Новосибирский государственный университет
*НАСТОЯЩАЯ НАУКА

ОКБ Пятое поколение

High-precision CubeSat sun sensor coupled with infrared Earth horizon detector

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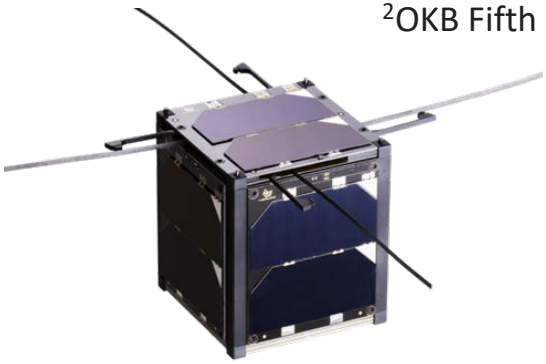

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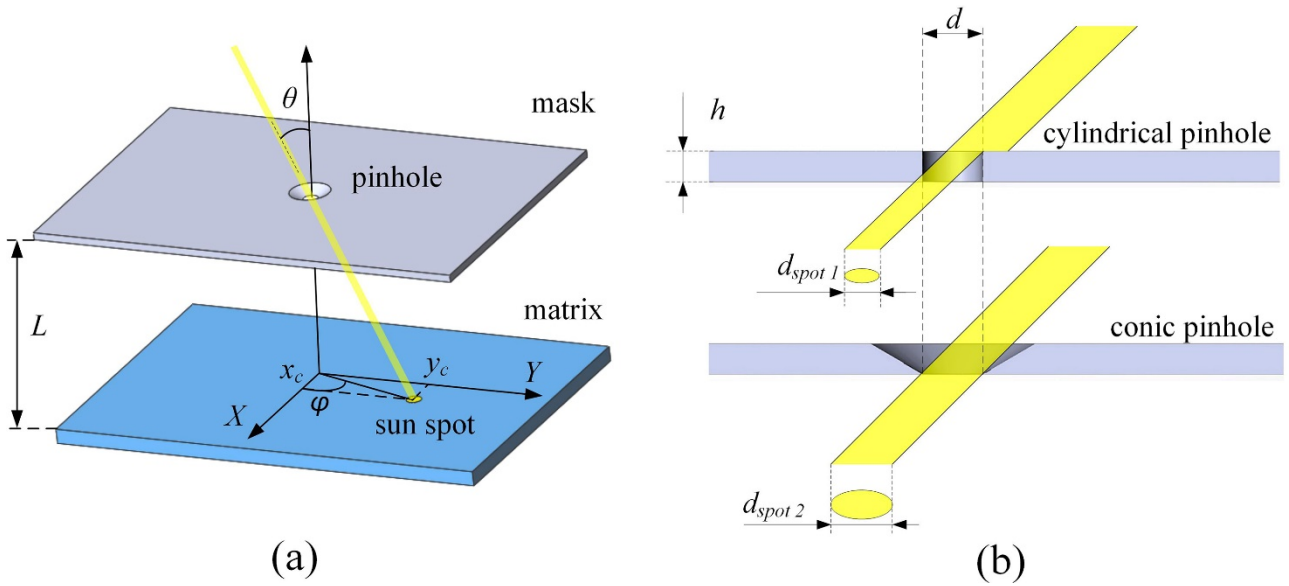
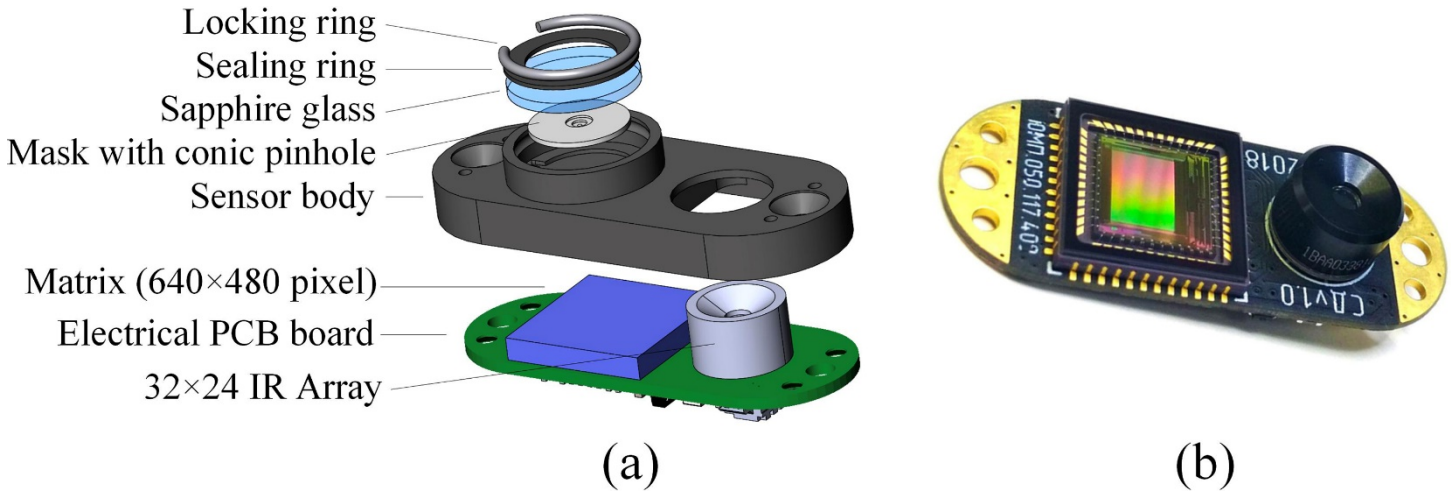
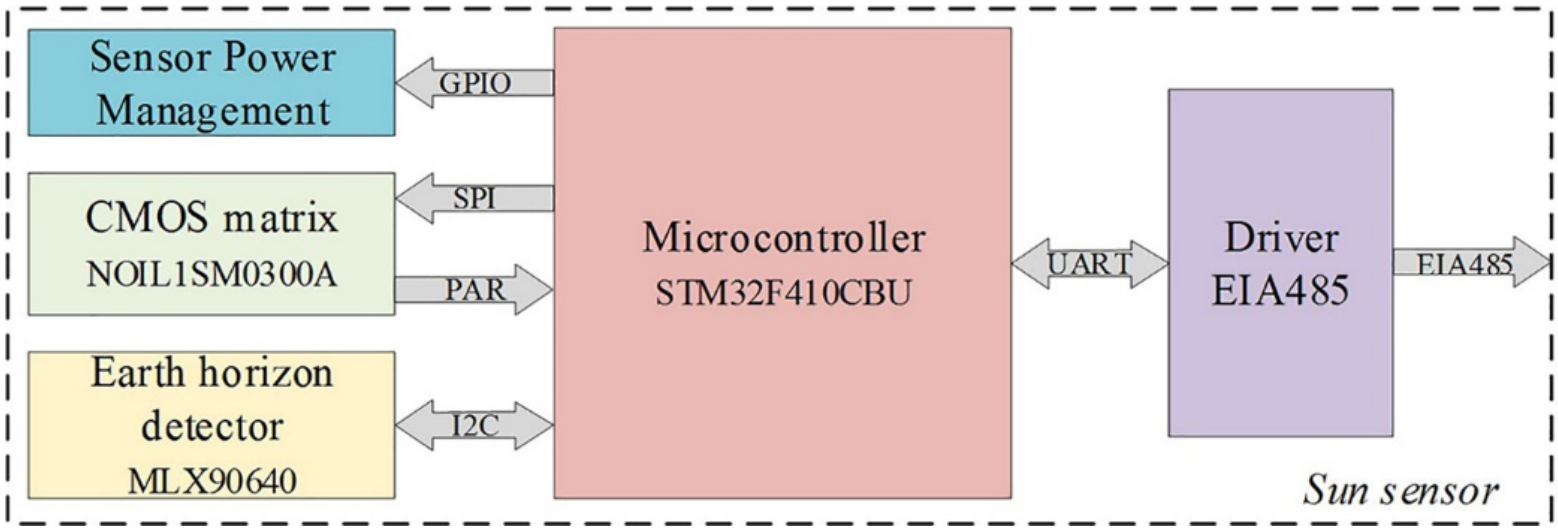


