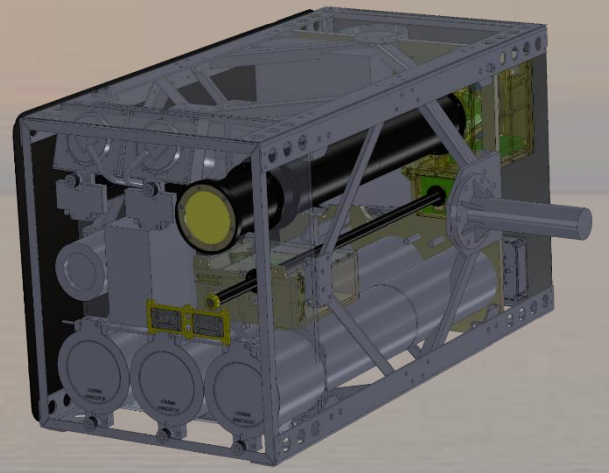
Soft X-ray polarimeter-spectrometer

SolpeX



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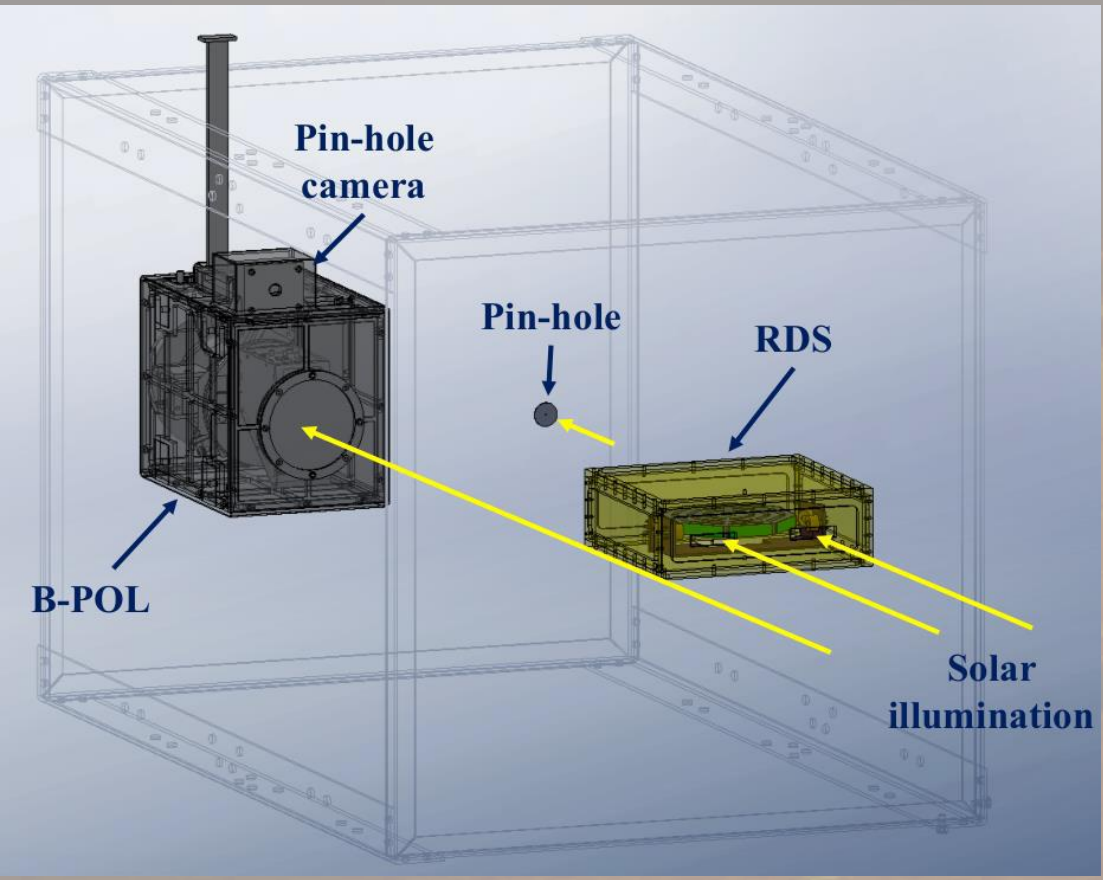
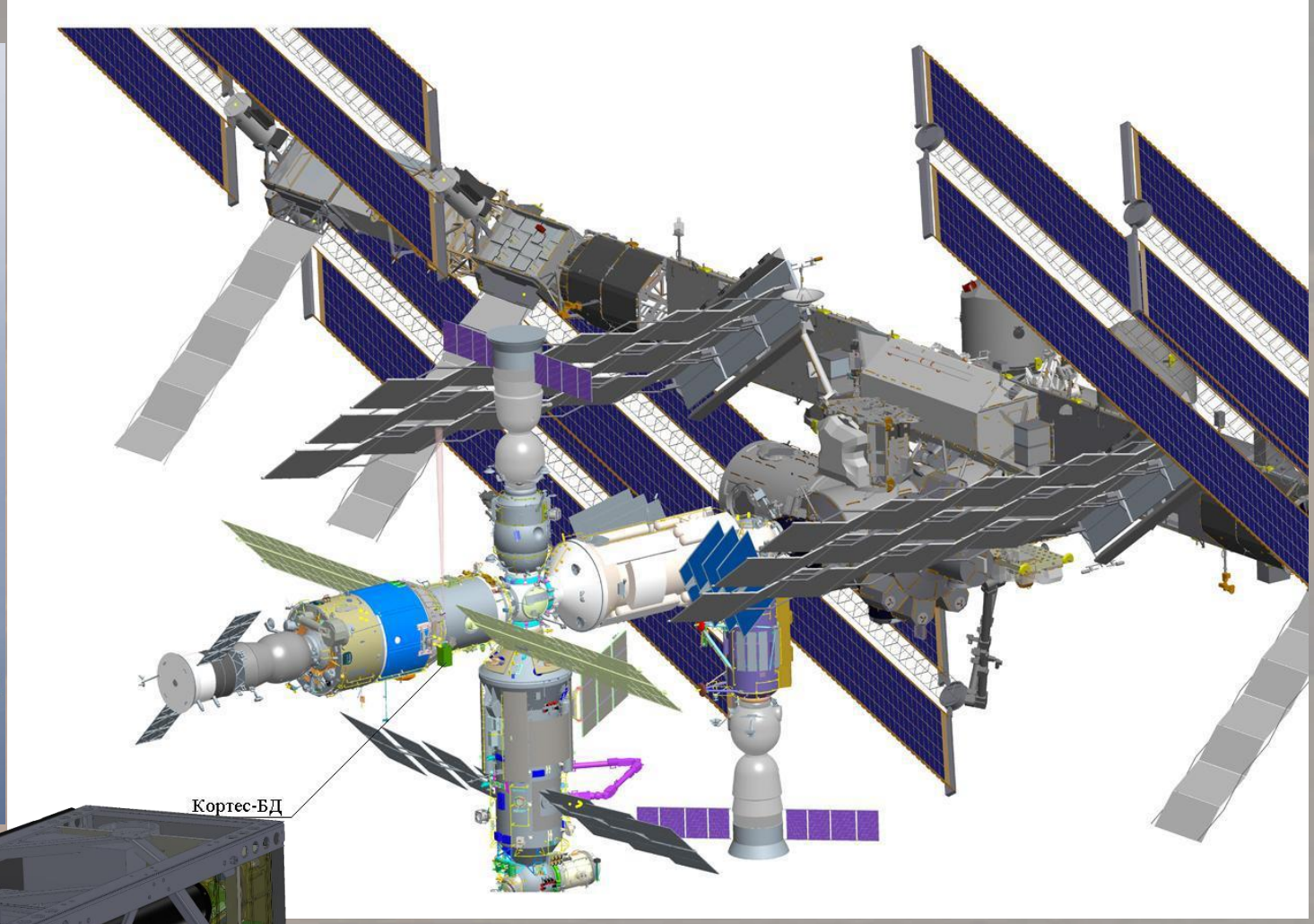
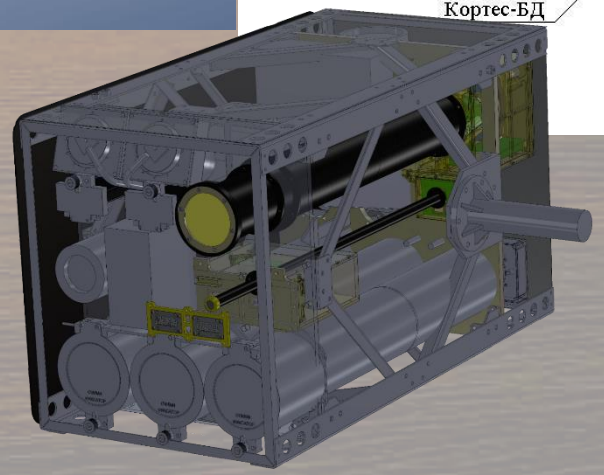




