

OPTOSIGMA EUROPE

EPIC Meeting on Photonics for Space:
Opening New Horizons at Exail





OptoSigma[®]

OptoSigma Europe S.A.S



Head Office :
Paris, France

German Branch
Munich, Germany



OptoSigma Europe

France, Germany

15 employees

Turnover : 6M\$

Created in 2014



Sigma Koki

Japan, China, Singapore

Asian Market Leader

500 employees

Turnover : 125 M\$

Created in 1977



OptoSigma Corporation

45 employees

Turnover : 15M\$

Created in 1995



What can we do for you ?

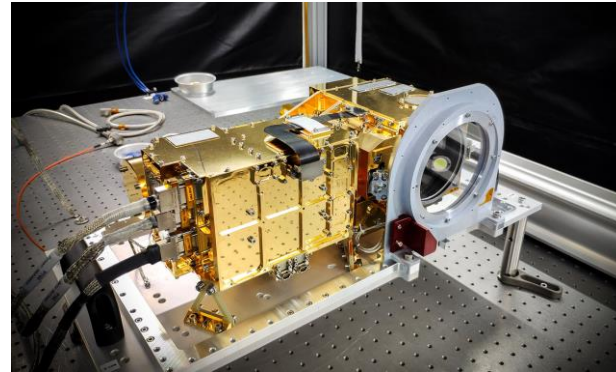
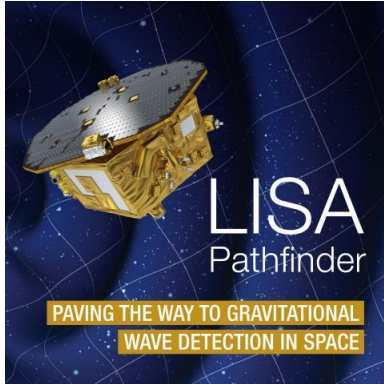


Off the Shelf Components



Customization Service

Our Partners



Challenge n°1 : Material Sourcing

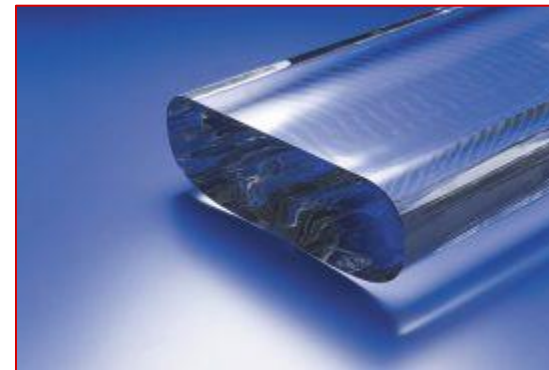
Export/Import Regulations

- Some Materials have restricted processing operations
- Example : **ZnSe** for Perseverance Mars Rover
- ZnSe Import/export and processing are regulated in Japan.
 - Adding extra documents and steps for production.



Availability over time

- Difficulty nowadays to source some materials
 - CaF₂
 - ZnSe
 - Germanium
 - UV Fused Silica
 - Specific Grade Materials
- Prepare for initial long lead time
- Anticipate and accomodate for equivalents
 - Space projects can take 10/20/30+ years, availability evolves



Challenge n°2 : Material Processing

Handling soft surfaces

- Ex : **ZnSe**
- Polishing requires specific Methods :
 - Define new processes
 - Max Surface accuracy : $\lambda/10$
- Cleaning is a big challenge to not damage the optical surfaces.
 - Different cleaning solutions
 - Different and more careful cleaning process
 - Be Careful when cleaning at reception

Polishing Hard Surfaces

- Ex : **SiC**
- Polishing requires specific Methods :
 - Define new processes
 - Max Surface accuracy : $\lambda/10$

Challenge n°3 : Multi-optics Assembly

Component compatibility for Space

- Common 'Earth' assemblies need redesign for internal parts:
 - Glue vacuum compatible
 - Adhesive / Cement compatible for vacuum
 - Black Paint
- Difficulty to make 1st prototype fully compatible
 - Price
 - LT for design
 - 2 Part Study

Performance / Reliability

- Performances :
 - High Strehl Ratio
 - Tight Centration
 - Tight tolerances on the optics
 - Fixed material grade
 - High Performance Coating
- Reliability
 - Exposed to vibrations => over tolerance ?
 - Availability of parts
 - Mechanics Materials of different size and density.

Challenge n°4 : Metrology and Warranty

Metrology

- Optical Performances
- Coating performances
- Substrate Qualification

- **We have the Equipment / We can Guarantee**

- Vibration Testing
- Life Cycle Testing
- High Pressure Testing
- Thermal Testing
- Abrasion Testing
- **No Testing Equipment / Need a Partner**

Prototypes / Final Warranty

- Warranty needs Metrology and simulation
- When it is not available => Prototype
 - 1 or more prototype per experiment
 - Spare samples

- Long Process with redesigns and ajustements



Looking for a
Business Partner !

