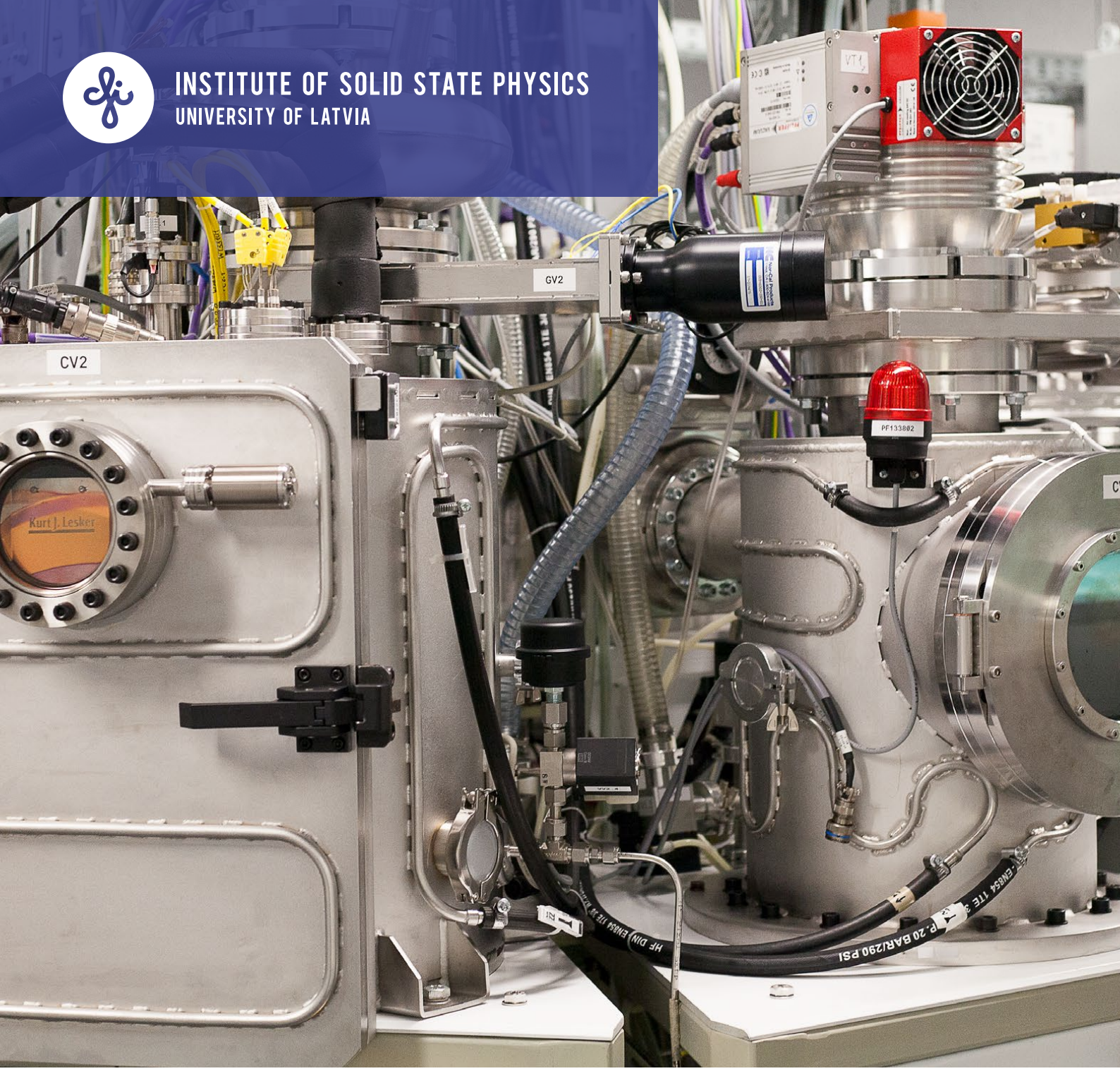
INSTITUTE OF SOLID STATE PHYSICS
UNIVERSITY OF LATVIA



aranet

CASE STUDY: WIRELESS MONITORING IN CLEANROOMS

Differential pressure, temperature, relative humidity

The Institute of Solid-State Physics, University of Latvia (ISSP UL) is an internationally recognised leader in the materials sciences and cross-disciplinary topics in the Baltic States. In 2012 they built their own cleanroom that houses cleaning, surface preparation, electron beam, photolithography, thin film deposition, wet and dry etching tools. And now they are also using the Aranet IoT solution to monitor their cleanroom environment to ensure that pressure differences are maintained, the temperature is stable, and the microclimate is appropriate for both people and equipment.