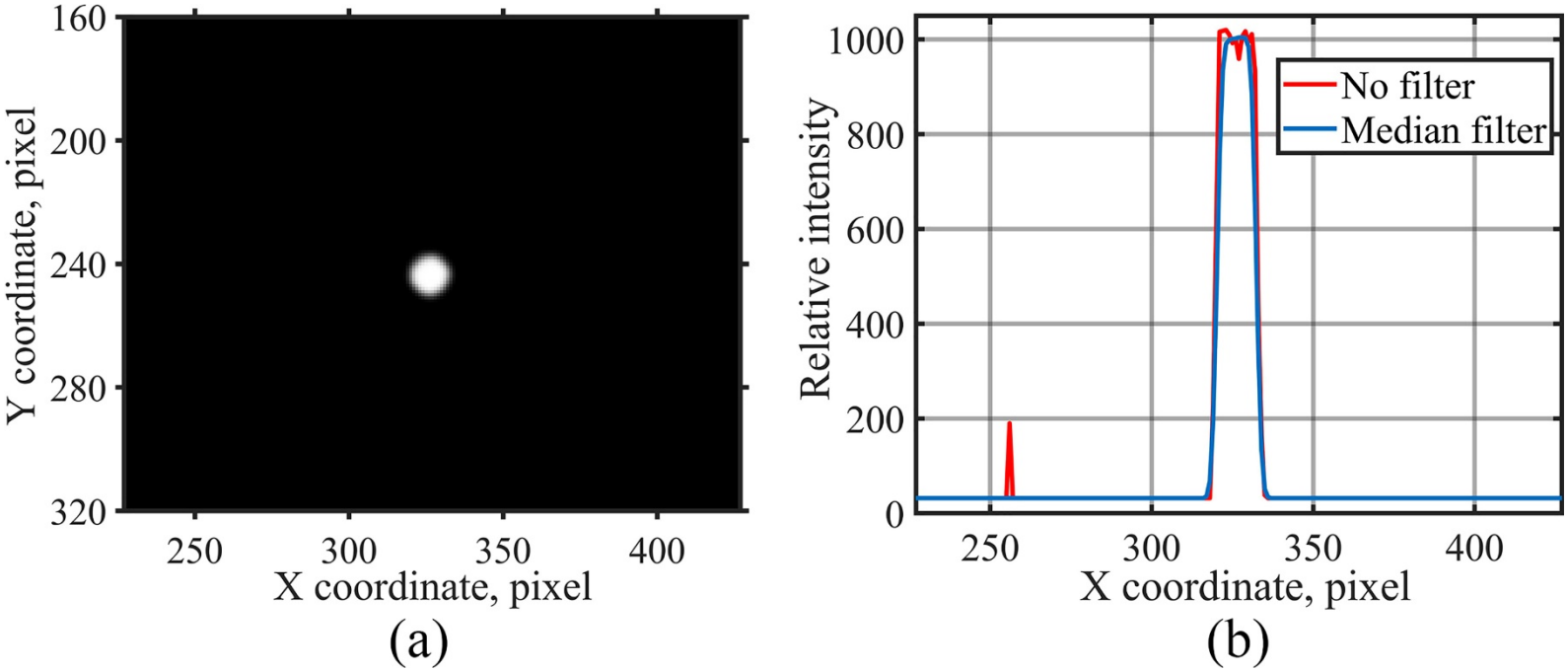
Working principle of the sun sensor. (b) The influence of the shape of the hole in the mask on the formation of a light spot on the matrix.



