



ORTOMATION.IO

OPTIMIZING YOUR WORLD

ORTO Software Quick Guide

<DRAFT>

Cover Page

Dropdown menus to allow users to load and save scheme configuration files, navigate, find help etc.



ORTO
File View Tools Help

Optimization Scheme: Demo - x2 Manipulated Variables
Scheme Name: UA_2MV_demo
Scheme Status: <Running>

Desc: OPC UA Two MV demo, using OA1 & OA2
Maximise product flow (FC206.pv) by manipulating temperature (TC381.sp) and pressure (PC267.sp).
22-7-22 / Paul Oram

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Cover OPC Comms Setup Optimization Objective Function ORTO Agent Build & Configuration Optimization Performance Monitoring & Analysis

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OPC Communications Tab



Select OPC communication protocol

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OPCUA TCP Address: opc.tcp://BOOK-4022QBKF0D.home:53530/OPCUA/SimulationServ
OPCUA HTTPS Address:
Username:
Password:
Scheme Communication: UA DA
Sample Time: 5 Secs

OPCDA Server Host:
OPCDA Server ID:
OPCDA Server Desc:

OPCUA Comms | OPCDA Comms

Reads				Writes			
Node Id	*Filter*	Read Tag	Current Value	Node Id	*Filter*	Read Tag	Current Value
1	----	----		1	----	----	
2	Simulation	FC206.pv	90.2919	2	Simulation	TC381.sp	1485.079
3	----	----		3	Simulation	PC267.sp	7473.8798
4	Simulation	TC381.pv	1485.079	4	----	----	
5	Simulation	PC267.pv	7473.8798	5	----	----	
6	----	----		6	----	----	
7	Simulation	TC381.mode	0	7	----	----	
8	Simulation	PC267.mode	0	8	----	----	
9	----	----		9	----	----	
10	----	----		10	----	----	
11	Simulation	Random	-0.80807				
12	Simulation	Triangle	1.8667				
13	----	----					
14	----	----					
15	----	----					

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Header – always displayed

OPC protocol / server description

OPC read / write tag selection

Optimization Objective Function Tab



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Maximize Optimization Variable (OV) Description: Product Flow

OV Calc. / Tag: FC206.pv OV Value: 87.3387 OV Units: kg/hr OV Range Low: -300 High: 300

By manipulating variables:

ORTO Agent	MV Tag	Current Value
ORTO Agent 1: MV	TC381.sp	1472.7111
ORTO Agent 2: MV	PC267.sp	7489.9594
ORTO Agent 3: MV	----	-----
ORTO Agent 4: MV	----	-----
ORTO Agent 5: MV	----	-----

Subject to constraints:

Constraint	Constraint Logic
C1	PC267.pv-TC381.pv<6000
C2	-----
C3	-----
C4	-----
C5	-----

Paused by:

Pause Logic
P1: TC381.mode>0
P2: PC267.mode>0
P3: -----
P4: -----
P5: -----

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OV tag or calculation
(using read and/or
write tags) →

MV selection
(using write tags) →

← Optimization Variable
(OV) description

← External constraint
logic configuration
(using read or write tags)

← External pause
logic configuration
(using read or write tags)

ORTO Agent Build Configuration Tab / ORTO Agent 1.5



ORTO
File View Tools Help

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Scheme Name: UA_2MV_demo Scheme Status: <Running>

Cover OPC Comms Setup Optimization Objective Function **ORTO Agent Build & Configuration** Optimization Performance Monitoring & Analysis

ORTO Agent 1 | <On> ORTO Agent 2 | <On> ORTO Agent 3 | <Unused> ORTO Agent 4 | <Unused> ORTO Agent 5 | <Unused> ORTO Agent Config. Summary

ORTO Agent 1 Name: Temperature TC381 (degC) Off On

Inputs	Configuration Parameters	Output
Opt. Objective: Maximize	OV Range Low: -300 High: 300	Output Tag (MV1): TC381.sp
OV Value: 89.8204	MV Range Low: -6000 High: 6000	Value (MV1.sp): 1407.6578
MV Readback Tag: TC381.pv	Cycle Time: 120 Secs Sensitivity Factor: 1	
MV Readback Value: 1412.5144	Max. Move / Cycle: 375	
Constraint Flag: C1	MV Bounds Low: -6000 High: 6000	
Pause Flag: P1	Push Direction: Positive	

Output (MV.sp)
 Readback (MV.pv)
 MV Bounds
 Legend
 Grid
 Y Axis High: 6500
 Low: -6500
 24 Hours

Constraint on/off:
 Pause on/off:
 OA on/off:

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Select Readback Tag (from read tag list) →

Define the constraint and pause flag applicable to agent →

← Configure up to five agents

← Agent Output tag (i.e., the associated MV, copied from previous tab)

← ORTO agent configuration parameters

← Agent MV, MV RB and upper and lower bounds trends

← Bars indicate when agent is constrained, paused and on

ORTO Agent Build Config. Tab / ORTO Agent Config. Summary Tab



ORTO
File View Tools Help

Optimization Scheme: Demo - x2 Manipulated Variables
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Desc: OPC UA Two MV demo, using OA1 & OA2
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Cover OPC Comms Setup Optimization Objective Function ORTO Agent Build & Configuration Optimization Performance Monitoring & Analysis

