NCSLI - 141 MII Committee Meeting

2020 - Virtual from Denver Colorado
August 21, 2020

NCSLI - 141 Committee Agenda

1. Current goals & plans
2. International update
3. Draft RP
4. Taxonomy development
5. Scope of accreditation editor
6. Open discussion

Goals & Plans for the NCSLI-141

Current:

1. Develop a machine readable measurement taxonomy
2. Complete an accreditation scope editor
3. Finalize the MII digital accreditation scope XML format
4. Involve calibration labs and ABs
5. Work with partners worldwide on digital certificates and instrument specs

Future:

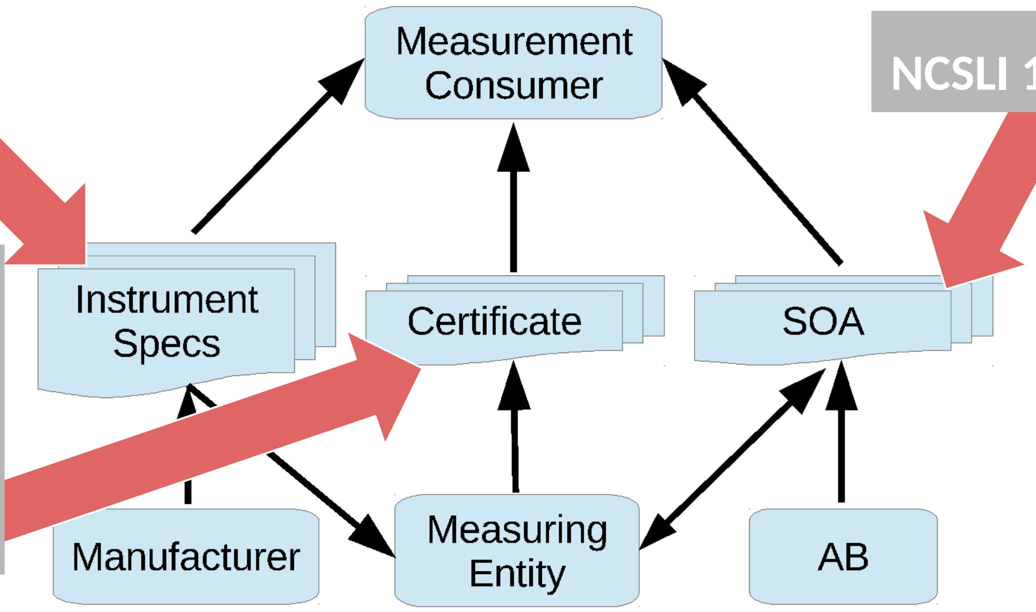
1. Present MII digital XML Format to ILAC through NCSLI and ABs
2. Publish a specification (RP or other format) for MII documents

International Update

Fluke’s Cubyt

NCSLI 141 - MII

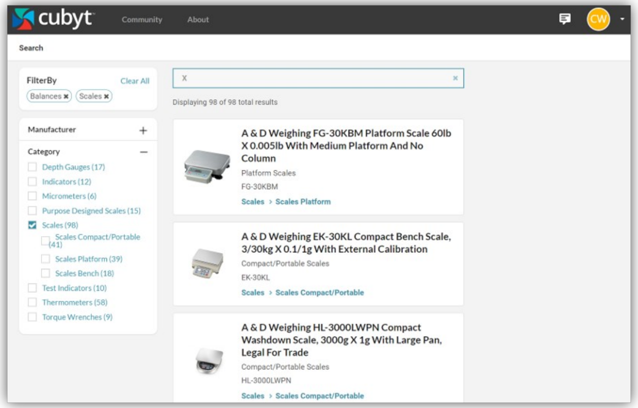
- EMPIR SmartCom D-SI and DCC
- Digital Certificates (DOE PSL, PTB, NPL, Fluke, others)

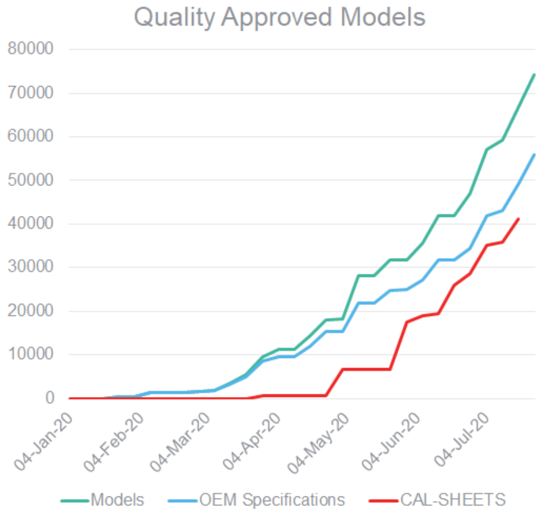


- BIPM’s Digital SI
- European Metrology Cloud
- PTB’s Digitization Strategy
- MSL Quantity Value project

