|  |
| --- |
|  GENERAL INFORMATION |
| 1. **NAME OF THE CENTER AND LOCATION**
 |
|  | GIS - TRANSFER CENTER FOUNDATION |
| Bulgaria, 1113 Sofia, Akad. Georgi Bonchev Str., block 4 |
| 1. **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: | Our team has an expertise in the experimental study of electromagnetic field-matter interactions; development of sensors for various applications, including investigation of biological objects; control of special features and irregularities on solid surfaces; control of specific chemical reactions.**KEY WORDS: sensor, viruses, electromagnetic field-matter interaction** |
| 1. **TYPE OF THE RESEARCH**
 |
| Provide information on the research carried on or planned in regard with COVID-19 and other viruses  | We have an idea how to build a sensor for detection of COVID-19 in three cases – on solid surfaces, in the air, and in fluids taken from the human body. We have numerous experimental results in this regard that support this idea.A possible approach is the following: finding a surface (liquid or solid) that is sensitive to the appearance of the virus, i.e. when the virus comes into contact with the surface a reaction will occur, even if this reaction is imperceptible without specialized equipment. Our experience has shown that the EMEE signal is very sensitive to weak or practically imperceptible reactions occurring at the interface. Therefore, we believe that it is completely feasible to register the presence of the controlled component (in this case - COVID-19). A possible modified approach is to add to the studied sample (e.g. liquid from the human body) a reagent, which can catalyse a reaction, sensitive to the virus. In each case, it is important that the reaction can occur only in the presence of a particular virus (in this case - COVID-19). This will be guaranteed by setting up the right conditions and choosing the appropriate reagent. The first goal will be the detection of animal viruses of the coronavirus type. Afterwards, work on controlling the presence of COVID-19 can begin. |
| 1. **WEBSITE**
 |
| Provide the internet address: | <http://counterfog.eu/2018/06/01/counterfog-awarded-by-the-bulgarian-industrial-association/>  |
| 1. **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**  | Our team has worked on development of sensors for fluids, including contaminations in the atmosphere. During our research, it became apparent that gas, liquid or vapour sensors, based on the electromagnetic echo effect, present a very attractive possibility for practical applications. The concept of the set-up is the same for all types of fluids: the surface of the irradiated solid should be in contact with the fluid under investigation. Moreover, between them there will be a boundary surface – an interface (the boundary between the solid and the fluid). Any variations in the fluid characteristics will induce a corresponding change in the boundary surface - especially in the area irradiated by the incident radiation. The measured signal is generated in this exact area. As a result, a change in the EMEE signal, corresponding to changes in the fluid, can be registered. It has been proven that even small changes in the controlled fluid can induce measurable variations in the EMEE signal, since the electron properties of the surface are substantially influenced by the solid-fluid interface. Therefore, changes in fluid properties can be detected, provided that all other conditions remain constant.Our team has publications on development of sensors for investigation of fluids and solid surfaces, which is related to the possibility to create a sensor for detection of COVID-19.