



EUROCHAMP-2020

Professor Hartmut Herrmann, Leibniz Institute for Tropospheric Research (TROPOS)

Professor Hartmut Herrmann at Leibniz-Institut für Troposphärenforschung has used European funding to initiate promising interactions with industry. SMEs in particular have used his consortium's atmospheric simulation chambers to validate innovative new instrumentation.

Institution: [Leibniz-Institut für Troposphärenforschung](#)

Research project: [EUROCHAMP-2020](#)

Funding: [Horizon 2020 Infrastructure grant](#)

Professor Hartmut Herrmann is a member of an integrated infrastructure project within the Horizon 2020 (H2020) programme, creating and supporting atmospheric simulation chambers. The Eurochamp-2020 project is co-ordinated by Prof. Jean-Francois Doussin at LISA, Creteil, Paris, France. Prof. Herrmann explains that his project works at the interface of atmospheric chemistry and environmental research and the consortium provides the most advanced EU chambers for external users throughout Europe. He says: **"The idea is that you can use these chambers to better understand atmospheric changes, air quality and the impact on health and environment."**

"We are close to finishing the second year. The original proposal was submitted in March 2016, and we started the project in 2017. The funding itself was for research infrastructure. In our case that was specifically for the structures themselves. On this project, there are 14 groups that form a consortium. The structures are essentially reactors – for instance, ours is a Teflon structure, roughly 20 cubic meters inside, and we run chemical reactions in those chambers that measure how they occur in the atmosphere so that we can characterize them.

"There is a lot of chemistry involved and the consortium includes physical chemists, like me, and a very prominent group of European atmospheric chemists. In the simulation chamber, you can study more complex systems. For instance, you can run a reaction in a mixture of gases and particles, which is a good proxy for London air, and you can simulate how, under those conditions, things like particle or ozone formation will occur and you can characterize this in the chamber."

International and industrial partners

The project is led by its French coordinator Prof. Jean-Francois Doussin and includes other members from France, Germany, Ireland, Finland, Greece, Switzerland, Italy, Spain, Romania and the UK – represented by the national centre for atmospheric science via the University of Leeds. Each chamber has its own characteristics – the University of Leeds reactor can be adjusted for higher and lower temperatures and another group at the University of York is running the most complex atmospheric mechanisms to simulate atmospheric chemistry in the real world. Hartmut says: **"On one hand the UK groups are important for the basics and on the other hand they are important for the applications to real world problems – if you run such a model you must first test it at a simulation centre, so the UK brings a lot of important skills. It is vitally important to have the UK groups participate."**



Scientists at the LEAK cloud chamber, Leibniz Institute for Tropospheric Research

Inside the LEAK cloud chamber



Interaction with industry is an equally important part of the project – not creating spin-outs but working with companies who use the chambers to get their new instrumentation characterized and there are around 20 successful collaborations all over Europe already. Hartmut argues that this is particularly beneficial for small and medium enterprises (SMEs), many of which are advancing innovative measurement technology and consultancy companies for air pollution cases. Hartmut says: “We have a programme called transnational access, where you can become a certified user of the chambers. If you are successful, you can use the chamber and be supported under the H2020 programme. I think it’s important to note as each of the chambers is a multi-million pound installation and typically it would be hard for many companies to gain access.”

Positive impacts for the environment and human health

Wood burning is an issue in Europe which, over the winter, degrades air quality significantly and which is a current focus for Hartmut’s chambers. He explains: “For air quality, the burning of wood is a huge step back. For instance, in Germany wood burning over the winter period produces more particulates in the air over a year than traffic does. This is something we are studying at the moment, particularly in urban areas as this problem is not unique to Germany but is also occurring in places like Paris as well.

“Our activity is very closely watched by environmental agencies. I am aware that there is regulation in the pipeline because at some point, if the air quality in winter gets worse, you have to do something. Of course, the wood burning is just one example. Other issues are, as you would expect, exhausts from cars. People take in the fumes from cars which can have consequences for human health. The atmosphere is essentially a chemical reactor: in some cases particulates can be degraded but can also be functionalised and become worse for you. With a chamber you can investigate the aging, the destruction or the functionalisation of a compound when exposed to the atmosphere.”

Publications and prizes

With a consortium of 14 research groups there have been a significant number of important papers published throughout the project. Hartmut says: “Globally speaking this consortium is representing the best and most advanced chambers in the world. There have been some chambers in the US but in this specialised infrastructure, Europe is the elite, far ahead and has the best community.

“Regarding the training of chemists, through this *transnational access* researchers are trained from one chamber to another and learnt about techniques that they don’t have at home. We normally have about 20–30 PhD students working at these chambers per country and we organise course work as well to help train them.

How important has EU funding been towards the success of this project?

Hartmut concludes: “It is essential. Without the EU funding we could not have done this. We probably could have built our chambers but we would not have had the international or topical collaboration and we would not be able to focus on issues such as wood burning etc. It is very important to bring the installations together.

“We could even say it is going further now as this partnership is part of the ESFRIE roadmap and that means it will further develop into a steadily funded effort and it means the installations will be handed back to the member countries in the long run. To receive this funding you need to have received EC funding three to four times – we are talking about continued funding over the next 15 years here, and what we need to determine is what this would look like should the UK not be eligible to be part of that programme going forward, which we certainly do not want.”