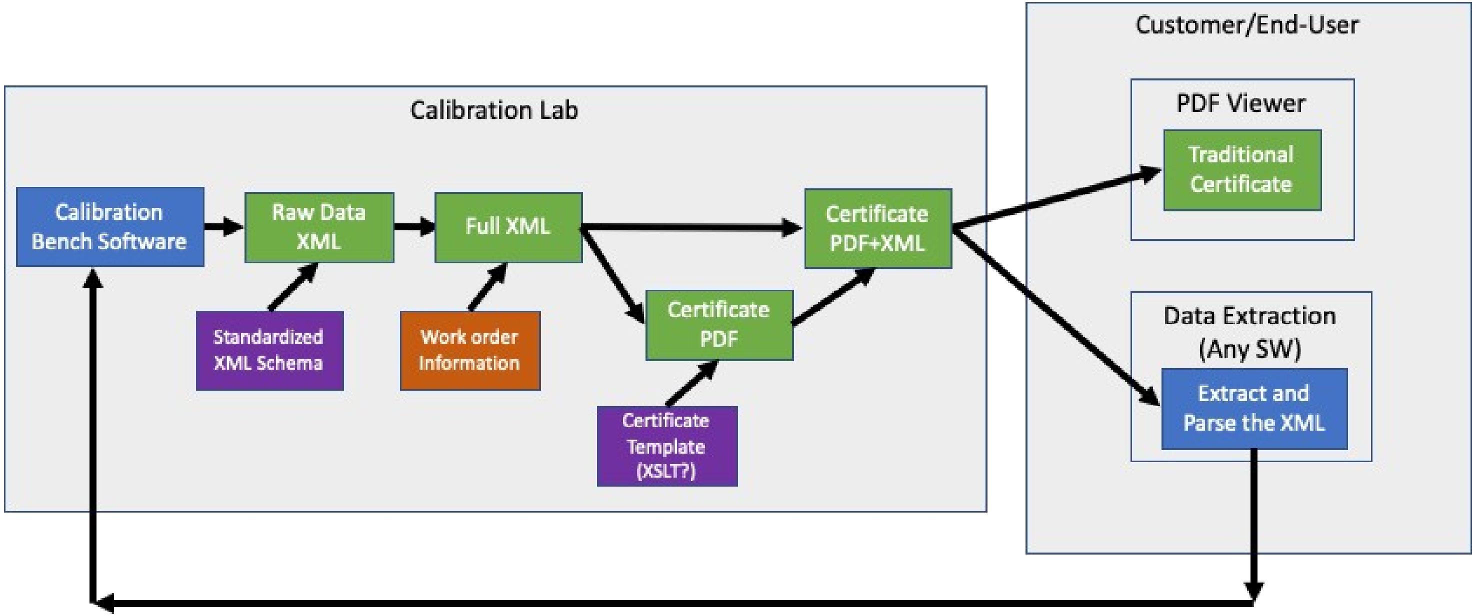
- Central community for Metrologists to access and share calibration specs / Cal-Sheets
- Over time, repository of every calibratable instrument on earth (3M - 4M DUTs)
- Initially powered by Fluke team of Metrologists loading instruments, specs, methods
- Community ratings, reviews, tips, instructions

FREE ACCESS → www.cubyt.io





Sandia PSL's Experiments with Digital Certs



For more details: "Exploration of a Data-Enhanced Calibration Certificate as Part of a Complete Measurement Information Infrastructure" in Session: Quality Management

