Passive and Active Long-Range Vision
- Capabilities Overview -

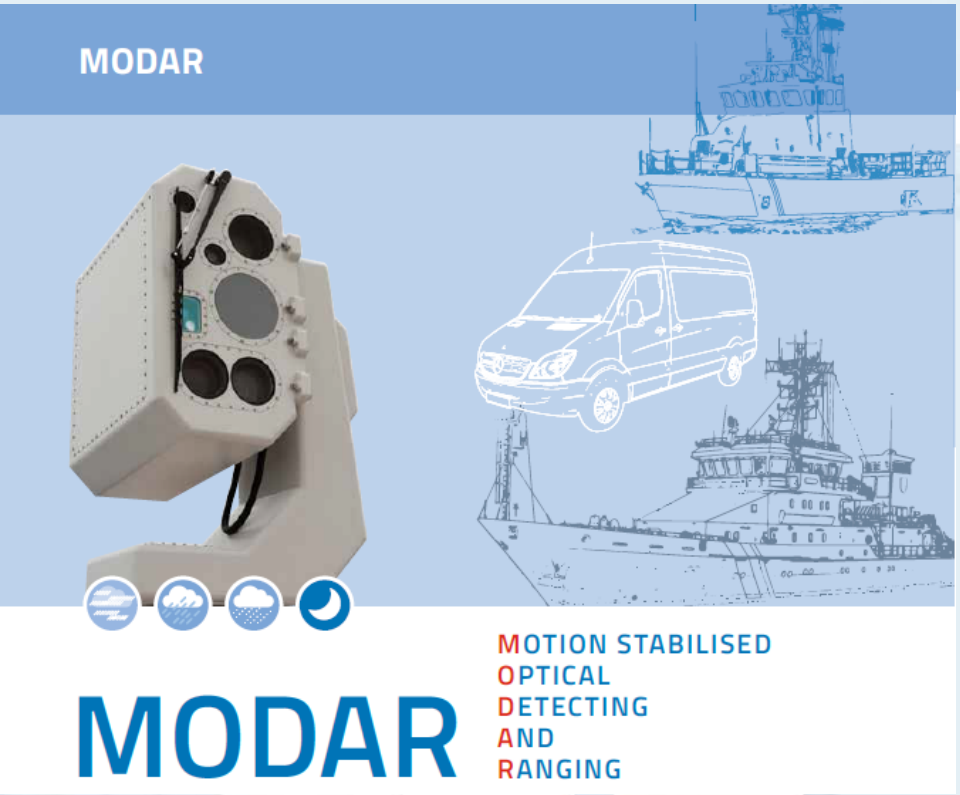
OptoPrecision GmbH, founded by [redacted] 1996, Team of 65 Engineers develo surveillance and reconnaissance systems for governmental agencies

More than 20 years of experience in laser illuminated undercover image acquisition systems

[all deletions: ersonal data, Art 4(1)(b) of Regulation (EC) No 1049/2001]

Technologies available from OptoPrecision,

Surveillance, Reconnaissance, Command control



"Let ´s take the most complex product of OptoPrecision for guidance :"

MODAR is a combination of up to 4 different camera techniques in a single System:

Channel 1: Range-Gated-Camera-System (RGCS) / Active Imaging

Channel 2: Uncooled Thermal Imager for maintenance-free operation

Channel 3: High-sensitivity EMCCD day / night camera

Channel 4: HD-color TV camera

Object detection, ranging and tracking as well as geo-coded recording and data transmission

Well known in the market…..

