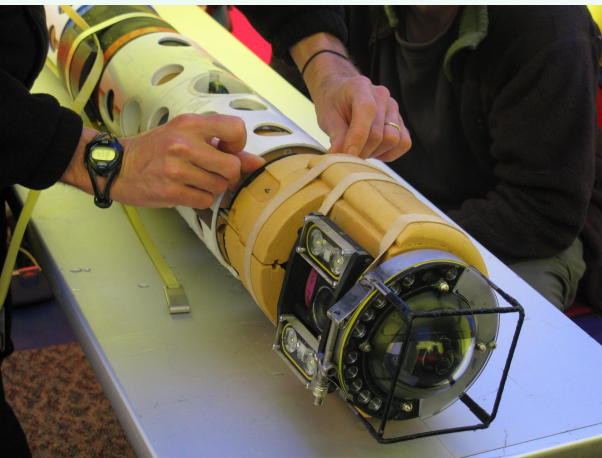
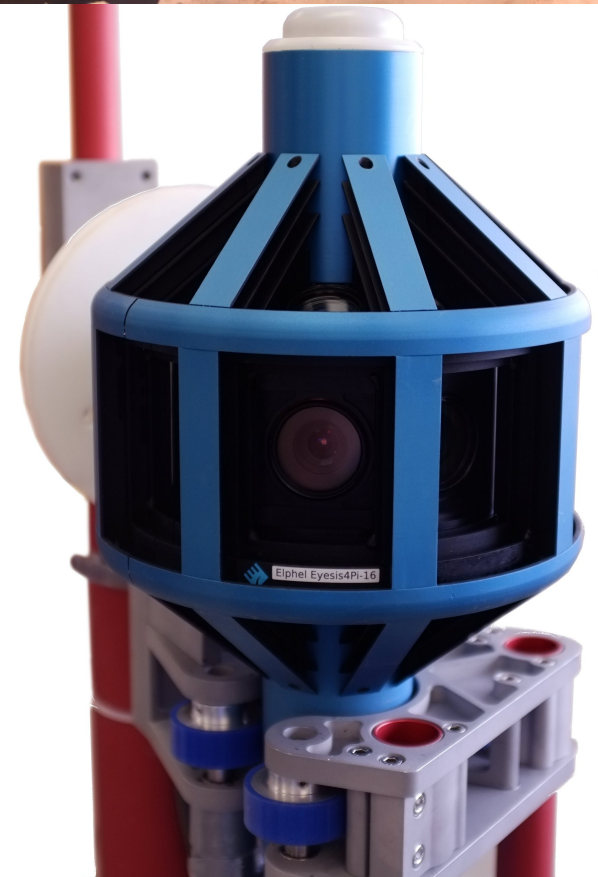
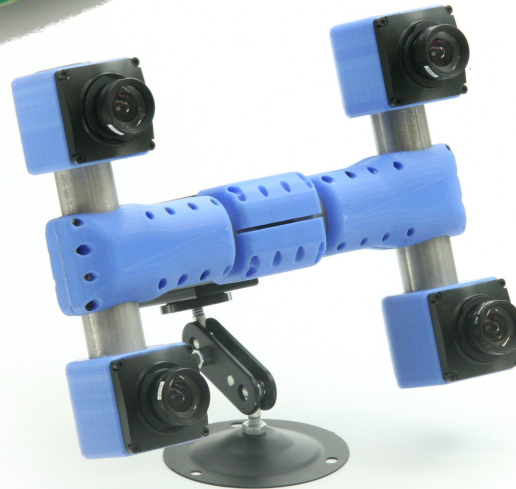
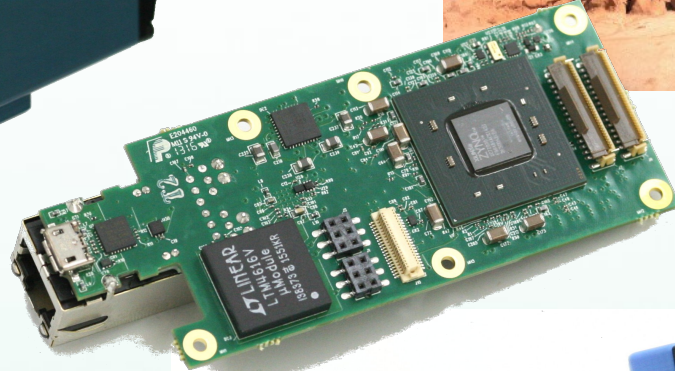
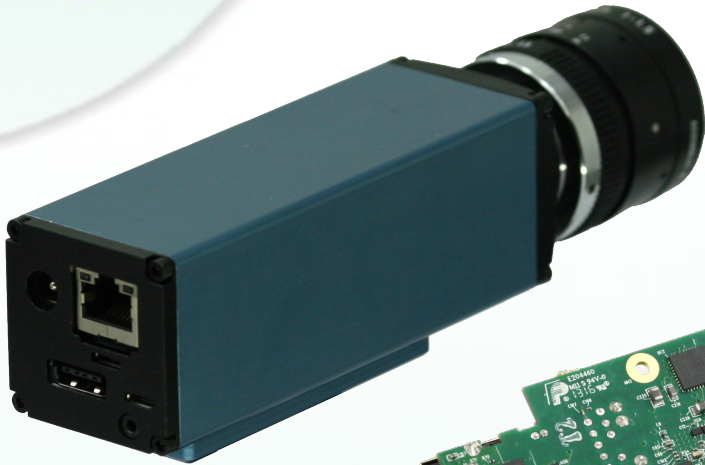


