




varioptic

A drop of genius

**A Drop of Genius for an
Optical Revolution**

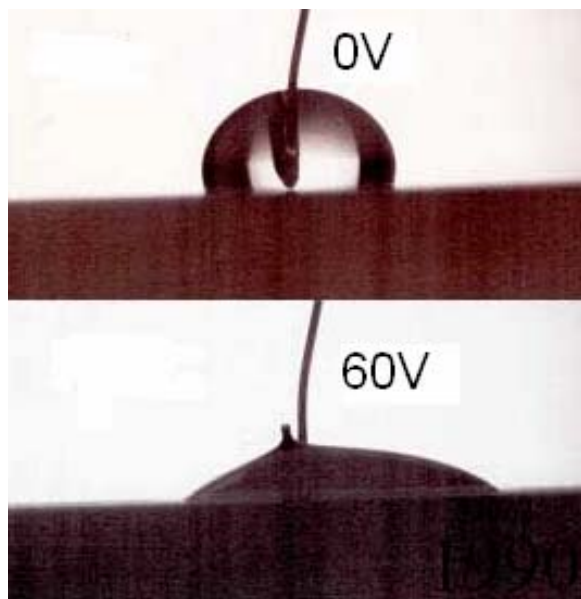


Company Overview

- Varioptic established in 2002 - based on 10 years of research
- Patents granted for fundamental liquid lens technology
- Based in Lyon, France
- 45 employees with 35 high level engineers and scientists in material science, optics, chemistry & mechanics
- Strong financial backing from Polytechnos (D), Sofinnova (F) and NIF (J)
- Samsung Electro-Mechanics is lead customer
- 12 other companies on Technology Assessment Programme
- In-house production line for low volume supply
- ISO9001 certification