ORTO Agent 1 | <On> ORTO Agent 2 | <On> ORTO Agent 3 | <Unused> ORTO Agent 4 | <Unused> ORTO Agent 5 | <Unused> ORTO Agent Config. Summary

	ORTO Agent 1	ORTO Agent 2	ORTO Agent 3	ORTO Agent 4	ORTO Agent 5
On/Off	On	On	Off	Off	Off
Optimization Objective	Maximize	Maximize	Maximize	Maximize	Maximize
Optimization Variable (OV) / Calc	FC206.pv	FC206.pv	FC206.pv	FC206.pv	FC206.pv
OA Name	Temperature TC381 (degC)	Pressure PC267 (barG)			
Manipulated Variable (MV) Readback	TC381.pv	PC267.pv	---	---	---
Constraint Flag	C1	C1	---	---	---
Pause Flag	P1	P2	---	---	---
OV Range Eng. Units Low	-300	-300	-300	-300	-300
OV Range Eng. Units High	300	300	300	300	300
MV Range Eng. Units Low	-6000	0	---	---	---
MV Range Eng. Units High	6000	12000	---	---	---
Cycle Time (secs)	120	90	---	---	---
Sensitivity Factor	1	1	---	---	---
Max. Move Size /cycle	375	225	---	---	---
MV Lower Bound	-6000	0	---	---	---
MV Higher Bound	6000	12000	---	---	---
Push Direction	Positive	Negative	Positive	Positive	Positive
MV Output Tag	TC381.sp	PC267.sp	---	---	---

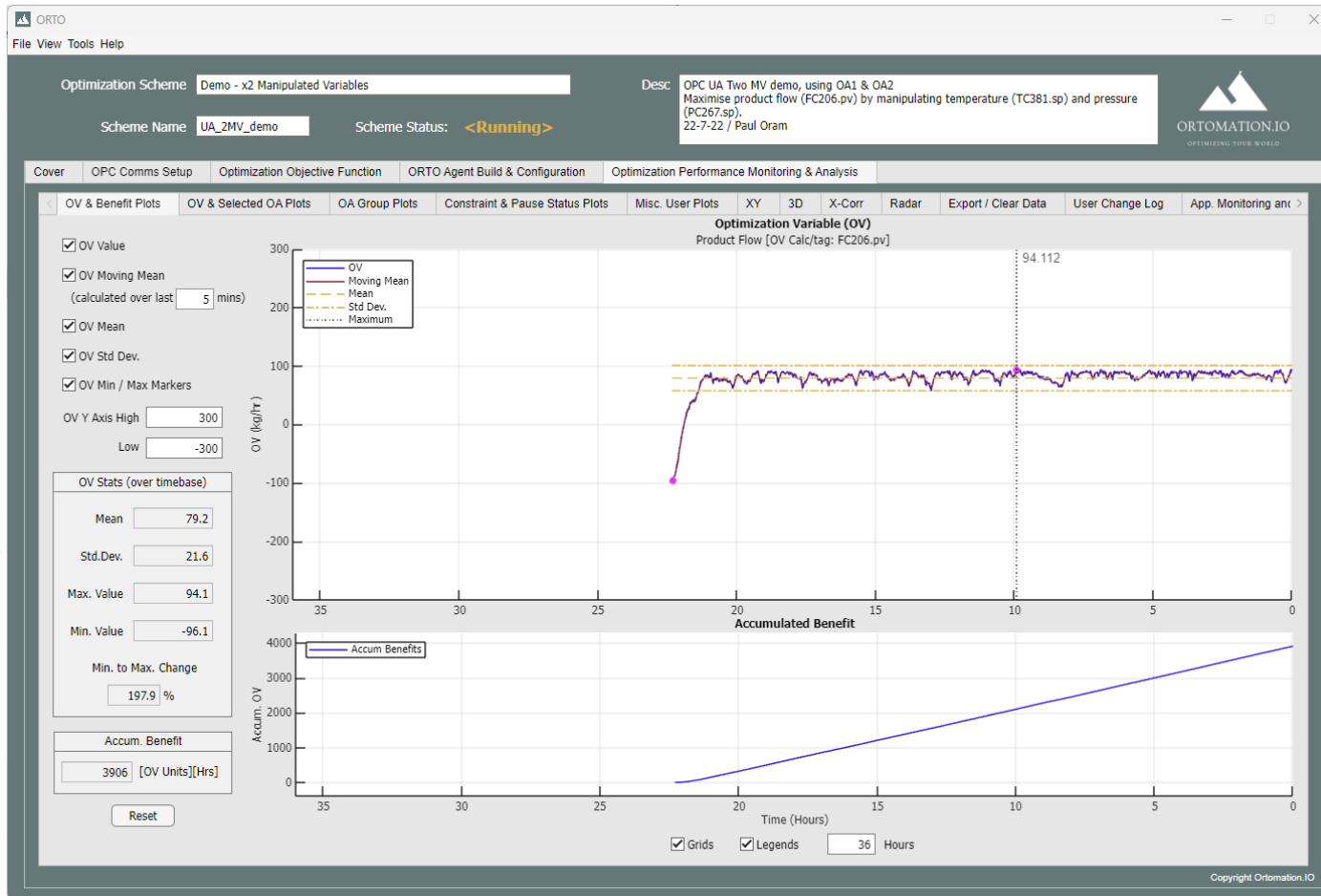
Agent assigned to scheme, running
 Agent assigned to scheme, not running
 Agent unused

