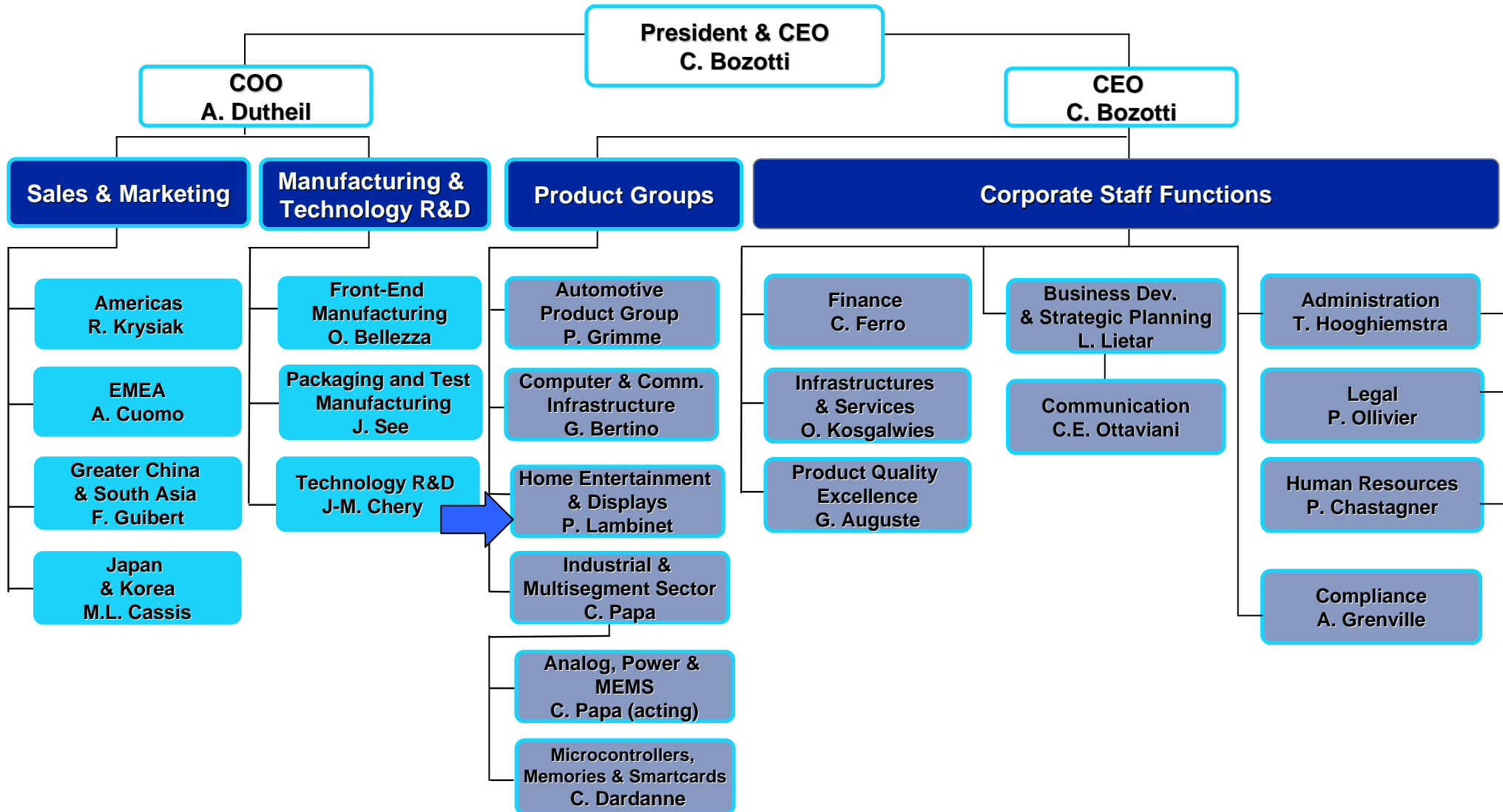


Organization



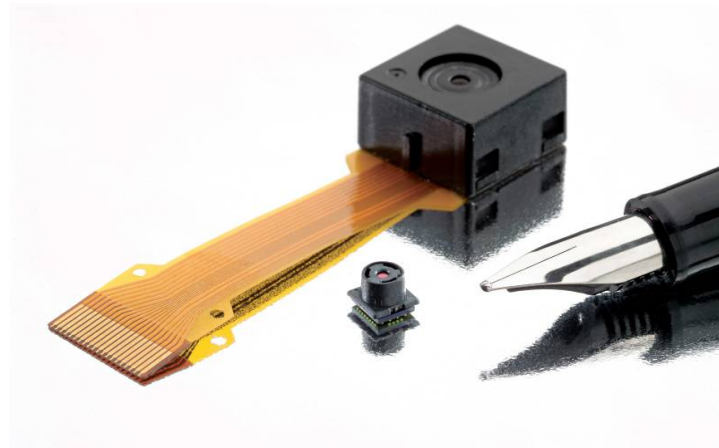
