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23.6.26

FISBA Innovators
in Photonics

Beyond the visible for defence

Swissphotonics Lunch Chat March 23.6.2026

Facts

- Founded in 1957
- Privately owned
- App. 350 employees around the world
- Investments CHF ~4 Mio/year
- 3 owned subsidiaries
- 4 distributors
- Quality credentials
 - ISO13485 (Switzerland)
 - ISO 9001:2015 (Switzerland)



What we Focus on

FISBA is a market leader in optical components and customized optical systems. We develop innovative glass technologies for shaping and delivering light.

Our 4 key capabilities are

- Optical Design and System Engineering
- High precision glass forming and molding
- Manufacturing of low weight, small size optical assemblies with high NA
- Coating Design including Process Engineering and Production

Committed to innovation in high volume, precision manufacturing.



FISBA offering range of optics for defence

1. Type of optics:

- Optomechanical assemblies (center-turned or dropped-in)
- Precision molded aspherical lenses (up to 35mm)
- Cemented optics (i.e. beamsplitters, doublets)
- Conventional optics (prisms, lenses, filters) –it has to be “very special” conventional optics (such as off-axis lenses, special outercontours, tight tolerances), because simple optics is nowadays a commodity

2. Restrictions:

- VIS-SWIR wavelength spectrum
- Size up to 100mm
- Materials: precision oxide glasses
fused silicaType of optics

3. Geography:

- EMEA



FISBA experience in serial production

- FISBA has long experience in serial manufacturing of lenses for tough environment:
- One of the most significant is F35 program of which FISBA is part:
 - Since more than 12 years we deliver up to 2'000 pcs of imaging lenses per year (helmet lenses and flight lens) for F35 program
 - Including F/D1.2 and F/D1.3 objective with aspherical elements and active coma compensation
- That has been used by LM in their promotional video for Swiss suppliers: https://www.linkedin.com/posts/fisba_f35-safety-helmet-activity-7206905695932235776-B4Sb/?utm_source=share&utm_medium=member_desktop
- [Kampfjet F-35: Helm kostet eine halbe Million Dollar - News - SRF](#)



Application example 1

Optics for JSF & Pilot

Challenge to FISBA:

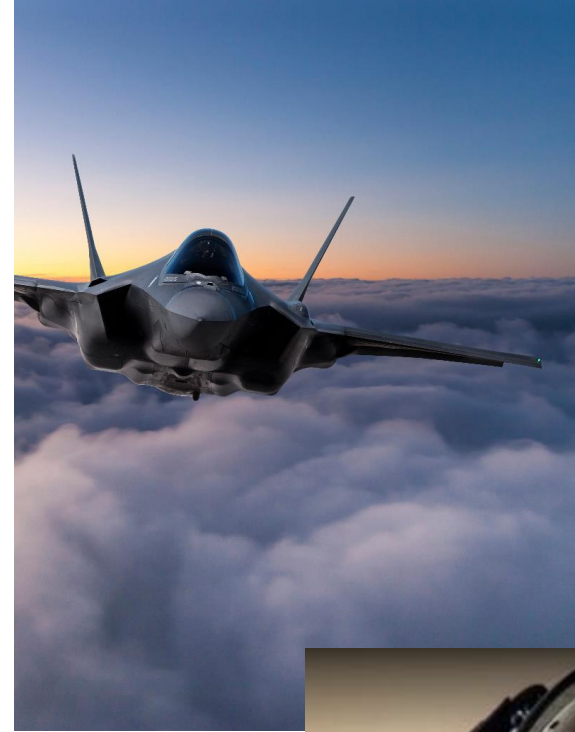
- Combine high image quality (MTF), low F-number, thermal compensation and minimum size/weight by use of a very compact, aspheric design.

Solution:

- Side-by-side development of opto-mechanical designs, tailor-made optical components and systems by combining Precision Molded Aspheres, and in house manufacturing and assembly process.

The Benefit:

- Economical production of high quantities of uniquely shaped aspheres:
- Perfect match of requirements, design and production process for excellent price/performance ratio
- Highly scalable production at reproducible quality
- High level quality management
- Production redundancy and safety stock to guarantee continuous supply and quick reaction



Application example 2

Laser Range Finder

Challenge to FISBA:

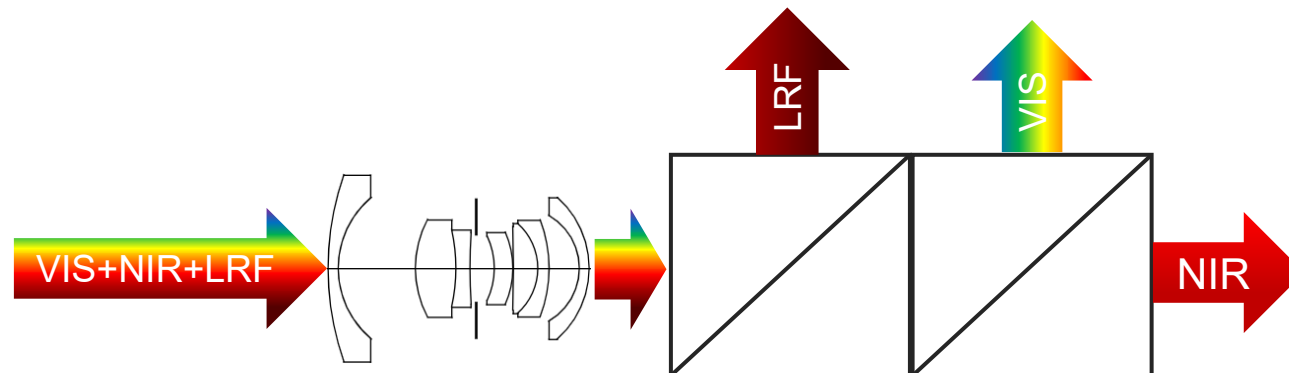
- Provide high precision objective with double beamsplitter for Laser Pointer, Laser Range Finder, low-light and visible sensors.