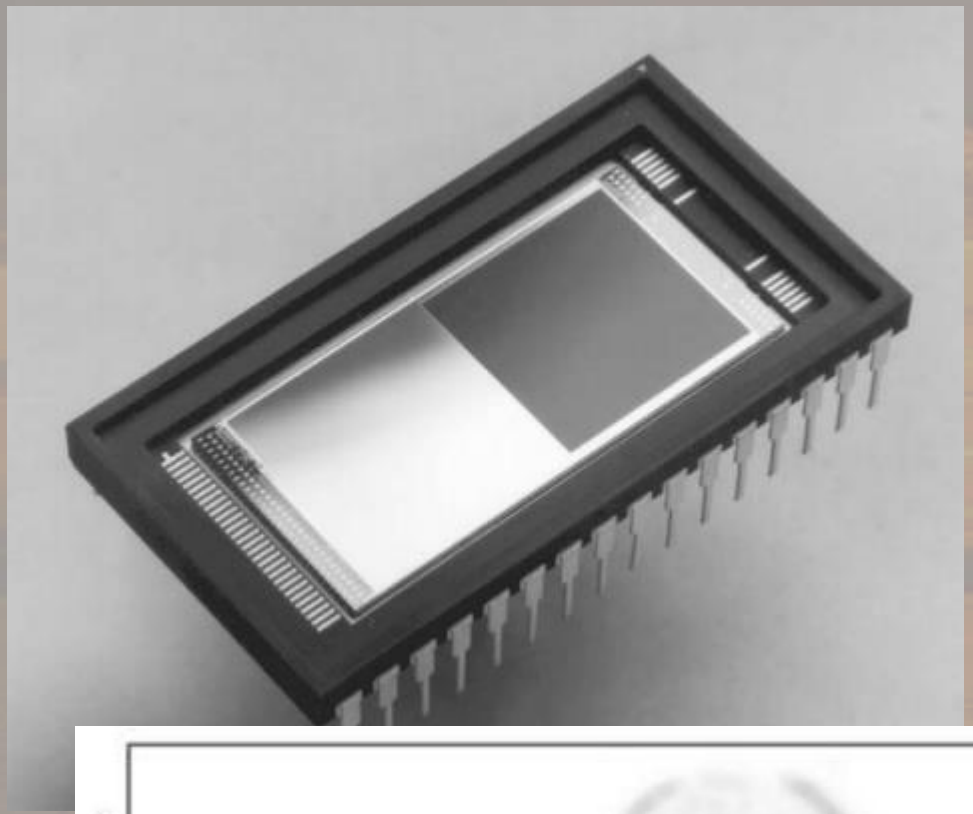
RDS - Rotating Drum Spectrometer

B-POL - Bragg Spectro - Polarimeter

PHI - Pin Hole Imager



Pin Hole Imager



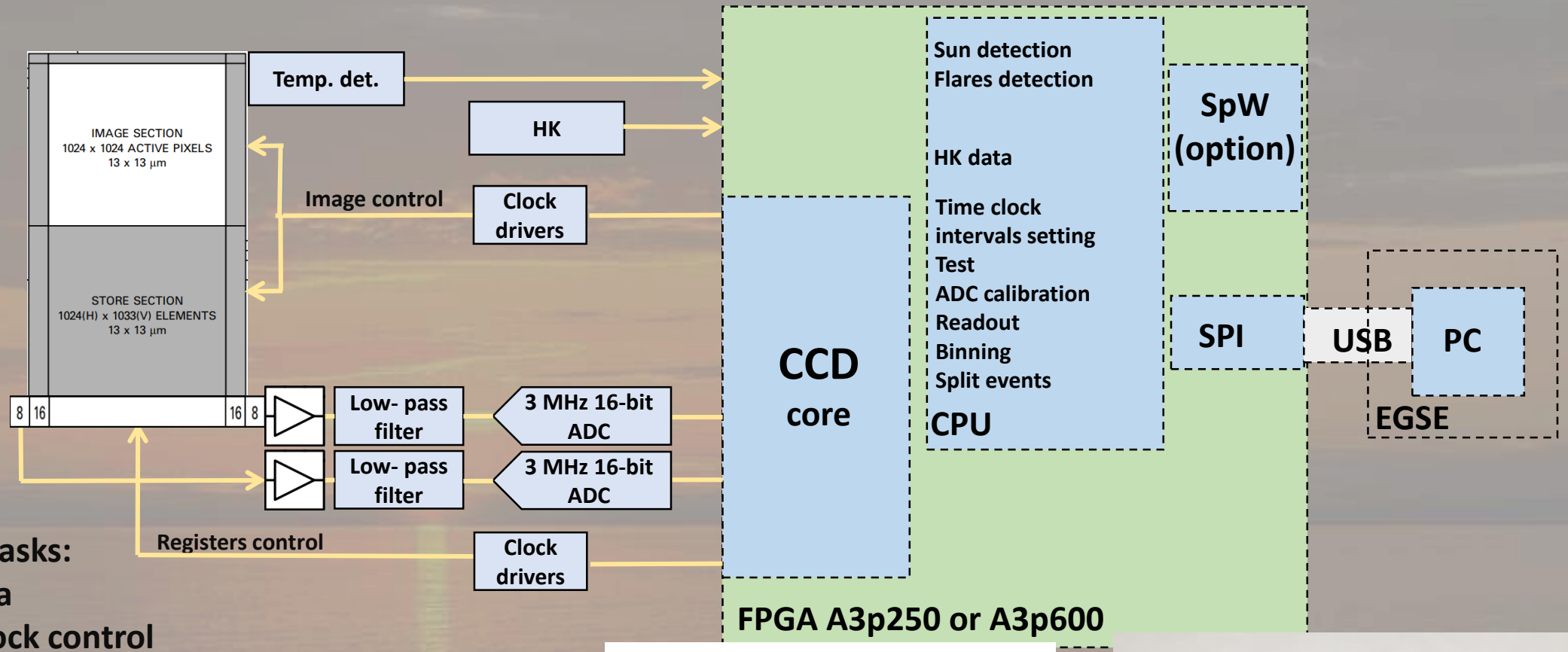
Pin Hole Imager - PHI

- To localize solar flares or other sources in the instrument coordinate
- Able to measure individual lightcurves and moderate spectra for individual separated sources.
- Focal length of the imager is about 60cm.
- The image will be produced on CCD detector.

CCD47–20 BI AIMO CCD Sensor – E2V

- Maximum readout frequency . . . 5MHz (3 frames/s)
- Output responsivity . . . . . 4.5 uV/e (Fe^{55} – 5.9keV - 7.3 mV
- Peak signal . . . . . 100 ke/pixel (~60 photons of 5.9keV)
- Pixel size . . . . . 13 x 13 um

Pin Hole Imager block scheme

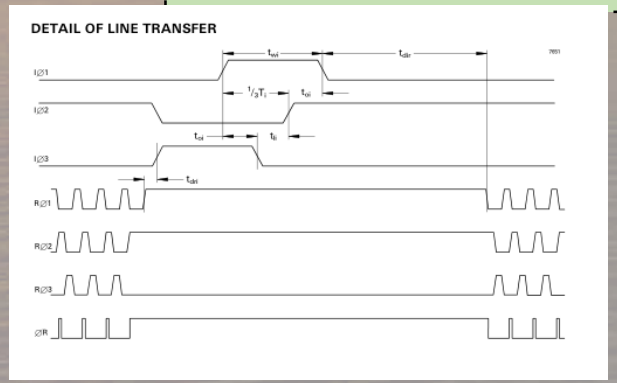


Technical tasks:

1. HK data
2. CCD clock control
3. Binning pixels
4. Calibrations, tests
5. SPI

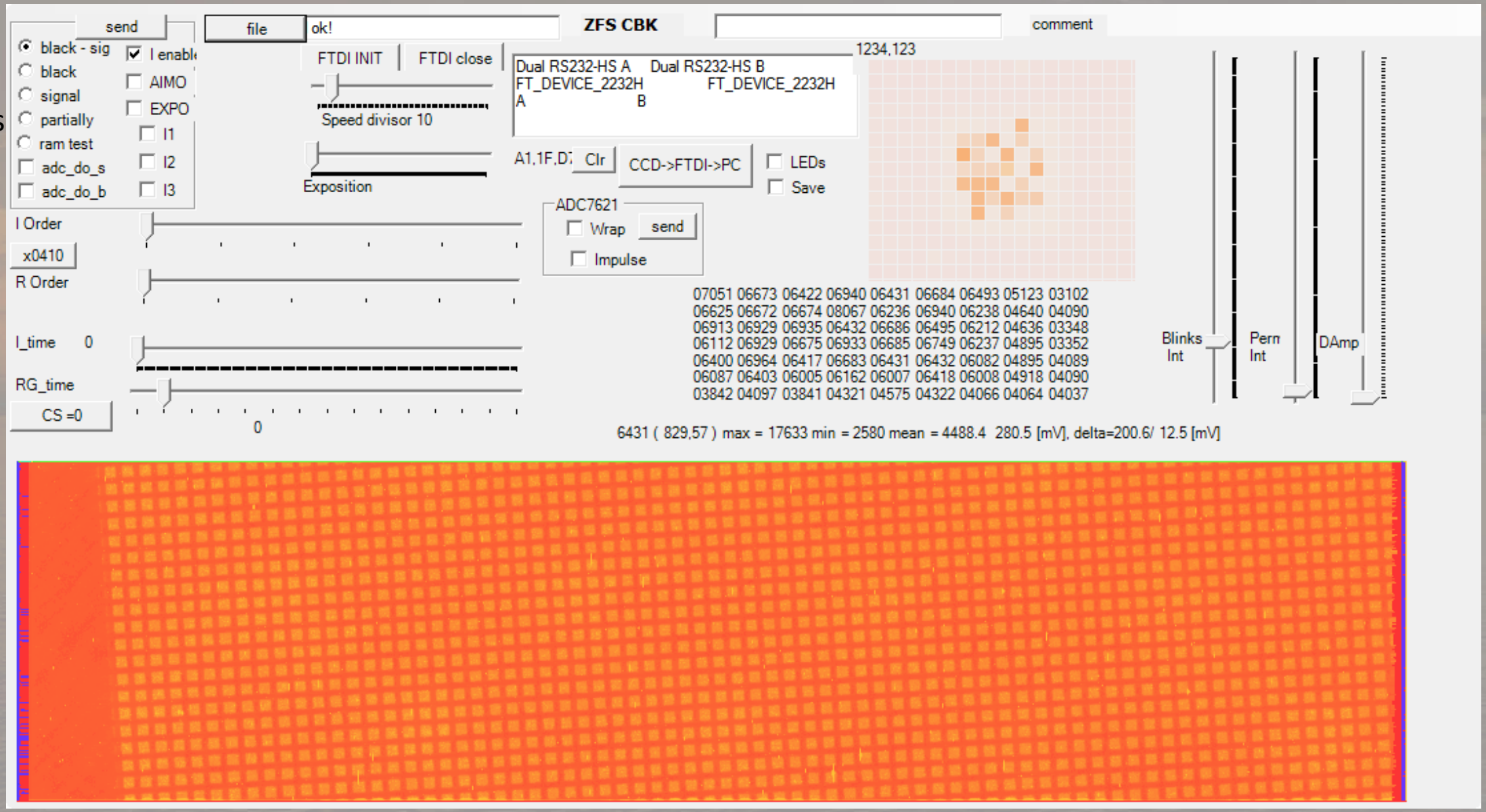
Scientific tasks:

1. Locating the X-ray source on the Sun
2. Detecting active phenomena on the disk, analyzing individual light curves

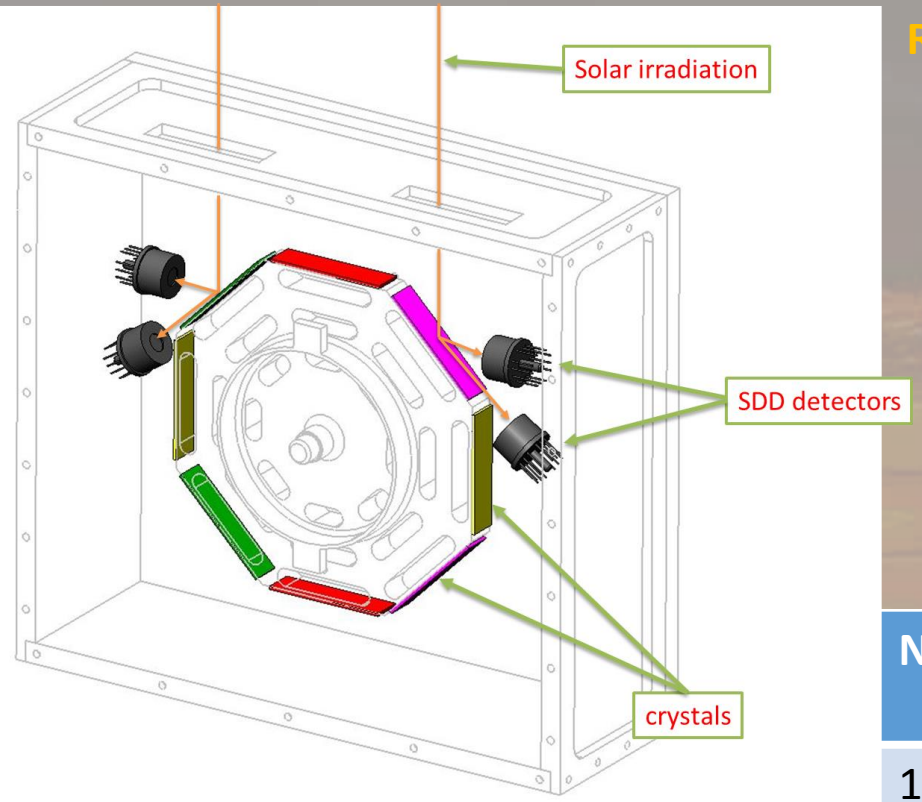


Pin Hole Imager - EGSE

Adjust timing
Different modes
ADC calibration
FPGA tests
Digital gain



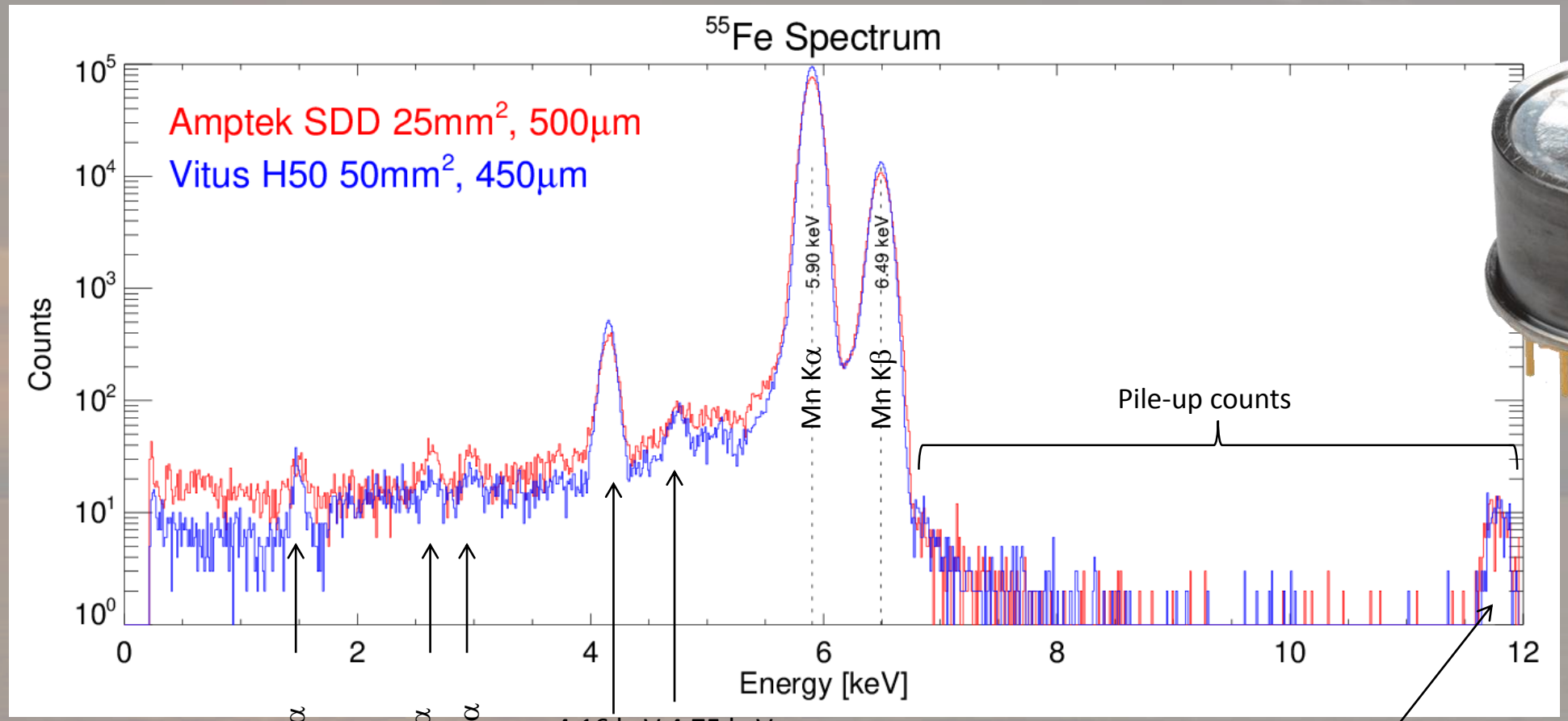
Rotating Drum Spectrometer



SDD detector:
Vitus h50
KETEK