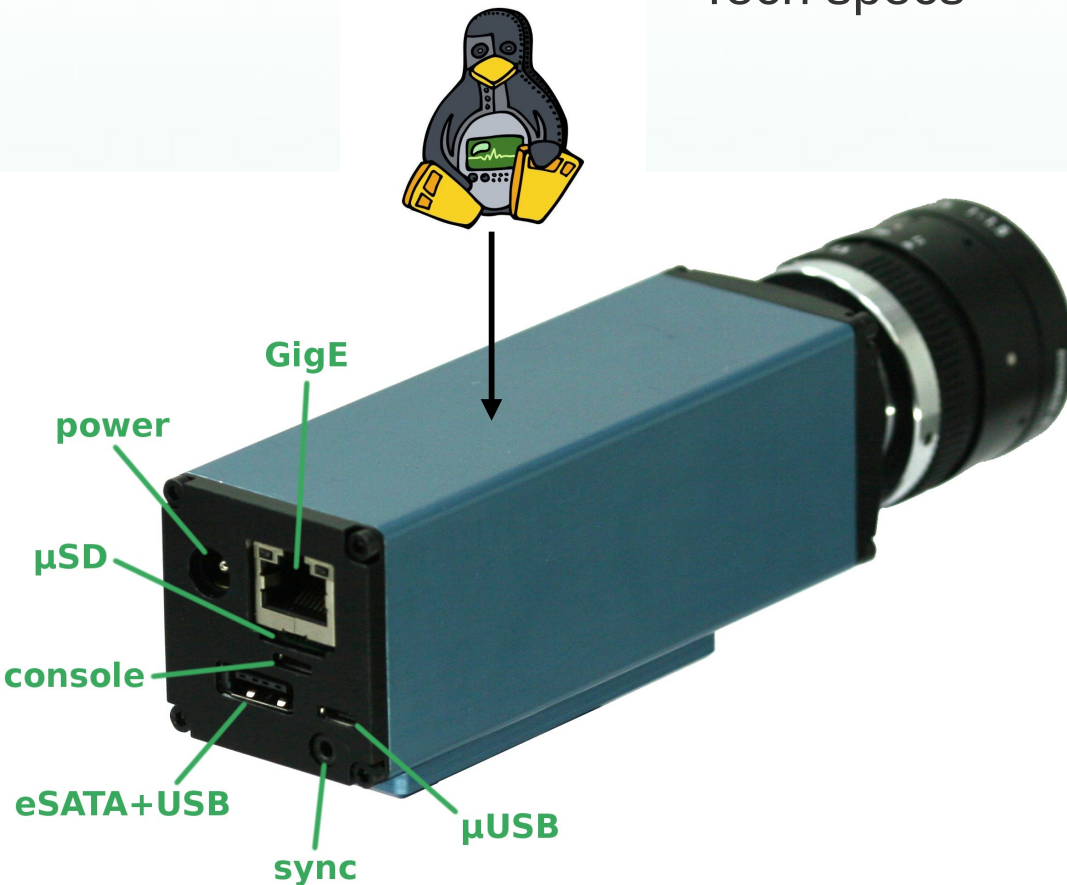
Elphel NC393L Open Hardware Cameras for hackers.
Building robotics, UAV navigation, medical imaging,
document scanning, photofinishing, stereo and
panoramic and even cinematographic cameras.