Sandia National Laboratories

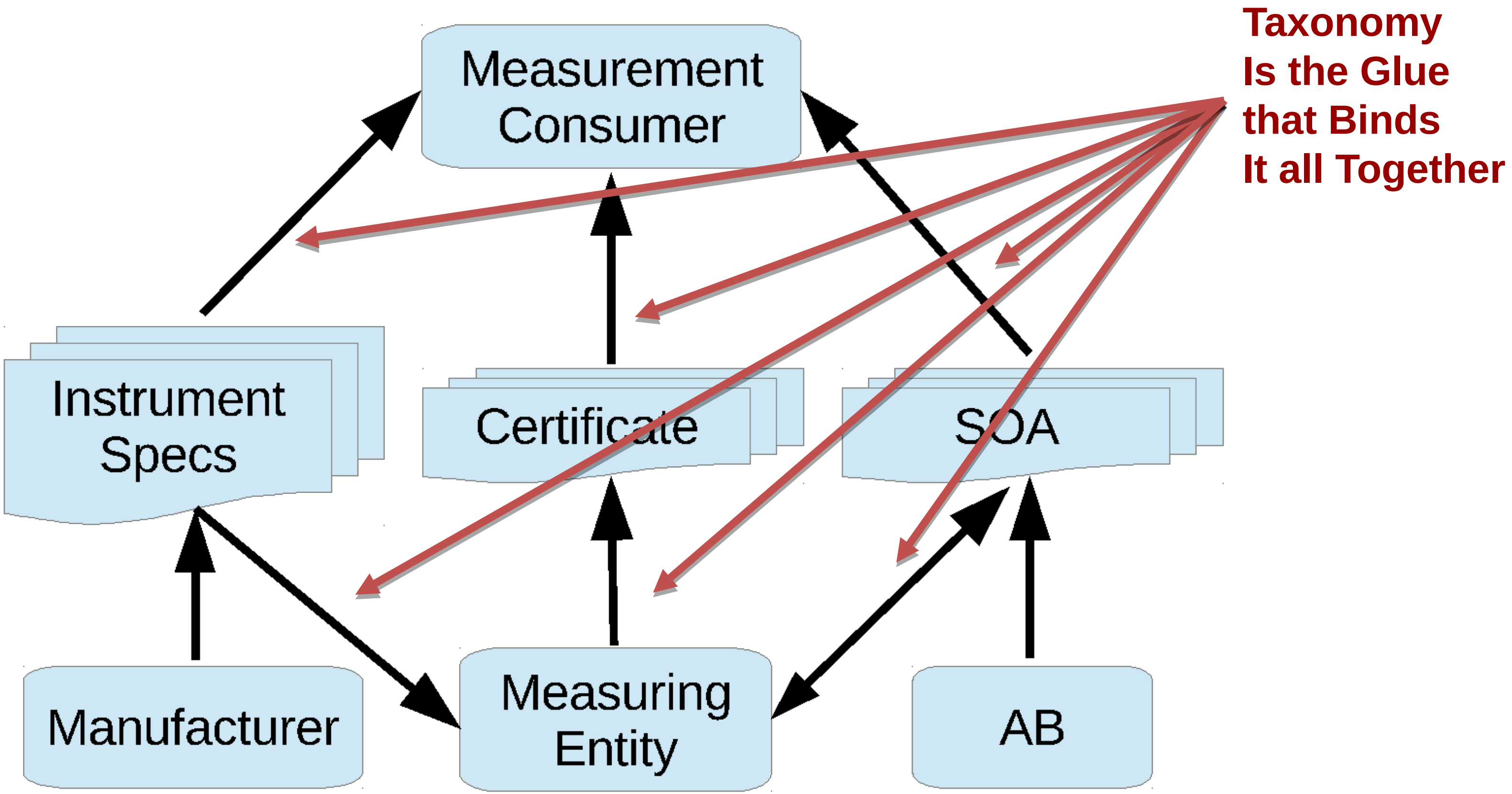
Review and Discuss Draft RP

Draft RP

Specifications for a Measurement Information Infrastructure (MII)

1. Currently begun as a Recommended Practice shell
2. May end up as an LM (lab management), standard, or other document
3. **Drafted**: MII Design Requirements (Standardization, Interoperability, Data Completeness, Identity, Extensibility, Authentication and Authorization, Revocation)
4. **Drafted**: Taxonomy Structure Rules
5. May publish in parts, SoA specification first

Taxonomy Development


Measurement Consumer
Instrument Specs
Certificate
SOA
Manufacturer
Measuring Entity
AB
Taxonomy
Is the Glue
that Binds
It all Together

Metrology Taxonomy

How we define the taxons

- One unique taxon per measurand
- Allows aliases for human-readable versions
- UpperCamelCase naming convention
- String format with concise tokens

1. Each begins with Measure or Source
2. After the first element, it proceeds from general quantity kind to specific measured quantity.
3. Each taxon definition includes required and optional properties and input and influence quantities.
    a. Parameters distinguish details within like measurement processes.

