

IEEE P2520 Working Group Meeting #8 Minutes 9 December 2019 / 10:45 AM – 11:30 AM (EDT)

Zoom Teleconference (https://ncsu.zoom.us/j/945473904).

Approved: 6/22/2020

- Members Present: Luis Hoffman, Troy Nagle, Susan Schiffman, Santigo Marco, James Covington, Rachel Sunghee Lee (5 voting)
- Members Absent: Radislav Potyrailo, Hua-Yao Li, Susana Palma, Peter Hesketh, Krishna Persaud, Hugo Gamboa, Howard Choe, Omer Oralkan, Yogesh Gianchandani, Jan Mitrovics, Mike McGinley, Ehsan Danesh, John Saffell (6 voting)

Staff Absent: Vanessa Lalitte, IEEE-USA

1. Call to Order – WG Chair, Schiffman

The Agenda was displayed to the attending WG members at 10:45 AM EDT. WG Chair Susan Schiffman called the meeting to order at 10:48 AM. She welcomed the participants to the 8th meeting of the Working Group to develop an IEEE Standard for Testing Machine Olfaction Devices and Systems. An announcement was made about recording the session for Minutes-preparation purposes. The file will be destroyed after the Minutes have been approved.

2. Identification of Participants & Declaration of Affiliation – WG Secretary, Nagle

At each meeting, each new member is asked to enter his/her name, affiliation, and email address into the Chat window.

3. Approval of Agenda – Schiffman

The Agenda displayed at the opening of the meeting was adopted without objection.

4. IEEE Patent & Copyright Policies – Schiffman

The WG Chair briefly reviewed the IEEE-SA Patent and Copyright policies. This item is required for every WG meeting.

5. Today's Discussion

a. Continued discussion about the focus of our first standard?

Susan congratulated James on conducing a terrific seminar. She then continued the discussion that was underway at our last meeting. The consensus from past WG meetings is that we focus on a point-source for our first standard. We can start by choosing an application (or family of similar applications). Will our standard be guidelines for sample handling and sensor selection for the targeted applications?

Today's seminar was focused around bringing a sample to the lab and then running it through an instrument. Autosamplers are commonly used in high-throughput analytical facilities. We can't require an autosampler. One approach would be to collect an odorous object in the field and place it in a holding vial for transport to the lab. At the lab one could test the object itself or the headspace in the vial. You could get a vial and you could put something in the bottom of it and then you could say they can either take the headspace or you can open it to the atmosphere. In either case, one can't control the odorant concentration profile of the headspace as the gas is transferred to the sensor chamber. So, limiting our first application to point sources makes the standard easier to write and to implement. We can have a standardized path from the point source opening to the sensors (controlling the odorant concentration profile, temperature, flowrate, and pressure within the closed path environment).

As for the standard's focus, environmental applications might be a good choice to get quick adoptions of the standard. For calibration, we could define the concentration of a point source test odorant (say isobutylene) as the default VOC measure because it's nontoxic and commonly used in industry. So, we could start with an ISB release of a known concentration, at a single point in time, and of a specific gas volume. The machine under test could operate at specified distances away from the point source under controlled static conditions. We could allow a pull or push gas-flow operation within the instrument.

Many of the most important environmental nuisance gases are toxic. So, calibration testing for these gasses should be avoided in our first standard offering. An enose augmented by electrochemical sensors for specific toxic gases could be a focus for a future standard. At Warwick, they are combining optical, NDIR, electrochemical, and metal oxide sensors into a more capable enose system. In the past, developers have used a straightforward approach to implement metal oxide sensors (like those of Figaro) because they are widely known and readily available. More modern metal oxides sensors are now available. Since building an enose with existing metal oxide sensors is common practice, the barrier for entry of new devices is fairly low.

If we are going to focus on the perception of an odor by neighbors, we will collect an odor sample and deliver it to the enose and ask the machine to mimic a human response. We will be comparing its performance to that of a human panel. And if we limit our standard to that problem, we don't have to worry about the chemicals in the odor sample. We are just taking a point source odor sample from the same location where that same odor enters the human nasal cavity.

We should consider writing a standard for instruments focused on continuous monitoring. They should have a simpler architecture than those that can be used in the laboratory environment because they will frequently be deployed outdoors. The standard can define a minimum level of quality for the device and should establish how it can be calibrated for a specific application. Calibration of the system should not require zero-air. The system can switch between filtered-air and sample-air. This switching can't be too slow. The filter-replacement schedule/process should be specified and synchronized with the calibration schedule/process. The filter and calibrant could both be in a replaceable module.

Can we choose a particular application area for which there's a market? Can we include enough sensor variety so that it is both very capable and inexpensive?

Can we begin some of the steps needed to write the standard?

- 1) What is the title? Guidelines for testing electronic devices for monitoring environment odors in outdoor environments.
- 2) What instruments are covered? List some technologies.
- 3) Under what conditions does it operate? temperature range, typical odorous mixtures, power requirements, weather protection, etc.
- 4) What are its performance parameters? reliability, repeatability, sensitivity, etc.
- 5) What information does it provide? Odor parameters (intensity, irritation, and pleasantness) over time, warning of high odor exposure, hourly, daily, weekly odor plots.
- 6) What is the testing procedure? Define the processes to employ to demonstrate compliance to this standard.

The WG decided that now is time to start writing. We formed two subgroups. James, Susan, and Troy will start a draft within two weeks, and then send it to Santi, Luis, and Rachel for their contributions. We plan to have a few paragraphs ready for our January WG meeting.

This discussion will continue at our next meeting.

b. <u>Topic of our 4th seminar</u>:

Chemical compounds of interest. Still no response from Samantha Henningsen, ALS Environmental, in California frequently who gives presentations about chemical compounds of interest to specific industries. Susan recommends that we search for another potential speaker.

c. Suggestions for soliciting new WG members:

This topic will be carried over to the next meeting.

d. Collaboration with other Standards Working Groups:

This topic will be carried over to the next meeting.

6. Approval of Minutes

At this point in the meeting, Troy indicated that we did not have a quorum. Approval of the Minutes from our November 11 Meeting will take place at a future session.

7. Topics for Future Meetings - Schiffman

- **a.** <u>Sensors and signal conversion</u>: This item will continue on our future topics list. Members of our group will coordinate with ASTM and other groups.
- **b.** <u>Signal processing best practices</u>: This item will continue on our future topics list. Prof. Ricardo Gutierrez-Osuna has been invited to present a seminar on this topic.
- **c.** <u>The enose market</u>: This item will continue on our future topics list. Can we find an enose market expert to help us rate example use-case clusters?
- **d.** <u>Best practices for enose testing</u>: This item will continue on our future topics list.

8. New Business

There was no New Business.

9. Introduction of New Working Group Members There were no new members.

10. Review of Action Items - Nagle

No outstanding action items were noted.

11. Future Meetings – Nagle

The next meeting was announced to take place at 10:00 AM EST on Monday, January 13, 2020, but was postponed due to an emerging viral pandemic.

12. Adjourn

With no other business being brought before the body, Susan thanked the WG members for their participation and adjourned the meeting at 11:12 AM EDT.

H. Troy Nagle WG Secretary 12/19/2019