Ideas and Efforts to Realize the Digital SI in Industry

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For you. For us.
For growth.

Fluke and the Digital SI

- Attended BIPM Workshop on The International System of Units (SI) in FAIR Digital Data
- Attended DCC Conference
- Active participation in NCSLI 141 Committee (Metrology Information Infrastructure)
  - Definition of M-Layer
- Meetings with NIST

Standardization of Metrology Practices

- Process of Corporate Calibration Certificate Standardization and Improvements began in December 2011
- Calibration Certificate Standardization determined to be biggest win for customers
  - Metrology's "product" is the certificate of calibration

Link to Fluke Standardized certificate of calibration

Bottom of Page 1 data

Approved Signatory

Fluke Corporation	Telephone	Internet	Page 1 of 2
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- QR Code
- Calibration Label
- Authorizing Signature
- Address
- Page number and number of pages
- Rev date of template

QR Code

- QR Code currently contains:
  - Fluke Laboratory Code where work was performed
  - Calibration Certificate Number
  - Date of Calibration
  - Serial number of Device Under Test (DUT)
- The goal was not to have too much information in order to make the QR code too dense
  - Able to make a photocopy of a photocopy of a photocopy and the QR code must still be readable
- We have discovered incidents where the QR code has identified improper alteration of the original calibration certificate (e.g. photoshopping to change the calibration date)
- We are open to other ideas about information to place in the QR code

Other Information at the bottom of page 1

- Calibration Label – Fluke uses special paper that includes a calibration label that can be peeled off of the certificate and placed on the DUT if the customer wants
- Authorizing signature – Can be hand signed or electronically signed
  - Electronic signatures common for high-volume or highly automated processes

Fluke's newest Experiments

- Agreed with a customer to provide calibration certificates in a specified CSV format for new 8588A's
- Calibrations performed at Fluke Park Laboratories can receive an XML version of the calibration certificate information upon request
  - Primary Standards Laboratory Calibrations
  - Newly manufactured
    - Electrical Calibrators
    - Pressure Controllers/EDWT
    - Drywell Calibrators
    - Liquid Temperature Baths
  - Products serviced at Fluke Park Laboratories
- Our tool stores the data as XML, and we can produce either the electronic file or a searchable PDF

Fluke XML Data Format

- <?xml version="1.0" encoding="utf-8"?>
- <certificateXml xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
- <laboratoryInfo>
- <name>Fluke Park Laboratory</name>
- <location>Everett, WA</location>
- <accreditationNumber>105016-0</accreditationNumber>
- <accreditationBody>NVLAP</accreditationBody>
- </laboratoryInfo>
- <calibrationSummary>
- <certificateNumber>F8857004</certificateNumber>
- <calStatus>5522</calStatus>
- <procedure>FPC4504.2008 Rev 20190128</procedure>
- <dateCalibration>22 Dec 2021</dateCalibration>
- <dateDue />
- <dateIssued>23 Dec 2021</dateIssued>
- <temperature>20.0 to 26.0 °C</temperature>
- <humidity>20 to 70 %RH</humidity>
- <pressure>95 to 103 kPa</pressure>
- <accredited>Accredited</accredited>
- <comment />
- Link to XML Data Format

Future Ideas

- Migrating toward Cloud applications of Calibration Cert storage, product specifications (Cubyt), and test executives
- Fluke will store all Calibration Certs in an XML format
- Format can be easily translated to Digital Calibration Certificate (DCC) Format once a standard is developed
- Customers that want a traditional certificate will be able to obtain one through a simple tool that converts data back to a format resembling today's calibration certs for print/pdf
- Every calibration data set produced by Fluke for the product will be available through a customer portal, starting with the manufacturing calibration data

Future Ideas

- Working towards a digital specification format that will be the single source of knowledge for the device
- Digital specification will also include all compliance requirements such as CSA, UL and CE marks for the product
- Digital specification will be able to be consumed by
  - Product Webpages and catalogs
  - Test Equipment firmware
  - Datasheets
  - Product Manuals
  - Automated Calibration Procedures
  - Uncertainty Analyses
  - ETC

Conclusion

- This is a beginning step, not an end
  - Continued improvements are anticipated
  - Interested in customer feedback
  - Will be participating in standards development
- Continuing towards goal of being the gold standard for industrial certificates of calibration