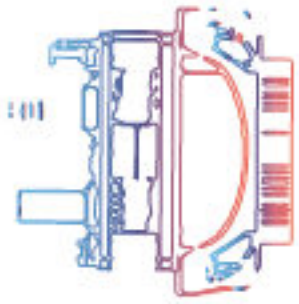
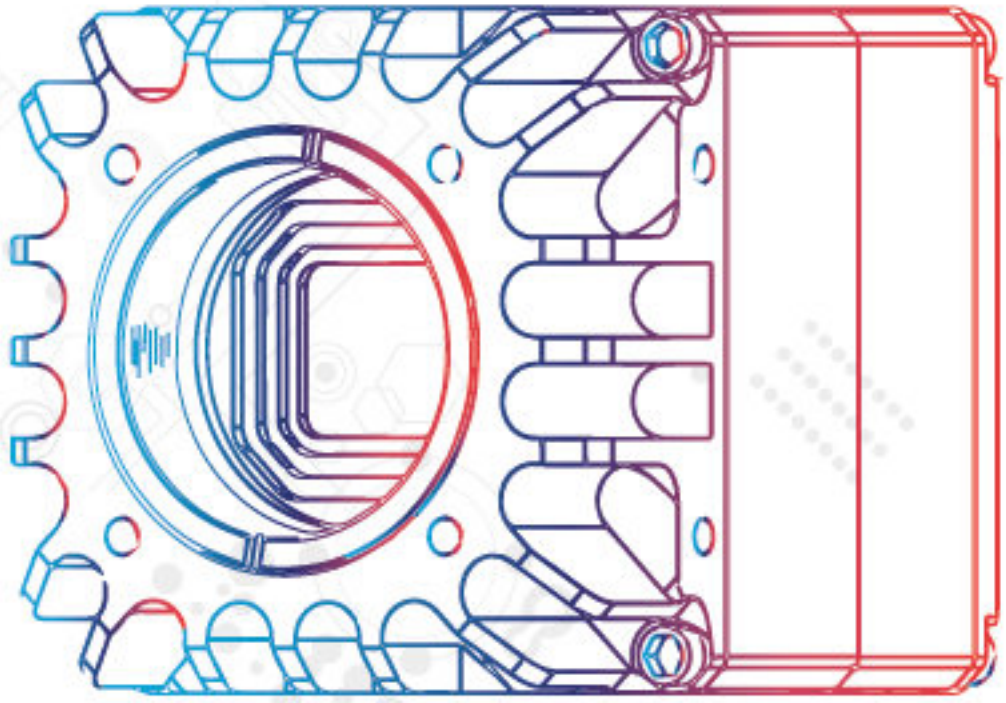
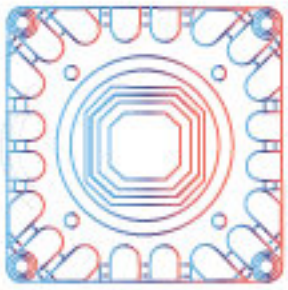
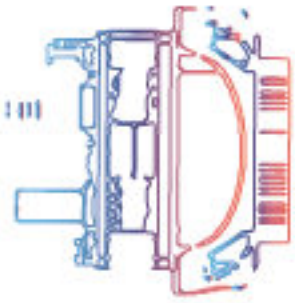
www.new-imaging-technologies.com









WiDy SenS 640 M-ST
Camera Datasheet

DOCUMENT

Date	Modification	Revision
11/09/2018	Document creation	V1.0
14/11/2018	Update of the mechanical interface and correction in registers.	V1.1
18/12/2018	Update communication with UART (use of SerTC and SerTFG from the camlink)	V2.0
19/03/2019	Template update	V3.0

Table of contents

OVERVIEW

Commercial Reference

Commercial reference	Description	Ordering information
WiDy SenS 640M-ST	CAMLINK SWIR TEC VGA CAMERA	9SMC1601IT31MC0X

References

Inde	Title of document	Revision	Issued by
R1	Camera interface drawing		NIT
R2	WiDyCAM Reference Guide		NIT
R3	Specification of the Camera Link Interface Standard for Digital Cameras and Frame Grabber		NORM
R4	Serial NITCAM Protocol		NIT

A reference document contains elements, which are used to draft this specification.

