




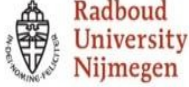


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**Abstract:** This document outlines planned activities by the Consortium members after the project end.

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## 1. Draft of planned activities for FLAIR project during 2021 & 2022

### 1.1 *Virtual workshop hosted by Senseair AB*

Projected date & time: February 2021

Speakers: Prof. Hans Martin

Guest Lecturer: EMPA

Topic: Gas sensing subsystem for project FLAIR

Language: English

Timing: 60 min (40 min presentation including videos and a 20 min Q & A session)

Webinar announcement channels: FLAIR newsletter, email invitations, publications on Senseair & Flair webpages, SMM (LinkedIn, Facebook, Twitter). Consortium members are expected to promote the event on their website and social media as well.

Est. number of attendees: 150 people

### 1.2 *Exhibitions 2021*

Radboud University, EMPA and Senseair plan to attend SENSOR + TEST (4-6th May) in Nuremberg Germany.

Senseair will aim for opportunity to market the new multi-pass absorption cell gas sensor. The idea is to have a Knowledge sections in the booth where Senseair present news - showcase the sensor, hand out brochures and show the new film. Furthermore, this exhibition will be a hybrid event, meaning that there will be an additional option of presenting and interacting digitally as well.

Exhibition announcement channels: Senseair and FLAIR newsletter, email invitations, publications on Senseair & Flair webpages, SMM (LinkedIn, Facebook, Twitter)

Est. number of exhibition visitors: 7000 people from 44 countries

Due to COVID-19 joint workshop activities planned in 2020 at Sensor and Measurement Science International (SMSI) were cancelled. Another offline workshop will be planned in early 2021 as this event will depend on travel restrictions in place.

### 1.3 *Planned exhibitions in 2022*

Event	Date/ Project month	Project member for approach	Target audience
<a href="#">International workshop Mid-Infrared Laser-Based Gas Sensing</a> Wroclaw, Poland	TBD	EMPA	Researchers, educators, and industry to advance light-based research and technologies

<a href="#">Acrex</a> Bangaluru, India	25 <sup>th</sup> -27 <sup>th</sup> February	SA	HVAC industry representatives: engineers, innovators, manufacturers
<a href="#">FLAIR, Field Laser Applications and Research</a> Lyon, France	TBD	EMPA	Researchers from both industrial and academic research laboratories and institutions to stimulate new research initiatives and field laser applications involving sensitive and selective detection of molecular species with a broad interdisciplinary approach.
<a href="#">Sensor+Test</a> Nuremberg, Germany	4 <sup>th</sup> -6 <sup>th</sup> May 2021	SA, RU, EMPA	International community of scientists, researchers and customers
<a href="#">OSA Optical Sensors and Sensing</a> Vancouver, Canada	19 <sup>th</sup> -23 <sup>rd</sup> July 2021	EMPA	Forum to facilitate reporting the latest optical-based sensor advances, bring together major sensor developers and users, and provide a showcase for the latest sensor prototypes and products.
<a href="#">SPIE Photonics West</a> San Francisco, USA	6 <sup>th</sup> -11 <sup>th</sup> March 2021	RU	Researchers, educators, and industry to advance light- based research and technologies
<a href="#">AHR Expo, 2022</a> Las Vegas, USA	January 31 <sup>st</sup> – February 2 <sup>nds</sup> , 2022	SA	HVAC industry representatives: engineers, innovators, manufacturers



<a href="#">Electronica</a> München, Germany	8 <sup>th</sup> -11 <sup>th</sup> November 2022	SA	Electronics industry representatives: engineers, innovators, manufacturers
<a href="#">MCE</a> Milan, Italy	8 <sup>th</sup> -11 <sup>th</sup> March 2022	SA	Companies and professionals in the HVAC+R, renewable sources and energy efficiency sectors

### 1.4 Website and Social Media

- Promote the new film about FLAIR on Senseair Youtube channel, LinkedIn and via newsletter, to subscribers of both Senseair and FLAIR newsletters.
- Market the FLAIR project and its results on Senseair website as news.
- Create a new Senseair brochure about the new multi-pass absorption cell gas sensor

### 1.5 New project Movie

As of December 2020 SA distributed manuscript of the future video about FLAIR which will conclude the results and show actual flight performance. Video will be distributed in Q1-Q2 2021 through existing communication channels (Consortium webpages, Social media, newsletters).

