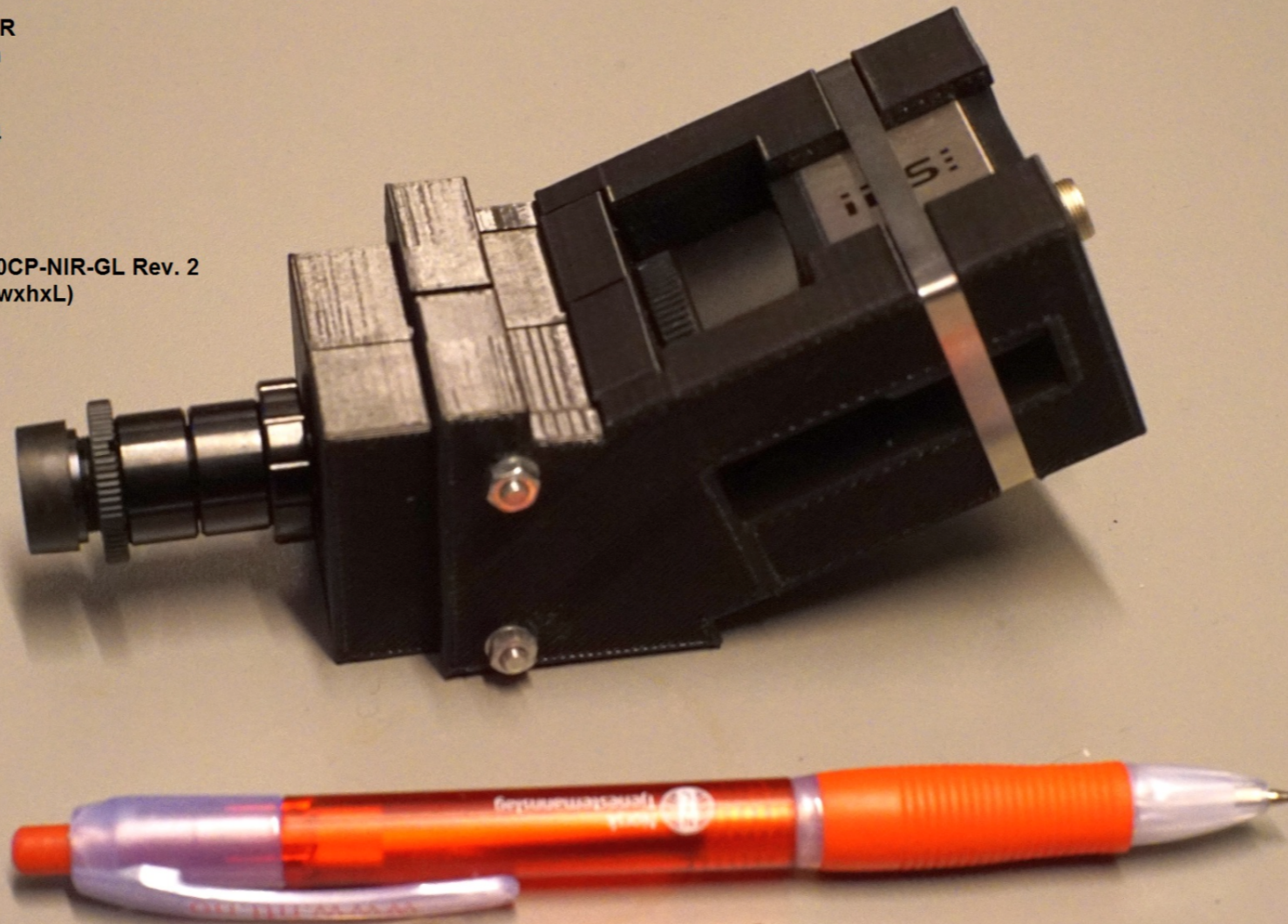# HSI Hardware

Current Imager

Micro lens hyperspectral hybrid imager V4

Spectral range: VIS/NIR
Grating: 600 lines/mm
Slit width: 25um
Slit height: 3mm
Front lens: 16 mm; f/4
Aperture: 9.5 mm
Collimator: 30 mm
Field lens: 10mm
Camera lens: 25 mm
Detector: uEye UI-3360CP-NIR-GL Rev. 2
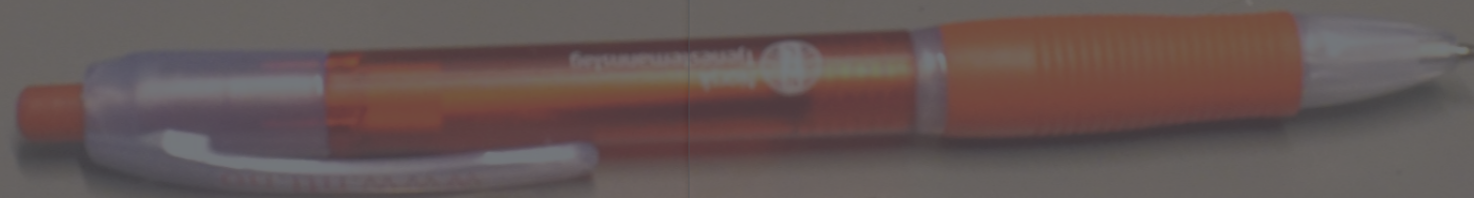Size: 47x58x130 mm (wxhxL)
Mass: 152g

Lenses, slit, grating and s-mount
tubes from Edmund Optics.