Subject

This document specifies the camera:

- Sensor description
- Presentation
- Mechanical dimension and optics interface
- Electrical and video interface
- Functionalities
- Software compatibility
- Electro-optics characteristics
- Environment
- Accessories
- Annexes

Definitions, Terminology and abbreviations

- NIT : New Imaging Technologies
- FPGA : Field Programmable Gate Array
- L : Length

- H : Height
- W : Width
- WDR : Wide Dynamic Range
- FPN : Fixed Pattern Noise

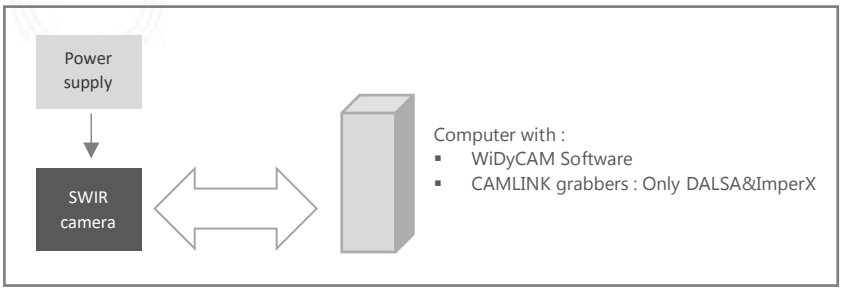
Sensor description

Optical format	1 inch
Active pixel	640x512
Material	InGaAs
Pixel size	Square 15 x 15µm
Readout mode	Global Shutter
Option	CDS
Dual mode	LOG or CTIA
Packaging	OEP252

PRESENTATION AND CONFIGURATION

General presentation

The WIDY SenS 640M-ST integrates the T-Cooled sensor NSC1601T-SI Monochrome. This camera integrates control of temperature to improve the intrinsic characteristics of the sensor.



Camera configuration

The camera is composed of **Sensor, ADC, FPGA** and interface boards:

- Sensor board which integrate the sensor and the Peltier (thermoelectric cooling).
- ADC board
- FPGA board which integrate the timing sensor generation and the camlink synchronization and data
- Interface board which integrate the management of the main power supply, the trigger, the Peltier management and the camlink transceiver.