Conceptual Solution:

- Alignment turned objective with a high precision planar optics demanding very precise manufacturing capabilities in assembly and coatings

The Benefit:

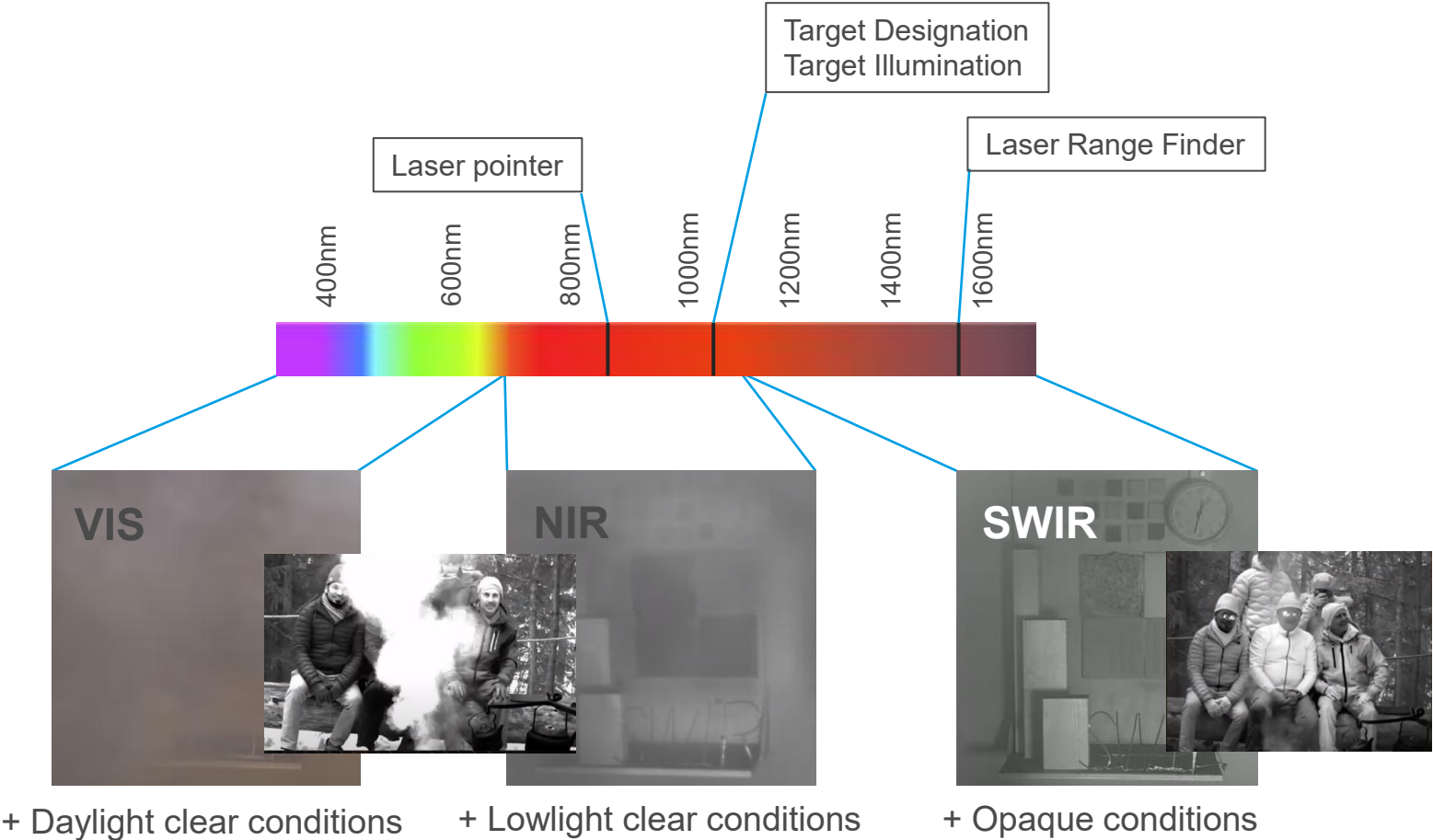
- Land of origin, Swiss supplier for the EMEA, short application path, manufacturing capabilities.



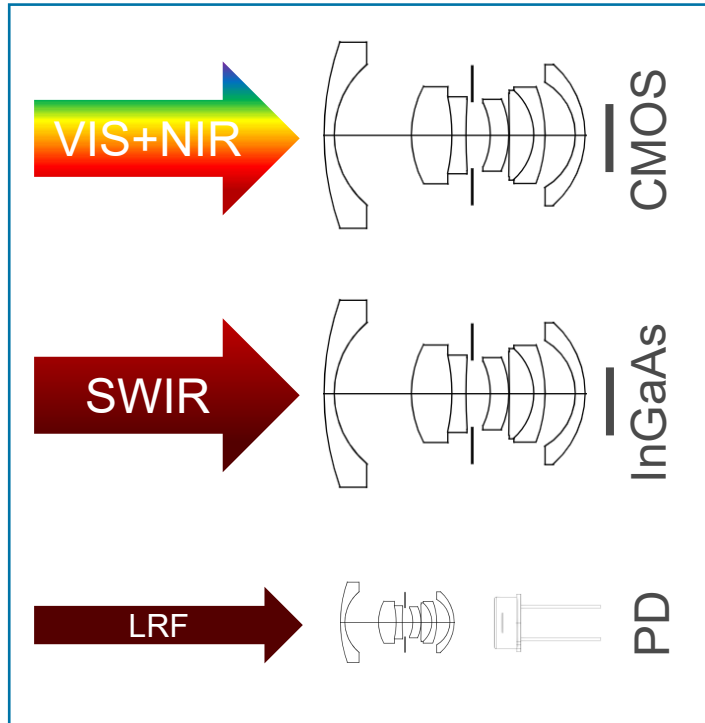
Optical architecture application trade-off for multispectral imaging

