

IEEE P2520.2.1
Machine Olfaction Devices and Systems used for General Outdoor Odor
Monitoring
(SEN/SC/TMODS/OOM/2520.2.1)

Working Group Meeting Minutes
08 November 2021 / 10:00 AM – 12:00 PM (ET)
WG Vice-Chair: Ehsan Danesh
WG Secretary: Cynthia Burham

1. Call to Order

The Chair called the meeting to order at 10:04 AM ET. The Chair also announced that the meeting was being recorded for the purpose of preparing minutes.

2. Roll Call and Disclosure of Affiliation

Affiliation FAQs: <http://standards.ieee.org/faqs/affiliation.html>

The Chair directed participants to a Google Docs link in the Chat window:

https://docs.google.com/spreadsheets/d/1ydvTFKxRSYRrpT1CX-22zaNkETV4_aqD2NDVSoxxfk8/edit#gid=0

Participants were asked to sign-in by placing an 'X' in the spreadsheet at the intersection between the column including their name and the column indicating the meeting date and provided a few minutes to update the spreadsheet. The Secretary added the attendance status of participants who did not complete their attendance status directly.

The Chair asked participants with incomplete information in the spreadsheet to provide the required information in order to hold full membership and voting rights in the WG. The names of participants with missing information are highlighted in the spreadsheet. The Chair also indicated to participants that they must attend at least two of the last four meetings to have voting status within the WG. A member with voting status who fails to attend at least two of the last four meetings will lose voting status until the attendance requirement is satisfied.

The participant information from the Google registration form and in the WebEx Participants List has been merged and may be found in **Attachment A**.

3. Approval of Agenda

The Chair displayed the announced agenda and indicated to participants that the minutes for the meeting held on October 11, 2021 were not available and would be provided for review and approval at or before the next WG meeting scheduled to be held in December 2021. Approval of the October meeting's minutes might be accomplished by electronic ballot. The Chair asked if quorum had been obtained and the Secretary erroneously stated that quorum had been achieved. As a result, the agenda was erroneously approved without objection to unanimous consent after a motion to approve by the Secretary (Cynthia Burham) which was seconded by Troy Nagle. The number of voting members in attendance required for quorum was 16. There were 17 voting members in attendance.

4. IEEE Patent & Copyright Policies

a. Call for Patents

<https://development.standards.ieee.org/myproject/Public/mytools/mob/sli-deset.pdf>

Per standard IEEE-SA WG meeting practice, the Chair reviewed the required policy regarding potentially essential patents. No one raised concerns for consideration.

b. Copyright Policy

<https://standards.ieee.org/ipr/copyright-materials.html>

Per standard IEEE-SA WG meeting practice, the Chair reviewed the required policy regarding copyrights. There were no questions or concerns.

5. Technical Presentation(s) and Discussion

a. Presentation

There was no presentation scheduled for the November 2021 WG meeting.

b. General discussion:

The group entered a general discussion period after reviewing the meeting agenda. The Chair delved into issues introduced during the October WG meeting related to

odour reconstitution and determining odour mixtures relevant to evaluating the performance of olfaction devices and artificial olfaction system design. The Chair pointed out the numerous chemical compounds constituting relevant odours and the need to detect very low concentrations. The Chair emphasized the necessity of obtaining a cylinder of a calibrated mixture for test and indicated that there has been minimal response from WG members regarding relevant odours for reconstitution. The Chair also emphasized the importance of obtaining very low concentration mixtures.

The Chair shared a document published by the Environmental Protection Agency (EPA) in 1990: Technical Assistance Document for Sampling and Analysis of Toxic Organic Compounds in Ambient Air. The document's appendices include an extensive list of toxic organic compounds analyzed in ambient air which were available from the EPA for calibration purposes. Many chemicals/compounds listed in the document are relevant to outdoor monitoring. Given the age of the document, the EPA should be approached regarding availability. It was mentioned that many investigators prefer not to work with toxic compounds such as Toluene.

The Chair asked participants again to please indicate stable mixtures that may be of interest or commercially available.

Mention was made of a German company capable of manufacturing low-concentration VOC mixtures. Many mixtures are implemented for indoor testing but there is no known similar manufacturing for outdoor compounds. A participant indicated that a representative (Nick Martin) at the National Physical Laboratory (NPL) in the United Kingdom (U.K.) is interested in expanding their mixture manufacturing capabilities and it is necessary to pursue the option further. Mention was made of a contact approached at NIST.

The Chair mentioned another goal being cylinders of mixtures that are stable for 6 months or more and not cross-reactive. A participant mentioned the importance of the cylinder size and the preference in some labs for lecture bottles and in others for larger samples for stability. Coatings within the cylinders and prohibition of oxygen within the system were mentioned.

Mention was made to the preferable testing method: in-field, in lab, or in 3rd party lab.

One participant's company has a program for validating the standard. Further discussion is necessary.

