GESELLSCHAFT FUER INERTIALE MESS-, AUTOMATISIERUNGS- UND REGELSYSTEME MBH
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Payload EO/IR Sensor Selection Guide for iMAR's Gyro Stabilized Platforms of Type iIPSC

Motivation for this Selection Guide

A stabilized platform, being used for observation tasks, geo-surveying or governmental / defense operations, always consists on 3 items:

- Electro-mechanical gimbal with torque drives, servo controllers, power conditioning, joystick control, remote interface etc.,
- gyroscopes and/or INS/GPS for platform stabilization and motion control,
- **electro-optical sensors** like daylight / Infrared cameras, laser range finder, laser designator etc.

Most of the platforms designed and manufactured by iMAR in Germany are following our "open architecture" design. This allows the highest flexibility in choosing adequate payload sensors for the specific customer's application. Therefore nearly all kind of optical sensors from the market can be integrated into our iIPSC platforms.

On the following pages a few typical EO/IR sensors are presented. The customer can select the most suitable sensors or he can suggest alternative preferred sensor constellations to be integrated into his platform at iMAR factory.

All these platforms contain iMAR's modular devices for data acquisition, signal processing, human-machine interface and remote control as a base of an economic design of customized as well as standard target tracking and observation platforms. iMAR provides standard as well as customized stabilization platforms also as OEM products.

Laser Range Finder

- **Laser Range Finder LRF 3020 (VX):**

  This LRF is a standard module of small size and wave length 1550 nm (eye safe). Range up to 2 km, regarding NATO Target (2.3x2.3 m, 30% reflexion) 1.2 km

- **Laser Range Finder LRF 3042 (VX):**

  This LRF is a standard module with wave length 1550 nm (eye safe). Range up to 6 km, regarding NATO Target (2.3x2.3 m, 30% reflexion) 2.8 km

- **Laser Range Finder LRF 5020 (VX):**

  This LRF is a standard module of small size and with integrated beam shaper for reduced beam divergence and wave length 1550 nm (eye safe). Range up to 4.5 km, regarding NATO Target (2.3x2.3 m, 30% reflexion, 1 Hz) 1.8 km

- **Laser Range Finder LRF 5042 (VX):**

  This LRF is a standard module with integrated beam shaper for reduced beam divergence and wave length 1550 nm (eye safe). Range up to 8 km, regarding NATO Target (2.3x2.3 m, 30% reflexion, 1 Hz) 3.3 km

	 LRF 1027	 LRF 3020	 LRF 3027	 LFR 3042	 LRF 5020	 LRF 5042
Measure / Locate						
Range / Distance Capability	2.5 km	2.0 km	4.2 km	6.0 km	4.5 km	8.0 km
Range Accuracy	± 5 m	± 5 m	± 5 m	± 5 m	± 5 m	± 5 m
Invisible to Image Intensifiers	No	Yes	Yes	Yes	Yes	Yes
Physical Characteristics						
Optical Aperture	27.5 mm	20 mm	27.5 mm	42 mm	20 mm	42 mm
Weight	0.25 kg	0.12 kg	0.25 kg	0.33 kg	0.12 kg	0.33 kg
Dimensions	105 x 80 x 41 mm	100 x 50 x 35 mm	105 x 80 x 41 mm	114 x 100 x 50 mm	100 x 50 x 35 mm	114 x 100 x 50 mm

IR Cameras and Micro-Bolometers

- **Cooled Infrared Camera µCAM-640** (AIM)

  This IR camera operates at wave length15 µm. Special feature ist he very short shutter time which allows also to detect fast moving objects with sharp images. The camera provides two field-of-views: 6.1°x4.9° and 16°x12°.