Export .xls

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← Agent configuration summary table, indicating those running, assigned or not used

Perf. Monitoring & Analysis Tab / Optimization Variable (OV) & Benefit Plots Tab



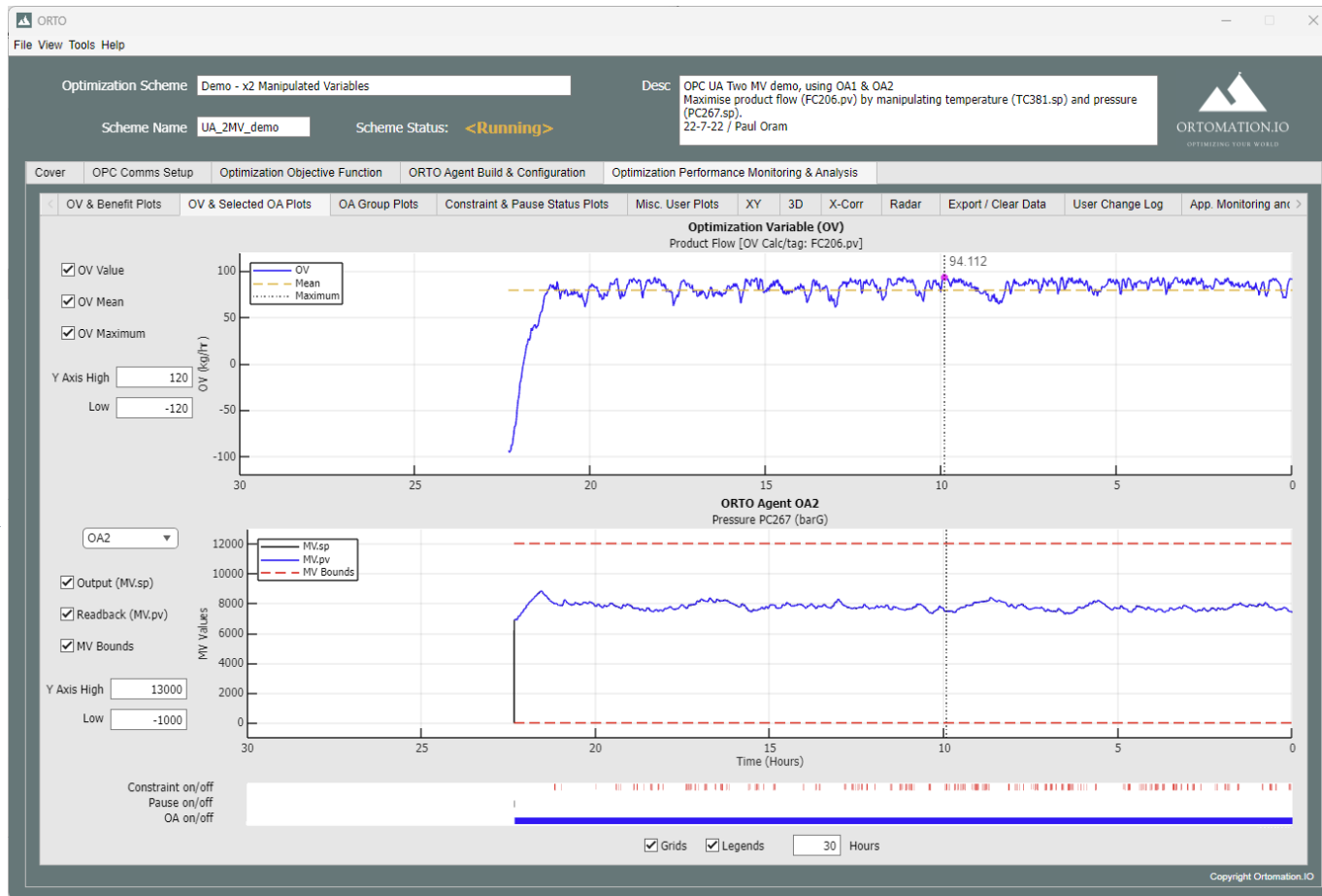
OV statistics panel



OV plot, with mean and standard deviations. min and max values shown

Accumulated benefits, since scheme switched on

Perf. Monitoring & Analysis Tab / OV & Selected ORTO Agent Tab



Select OA to plot