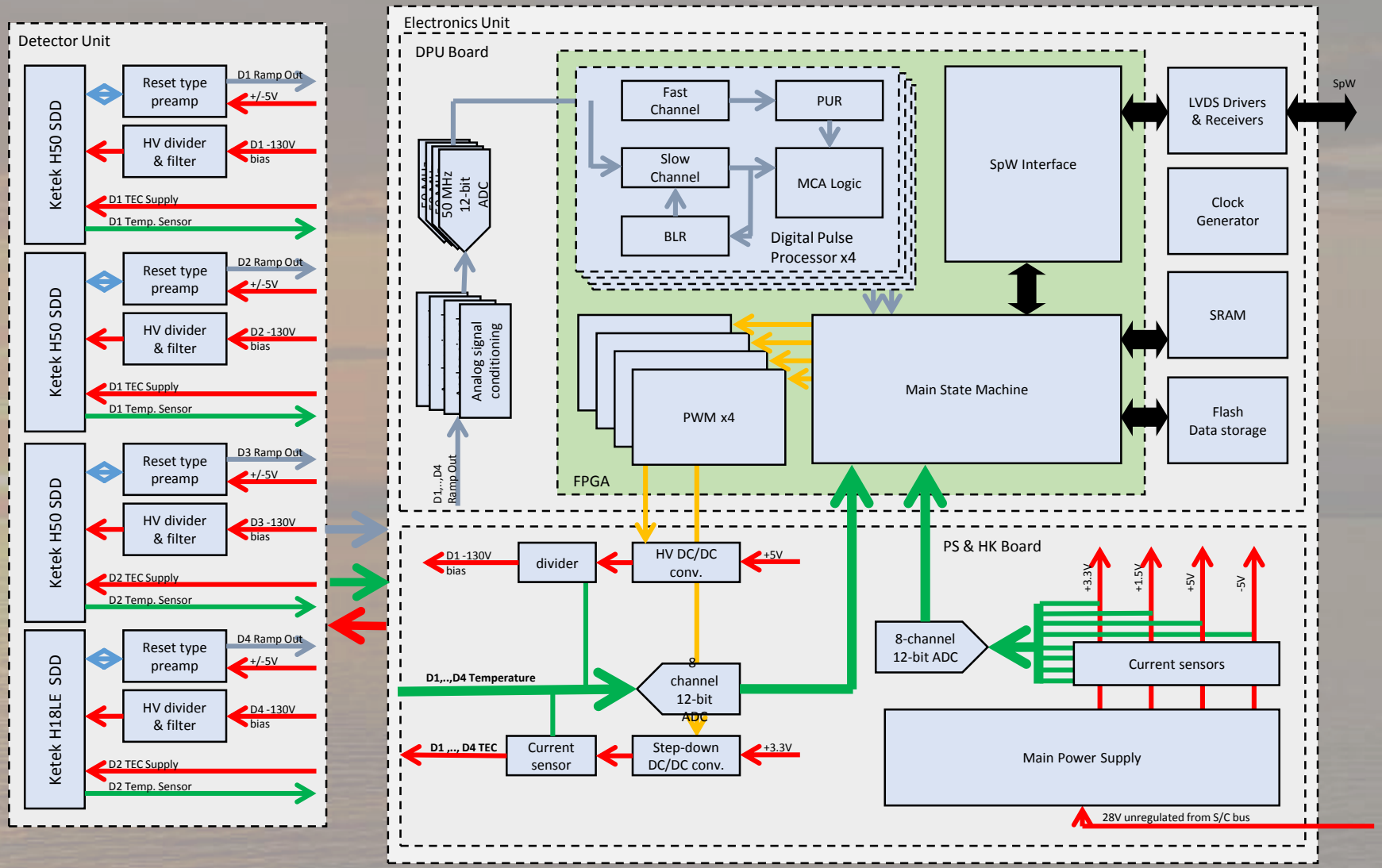
No.	Detector #1 (front)	Detector #2 (rear)	Detector #3 (front)	Detector #4 (rear)
1	Fe XXV (Si400)	-	O XVII (KAP)	-
2	-	Fe XXV (Si400)	O XVII (KAP) ***	Fe XXV (Si111)
3	-	Mg XI (KAP)	-	CaXIX (Qu10-11)
4	Si XIII (ADP)	-	Si XIII (Qu10-10)	-
5	Ar XVII (Si111)	-	S XV (Qu10-11)	-
6	S XV (Qu10-11)	-	Si XIII (ADP)	-
7	Ca XIX (Si220)	-	-	-

