

TINE Combobulator

A configurable middle layer ...



From last time :

Combobulator

- A pre-built server !
- Another TINE tool (like the Repeater)
 - *but as yet:*
 - no config database manager
 - no documentation per se
(but that is easily remedied)
 - Not limited to MCA combobulation !
 - Can also repeat/forward commands !
- ~~> 20~~ combobulators now in service ...

>30 !

From last time :

Combobulator (examples)

Java Instant Client

Context: FLASH, Subsystem: ALL, Stock Properties: , Meta Properties: A

Server: ComBobFla2PP, Device: NOPA_preamp, Property: PulseEnergy.Mean

Data Size: 11, Data Type: FLOAT, Timeout: 1000

Read Pulse Energy Mean (in Burst)

Read system stamp: 0, user stamp: 0

```
NOPA_preamp: 364.8487
OPCPA50k_SHG: 0.12283699
OPCPA50k_stage1: 73.61099
OPCPA_output: 364.1537
PB1_PD5.5b: 10.278476
PB2A_IN: 109.22051
PB2A_OUT: 3.7073016
PB2B_IN: 0.0
PB2B_OUT: 0.0
FL26_IN: 0.0
```

Draw Mode: Textbox, Decimal, Autoscale, Log Scale, History

Java Instant Client

Context: PETRA, Subsystem: ALL, Stock Properties: , Meta Properties: A

Server: BeamQuality, Device: Sector N1, Property: BeamAngleXQuality

Data Size: 15, Data Type: DOUBLE, Timeout: 1000

Read Beam Angle Delta

Read system stamp: 1226787318, user stamp: 0

```
Sector N1: 96.33777773871404
Sector N2: 98.98666665585779
Sector 1: 99.92185465914766
Sector 2: 97.65938216514442
Sector 3: 99.68342287029931
Sector 4: 96.25884854264886
Sector 5: 98.7720644666155
Sector 6: 99.98081460791101
Sector 7: 99.64216441625098
Sector 8: 99.040730395551
```

Draw Mode: Decimal, Autoscale, Log Scale, History

Java Instant Client

Context: MVS, Subsystem: ALL, Stock Properties: , Meta Properties: A

Server: ComBobMS, Device: MS01, Property: MassSpec.Scan.EM

Data Size: 100, Data Type: FLOAT, Timeout: 1000

Read Mass Spectrometer Emission Current

Read system stamp: 0, user stamp: 0

```
MS01: 0.0125
MS02: 0.0075
MS03: 0.0025
MS04: 0.0025
MS05: 0.0025
MS06: 0.0025
MS07: 0.0
MS08: 0.0
MS09: -1.0
MS10: 0.0025
MS11: 0.0025
MS12: 2.005
MS13: 0.0025
```

Draw Mode: Textbox, Decimal, Autoscale, Log Scale, History, Suggest Decorations, Suggest Draw Mode, Overlap, Input Pane

Java Instant Client

Context: XFEL, Subsystem: ALL, Stock Properties: , Meta Properties: A

Server: MODS.HPRF, Device: GUN.II, Property: Kly_voltage

Data Size: 2000, Data Type: FLOAT, Timeout: 1000

Read Klystron Voltage

Read system stamp: 139

Graph: kV vs Time (ms)

Time (ms)	kV
0	0
200	100
400	100
600	100
800	100
1000	100
1200	100
1400	100
1500	100
1600	0
1800	0
2000	0

Draw Mode: PolyLine, Decimal, Autoscale, Log Scale, History, Suggest Decorations, Suggest Draw Mode, Overlap, Input Pane

From last time :

Combobulator.csv (example)