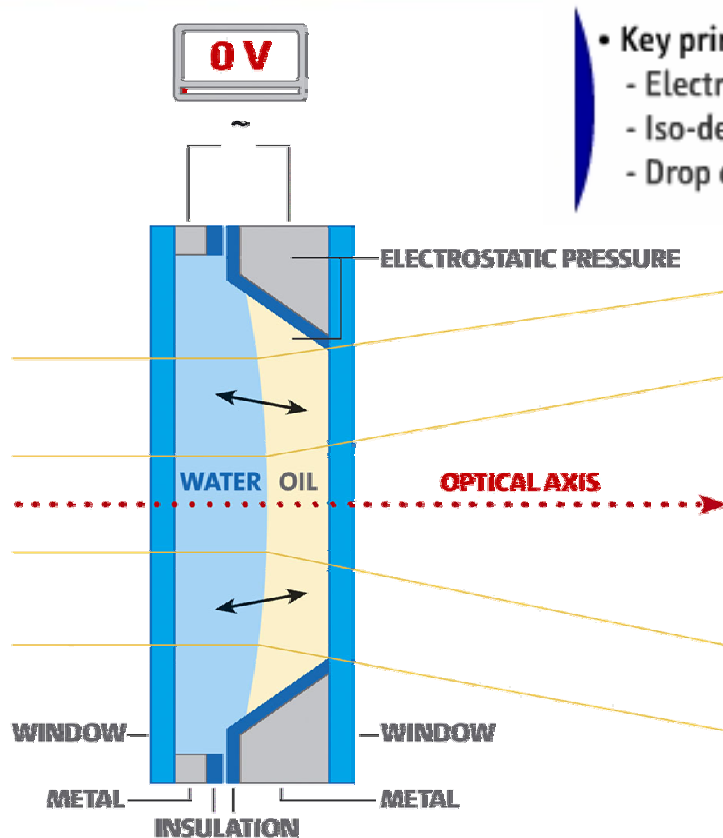


Electrowetting Principles

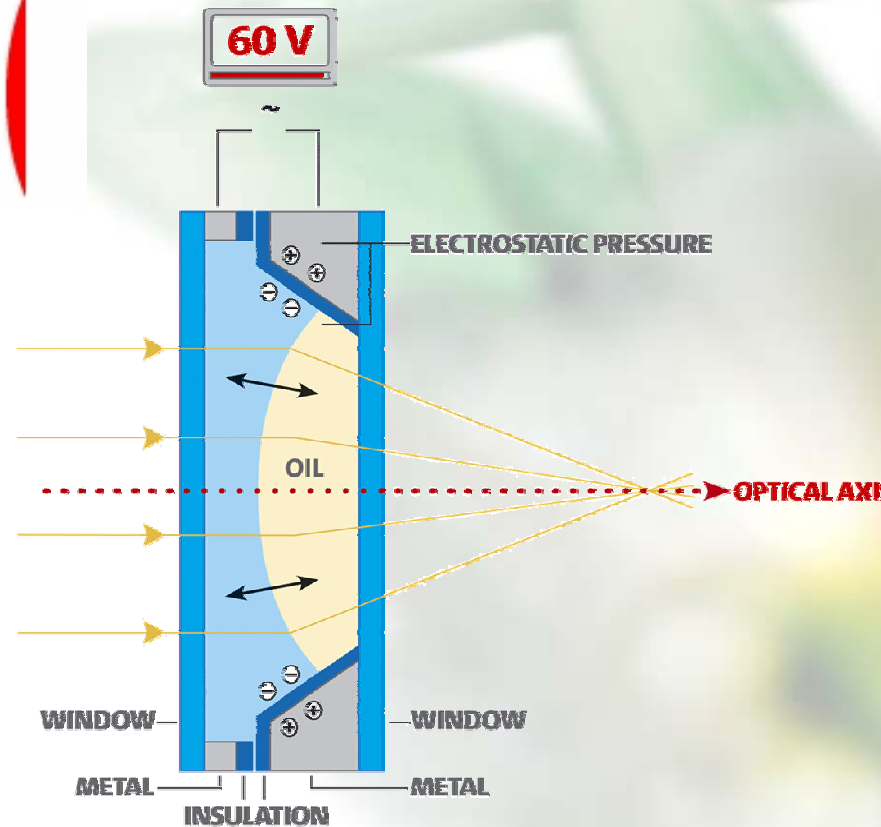


- Liquid is “phobic” of the surface
- Increase voltage and the liquid increasingly “wets” the surface

Liquid Lens in Operation



- Key principles :
 - Electrowetting
 - Iso-density
 - Drop centering

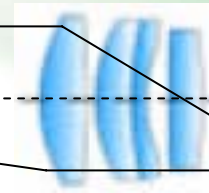


- At low voltage the lens is slightly divergent

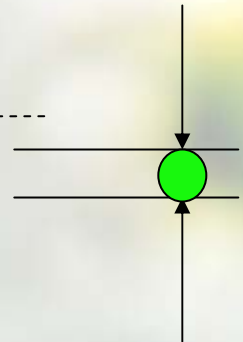
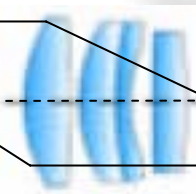
- Increase voltage and the lens power increases
- Range of -5 to +20 dioptres for launch product



"Focus" is essential for sensors with resolution $> 1.3\text{MP}$ (1)

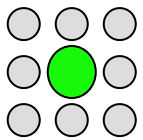


**Long distance focus is OK
...but short range is blurred**

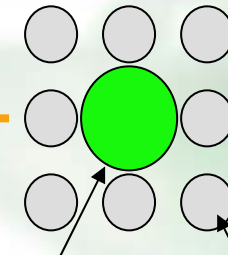


- "Focus" point moves behind image plane
- At image plane, image is blurred if image size is larger than pixel size

"Focus" is essential for sensors with resolution > 1.3MP (2)



