

Continuous Transient Oscillography

(The true power of CTO)

i-PCGRID Workshop

March 28th 2019

Continuous Transient Oscillography

- It's not what your DFR/Relay *is* recording, it's what your DFR/Relay did **NOT** record & the value of the data you've *missed* that is the most important bit of *information* you need **NOW !!!**
- ...The true power of **CTO**...
- Go beyond the requirements and CYA ... (cover your assets) ... access to **ALL** the data, always available in the device at an instant.
- **Compliance, Security, Assurance & Insurance !**

Regulations and Requirements

Drive Compliance & Accountability

- Compliance with **NERC PRC-002-2** is a Requirement !!!
 - ✓ SER
 - ✓ FR
 - ✓ DDR
 - ✓ Time Synchronization
- **CTO** ensures you are compliant regardless !!!

Continuous Transient Oscillography

- A Continuous Transient Logger
- Captures **ALL** Analog & Digital inputs within the record
- Does **not** require a trigger to create the record
- Provides Transient data for future **analysis** of past system occurrences.
- Ability to go back and review **high** resolution **Transient** data
- Enabling future detailed investigations of past anomalies **not** otherwise available.

Continuous Transient Oscillography

- So what if you missed the initial Un-Triggered event?
 - Results – No Triggered Records
 - Missed an opportunity to analyze a system anomaly and prevent future occurrence
 - Nothing to go back and analyze for future settings adjustments to ensure the occurrence is capture the next time around for analysis!

Continuous Transient Oscillography

- **Not a big deal... right ?**
 - Just wait for the next occurrence and hope it gets captured for analysis this time !
 - Hopefully its not more serious and no major system components are affected by the occurrence as well
 - May not even cause another system disturbance or failure, even if it could have been prevented based on the analysis of the previously missed event information !

Continuous Transient Oscillography

- Prevention is key
 - Its better to have the data and information available for analysis and determine there is nothing to worry about...
 - ...rather than to not have the information and worry about what might happen the next time, and hope it's nothing more serious!

Continuous Transient Oscillography

- **CTO options** - Recording 7 X 24 X 365
- **Resolution**
 - Sample Rates (samples per cycle)
 - 8 spc
 - **16 spc**
 - 32 spc

Continuous Transient Oscillography

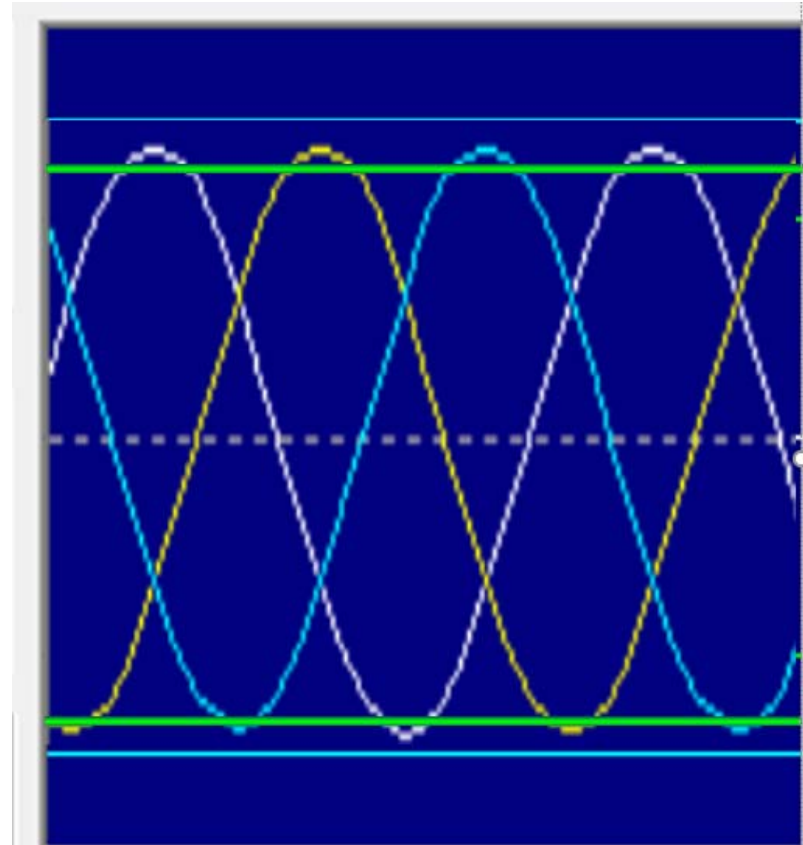
- **CTO options** - Recording 7 X 24 X 365
- Duration (days)
 - 1
 - 2
 - 4
 - 8
 - 16
 - 32
 - 64
 - 128
 - 256

