BYPRODUCTS OF ACADEMIC FREEDOM

Physicist Mikko Sipilä innovates industrial applications of atmospheric sciences. However, he emphasises the importance of basic academic research

Mikko Sipilä works as an associate professor at the University of Helsinki. He specialises in experimental aerosol physics and, alongside his scientific efforts, he has patented two commercial inventions so far – a particle counter and a threat detector. Both of the instruments are byproducts of basic atmospheric research carried out at the Finnish Centre of Excellence in Atmospheric Sciences.

Two spin-off firms have sprung up around the apparatus. Sipilä is the co-founder of Airmodus Ltd, which develops and manufactures particle counters sold around the world and has employed a few physicists and engineers since its establishment in 2010. Currently, Sipilä is preparing the market breakthrough of an extra high sensitivity explosive trace detector.

The detector, developed with Sipilä's research group, is designed for public security. The instrument detects explosives and hazardous chemicals suspended in the air, and could thus be utilised to improve, for example, aviation security or to protect buildings and infrastructures from acts of terrorism. The apparatus offers pinpoint accuracy by detecting one molecule of target substance in one million billion molecules of air.

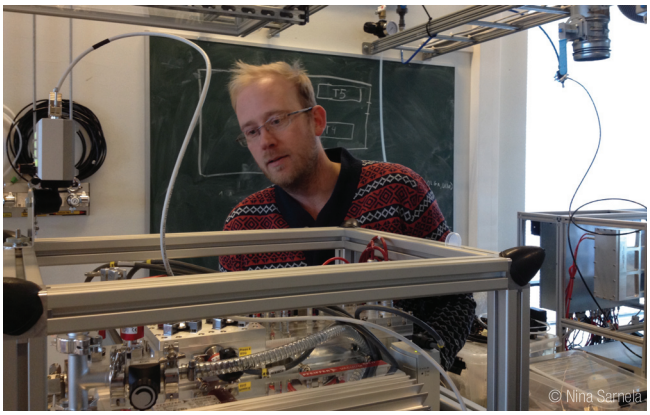
Sipilä is very modest about his accomplishments. "We are not moneymakers," he says, smiling. "We are of course happy with the success of our instruments, but still, our aim is not to innovate industrial applications. They are born more or less by accident as some kind of additional spice to severe academic work."

Having found several private investors to fund the innovation both in Europe and the US, there remain, however, some hindrances before Sipilä, not least due to the bureaucratic practices of Finnish universities. Sipilä remains optimistic: "I am sure the consensus can be found. The negotiations are ongoing."

How did Sipilä and his colleagues form the idea of an instrument like the threat detector?

Examining aerosols

Initially, the team was merely attempting to develop their everyday research instruments. During his academic career Sipilä has concentrated on secondary organic aerosols, which are natural airborne particles. For example, boreal forests emit chemical substances that, after a few complex microphysical processes, turn to so-called 'extremely low volatile compounds'. These compounds can, under certain conditions, become secondary organic aerosols and then grow to become 'the seed of a cloud'. Thus, secondary aerosols might have significant climatic effects.



Mikko Sipilä in his laboratory

Scientists around the world have tried to reveal the primary driver of the formation process of the secondary aerosols. Despite the advancements many open questions remain.

The origin of the secondary aerosols has been intensively studied also by Sipilä and his group. They have together constructed several measurement instruments to detect the tiniest molecule groups in the air and other gases. In the course of time, they realised that someone outside the campus could benefit from their ideas.

"I hope the detector will find its markets, and I am happy to promote it. However, I think it is important for every academic researcher to realise the differing aims of academic research and business. Especially the differences in the practices and principles of the two worlds should be respected. This is the only way to achieve a fruitful co-existence of basic research and product development."

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