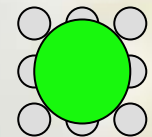
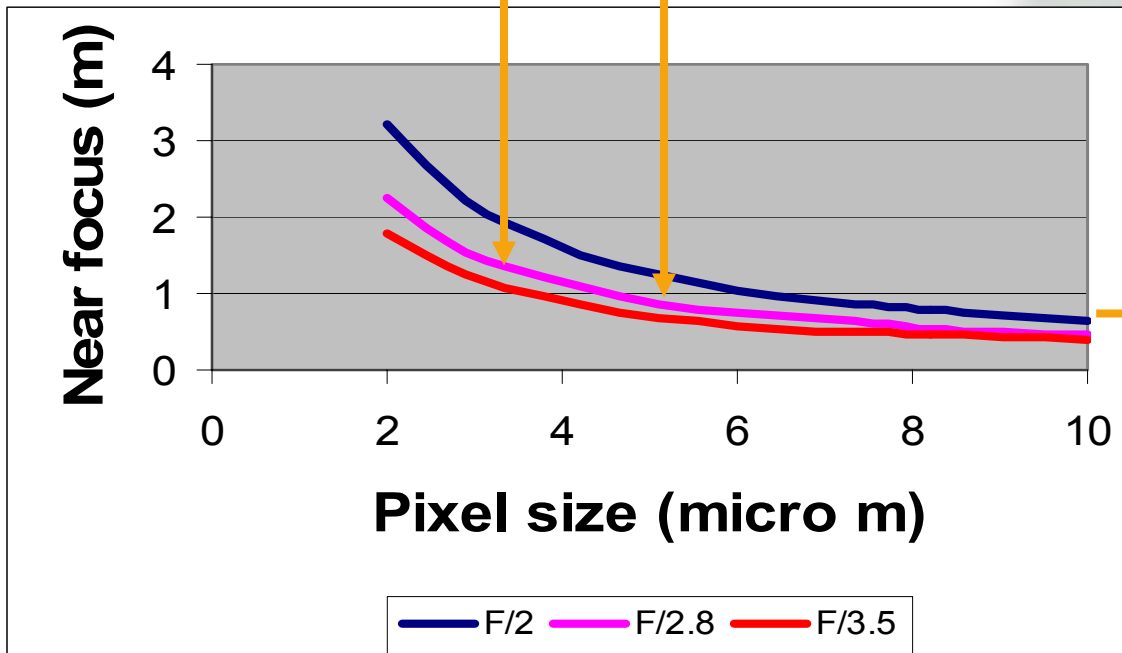
(B2) 1.3MP sensor – image clear at 130cm or greater



(A) VGA sensor - clear image to 80cm for F/2.8 lens

Image Pixel

BUT...