Thermal Imager

Search and rescue capability.
Detection of semi-submerged objects.
Inspection of small vehicle crew / instrumentation

Zoom lens f= 25 – 225 mm
Man detection (1.8 m * 0.5 m): 3500 m
Object detection (2.3 m * 2.3 m): 12000 m

Understanding the strength of MODAR

1. Surveillance results with laser illumination
2. The challenging task of driver recognition
   =>Overcoming disturbing light sources
3. Long-Range Solutions: **MODAR**
   => Overcoming atmospheric disturbances
4. System configurations and tactical use

Geo-referenced detection & ranging

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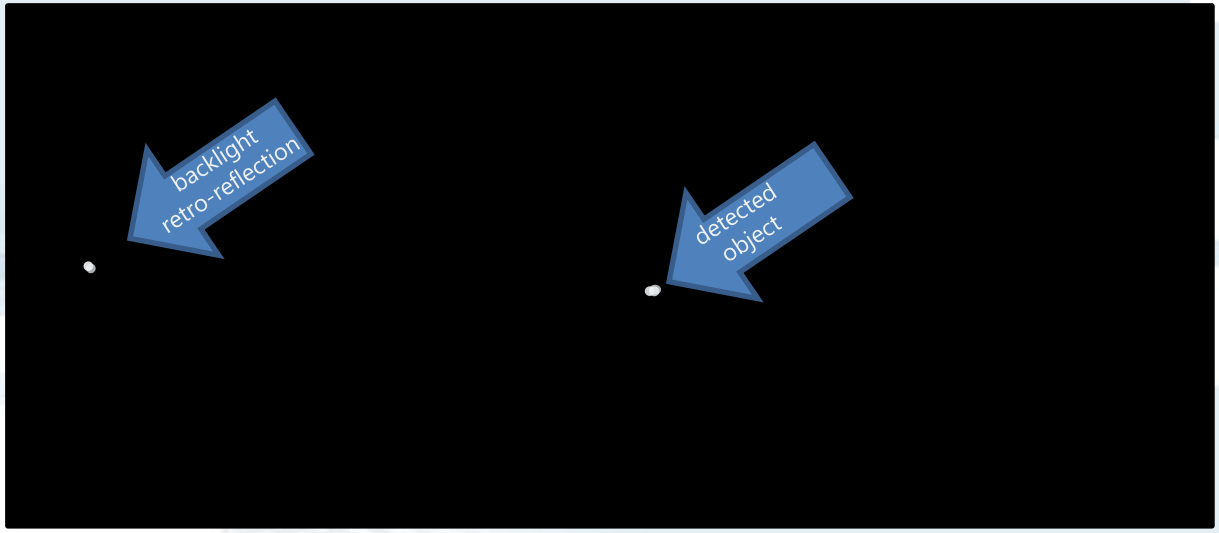