Continuous Transient Oscillography

- Typical Triggering configurations – Transient, Disturbance or both
 - Analog
 - Over / Under
 - ROC
 - THD
 - Harmonics
 - Digital
 - Level
 - Edge
 - Phase Group
 - Zero Sequence
 - Negative Sequence
 - Positive Sequence
 - ROC
 - Frequency
 - Over
 - Under
 - ROC
 - Timed
 - Interval
 - Day of week

Continuous Transient Oscillography

- Trigger Settings out of range
 - Over Trigger set too High
 - Under Trigger set too Low
 - ROC trigger just out of range
 - THD trigger not quite right
 - Etc...
- Results
 - Event NOT captured !!!
 - No Records created
 - No data to analyze



Continuous Transient Oscillography

- Select the parameters for data retrieval
 - Identify time frame in question by analyzing Disturbance Logger for anomalies
 - Correlate the disturbance time frame with the CTO Logger time frame
 - Select the parameters desired and pull back the CTO Logger
 - Quick Select Time Options
 - Start of record, Date and time
 - End of Record, Date and time
 - Time Frames – Length of individual CTO Logger
 - 5 sec – 600 Seconds

Continuous Transient Oscillography

- Creating the CTO List File
 - Select the CTO time frame
 - Select the specific record length
 - Create the CTO record
 - Retrieve the CTO record
 - Analyze the record

Continuous Transient Oscillography

- Retrieve the CTO list file for further analysis

The screenshot shows the 'Display Station 32' application window. The interface includes a menu bar (System, Edit, Recorder, View, Database, Help), a toolbar with icons for help, search, and other functions, and a main panel with tabs for Transient, Logger, Disturbance, Harmonic, and Report. Below the tabs are filter controls for Location (TESTL), Recorder, Classification (Single phase fault), and Date (3/12/2019 -> 3/12/2019). A table displays a list of transient events with columns for Location, Recorder, Date, Time, Duration, Description, Data Availability, and Classification. The table is sorted by Date and Time. A status bar at the bottom shows 'Manual Automatic' indicators and connection/job counts.