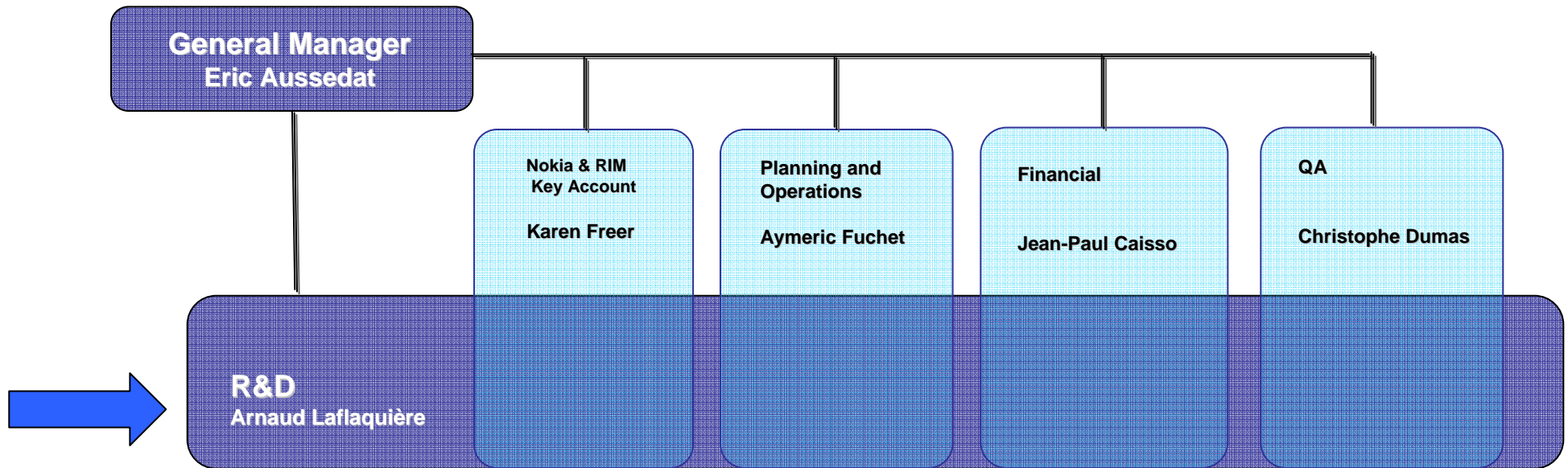
Imaging Solutions



