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
12 July 2021 / 10:00 AM – 11:00 AM (ET)
WG Chair: Ehsan Danesh
WG Secretary: Cynthia Burham

1. Call to Order

The Chair called the meeting to order at 10:04 AM ET. He 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?usp=sharing

The Google form differs from the registration form used in previous meetings. The form includes the names and affiliations of all previous participants with a column next to their name indicating voting status. A 'V' in the aforementioned column indicates which participants are voting members. Participants were asked to place an 'X' in the intersection between the row containing their name and the column indicating the meeting date ('12 July 2021'). Names and affiliations of attendees not already named in the document were added to the document. A few minutes were allowed for participants to access and complete the sign-in process.

Participants were provided a few minutes to access and complete the sign-in process. Secretary (Cynthia Burham) was to add names to the spreadsheet which were not entered directly by attendees.

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 delayed approval until later in the meeting in order to obtain and confirm quorum. Quorum was not obtained before conclusion of the meeting.

4. IEEE Patent & Copyright Policies

a. Call for Patents

https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.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 by Santiago Marco:*

Santiago Marco is a full professor with the Department of Electronics and Biomedical Engineering at the University of Barcelona. Professor Marco is also the group leader of signal and information processing for sensing systems at the Institute for Bioengineering of Catalonia at the Barcelona Institute of Science and Technology. Prof. Marco's contact information is: smarco@ibecbarcelona.eu

Prof. Marco's presentation provided an introduction to machine olfaction devices and systems used for general outdoor odour monitoring. The presentation included a discussion of machine olfaction and environmental odour monitoring, an investigation of standardization schemes and odor intensity estimation, and an exploration of the agreement between human panels and machine olfaction. During the presentation, Prof. Marco discussed the requirements of an effective machine olfaction system and the components necessary to develop and train such a system. Issues which must be overcome to engineer effective machine olfaction were presented. The dearth of calibration examples for effective training were discussed. Determining how to mimic human perception with minimal distortion due to higher sensitivity to specific odour elements in e-nose systems was also discussed. The use of the Bland-Altman method to address machine olfaction with respect to human

perception was explored and an example applying the Bland-Altman method provided. Environmental odour monitoring and regulation schemes and the difficulty in defining terms effectively were also mentioned. The work of WG41 in establishing some standards was also introduced.

During the Q&A, Prof. Marco discussed the difficulty in estimating perception. Generally, dynamic olfactometry does not perform as well as human panels. There are some examples, though limited in number, where instruments reach the performance of human panels.

In response to a question regarding calibration and dynamic olfactometry, the validity of machine olfaction in the field for more frequent (continuous), less expensive, and highly local applications was discussed. Generally, the advantages of continuously monitoring machine olfaction systems in industrial applications outweighs the disadvantages associated with monitoring in ambient air. The discussion included the importance of baseline performance to the WG for establishing standards for specific outdoor and indoor applications and, for example, for specific gases. It was suggested that comparing the behavior of a machine olfaction system to that of a human panel for calibration and validation once or twice every year would be a way to reduce costs. A two-level approach was mentioned by Prof. Marco in which the first level validation would involve test performance with standard test cases in lab to set minimum performance conditions and then actual validation would occur in the field. Prof. Marco mentioned that there has been discussion about this two-stage approach with some feeling the lab testing is irrelevant and analysis should be done directly in the field.

Comments from the chat window were discussed. Scenarios involving systems sensing something different from what is being perceived or only sensing a fraction of the whole were discussed. An approach was suggested to validate performance involving definition of VOC standards rather than calibration of all possible combinations.

The discussion then turned to the importance of continuous measurement and the need to reduce uncertainty in measurements so that regulation does not become meaningless. Work must be done to make instruments more precise and to ensure values recorded are correctly interpreted. The relevance of dynamic range, emission rates, concentration levels, and estimation models was emphasized.

b. General discussion:

After the presentation, the group entered a general discussion period. There were fewer than the 21 voting members required to achieve quorum. Only 20 voting members were in attendance. As a result, the meeting agenda and the minutes for the July meeting could not be approved. The next WG meeting was scheduled for September 13, 2021.

During the general discussion, the Chair presented a draft version of the WG Table of Contents for review. The Chair indicated that the draft may be changed as sections continue to develop and indicated dependence on IEEE SA P2520.1 for many of the draft sections. The annex sections were also discussed. There were no questions or comments about the Table of Contents by members in attendance during the meeting.

The Chair indicated that the draft of the Table of Contents would be sent to WG members for review and comments. The Chair indicated that the deadline for the draft is August 7th and requested that comments be forwarded before the deadline The Chair also stated that the Table of Contents would be discussed during the next or a future meeting. The Chair also stated that subgroups would be created and tasks assigned at a later date to draft specific elements as described within the Table of Contents. It was mentioned that, if the draft of the Table of Contents was not finalized before the deadline, it would be finalized during the meeting scheduled for September 2021.

6. Agenda and Previous Meeting Minutes Not Approved

Meeting agenda and the minutes from the last meeting could not be approved for lack of quorum.

7. Unfinished Business/Action Item Review

The Chair has requested comments on the draft Table of Contents and has indicated that approval will occur during a future meeting. The Chair also indicated that subgroups will be created to address sections of the Table of Contents.

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 September 13th, 2021. Both P2520.2.1 and P2520.3.1 will meet on September 13th with P2520.3.1 beginning immediately after P2520.2.1. 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 WG Chair asked for a motion to adjourn. Troy Nagle made the motion and Cynthia Burham seconded. Without objection to unanimous consent, the Chair adjourned the meeting at 11:06 AM ET.

Attachment A: Meeting Participants (31)

Last Name	First Name	Affiliation
Sagar	A S M Sharifuzzaman	Sejong university, South Korea
Sabry	Yasser	Faculty of Engineering, Ain Shams University
Danesh	Ehsan	Alphasense Ltd
Schiffman	Susan	North Carolina State University
Nagle	Troy	ECE, NC State University
Chen	Allen C	Self
Burham	Cynthia	University of Texas at Austin
Leccesse	Fabio	Science Department - Università degli Studi "Roma Tre"
Suciu Sr	George	BEIA
Covington	James	Professor, School of Engineering, University of Warwick
Saffell	John	Alphasense Ltd.
WONG	KO CHUNG	Oxford Technology
capelli	laura	politecnico di milano
Majewski	Leszek	The University of Manchester
Harris	Louis-Ray	The University of the West Indies (Mona Campus)
Carneiro	Magnovaldo	Self
Isz	Sandrine	Alpha MOS
Reimringer	Wolfhard	3S - Sensors, Signal Processing, Systems GmbH
Suciu Jr.	George	Beia-Ro
Singh	V R	?
Lalitte	Vanessa	IEEE (Program Manager)
Roman-Gonzalez	Avid	Business on Engineering and Technology S.A.C. (BE Tech)
Bernardini	Sandrine	Aix-Marseille University
Dutu	Daniel-Marian	?
Guillot	Jean-Michel	IMT Mines Ales
Muresan	Pavel	?
De Vito	Saverio	ENEA - Agency for New Technology, Energy and Sustainable Economic Environment
Marco	Santiago	Institute for Bioengineering of Catalonia
Palma	Susana	NOVA university of Lisbon
Tiziano	Zarra	Università degli Studi di Salerno
Subramaniam	Ravi	IEEE (Conformity Assessment)