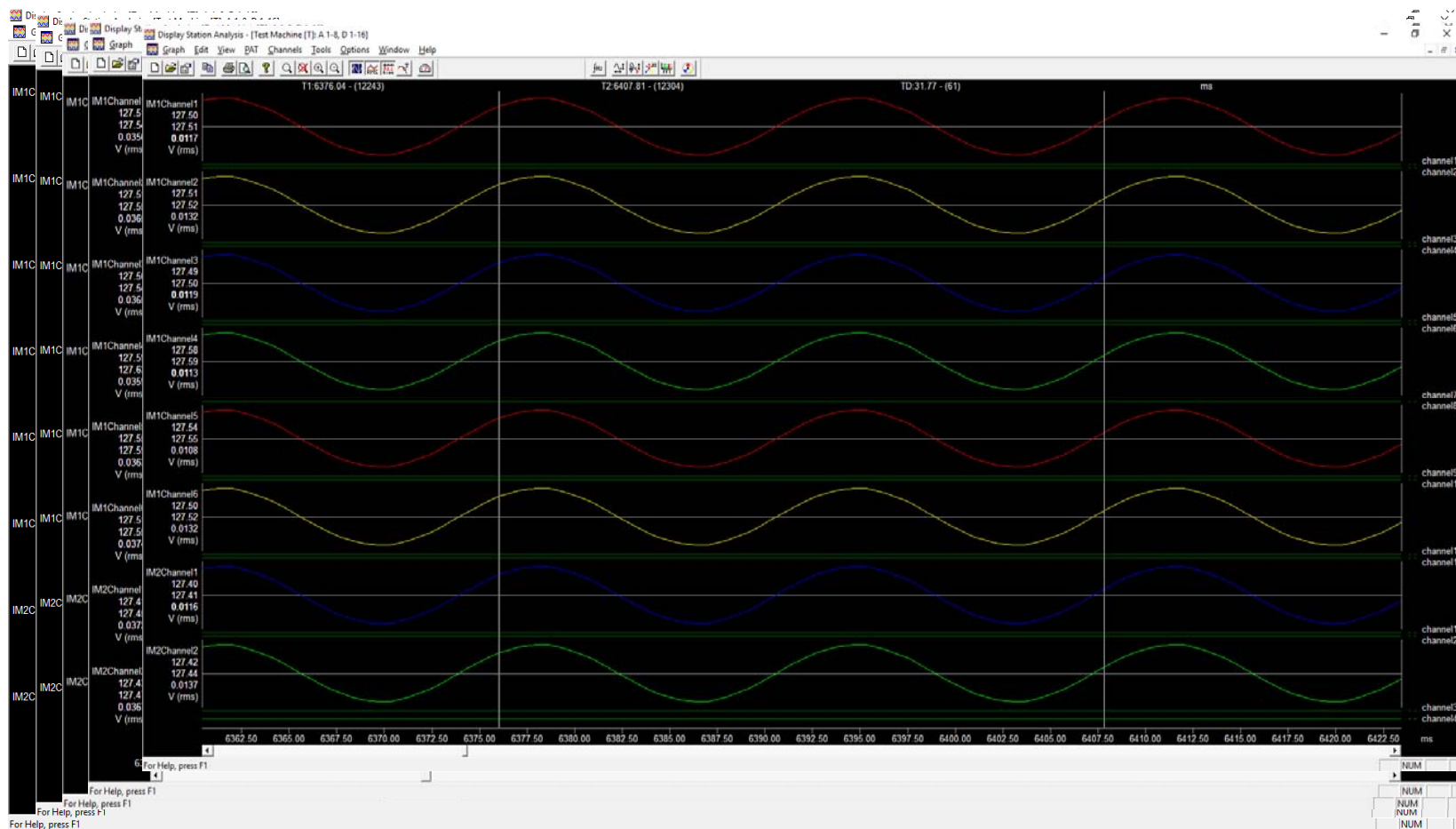
Location	Recorder	Date	Time	Duration	Description	Data Availa...	Classi
Rochester	TR-3000	10/4/2018	08:52:41.525	14.0	MANUAL	Fault data	Not c
10013821-1	1807-0001	9/27/2018	08:22:06.000	600.0	Transient Logger	Fault data	Not c
10013821-1	1807-0001	9/27/2018	08:18:44.000	600.0	Transient Logger	Fault data	Not c
10013821-1	1807-0001	9/26/2018	15:42:09.000	300.0	Transient Logger	Fault data	Not c
Ametek Blr	Test Machine	9/11/2018	06:58:14.400	14.0	MANUAL	Fault data	Not c
Ametek Blr	Test Machine	9/11/2018	06:58:03.610	14.0	MANUAL	Fault data	Not c
Ametek Blr	Test Machine	9/10/2018	12:07:28.000	7200.0	Transient Logger	Fault data	Not c
Ametek Blr	Test Machine	9/10/2018	09:07:09.575	14.0	MANUAL	Fault data	Not c
TESTL	TEST	8/28/2018	11:17:44.130	50.0	Analog under on channel 3-1 'test Va'	Fault data	Not c
TESTL	TEST	8/27/2018	23:35:20.250	50.0	Analog over on channel 5-1 'IM5Channel1'	Fault data	Not c
TESTL	TEST	8/27/2018	23:35:19.140	18.0	Analog under on channel 5-1 'IM5Channel1'	Fault data	Not c
TESTL	TEST	8/27/2018	23:35:17.930	50.0	Analog over on channel 5-1 'IM5Channel1'	Fault data	Not c
TESTL	TEST	8/27/2018	23:35:16.680	50.0	Analog under on channel 5-1 'IM5Channel1'	Fault data	Not c
TESTL	TEST	8/27/2018	23:35:15.660	50.0	Analog over on channel 5-1 'IM5Channel1'	Fault data	Not c
TESTL	TEST	8/27/2018	23:35:13.480	50.0	Analog under on channel 5-1 'IM5Channel1'	Fault data	Not c
TESTL	TEST	8/27/2018	23:35:10.830	50.0	Analog under on channel 5-1 'IM5Channel1'	Fault data	Not c

Manual Automatic 0 connection(s), 0 pending - 0 job(s), 0 pending

For Help, press F1 NUM

Continuous Transient Oscillography

- Zoom in to see what is really going on!