Camera by iDS Imaging. Grating
house made by Makerbot 3D
printer.

Fred.Sigernes@unis.no, 2017

Current Imager

Micro lens hyperspectral hybrid imager V4

Spectral range: VIS/NIR
Grating: 600 lines/mm
Slit width: 25um
Slit height: 3mm
Front lens: 16 mm; f/4
Aperture: 9.5 mm
Collimator: 30 mm
Field lens: 10mm
Camera lens: 25 mm
Detector: uEye UI-3360CP-NIR-GL Rev. 2
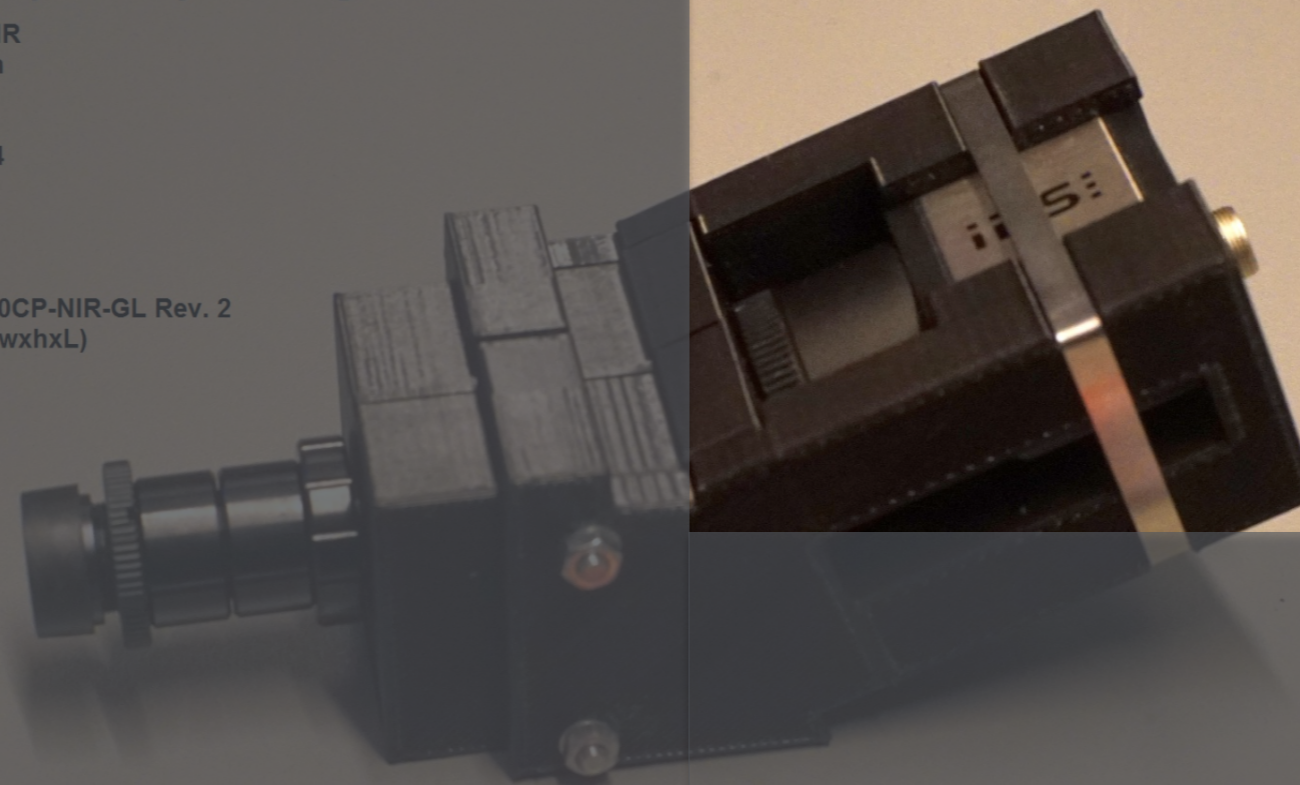Size: 47x58x130 mm (wxhxL)
Mass: 152g