Range-Gated camera

Geo-referenced detection & ranging

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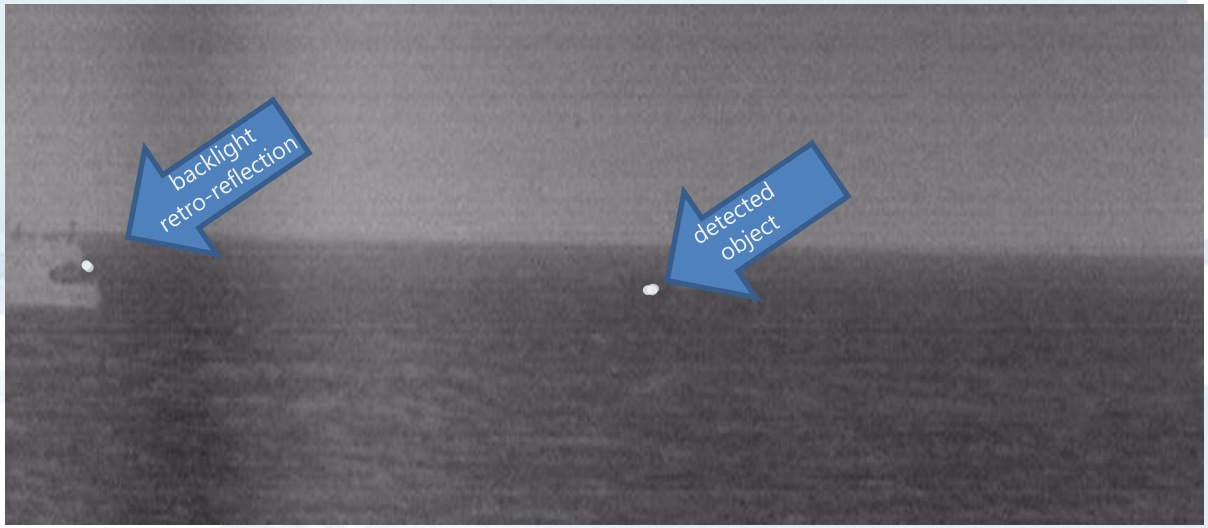
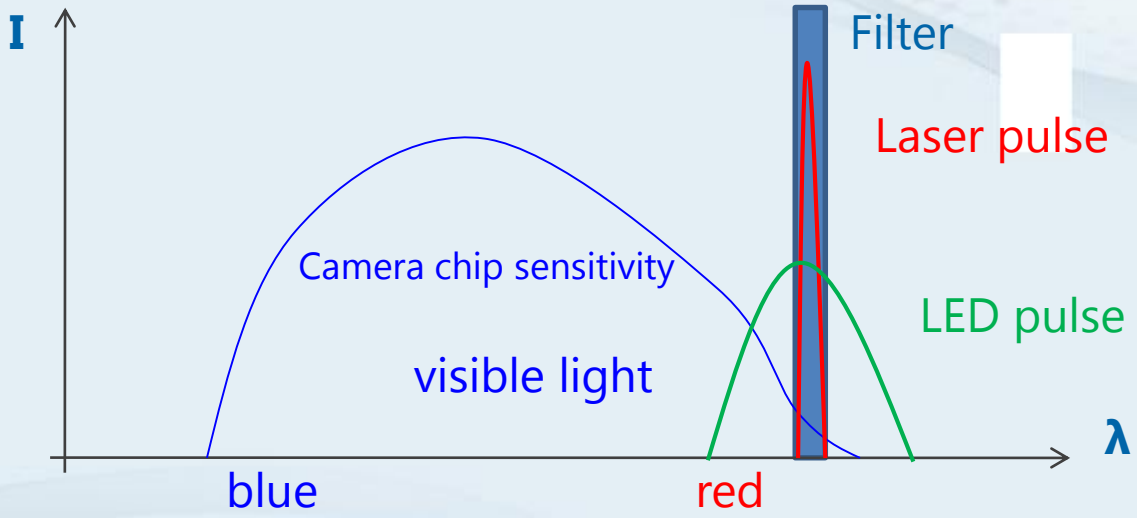


Range-Gated camera & Thermal camera

Geo-referenced detection & ranging

Surveillance results with Laser illumination



conventional camera

camera + laser + filter

Suppressing disturbing ambient light by filters. Visible light will be reduced to a minimum

- → Bandpass-filter blocking visible light.
- → High efficient by using narrow bandwidth (2-4 nm)
- → Additional suppression of polarized light (e.g. reflection of sun light) by a polarized filter