Alexandre Poltorak
Elphel, Inc. 1455 W. 2200 S. #205
West Valley City, UT 84119

NC393-CS camera

Tech specs



Free Software and Open Hardware

User/developer friendly: HTML, JavaScript, PHP, Python, CGI, C/C++ , Verilog

Operating System: OpenEmbedded Linux (Yocto build)

Hardware:

5MPix or 14MPix, 1/2.5" format sensors Xilinx Zynq 7030 SoC - Dual-core ARM Cortex-A9 + FPGA, 800MHz

RAM: 1GB (system) and 0.5 GB (fpga) DDR3 memory

1 GB NAND Flash

1 GigE

μSD

m.2 SSD

μUSB2

eSATA+USB2 - 2in1 port

4x sensor ports - routed to FPGA, each reconfigurable for general multi-purpose use

External sync port

Power:

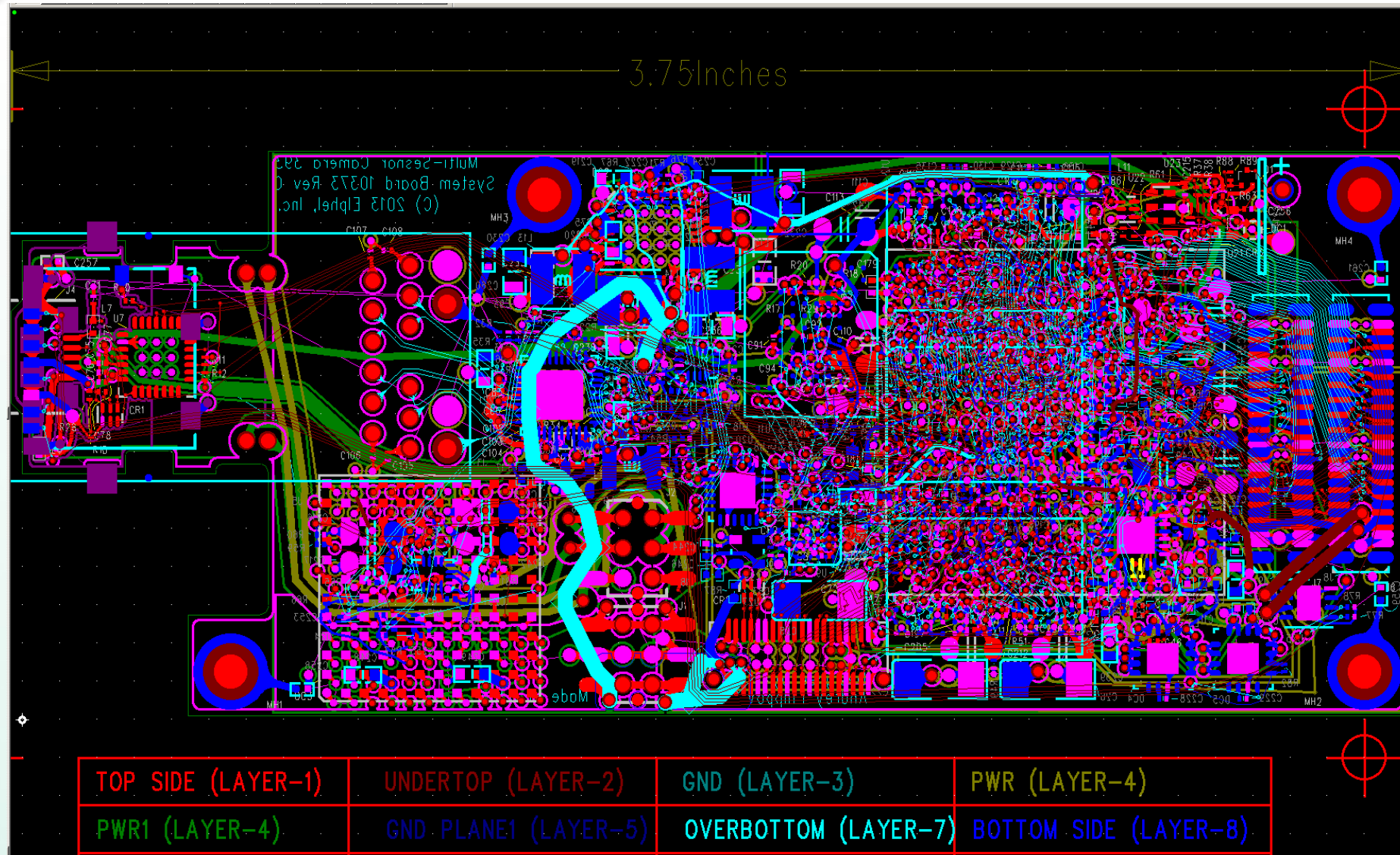
18-75V or 12-36V

Without lens or adapters:

WxHxL: 40x45x123 mm

Weight: 215g

NC393L camera – PCB design



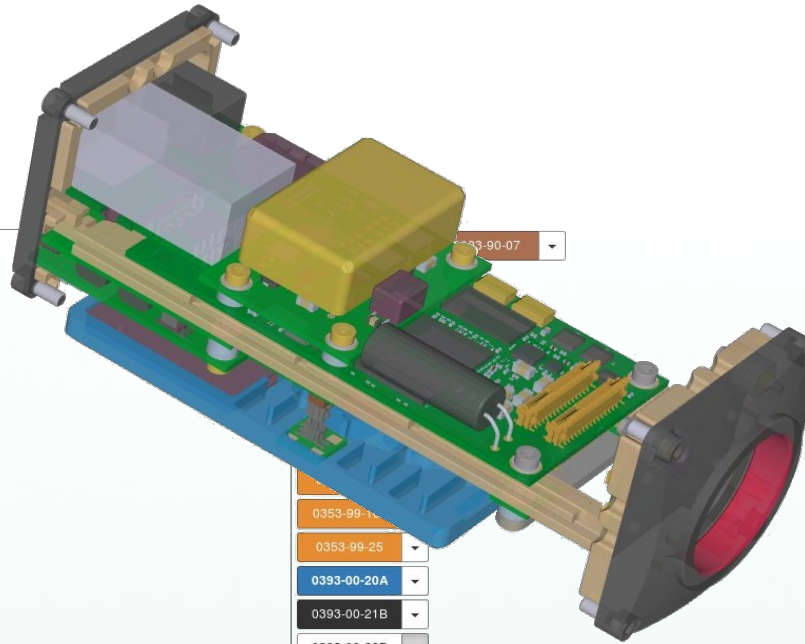
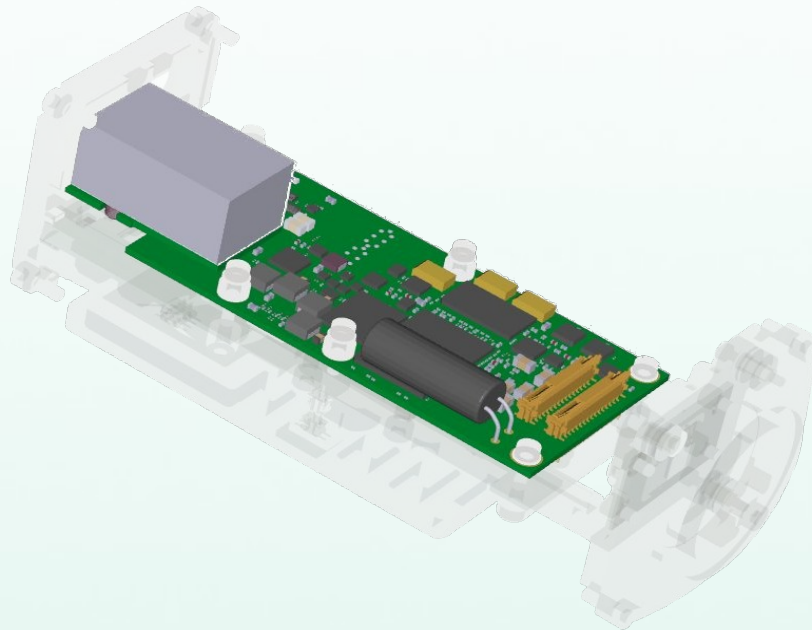
slide 21