ST Imaging Division Overview



Imaging Solutions



Confidential information

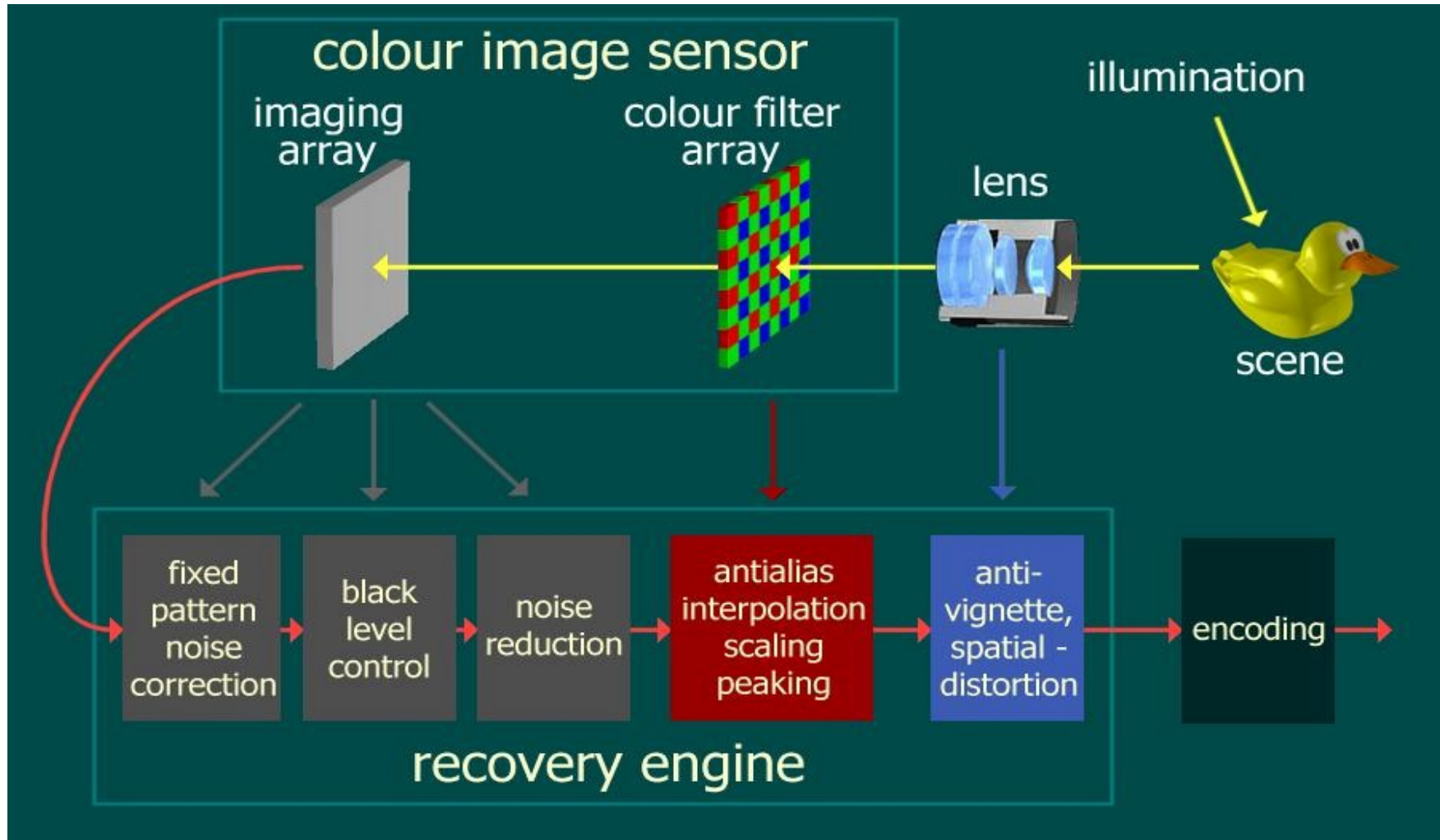


ST Imaging , at a glance

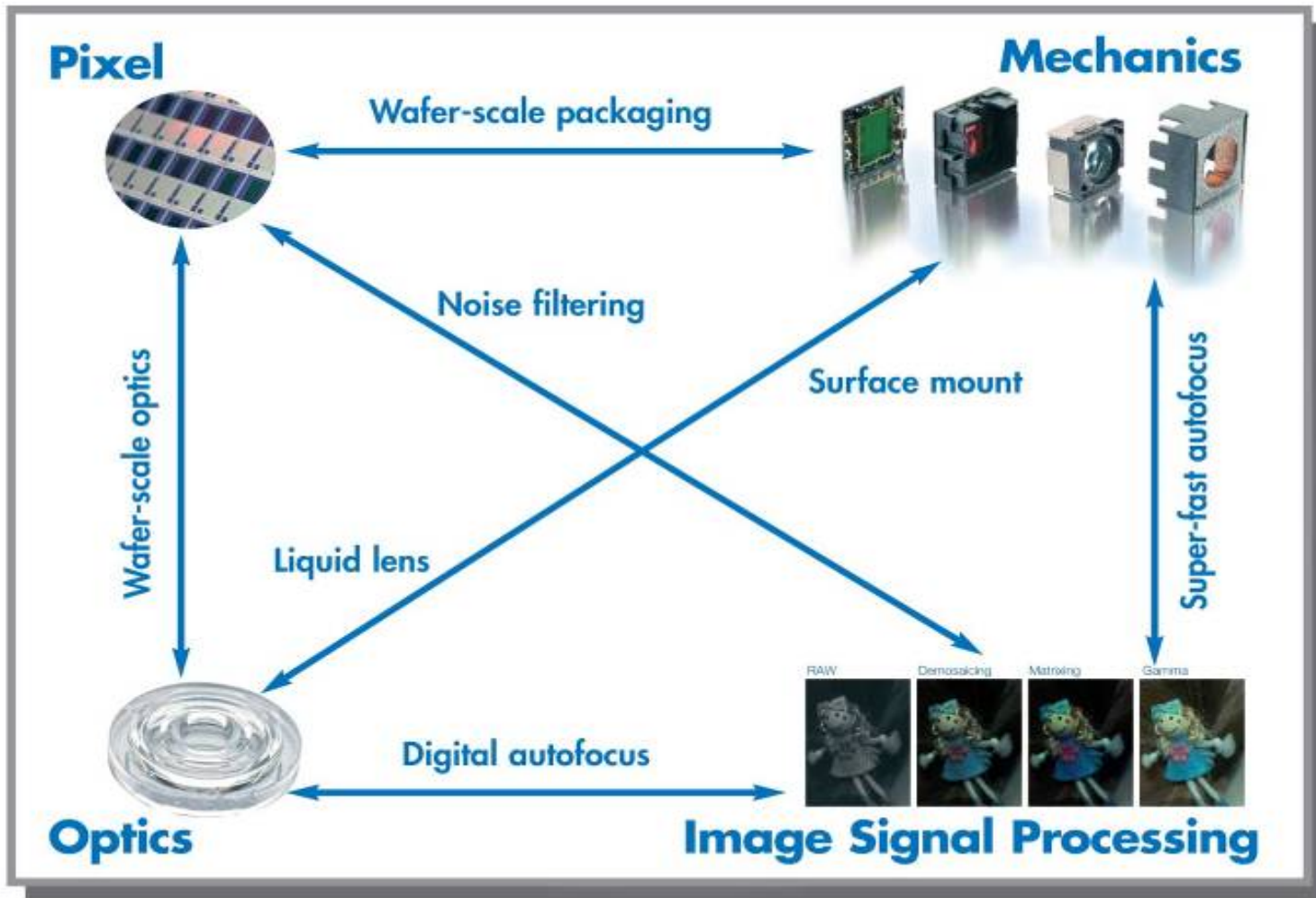
One stop shop for camera



