NGC Front-end for AO applications and CCDs

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The New General detector Controller (NGC) at ESO aims at covering optical, infrared and wavefront sensing applications with a single controller. However, the detector requirements for optical, infrared and adaptive optics have clearly diverged more and more in the past years presenting a challenge in the design of the electronics.

This poster extends the description of the general architecture of the controller (cf. Mark Downing, c.f. Manfred Meyer et al.) towards the specific front-end electronics to drive and read-out CCDs both for optical instruments and AO applications. In addition, the adaptation of the NGC front-end to the future ESO CCD head for AO and the control of the L3 devices is presented.
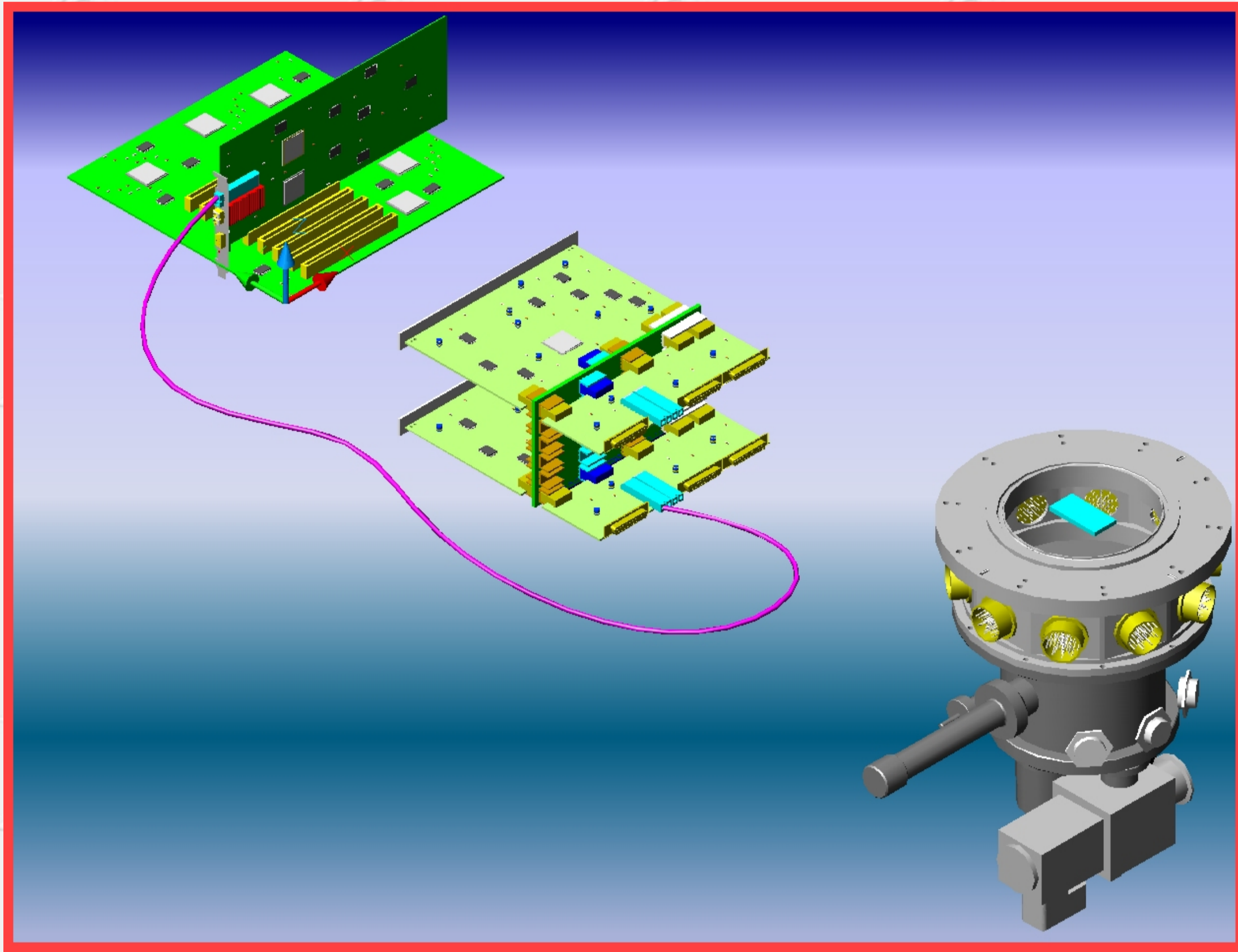

