CCD sensors embedded in satellites:
- convert analog signals into digital ones with high precision and speed (11 bits – 14 bits at 10 MS/s)
- must be radiation hardened due to the space environment.

Overview of the most used architectures depending on the required performances

Choice of the most suitable ADC

The components that have the greatest influence on the ADC performances and the most sensitive blocks to radiations are highlighted: comparator, switches and amplifier.

Switches

Analog CMOS switches weaknesses:
- charge injection,
- $R_{on}$ depending on $V_{in}$ amplitude,
- cut-off region.

Robsturred switch architecture: No voltage overshoot to prevent from SEGR damages

Comparator

Weaknesses in radiative environment:
- high number of SEU.

Dual path design technique: lower vulnerability of floating nodes.
- Auto-zero approach to reduce the offset.

Amplifier

Weaknesses:
- reliability of the main stage amplifier,
- high power consumption (Gain, GBW).

Correlated double sampling (CDS) 
Predictive rail to rail amplifier

Conclusion and Perspectives:
- Ongoing experimental measurements to validate simulation results,
- Heavy ions tests to assess SEE,
- Complete RHBD pipeline 11 bits 10MS/s ADC design.
- Higher Amplifier Gain based on RFC architecture (60-70dB gain)