Lensless Smart Sensors

Low-power, low-cost visual sensing technology that captures information-rich scene data in a tiny form factor using a revolutionary new approach to optical sensing.

Enhanced Sensing
- Collects information-rich sensing data without risk to personal privacy
- Excellent point tracking abilities; captures motion, object tracking, target depth and scene change

Reduces Cost
- Standard manufacturing processes combined with commodity image sensors
- Enables new form factors and low-cost infrastructure

Ultra-low Power
- Application–specific optics and algorithms extract scene data with low-power computer vision

Tiny Form Factor
- Modules as thin as 1mm
- Enables deployment of sensing capabilities into the smallest of applications
Overview

In order for machines around us to adapt and anticipate our changing needs, they must be able to gather and act upon relevant data from their surroundings quickly and cost-effectively. Most often, this data is obtained through visual sensors, which must be always-on and always-aware for the best user experience.

Rambus has pioneered a new class of visual sensor ideally suited for these needs with our ultra-miniature Lensless Smart Sensors (LSS). LSS offers a novel approach to sensing that reduces the larger size, higher cost and significant power consumption normally associated with traditional sensors through the use of low-cost diffraction gratings combined with uniquely-designed algorithms.

LSS gratings are combined with off-the-shelf visible or thermal image sensors into single package. Light passes through the LSS grating, and creates predictable light patterns on the sensor; this data-rich information is captured and then processed by the algorithms to provide actionable data to the host system.

The net result is a smart sensor with a smaller form factor, better power efficiency, greater precision, and lower cost compared many traditional visual sensors like PIR (passive infrared sensors) or lensed cameras, but without risk to personal privacy.

LSS is available for evaluation through Rambus’s POD 2.0 hardware and software kit. These kits offer system developers a known-good starting point for the evaluation of LSS fitness for their applications, and can include an SDK with algorithm reference libraries.

Features

- Extremely thin, small, solid state
- Highly cost effective
- Extended depth of field (mm to ∞)
- Enhanced sensing (motion, depth, change, etc.)
- Ultra-low power computer vision (energy consumption)

Applications

- Motion detection/occupant classification, counting, and tracking for Smart Buildings and Smart Home
- Eye tracking for Augmented and Virtual Reality Headwear
- Safer adaptive airbag deployment for automobiles
- Gesture sensing for consumer, automotive, and industrial devices