CMOS sensors

CMOS sensors were created at the beginning of the 1990s.

Among other things, they can directly make the charge conversion on the generation photosite thanks to their pixel amplifier. This characteristic give them the ability to get rid of several transfers and to increase the processing speed. Their main advantages come from the way they are manufactured.

- Manufacturing identical (90%) to computer chips (particularly to the **DRAM** Dynamical Random Access Memory),
- Cheap mass-production,
- Direct charge conversion without any transfer: neither blooming nor smearing,
- Each pixel has its own amplifier, no shift register: Active Pixel Sensor,
- Each pixel can be individually addressed,
- No complex time clocks,
- Low energy consumption (100 times less than **CCD**),
- High reading rate.

In the last few years, they have really come to the fore compared to the **CCD** sensors, which is directly linked to them being used in cellular telephony as video devices or on-board cameras. This is a direct consequence of their low-cost manufacturing and low consumption.

For scientific applications, it is their operating speed (image rate), linked to the charge conversion on the creation site, which make them more appropriate for used than the **CCDs**. One of the last generation sensors can digitize 1024 x 1024 pixel images to a 5400 images/second rate...

More over, each pixel can be independently driven (manually or automatically), which explains that they can be used in vision for highly contrasted scenes. However, they do induce a slight bias, which can generate major differences between the images sensed by the human eye and the rough image coming from the **CMOS** sensor.