



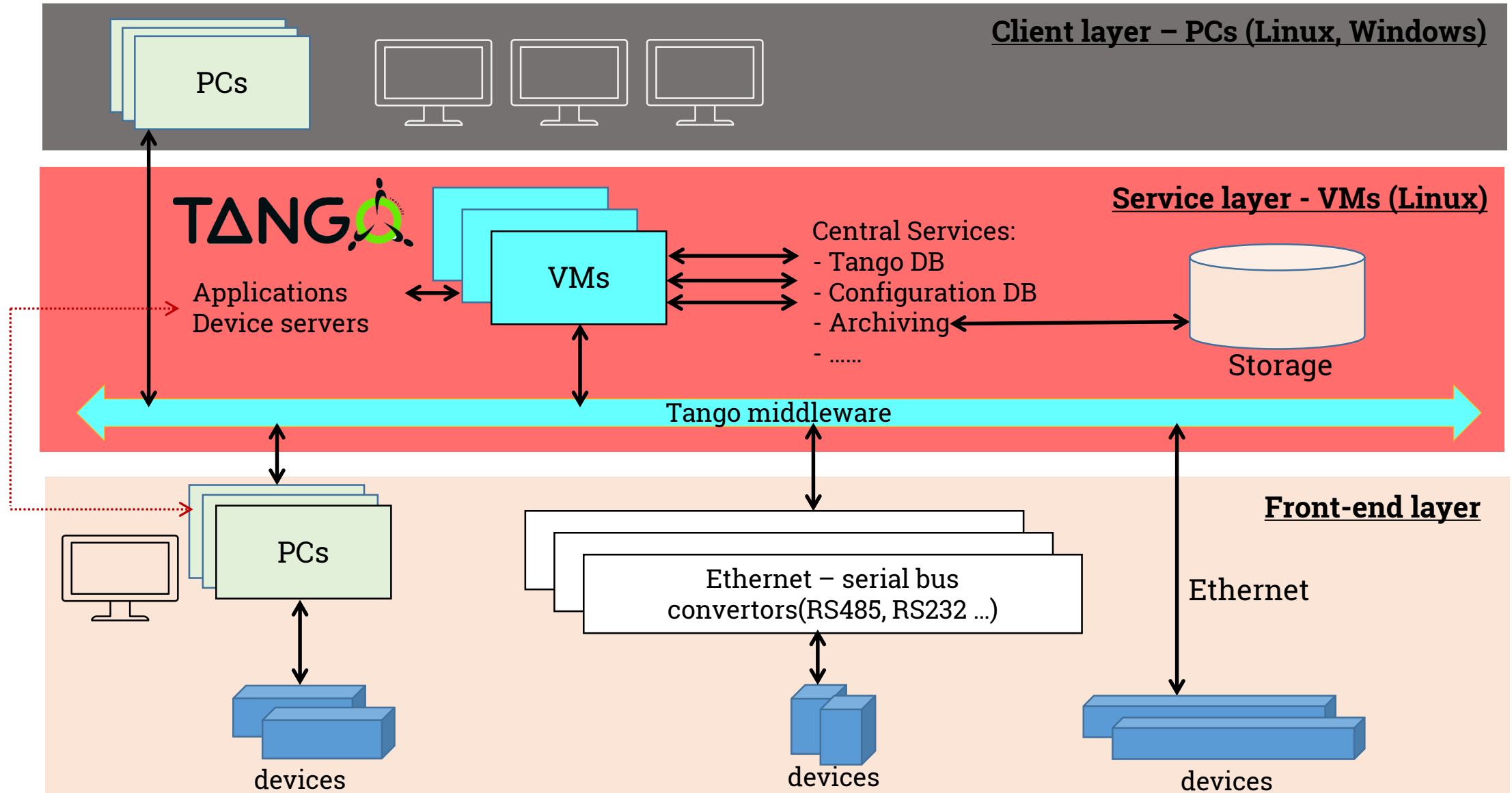
Software developments for detectors' experimental hardware