The best method for sampling for field testing was discussed. Sampling bags were discussed. The necessity to expel the sample was mentioned to cause difficulty in odour stability.

A need for compounds with lower thresholds was mentioned by the Chair. Compound lists are necessary to manufacture sampling canisters. The Chair mentioned that there has been no response to a request to WG members to update a Google sheet intended to include relevant odours for analysis.

Mention was made to appropriately addressing liquid odour sources. Use of headspace for use in mixtures was mentioned. Membranes with liquid reservoirs and more common Teflon (permeation) tube systems were discussed. Methods to determine rates of diffusion and methods to deal with cross-reactivity and other issues with these systems were discussed. Calibration in lab and in field was also discussed. The need for a strategy for this calibration was mentioned for validation purposes and performance criteria such as repeatability. For baseline performance characterization, a mixture that is stable and representative is necessary. A goal is to keep the complexity low so that components may be distinguished (6 or 7 compounds). The main goal is obtaining concentrations representative of human perception.

Issues related to developing a table of compounds were probed such as dividing compounds by application and how to measure sensor effectiveness. How to best test a sensor for applications such as landfill and wastewater assessment was discussed. Several sensors for a wide range of compounds were mentioned as an option. A sensor exposed to a few compounds to observe different response patterns was mentioned. Whether this might be accomplished through one or multiple cylinders was discussed.

The Chairman introduced another document: ISO 16000-29: 2014 Indoor Air – Part 29: Test Methods for VOC Detectors. The Chair considers it a good guideline. The guideline may serve as a good framework for developing the WG's test protocol.

A mention was made to the fact tests were being developed in Germany 3 years ago for the indoor air quality market and an opinion was developed that there was a need for a better, more differentiated standard. There has been an ongoing discussion at the national level. A participant knows individuals involved in the discussion and will

ask for additional information in order to advise the WG to align so that traps related, for example, to a lack of differentiation, may be avoided.

The Chair mentioned that there are many documents of interest that the WG is unable to access. Access will be discussed with the WG's IEEE contact.

A decision must be made regarding devices to be tested. Reference was made to IEEE P2520. The parent group may need to adopt something like IEEE 1451.2.

A discussion regarding drone flyovers to determine VOC levels took place. Costly optical based gas analysis methods used by the systems were mentioned. The methods are often proprietary, but extremely effective in detecting very low concentration levels. A presentation by a representative of a company using and developing the technology was suggested by the Chair. In response, a participant mentioned contacting a representative from Olfascan as a possible presenter.

A short discussion of the 1451 series of standards developed by the standards council was mentioned. The standard includes coverage for security and communication which may be useful for the parent WG. A mention was made regarding conversion of the P2520 standard to a guide.

The Chair mentioned that subgroups should be established during the next meeting to address development of the various sections described within the Table of Contents. The Chair also invited participants to visit the WG website where presentations and other documents introduced during WG meetings are stored and accessible.

6. Agenda and Previous Meeting Minutes Not Approved

Meeting agenda could not be approved for lack of quorum (However, later it was noticed that quorum had actually been achieved – this was noted in the Official Roster)

7. Unfinished Business/Action Item Review

The Chair has requested that experts be identified and contacted who might be able to assist in synthetic odour development and identification. The WG should investigate and any sources which may be able to manufacture synthetic versions of the related odours for test.

8. New Business

There was no new business.

9. Future Meetings

The next meeting of the WG will take place at 10 AM ET on December 13, 2021. It will immediately precede the P2520.3.1 WG meeting. An attempt will be made to keep both meetings to one hour in length although one or both meetings may be longer than one hour in order to ensure all relevant points within the agenda are addressed.

10. Adjourn

The Chair asked for a motion to adjourn. Said motion was made by Troy Nagle and seconded by Cynthia Burham. The Chair adjourned the meeting at 10:58 AM ET.

Attachment A: Meeting Participants (18)

Last Name	First Name	Affiliation
Schiffman	Susan	North Carolina State University
Nagle	Troy	ECE, NC State University
Burham	Cynthia	University of Texas at Austin
Covington	James	Professor, School of Engineering, University of Warwick
Saffell	John	Alphasense Ltd.
WONG	KO CHUNG	Oxford Technology /FRSA
Carneiro	Magnovaldo	Self
Reimringer	Wolfhard	3S - Sensors, Signal Processing, Systems GmbH
Staerz	Anna F	Massachusetts Institute of Technology (not first meeting)
Li	HY	Huazhong University of Science and Technology
Danesh	Ehsan	Alphasense Ltd
Petrache	Ana	BEIA Consult
Isz	Sandrine	Alpha MOS
Chen	Allen (Cheng-Jen)	Self
Suciu (Jr)	George	BEIA-Ro
Sabry	Yasser	Faculty of Engineering, Ain Shams University
Suciu (Sr)	George	BEIA
Kuna	Kishore	Honeywell Technology Solutions