Rotating Drum Spectrometer - Spectra

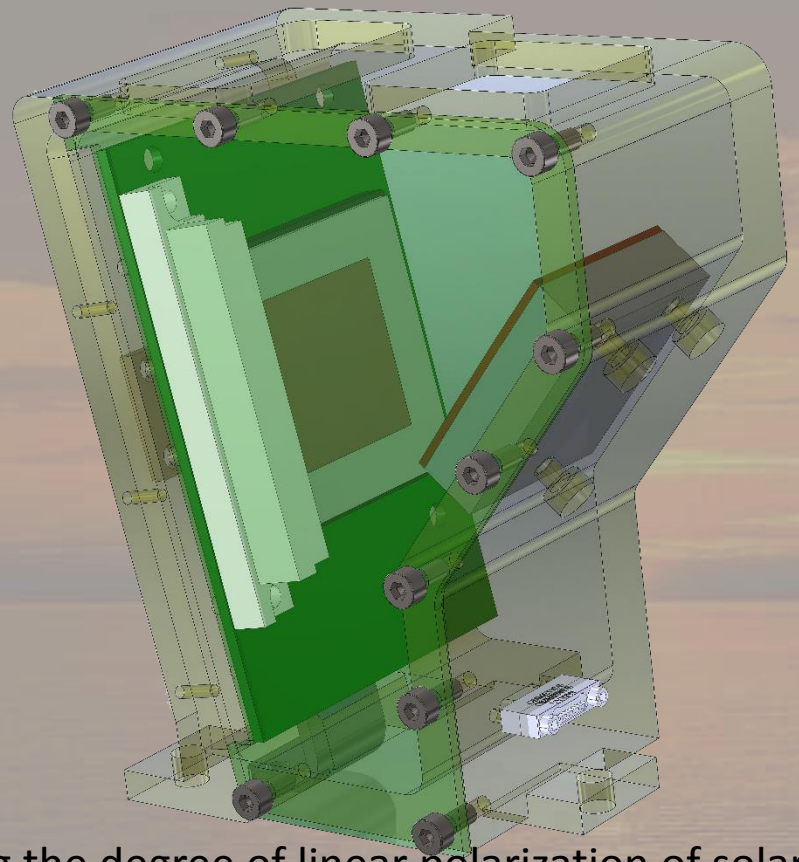


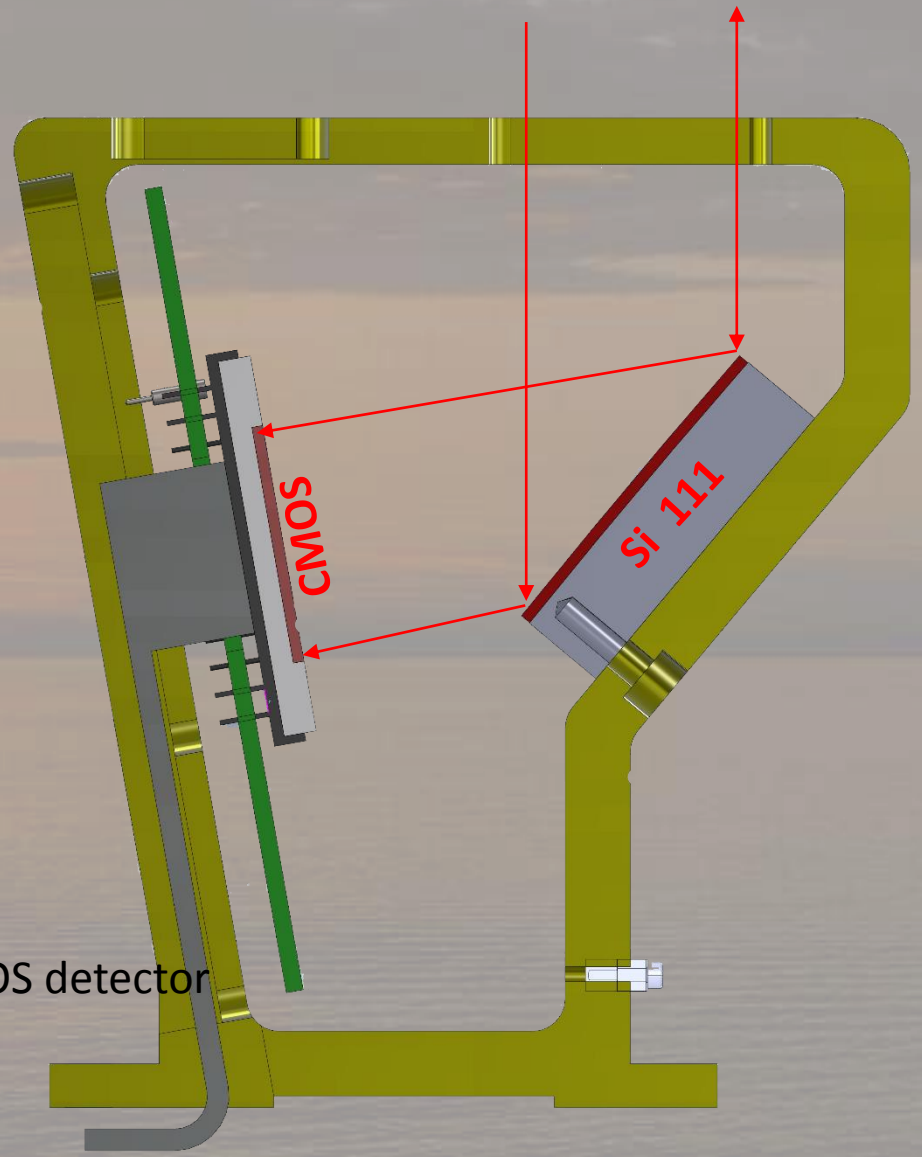
Rotating Drum Spectrometer – Block scheme

- Pulse shaper
- Pilup rejector
- Base line restorer
- Thresholds
- Fastchannel thresholds
- Multichannel analyzer



