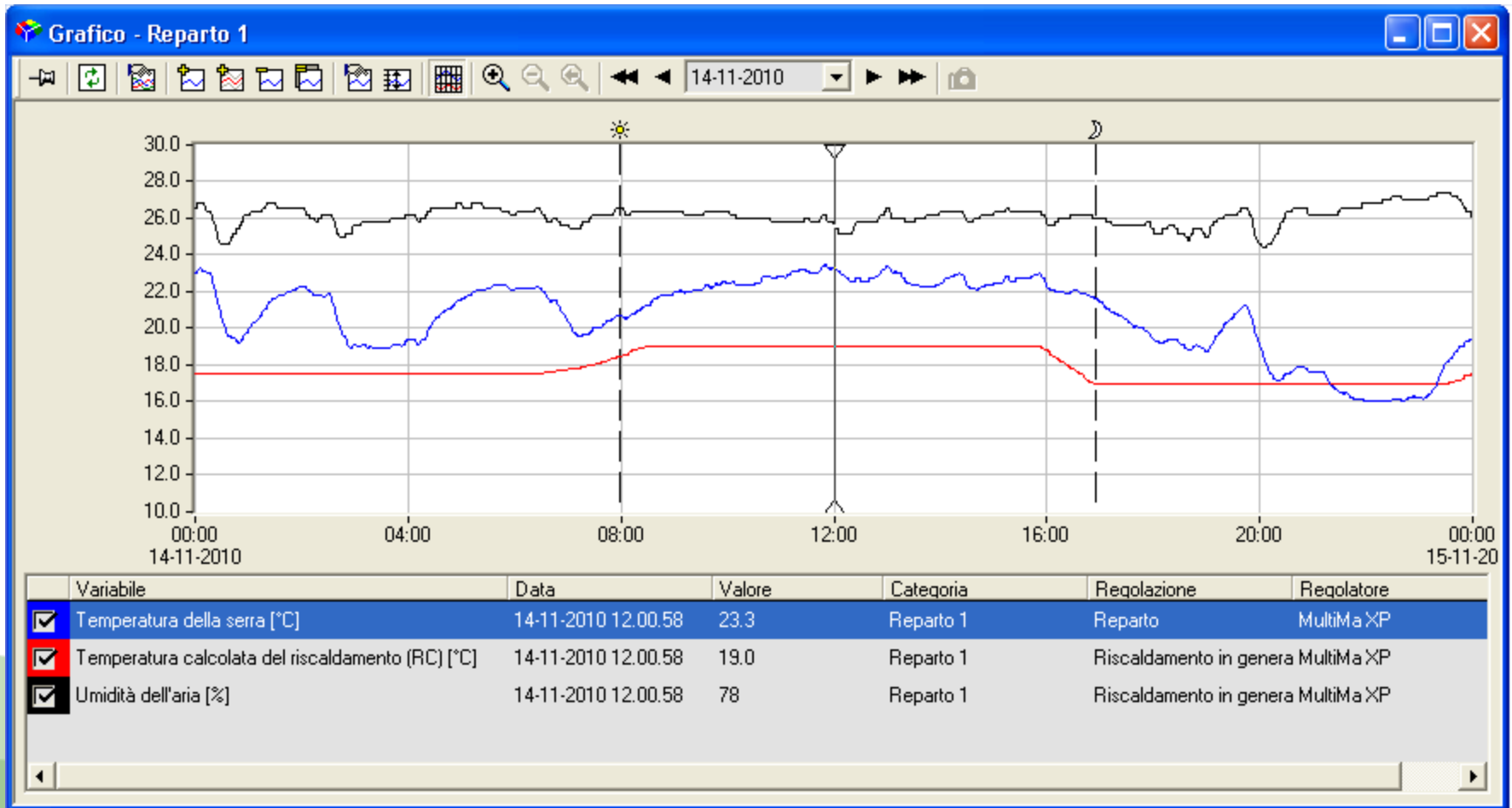
8-11-2010 - 14-11-2010	[J/cm <sup>2</sup> ]	Reparto 1 [°C]	Reparto 2 [°C]	Block 3 [°C]	
<b>8-11-2010 Lunedì</b>	256.9	20.4	20.2	21.2	
<b>9-11-2010 Martedì</b>	121.6	20.5	20.6	21.0	
<b>10-11-2010 Mercoledì</b>	70.7	21.5	21.5	22.0	
<b>11-11-2010 Giovedì</b>	40.3	19.9	20.4	18.4	
<b>12-11-2010 Venerdì</b>	330.0	20.9	21.4	20.7	
<b>13-11-2010 Sabato</b>	145.3	21.2	21.7	20.4	
<b>14-11-2010 Domenica</b>	120.5	20.7	21.5	20.5	
<b>Periodo totale</b>					
<b>Tabella valori medi</b>	155.1	20.7	21.1	20.6	
<b>Tabella dei valori di massima</b>	330.0	21.5	21.7	22.0	
<b>Tabella dei valori di minima</b>	40.3	19.9	20.2	18.4	
<b>Tabella somma valori</b>	1085.4	145.0	147.4	144.3	