OV plot, with mean and max values shown

Agent MV, MV RB and upper and lower bounds trends

Bars indicate when agent is constrained, paused and on

Perf. Monitoring & Analysis Tab / ORTO Agent Group Plots Tab

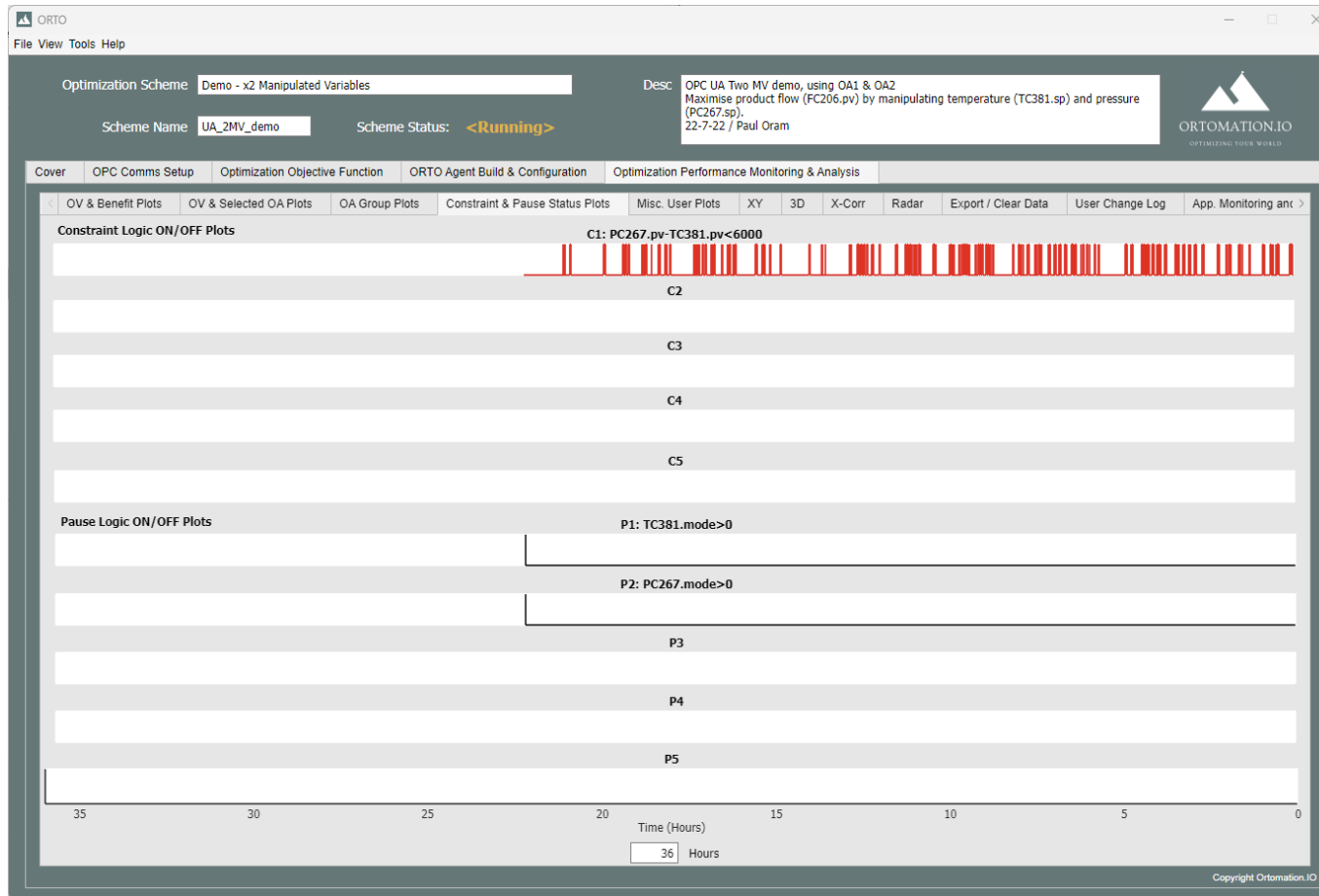


← ORTO Agent SP, MV and bounds plots

Perf. Monitoring & Analysis Tab / Constraint & Pause Flag Plots Tab



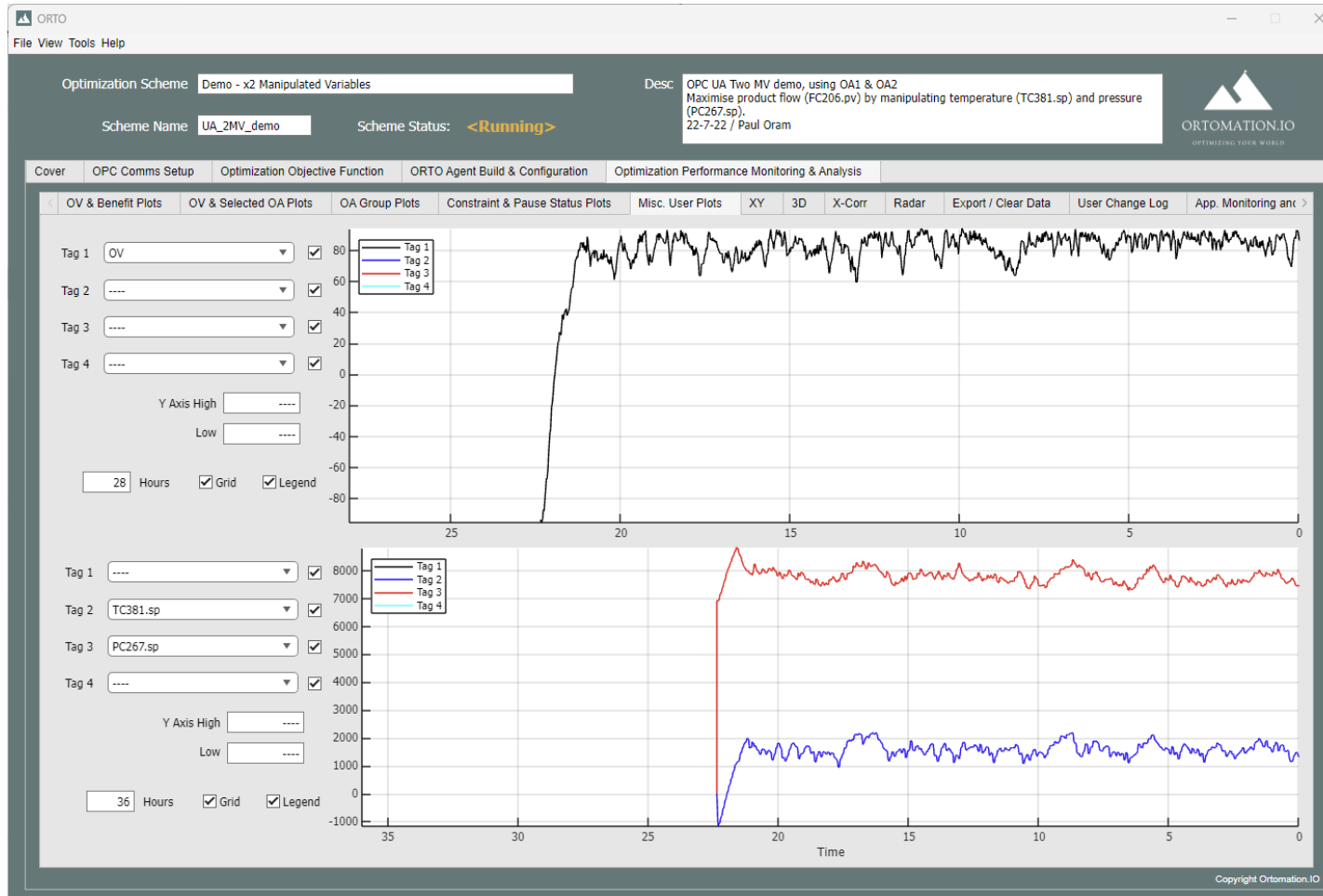
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← Constraint flags 1-5 statuses