Imaging Solutions



Mastering the four pillars of imaging



Worldwide imaging presence



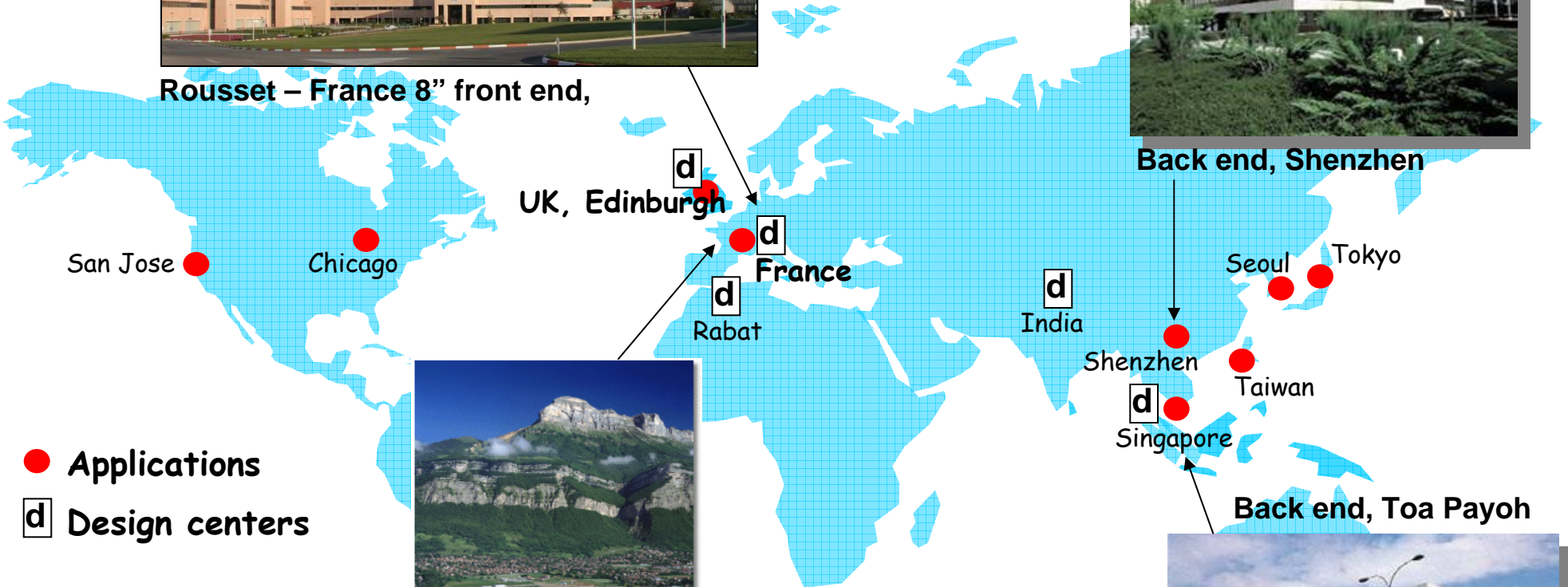
Imaging Solutions



Rousset – France 8" front end,



Back end, Shenzhen



- Applications