NICA Days'19, 23.10.2019

P. Chumakov, D. Egorov, R. Nagdasev, V. Shutov

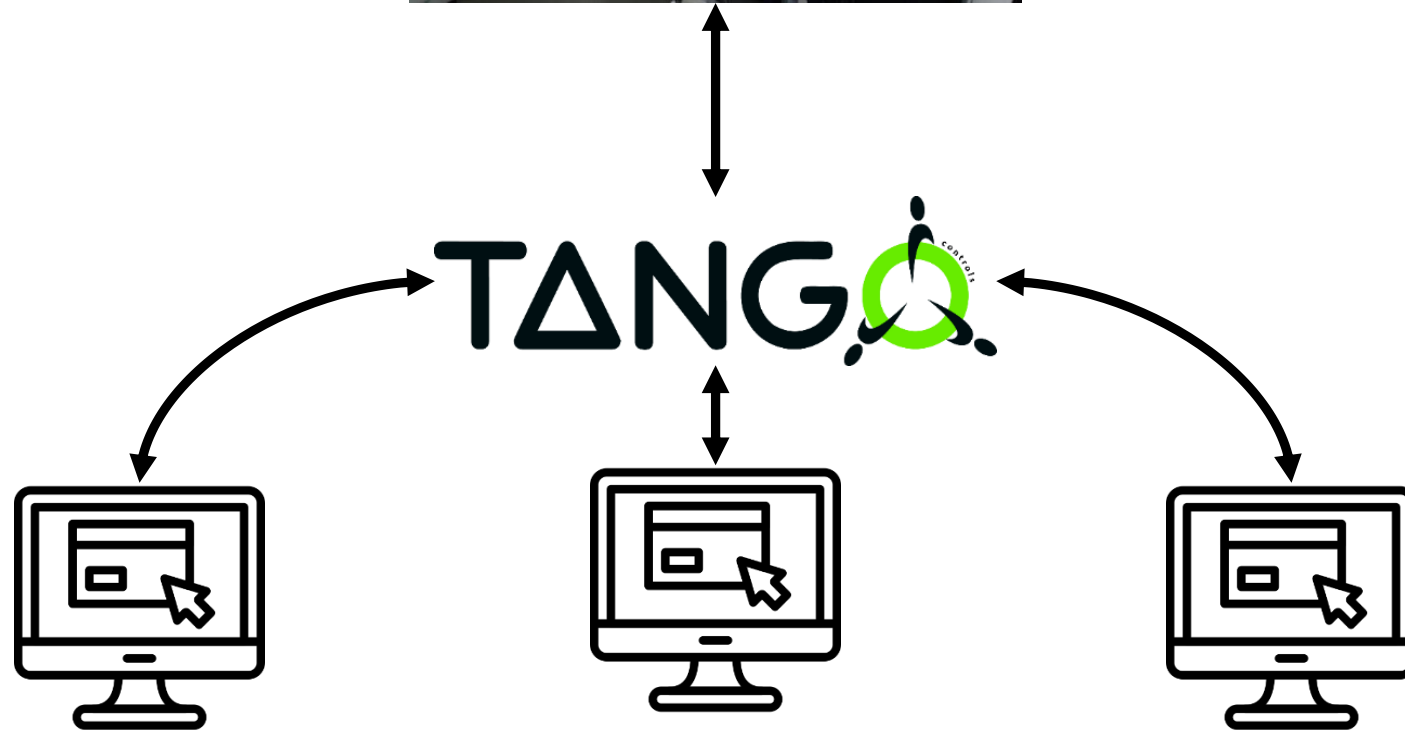


Tango-based device control system





Workflow



Monitoring and control applications



Workflow



Detectors' group applications

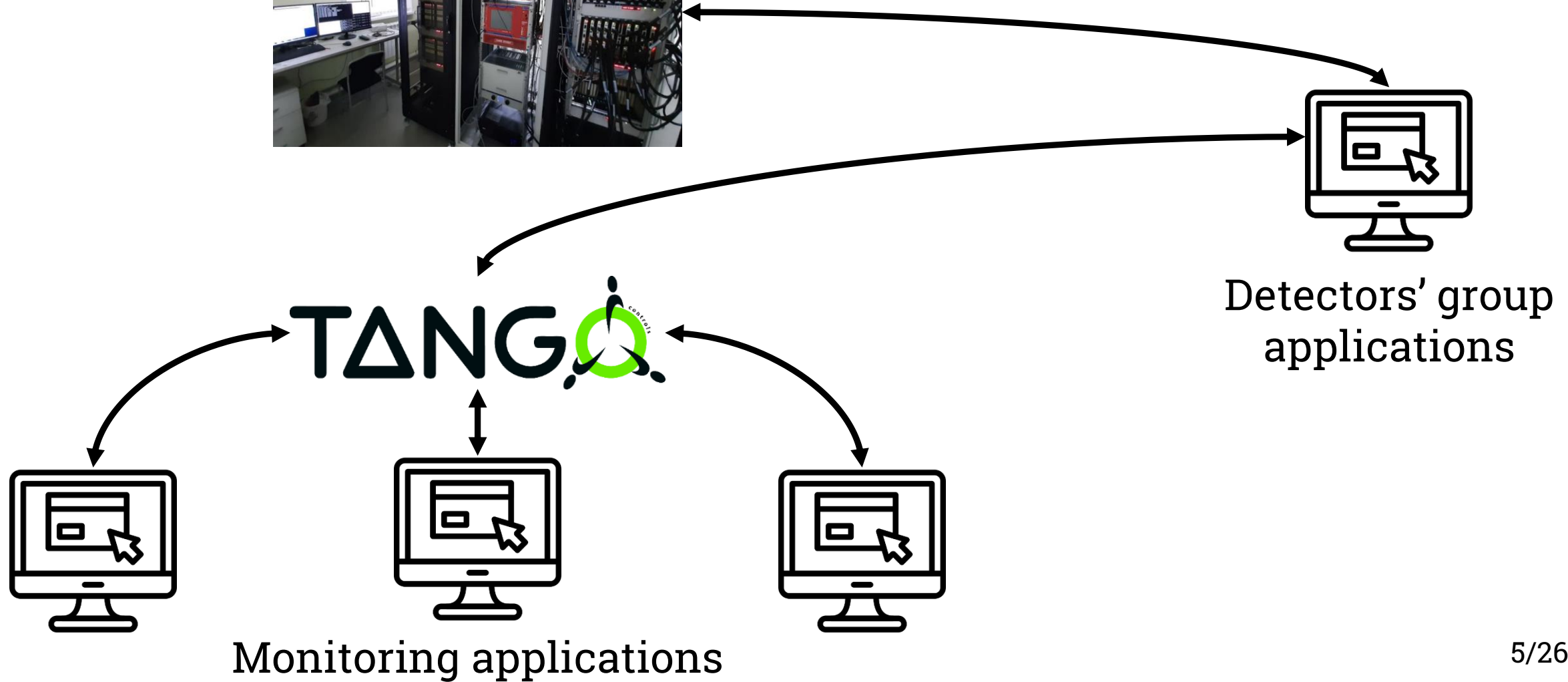
TANGO



Monitoring and control applications



Workflow





Workflow



**No direct access
to devices**



Detectors' group
applications

**Application
status
unknown**

**No data quality
check**

TANGO



Monitoring applications



Workflow



Hardware
or
software
multiplexer



Detectors' group
applications

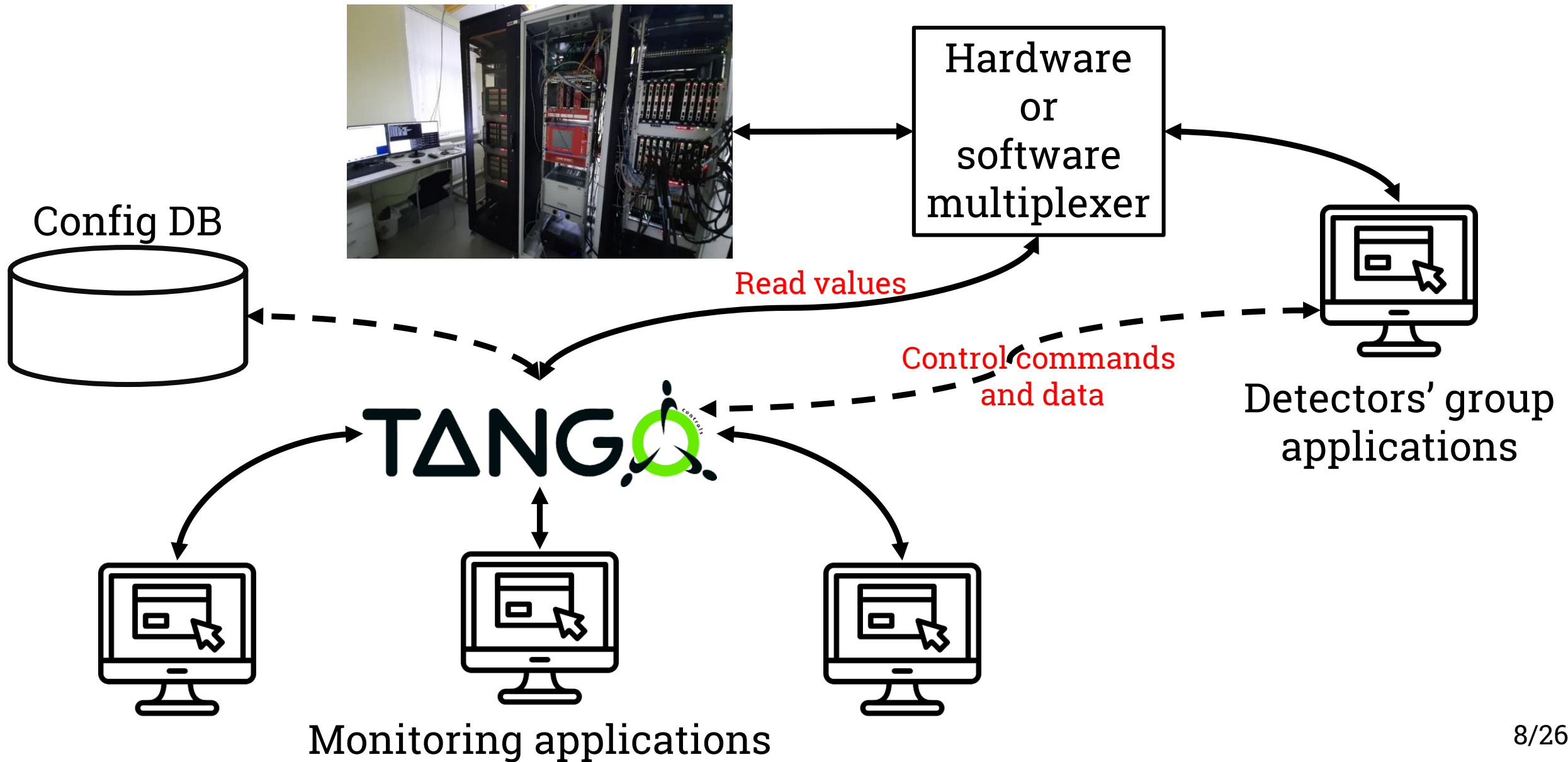
TANGO



Monitoring applications

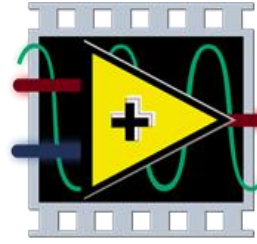


Workflow





Case 1: Trust, but verify

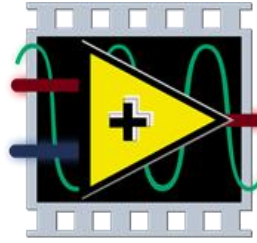


LabVIEW





Case 1: Trust, but verify



LabVIEW

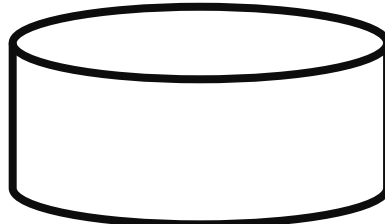


What data received from device?

