

GIDPROvis – Annual Press Release 2021

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Gas Ion Distillation and Sequential Ion Processing Technologies for Identification and Visualization of Chemicals in Airborne Vapours - the GIDPROvis project – kicked off in October 2020. A consortium led by the Finnish Institute for Verification of the Chemical Weapons Convention (VERIFIN) of the Chemistry Department of the University of Helsinki was awarded a 3.9 M€ grant the EU's Horizon 2020 Future Emerging Technologies (FET Open) call. FET Open supports the early-stages of the science and technology research and innovation around new ideas towards radically new future technologies.

The GIDPROvis is based on breakthrough technologies. Radically new chemical analyzers based on Gas Ion Distillation (GID) and Sequential Ion Processing (SIPRO) separate mixtures in ambient atmospheres and identify components. After the GID-SIPRO stage, chemical information is transmitted in the DataHub to provide live visualization (vis), so called molecular auras, of volatile chemicals in our surroundings. This new technology will provide humans access to a molecular world previously unseen and will also investigate human reactions to the massive access to chemical information.

The first year of the project was filled with successes and problems to overcome. The Covid-19 pandemic restricted travel and personnel exchange activities, and virtual meetings became the new normal. Despite these challenges, the research got off to a promising start when research teams and companies from Finland, Germany, Greece, and Spain engaged in science and discovery around the GIDPROvis concept. During the first year, the main accomplishments in the University of Helsinki involved computational modelling of the chemistry of ion molecule reactions at ambient pressure, which is the basis for gas ion distillation (GID), as well as modelling of the technical aspects of possible embodiments of GID technology. Additionally, models for the chemical separation of simple mixtures using selectivity of ionization reactions has been demonstrated successfully through *in-silico* modelling and is in-preparation for journal publication. In Leibniz Universität Hannover (Germany), instrument design for the sequential ion processing (SIPRO) component of GIDPROvis moved forward with the development of a tandem ion mobility spectrometer with a reactive stage using a design with inexpensive circuit boards. Initial steps to combine SIPRO with a mass spectrometer occurred collaboratively with teams from Karsa Oy (Finland), Airsense Analytics (Germany), T4i Engineering (Greece), National Technical University of Athens (Greece), and ATOS (Spain). Two scientific articles have been published based on these findings.

In addition to the technology development, the human dimension of the augmented reality is addressed in the GIDPROvis project. During the first year, multitude of interviews including people with different backgrounds took place in order to understand emotional responses to chemical information. These studies will guide the

development of the human-machine interface, where visualization of the chemical information will take place through the DataHub which will represent to users the composition of ambient air, as provided from the GID-SIPRO instruments.

Towards the end of the 1st year, the global pandemic slowed down allowing the consortium to meet face to face in the project's first Annual Meeting on Science in Hannover, Germany. This meeting was a successful gathering of scientists, students, and the Scientific Advisory Board (participating virtually), and paved the path for a second year of success in the project. As the project enters a second (of three) years support with EU funding, successfully computational modelling will transition fully to functional embodiments of technologies that impact the outcome of the project. These technologies are envisioned to have benefits in multiple sectors of industry and society when brought to engineering maturity in years to come.

More information about the project, as well as access to the publications, can be found from www.gidprovis.eu.



GIDPROvis consortium in Hannover, Germany