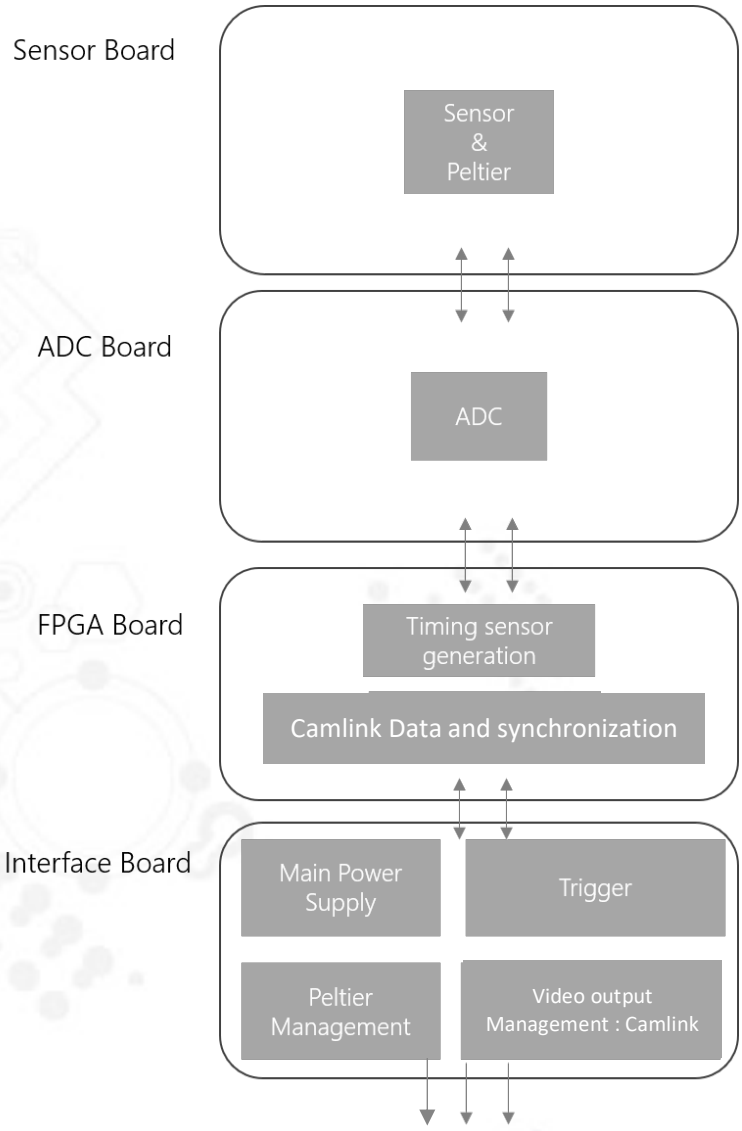
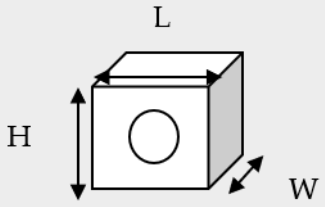
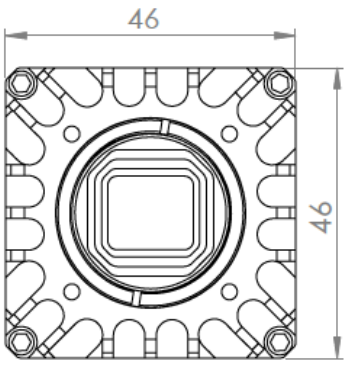
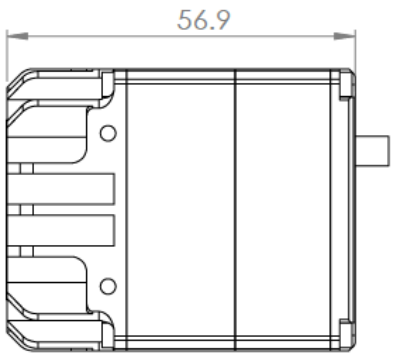
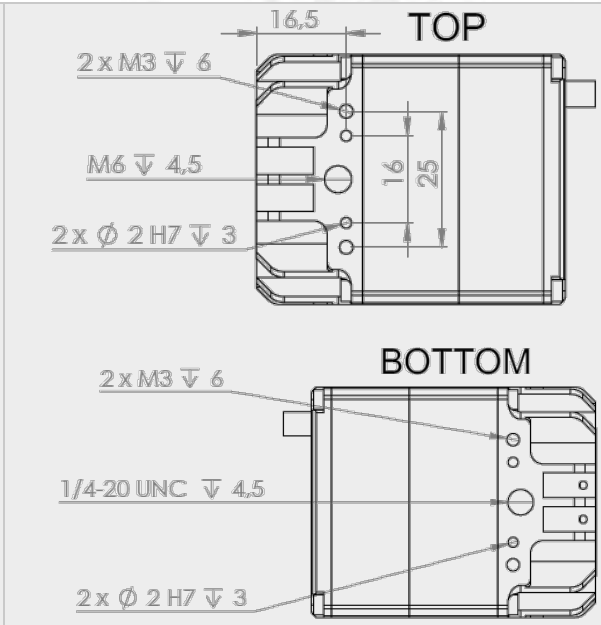


Figure 1 Camera architecture

SPECIFICATIONS

Mechanical dimension and optics interface

Mechanical dimensions	L : 46mm H: 56.3mm W: 47.1mm (without the connector) 
Camera	 
Mount	C
Weight	Camera <215g

