

GENERAL INFORMATION

1. NAME OF THE CENTER AND LOCATION	
	<i>AMG Technology Ltd, Botevgrad, Bulgaria</i>
2. TYPE OF THE RESEARCH INFRASTRUCTURE AND/OR SCIENTIFIC EXPERTISE	
Identify the type of the RI, equipment/facilities/ specific research, and in particular linked to COVID-19:	<p>Complete prototyping facility for silicon MEMS devices showing beyond state-of-the art performance. Prototyping fab line comprises more than 40 separate machines for front-end and back-end processing, as well as relevant infrastructure for fabrication of various self-sensing devices having 3um design rules. Being autonomous and providing all in-house processing, synergy between original technologies and dedicated design is the first key enabling capacity of the team.</p> <p>Second one factor – successful cooperation with committed national and international partners allow for successful addressing challenges being well beyond currently available resources.</p> <p>Resent research is oriented towards resolving the dilemma between sensitivity and time-to-provide reliable result at detecting various viruses, incl. COVID-19, with functionalized self-sensing arrays of microcantilevers (normally used in combined AFM). Said arrays will be intrinsically drift-free and cantilevers will provide real time response with very high reliability for express identification of infected persons and mapping the spread of the infection. Thus, no oversized restrictions will be needed to handle effectively any future outbreaks even if infected persons, mammals or birds have no symptoms.</p> <p>Further details that proof the concept are available at requesting.</p> <p>KEY WORDS: self-sensing cantilevers, cantilever array functionalization, drift-free, real time detection and mapping, effective handling</p>
3. TYPE OF THE RESEARCH	
Provide information on the research carried on or planned in regard with COVID-19 and other viruses	<p>Based on results obtained with currently developed cantilever sensors for air quality monitoring (AQM), cantilever arrays will be scaled down to demonstrate the concept.</p> <p>Complementary expertise in cantilevers functionalization and testing of virus binding, is sought.</p>

4. WEBSITE

Provide the internet address:

www.amg-t.com

5. BACKGROUND, PUBLICATIONS AND OPEN DATA REPOSITORY

leading research team AND Scientific publications of the research group on the topics of related to coronaviruses research results;

link to open data repository

Project team:

Vladimir Stavrov: team leader, overall management, MEMS technologies

Emil Tomerov: MEMS design and prototyping

Galina Stavreva: MEMS testing, characterization and administrative management

Mariya Villani: Front-end processing

Stefan Kocev: Electronic Eng.

Selected Papers related to self-sensing cantilevers:

- M. Dukic, M. Winhold, J. Adams, C. Schwalb, V. Stavrov, M. Huth, and G. Fantner, Direct write nanoscale printing of nanogranular tunnelling strain sensors for sub-micrometer cantilevers for the next generation high-speed atomic force microscopy, *Nature Communications* 7, 12487 (2016)

- V. Stavrov, G. Stavreva, A. Shulev, Contact position microsensors with travel ranges between 50µm and 2mm, Proc. of 30th Eurosensors Conference, EUROSENSORS 2016, Budapest, September 5-7, 2016 (8153)

- V. Stavrov, G. Stavreva, A. Shulev, Piezoresistive position micro-sensors with ppm accuracy, Proc. of 30th Eurosensors Conference, EURO SENSORS 2016, Budapest, September 5-7, 2016 (8171)

- C. H. Schwalb, M. Winhold, M. Dukic, J. Sattelkov, M. Leitner, T. Strunz, F. Hofbauer, V. Stavrov, A.-D. Müller, G. E. Fantner and H. Plank, The AFSEM™ - Correlated in-situ AFM & SEM & EDX analysis of nanostructured materials, ISPM CONFERENCE, June 12th-15th 2016, Grindelwald, Switzerland

- N. Hosseini, A. P. Nievergelt, J. D. Adams, V. T. Stavrov, G. E. Fantner, A monolithic MEMS position sensor for closed-loop high-speed atomic force microscopy, *Nanotechnology* 27 (2016) 135705 (9pp)

- V. Stavrov, G. Stavreva, E. Tomerov, H. Dikov and P. Vitanov, Self-sensing Cantilevers with Nano-laminated Dielectric-Metal-Dielectric Resistors, ISSE 2017, 40th International Spring Seminar on Electronics Technology (I06), May 10-14, 2017, Sofia, Bulgaria

6. COORDINATOR	
	We can be a coordinator of cantilever-oriented project
7. POSSIBLE PARTNERS	
Indicate the partner organizations	<p><i>Full name of the partner</i></p> <p>Hahn-Schickard Gesellschaft für angewandte Forschung e. V., Wilhelm-Schickard-Str. 10, 78052 Villingen-Schwenningen, Germany</p> <p><i>Contact person;</i> Dr. Sophie Billat, Phone: +49 7721 943-242</p> <p><i>e-mail:</i> Sophie.billat@hahn-schickard.de</p> <p>Expertise in Industrialization and validation of the innovation:</p>
	<p><i>Full name of the partner</i></p> <p>INL- International Iberian Nanotechnology Laboratory, Avenida Mestre José Veiga s/n; 4715-330 Braga, Portugal,</p> <p>Contact person: Dr. Mariam Gonzalez Debs, Phone: +351 253 140 112,</p> <p>e-mail: mariam.debs@inl.int</p> <p>Expertise in Functionalization of cantilever arrays:</p>
	<p><i>Full name of the partner</i></p> <p>Institut für Sensor- und Aktuatorssysteme, TU Wien, Gusshausstrasse 27-29/ 2. Stock, E366, 1040 Wien, Austria,</p> <p>Contact Person: Prof. Dr. Ulrich Schmid; Phone: +43 (1) 58801 36689 ,</p> <p>e-mail: ulrich.e366.schmid@tuwien.ac.at</p> <p>Complementary/backup and processing of silicon cantilever arrays</p>

8. IMPLEMENTED AND RUNNING PROJECTS

Projects related to virology, vaccines, infection diseases ...

No expertise directly in virology available – our expertise and know-how are focused on detecting nano-scale objects, related forces, etc. We detect the fact of virus immobilization, not the products related to its interaction with receptors/antibodies

Following micro-projects in Air Quality Monitoring were successfully completed:

www.ket4sme.eu/micro-grants/winners, www.tetramax.eu/the-project/