What data comes to us?



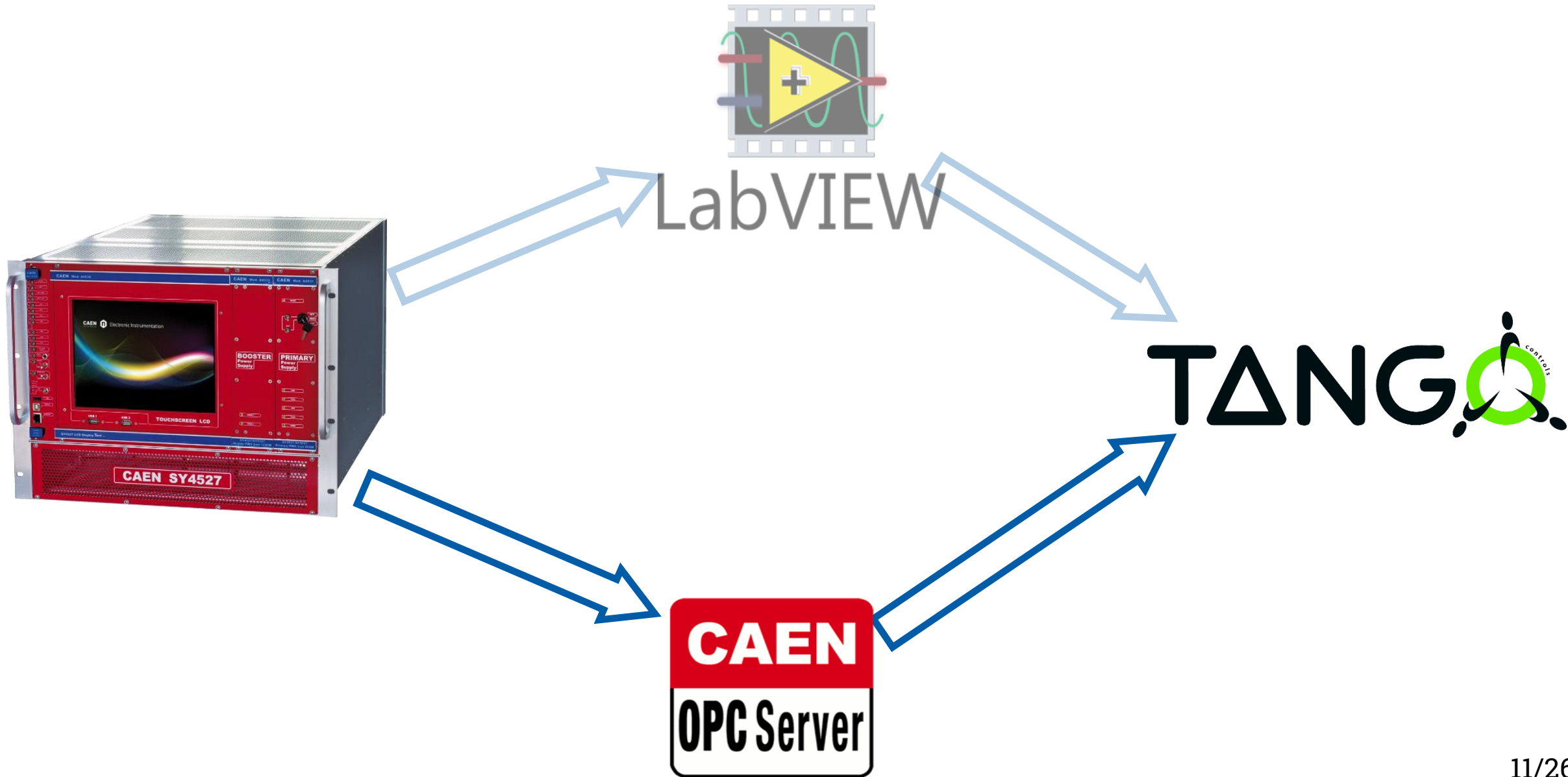
Archiving DB



???