SERVER	PROPERTY	DEVICE	DEVICE_ALIAS	DESCRIPTION	FORMAT	CAPACITY	OPTIONS
/XFEL/MOD01.DUMMIES	Mod-Dummies.csv	device0	GUN.I1	Mod for Kryo	single	30	
/XFEL/MOD02.DUMMIES	Mod-Dummies.csv	device0	A1.L1	Mod for Kryo	single	30	
/XFEL/MOD03.DUMMIES	Mod-Dummies.csv	device0	A2.L1	Mod for Kryo	single	30	
/XFEL/MOD04.DUMMIES	Mod-Dummies.csv	device0	A3.L1	Mod for Kryo	single	30	
/XFEL/MOD05.DUMMIES	Mod-Dummies.csv	device0	A4.L1	Mod for Kryo	single	30	
/XFEL/MOD06.DUMMIES	Mod-Dummies.csv	device0	A5.L1	Mod for Kryo	single	30	
/XFEL/MOD07.DUMMIES	Mod-Dummies.csv	device0	A6.L3	Mod for Kryo	single	30	
/XFEL/MOD08.DUMMIES	Mod-Dummies.csv	device0	A7.L3	Mod for Kryo	single	30	
/XFEL/MOD09.DUMMIES	Mod-Dummies.csv	device0	A8.L3	Mod for Kryo	single	30	
/XFEL/MOD10.DUMMIES	Mod-Dummies.csv	device0	A9.L3	Mod for Kryo	single	30	
/XFEL/MOD11.DUMMIES	Mod-Dummies.csv	device0	A10.L3	Mod for Kryo	single	30	
/XFEL/MOD12.DUMMIES	Mod-Dummies.csv	device0	A11.L3	Mod for Kryo	single	30	
/XFEL/MOD13.DUMMIES	Mod-Dummies.csv	device0	A12.L3	Mod for Kryo	single	30	
/XFEL/MOD14.DUMMIES	Mod-Dummies.csv	device0	A13.L3	Mod for Kryo	single	30	
/XFEL/MOD15.DUMMIES	Mod-Dummies.csv	device0	A14.L3	Mod for Kryo	single	30	
/XFEL/MOD16.DUMMIES	Mod-Dummies.csv	device0	A15.L3	Mod for Kryo	single	30	
/XFEL/MOD17.DUMMIES	Mod-Dummies.csv	device0	A16.L3	Mod for Kryo	single	30	
/XFEL/MOD18.DUMMIES	Mod-Dummies.csv	device0	A17.L3	Mod for Kryo	single	30	
/XFEL/MOD19.DUMMIES	Mod-Dummies.csv	device0	A18.L3	Mod for Kryo	single	30	
/XFEL/MOD20.DUMMIES	Mod-Dummies.csv	device0	A19.L3	Mod for Kryo	single	30	
/XFEL/MOD21.DUMMIES	Mod-Dummies.csv	device0	A20.L3	Mod for Kryo	single	30	
/XFEL/MOD22.DUMMIES	Mod-Dummies.csv	device0	A21.L3	Mod for Kryo	single	30	
/XFEL/MOD23.DUMMIES	Mod-Dummies.csv	device0	A22.L3	Mod for Kryo	single	30	
/XFEL/MOD24.DUMMIES	Mod-Dummies.csv	device0	A23.L3	Mod for Kryo	single	30	
/XFEL/MOD25.DUMMIES	Mod-Dummies.csv	device0	A24.L3	Mod for Kryo	single	30	
/XFEL/MOD26.DUMMIES	Mod-Dummies.csv	device0	A25.L3	Mod for Kryo	single	30	
/XFEL/MOD01.FAST_CHANNEL	Mod-FastChannelTr	device0	GUN.I1	Mod for Kryo	single.SPECTRUM	2000	SCHEDULE MONOTONIC
/XFEL/MOD02.FAST_CHANNEL	Mod-FastChannelTr	device0	A1.I1	Mod for Kryo	single.SPECTRUM	2000	SCHEDULE MONOTONIC
/XFEL/MOD03.FAST_CHANNEL	Mod-FastChannelTr	device0	A2.L1	Mod for Kryo	single.SPECTRUM	2000	SCHEDULE MONOTONIC
/XFEL/MOD04.FAST_CHANNEL	Mod-FastChannelTr	device0	A3.L1	Mod for Kryo	single.SPECTRUM	2000	SCHEDULE MONOTONIC

Can supply a property list !

SPECTRUM array type
=> not an MCA

Specific
options

From last time :

Combobulat

■ Demo ...



Combobulator news ...

Now there's documentation !