Surveillance results with Laser illumination

Applications

Without Laser illumination

Laser illumination

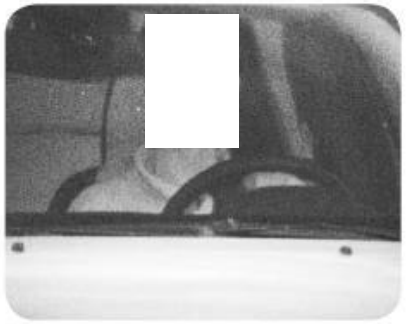
Camera without Filter

Laser illumination + Filter

Without Laser illumination

Laser illumination

Camera without Filter

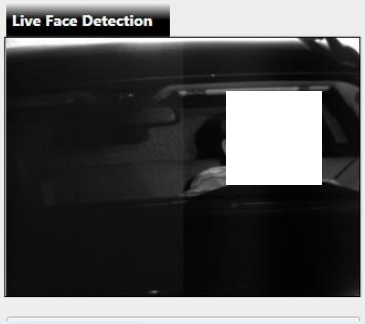


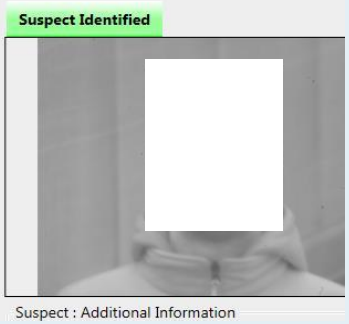
Laser illumination + Filter

Wavelength dependent Image Quality

SWIR

NIR





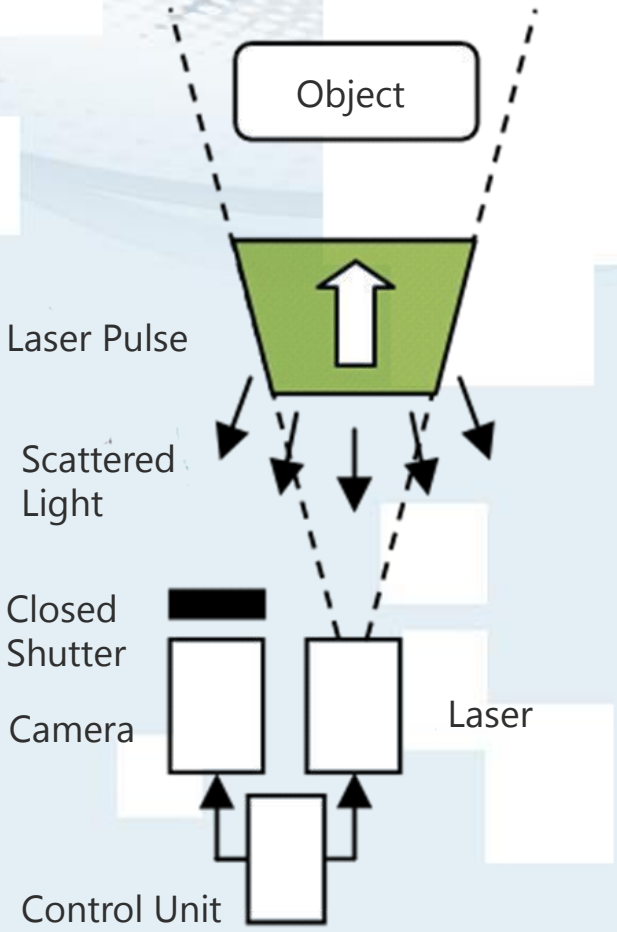
Range-Gated-Camera-System (RGCS)

MODAR Laser working distance 0.3 – 12km

Range Gating working principle

1. The laser sends out a short laser pulse.
2. The camera shutter is closed.
3. The control unit controls the triggering of the laser and the camera.
4. After delay time camera shutter opens for short time.
5. Delay time depending on distance to object.