X-3Dom model

set model

NC393-M2260-F-CS-ASSY

slide 21



- 0353-99-15
- 0353-99-25
- 0393-00-20A
- 0393-00-21B
- 0393-00-22B
- 0393-02-61
- 0393-10-01
- 0393-11-01
- 0393-11-04
- 0393-11-10
- 0393-11-11
- 0393-12-29
- 0393-12-30
- 0393-12-31
- 0393-13-01
- 0393-18-30
- 0393-20-11
- 0393-30-30
- 0393-63-01
- 0393-63-01
- 0393-90-06

all 1

- 0393-11-11
- 0393-12-29
- 0393-12-30
- 0393-12-31
- 0393-13-01
- 0393-18-30
- 0393-20-11
- 0393-30-30
- 0393-63-01
- 0393-63-01
- 0393-90-06

0393-00-20A

Documentation:

- *<http://wiki.elphel.com/>*
- *<http://blog.elphel.com/>*

Licenses:

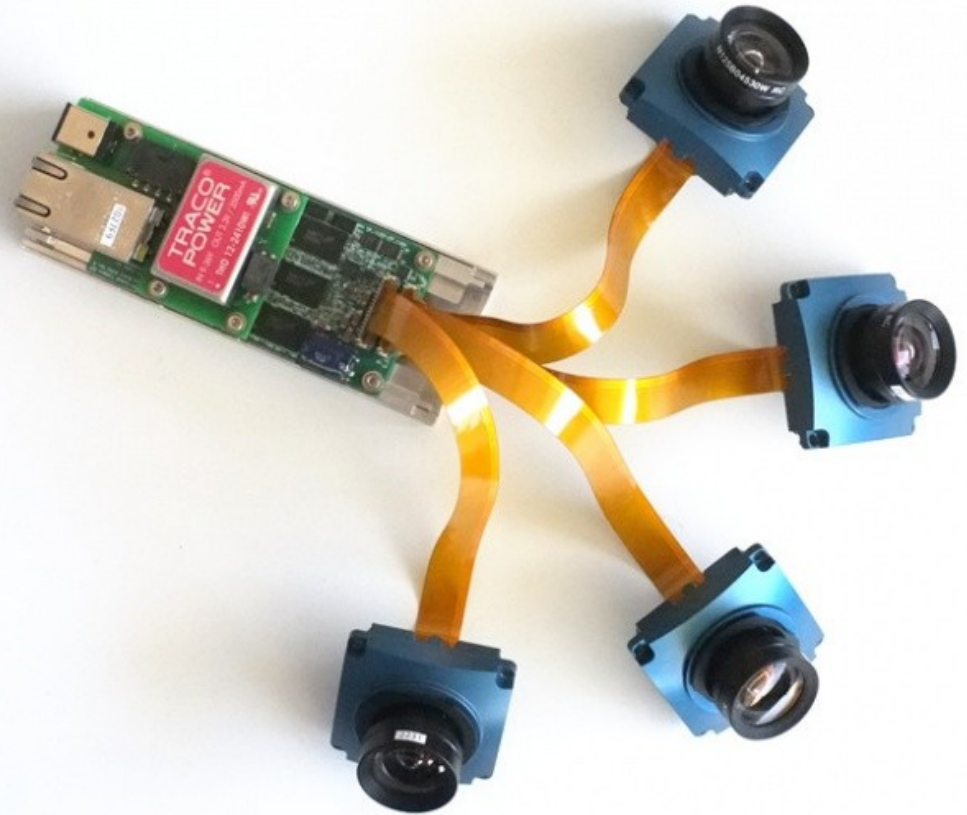
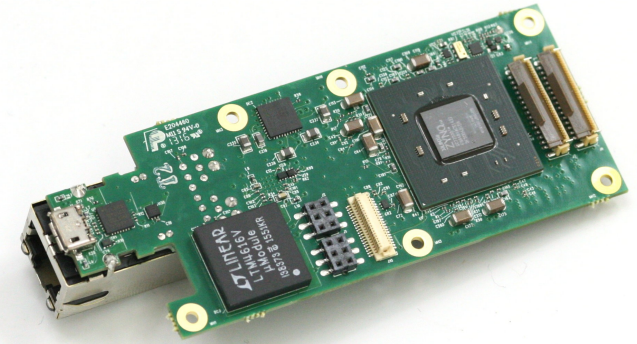
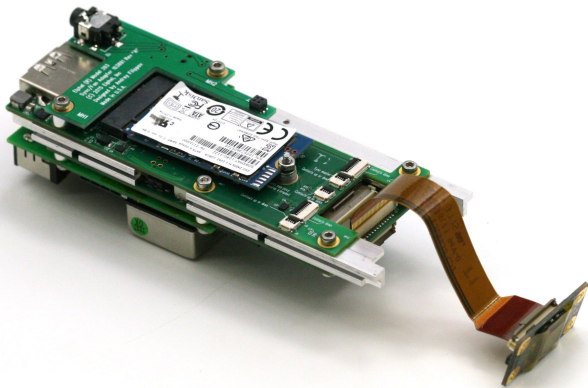
- *GNU GPL V3*
- *GNU Free Documentation License V1.3*
- *CERN Open Hardware License V1.1*



Hackable camera

<http://blog.elphel.com/category/model-393/>

<http://wiki.elphel.com/index.php?title=10393>

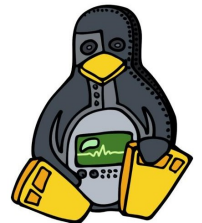
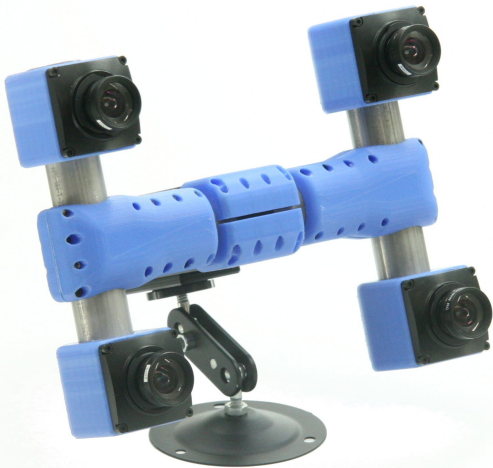


3D printed parts - our template or modified by you !

Base parts made from aluminum

Based on the new 10393 system board (see NC393-CS)

MNC393 – Customizable Multisensor camera



Why multi-sensor?



