NCSLI 173 Metrology Practices

Condensed Minutes
Disneyland Hotel, Monorail A (moved to B), Main Tower, 5 pm to 7 pm

3/24/2016

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1 Attendees, Introductions

Bill Bellows
Deedee Banf, NSWC Corona
Dennis Jackson, NSWC Corona
Gary Olsen, Boeing
Gerhard Mihm, Bundeswehr
Greg Cenker, ATS Metrology
Howard Castrup, Integrated Sciences Group
Laron Scott, NSWC Corona
Marek Barylak, Amgen
Mark Kuster, Pantex Metrology
Nam Phan, NSWC Corona
Raghu Kacker, NIST
Steve Dwyer, NSWC Corona
Suzanne Castrup, Integrated Sciences Group

2 Minutes Review

Corrections to the July, 2015 meeting minutes: None

3 Status Updates Since Last Meeting

Mark Kuster showed the MPC’s new administrative guideline (AG), which includes the new charter and called for comments or feedback. Marek Barylak suggested that we augment the revision history to list each change’s author. The NCSLI office has posted the AG, along with an updated description, goals, meeting details and past minutes on the NCSLI web site. Mark Kuster drafted and showed the new subcommittee-WG charters and will distribute them for comments also.

The committee heard RP development and related status updates and held discussion as follows.
3.1 173.1 Calibration Interval Analysis (RP-1)

Working Group Chair: Mark Kuster, Pantex Metrology

Status update: The 5th edition material selection and methodology effectiveness research continues, the latter last presented at NCSLI 2015. The NCSLI Office replaced the incorrectly posted RP-1 2010A edition in September. We have yet to post the membership survey results and interval analysis validation data. We will update this RP after dealing with RP-19 and RP-5.

Mark Kuster, Greg Cenker and Howard Castrup described a document that recently surfaced (thanks to Paul Reese): the EPRI 2014 Technical Report for the nuclear power industry: “Guidelines for Instrument Calibration Extension/Reduction – Revision 2: Statistical Analysis of Instrument Calibration Data”. Highlights:

- Variables data approach, simplified
- As-found minus previous as-left drift, either raw or normalized to calibrated span
- Analyzed as like-item, like-application groups
- Mainly used to justify nuke fuel cycle extensions, e.g., 18 mo to 24 mo
- Recognizes data discontinuities due to maintenance events, significant procedural changes, etc.
- Recognizes problems comparing data from different sites
- IPASS: Instrument Performance Analysis Software System (spreadsheet)
- No apparent awareness of NCSLI RPs, VIM, GUM, etc.
- Terminology problems—calibration, bias; doesn’t mention measurement reliability per se
- “Tolerance intervals”: confidence of minimum containment probability
- Outlier ID: Grubb’s t-test
- Outlier removal for identified causes only
- Includes normality tests: Chi-Squared, W, D’, plots, coverage analysis
- Discounts regressions and ANOVA to determine time dependence
- Groups drift data by interval and applies F-tests or Bartlett’s test to bin standard deviations
- Doesn’t consider measurement uncertainty except when guardbanding safety set points
- Uncertainty analysis not remotely GUM-compliant
- Mentions attributes data analysis as “Binomial Pass/Fail Analysis”

Howard Castrup mentioned his past discussions with Craig Gulka, Tim Osborne and others regarding establishing an NCSLI reference library for the past conference papers and articles to improve general awareness of NCSLI resources. Raghu Kacker pointed out that giving NCSLI documents a DOI (digital object identifier) as most journals and publishers do, would make the titles and abstracts visible on the internet. The office may have moved this direction some already by contracting Measure to a mainstream journal publisher. Suzanne Castrup would like to see NCSLI publicize new documents more, including notices to the general membership, blurbs in Measure and lists of newly published RPs on the upcoming conference web pages. Mark Kuster suggested finding someone common to the NRC and NCSLI worlds to initiate some discussions with EPRI and Greg Cenker volunteered to contact Bill Hinton to find a suitable liason.
3.2 173.2 Measurement Decision Risk Analysis (RP-18)
Working Group Chair: Howard Castrup, Integrated Sciences Group

