

Thales applications for freeform optics

EPIC Online Technology Meeting on Next Steps Fast
Growing Freeform Optics Applications

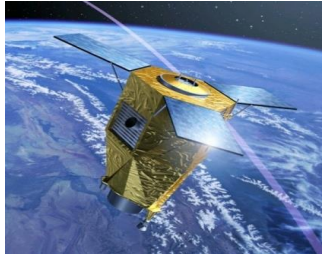
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Thales applications for freeform optics

Space



**Next generation
of earth
observation
instruments**

Avionics



**Helmet
visor & HMD**

Transportation



Autonomous vehicle

Optronics

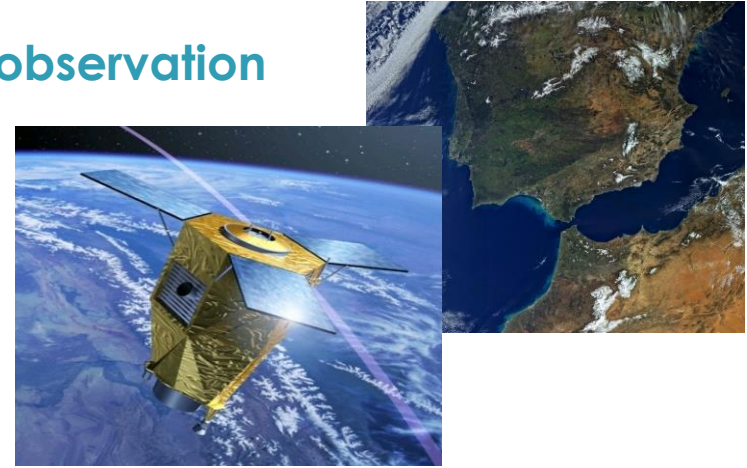
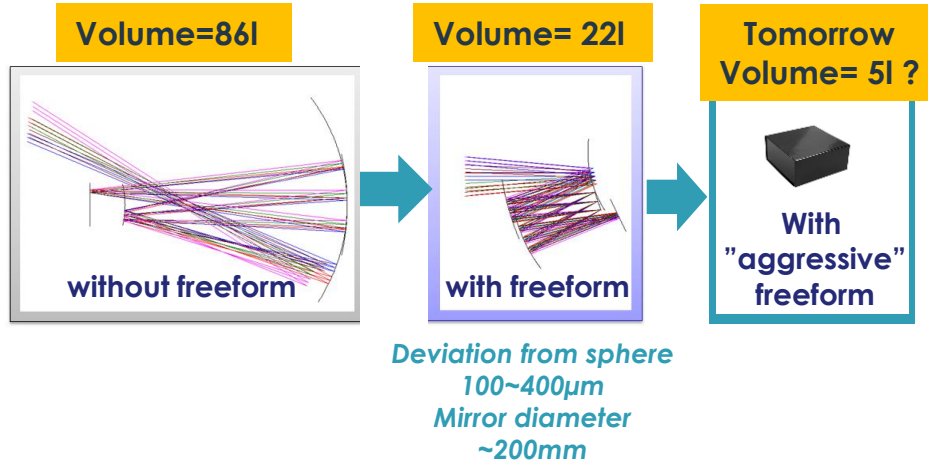


**Soldier helmet
Situation awareness**

Compact spectrometer for space

Next generation of spectrometers for earth observation

- Compactness/mass reduction
- wide spectral band (340nm-2 μ m)
- wide field of view (up to 70°)

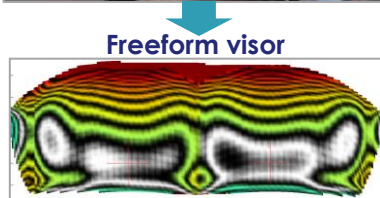


Requirements

- Large surface components
- Metrology means
- Design tools & methods enabling the whole potential of freeform

Helmet for avionics/optronics

Pilot helmet visor



Requirements

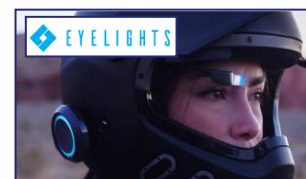
- Lightweight component
- Large deviation from sphere 100-200µm
- Diameter 100mm
- Molded plastic
- low cost

- Compactness
- Mass reduction
- Ergonomics
- Vision comfort

Soldier helmet



Low cost



Towards ultra low cost?

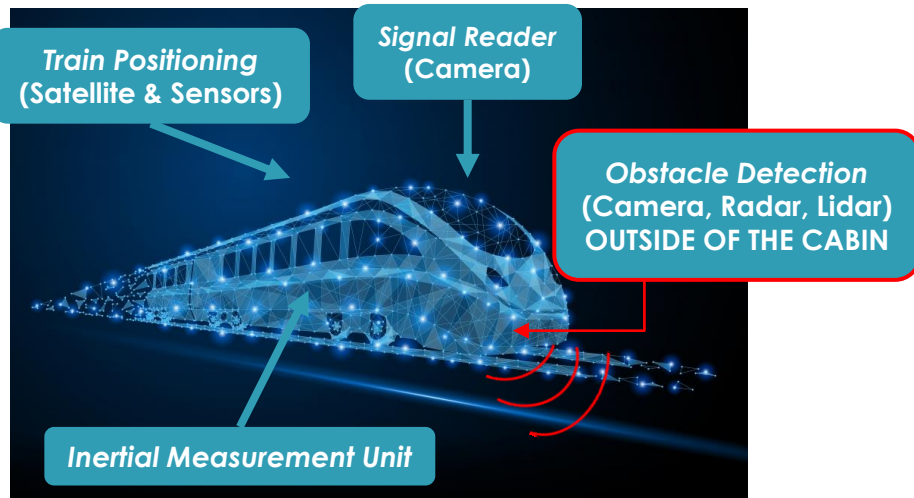
Requirements

- Lightweight & compact optical system
- Molded glass/plastic
- Low cost /ultra-low cost
- Robustness to environment

Functionalized windows for transportation/optronics

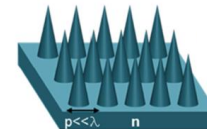
Urban rail/metro platform

- Security
- Robustness/yearly maintenance
- Large volume
- Cost of windows



Surveillance systems

- Robustness
- Wiper less
- Avoid complex maintenance



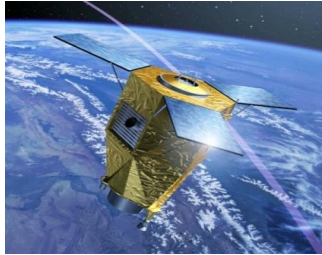
Requirements

- Molded glass or 3D imprint of glass
- For infrared or visible sensors
- Robustness
- Flat or curved windows

Summary

Thales offer: several domains of application for freeform optics

Space



Avionics



Transportation



Optronics



Thales demand for freeform optics:

- Large size components
- High precision metrology

- Molded plastic

- Molded glass
- Flat only surfaces
- Robustness

- Low cost
- Molded glass/ IR glass
- Robustness
- Toward curved surface

+ Adapted optical design tools to benefit from the whole potential of freeforms