The TINE combobulator is a simple command line server. By typing 'combobulate' at the command line (after installing TINE) you should see output similar to the following:

```
combobulate
Usage:
    combobulate /s=<server name> [/f=<config file> /n=<fecname> c=<context> /u=<subsystem> /l=<location> /r=<responsible> /p=<port offset> /b=TRUE (run in b
```

The *Combobulator* is not limited to providing multi-channel arrays. It can as well offer single value attributes or waveform like trace arrays. And it can function as a full-blown middle layer by forwarding or redirecting WRITE commands to a target parent server.

The combobulator reads (and must read!) a configuration file, called **combobulate.csv**.

As a .csv File, **combobulate.csv** should offer the following columns (in any order):

- **SERVER** (required) is the context qualified target server whose properties are to be combobulated. If the **SERVER** entry is one of "self", "this", or "me", then the entry is assumed to be a *clone* of another entry with a different **PROPERTY_ALIAS**.
- **PROPERTY** (required) is the target property, or a property list .csv file, giving the property(ies) to be combobulated.
- **PROPERTY_ALIAS** (optional) is the combobulated export property associated with the **PROPERTY** entry. If omitted, then the same property name found in the **PROPERTY** entry is used or, in the case of a list file, the **ALIAS** names found in the list file will be used.
- **DEVICE** (optional) is the target device, or a device list .csv file. If omitted or a wildcard "*" is used, then the device list is obtained from the target server.
- **DEVICE_ALIAS** (optional) is the combobulated export device name associated with the **DEVICE** entry.
- **DESCRIPTION** (optional) is the combobulated property description.
- **FORMAT** (required) is the TINE format of the target property. It can be omitted in case a property list .csv file is used and format information is found there. If otherwise omitted, then the CF_NULL data type is used, which would only make sense in the case of a forwarded WRITE access command. **Note**: If **TEXT** is specified (or **CHAR**) then the **FORMAT_EXPORT** should be used to remap the acquired data into fixed length strings such as **NAME64**. Furthermore, the acquisition size of the **TEXT** data should be specified by appending a .size to the **FORMAT** (e.g. **TEXT.16** to acquire a text field of 16 characters).
- **FORMAT_EXPORT** (optional) is the combobulated export property preferred data format. If omitted, then the same value as given in the **FORMAT** column is used.
- **CAPACITY** (required) is the data size of the target property acquisition. If omitted, then 0 is assumed, which would only make sense in the case of a forwarded WRITE access command.
- **INTERVAL** (optional) is the desired update interval of the target property data. Default = 1000 msec.
- **DISABLED** (optional) is a boolean which if **TRUE** instructs the combobulator *not* to acquire the data for this entry. Default = **FALSE**.
- **SHIFT** (optional) can be used to shift numerical input data by the given amount. Default = 0.
- **SCALE** (optional) can be used to scale numerical input data by the given amount. Default = 1.
- **FIELD_INDEX** (optional) can be used to specify which field index of a compound data type or structure is to be used in the resulting combobulated property.
- **DEFAULT_VALUE** (optional) specifies a data value to use in case of link errors associated with the data acquisition of the target property. The feature to use this default value in lieu of actual data from the target should also be turned on in the command line which starts the combobulator.
- **OPTIONS** (optional) can be used to specify additional data acquisition and export options. This should be a string which can be any of the following in combination (separated with a pipe symbol '|'):
 - **"LOCALTIME"** specifies that the local timestamp and system stamp of the combobulator should be used to tag the incoming data in lieu of the incoming time and system stamps.
 - **"REDIRECT"** specifies that the combobulated property and device, when called, should redirect back to the original target and not acquire data from the target.
 - **"SCHEDULE"** specifies that the combobulator should schedule the exported property when fresh data arrive.
 - **"FORWARD"** specifies that the combobulator should forward a WRITE request back to the target property and device. (nominally useful for WRITE access commands on an attribute property).
 - **"WRITEONLY"** specifies that the combobulated property only services WRITE commands and should forward all requests back to the target property and device.
 - **"MONOTONIC"** specifies that the combobulated property is expected to have a monotonically increasing system stamp (e.g. event number or cycle number) in its data updates. The expected increment is by default '1'. If **MONOTONIC** is specified, then the connection quality statistics will count missed increments. To specify another expected increment, append ':' and the increment to the **MONOTONIC** option (e.g. **"MONOTONIC:2"**).
 - **"STATIC"** specifies that the combobulated property accesses static information and does not need to continuously acquire data from the targeted server(s). All links will then be closed following a successful data acquisition.

