CCAUV SPWG/15-09
CCAUV/15-29

CCAUV Strategic Planning Working Group Report

Michael Gaitan, NIST

CCAUV General Meeting

November 25, 2015

CCAUV SPWG Meeting Agenda

- Welcome
- Introductions / Roll Call
- Review of the past CCAUV Strategic Plan
- Presentations and Discussions
- Outline of the new Strategic Plan
- Organization / Assignments
- Adjourn

Strategic Planning Working Group Roll Call/Introductions

Takashi Usuda (President, NMIJ/AIST)

Michael Gaitan (Chair, NIST)

Salvador Barrera-Figueroa (DFM)

Bajram Zeqiri (NPL)

Ian Veldman (NMISA)

Enver Sadikoglu (UME)

Leo Wu (NRC)

Christian Koch (PTB)

Ryuzo Horiuchi (NMIJ/AIST)

Gustavo Ripper (INMETRO)

Richard Barham (NPL)

Stephen Robinson (NPL)

Steven Crocker (NIST/USRD)

Hideaki Nozato (NMIJ/AIST)

Yang Ping (NIM)

Yu-Chung Huang (ITRI)

Riann Nel (NMISA)

Susanne Picard (BIPM)

Gianna Panfilo BIPM)

Strategic Plan Outline

1. General Information about the CCAUV
2. Terms of Reference
3. Baseline
4. Stakeholders
5. Future Scan
6. Requirements and Rational
7. Key comparisons and Pilot Studies
8. Resource Implications
9. Challenges for Implementation

Presentations and Discussions

- Airborne Sound
  - Richard Barham and Salvador Barrera-Figueroa, “Input to the SPWG.”
  - Leo Wu, “Calibrations of microphones beyond 20 KHz, up to 50 KHz for implementing ultrasound safety codes.”
  - Christian Koch, Discussion on Ideas for Airborne Sound
  - Ian Veldman, Discussion on needs for low frequency sound measurements < 10 Hz
- Ultrasound
  - Bajram Zeqiri, “Ultrasound – Future Topics.”
  - Christian Koch, “Ideas for SPWG.”
- Vibration
  - Michael Gaitan, “Emerging calibrations needs driven by MEMS technologies.”
  - Ian Veldman, Discussion on time varying parameters (shock, shock force, acoustics shock)
- Underwater Acoustics
  - Stephen Robinson, “Some future developments underwater acoustic metrology.”

Airborne Sound

Richard Barham, Salvador Barerra-Figueroa, Christian Koch

- Low frequency sound
  - Public concern is growing over low frequency sound. Example: wind power generators.
  - Low frequency measurements are strongly dependant on the model used for heat conduction. New models are proposed. Pilot studies are recommended.
  - What are the measurement applications driving this need?
- Airborne ultrasound presents new hazards to human hearing and general health and wellbeing
  - There is increasing used in consumer applications at low power that are unregulated.
  - There is an urgent need to develop systems for traceable measurement in public spaces and the workplace.
  - CCAUV would need capabilities up to 100 kHz at more NMIs to respond.
- Optical techniques for acoustic measurements have been demonstrated
  - These methods should be validated by comparison with free-field reciprocity calibration of microphones.

Ultrasound

Bajram Zeqiri, Christian Koch

- Therapeutic Ultrasound
  - Applications of therapeutic ultrasound are still expanding with current standards insufficient.
  - There is also increasing use low power in cosmetic applications, which are unregulated.
  - The current CCAUV scope is 2 MHz to 15 MHz and 110 mW to 15 W.
  - Future considerations relate to lower frequencies (20kHz) and higher powers (500 W)
- High Frequency Hydrophones
  - There are increasing applications of ultrasound use elevated acoustic frequencies (>60MHz) for medical diagnostics.
  - Extension to these higher frequencies will require more NMIs to develop capability.
- Materials Applications
  - Elastograpghy is increasingly being used to image cancer tissue.
  - Ultrasonic Cleaners: Characterizing performance, understanding cavitation
  - What is the role for CCAUV?

Vibration

Michael Gaitan, Ian Veldman

- The past CCAUV Strategic Plan called for extending the range of sinusoidal excitation frequencies. These
  - To lower sinusoidal frequencies 100 mHz (and lower?) and to higher sinusoidal frequencies 50kHz (and higher?) and to include phase measurements
  - Angular vibration measurements.
- Microsensor (MEMS) accelerometers manufacturers calibrate using gravity
  - Digital sensor technologies.
  - Calibrations are gravitimetric-based.
- Optical-based self-calibrating accelerometer technologies
  - Are these technologies of future use to the CCAUV?
- Shock / Dynamic Measurements
  - The last strategic plan called for shock comparisons up to 10^5 m/s^2. Commercial calibration labs are asking for calibrations up to $2x10^6$ m/s^2.
  - What is CCAUV role with dynamic pressure and force measurements?

Underwater Sound

Stephen Robinson

- There is increasing regulation for monitoring marine environments
  - Regulation requires absolute measurement of ocean sound
  - Increased range of environmental conditions is needed: deeper and higher temperature range
  - Underwater sound metrology infrastructure weak
- Example Drivers
  - European Marine Strategy Framework Directive (EU MSFD): noise classified as Pollution
  - Sound particle velocity measurements. Sound particle measurements are considered important for studying effects on fish.
  - Human exposure to underwater sound.
- Possible implications for CCAUV
  - Low frequency Key Comparison (20 Hz - 1 kHz) are needed in the next 5 years
  - Optical methods for calibration could be adopted as primary standard for 100 kHz – 1 MHz
  - Future need for future comparisons of wider range of capabilities (environmental conditions, particle velocity...)

SPWG Assignments

Takashi Usuda (CCAUV President)

Michael Gaitan (Chair CCAUV SPWG)

Susanne Piccard/Gianna Panfilo (CCAUV Secretary)

A. Airborne Sound

Richard Barham (Co-Leader)

Salvador Figueroa (Co-Leader)

Enver Sadikoglu

Leo Wu

Christian Koch

R. Horiuchi

Riann Nel

U. Ultrasound

Bajram Zeqiri (Leader)

Christian Koch

Yang Ping

V. Vibration

Thomas Bruns (Leader)

Michael Gaitan

Ian Veldman

H. Nozato

Gustavo Ripper

Guillermo Silva Pineda

Yu-Chung Huang

W. Underwater Sound

Stephen Robinson (Leader)

Steven Crocker

Merci Beaucoup!