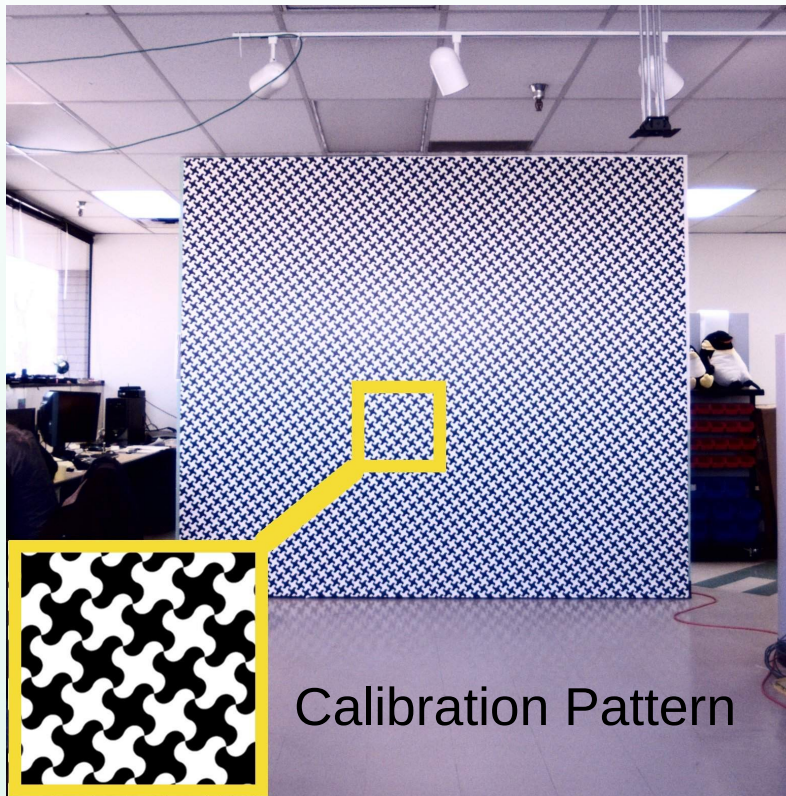
Panoramic



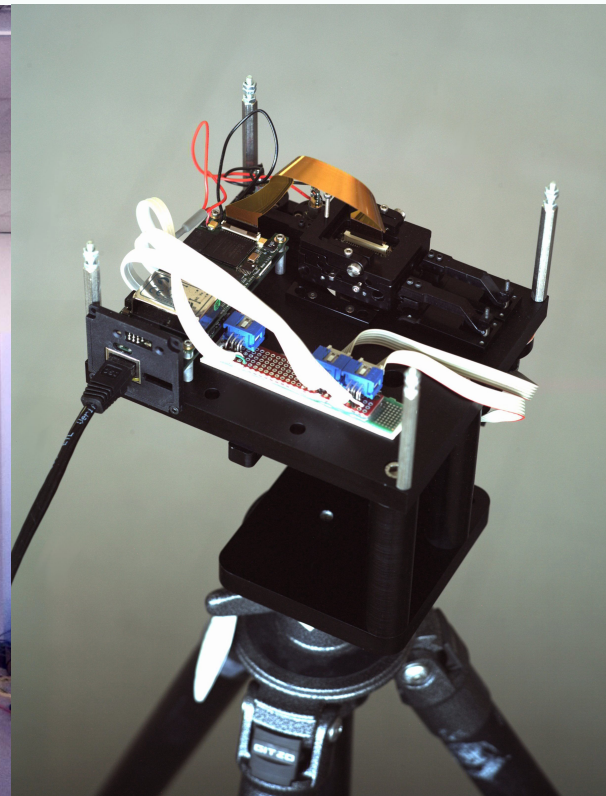
Focus and Alignment

optical aberration measurement and correction developed for Eysis cameras

<http://blog.elphel.com/category/calibration/>



Calibration Pattern



Lens is aligned and centered with sensor¹¹

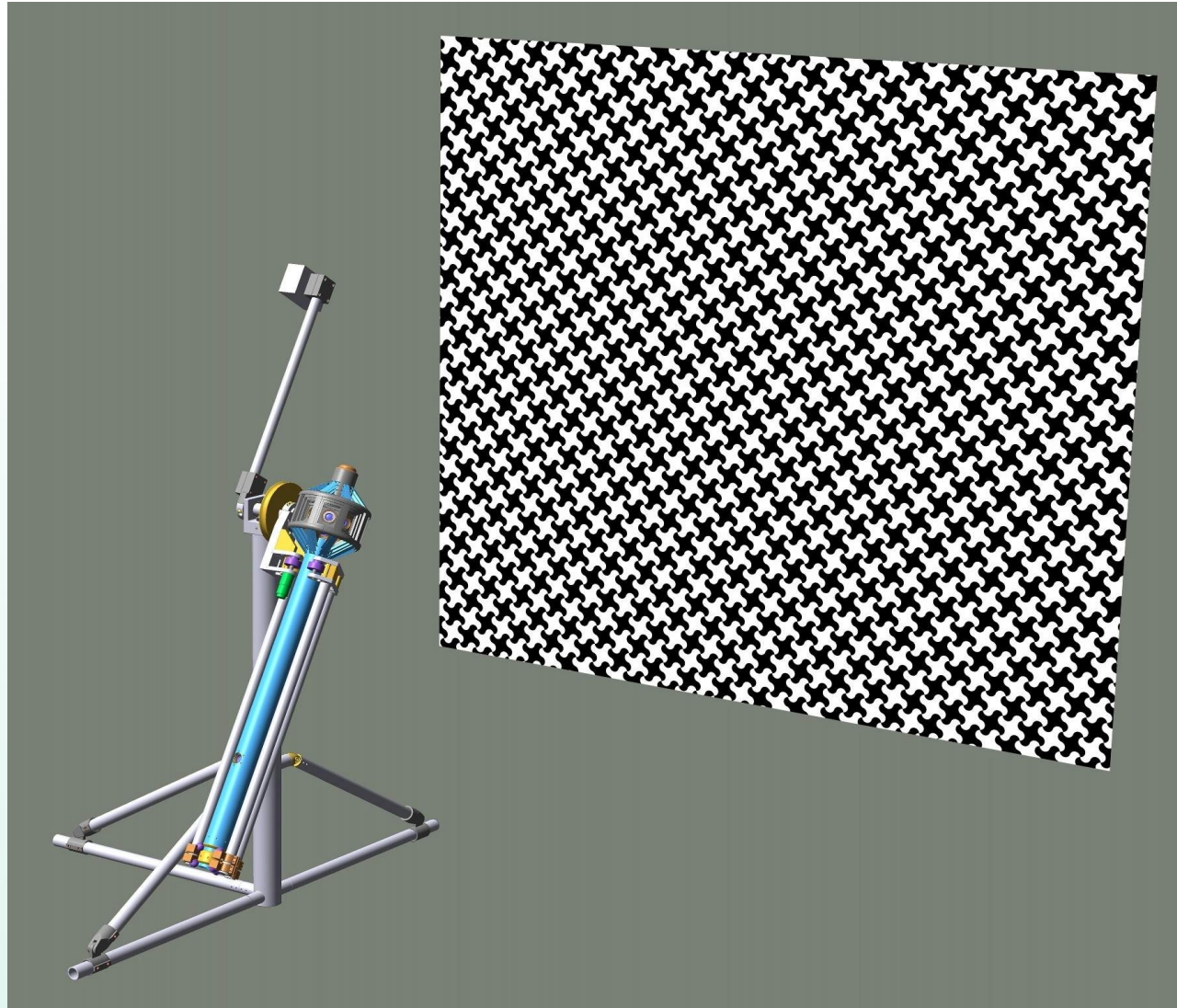
Pixel Mapping with sub-pixel resolution

<http://blog.elphel.com/category/calibration/>

Camera as a measuring tool

Photogrammetry

3D reconstruction



Other applications of photogrammetric cameras:

Depth of Field with Triclops Camera

<http://community.elphel.com/files/phg3/>



Apply for a sponsored camera !

alexandre@elphel.com

Elphel, Inc.

1455 W 2200 S #205 WVC, UT 84119

www.elphel.com

Development Blog: <http://blog.elphel.com>

Documentation: <http://wiki.elphel.com>

Code: <http://github.com> (latest) & <http://sourceforge.net>