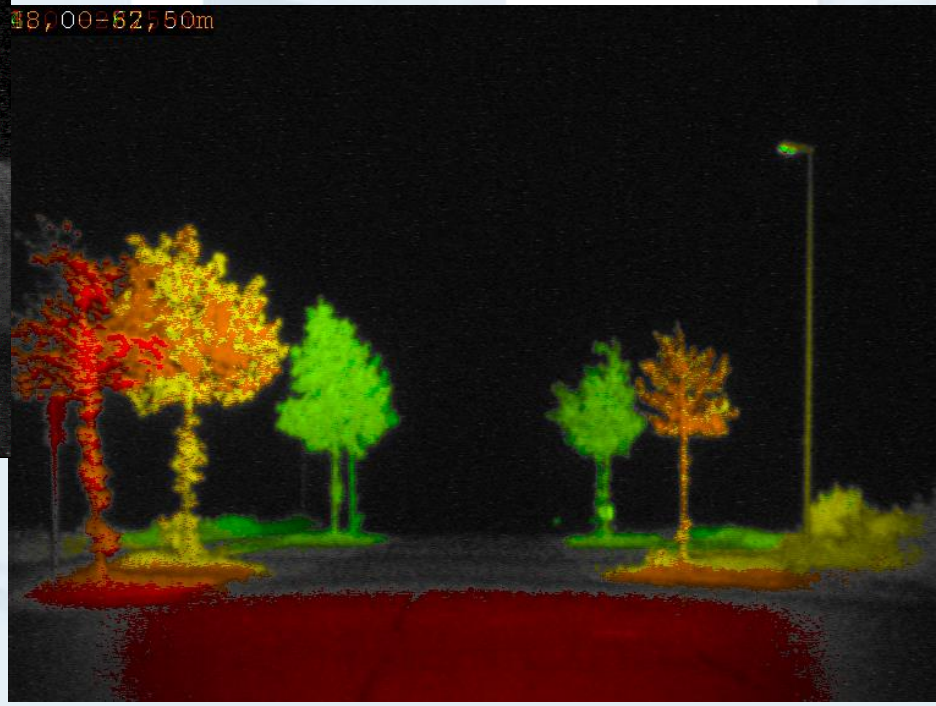
Small sailing boat (840 m) (Source: ISL)



Range-Gated-Camera-System (RGCS)

Short range example for illustration

“ MRT – like view”
scan along the street (0 - 400 m)



first 5 slices combined
to a false color image

The challenging task of driver recognition

Long-Range-Driver Recognition

Driver recognition during night and day with new camera technology and NIR laser.

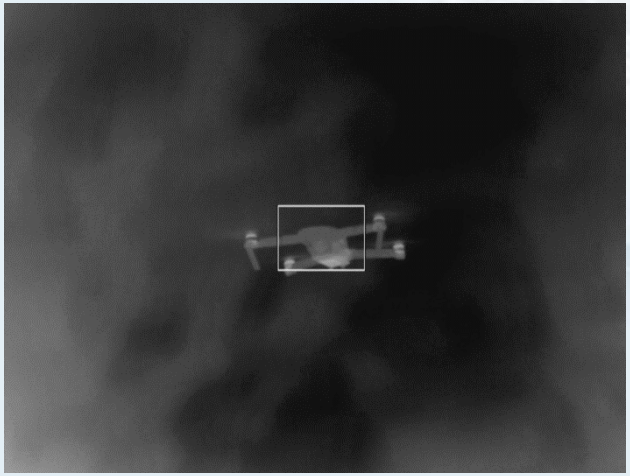
- Suppress disturbing light sources
- Suppress influence of atmosphere
- Get high resolution image
- Analyses image and compare with database in real-time

20 m distance without visible flash

400 m distance with OptoPrecision laser illumination

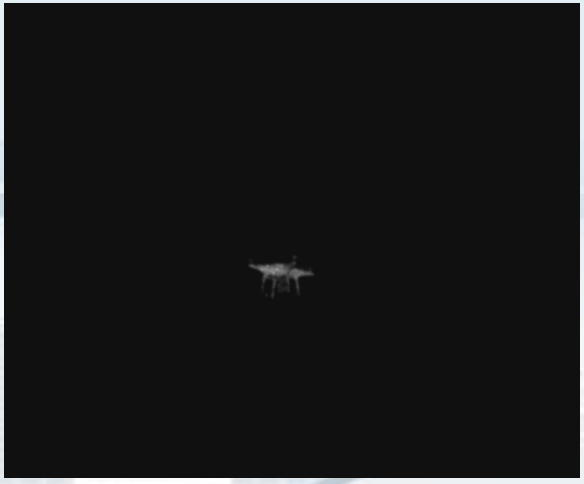
Drone Detection and Tracking

1.000 m distance, range-gated ↑ ↓



1.000 m distance, thermal imager

1.000 m distance, daylight camera



Size:

240mm

System configurations and tactical use:
Integration on patrol boat

System configurations and tactical use:
Commercial Vehicle Integration of MODAR

Sprinter 4x4 with telescope mast in the back

Sprinter 4x4 with telescope mast in the front

Vehicle Integration of MODAR

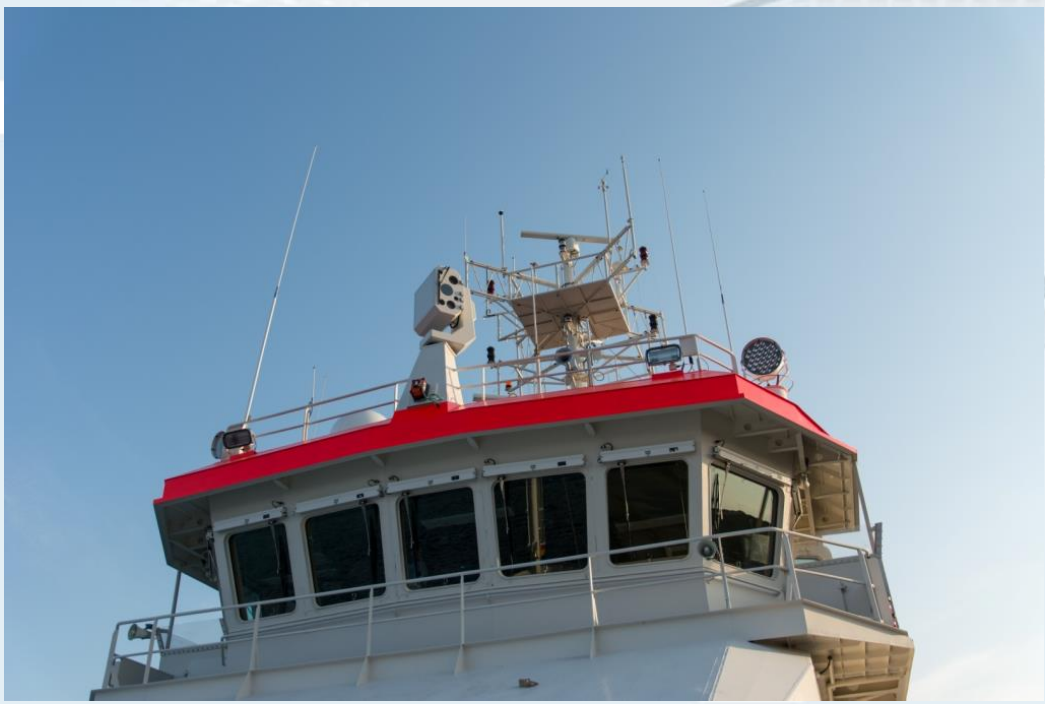
Interior: Mercedes Sprinter 4x4 with telescope mast,
Local command center, information transmission

Human Machine Interface of MODAR

Track Record / Reference

1998	First Laser Flash in charge for BKA	Germany
2002	200 LaserFlash for traffic monitoring	Spain
2008	First Front-Foto-System installed	Germany
2012	First MODAR for Coast Guard	Germany
2016	6 MODAR Systems in charge for Coast Guard	Germany
2016	Research Contract with US Coast Guard & Navy	USA
2017	Permanent operation of MODAR with web-server and Satellite communication to command center for G20 Summit Hamburg	Germany
2017	Germany orders 12 more MODARs for patrol boats and 24 + 6 MODARs for surveillance vehicles	Germany

THANK YOU FOR YOUR KIND ATTENTION!



OptoPrecision GmbH

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