Below is a simple example of a *combobulate.csv* file

SERVER	PROPERTY	PROPERTY_ALIAS	DEVICE	DEVICE_ALIAS	FORMAT	CAPACITY	DESCRIPTION	SHIFT	SCALE	INTERVAL
/PEX/TangoTineGw0-P211	Value1	Temperatures	p211/beckhoff/beckoh01	InOut	double	1	[0:100 °C]Temperature	0	1	1000
/PEX/TangoTineGw0-P211	Value2	Temperatures	p211/beckhoff/beckoh01	Pitch	double	1	[0:100 °C]Temperature	0	1	1000



Combobulator news ...

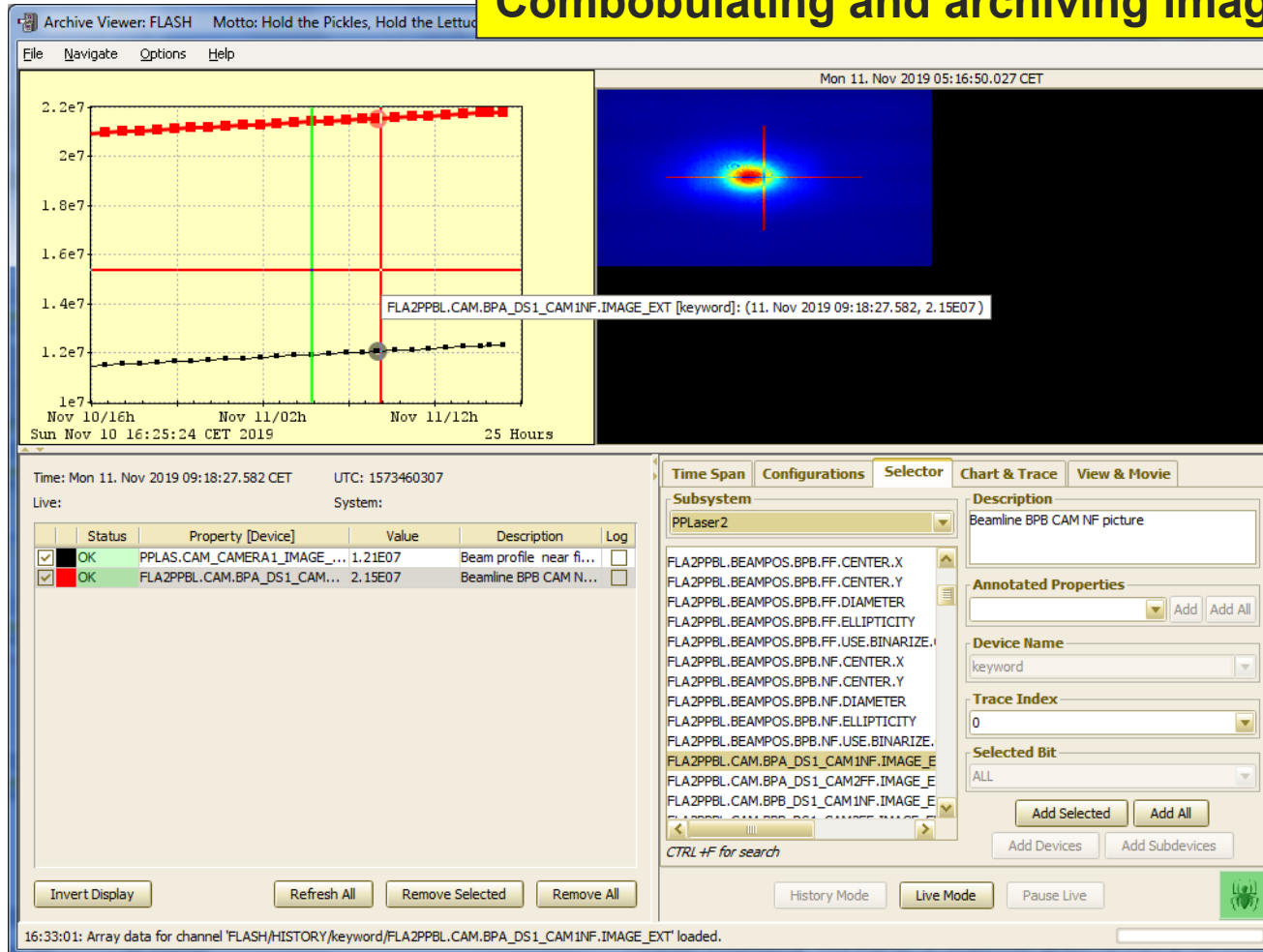
- Can now combobulate **IMAGE** types !
 - *Why?*
 - Archiving IMAGES (from a doocs server)
 - DOOCS server requires a TINE call to request 33554432 bytes even though only < 1 Mbyte is returned. (*Arthur is fixing this*)
 - **Combobulator** can acquire this and allow requests of e.g. 50 Kbytes from the central archiver to work just fine.
 - AND (added plus) the **combobulator** *can keep local histories* !
 - e.g. Central archive keeps 1 frame per hour, local history keeps 1 frame per every 5 minutes.

```
SERVER, PROPERTY, PROPERTY_ALIAS, DEVICE, DEVICE_ALIAS, FORMAT, FORMAT_EXPORT, CAPACITY, DESCRIPTION, INTERVAL, OPTIONS
/FLASH/FLA2PPFL26.CAM, IMAGE_EXT, Image, DS1_CAM1NF, DS1_CAM1NF, IMAGE, IMAGE, 33554432, doocs image, 30000, CONNECT
/FLASH/FLA2PPFL26.CAM, IMAGE_EXT, Image, DS1_CAM2FF, DS1_CAM2FF, IMAGE, IMAGE, 33554432, doocs image, 30000, CONNECT
/FLASH/FLA2PPFL262.CAM, IMAGE_EXT, Image, DS2_CAM1NF, DS2_CAM1NF, IMAGE, IMAGE, 33554432, doocs image, 30000, CONNECT
/FLASH/FLA2PPFL262.CAM, IMAGE_EXT, Image, DS2_CAM2FF, DS2_CAM2FF, IMAGE, IMAGE, 33554432, doocs image, 30000, CONNECT
```