Prepared by Roman Szatkowski

Spectral uses



Multispectral optics with separate optical channels

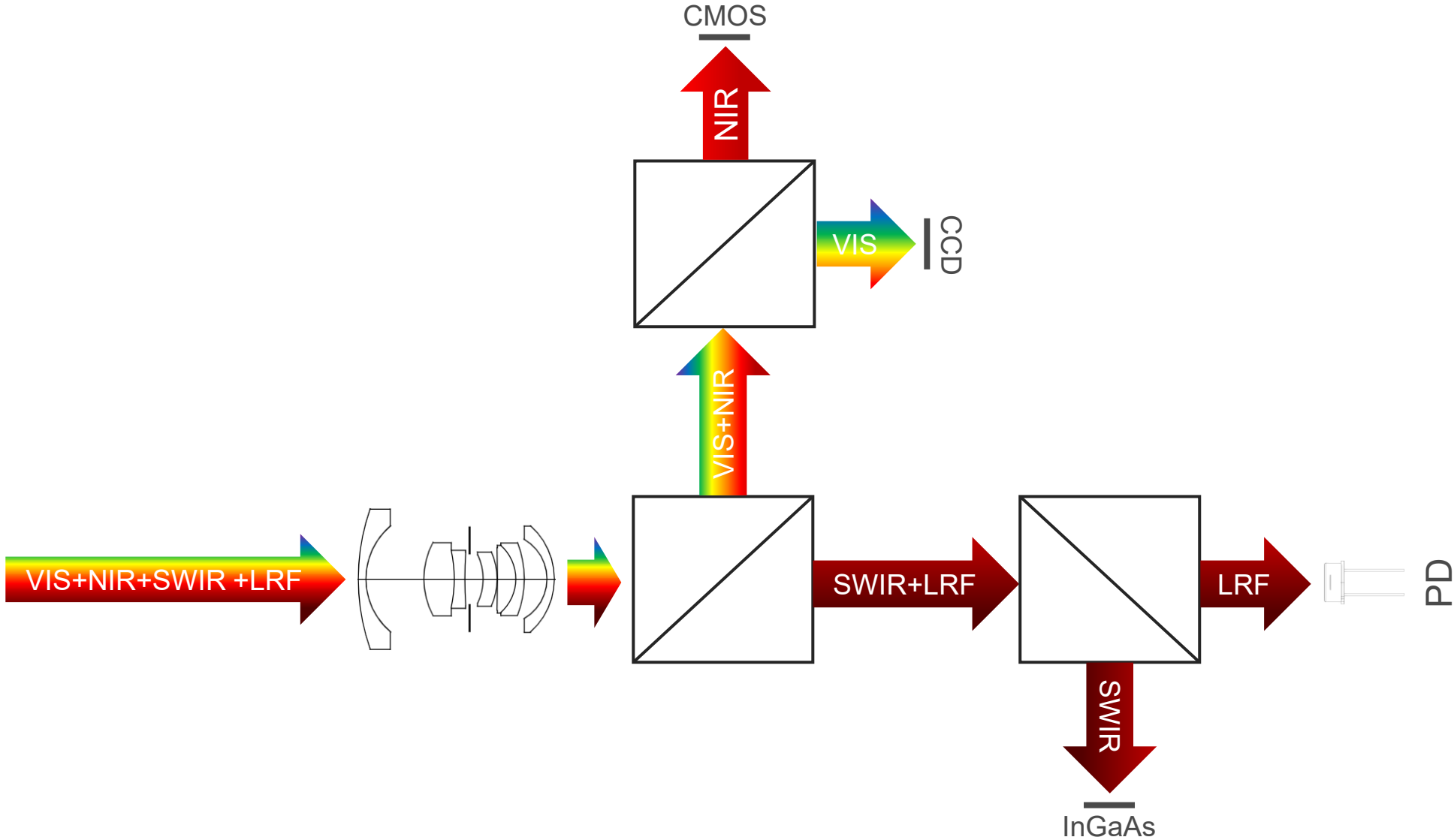


+ Performance
- Cost
- Weight

Perfect for:

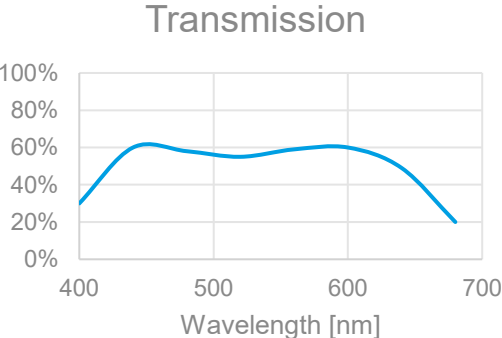
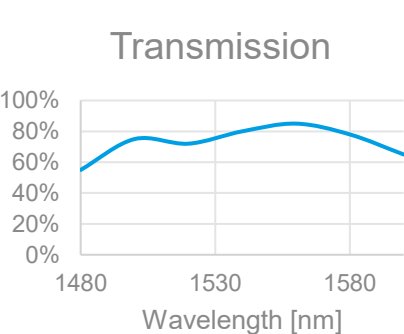


Multispectral imaging with single imaging lens I (THE DREAM)