- d Design centers



Crolles – France 8" + 12" front end



Back end, Toa Payoh



Imaging focus in Consumer applications



Imaging Solutions



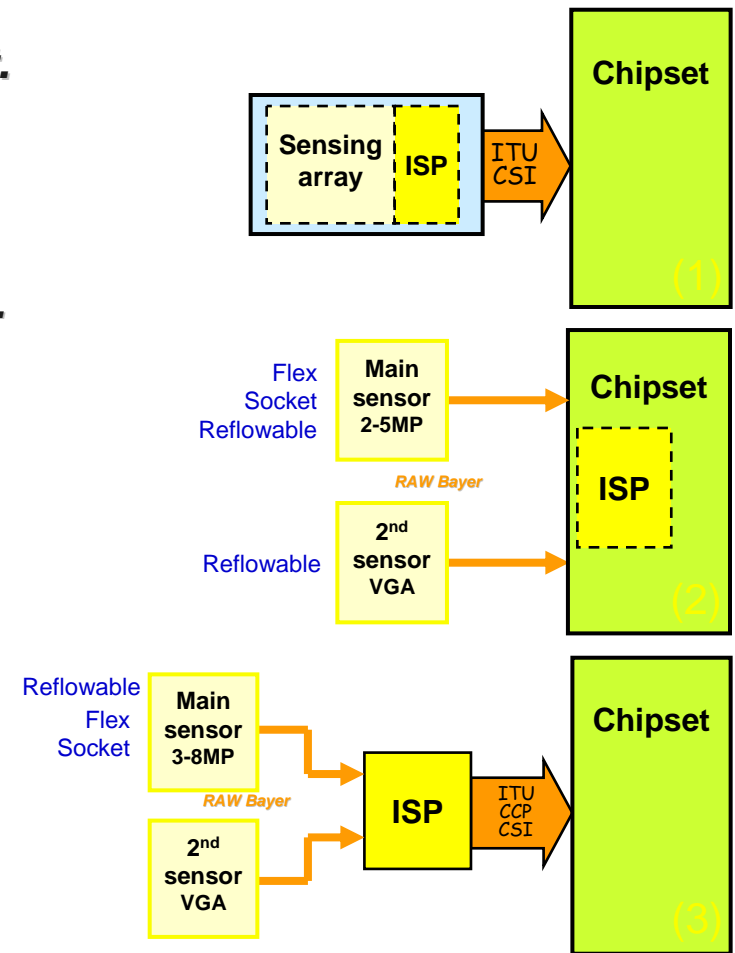
21/09/2010

Confidential information