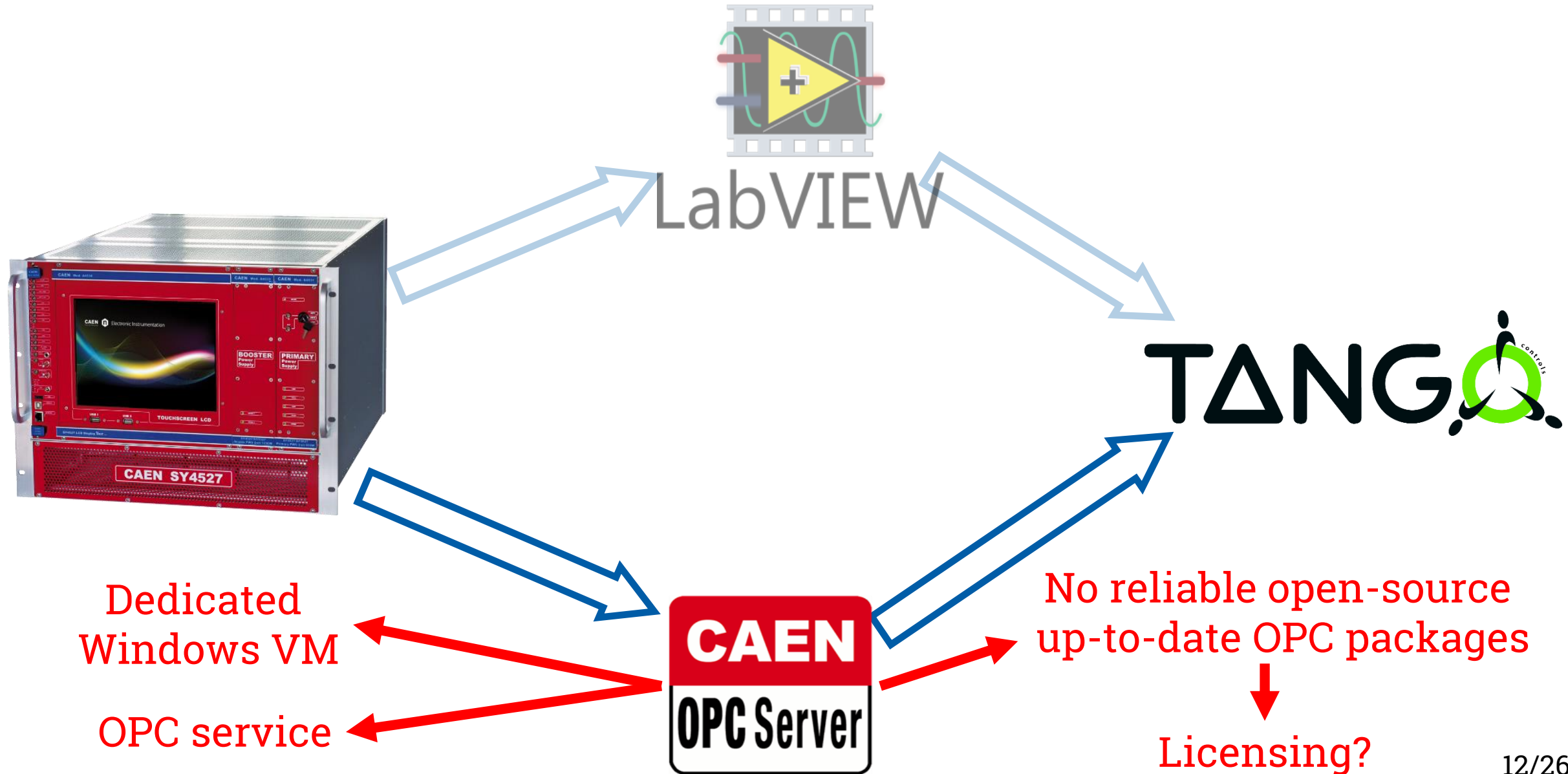


Case 2: CERN Experience



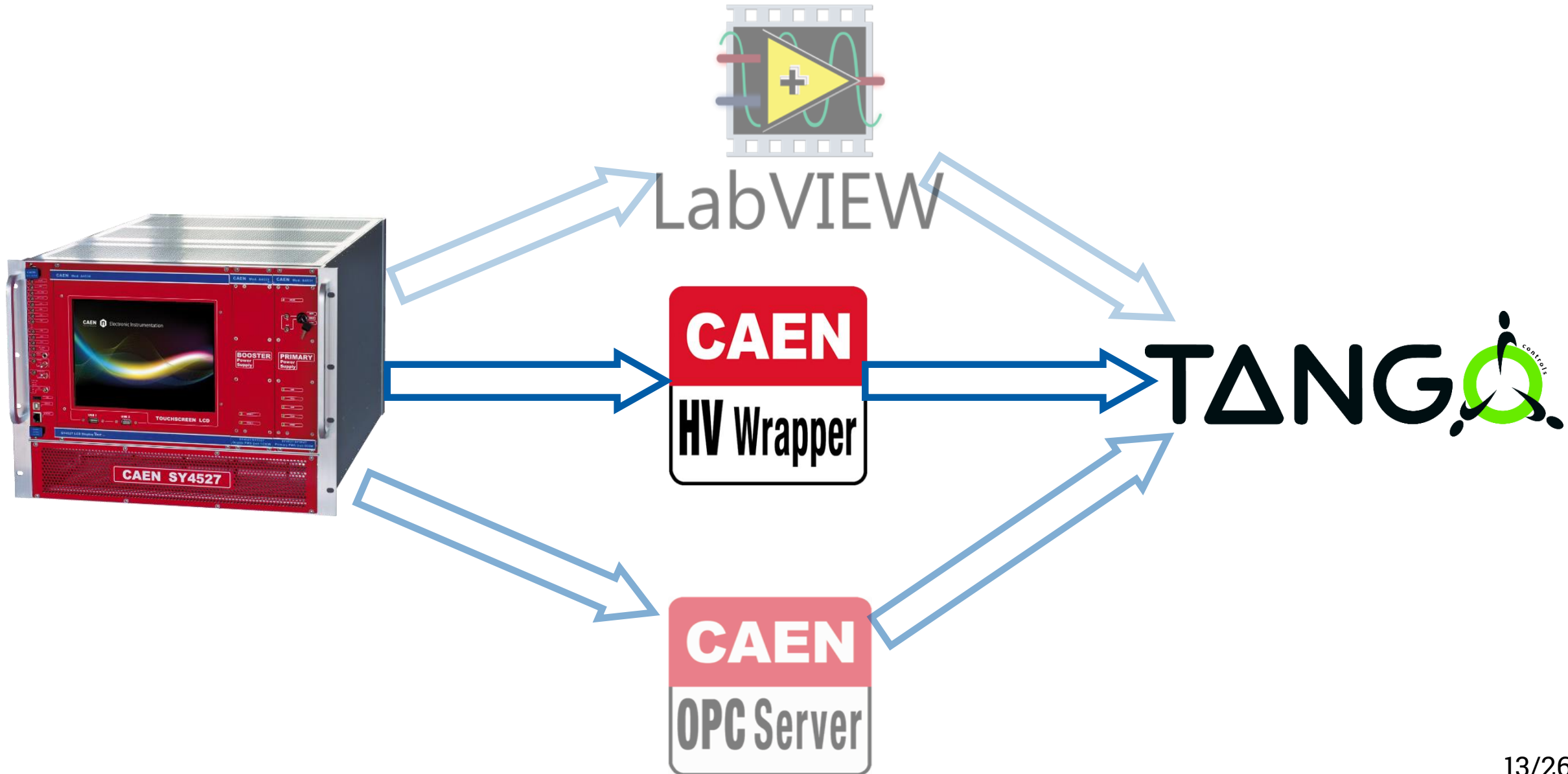


Case 2: CERN Experience



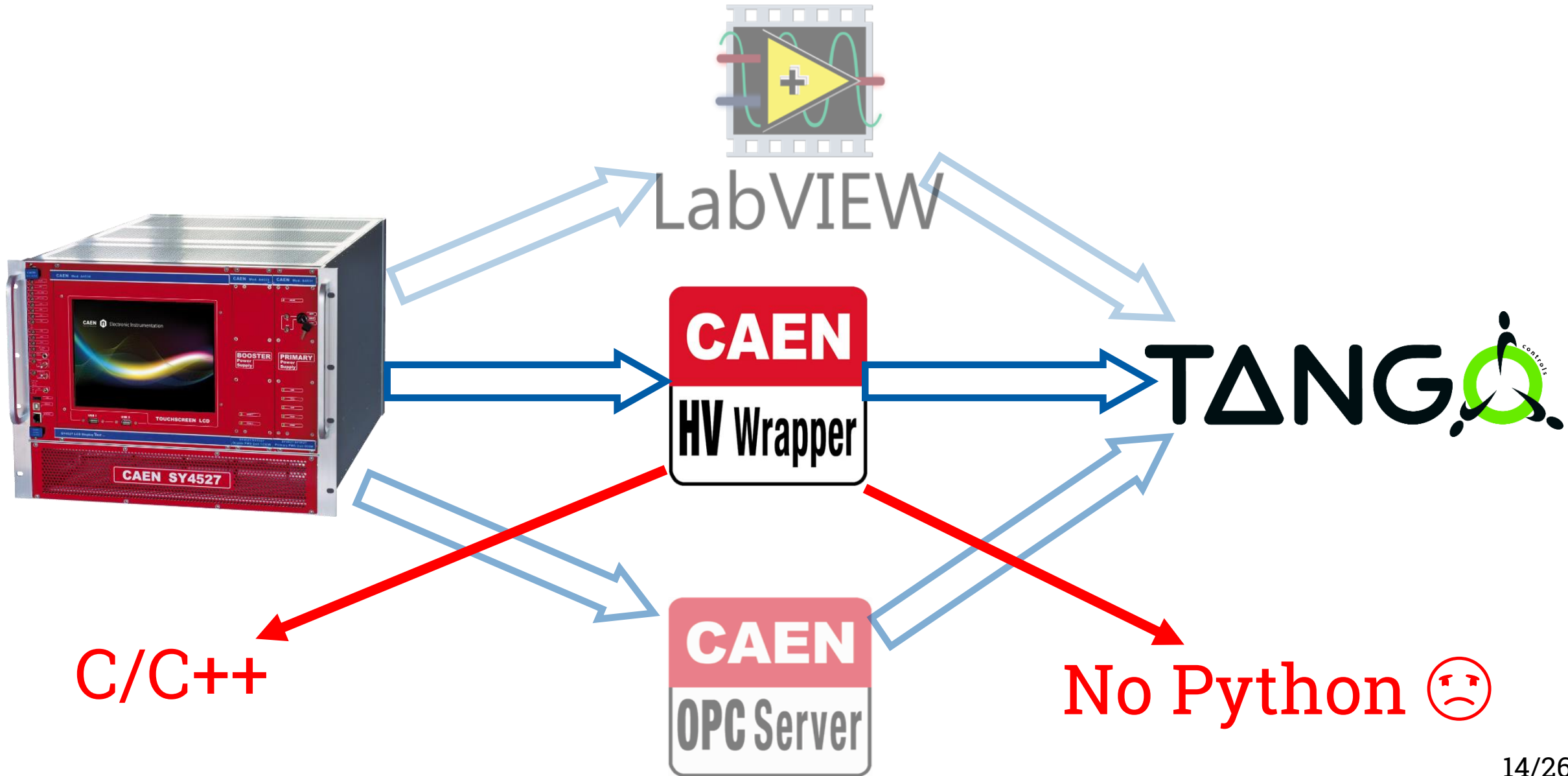


Case 3: Manufacturer libraries





Case 3: Manufacturer libraries

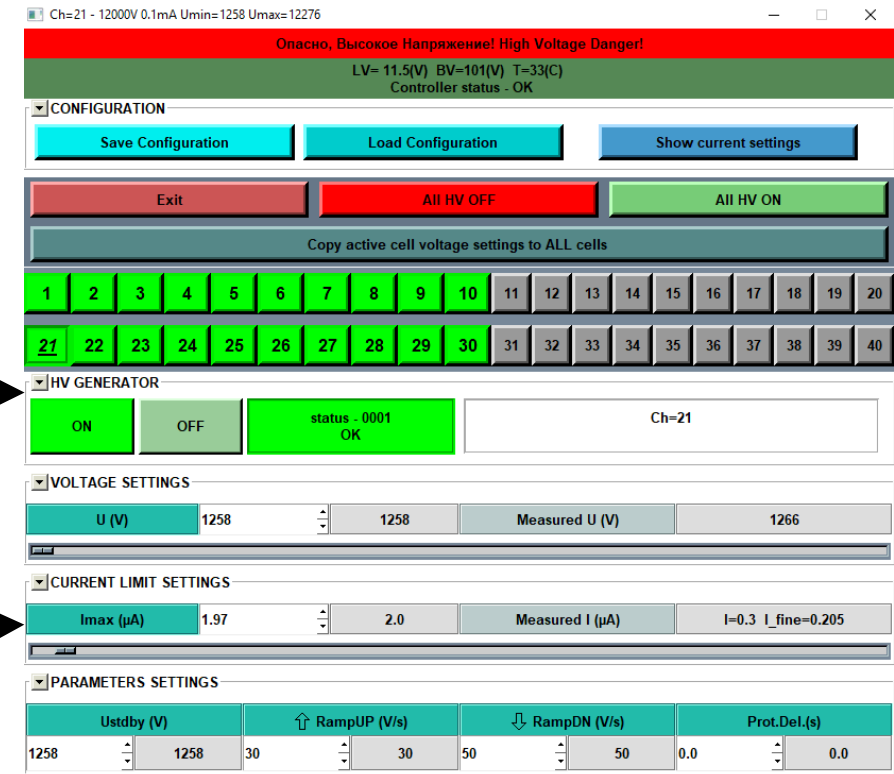




HV Sys-base power supply systems



