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

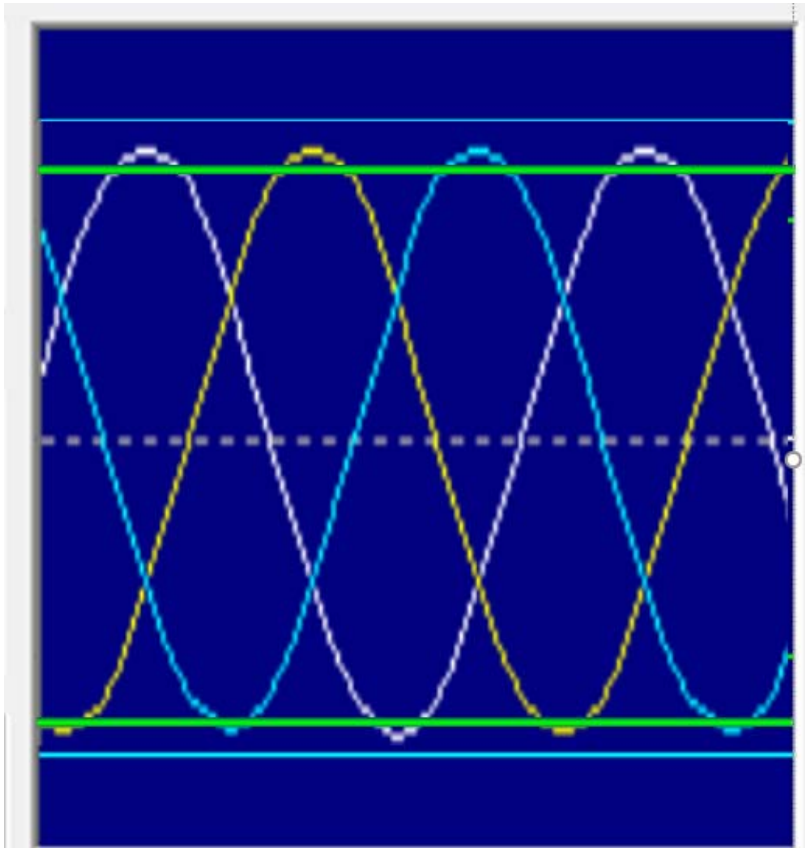
- Duration (days)
  - 1
  - 2
  - 4
  - 8
  - 16
  - 32
  - 64
  - 128
  - 256

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

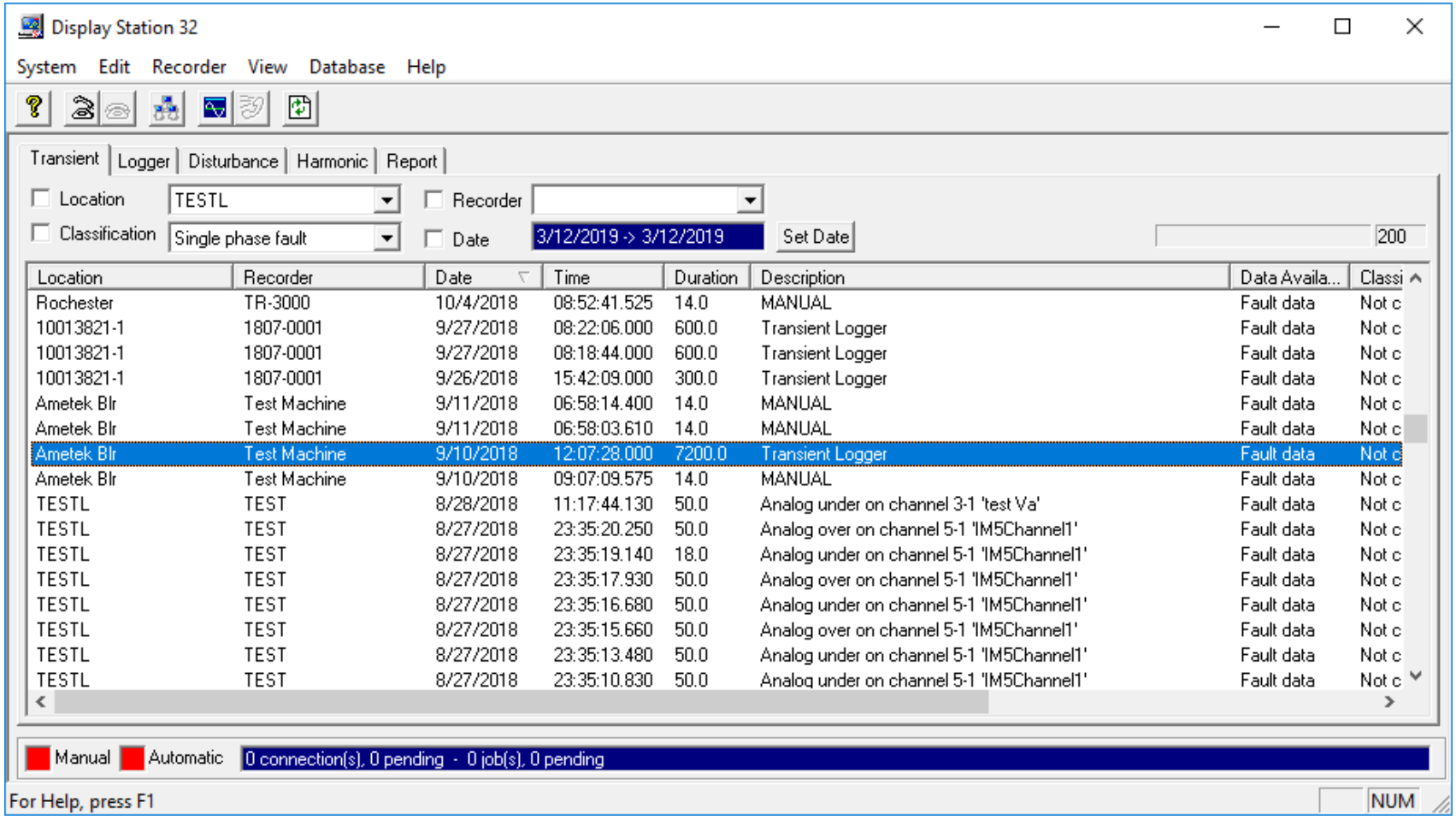
    - Time Frames – Length of individual CTO Logger
      - 5 sec – 600 Seconds