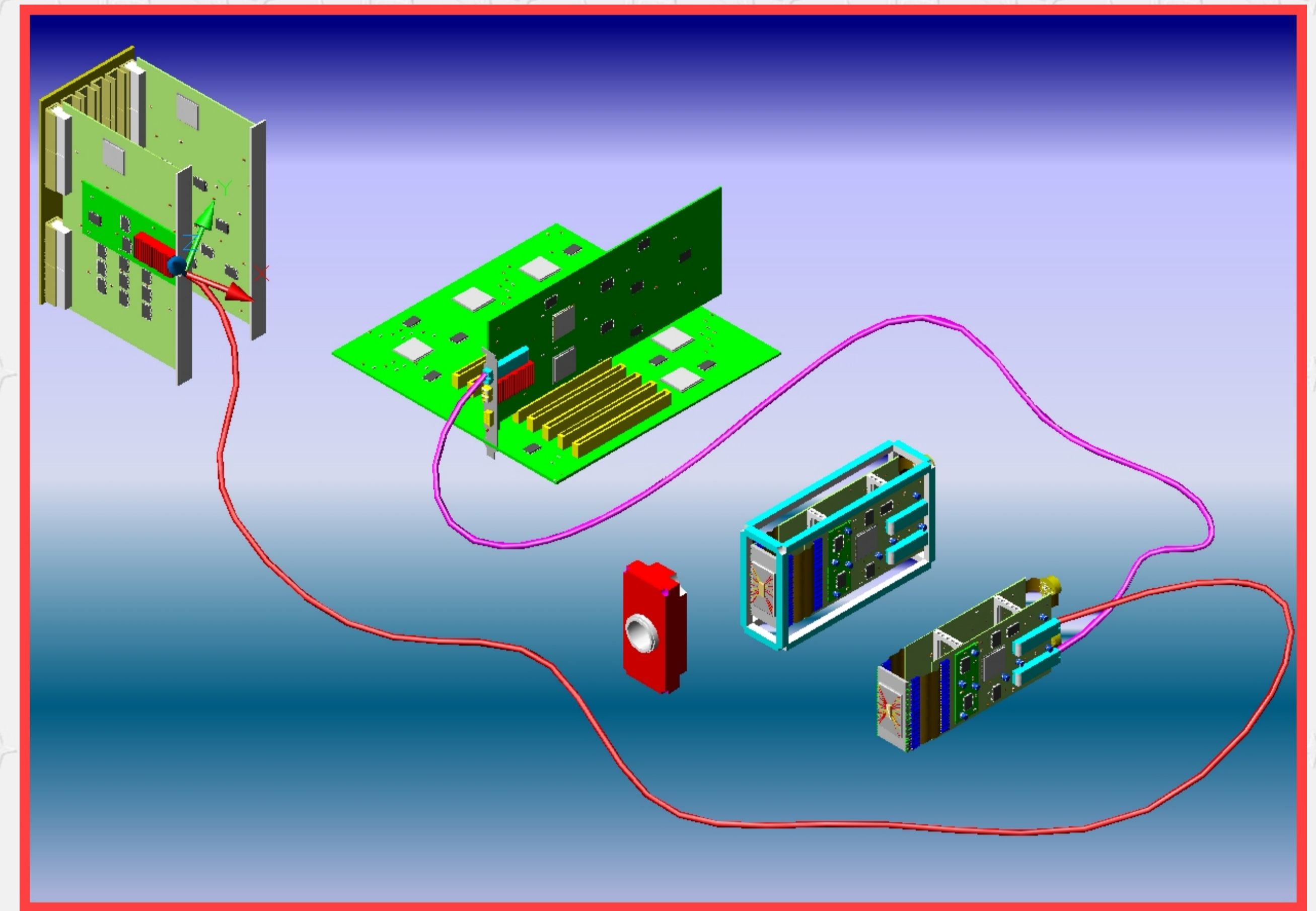**Figure 1: NGC for scientific applications**