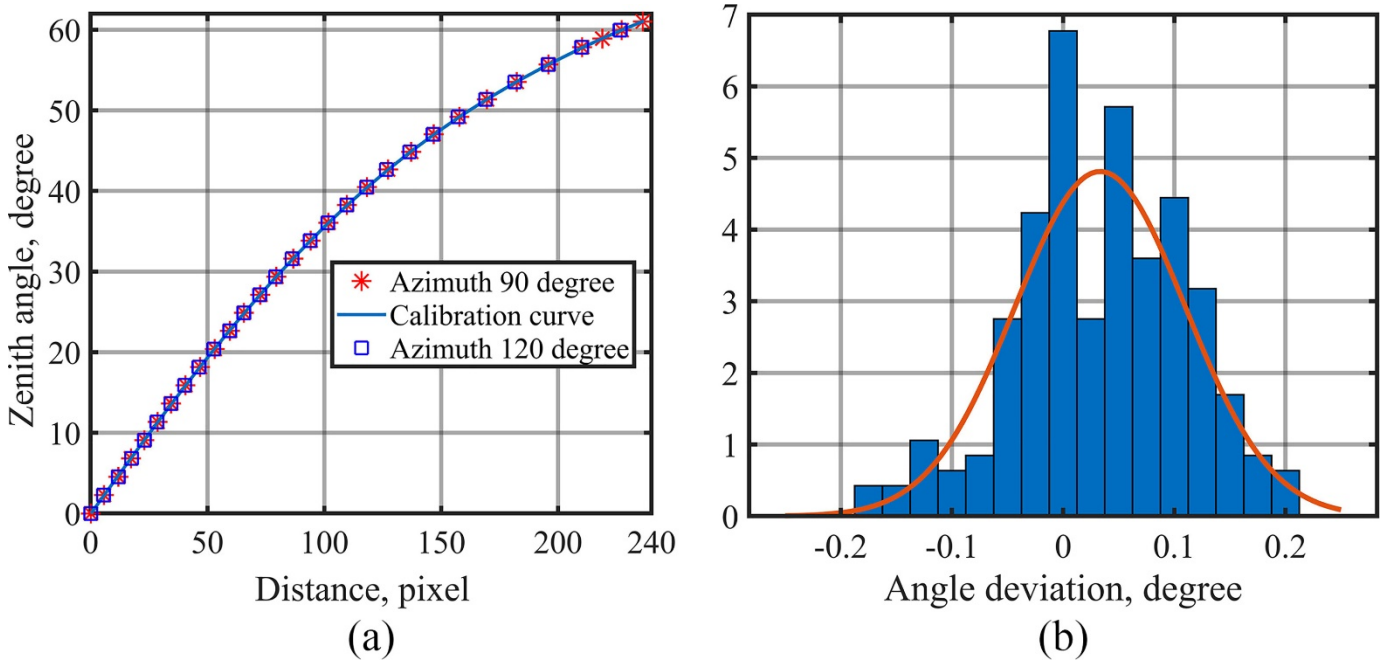
The orientation module design: (a) a 3D model and (b) a photograph of the developed module prototype (without a sensor case).



Functional block diagram of the orientation module.



Results of image filtering to reduce CMOS matrix noise.
(a) The processed image from the matrix near the sunspot.
(b) The relative intensity of pixels depending on the horizontal coordinate X at Y = 244 pixel.



(a) Calibration function (blue curve), which approximates the measured dependence of the zenith angle θ on the distance R from the center of the sunspot to the origin of the coordinate system of the sun sensor (red asterisks and blue squares).
(b) Histogram of the deviations of the measured zenith angles θ from the calibration curve and its approximation by the Gauss function.