Combobulator news ...

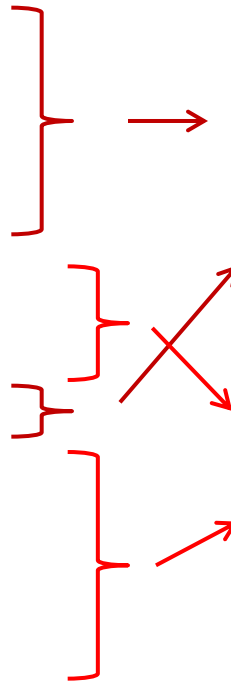
Combobulating and archiving Images ...



Combobulator news ...

Multi-Channel Array segments ...

```
Context Server Device
1 TTF2 ION_PUMP CATH.TR1
2 TTF2 ION_PUMP CATH.TR2
3 TTF2 ION_PUMP CATH.TR3
4 TTF2 ION_PUMP 1CATH
5 TTF2 ION_PUMP 2CATH
6 TTF2 ION_PUMP 3CATH
7 TTF2 ION_PUMP 1GUN
...
186 TTF2 ION_PUMP 03FL2PHOT
187 TTF2 ION_PUMP 01FLFEXTR
188 FLASH VAC.ION_PUMP 02FLFEXTR
189 FLASH VAC.ION_PUMP 03FLFCOMP
190 FLASH VAC.ION_PUMP 06FLFCOMP
191 FLASH VAC.ION_PUMP 09FLFCOMP
192 FLASH VAC.ION_PUMP 12FLFCOMP
193 FLASH VAC.ION_PUMP 16FLFCOMP
194 FLASH VAC.ION_PUMP 19FLFCOMP
195 TTF2 ION_PUMP 23FLFCOMP
196 FLASH VAC.ION_PUMP 65FLFXTDS_LDL_O
197 FLASH VAC.ION_PUMP 65FLFXTDS_LDL_U
198 FLASH VAC.ION_PUMP 65FLFXTDS_LDR_O
199 FLASH VAC.ION_PUMP 65FLFXTDS_LDR_U
200 FLASH VAC.ION_PUMP 65FLFXTDS_CAV_L
201 FLASH VAC.ION_PUMP 65FLFXTDS_CAV_R
202 FLASH VAC.ION_PUMP 65FLFXTDS_WG_1
203 FLASH VAC.ION_PUMP 65FLFXTDS_WG_2
204 FLASH VAC.ION_PUMP 65FLFXTDS_WG_3
205 FLASH VAC.ION_PUMP 65FLFXTDS_WG_4
206 FLASH VAC.ION_PUMP 65FLFXTDS_WG_5
207 FLASH VAC.ION_PUMP 65FLFXTDS_WGTR_1
208 FLASH VAC.ION_PUMP 66FLFXTDS_WGTR_2
209 FLASH VAC.ION_PUMP 67FLFXTDS_KLY
```