Figure 2: NGC for sensing applications

1. NGC for CCDs

- 6 slots custom backplane.
- Board-to-board communication using high-speed serial links through the backplane.
- Digital multisampling for CCD read-out.
- 2 x 2.5 Gbps fiber serial link per board.
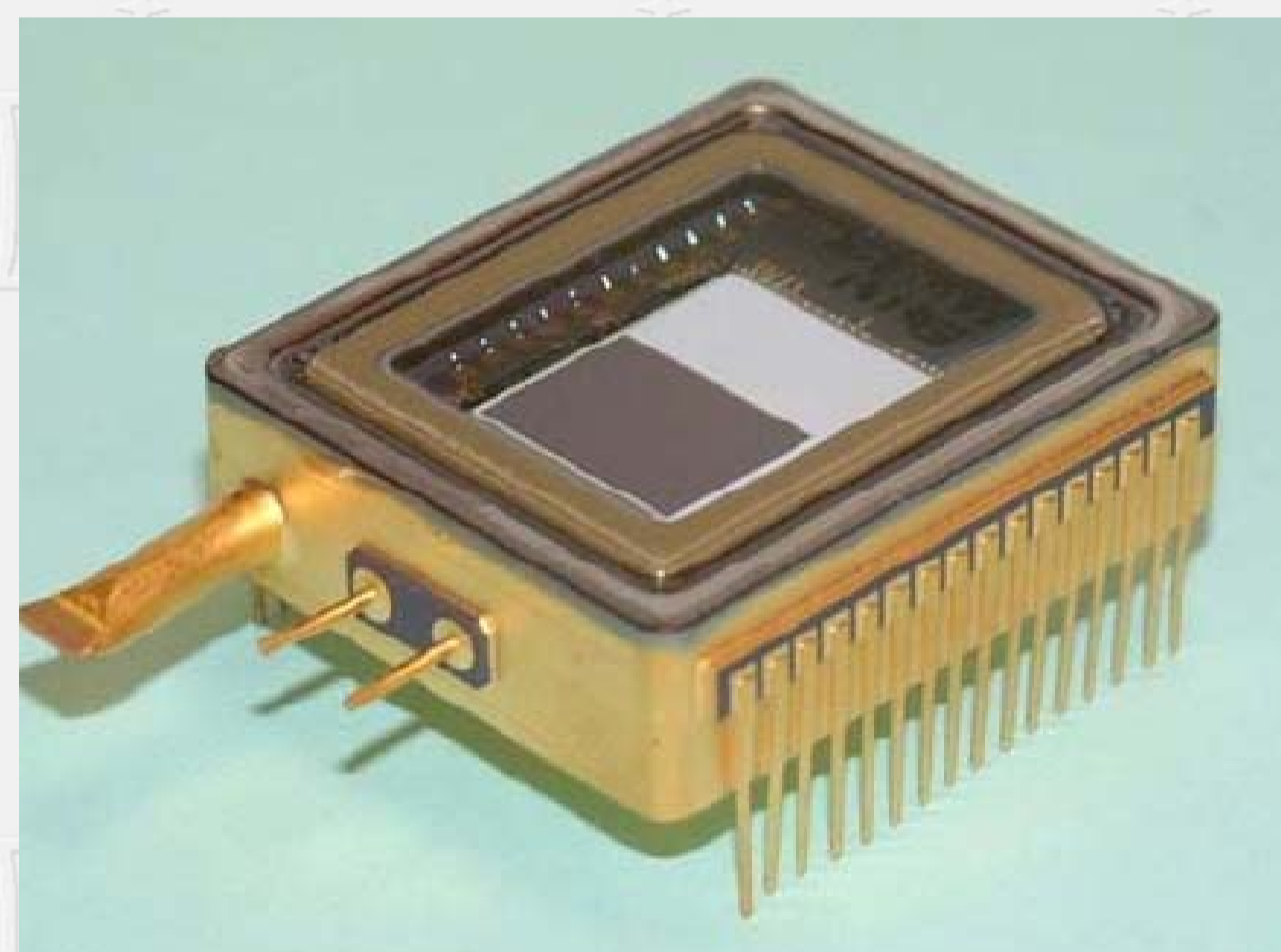- E2V, MIT, deep depletion devices, OTAs

Figure 3: e2V 240 x 240 pixels. Integrated Peltier cooler. (Sample picture.)