HV Sys controller



HV Sys standalone application





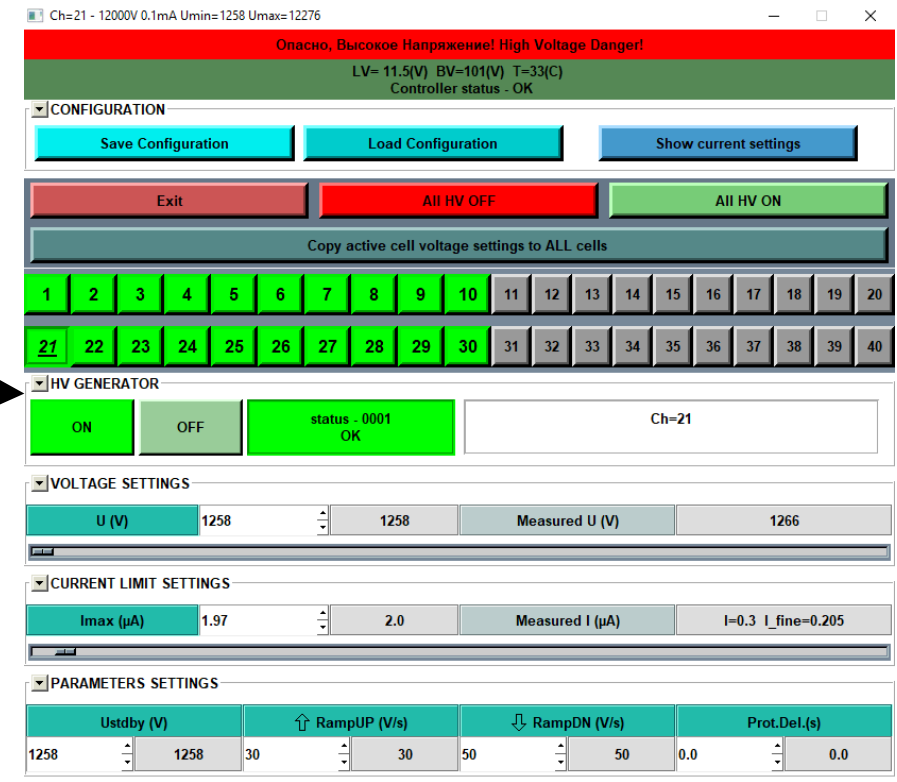
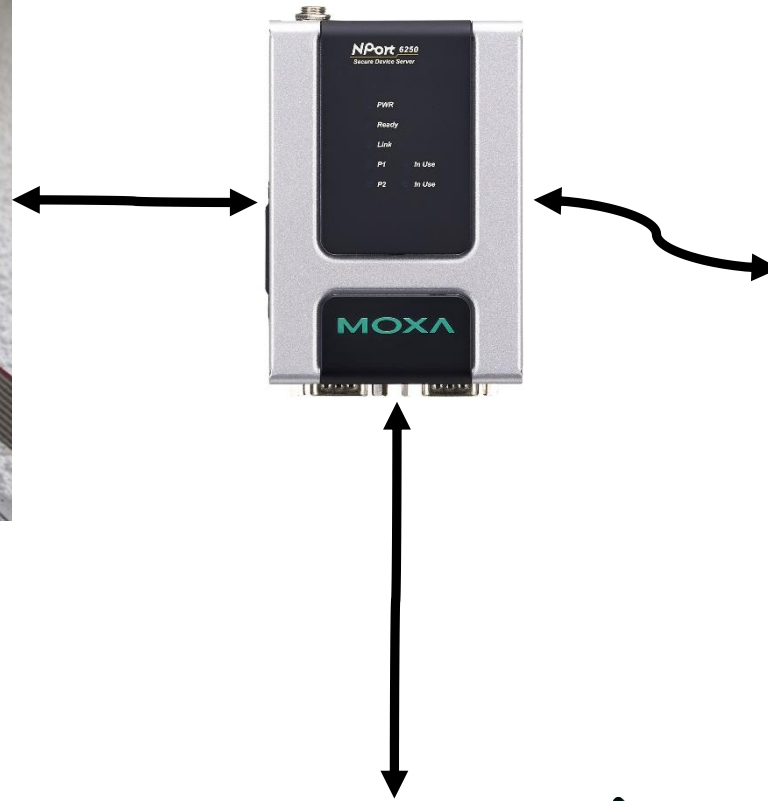
HV Sys-base power supply systems



HV Sys controller

Command by command operation:

store all the commands in the buffer and then send them to serial ports in FIFO (first-in, first-out) order.