Metrology Taxonomy

Example for - TestProcess.Source.Voltage.AC.SineWave

The process measures the AC RMS (Root-Mean-Square) voltage sourced by the UUT.

Because the shape is known the values can be converted to peak-to-peak voltage.

Required Parameters

- Volts – Volts RMS
- Frequency - Hz

Optional Parameters

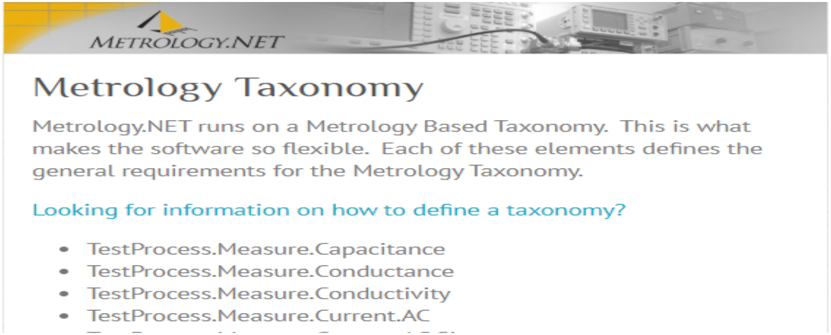
- Impedance
- UUT.Input – Input Name of the UUT Connecting Point

Measured Value & Uncertainty

- Volts

Metrology Taxonomy > 150 Taxonomies Defined

https://www.metrology.net/home/metrology-taxonomy/


METROLOGY.NET

Metrology Taxonomy

Metrology.NET runs on a Metrology Based Taxonomy. This is what makes the software so flexible. Each of these elements defines the general requirements for the Metrology Taxonomy.

Looking for information on how to define a taxonomy?

- TestProcess.Measure.Capacitance
- TestProcess.Measure.Conductance
- TestProcess.Measure.Conductivity
- TestProcess.Measure.Current.AC

1. Electrical
2. RF & uWave
3. Time
4. Temperature
5. Torque
6. Pressure
7. Mass
8. Humidity
9. Energy
10. Length - **Inwork**
11. Hardness
12. Flow
13. Irradiance & More

Calling All Measurement Experts!

Weekly Meeting -

Mondays 2:00 pm Mountain Time

Gotomeeting ID 909-871-373

Scope of Accreditation Editor Update

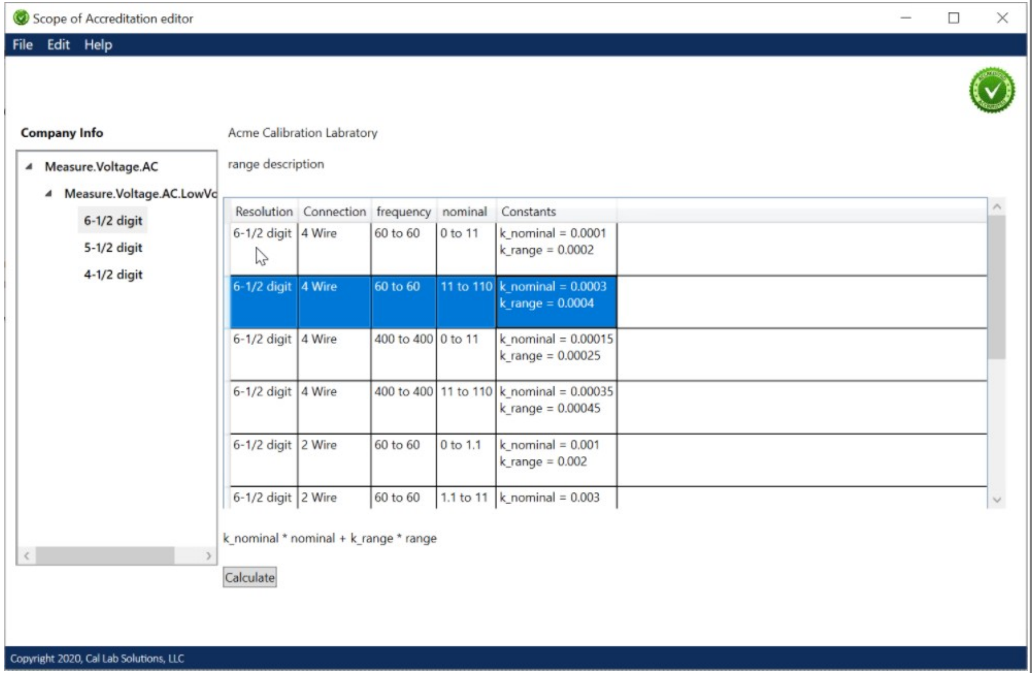
Scope of Accreditation Editor

Preview Look

https://github.com/CalLabSolutions/Metrology.NET_Public

- FREE Tool
- Open Source - 3GP License
- Brandable by Accreditation Bodies
- Available Q4-2020