2. NGC for sensing applications

- Complete NGC front-end integrated in two Eurocard size boards.
- Volume for electronics: 90 x 160 x 35 mm.
- Direct connection to Real Time Computer.
- No dedicated controller for AO: homogeneous interface.
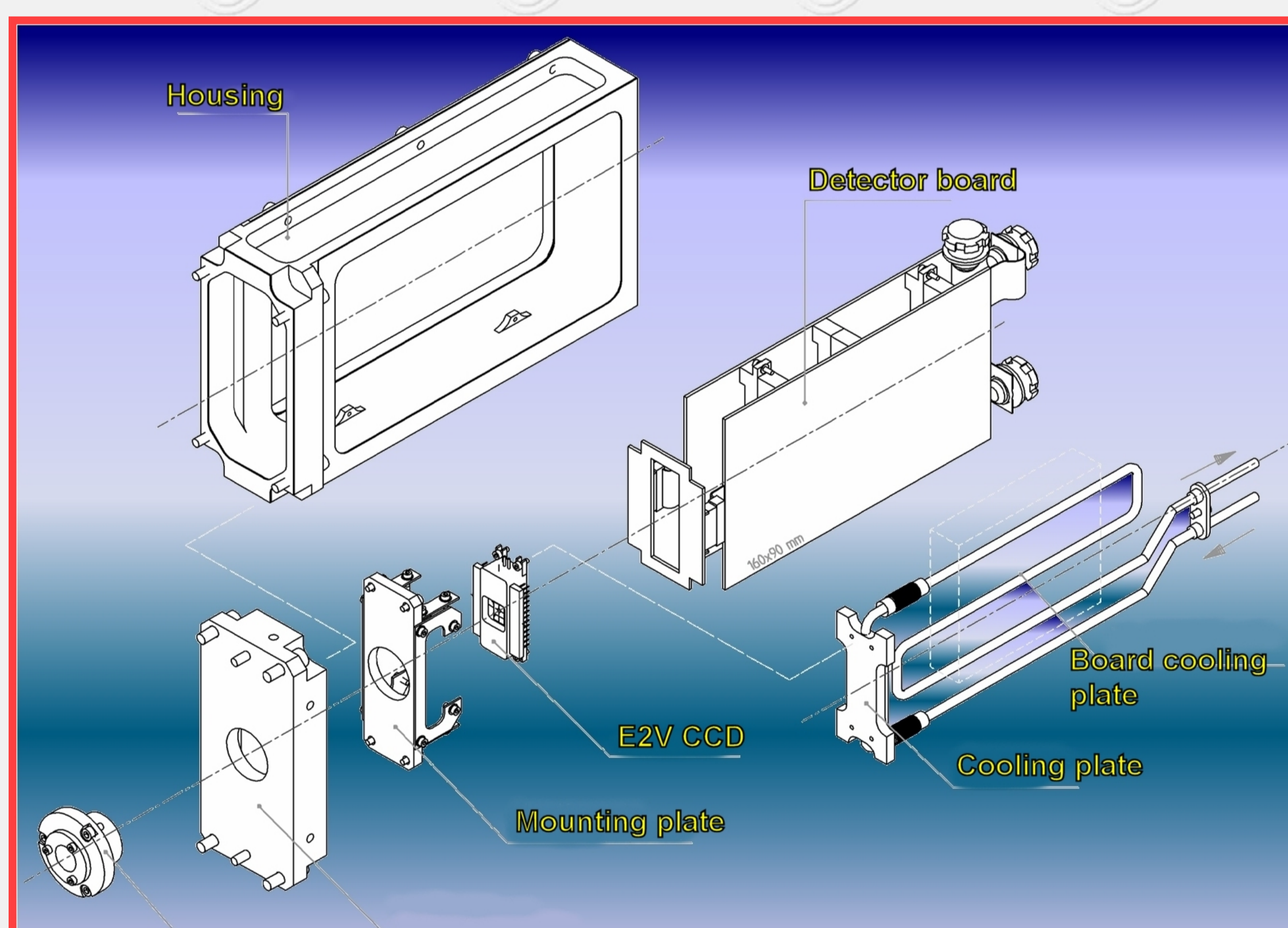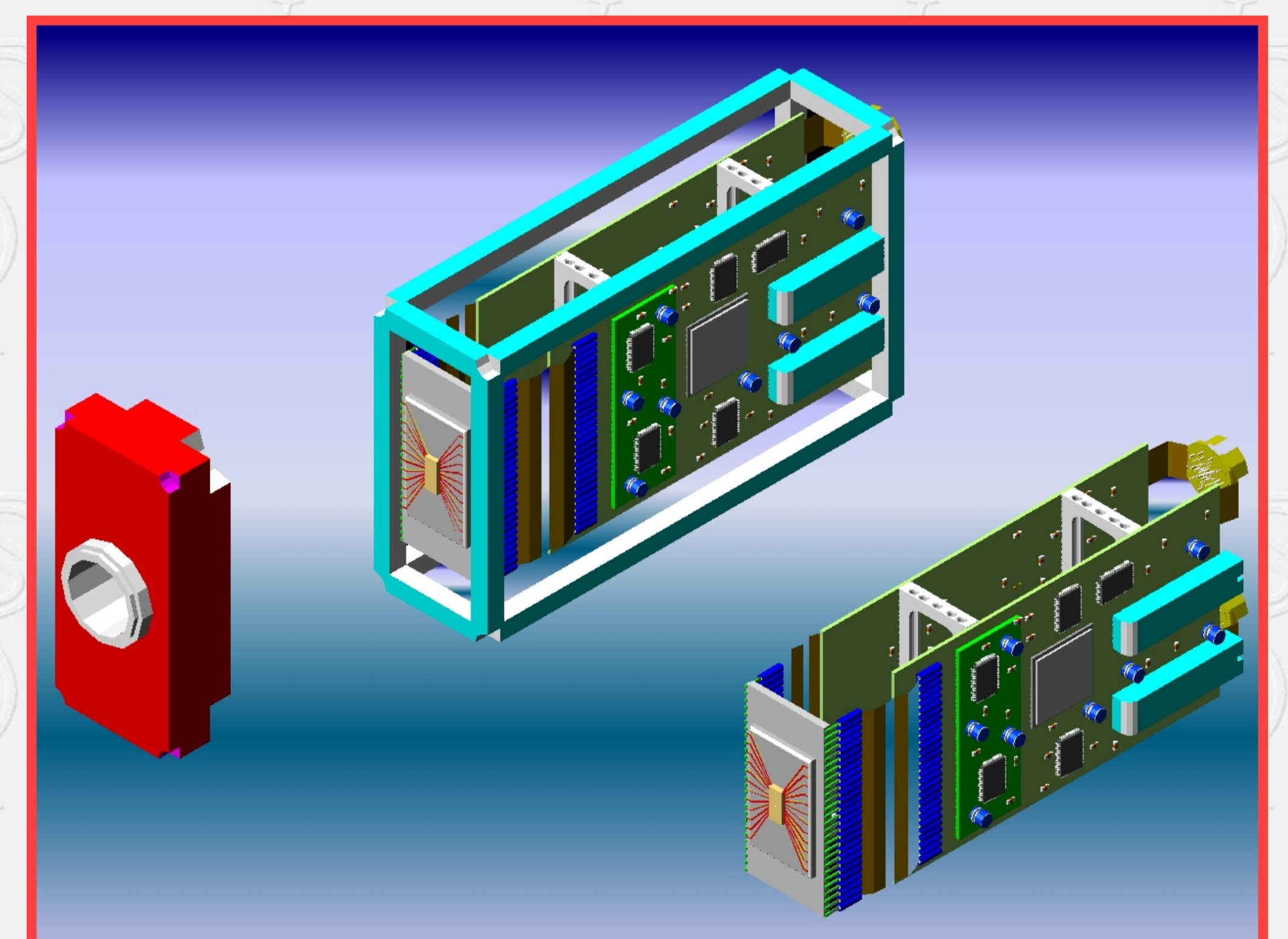- High-voltage high-speed clocks.
- Fast ADCs.

Figure 4: NGC Front-end electronics in AO head

Figure 5: New ESO head for Adaptive Optics

3. The Challenges

- 10 Mlines per second.
- Frame rate of up to 1.2 kHz.
- 110 MB/s throughput.
- High-voltage high-speed clock driver.
- RON < 1 (0.1) e-/pixel.
- Small volume for electronics.

4. NGC for CCDs

- Digital correlated sampling still to be proven.
- Common video board for IR and Visible.