A cleanroom is a room in which the concentration of airborne particles is controlled and which is constructed and used in a manner to minimize the introduction, generation and retention of particles inside the room. They are designed to maintain extremely low levels of particulates, such as dust, airborne organisms or vaporized particles. This is also controlled via other parameters like temperature, relative humidity, vibration, pressure etc. In the case of ISSP UL cleanroom important relevant parameters are temperature, relative humidity and differential pressure.

THE ENTIRE SYSTEM USED BY THE INSTITUTE CONTAINS:

- Aranet PRO 100 base station
- Several Aranet T/RH sensors
- Several Aranet T-probe sensors
- Few Aranet CO_2 sensors
- Several Aranet Differential Pressure sensors

Within cleanrooms you must maintain a positive pressure relative to the outside environment to keep pollution out. ISSP UL used to have a problem – they could only see the pressure difference on a screen inside the cleanroom. Someone always had to check it manually on a local screen. Now with the Aranet Differential Pressure sensor they can do it remotely. They can react to problems more rapidly – if they see that the differential pressure is decreasing, they know that either the ventilation has stopped or something else has happened.

> **"Last Monday we had an issue where the ventilation controller shut down at 5AM. The temperature started to climb only after 2 hours, but we saw the differential pressure problem immediately so we could react,"** says Valdis Korsaks, a Cleanroom Manager at the institute, who is also in charge of this project.

The team working in the laboratory was also pleased to find another use for the differential pressure sensor – monitoring of fume hoods and other air extraction places. A fume hood (sometimes called a fume cupboard or fume closet) is a type of local ventilation device that is designed to limit exposure to hazardous or toxic fumes, vapours or dust. **It is important to monitor whether this air extraction is working and if it is not, Aranet sends an alarm message informing that the ventilation has stopped.** This really helps to make sure that the people working there are safe and they are not endangering their health.

Aranet Differential Pressure sensor

CO_2 is primarily measured to control for the well-being of people who are working within the cleanroom. The institute bought the CO_2 sensors out of care for their researchers' wellbeing. They knew that **prolonged exposure to high CO_2 levels can be detrimental to cognitive abilities and other health aspects** and typically isolated environments like cleanrooms can have excess CO_2 build-up. They were pleased to find out that that the air exchange is working properly and CO_2 levels do not exceed norms.

Aranet CO_2 sensor

It is also important to monitor the temperature to ensure that their equipment can function properly. Electron microscopy and lithography both are very sensitive to temperature changes and if they get disturbed, it can result in large service costs and valuable research time lost. **Having Aranet sensors for temperature monitoring helps them to react in time to changes and solve them before they result in problems.** For lithography relative humidity is also very important. If there is not enough moisture in the room, the process cannot happen – it is very handy that the Aranet T/RH sensor measures both parameters.

> **"Before Aranet we had control but didn't have monitoring – meaning that we could set the parameters and set points for ventilation. We didn't know what was happening, the lithography got destabilized and we didn't know why, so we started to look for solutions,"** remembers Valdis.
>
> **"Now the situation is greatly improved – before installing Aranet we could assure that our cleanroom had a ±2-degree temperature stability. With the help of Aranet sensors we can ensure that the temperature does not vary by more than ±0.2 degrees.**
> **I would definitely recommend Aranet to other cleanrooms and laboratories because it is a simple, easy to use wireless system with a great price/performance ratio. You can place the sensor anywhere – near any device that you wish to measure, and the alarm functionality helps you avoid very costly problems."**

It just goes to show that you can only improve what you can measure. Aranet delivers these measurements in the easiest to use and simple manner.

AND WHAT WOULD YOU LIKE TO MEASURE?

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