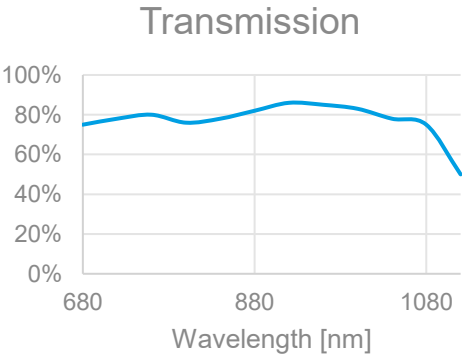
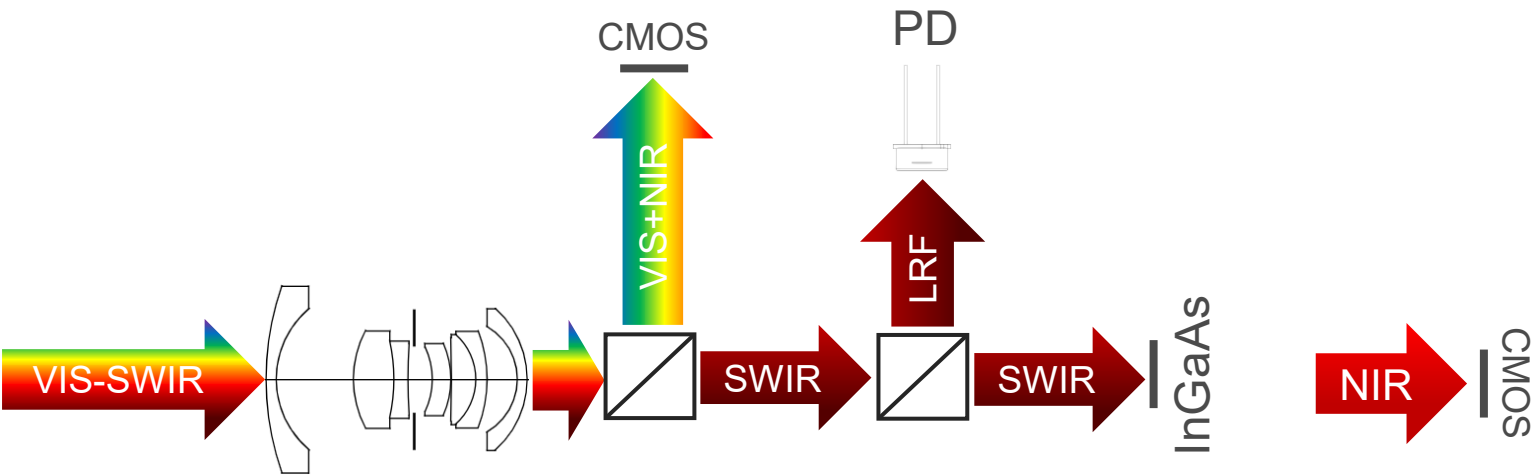


Multispectral imaging with single imaging lens (The Reality)

- + Weight
- + Cost
- Performance



Perfect for:



Optical coatings for multispectral imaging

Prepared by Carsten Rosenblad

Coatings

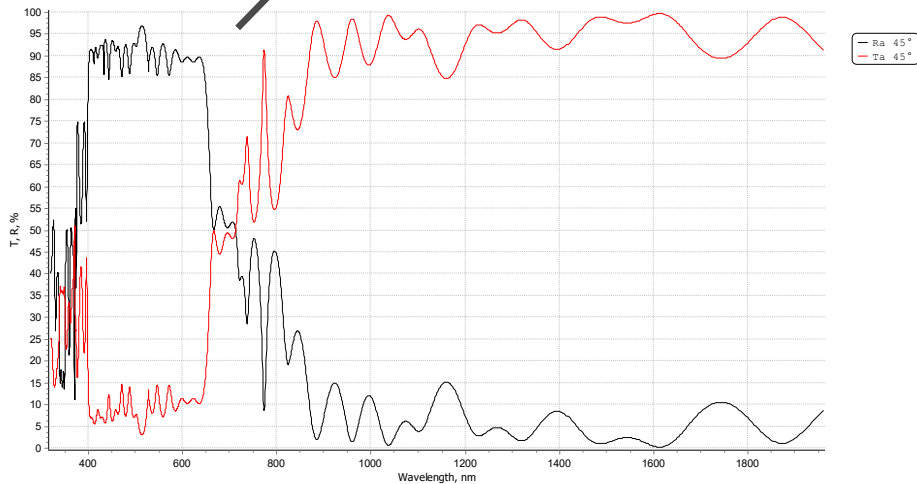
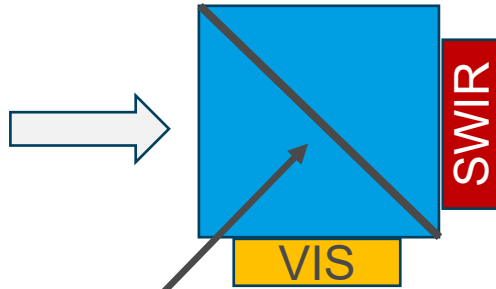
Performance requirements for the coating required from the defence market:

- The wavelength range: Typical VIS + «Invisible» light (400 – 2500 nm).
- The mechanical/durability specifications are often very high to reflect the harsh environment the applications are used:
 - *Rapid shift in temperatures*
 - *Operation in the arctics and in the desert*
 - *Airborne operations*
 - *Humid environments*
 - *Maritime operations with sea-water*
 - *And / Or combinations of the above*
- Systems operating with high laser-power