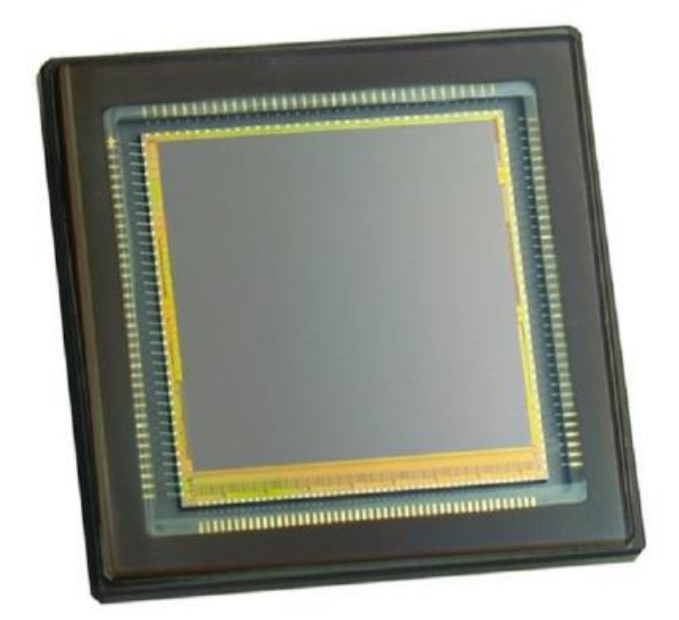
B-Pol – bend crystal Bragg spectropolarimeter





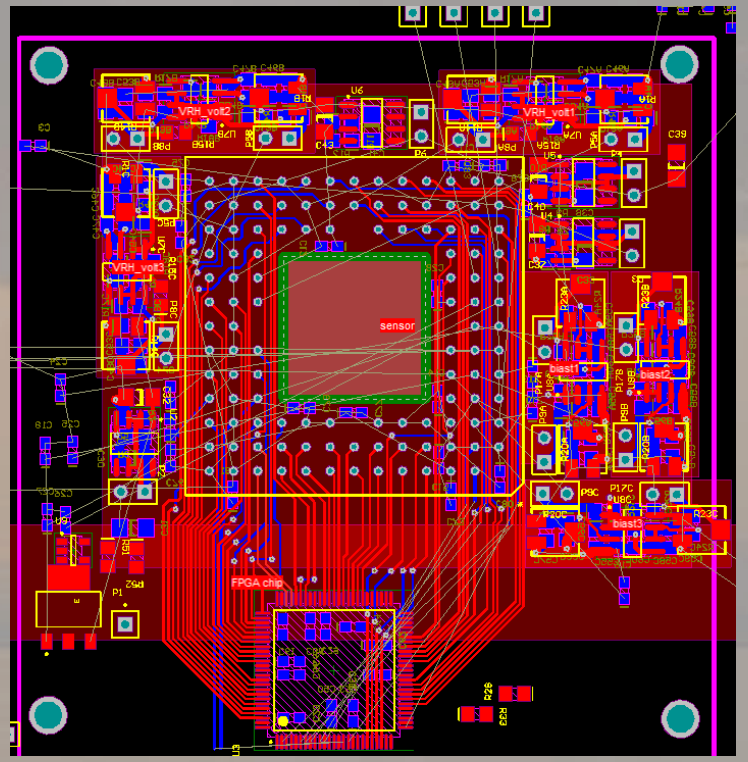
Measuring the degree of linear polarization of solar flares.
The reflected spectrum will be recorded by a large area of CMOS detector