- Model View Viewmodel - MVVM Pattern
- Build in Math Calculation Engine
- MII Taxonomy & Quantities XML Schema

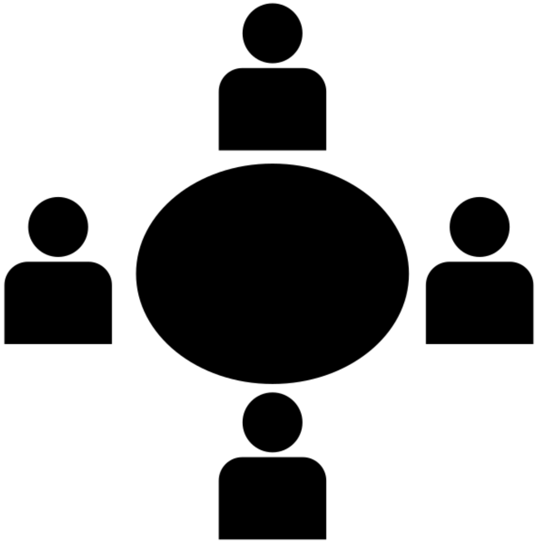


Come Join Us - Weekly meeting

Weekly Meeting - Mondays 2:00 pm Mountain Time

Gotomeeting ID 909-871-373

https://global.gotomeeting.com/join/909871373



Open Discussion

Questions?

Questions? / Comments

For ALL the Information on this project
http://miiknowledge.wikidot.com/start

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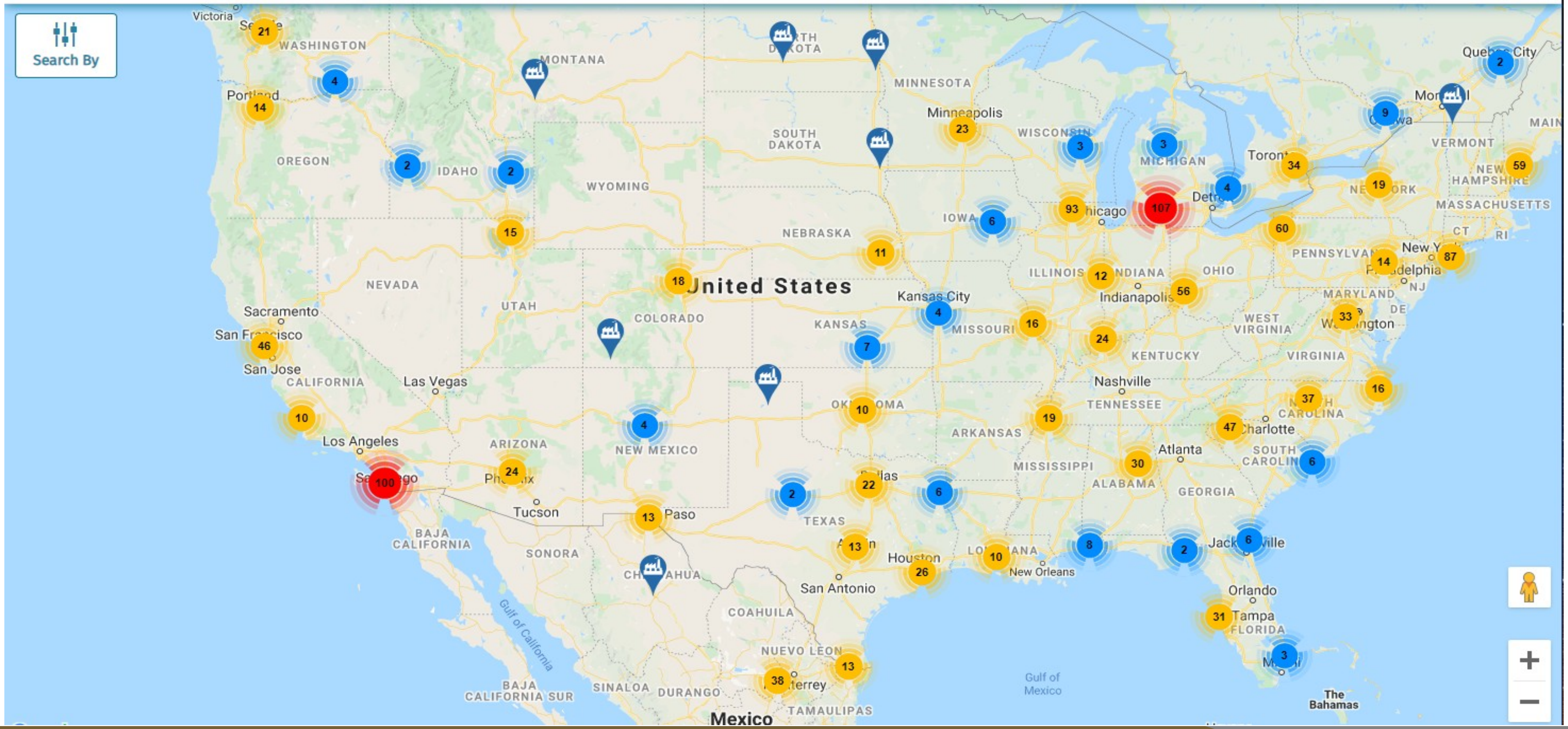
Future Plans:

1. Keep Moving Forward
   a. Weekly Meeting - Mondays 2:00 pm Mountain Time
      Gotomeeting ID 909-871-373
   b. Classify / Define the Remaining Taxons
2. Create NCSLI MII RP
3. Present to ILAC through NCSLI and ABs

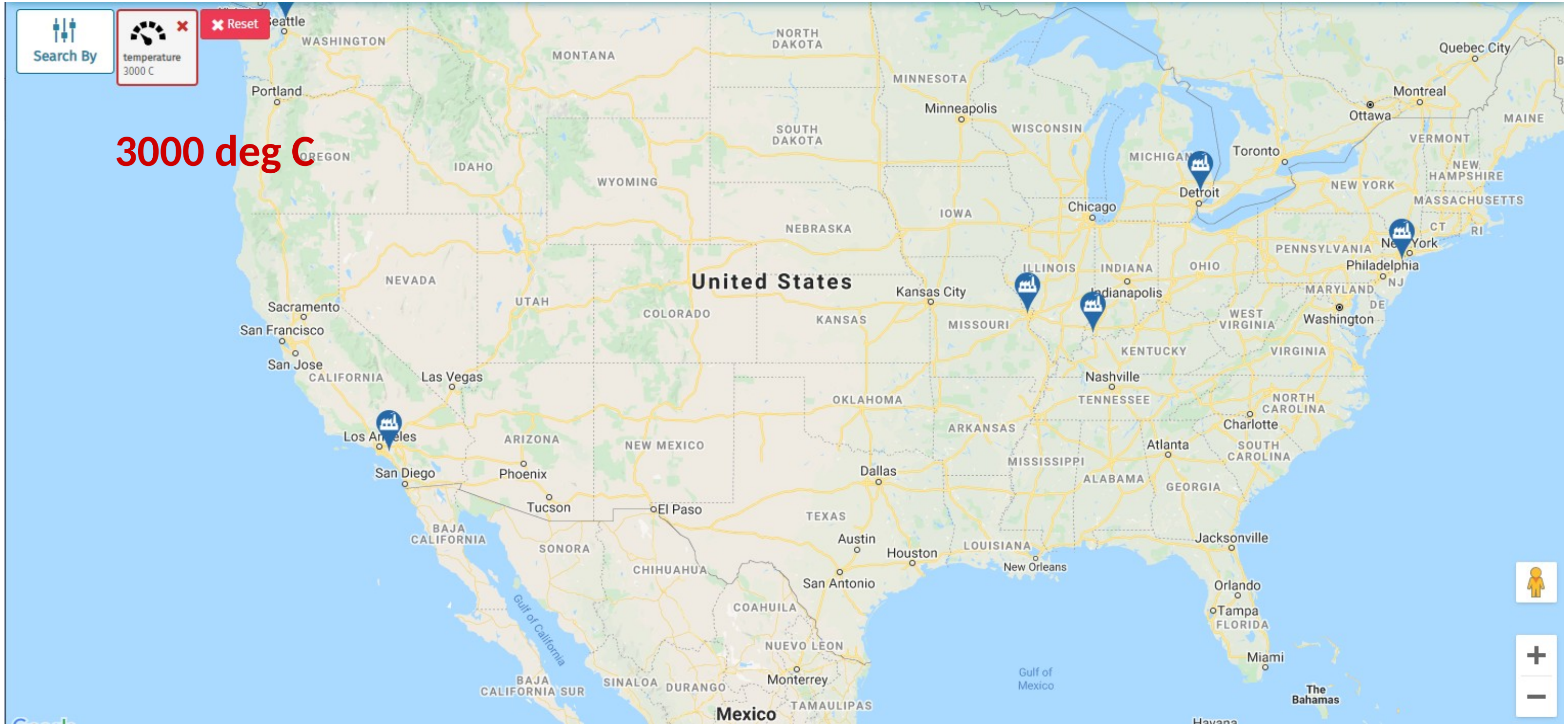
Overview (make sure all topics are covered, then, delete this slide)