- Pérez Díaz J. L, Kuneva K. M., Application of Surface Photo-Charge Effect for Control of Fluids, in *Advances in Biosensors: Reviews*, Editor: Sergey Y., Yurish, Vol. 1, p. 121-137, International frequency sensor association publishing, Barcelona, 2017, ISBN: 978-84-697-3467-4, e-ISBN: 978-84-697-3468 [link](https://www.researchgate.net/profile/Sergey_Yurish/publication/326926172_Advances_in_Biosensors_Reviews_Vol_1_Book_Series/links/5b6cb85d299bf14c6d97d64b/Advances-in-Biosensors-Reviews-Vol-1-Book-Series.pdf?_sg%5B0%5D=BzAIV-YUCtUIKihj3W0kVjKl4hgNV5pX82b1jQThPZCP4G-ybwTk9rDAOsjlFbWF40AGUTCLkQFMlg1LCjR0kg.s64Xc7q_C1LV7tKpt_jBxLsyd3itS76VDta7ffmggfoxKSjtjFQObdJBd6gtVEuLqOd7FvwTRGGhXu6q8nu-wg&_sg%5B1%5D=ynBWYXYqvF2vBKKl9rQQDeFXpccKF7VvhanAy_rsj8l1T9OtrFU0eb_vSGAi5uNr8t0mxKUSU6eS4AI5SUut-LW3JWLIzUCbYl8fvDexX3Hi.s64Xc7q_C1LV7tKpt_jBxLsyd3itS76VDta7ffmggfoxKSjtjFQObdJBd6gtVEuLqOd7FvwTRGGhXu6q8nu-wg&_iepl=)- Ivanov O., Karatodorov S., Pérez-Díaz J. L., Novel Electromagnetic Sensor for Contaminations in Fog Based on the Laser-induced Charge Effect, *2017 IEEE SENSORS Proceedings*, p. 1509-1511, 30.10-01.11.2017, Glasgow, Scotland, United Kingdom (2017) ISBN: 978-1-5386-4056-2, Part Number: CFP17SEN-ART [link](https://www.researchgate.net/publication/322219237_Novel_electromagnetic_sensor_for_contaminations_in_fog_based_on_the_laser-induced_charge_effect)- Ognyan Ivanov, José L. Pérez-Díaz, Matthew Serkedzhiev, Fog Influenced signal generation by Surface photo-charge effect (SPCE), *Comptes rendus de l'Académie bulgare des Sciences*, Issue 1, 71, pp. 22 - 28 (2018) ISSN 1310–1331 (Print), ISSN 2367–5535 (Online)), IF: 0.251 (2016) [link](https://www.researchgate.net/publication/323252823_Fog_influenced_signal_generation_by_surface_photo-charge_effect_SPCE)- Todorov P., Ivanov O., Pashev K., Ralev Y., Pérez-Díaz J. L., Automated 2D Laser Scanning Systems for Investigation of Solid Surfaces, Machines. Technologies. Materials, Issue 7, 2019, ISSN PRINT 1313-0226, ISSN WEB 1314-507X, 306-309 [link](https://stumejournals.com/journals/mtm/2019/7/306.full.pdf)Our team participates in a European project “Device for large scale fog decontamination” with acronym COUNTERFOG in the field of security, for counteraction in cases of dangerous contaminations resulting from terrorist attacks, industrial accidents and natural disasters.<http://counterfog.eu/> A report on COUNTERFOG was filmed by a team of Channel 1 of the Bulgarian National Television: <https://www.bnt.bg/bg/a/svmestna-razrabotka-na-sistemi-za-zashchita-pri-bedstviya-i-ataki> Within the campaign for dissemination of the results of the COUNTERFOG project, in 2019 we prepared the shooting of a 30-minute film on the BNT – 2 channel about our activity: <https://www.bnt.bg/bg/a/studenti-i-prepodavateli-razrabotikha-senzori-za-sigurnost-na-obshchestveni-mesta>  |
| 1. **COORDINATOR**
 |
|  | Assoc. Prof. Dr. Ognyan Ivanov, PhD |
| GIS - Transfer Center Foundation |
| 1. **POSSIBLE PARTNERS**
 |
| Indicate the partner organizations  | *Full name of the partner:*Departamento de Teoria de la Seftal y Comunicaciones, Universidad de Alcala, EPS, Campus externo N-II km 33,600, 28805 Alcala de Henares, Spain |
| *Contact person:*Prof. Jose L. Perez-Diaz, PhD*E-mail:* jl.perezd@uah.es |
|  | *Full name of the partner:*International Clean Water Institute, 13873 Park Center Road, Herndon, VA 20171, USA |
|  | *Contact person:* Prof. Dr. Ashok Vaseashta, PhD*E-mail:* prof.vaseashta@nanoknowledge.info  |
| 1. **IMPLEMENTED AND RUNNING PROJECTS**
 |
| Projects related to virology, vaccines, infection diseases … | DEVICE FOR LARGE SCALE FOG DECONTAMINATIONAcronym: COUNTERFOGGrant agreement ID: 312804Funded under: FP7-SECURITY<https://cordis.europa.eu/project/id/312804> |