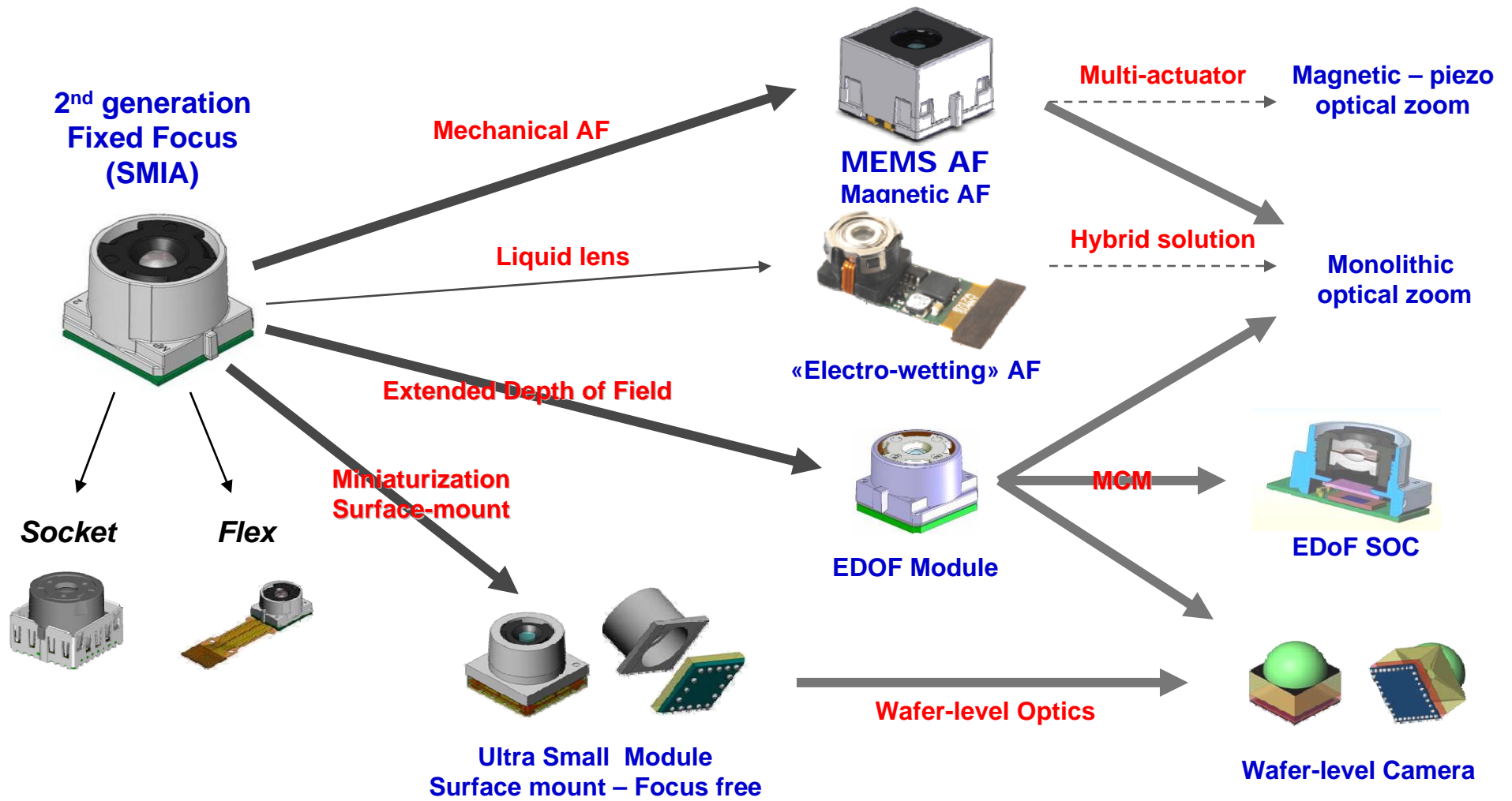
- **Top-level CMOS Camera supplier for cellular market. Manufacturing capacity of 200 Mu/year.**
- **Innovative products with significant cost and size advantages, leveraging from system-level approach.**
- **Three complementary roadmap axis:**
 - ✘ **Single-chip cameras** for legacy
 - ✘ **Bayer sensors** for optimized implementations ⁽²⁾
 - ✘ **ISPs** for more flexibility and performance ⁽³⁾