From /TTF2/ION_PUMPS

From /FLASH/VAC.ION_PUMPS

Combobulator news ...

Start @ position 02FLFLEXR
and get 7 elements
@ position 65FLFXTDS_LDL
and get 14 elements

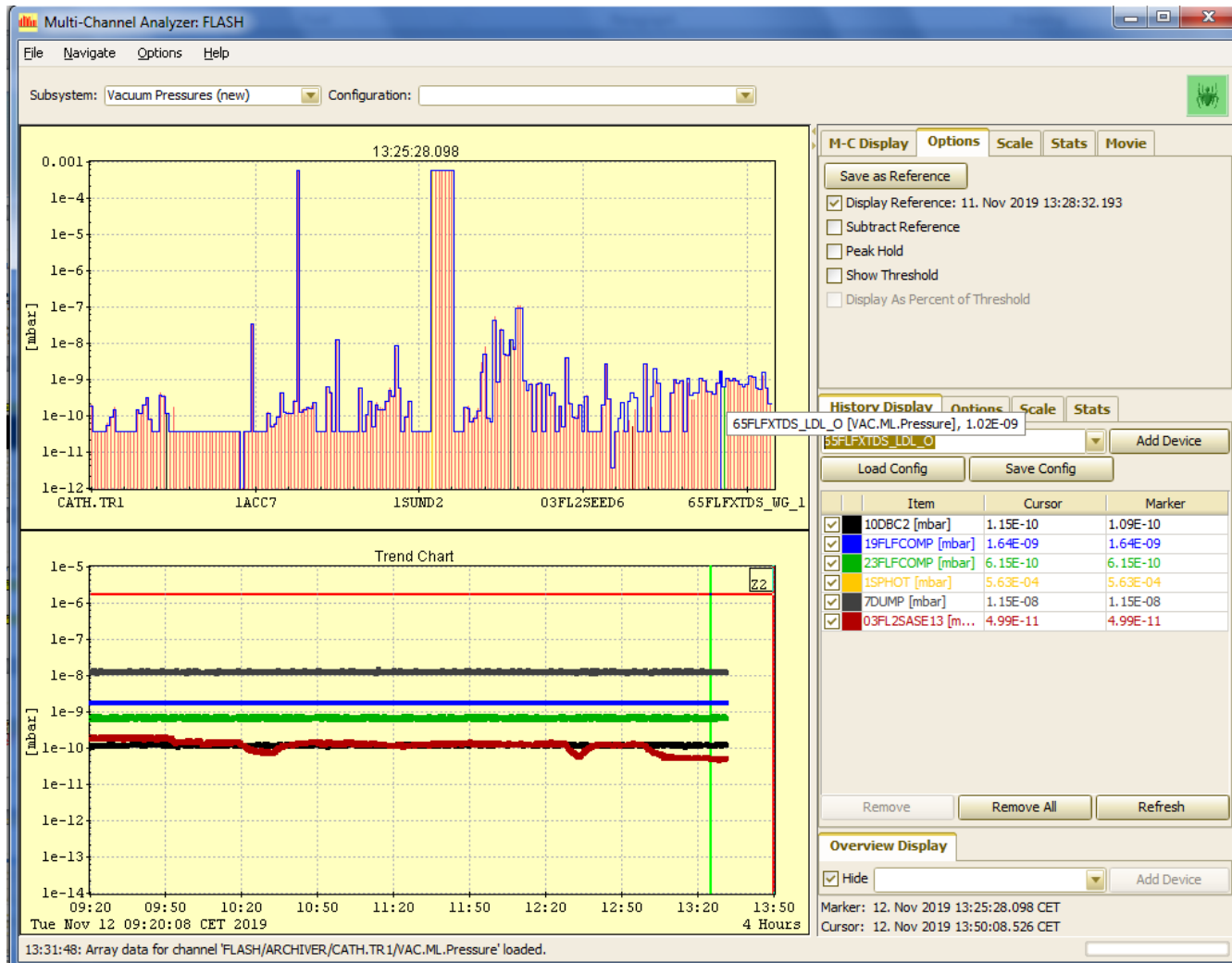
■ combobulate.csv :

```
SERVER, PROPERTY, DEVICE, ...  
/TTF2/ION_PUMP, vacprps.csv, DEVGRP0, ...  
/FLASH/VAC.ION_PUMP, vacprps.csv, 02FLFEXTR[7], ...  
/TTF2/ION_PUMP, vacprps.csv, 23FLFCOMP, FLOAT, ...  
/FLASH/VAC.ION_PUMP, vacprps.csv, 65FLFXTDS_LDL_0[14], ...
```