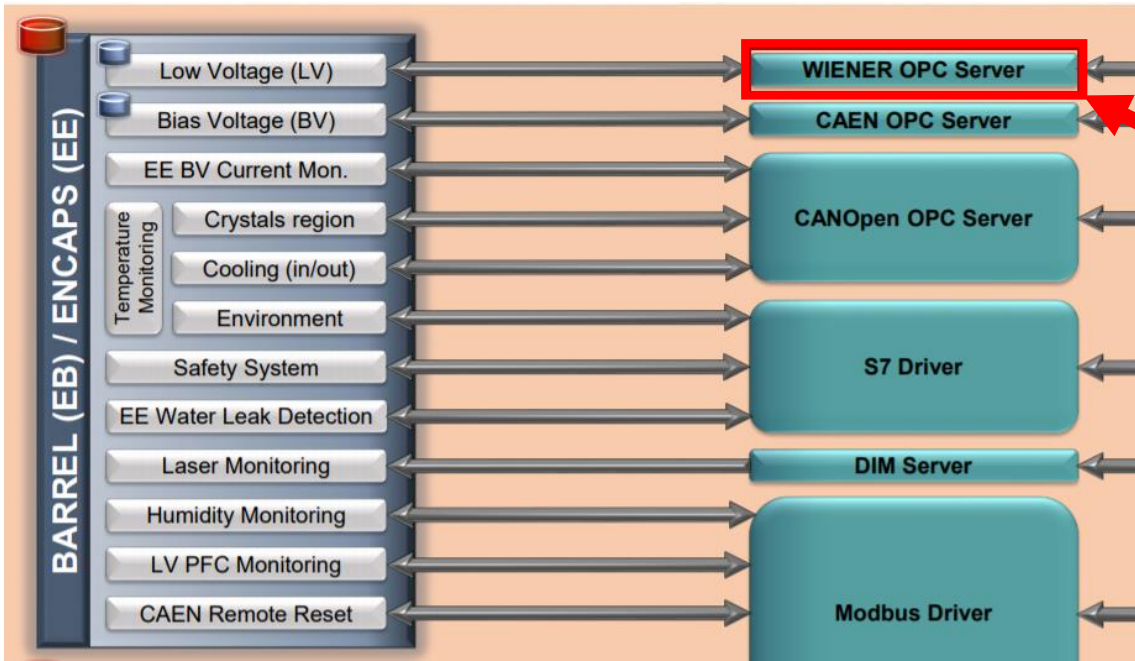


HV Sys standalone application





Wiener HV and LV systems



The CMS ECAL Control and Safety Systems Upgrades During the CERN LHC Long Shutdown 2, *ICALEPCS'19*, *WEPHA041*



SNMP
Simple Network Management Protocol





TOF FEE control and monitoring



GUI application that allows to monitor FEE parameters and temperature and set DAC values. Uses Socket protocol.



↓ X 20



	V+, mV	V-, mV	Vdelta, mV	Vpower, mV	DAC, mV	Tboard, °C	Tgas, °C
1	1946	1741	1624	3248	2775	45	44
2	1693	1637	1544	3287	0	41	36
3	1687	1737	1735	3293	0	43	43
4	1940	1649	1627	3220	0	48	46
5	1914	1588	1615	3265	0	46	38
6	1993	1985	1741	3235	0	50	44
7	1754	1906	1731	3204	0	40	47
8	1777	1836	1860	3272	0	38	48
9	1915	1909	1655	3222	0	37	37
10	1864	1969	1703	3295	0	46	49
11	1855	1578	1841	3268	0	50	46
12	1610	1751	1908	3206	0	49	49
13	1976	1686	1611	3286	0	39	48
14	1693	1898	1787	3250	0	44	47
15	1788	1847	1517	3252	0	49	44
16	1503	1645	1761	3207	0	46	36
17	1711	1785	1990	3268	0	42	35
18	1746	1559	1676	3256	0	38	47
19	1788	1579	1829	3256	0	40	36
20	1514	1566	1641	3296	0	49	46



DAQ VME crates monitoring and control



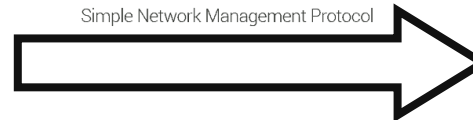
Monitoring and control for Wiener and ELMA VME crates

- Multidevice support;
- Displays state and status for every crate;
- On/off/reset buttons for crates.



SNMP

Simple Network Management Protocol



bmn-daq-vme-1				bmn-sts-vme-1			
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET
bmn-t0-vme-1				bmn-tof400-vme-1			
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET
bmn-dch-vme-1				bmn-tof400-vme-2			
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET
bmn-dch-vme-2				bmn-tof700-vme-1			
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET
bmn-dch-vme-3				bmn-tof700-vme-2			
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET
bmn-dch-vme-4				bmn-tof700-vme-3			
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET
bmn-gem-vme-1				bmn-tof700-vme-4			
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET
bmn-gem-vme-2				bmn-fhcal-vme-1			
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	ON	
bmn-gem-vme-3				bmn-ecal-vme-1			
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	ON	
bmn-mwpc-vme-1				bmn-zdc-vme-1			
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	ON	
bmn-src-vme-1				bmn-csc-vme-1			
<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	mainOn	RESET	<input checked="" type="checkbox"/> ON	<input type="checkbox"/> OFF	ON	



Network switch monitoring and control



Application for HP Aruba switches control. Uses SNMP protocol.

- Multidevice support;
- Power consumption and status for every connected device;
- Allows to switch on/off network and/or power for every port.



