

Spectral Imaging of Complex Surface Tomographies (SICSURFIS)

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RADESS Medical imaging helps to see better and deeper than it is possible with bare visual inspection. Imaging methods based on visible and near infrared (vis-NIR) light are non-invasive and are thus under active research. The reconstruction of the structure of optically active media based on refraction and light scattering is mathematically ill-posed and non-linear problem by nature. When spectral imaging is done from closer range, surface topography and also tomography starts to affect the spectral quality and homogeneity of images. Good examples of such surfaces are human skin and tooth.

SICSURFIC project is creating a cost-efficient hardware and software solution with miniaturized spectral sensors and illumination devices for the spectral imaging of surfaces with complex tomography. For these devices, we will further develop novel software tools to analyze and model the data applied to the detection of e.g. skin cancer and caries. The devices will be created by developing novel metal mirror micro electro mechanical systems (mems), which are combined with optimized light sources. The software part uses numerical models and efficient computational methods to analyse data and FPGAs for high performance and energy efficient computing.

Multidisciplinary research consortium consists researchers from Universities of Jyväskylä and Vaasa, VTT Technical research centre of Finland and Helsinki University Central Hospital covering expertise from areas of optics, analogue and digital electronics, computer science, automation, applied mathematics histopathology and dermatology.