Video processor tailored for image performance

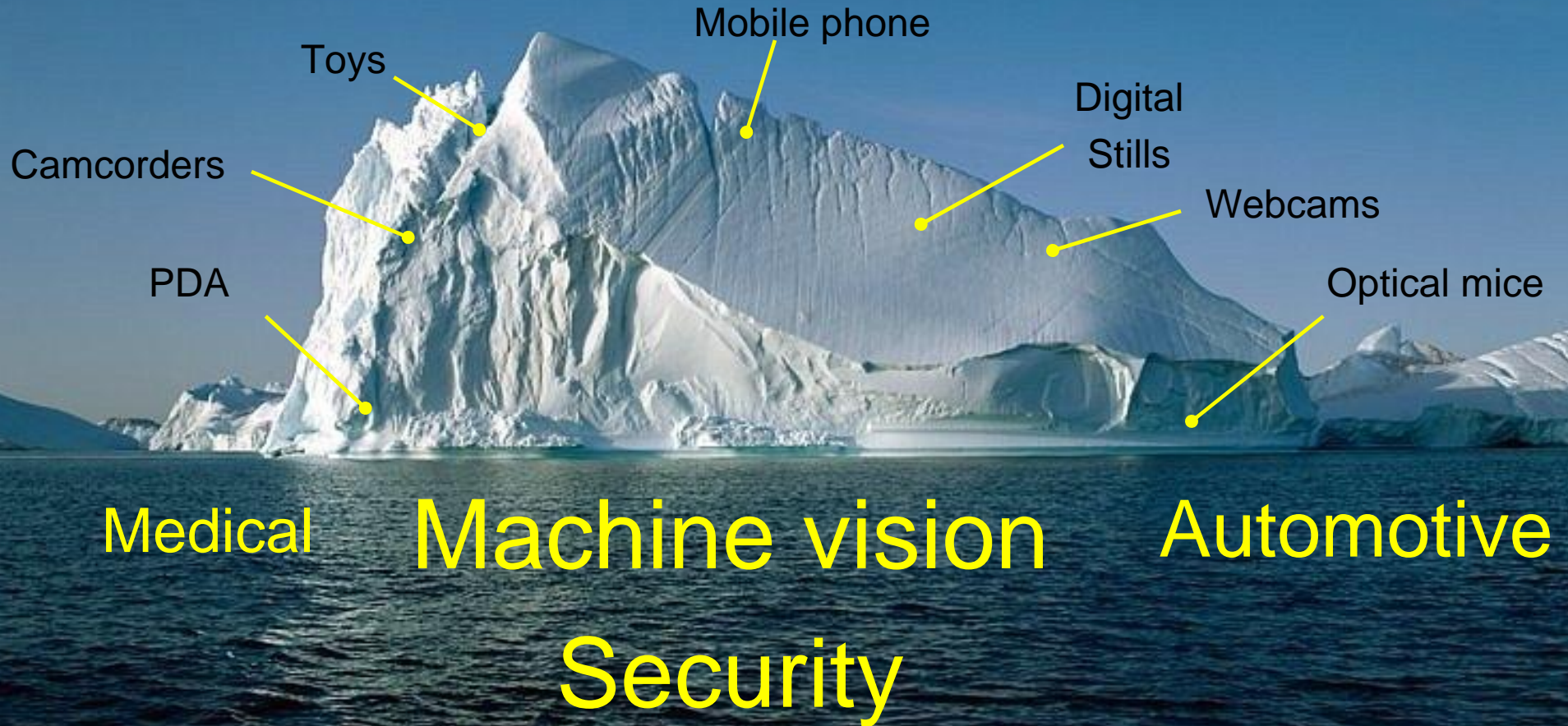


Camera modules family



Imaging market is larger than mobile phone market

The “traditional” markets for Imaging are only the tip of the iceberg





- ***Edinburg, optical conception site, products development:***

- ✘ 4 optical engineers for camera lens design and EDOF.

- ***Grenoble, marketing & ISP:***

- ✘ 3 optical engineers, waferlevel optics, disruptive solutions for emerging markets.
 - Need for one optical student each year! (end of study placement).
 - We also need a PhD student.

- ***Crolles, photolithography and CMOS sensors modeling:***

- ✘ 3 optical engineers, CMOS optimization and characterization, photolithography equipments.

- ***Singapore, packaging & automation:***

- ✘ 1 optical engineer, camera module characterization, yield improvement.

PhD subject for 2010-2013: passive 3D ranging using a single image sensor



- **State of the art:**

- ✗ Active ranging already exist: stereoscopy, active triangulation, time of flight

- **Scope of the investigation:**

- ✗ To study passive 3D ranging techniques using a single camera module
 - Wavefront coding: adding a phase plate near the stop aperture.
 - 4D imaging (like Plenoptics function capture)
 - Local wavefront defocus measurement
 - Depth recovery from defocused spot variation with objective aperture
- ✗ To analyze those approaches (including new ones)
- ✗ To select the most suitable one for 3D integrated systems.

- **The PhD student will:**

- ✗ make a bibliographic study first, including simulations to better understand the limitations of each one.
- ✗ Once one (or a few) solution is selected, a demonstrator will be developed involving circuit design, pixel process adjustment and specific characterization.

- **Team:**

- ✗ PhD student profile: Optical engineer or Physic engineer with good knowledge in optics and imaging.
- ✗ ST tutor: Jérôme Vaillant, Imaging Division, STMicroelectronics, Grenoble.
- ✗ University tutor: Etienne Le Coarer, laboratoire d'astrophysique de l'observatoire de Grenoble
- ✗ Location; ST Grenoble. Duration: 3 years, STM contract.