Beamsplitters

VIS/SWIR beamsplitter: Making the invisible visible

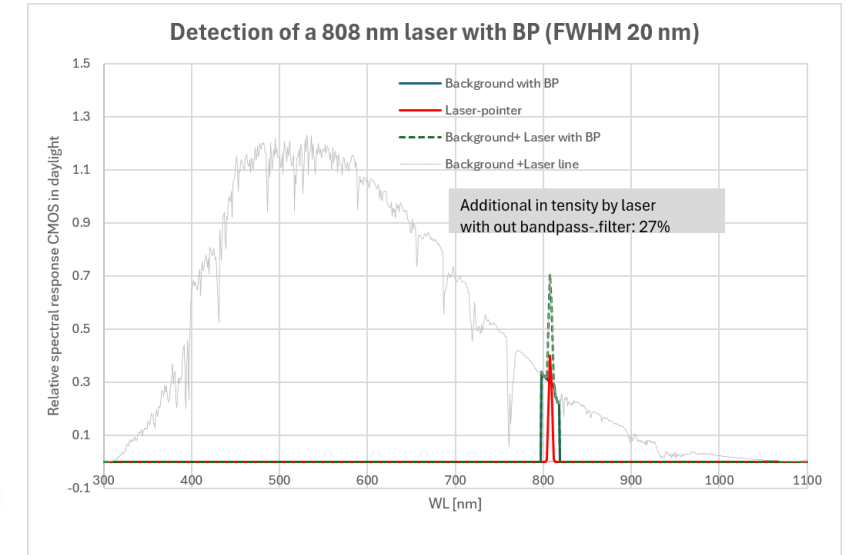
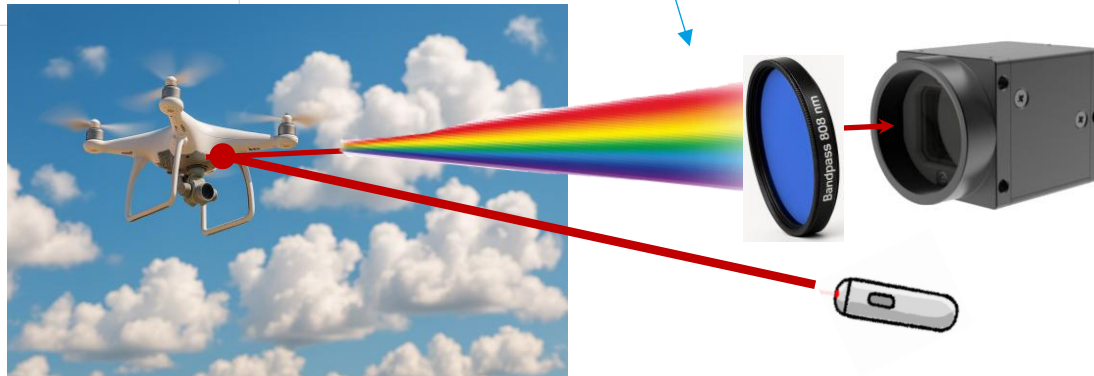
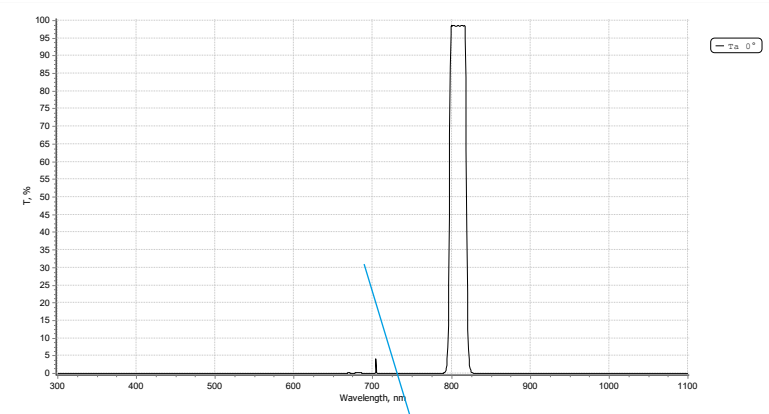
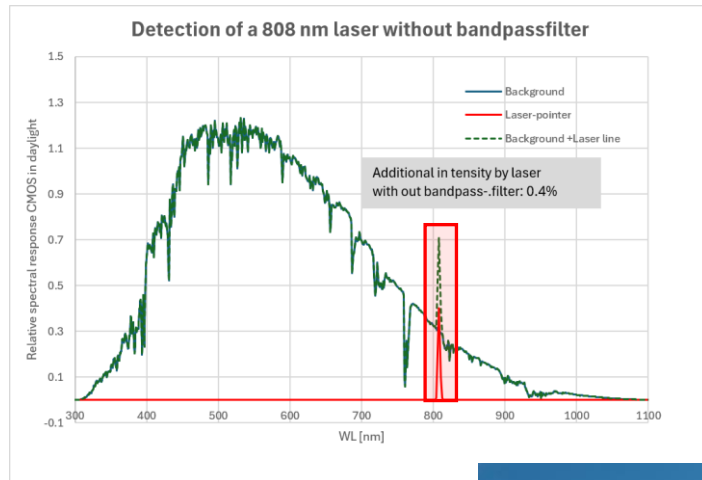
- A typical application is that of the VIS/SWIR beamsplitter that splits the view into 2 or more channels for different cameras or detectors.