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

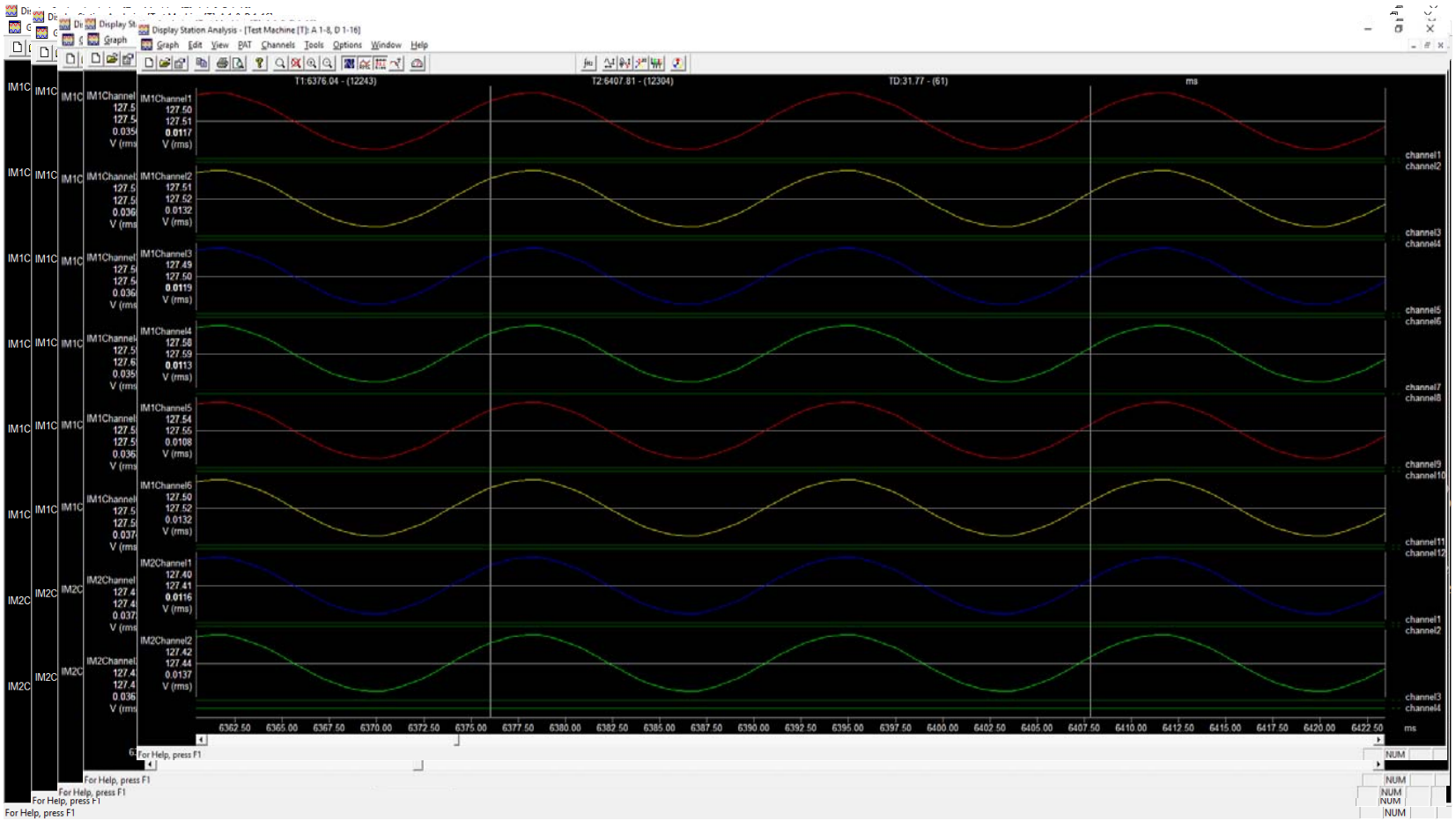
Continuous Transient Oscillography

- Retrieve the CTO list file for further analysis



Continuous Transient Oscillography