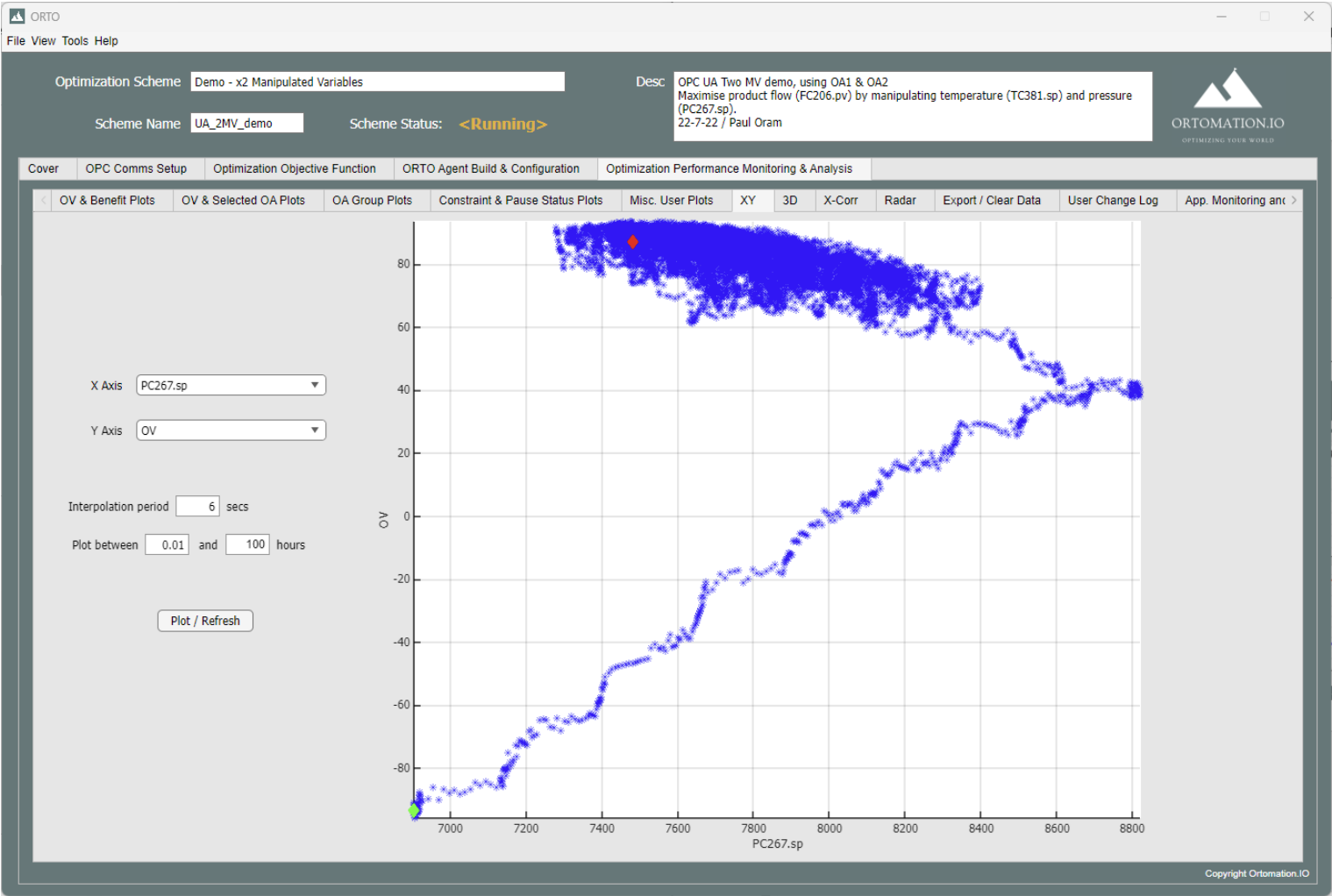
← Pause flags 1-5 statuses

Misc. Plots Tab



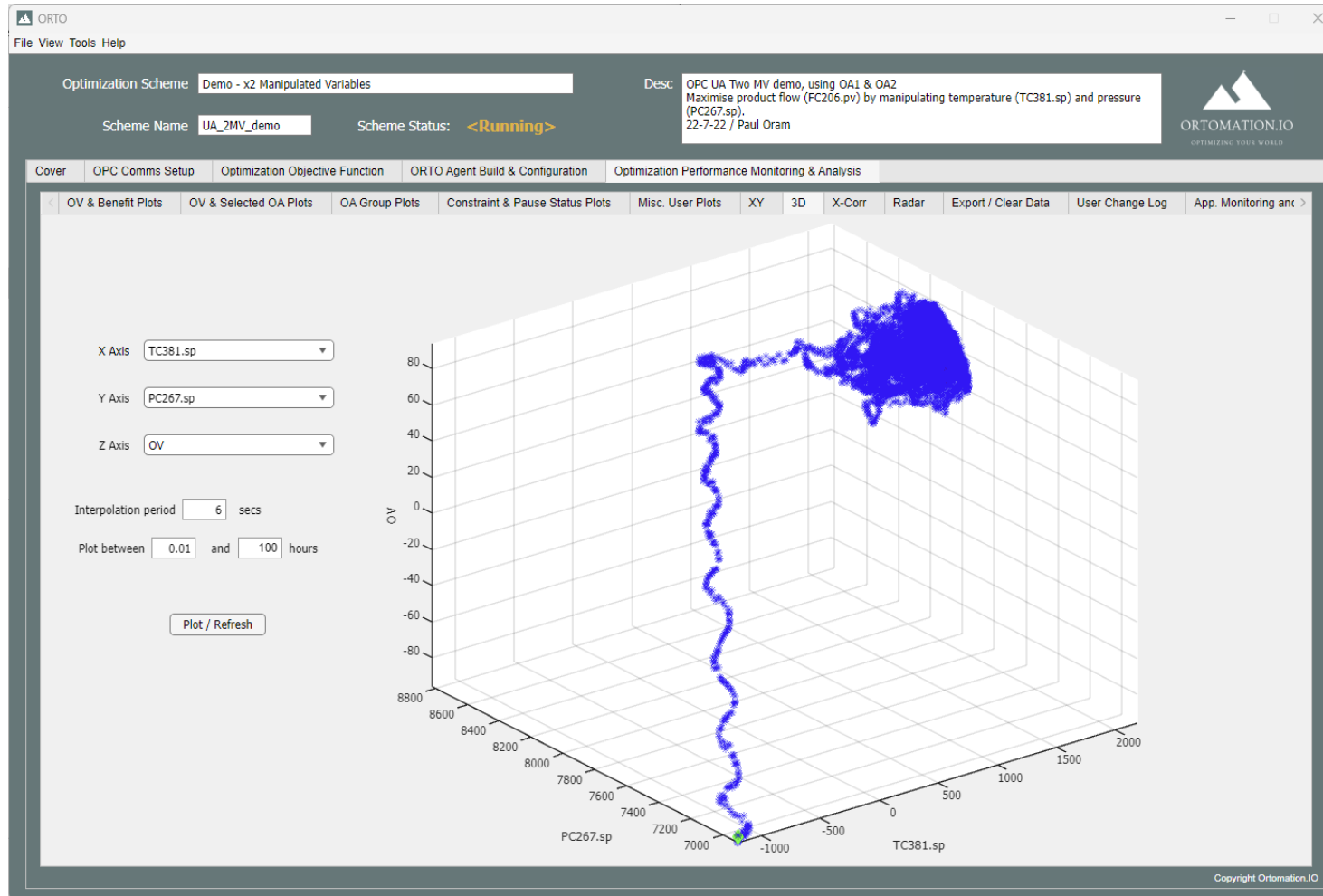
← User created real-time plots

XY Plot Tab



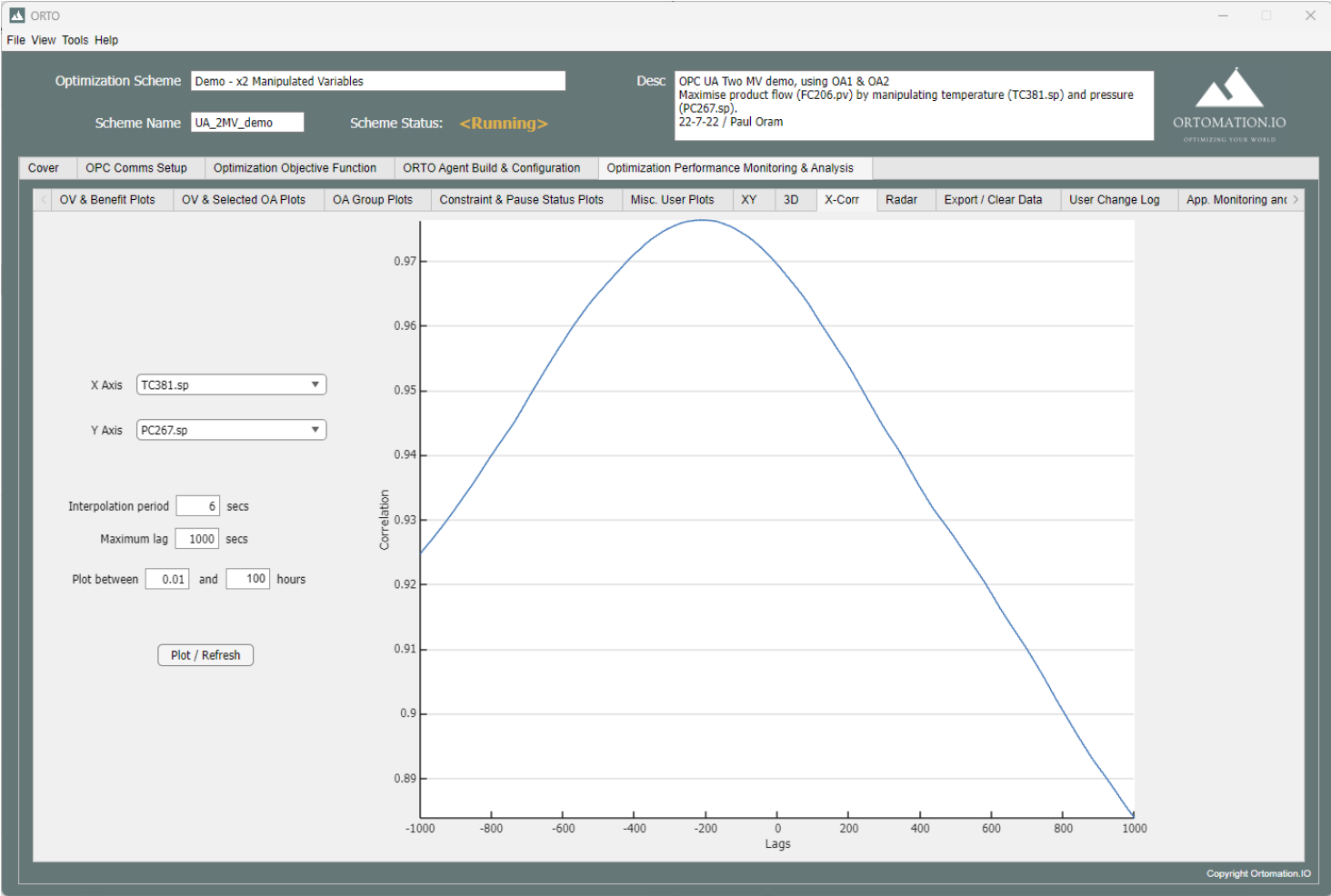
← Plot one variable against another

3D plot



Plot three variables, for example, to visualize the 3D plane between two MVs and the OV

Cross Correlation Tab



← Perform cross and auto correlations

Perf. Monitoring & Analysis Tab / Export & Clear Data Tab



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Cover OPC Comms Setup Optimization Objective Function ORTO Agent Build & Configuration Optimization Performance Monitoring & Analysis

OV & Benefit Plots OV & Selected OA Plots OA Group Plots Constraint & Pause Status Plots Misc. User Plots XY 3D X-Corr Radar Export / Clear Data User Change Log App. Monitoring and >

Export Process and ORTO Agent Real-time Data

File name	OPC Data	Objective Function Data	ORTO Agent Input / Output Data	Analysis Data
x2MV_demo	<input checked="" type="checkbox"/> Read Data (1-15) <input checked="" type="checkbox"/> Write Data (1-10)	<input checked="" type="checkbox"/> Optimization Variable <input checked="" type="checkbox"/> Constraint Variable Flags (1-5) <input checked="" type="checkbox"/> Pause Logic Flags (1-5)	<input checked="" type="checkbox"/> ORTO Agent 1 <input checked="" type="checkbox"/> ORTO Agent 2 <input type="checkbox"/> ORTO Agent 3 <input type="checkbox"/> ORTO Agent 4 <input type="checkbox"/> ORTO Agent 5	<input checked="" type="checkbox"/> Accumulated Benefit