■ vacprps.csv :

```
PROPERTY, PROPERTY_ALIAS, DESCRIPTION, FORMAT, ...  
P, Pressure, [1e-14:1e-4] FLASH vacuum pressure, float,  
HV, HV, [0:10000] High Voltage, float,
```

Combobulator news ...



[Repeater News ...]

- **Two operation modes:**
 - **Local repeater**
 - Background repeater for command link utilities
 - Never-ending battle against synchronous polling
 - **Server repeater**
 - Shield sensitive servers (e.g. FOB, PI)
 - Servers on a 'restricted net'
 - Providing data to EMBL ...
- The **repeater** repeats a full picture of *some server's* registered properties
 - is not *active* until some client requests something
 - can be a *self-client* by having its own local histories or alarm watch tables

Repeater News ...

```
tine repeater: acquire and re-register and export information
                from the specified TINE device server
```

```
Usage : tineRepeater <context> <device server> [/c=<new context> /s=<new servername>
        /f=<fec name> /p=<port offset> /r=<polling interval> /m=<polling mode>
        /l=<listener table capacity> /x=TRUE /i=TRUE /h=TRUE /t=<idle time> /d=<debug level>]
```

```
if no new context or server are specified, the repeater server will
have the same context as the target server, and a server name given
by the target server name appended with '.RPT'
```

```
e.g.
```

```
tineRepeater HERA BPM
```

```
will produce a server called BPM.RPT in context HERA
```

```
tineRepeater PETRA undulator /c=PETRA.EXT /s=undulator
```

```
will produce a server called undulator in context PETRA.EXT
```

```
a port can be specified with the /p switch (default = 101)
```

```
a polling interval can be specified with the /r switch (default = 1000 ms)
```

```
(note: the polling interval determines the listener refresh rate for any repeated properties)
```

```
the listener table capacity can be adjusted with the /l switch (default= 5000 entries)
```

```
a polling mode can be specified with the /m switch, e.g. /m=DATACHANGE (default = TIMER)
```

```
a specific FEC name can be given with the /f switch (default = Rpt<context%2><server%7>.<port>)
```

```
exclusive read can be specified with /x=TRUE
```

```
the listening idle time (default = 300 seconds) can be set with the /t switch
```

```
(e.g. /t=86400 will continue listening for 1 day even when the targetvalue is not being read)
```

```
ignore listening errors (e.g. via history configuration) can be specified with /i=TRUE
```

```
remote local histories will be repeated if /h=TRUE (default = FALSE => maintain true local histories)
```

Option to 'repeat' the remote server's local histories

Future option to 'repeat' the remote server's alarms ?