Interface	

Electrical Video Interface

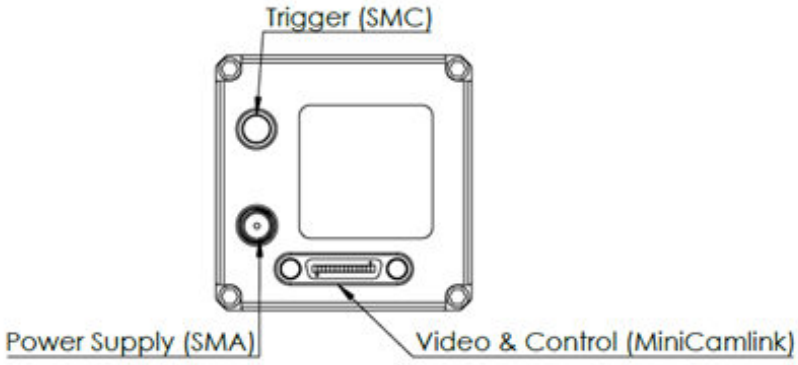


Figure 2 electrical and videos interface

- Power supply

Power supply signal is provided through SMA connector.
Power supply range is 5 to 12V (Nominal 12V)

Reference	Designation	Manufacturer
CONSMA008	SMA connector	Lynx Technologies

Output Data

The WIDY SenS 640M-ST provides a 14-bit output raw data through through CameraLink specification [R3] and a mini CamLink connector (SDR26) [2].

Reference	Designation	Manufacturer
12226-1150-00FR	SDR26 connector	3M

The camera sends 14 bits data (default configuration) through the CameraLink interface.
This configuration respects the CameraLink Standard (base configuration):

Base Configuration						
Port/bit	8-bit x 1~3*	10-bit x 1~2	12-bit x 1~2	14-bit x 1	16-bit x 1	24-bit RGB
Port A0	A0	A0	A0	A0	A0	R0
Port A1	A1	A1	A1	A1	A1	R1
Port A2	A2	A2	A2	A2	A2	R2
Port A3	A3	A3	A3	A3	A3	R3
Port A4	A4	A4	A4	A4	A4	R4
Port A5	A5	A5	A5	A5	A5	R5
Port A6	A6	A6	A6	A6	A6	R6
Port A7	A7	A7	A7	A7	A7	R7
Port B0	B0	A8	A8	A8	A8	G0
Port B1	B1	A9	A9	A9	A9	G1
Port B2	B2	nc	A10	A10	A10	G2
Port B3	B3	nc	A11	A11	A11	G3
Port B4	B4	B8	B8	A12	A12	G4
Port B5	B5	B9	B9	A13	A13	G5
Port B6	B6	nc	B10	nc	A14	G6
Port B7	B7	nc	B11	nc	A15	G7
Port C0	C0	B0	B0	nc	nc	B0
Port C1	C1	B1	B1	nc	nc	B1

Base Configuration						
Port/bit	8-bit x 1~3*	10-bit x 1~2	12-bit x 1~2	14-bit x 1	16-bit x 1	24-bit RGB
Port C2	C2	B2	B2	nc	nc	B2
Port C3	C3	B3	B3	nc	nc	B3
Port C4	C4	B4	B4	nc	nc	B4
Port C5	C5	B5	B5	nc	nc	B5
Port C6	C6	B6	B6	nc	nc	B6
Port C7	C7	B7	B7	nc	nc	B7
* If only using a single channel, use Port A. If using two channels, use Port A and B.						

Communication

Serial NITCAM is the protocol used to communicate with the camera. See [R4] for more details.
It used the SerTC and SerTFG link of the Cameralink to send or receive commands from the camera.

Synchronization connectors

A synchronization signal can be provided through a standard female SMC connector.
2 configurations modes are available:

- From camera to external source, SMC connector is defined as an output
- From external source to camera, SMC connector is defined as an input

The voltage range of the trigger signal must be [0-3.3V / LVTTL format].