Variabile	Statistiche	Ora d'inizio	Ora di termine	Categoria	Regolazione	Regolatore
[J/cm <sup>2</sup> ]	Differenze	00:00:00	23:59:59	Stazione metereologica 1	Stazioni metereologiche	MultiMa XP
Reparto 1 [°C]	Media	00:00:00	23:59:59	Reparto 1	Riscaldamento in generale	MultiMa XP
Reparto 2 [°C]	Media	00:00:00	23:59:59	Reparto 2	Riscaldamento in generale	MultiMa XP
Block 3 [°C]	Media	00:00:00	23:59:59	Reparto 3	Riscaldamento in generale	MultiMa XP

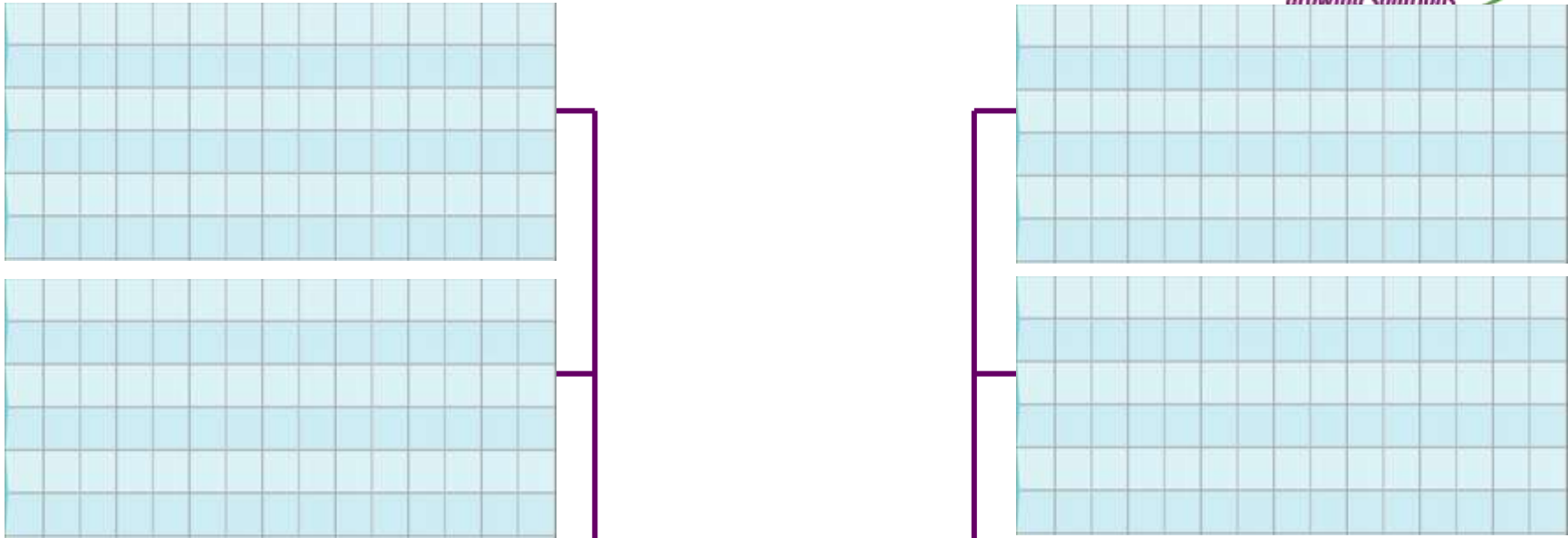


# Computer control Learning from historical data graphs





# Central computer



HMX IO bus



MultiMa  
proces  
computer

Synopta  
Server



NAS





# Smart controls SensorTom

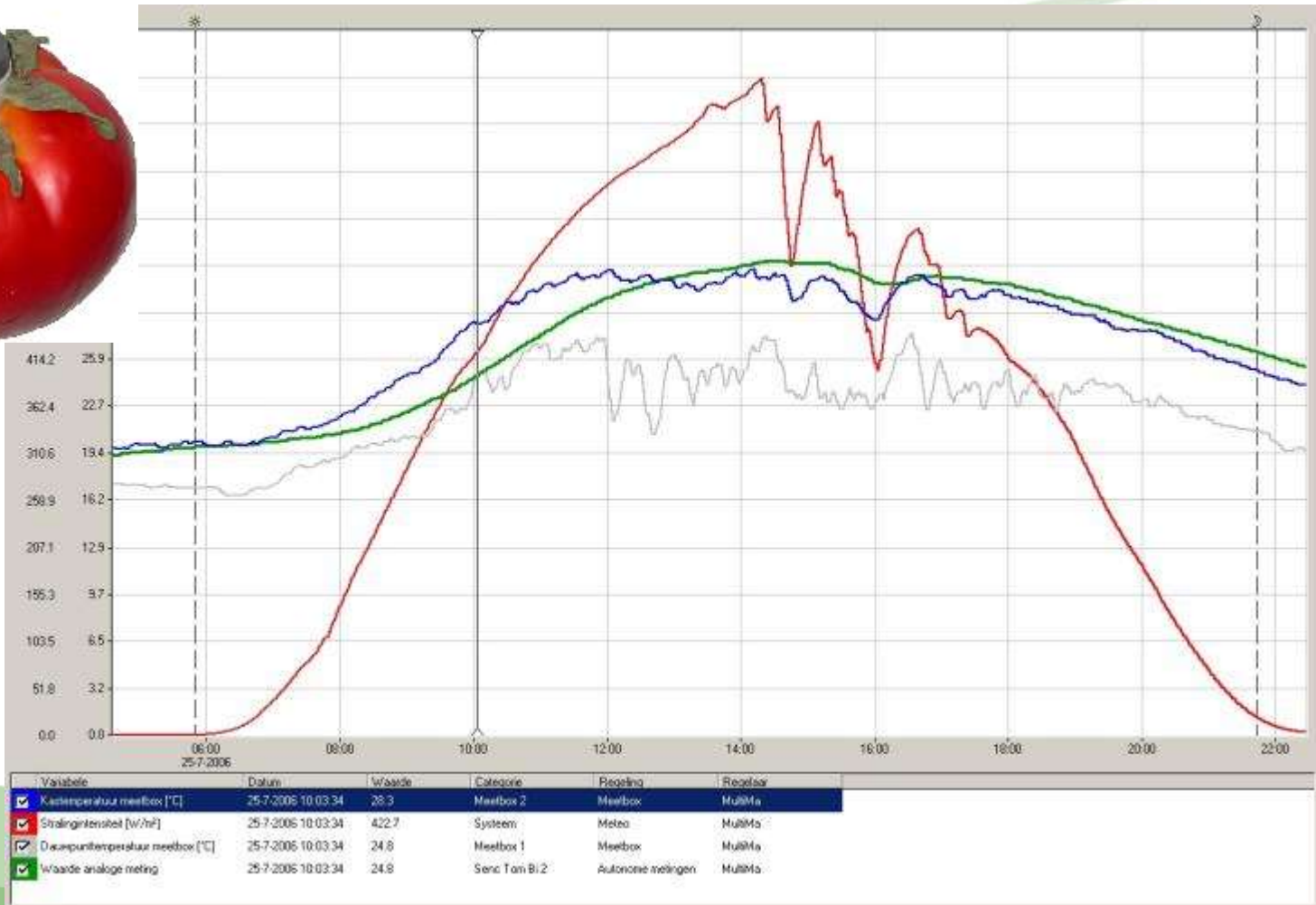
**HortiMaX**  
growing solutions





# Smart controls Dew point control

**HortiMaX**  
growing solutions



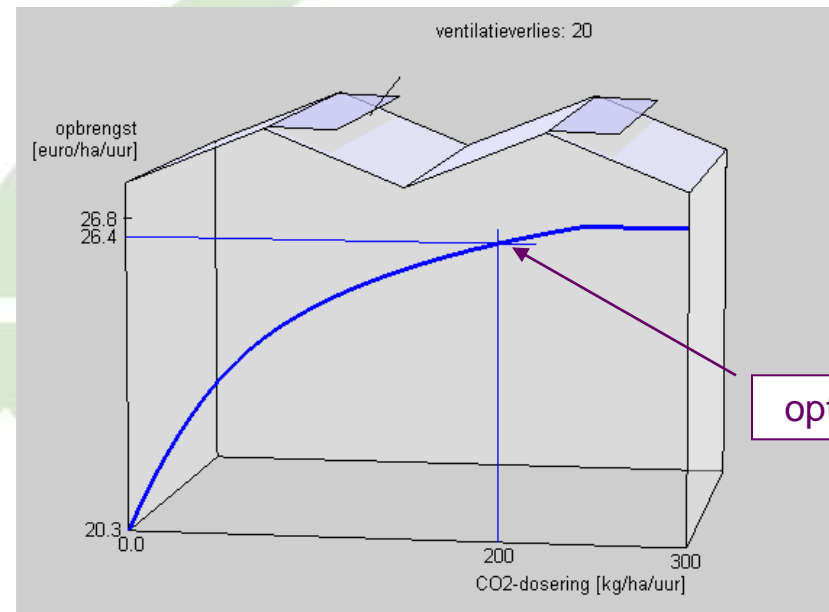