- Zoom in to see what is really going on!



X 0.01 MS

X 0.1 MS

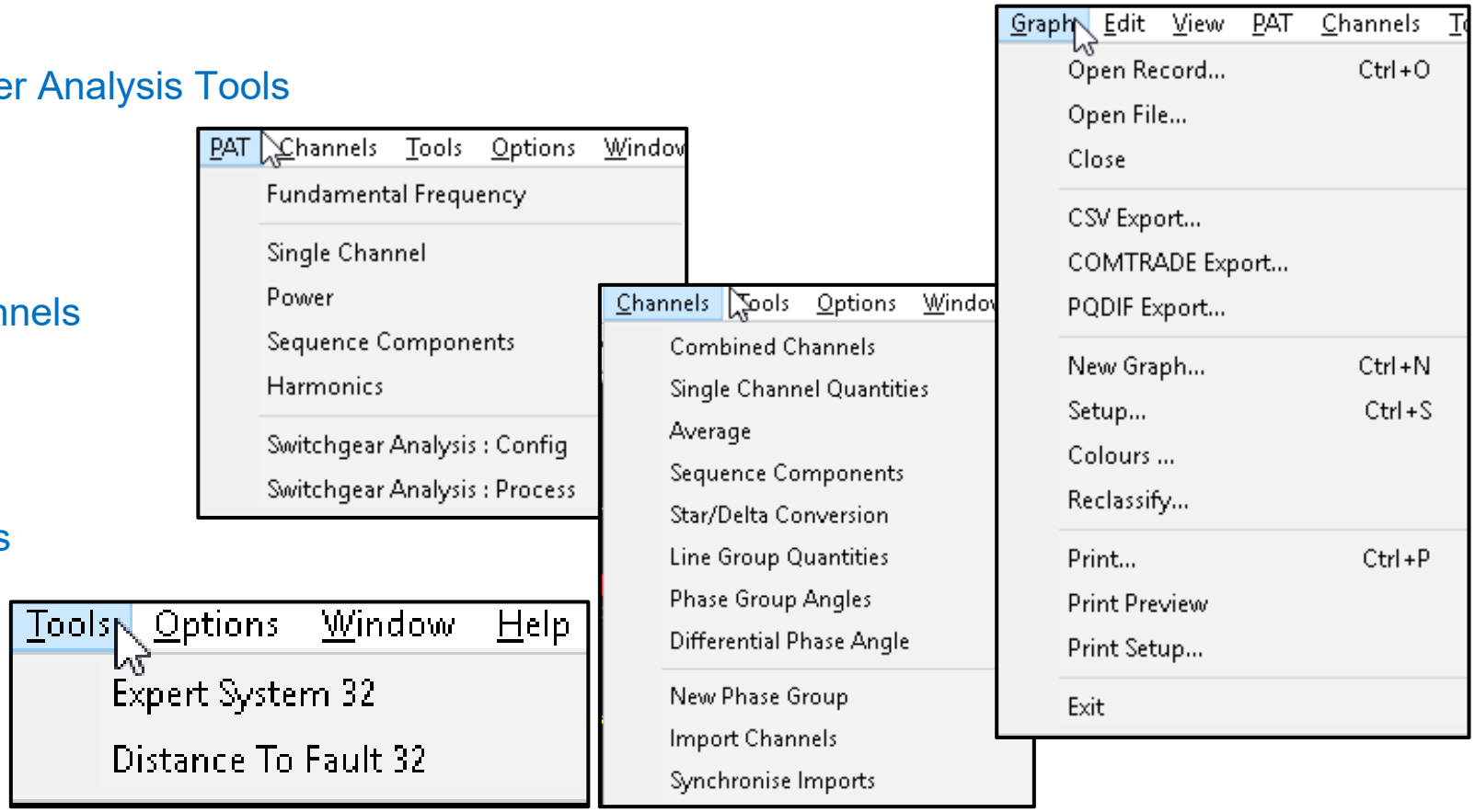
X 1.0 MS

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

AMETEK® 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