J9574A POE SWITCH CONTROL

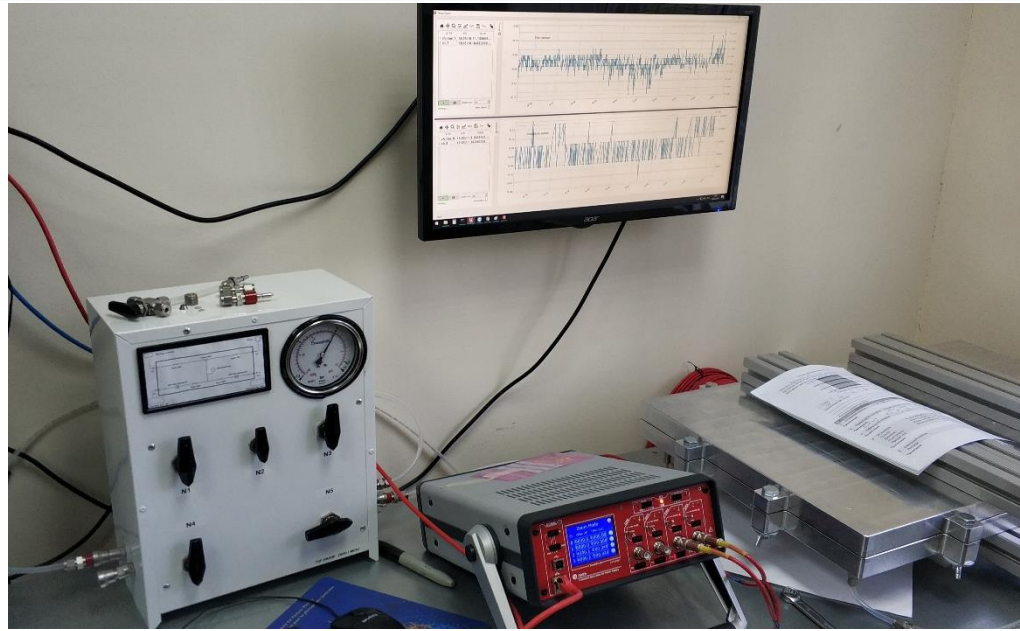
Address: bmn-sw-r1.he.jinr.ru swhe-bmn-r1 R1					Address: bmn-sw-r2.he.jinr.ru bmn-sw-r2 R2					Address: bmn-sw-r3.he.jinr.ru bmn-sw-r3 R3					Address: bmn-sw-r6.he.jinr.ru swhe-bmn-r6 R6				
NET	STATUS	NAME	POWER		NET	STATUS	NAME	POWER		NET	STATUS	NAME	POWER		NET	STATUS	NAME	POWER	
13	UP	ON	...6asd-06E9B78B	14370	1	UP	SEARCH	N/A	0	1	UP	SEARCH	N/A	0	1	UP	SEARCH	N/A	0
14	UP	ON	...6asd-046F2950	15428	2	UP	SEARCH	N/A	0	2	UP	SEARCH	...daq-1.he.jinr.ru	0	2	UP	SEARCH	N/A	0
15	UP	ON	...6asd-06E9B820	14567	3	UP	SEARCH	N/A	0	3	UP	SEARCH	N/A	0	3	UP	SEARCH	N/A	0
16	UP	ON	...6asd-06E9B8BE	14619	4	UP	SEARCH	N/A	0	4	UP	SEARCH	...daq-3.he.jinr.ru	0	4	UP	SEARCH	...-8spi030DA879	0
17	UP	ON	...6asd-06E9B83F	14619	5	UP	SEARCH	N/A	0	5	UP	SEARCH	N/A	0	5	UP	SEARCH	...4verc046F292C	0
18	UP	ON	...6asd-06E9B838	14701	6	UP	SEARCH	...4verc07A924EE	0	6	UP	SEARCH	N/A	0	6	DOWN	SEARCH	N/A	0
19	UP	ON	...6asd-06E9B8C5	14698	7	...WN	SEARCH	N/A	0	7	UP	SEARCH	N/A	0	7	DOWN	SEARCH	N/A	0
20	UP	ON	...6asd-06E9B791	15206	8	...WN	SEARCH	N/A	0	8	UP	SEARCH	...daq-1.he.jinr.ru	0	8	DOWN	SEARCH	N/A	0
21	UP	ON	...6asd-06E9FFB7	14589	9	...WN	SEARCH	N/A	0	9	UP	SEARCH	N/A	0	9	DOWN	SEARCH	N/A	0
22	UP	ON	...6asd-06EA474D	14787	10	...WN	SEARCH	N/A	0	10	UP	SEARCH	...-8spi030DBFBD	0	10	UP	SEARCH	N/A	0
23	UP	ON	...6asd-06E9B8A5	14619	11	...WN	SEARCH	N/A	0	11	...WN	SEARCH	N/A	0	11	UP	SEARCH	N/A	0
24	UP	ON	...6asd-06E9FFB4	14452	12	...WN	SEARCH	N/A	0	12	UP	SEARCH	N/A	0	12	DOWN	SEARCH	N/A	0
25	...WN	SEARCH	N/A	0	13	...WN	SEARCH	N/A	0	13	UP	SEARCH	N/A	0	13	DOWN	SEARCH	N/A	0
26	...WN	SEARCH	N/A	0	14	...WN	SEARCH	N/A	0	14	UP	SEARCH	...daq-1.he.jinr.ru	0	14	UP	SEARCH	N/A	0
27	...WN	SEARCH	N/A	0	15	...WN	SEARCH	N/A	0	15	UP	SEARCH	...daq-1.he.jinr.ru	0	15	DOWN	SEARCH	N/A	0
28	...WN	SEARCH	N/A	0	16	...WN	SEARCH	N/A	0	16	UP	SEARCH	...daq-4.he.jinr.ru	0	16	DOWN	SEARCH	N/A	0
29	...WN	SEARCH	N/A	0	17	...WN	SEARCH	N/A	0	17	UP	SEARCH	N/A	0	17	DOWN	SEARCH	N/A	0
30	...WN	SEARCH	N/A	0	18	...WN	SEARCH	N/A	0	18	UP	SEARCH	N/A	0	18	DOWN	SEARCH	N/A	0
31	...WN	SEARCH	N/A	0	19	...WN	SEARCH	N/A	0	19	UP	SEARCH	N/A	0	19	DOWN	SEARCH	N/A	0
32	...WN	SEARCH	N/A	0	20	...WN	SEARCH	N/A	0	20	...WN	SEARCH	N/A	0	20	DOWN	SEARCH	N/A	0
33	...WN	SEARCH	N/A	0	21	...WN	SEARCH	N/A	0	21	UP	SEARCH	N/A	0	21	UP	SEARCH	N/A	0

Enable POE Disable POE Reset POE
Enable Port Disable Port Reset Port

History Last updated: 2018-04-25 13:29:01



MPD TOF assembling and test site





MPD TOF test stand



TOF Test Stand

Temperature: None Humidity: None

The test stand is composed of several modules, each with HV and LV connections. The modules are arranged in a long rack, and the cables are organized in a systematic manner. The following table shows the HV and LV connections for each box:

Box	HV	LV
Box 4	1057 mV	1070 mV
Box 5	1083 mV	1070 mV
Box 9	1057 mV	1070 mV
Box 10	1083 mV	1070 mV

Box 9 also includes a table of HV and LV connections:

HV	LV	0.0V	0.0A
1057 mV	1070 mV		
1083 mV	1070 mV		
1096 mV	1070 mV		



MPD TOF test stand



TOF Test Stand

Temperature: None Humidity: None



Box 9

HV:		LV:			HV:		LV: 0.0V		
1057 mV	1083 mV	1083 mV	1070 mV	1070 mV	1057 mV	1083 mV	1096 mV	1070 mV	1070 mV
1083 mV	1070 mV	1096 mV	1057 mV	1083 mV	1083 mV	1057 mV	1096 mV	1070 mV	1096 mV
HV:		LV:			HV:		LV:		

Box 4

Box 9

HV:		LV:			HV:		LV: 0.0V 0.0A		
					1057 mV	1083 mV	1096 mV	1070 mV	1070 mV
					1083 mV	1057 mV	1096 mV	1070 mV	1096 mV
HV:		LV:			HV:		LV:		