1. Introduction
    a. NCSLI 141 MII Overview -- Goals and Plans
    b. Background
2. Draft RP - “Specifications for a Measurement Information Infrastructure (MII)”
3. Taxonomy Specifications
    a. How they are defined
    b. Work to date
    c. Involving SMEs for Development, Review and Feedback
4. Related Efforts
    a. SoA Editor
    b. Worldwide projects
5. Join us any Monday at 2:00 pm Mountain Time

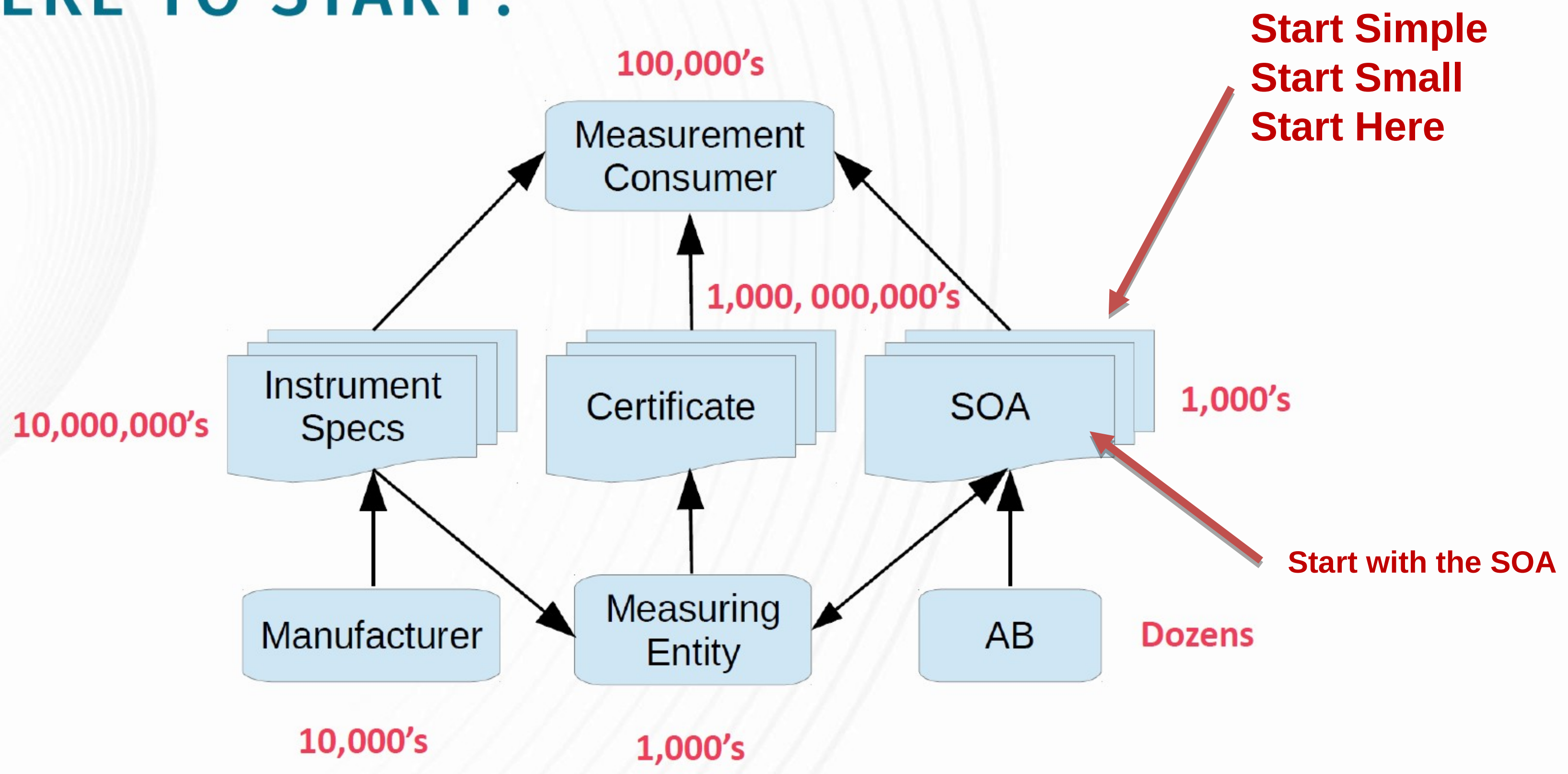
Qualer Search - https://search.Qualer.com
They said it couldn't be done!