Bandpass-filters

Maximize S/N: Only What Matters Gets Through

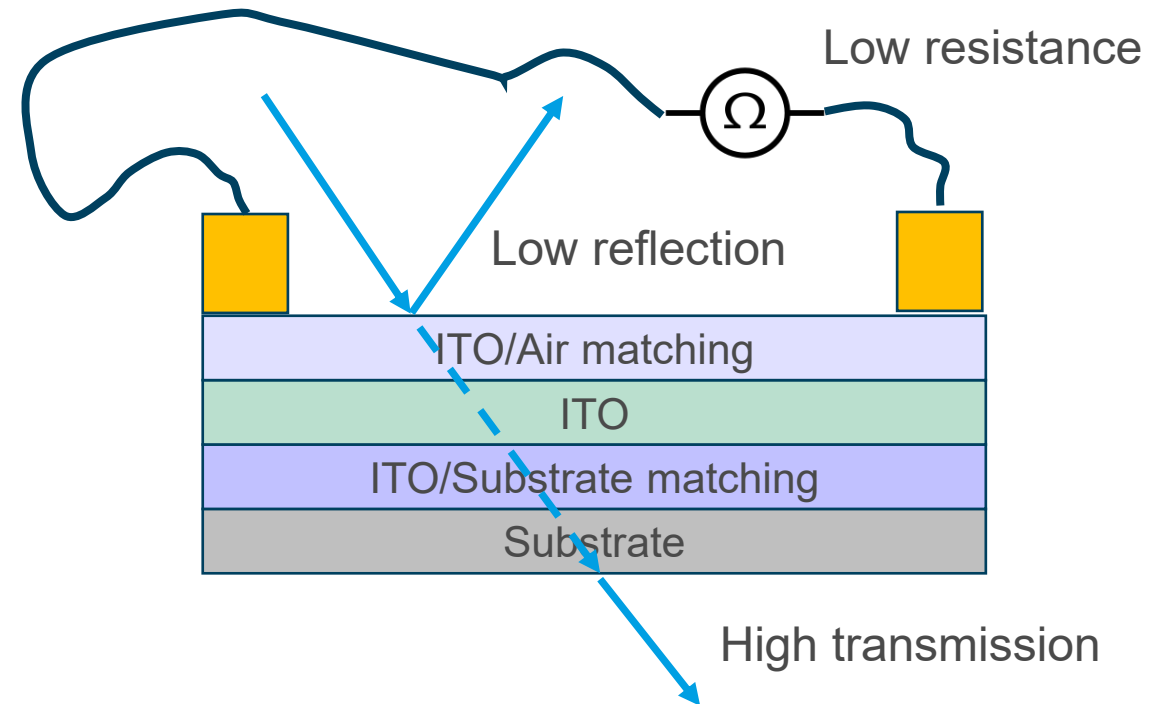
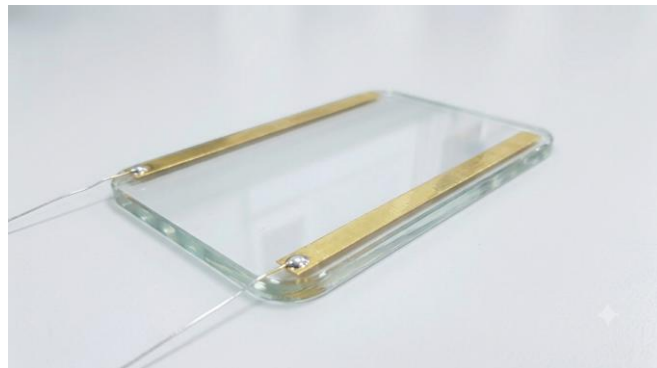
- Bandpass-filters are typically used to filter only the interesting part of the spectrum, e.g., a well-defined laser-line in the spectrum of a CMOS detector in daylight.



Transparent conducting oxides (ITO)

Coating – More than shaping the spectra

- $\text{In}_2\text{O}_3:\text{Sn}$ is as a highly degenerate n-type semiconductor with a fair density of free electrons (Sn-dopant), while still maintaining a wide bandgap of 3-4 eV: Transparent and conductive.
- In defence applications, ITO enables transparent heating for de-icing and de-fogging and providing effective electromagnetic shielding for sensitive systems.

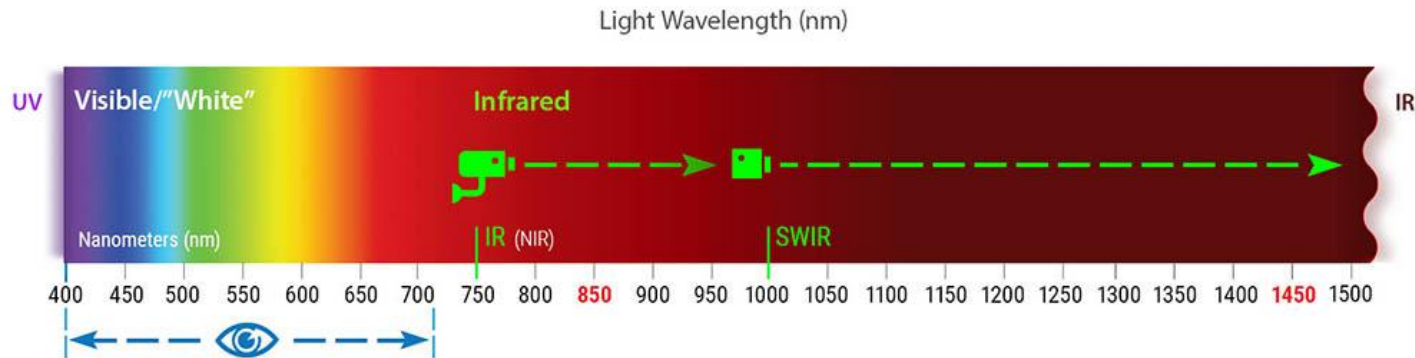


Optical metrology for defence solutions

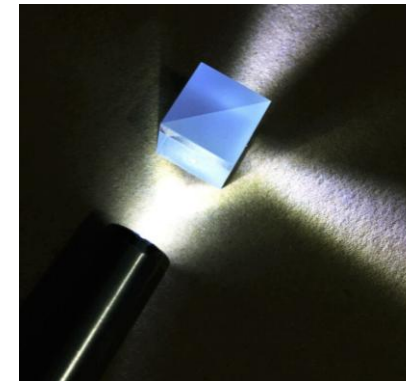
Prepared by Cord Brüggemann

Metrology for Defence

- Coverage of a large wavelength range
 - VIS - visible wavelength range – 380nm to 700nm
 - SWIR - short-wave infrared range – 900nm to 1700nm