# Smart client CO2 optimizer

**HortiMax**  
growing solutions

**Optimal control  
of CO2 dosing**

**Uses a  
greenhouse model and  
a crop model**



optimum



# Computer control for higher returns

**Automation**

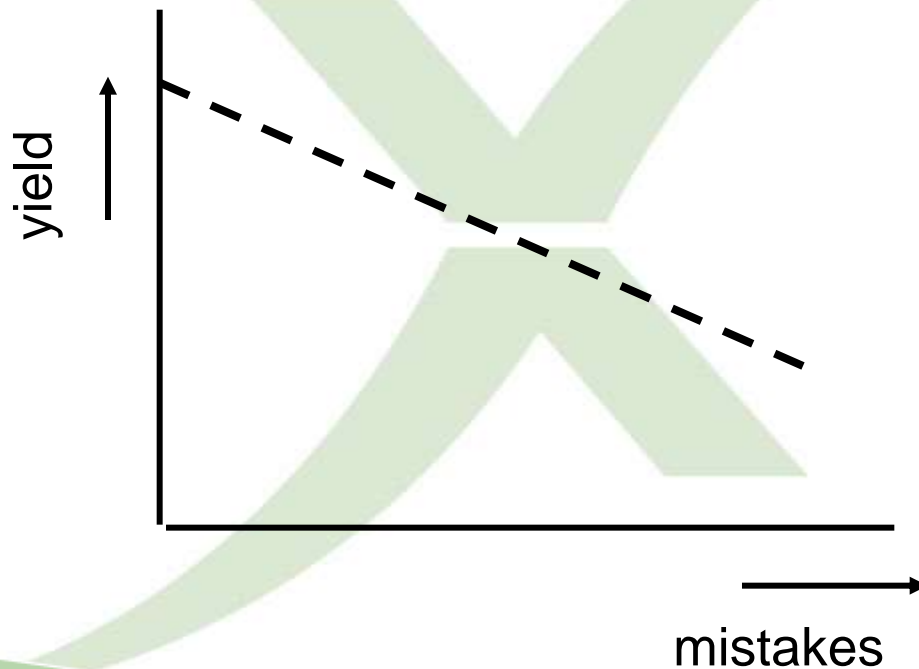
**Information**

**Optimisation**





# Computer control for less mistakes and higher returns







## Demonstration

- CropView
- ClimateMaps