The October 2015 Metrologist published a promotion synopsis and the NCSLI office issued a release notice on the the news wire. Greg Cenker had developed a risk analysis spreadsheet and used it to work up a risk analysis example to accompany the RP-12 3458A calibration uncertainty analysis example. The committee discussed the NCSLI Board’s suggestion to post examples on their YouTube channel but came to no agreement. Raghu Kacker volunteered to look at the JCGM 106 risk material.

3.3 173.3 SPC for Metrology (RP-XX)
The group reviewed the options for pursuing this RP and HC briefly summarized some of its intended content and applications. Howard Castrup has a paper on the isgmax.com web site that describes the methodology.

3.4 173.4 Measurement Quality Assurance End-to-End (RP-19)
Working Group Chair: Howard Castrup, Integrated Sciences Group

Howard Castrup reported that he had finished the RP-5 comment resolution with some caveats and provided it to 140 VP James Smith. That leaves him free to compile a draft RP-19 from the NASA version. Review volunteers now include Dennis Dubro, Gary Olsen, Greg Cenker, Steve Dwyer, Dennis Jackson, Nam Phan, Merek Barylak and Mark Kuster. Raghu Kacker indicated an interest in exploring the economic implications of uncertainty.

The Jan 2016 Metrologist published a Committee News piece introducing the RP-19 ideas and requesting feedback to gage interest. We will want software to support this RP.

3.5 173.5 Uncertainty Analysis (RP-12)
Working Group Chair: Suzanne Castrup, Integrated Sciences Group

Dennis Jackson had reviewed the existing uncertainty analysis examples and provided verbal comments, suggesting that most engineers would not write analyses with full derivations but would rather concentrate on the uncertainty sources and budget specific to the measurement. Suzanne Castrup indicated that the committee had not settled on a format yet and Dennis Jackson suggested reorganizing the examples to fully address each uncertainty source before moving to the next. Suzanne Castrup and Dennis Jackson volunteered to develop a mutually satisfactory format. The group discussed providing one analysis with full derivations to exemplify the process (or perhaps the RP examples already cover this) and also to serve as validation data, or alternatively, to reorganize the examples to put the main information up front and relegate the derivations to the end.

The group discussed introducing uncertainty sources from one traceability level further back than normal but did not reach a consensus.

Raghu Kacker informed the committee that NIST had developed another uncertainty document, TN-1900, and requested that committee members review it to see how well it applies to commercial lab situations and offered to collaborate with group members on the limitations of NIST results. He reported that NIST decided in the 1980s to report only time-of-measurement uncertainty. He inquired whether RP-12 addresses (variable) uncertainty over a range and reported that the IEC standards expect a constant uncertainty over a range.

The WG has yet to survey the membership on the RP but this will wait until we approach its update time frame.

4 General Discussion

At this point, the meeting adjourned.
5 Action Items

- RP-1 WG: Develop interval analysis validation data as part of the methodology effectiveness research (long term).
- Howard Castrup, Mark Kuster: Discuss DOI numbers and more publicity for publications with the NCSLI office.
- Greg Cenker: Identify a liaison between NCSLI and EPRI.
- Howard Castrup: Compile and issue a draft RP-19 for comments.
- Mark Kuster: Send Dennis Jackson the uncertainty example source documents.
- Suzanne Castrup, Dennis Jackson: Refine the uncertainty analysis format.
- Mark Kuster: Issue draft subcommittee charters for review.
- Chairs, everyone: Review and edit subcommittee charters as appropriate.
- Mark Kuster: Post charters and other subcommittee information on the NCSLI web site.
- Chairs: Develop short RP presentations for use at region and section meetings.