National Conference on Weights and Measures

"That Equity May Prevail"

Software Sector 2014

Software Identification Goals ("Root Wants" 1/2)

- Each piece of physical equipment is unique and needs a serial number
- Software by itself is non-unique; it does **not** need a serial number
- All metrologically significant software, embedded or PC-based, needs version/revision identification
- Identification is best provided by the software itself; there is no guarantee that a hard-marked version/revision matches what is running

Software Identification Goals ("Root Wants" 2/2)

- Metrologically significant software and its version/revision identification must be linked together; it must not be possible to modify the software without a change to its identification and vice versa.
- Changes to metrologically significant software made after placement in service must be evident

Effecting these changes

- Handbook 44: Current marking requirements for software in GS-1 are different for built-for-purpose and not-built-for-purpose
- HB44 has wide reaching impact and changes are understandably scrutinized by all, difficult to modify
- New goal is to implement the consensus items with minimal impact on existing HB 44 language
- Propose to add explanations and clarifications of intent to Publication 14

Software Identification

- Software must be identified, preferably self
- Handbook 44 proposed change:
  - Software identification must be displayable or printable, unless impossible (applies to all metrologically significant software)
- Publication 14 proposed additions:
  - Define software separation and explain options to submit software either as a monolithic entity that includes metrologically significant software or as a separated piece of metrologically significant software
  - Explain that metrologically significant software and its version/revision identifier must be linked together

Recommended addition to Publication 14

Identification of Certified Software:

Note: Manufacturers may choose to separate metrologically significant software from non-metrologically significant software. Separation would allow the revision of the non-metrological portion without the need for further evaluation. In addition, non-metrologically significant software may be updated on devices without breaking a seal, if so designed. Separation of software requires that all software modules (programs, subroutines, objects etc.) that perform metrologically significant functions or that contain metrologically significant data domains form the metrologically significant software part of a measuring instrument (device or sub-assembly). If the separation of the software is not possible or needed, then the software is metrologically significant as a whole. The conformity requirement applies to all parts and parts shall be marked according to Section G-S-X.X.

The manufacturer must describe and possibly demonstrate how the version or revision identifier is directly and inseparably linked to the metrologically significant software. Where the version revision identifier is comprised of more than one part, the manufacturer shall describe which portion represents the metrologically significant software and which does not.

Software Protection

- Update of metrologically signifcant software must be protected
    - Physical seal can protect software update but current event counters / audit trails may not
    - No clear requirement for counters/event log to either take note of, or survive a software update intact
- Publication 14 proposed addition:
    - Update of metrologically significant software becomes a sealable event

Recommended addition to Publication 14

The updating of metrologically significant software, including software that checks the authenticity and integrity of the updates, shall be considered a sealable event.

Software Update

- Metrologically significant software contains algorithms, methods and procedures that operate on data, which includes both sealable and non-sealable parameters.
- Today, type approval evaluation considers protecting the modification of sealable parameters but ignores protecting the software that manipulates those sealable parameters.

Software Update (con't.)

- Equipment protected by a physical seal may prevent the update of software unless a seal is broken and provides evidence of software update.
- Event Counter & Event Logger sealing methods lack any requirement for such protection today.
- Software Sector believes that the field update of metrologically significant software is at least as important as the field change of a metrologically significant parameter – either can adversely impact a future measurement result.
- **Metrologically significant software update should be a sealable event.**

Future vision

- Make Software Sector more visible /transparent
  - Educate & better explain Software Sector objectives
- Improve communication with other Sectors
  - Propose to overlap Software Sector meetings with other Sector meetings to better align Publication 14 changes and speed up the consensus process
- Finalize definition of 'easily recognizable' menu selections/icons to display software identification
- Provide checklists for software evaluations
- Assist in software-specific field training curriculum