X 0.01 MS

X 0.1 MS

X 1.0 MS

X 10 MS

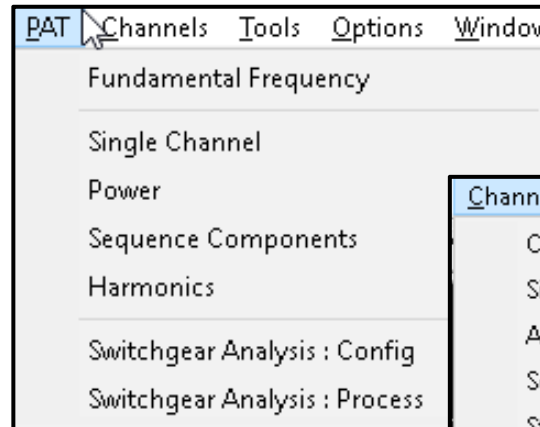
X 100 MS

Continuous Transient Oscillography

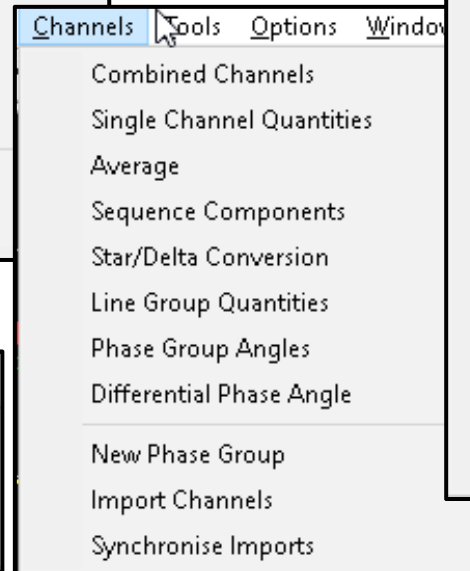
- Use Display Station Analysis to dig deeper and perform extensive analysis

- Customized Graphing options of individual, combined or derived signals

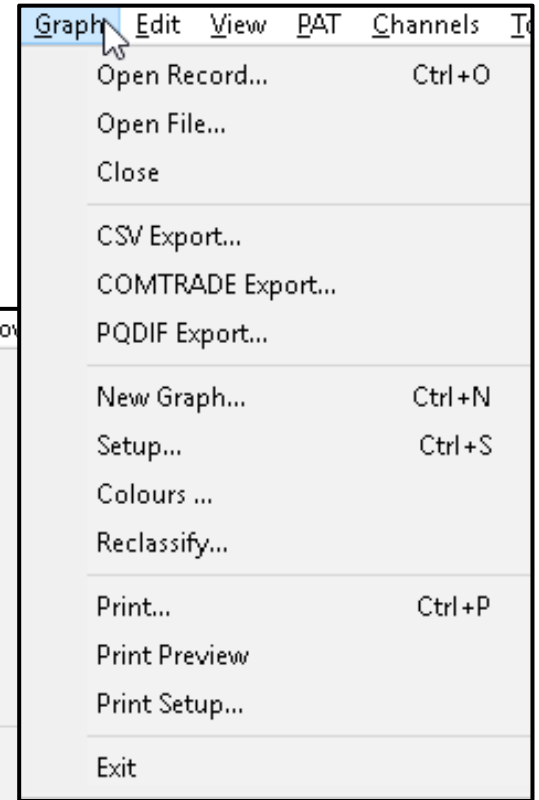
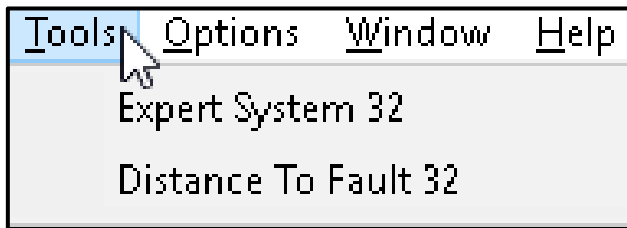
- Power Analysis Tools



- Channels



- Tools



Continuous Transient Oscillography

- The true Power of CTO
 - Capture more system anomalies & *Never miss an event*
 - Ease of Use
 - Reliability



CLEAR VISION SOUND STRATEGIES SOLID PERFORMANCE

Ametek TR-3000

Advanced Multi-function Recorder



Continuous Transient Oscillography
The Power of CTO

Questions ?



THANK YOU !

Sal Cardella

Product Marketing Manager

Sal.Cardella@Ametek.com

Office:585-238-4050

Mobile:585-478-4860