### 1.6 Other

Present FLAIR projects and Senseair accomplishments within the project in future internal/external workshops and events.



## 2. Promotion in events, workshops, and major meetings in 2020

During the reporting period COVID-19 was affecting the mode of offline communication activities. Public events have been postponed or held as teleconferences.

However, project partners did number of talks about FLAIR during different workshops and events:

- **DTU:** A.I. Adamu, M.K. Dasa, K. Kwarkye, G. Woyessa, O. Bang, C. Markos, "Optical ammonia sensors based on Hollow core fiber and photoacoustic spectroscopy", In Frontiers in Optics 2019 [JW4A.64] Optical Society of America (OSA), (2019)
- **Senseair:** [AHR Expo](#), 3-5th February 2020, Orlando, USA
- **DTU:** M.K.Dasa, K.Kwarkye, G.Nteroli, B.O. Efunbajo, M.Bondu, G.Woyessa, N.M. Israelsen, A.Bradu, C.R. Petersen, P.M. Moselund, P.Bowen, C.Markos, and O.Bang "High-pulse energy supercontinuum sources for multi-spectral photoacoustic imaging in the near-infrared wavelength region (Conference Presentation)", Proc. SPIE 11234, Optical Biopsy XVIII: Toward Real-Time Spectroscopic Imaging and Diagnosis, 112340B (9 March 2020)
- **DTU:** K.Kwarkye, M. K. Dasa, A. I. Adamu, G. Woyessa, C.R. Petersen, S.B. Engelsen, and O.Bang "Mid-IR supercontinuum based vibrational overtone combination spectroscopy (Conference Presentation)", Proc. SPIE 11260, Fiber Lasers XVII: Technology and Systems, 112601Q (11 March 2020)
- **DTU:** N.M. Israelsen, C.R Petersen, P.J.L. Rodrigo, A. Barh, D. Jain, G.T. Woyessa, M. Jensen, G. Hanneschläger, P.T.-Lichtenberg, C. Pedersen, A.G.H. Podoleanu, O. Bang, "Spectrometer-based mid-infrared optical coherence tomography operating at multi-kHz line rate speed (Conference Presentation)", Proc. SPIE 11279, Terahertz, RF, Millimeter, and Submillimeter-Wave Technology and Applications XIII, 1127906 (10 March 2020)
- **RU:** Conference on Lasers and Electro Optics/ Europe (CLEO), May 11<sup>th</sup>-15<sup>th</sup> 2020 – Virtual Event. RU performed presentation on the following topic: Broadband Mid-infrared Trace Gas Sensor Based on a Supercontinuum Source and Lock-in Detection
- **EMPA & RU:** [High-brightness Sources and Light-driven Interactions, OSA Conference](#), 16th-20th November 2020 (RU topic: Title: New coherent sources for mid infrared spectroscopic applications) – Virtual Event
- **DTU:** [High-brightness Sources and Light-driven Interactions, OSA Conference](#), G. Woyessa, M.K. Dasa, K. Kwarkye, C.R. Petersen, O.Bang, "Long Wavelength Mid-Infrared Supercontinuum Source," High-brightness Sources and Light-driven Interactions Congress Nov. 16th – 20th, 2020, Virtual conference( MM1C.5)
- **DTU:** [OSA High-brightness Sources and Light-driven Interactions Congress](#) - Virtual conference, Nov. 16th – 20<sup>th</sup>, 1.G.Woyessa, K.Kwarkye, M.K.Dasa, C. R. Petersen, R.Sidharthan, S.Chen, S.Yoo, and O. Bang, "Stable and Portable MHz-rate Long-wavelength Mid-infrared Supercontinuum Source". 2.Christian R.