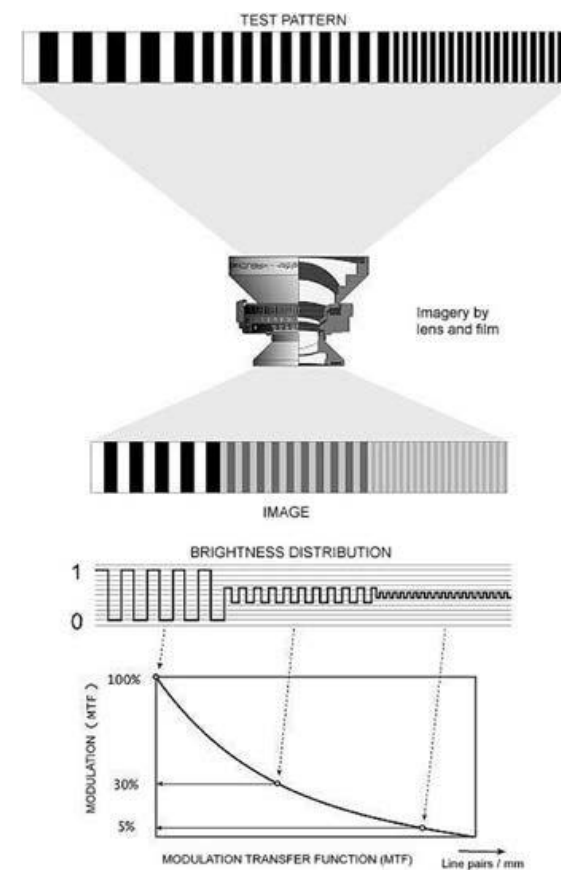
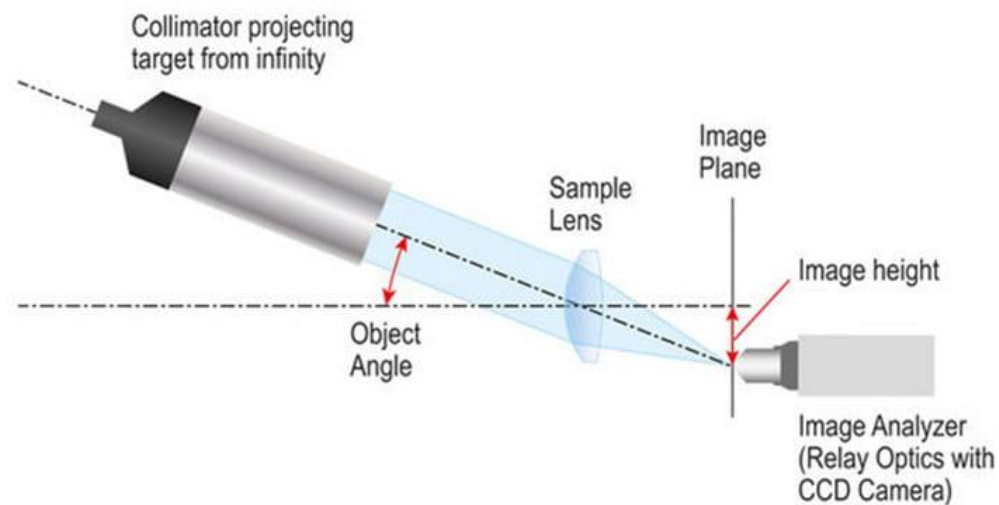


- Measurement of straight and angled beam paths



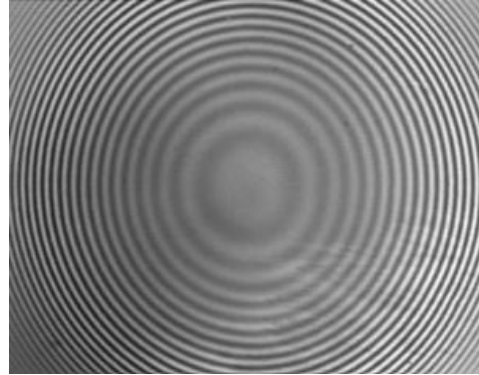
Metrology for Defence - Solutions

- MTF measurement system
 - mirror collimator

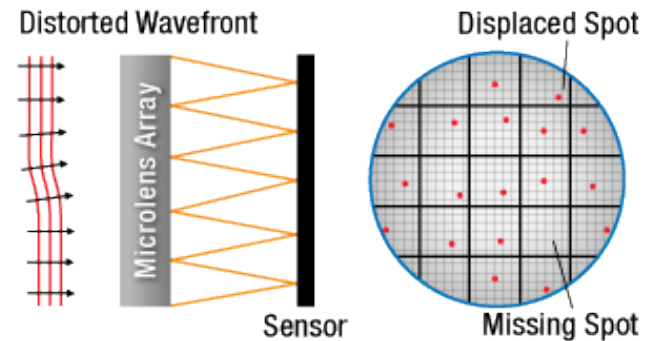


Metrology for Defence - Solutions

- Interferometer
 - 405nm – 1064nm



- Wavefront sensor covering SWIR range
 - 950nm -1700nm



Metrology for Defence - Solutions

- Temperature tests
 - Typical -40°C - $+80^{\circ}\text{C}$
- Vibration tests
 - Extreme case: catapult launch from an aircraft carrier