Box 5

Box 10

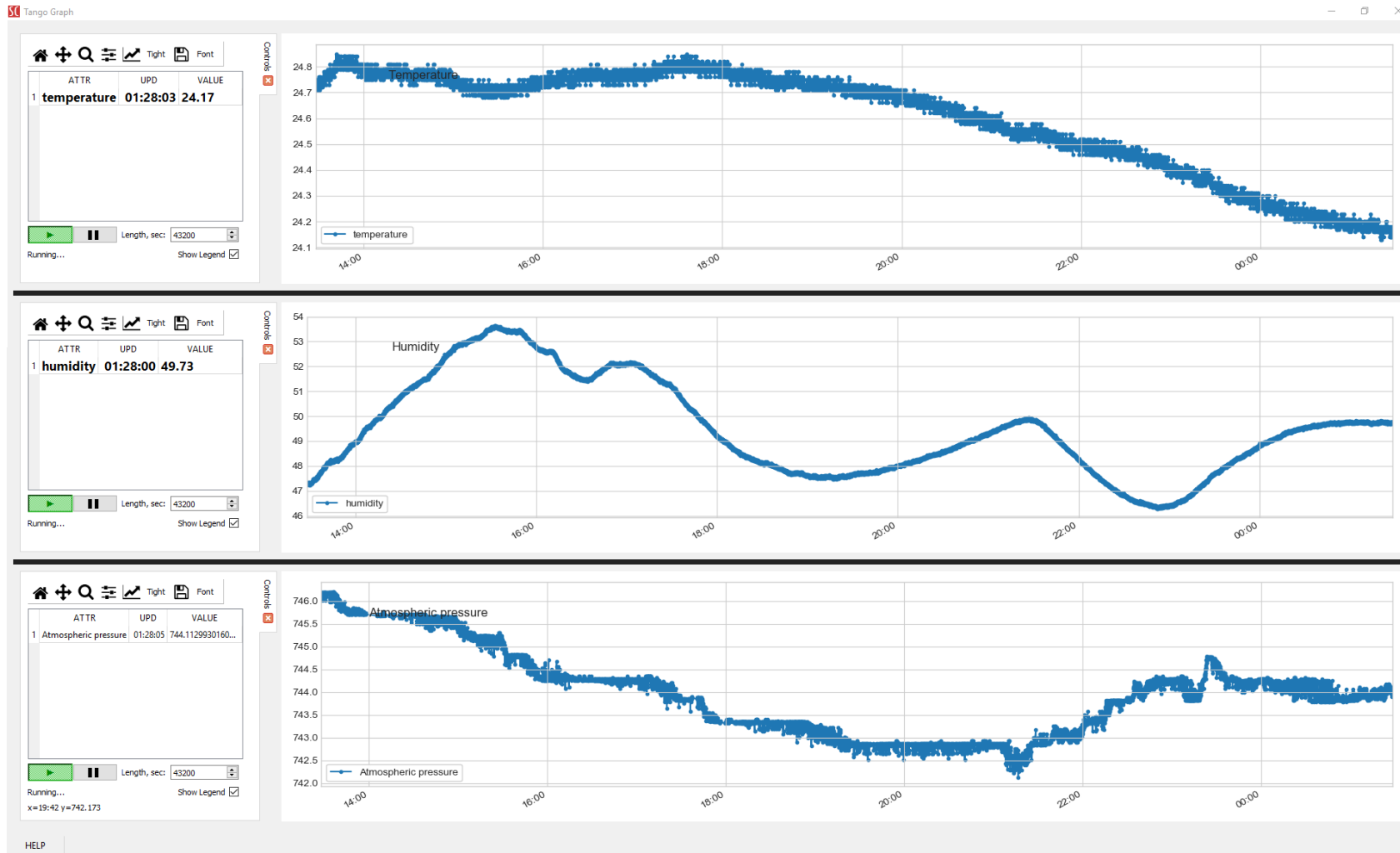
HV:		LV:			HV:		LV:		
HV:		LV:			HV:		LV:		



MPD TOF bld. 42 environment monitoring



The module PIR-230-E contain a temperature and humidity sensor for measuring indoor temperature and humidity



Honeywell Heavy Duty Pressure Transducer 15 psi range, 0.25% accuracy



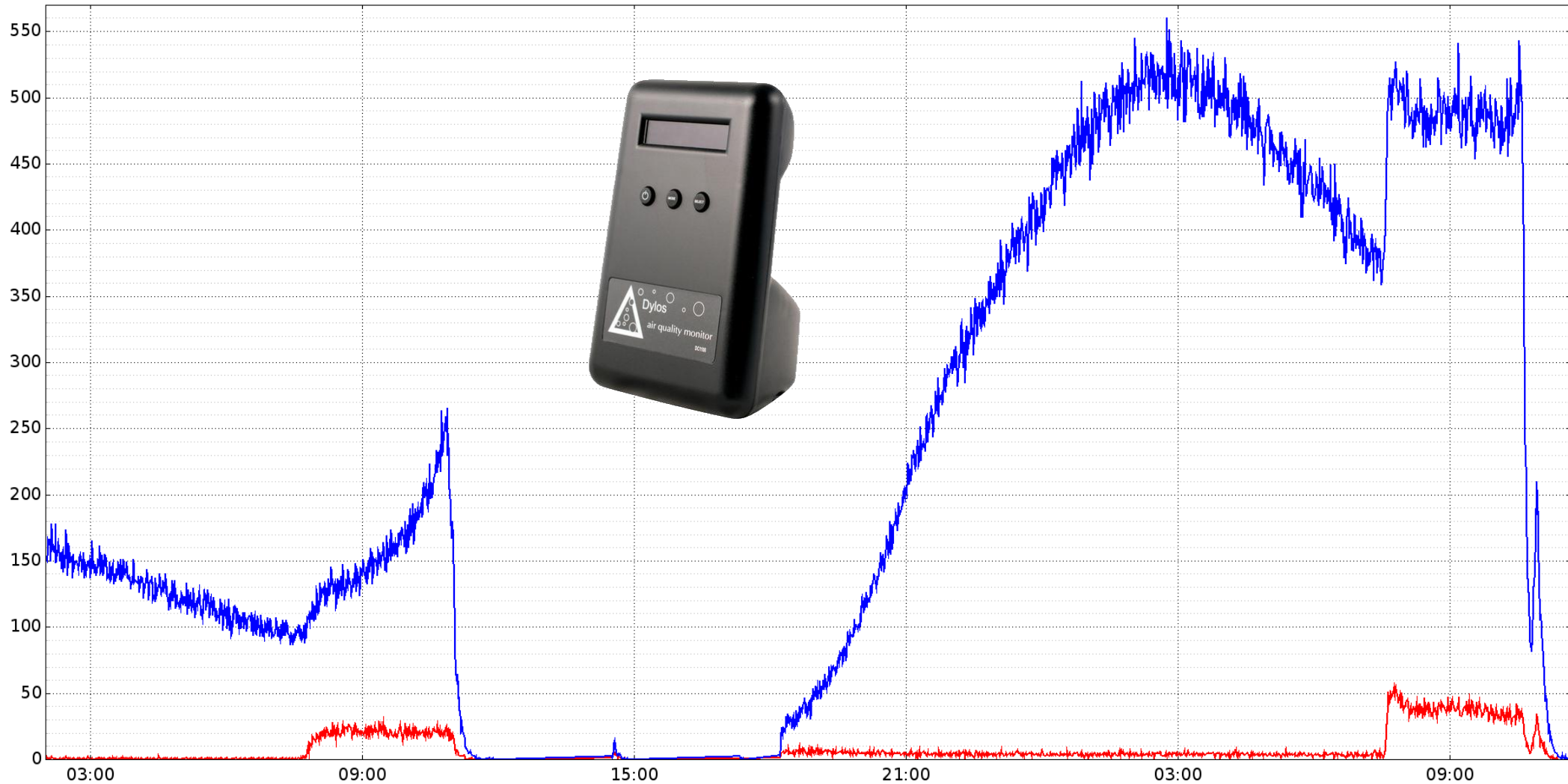
Temperature, humidity and atmospheric pressure plots 12 hours, TOF detectors assembling area



Clean room air quality monitoring



MPD TOF assembling and testing stand requires clean room environment.
We use Dylos DC1100 Pro Air Quality Monitor to control number of dust particles.





THANKS
FOR YOUR ATTENTION