Petersen, Mikkel B. Lotz, Christos Markos, Getinet Woyessa, David Furniss, Angela B. Seddon, Rafael J. Taboryski, and O. Bang, "Thermal Nanoimprinting of Anti-reflective Structures on Mid-IR Chalcogenide Fibers"

- **CSEM:** [OSA High-brightness Sources and Light-driven Interactions Congress](#) - Virtual conference, Nov. 16th – 20<sup>th</sup>

### 3. Publications

- C.R. Petersen, P.M. Moselung, L. Huot, L. Hooper, O. Bang, Towards a table-top synchrotron based on supercontinuum generation, *Infrared Physics & Technology* 91, 182-186 (2018)
- C.R. Petersen, M.B. Lotz, G. Woyessa, A.N. Ghosh, T. Sylvestre, L. Brilland, J. Troles, M.H. Jakobsen, R. Taboryski, O. Bang, Nanoimprinting and Tapering of Chalcogenide Photonic Crystal Fibers for Cascaded Supercontinuum Generation, *Optics Letters* 44(22), 5505-5508 (2019)
- N. Ghosh, M. Meneghetti, C.R. Petersen, O. Bang, L. Brilland, S. Venck, J. Troles, J.M. Dudley, T. Sylvestre, Chalcogenide-glass polarization-maintaining photonic crystal fiber for mid-infrared supercontinuum generation, *Journal of Physics: Photonics* 1, 044003 (2019)
- K. Kwarkye, M.K. Dasa, G. Woyessa, C.R. Petersen S.B. Engelsen, O. Bang, "Mid-IR Supercontinuum based vibrational overtone combination spectroscopy", *Photonics West 2020. SPIE LASE*, 1-6 February 2020, San Francisco, USA (No. 11260-62)
- M.K. Dasa, K. Kwarkye, G. Nteroli, B.O. Efunbajo, M. Bondu, G. Woyessa, N.M. Israelsen, A. Bradu, C.R. Petersen, P.M. Moselund, P. Bowen, C. Markos, O. Bang, "High-pulse energy supercontinuum sources for multi-spectral photoacoustic imaging in the near-infrared wavelength region", *Photonics West 2020. SPIE BIOS*, 1-6 February 2020, San Francisco, USA (Invited talk, No. 11234-10)
- O. Bang, Mid-infrared Fibre Supercontinuum Generation, *OSA Advanced Photonics 2018*, July 2-5, 2018, Zurich, Switzerland (Invited talk, No. SoTh3H.3).
- G. Woyessa, K. Kwarkye, C.R. Petersen, R. Sidharthan, S. Chen, S. Yoo, O. Bang Power stable 1.5-10.5  $\mu\text{m}$  cascaded mid-infrared supercontinuum laser without thulium amplifier, *Optics Letters* (submitted Nov. 10, 2020)
- K. Kwarkye, M. Jensen, M.K. Dasa, G. Woyessa, D. Jain, P. Bowen, P.M. Moselund, R. Sidharthan, S. Chen, S. Yoo, C.R. Petersen, O. Bang, Influence of pulse duration and repetition rate on mid-IR cascaded supercontinuum generation, *Optics Letters* 45(18), 5161-5164 (2020)
- ElectoOptics: ["Optical sensor drones fly into danger"](#)
- OSA Publishing: J. Gouman, F. Lütolf, P. Renevey, S. Dasen, S. Chin, T. Herr, G. Buchs, S. Lecomte, G. Vergara, H. Martin, P. M. Moselund, F. J.M. Harren, and L. Balet , [Compact UAV compatible broadband 2D Spectrometer for multi-species atmospheric gas analysis](#)
- Photonics21: ["LIFE-SAVING DRONES USE PHOTONICS TO TRANSFORM DISASTER RESCUE EFFORTS"](#)



- The Engineer: [“Pan-European drone project detects toxic gases in disaster zones”](#)
- EUREKA!: [“Drones using photonics to transform disaster rescue efforts”](#)
- LaserFocusWorld: [“Photonic sensors assess air quality for rapid-response drone”](#)
  
- ElectroOptics: [“EU project develops sensor to transform disaster rescue efforts”](#)