B-Pol – bend crystal Bragg spectropolarimeter

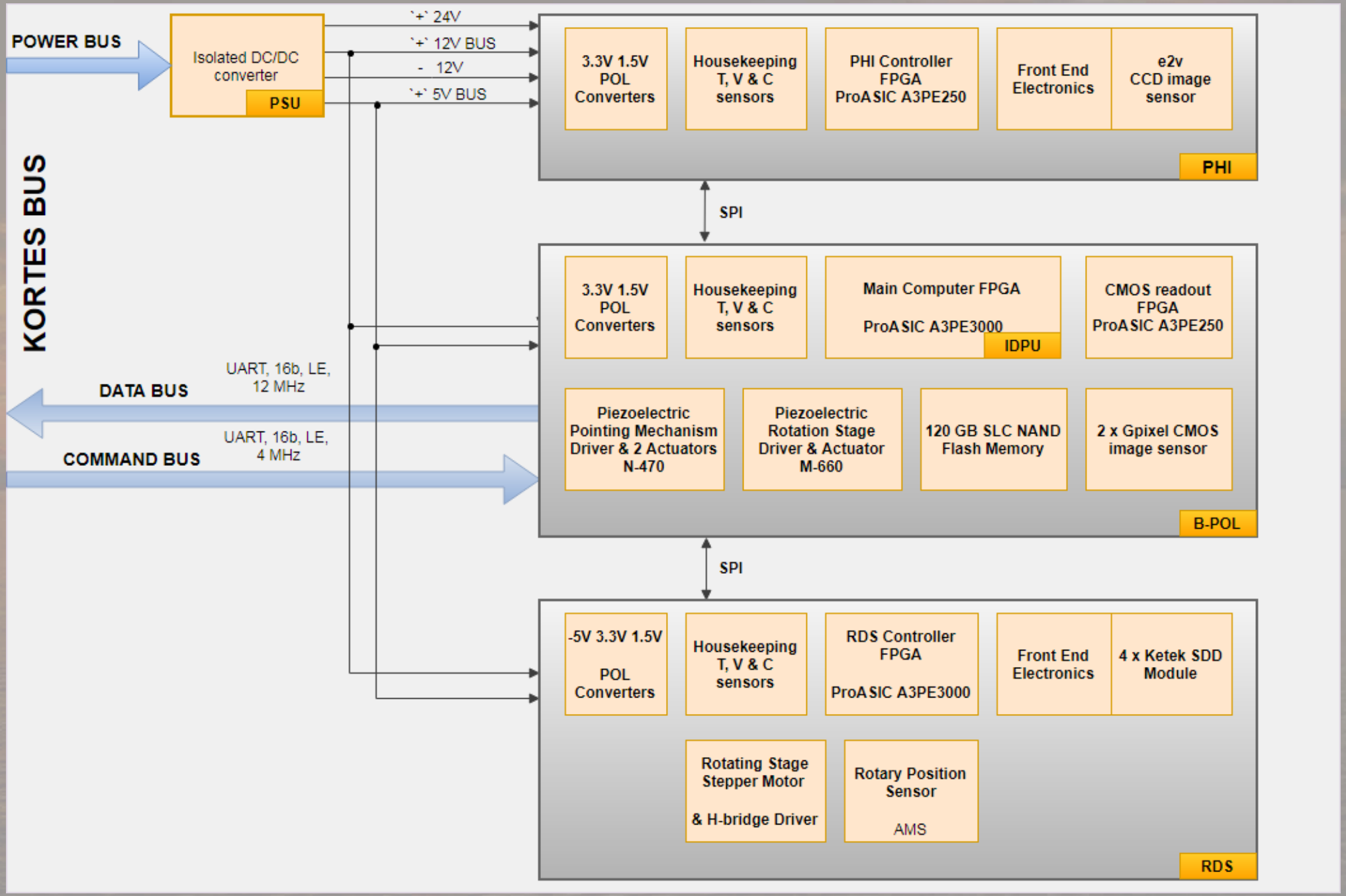


4 Megapixels Scientific CMOS Image Sensor http://www.gpixelinc.com/

Parameter	Value
Optical format	2.0 inch
Active image size	22.528mm x 22.528mm
Pixel size	11μm x 11μm
Number of active pixels	2048 (H) x 2048 (V)
Shutter type	Electronic rolling shutter
Pixel clock rate	20 MHz — 30MHz
Frame rate	24 fps @HDR mode 48 fps @STD mode
Data rate	2.4Gbit/s at 25MHz pixel clock
Full well capacity(FWC)	120ke$^-$
Temporal noise	1.47e$^-$
Dynamic range	>96dB (HDR mode)
Supply voltage	3.3V for analog 1.8V for digital
Output format	8 pairs of LVDS drivers
Power consumption	<600mW
Package	115 pins PGA



SolpeX- bloc scheme



СПАСИБО
ЗА ВНИМАНИЕ