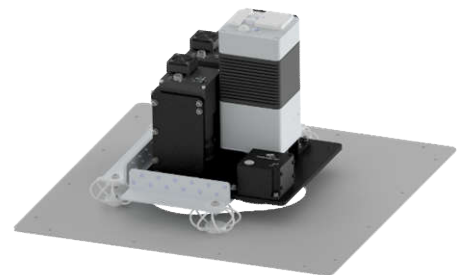


German Aerospace Center (DLR)
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MACS-POLAR21
AERIAL CAMERA SYSTEM
FOR AWI AIRCRAFT C-GHGF / C-GAWI

TECHNICAL DATASHEET



Rev. 1.0 June 2021

Revision

Rev#	Author	Description	Date
1.0	Jörg Brauchle	Document created based on MACS-Polar20	18.06.2021

MACS-Polar21

MACS-Polar21 is a scientific aerial camera system developed by DLR. It consists of a computing unit which is 19" rack-mounted in the cabin and a sensor unit which is mounted in an underfloor payload compartment, see Figure 1. The computing unit comprises sub-assemblies like an image recording computer, a GNSS INS and an operator's computer to control the system including exchangeable data cartridges. The computing unit rear panel is shown in Figure 2. The sensor unit contains three cameras and an inertial measurement unit IMU (Figures 3-6). This document is the technical datasheet, summarized in Table 1. The list of devices and model numbers is shown in Table 2. EU dual use assessment is shown in Table 3.

Electrical connections which have to be routed through the aircraft BT-67, particularly

- between computing unit and sensor unit,
- between computing unit and aircraft

are described in the document "MACS-Polar21_wiring_revX.X"

Wiring within the 19" computing unit is described in the document "MACS-Polar21_wiring_computing-unit_revX.X" which is delivered on request.

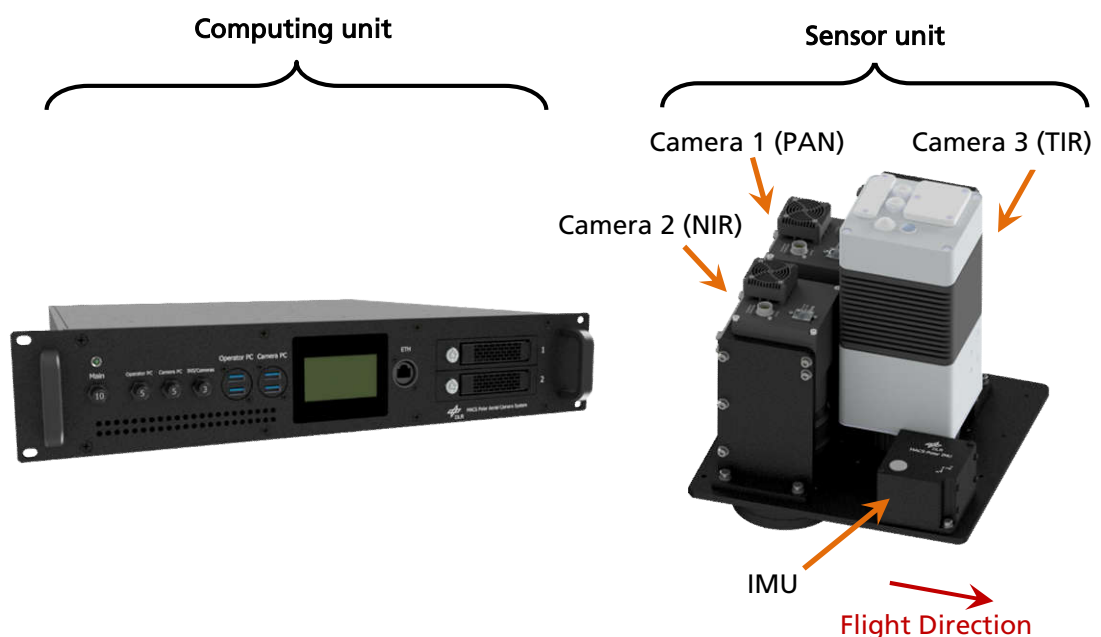


Figure 1: MACS-Polar21 main components overview



Figure 2: Computing unit rear panel



Figure 3: Camera 1 with 35mm lens (left) and rear connector panel (right)



Figure 4: Camera 2 with 35mm lens (left) and rear connector panel (right)



Figure 5: Camera 3 (TIR) with 15mm lens (left) and connector panel (right)



Figure 6: IMU enclosure

Table 1: Technical data

	Value	Unit	Note
Weight (gross / computing / sensor unit)	16.3 / 10 / 6.3	kg	without cables
Voltage	28	V	
Power consumption	170	W	typical
Dimensions computing unit (LxWxH)	255 x 255 x 274	mm ³	without cables
Dimensions sensor unit (LxWxH)	320 x 240 x 220	mm ³	without cables
Chroma camera 1	Panchromatic	-	450-1,000nm
Chroma camera 2	Near-infrared	-	700-1,000nm
Chroma camera 3	Thermal infrared	-	7.5-14µm
Resolution cameras 1 & 2	50	MPix	
Resolution camera 3	1024x768	Pix	
Field of view cameras 1 & 2	58 x 43	deg	cross x along track
Field of view camera 3	60 x 47	deg	cross x along track
iFOV	120 / 120 / 1027	µrad	Camera 1 / 2 / 3
Ground Sampling Distance @1.000m AGL	13 / 13 / 114	cm	Camera 1 / 2 / 3
Orientation cameras	Vertical	-	Aligned with air- craft yaw axis
Maximum recommended frame rate	7	fps	Camera 1 / 2 / 3

GNSS Receiver quality	L1/L2/L-Band RTK	-	
INS orientation accuracy	0.01	deg	RMS, following Novatel Inc. SPAN STIM 300 datasheet

Table 2: List of devices

Component	Manufacturer	Model
Camera 1	SVS Vistek GmbH	hr51MXGE
Camera 2	SVS Vistek GmbH	hr51MXGE
Camera 3	Jenoptik GmbH	VarioCam HD head
Lens cameras 1 & 2	Zeiss	Interlock 2.0 / 35mm
Lens camera 3	Jenoptik GmbH	15mm
GNSS-Receiver	Novatel Inc.	OEM7720
Inertial Measurement Unit	Sensoror AS	STIM300
Main computer	MPL	PiP46

Tabelle 3: EU dual use items check

Component	Categorie	Rationale	S/N #	Weight	Value
Camera 1/2 incl. lens	6A002b1	IFOV is 110 μ rad, threshold is <200 μ rad → dual use	99662 / 99683	1,2 kg each	11 kEur each
Camera 3 incl. lens	n.a.	Following 6A003b4b Note 3a not limited, because camera has a frame rate of max. 7.5 Hz, threshold is <9Hz → not dual use	1284123	1,4 kg	40 kEur
IMU	n.a.	Manufacturer states that STIM300 with 400°/sec and 10G is not dual use → not dual use	N255814 19658318	0.05 kg	7 kEur

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