Qualer Search - https://search.Qualer.com
Only 4 Labs have 3000°C on their scope



WHERE TO START?



TestProcess.Measure.Ratio.Volts.AC.Sinewave.Delta.Frequency

A test process that measures & compares 2 sinusoidal AC sine wave signals at different frequencies while keeping the voltage constant. The result may be expressed as delta volts, dB, percent, etc.

These two signals are often used when calibrating device’s flatness.

Required Parameters

- Volts
- Frequency –
- FrequencyRef –

Optional Parameters

- Impedance –
- UUT.Output – Output Name of the UUT Connecting Point

Output Value & Uncertainty

- Volts Measured Value – Reference Value
- dB – 20 * Log(Measured Value / Reference Value)
- % – Reference Value / Measured Value * 100

Metrology Taxonomy Overview

Errors in moving data from System-To-System

What does the data mean … Imports are custom

Look at any calibration cert, How do you get that data back into your database (Useable)

Attaching Taxonomy Definitions / IDs to the data points

The data is now classified

Indexable / Searchable

What can be achieved (unlimited possibilities), e.g.:

Check uncertainties against the SoA

Import / Export calibration data made easier

TestProcess.Measure.Volts.AC

The process measuring the AC RMS (Root-Mean-Square) voltage sourced by the UUT.

Values can only be expressed in RMS because the shape of the signal is not known.

Required Parameters

- Volts –

Optional Parameters

- Frequency
- UUT.Input – Input Name of the UUT Connecting Point

Measured Value & Uncertainty

- Volts

TestProcess.Source.Volts.AC.Sinewave

The process of sourcing a sinusoidal AC Voltage signal from a device and measuring the value on the UUT.

This test process can be used by any device that measures absolute AC Voltage.

Required Parameters

- Volts – RMS
- Frequency –

Optional Parameters

- Impedance –
- UUT.Input – Input Name of the UUT Connecting Point

Output Value & Uncertainty

- Volts – RMS

TestProcess.Source.Ratio.Volts.AC.Sinewave.Delta.Frequency

A test process the sources 2 sinusoidal AC Voltage signals at different frequencies keeping the voltage levels constant between the two frequencies. The FrequencyRef signal is sourced and the voltage is measured by the UUT and saved as the Reference value. Then the signal is changed to the test Frequency and the Test value is measured on the UUT. The two measured values are compared, the results can be expressed as Delta Volts, dB or percent of change.

These two sinusoidal signals are often used when calibrating bandwidth or frequency response on an Oscilloscope or similar device.

Required Parameters

- Volts – RMS
- FrequecyRef –
- Frequency –

Optional Parameters

- Impedance –
- UUT.Input – Input Name of the UUT Connecting Point

Output Value & Uncertainty

- dB – 20 * Log(Measured Value / Reference Value)
- V – Measured Value – Reference Value
- % – Reference Value / Measured Value * 100

Things we want help with:

1. Review the electrical-RF draft items
    a. Web site address
    b. Commenting procedure
2. Draft more areas:
    a. Hardness
    b. Mass
    c. Dimensional & Coordinates (CMMs)
    d. Chemical
    e. Thermodynamics
    f. Mechanics
    g. Optical
    h. Acoustics
    i. Nuclear

SoA Editor Update

1. dll has been created and open source.
    a. Available on GitHub https://github.com/CalLabSolutions/Metrology.NET_Public
2. UI version 1 template created in XMAL
3. New UI update has been delayed - Mahdi was accepted into a PhD program
4. Editor is waiting for Taxonomy