Lenses, slit, grating and s-mount
tubes from Edmund Optics.
Camera by iDS Imaging. Grating
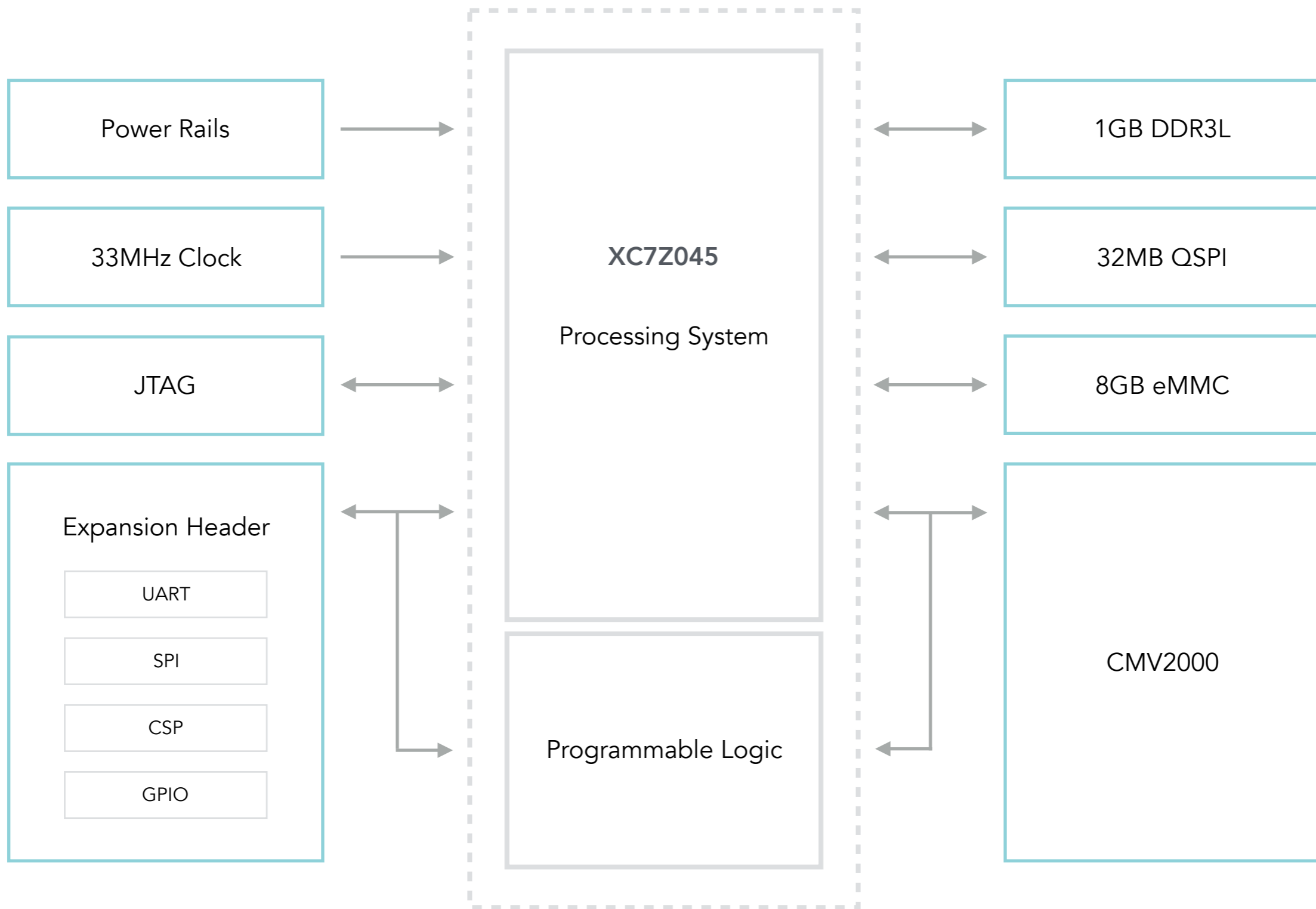house made by Makerbot 3D
printer.