2 modes:

1/
High level: integration start on sensor pixels.
Falling edge: Integration stop and beginning of the reading and send of the image on the video output connector.
2/
High level: Integration start on sensor pixels
Integration time is equal to the exposure time register.

Reference	Designation	Manufacturer
152140	SMC connector	Amphenol

FUNCTIONALITIES

Camera

Different features can be controlled with WiDyCAM Software - for more details see [R2].

Camera mode	**Frame rate**	**Up to 230Hz (in full resolution)**
	Mode of sensor	**Standard Global shutter**: Integration time variable from 10us to 220ms in ITR Integration time variable from 100us to 220ms in IWR Maximum integration time in Log. 10ms Maximum integration time in Log mode: 10ms **Dual mode : Log or CTIA** **Sensor Reading : ITR or IWR** **Option : CDS (only in CTIA High Gain)**
	Trigger	In/Out LVTTL Delay selectable
	Partial reading mode	Possible to integer just a part of the sensor (ROI) and display only this window on the video output. This option allows a frame rate increase on the ROI
Software control (all functions are realized on computer)	Min/Max Settings for display – Histogram Stretching	Automatic or Manual. In Automatic the gain and offset are calculating depending of the histogram. In Manual you can choose the gain and offset you want to apply on the image.
	Zoom	Bicubic zoom function available.
	Gamma correction	From 0 to 3.
	Contrast enhancement	Contrast improvement by local histogram equalization
	Colour maps	Grey, Jet, Hot, HSV, Rainbow, Cool, Night Vision
	Cross Hair	Display of the cross hair with variable position, color and dimension.
	Filters	Canny, Laplace, Sharp, High Boost, Invert
	NUC correction	Correction 1-Point or 2-Point calculated in factory (possible to realize it also by user) – For more details See [R2]
	Bad pixel correction	Correction of bad pixel in factory (possible also by user)– For more details See [R2]
	Recording videos	Recording video in .AVI or. PTW (Raw 14 bits)
	Image capture	.jpeg, .png or. Tiff
	Temperature	Temperature reading. Resolution: 0.1462°C/LSB
	Horizontal and vertical inversion	Flip on the image in horizontal and vertical
Analysis Functions	Histogram computation	

(all functions are realized on computer)	Statistics analysis	
	ROI (region of interest)	
	Cross section Profiles	
	Rectilinear profiles	
	Linear profiles	

Trigger Delay

Camera	Trigger Mode	
WiDy SenS 640M-ST	Trigger from ext. to camera	Trigger from camera to ext.
Global shutter	Min value: -1280 µs Max value: 1270 µs Step: 10 µs	Min value: -1280 µs Max value: 1270 µs Step: 10 µs

Peltier / Control of the temperature

PELTIER	Control of temperature +/- 1°C	Single stage TE cooler ***Note: The NUC and BPR files are delivered only for +15°C*** You can select the temperature from -15°C to 48°C.
	3 modes	1- Low current < 1W 2- Middle current < 2W 3- High current < 4W
	Cooling capacity	ΔT = 30degC

SOFTWARE COMPATIBILITY

Our Software WiDyCAM is only compatible with DALSA Frame grabbers and ImperX.
WiDyCAM is compatible only with Windows 7, 8, 8.1 or 10.
We don't guarantee that the software is working with previous versions of Windows.

ELECTRO-OPTICS CHARACTERISTICS

Consumption	2.3W TECless
	3.2 W TEC
Dynamic Range	120dB typical in Log 63dB typical in CTIA (Low Gain) 49 dB typical in CTIA (High Gain)
Full well capacity (in CTIA)	>380ke- (Low Gain) >17ke- (High Gain)
MTF @ 33pl/mm (typical)	>50%
Sensor Noise	High Gain with CDS<50e- Low Gain < 270e- Log < 340e-
Logarithmic sensibility	600 lsb/decade