Time base: Hours
Save between: 0 and 9999 hours ago
File Format: .xls .bt

Export Data

Schedule Export of Process and ORTO Agent Real-time Data

File name	OPC Data	Objective Function Data	ORTO Agent Input / Output Data	Analysis Data
x2MV_demo_sched	<input checked="" type="checkbox"/> Read Data (1-15) <input checked="" type="checkbox"/> Write Data (1-10)	<input checked="" type="checkbox"/> Optimization Variable <input checked="" type="checkbox"/> Constraint Variable Flags (1-5) <input checked="" type="checkbox"/> Pause Logic Flags (1-5)	<input checked="" type="checkbox"/> ORTO Agent 1 <input checked="" type="checkbox"/> ORTO Agent 2 <input type="checkbox"/> ORTO Agent 3 <input type="checkbox"/> ORTO Agent 4 <input type="checkbox"/> ORTO Agent 5	<input checked="" type="checkbox"/> Accumulated Benefit

Save every: 6 hours
File Format: .xls .bt

Schedule Export: Off On

Clear All Historical Data

Clear Data

Select real-time data to export

Select real-time data to be exported periodically

Clear data and erase plots

Perf. Monitoring & Analysis Tab / User Change Log Tab



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Scheme Name: UA_2MV_demo Scheme Status: <Running>

Optimization Performance Monitoring & Analysis

OV & Benefit Plots OV & Selected OA Plots OA Group Plots Constraint & Pause Status Plots Misc. User Plots XY 3D X-Corr Radar Export / Clear Data User Change Log App. Monitoring and

Date / time	Header / Tab Location	ORTO Agent	OA Descriptor	Parameter	Previous Value	New Value
23-Jul-2024 08:28:15	Scheduled data export switched on and writing to: <C:\Users\oramp\OneDrive\Desktop\ORTO Data Files>	-	-	-	-	-
23-Jul-2024 08:26:58	<Scheduled data export switched off>	-	-	-	-	-
23-Jul-2024 06:11:41	Real-time data scheduled export to <x2MV_demo (3) (23_Jul_2024 06_11_41).xls>	-	-	-	-	-
23-Jul-2024 00:11:37	Real-time data scheduled export to <x2MV_demo (2) (23_Jul_2024 00_11_36).xls>	-	-	-	-	-
22-Jul-2024 18:11:35	Real-time data scheduled export to <x2MV_demo (1) (22_Jul_2024 18_11_34).xls>	-	-	-	-	-
22-Jul-2024 12:11:25	Scheduled data export switched on and writing to: <C:\Users\oramp\OneDrive\Desktop\ORTO Data Files>	-	-	-	-	-
22-Jul-2024 11:42:29	Scheme config. saved to ZMV Process OA1 OA2 constrained - UA - 22-7-24>	-	-	-	-	-
22-Jul-2024 11:41:39	ORTO Agent Build & Configuration	OA2	Pressure PC267 (barG)	Agent On/Off	off	on
22-Jul-2024 11:41:37	ORTO Agent Build & Configuration	OA2	Pressure PC267 (barG)	Pause Flag	P1	P2
22-Jul-2024 11:41:35	ORTO Agent Build & Configuration	OA2	Pressure PC267 (barG)	Agent On/Off	on	off
22-Jul-2024 10:19:43	ORTO Agent Build & Configuration	OA2	Pressure PC267 (barG)	Agent On/Off	off	on
22-Jul-2024 10:19:41	ORTO Agent Build & Configuration	OA1	Temperature TC381 (degC)	Agent On/Off	off	on
22-Jul-2024 10:19:00	<ZMV Process OA1 OA2 constrained - UA - 22-7-24.orto> load complete.	-	-	-	-	-
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5	<see new value>	ORTO Agent 5 Name	----	----
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5		Push Direction	Positive	Positive
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5		MV Bounds [High Low]	[---- ----]	[---- ----]
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5		MV Bounds [High Low]	----	[---- ----]
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5		Sensitivity Factor	1	----
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5		Max. Move / Cycle	----	----
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5		Agent Cycle Time (Prime ...	----	100
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5		MV EU Range [High Low]	[---- ----]	[---- ----]
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5		MV EU Range [High Low]	----	[---- ----]
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5		Pause Flag	----	----
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5		Constraint Flag	----	----
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA5		MV Readback Tag	----	----
22-Jul-2024 10:18:59	ORTO Agent Build & Configuration	OA4	<see new value>	ORTO Agent 4 Name	----	----

Export .xls

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← All user changes are logged. Logs can be exported as a .xls file.

App. Monitoring and Preferences Tab

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File View Tools Help

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App Performance Monitoring

Total run time: 22.43 hours
Execution cycle time: 0.1207 secs
Reserved memory: 0.497 GBs
Data memory used: 1.585 MBs

App Preferences

Inactivity timer: 30 mins
Compression tolerance: 0.3 %
No. points / plot: 1000

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← ORTO application software monitoring and preferences.