Fred.Sigernes@unis.no, 2017

Specification

- Sensor width larger than ~7.5 mm

- Frame rate ~ 100SPS

- Dark target - high pixel bit depth

- Power consumption < 5W

Design Principles

1) Build as little as possible from scratch.

2) Use AEC-Q100 certified parts from the automotive industry.

3) Design for multiple vehicles

Power Rails	→			↔	1GB DDR3L
33MHz Clock	→	XC7Z045		↔	32MB QSPI
JTAG	↔	Processing System		↔	8GB eMMC
Expansion Header	↔			↔	CMV2000

XC7Z045

Processing System

Programmable Logic

Power Rails

33MHz Clock

JTAG

Expansion Header

UART

SPI

CSP

GPIO

1GB DDR3L

32MB QSPI

8GB eMMC

CMV2000

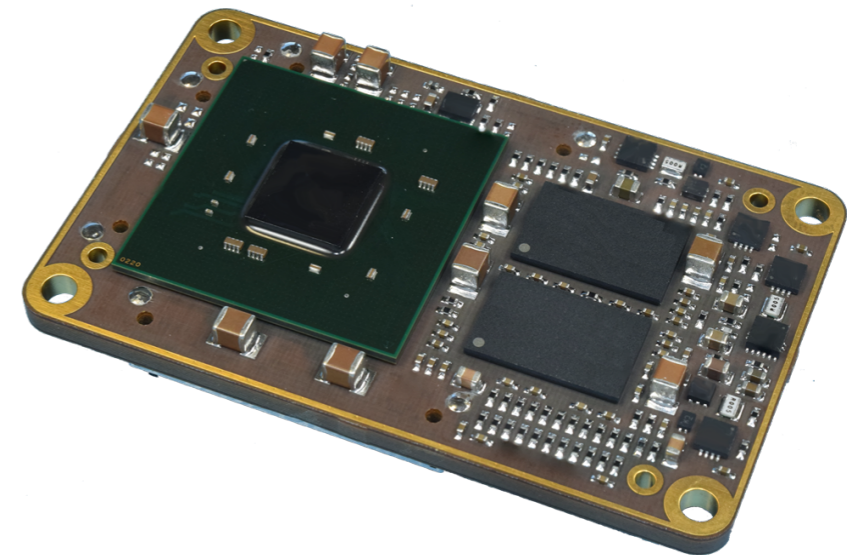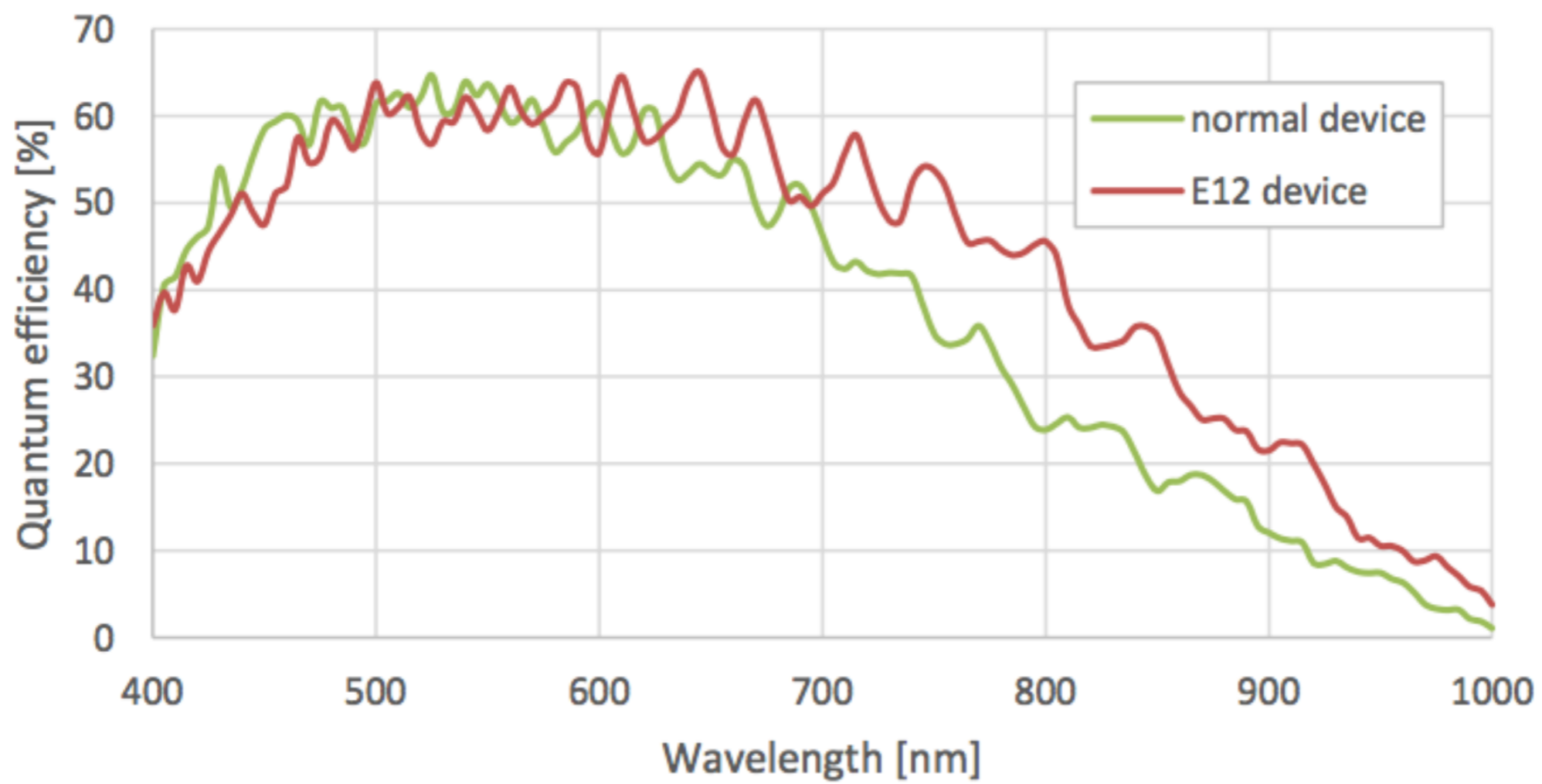NTNU Hyperspectral Camera Payload Rev 1.0

Custom Design

- Significantly cheaper per unit
- Takes up less space
- Flexible power supply solution
- Better connectivity options

NanoMind Z7000

- Shorter development time
- Less complexity
- Cheaper PCB production technology
- Flight proven

Spectral Response

SNR

- Exposure Time

- Pixel Size

- Bits per pixel

- Distance from earth

- Optics

- Environmental noise