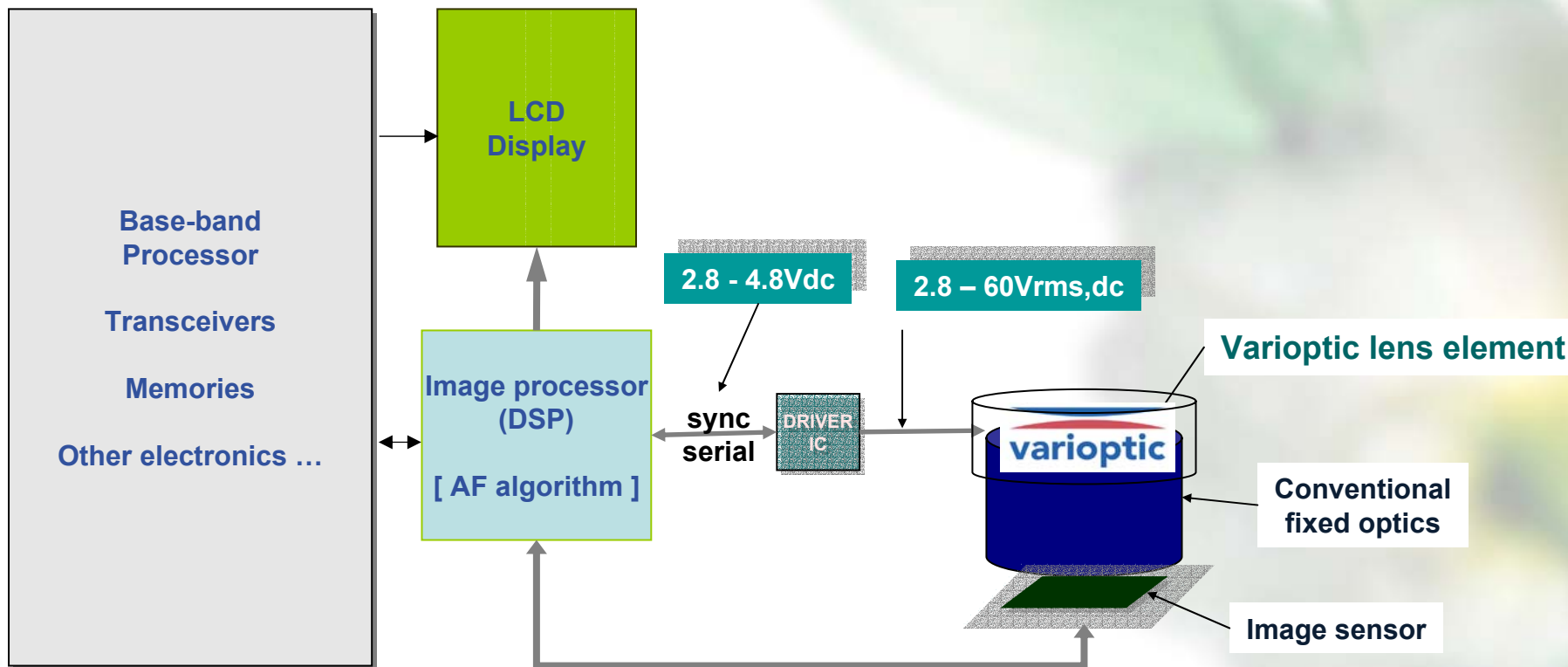
(B1) 1.3 MP sensor – image blurred at 80cm

Increasing sensor resolution

Markets For Auto-Focus & Zoom



Auto-focus system





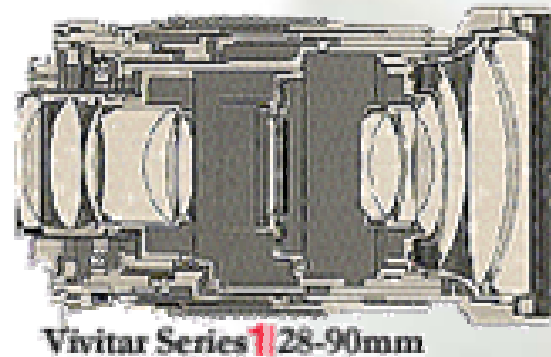
The Problem : Poor image quality on camera-phones

**CAMERA-PHONES ESSENTIALLY LACK AUTO-FOCUS (AF) OR ZOOM CAPABILITY.
/F AND ZOOM CURRENT TECHNOLOGIES ARE NOT COMPATIBLE WITH REQUIREMENTS
OF MOBILE-PHONES.**

EXISTING SOLUTIONS:

Mechanical displacement of fixed lenses

- ⦿ Fragile and Complex
- ⦿ Too big
- ⦿ Require high power
- ⦿ Expensive



The Solution:

**VARIOPTIC TECHNOLOGY GETS RID OF ANY MOVING PART.
THE LENS ITSELF ADJUSTS ITS FOCUS.**

- **Stronger:** Tested for more than 2 million ON-OFF cycles and 20 drop-tests 1.5 m.
- **Smaller:** 10.5 mm versus 12.5 mm and large possibilities of miniaturisation
- **Lower power:** 1mW versus 70 mW
- **Cheaper:** 0.5 € versus 2 € in volume production



The logo for Varioptic, featuring a stylized blue and red swoosh above the word 'varioptic' in a lowercase, sans-serif font.