

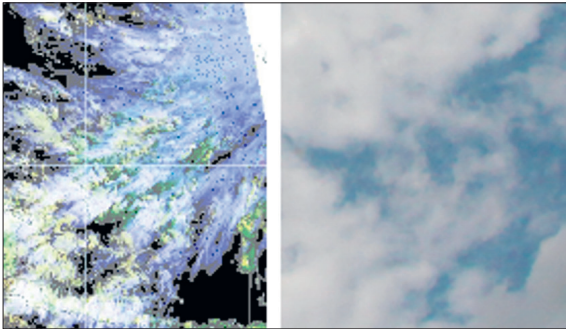


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Subject Area	Mobilkommunikation
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Design and implementation of the whole sky imager

Wide angle high resolution sky imaging system: WAHRIS 3



Examples of cloud images. (a) Satellite image of Southern ASEAN, archived from NEA. (b) Ground-based image

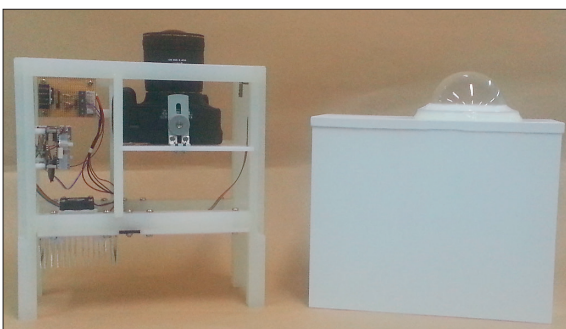
Ground-based images are becoming more important for signal attenuation estimation and for forecasts from cloud analysis of the energy production from photovoltaic solar panels. Cloud monitoring systems such as the whole sky imager (WSI) deliver better images than satellites do for the detection and classification of clouds.

Images have to be taken all day long and the WSI has to deal with Singapore's tropical climate. The focus is on a cheap, compact and rainproof system, which controls the inside temperature to guarantee the full functionality of all electronic components. In addition, instead of a common mechanical sunblocker, a new approach, high dynamic range imaging (HDRI), will in future generate images with more information. Those requirements led to a self-made WSI. Designs and different materials were compared. For HDRI a more powerful single-board computer (SBC) than the Raspberry Pi B has to be evaluated.

A new WSI was developed: the wide angle high resolution sky imaging system (WAHRIS) 3. With common materials, such as plastic, and readily available hardware, such as a spherical test tube as a dome, it was possible to construct an inexpensive (less than 200 SGD without camera and lens), compact (320x300x140 mm) and rainproof housing. High-resolution images will be taken by a Canon EOS 600D with a fisheye lens. For image processing and temperature control, the SBC from ODROID-U3 with a 1,7 GHz Quad-Core processor and 2 GByte RAM is used.



HDRI image. Image merged from three images at different exposure time



WAHRIS 3. (Left) Frame with camera, SBC, Peltier cooler, sensor and MOSFET switch. (Right) Rainproof housing with round-bottom flask as glass dome