

360-degree panoramic view via single-sensor matrix

29 January 2018

VTT Technical Research Centre of Finland has developed a new solution for thermal infrared applications, making it possible to fold a 360-degree panoramic view on a single sensor matrix. The concept guaranteeing optimal image quality is especially suitable for security, surveillance, military, and building diagnostic applications, where the objects to be imaged lie in the horizontal directions from the camera.

In [thermal imaging](#), infrared radiation emitted by objects being imaged is detected and used for showing the temperature variations of the target scene in the form of an image. The fields of application for this technology and its use have been growing steadily, including military systems, building diagnostics, electrical or mechanical inspection, medicine, surveillance, bioeconomy, firefighting, and many others, where there is a recurring need to cover a wide horizontal field of view in the imaging.

The commercial solutions for providing broad panoramic thermal imaging available so far have been based on either having several thermal cameras looking at different directions, or a single rotating camera. The first choice comes with a costly price tag, and the latter fails to provide a fully concurrent panoramic view, because of the delay caused by the turning of the [camera](#).

The key component of VTT's new optics design is a monolithic lens element that folds a panoramic field of view on a single thermal sensor matrix. Therefore, there is no need to use several expensive thermal cameras. In addition, the broad 360-degree panoramic view can be captured on a single shot. The optics solution developed is particularly well suited for situations where a continuous panoramic thermal image close to the horizontal plane is needed.

"This concept enables the development of affordable and powerful products for the

[applications](#) of broad horizontal thermal imaging. The optics design can be modified according to the desired vertical field of [view](#) or, for example, image sensor properties. This ensures the optimal image quality for the specific application," says Kimmo Solehmainen, Key Account Manager at VTT.

Provided by VTT Technical Research Centre of Finland

APA citation: 360-degree panoramic view via single-sensor matrix (2018, January 29) retrieved 22 April 2021 from <https://phys.org/news/2018-01-degree-panoramic-view-single-sensor-matrix.html>

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