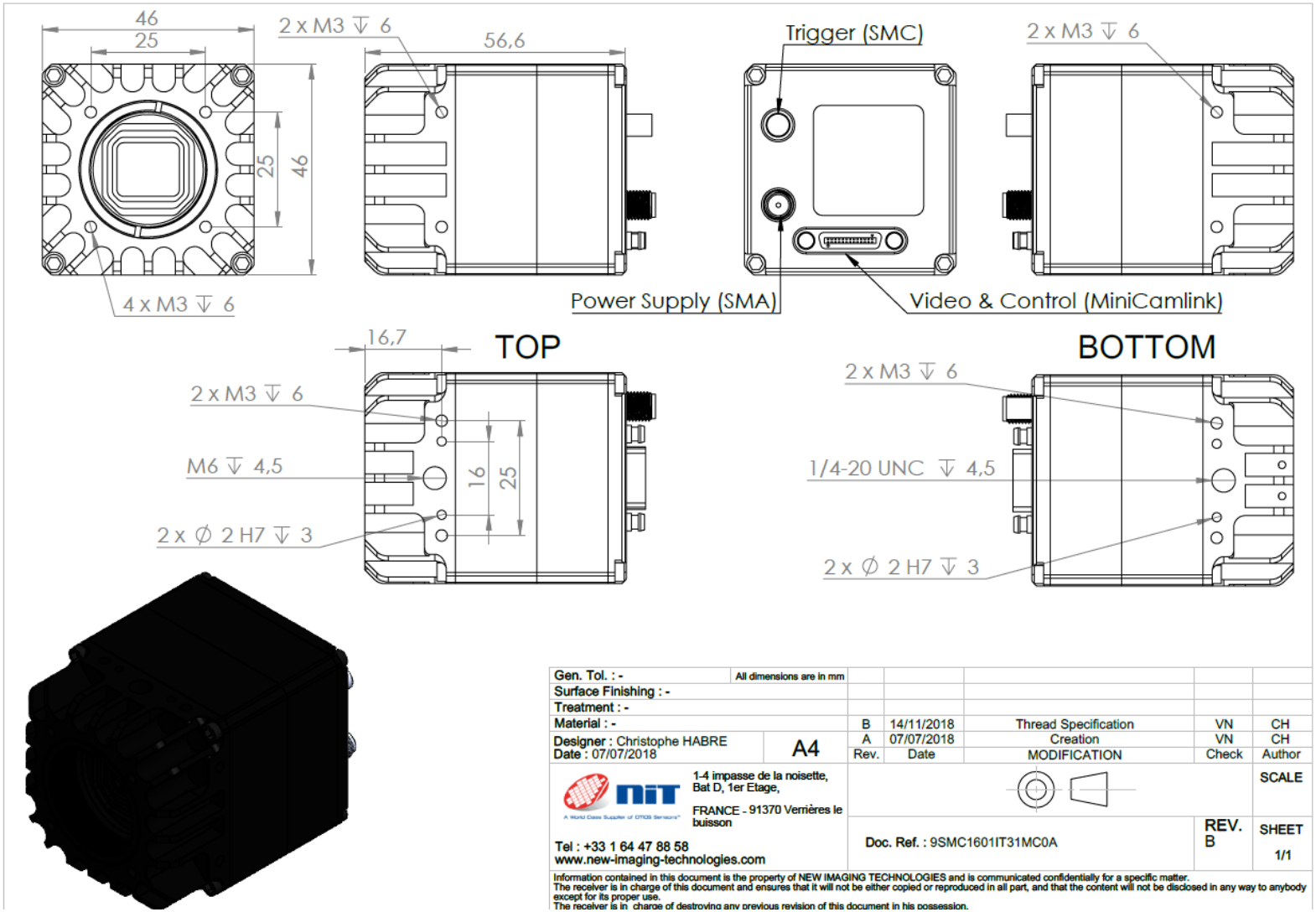
ENVIRONMENT & ACCESSORIES

Storage temperature	-20 to 80°C
Operating Temperature	-10 to 71°C

	Banana plugs / SMA	BNC / SMC	WiDyCAM Software	ADAPTATOR CS/C
WiDy SenS 640M-ST	✓	✓*	✓	

*Available in option

ANNEXES \ Camera Interface



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