Further Metrology Capabilities

Centration Systems



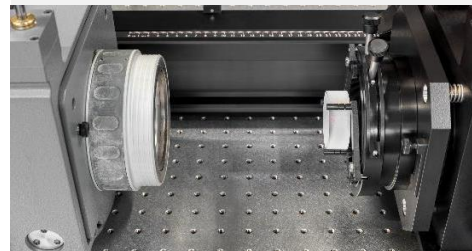
- lens centration

MTF Systems



- imaging performance

Interferometer Systems



- form deviation, roughness

OGP Multi Coordinate System



Phasics wavefront sensor



- Wavefront measurement

UA3P Profilometer



- form deviation (aspheres)

White-Light-Interferometer



- form deviation, roughness

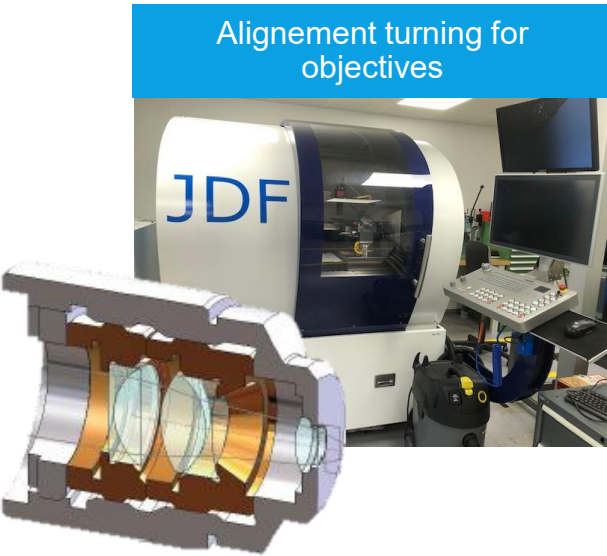
Zeiss 3D Coordinate System



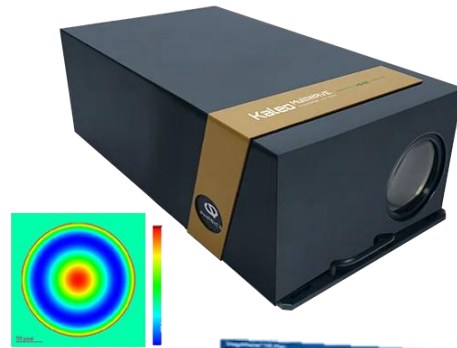
Capabilities at FISBA for manufacturing single aperture multispectral system

Beside all the usual stuff... you need and FISBA has:

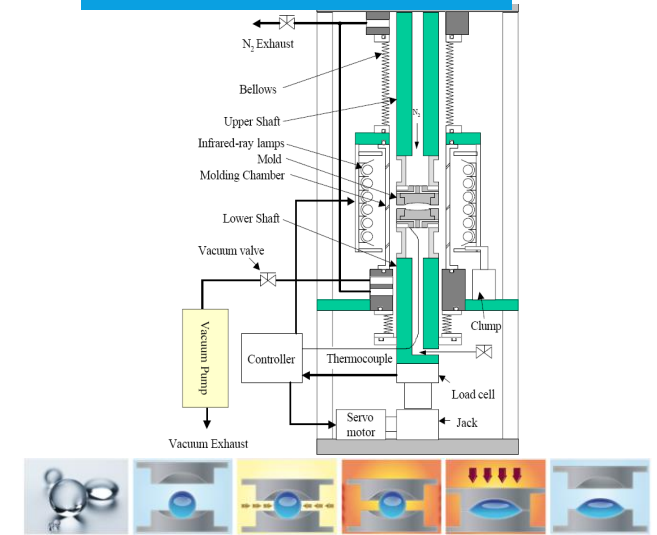
Alignement turning for objectives



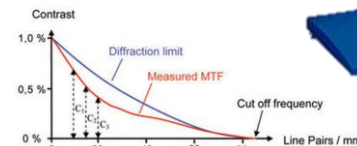
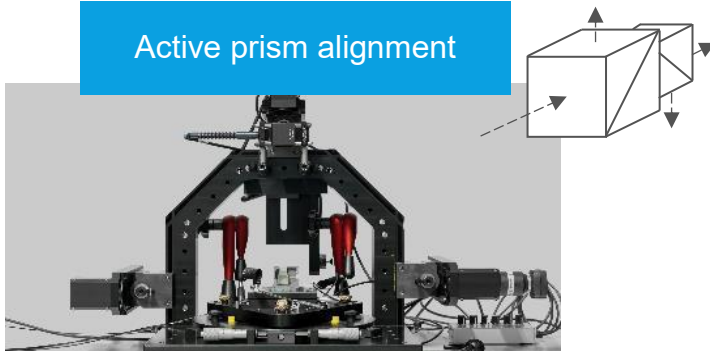
Live wavefront measurement at 950-1700nm and MTF measurement at 450-1700nm



Precision asphere molding



Active prism alignment



Expertise in Thin Film Coating



FISBA going beyond and on the top

Looking out for Research & Development Partners

- mini-CH-darpa by Armasuisse and Innosuisse
- Armasuisse Offset
- Switzerland still excluded from European programs, but...

Design & Engineering

- Airborne Sensing and Vision
- System requirement analysis
- Integration of sensor and system electronics
- System qualification

Components and Materials

- High Power Laser Weapon Components
- Conventional aspheres
- Larger flat optics for protection windows
- Diode laser collimation optics



- *Sub-nm polishing*
- *Spherical and aspherical surface*
- *In fused-silica or oxide glass*
- *Polished cylinder sides*

THANK YOU