

VTT's miniature hyperspectral camera launched to space in Aalto-1 satellite

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VTT's small and lightweight hyperspectral camera was successfully launched to space in Aalto-1 nanosatellite on 23rd of June 2017. Scalable sensing technology offers opportunities for new SmallSat-based services.

This tunable spectral imager operating in the visible and near-infrared spectra can measure wavelength range of 500-900 nanometres. The camera is half a cubesat unit (0.5U) in size, or 5 cm x 10 cm x 10 cm. This [technology](#)'s key advantage is that the measurement wavelengths are software programmable - the same camera hardware can be easily scaled to different applications, also after the launch.

"So far, [hyperspectral imaging](#) has only been possible with instruments in traditional, large satellites, but VTT's technology now makes it possible to do hyperspectral imaging also from small satellites," says Research Scientist Antti Näsilä. He has been involved in creating the first light-weight hyperspectral imager AaSI for Aalto-1, as well as hyperspectral imagers for the PICASSO and the upcoming Reaktor Hello World nanosatellite missions..

In recent years, the number of launches of small satellites, often referred to as nanosatellites or CubeSats based on their cube-shaped form, have grown significantly, thus enabling much faster technical advances in comparison to traditional [space](#) industry.

One rocket launch can carry dozens of small satellites to space, making

individual [satellite](#) launch cost significantly lower. Because of this cost efficiency, small satellites can form large constellations, and the small sensing instruments they carry can be replaced more often with latest technical solutions.

"VTT's technology also enables SmallSats to measure spectral data, making it possible to detect properties not visible to the naked eye, such as water quality, pollution or vegetation health," explains Anna Rissanen, who is leading the research team.

Constellations can measure local data with much more rapid cycles than the traditional instruments, making it possible to create data-based services for industries not traditionally involved in space, such as agriculture and insurance.

VTT's hyperspectral technology can be customized also for other wavelength ranges and specific needs. "This technology enables us to work with start-ups, aerospace industry and other research institutes in order to enable new application and service development based on [small satellites](#)," Rissanen says.

Provided by VTT Technical Research Centre of Finland

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