- **Uncooled IR Camera µCAM-640-uncooled** (AIM)

This IR camera operates at wave length 25 µm and ist spezial feature is low mass and weight. The FOV is 45°x34°

Technical Data

	µCAM-640	µCAM-640 uncooled
Detector	MCT 640 x 512 15µm MWIR	Microbolometer 640 x 480 25µm LWIR
Field of view	NFOV 6.1° x 4.9° / WFOV 16° x 12°	45° x 34°
Range performance		
Identification (*)	NFOV > 1,300m / WFOV > 560m	200m
Recognition (*)	NFOV > 2,500m / WFOV > 1,000m	400m
Weight	< 2.2kg	< 200g
Size	213mm x 118mm x 102mm	140mm x 80mm x 70mm
Interface	digital und analog	

(*) in accordance with STANAG 4347 and TRM3-approach

- **Cooled IR Camera ATTICA-Z** (CARL ZEISS)

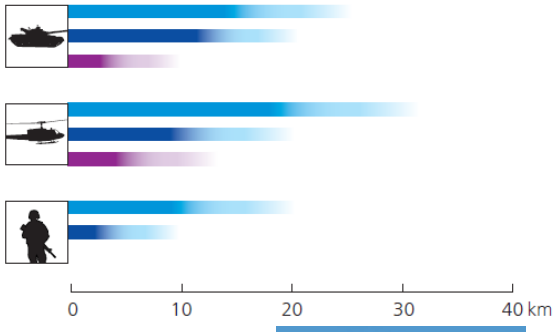
This IR camera operates at wave length 3-5 µm. Special feature is its high thermal resolution, it provides furthermore 4 Field of Views: 1.0°x0.8°, 2.0°x1.6°, 8.0°x6.4° (selectable) and 20°x16°.

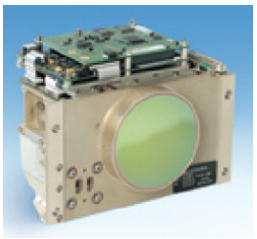
- **Cooled IR Camera ATTICA-P** (CARL ZEISS)

This IR camera operates at wave length 8-12 µm. Special feature is its high thermal resolution, small size, and it provides 3 Field of Views: 2.8°x2.0°, 11.3°x8.5° (selectable) and 21.6°x16.2°).

	ATTICA P	ATTICA Z
Wavelength range	LW	MW
Detector material	CMT	CMT and InSb
Resolution	768 x 576	640 x 512 or 1280 x 1024
Opt. fields of view, programmable	2.8° x 2.1° – 22° x 16.5°	1° x 0.8° – 20° x 16°
Continuous opt. zoom	–	2° – 20°
Digital zoom	2x, 4x	2x, 4x
Power supply		
Power supply	as per MIL STD 1275 B	as per MIL STD 1275 B
Power consumption	typ. < 30 W	typ. < 30 W
Interfaces		
Video – analog	CCIR, RS 170 (optional) VESA (to SVGA)	CCIR, RS 170 (optional) VESA (to SXGA)
Video – digital	LVDS 8 bits	LVDS 8 bits
Communication	CAN, RS 422, CAN OPEN	CAN, RS 422, CAN OPEN
Qualified	MIL 810 F	MIL 810 F
Dimensions, weight (without housing)		
Dimensions (W x H x L)	212 mm x 158 mm x 107 mm	212 mm x 158 mm x 190 mm
Weight	< 4.6 kg	< 4.5 kg

Detect and identify with a 1° x 0.8° field of view with ATTICA Z





Contact

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Day Light Cameras and Miro-Light Cameras:

- **Daylight Color Camera FCB-EX1020P** (SONY)

  This camera provides a 36x optical zoom and a 12x digital zoom and an integrated image stabilizer. It comes with 760x580 pixel resolution and with very small size and low weight. The camera provides continuous zoom (Field of View) in the area of 1.7° (f=122.4 mm) … 57.8° (f = 3.4 mm) [F1.6…F4.5]. The minimum required illumination density is only 1.4 Lux.

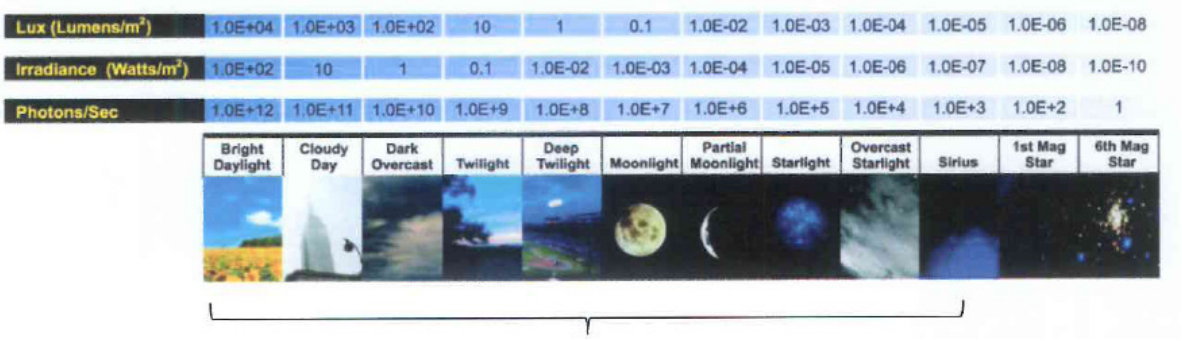
	FCB-EX1020	FCB-EX1020P
Image sensor	1/4-type EXview HAD CCD	
Effective Number of Pixels	Approx. 380,000 pixels	Approx. 440,000 pixels
Signal output	NTSC	PAL
Sync system	Internal/External (V-Lock)	
Video output	VBS: 1.0 Vp-p (sync negative), Y/C output, Comparable to ITU-R BT656	
Camera control interface	VISCA (TTL signal level) Baud Rate: 9.6 kbps, 19.2 kbps, 38.4 kbps, 1 or 2 stop-bit selectable	
Lens	36x optical zoom, f=3.4 mm (wide) to 122.4 mm (tele), F1.6 to F4.5	
Digital zoom	12x (432x with optical zoom)	
Horizontal angle of view	57.8 degrees (wide) to 1.7 degrees (tele)	
Minimum object distance	320 mm (wide) to 1500 mm (tele)	
Horizontal resolution	540 TV line (Tentative)	
S/N ratio	More than 50 dB	
Minimum illumination (Typical)	1.4 lx (F1.4, 50IRE)	
Electronic shutter	1/1 sec to 1/10,000 sec, 22 steps	
Gain	Auto / Manual (–3 dB to +28 dB, 2 dB 16 steps)	
Storage temperature/humidity	–20°C to +60°C/20% to 95%	
Operating temperature/humidity	0°C to 50°C/20% to 80%	
Power requirements	6.0 V to 12.0 V DC	
Power consumption	2.7 W (motors inactive: 4.8 W)	
Mass	230 g	
Dimensions (W × H × D)	50.0 × 57.5 × 87.9 mm	

The values for mass and dimension are approximate.

* "VISCA" is a trademark of Sony Corporation

- **µLight Camera iCAµL-N-22X:**

  This „Micro-Light" camera can detect from (!) 500 µLux…KiloLux and provides even there excellent image information where standard daylight cameras will not work at all. It covers the full spectrum of 400…1100 nm and operates from partial moonlight up to bright daylight. The resolution is 658 x 496 Pixel. The camera can be delivered with monochrome or with color sensor (color reduces the video sharpness). The FOV is in the range of 31x23.5° … 1.5x1.0°



µLight Camera

Support of Several other Cameras like:

- Hitachi-Denshi: 3-CCD Color camera Model HV-D25
- Vision Research: Phantom High Speed Camera V7.3 with internal 32 GByte memory
- Sony: FCB-EH4300 Full High Definition
- Thermoteknix: Miricle 110K / 307K (micro-bolometer, 7-14 µm)
- Customer Proposal: tbd

Please do not hesitate to contact our design specialists with your application specific requirement specification.

Contact

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