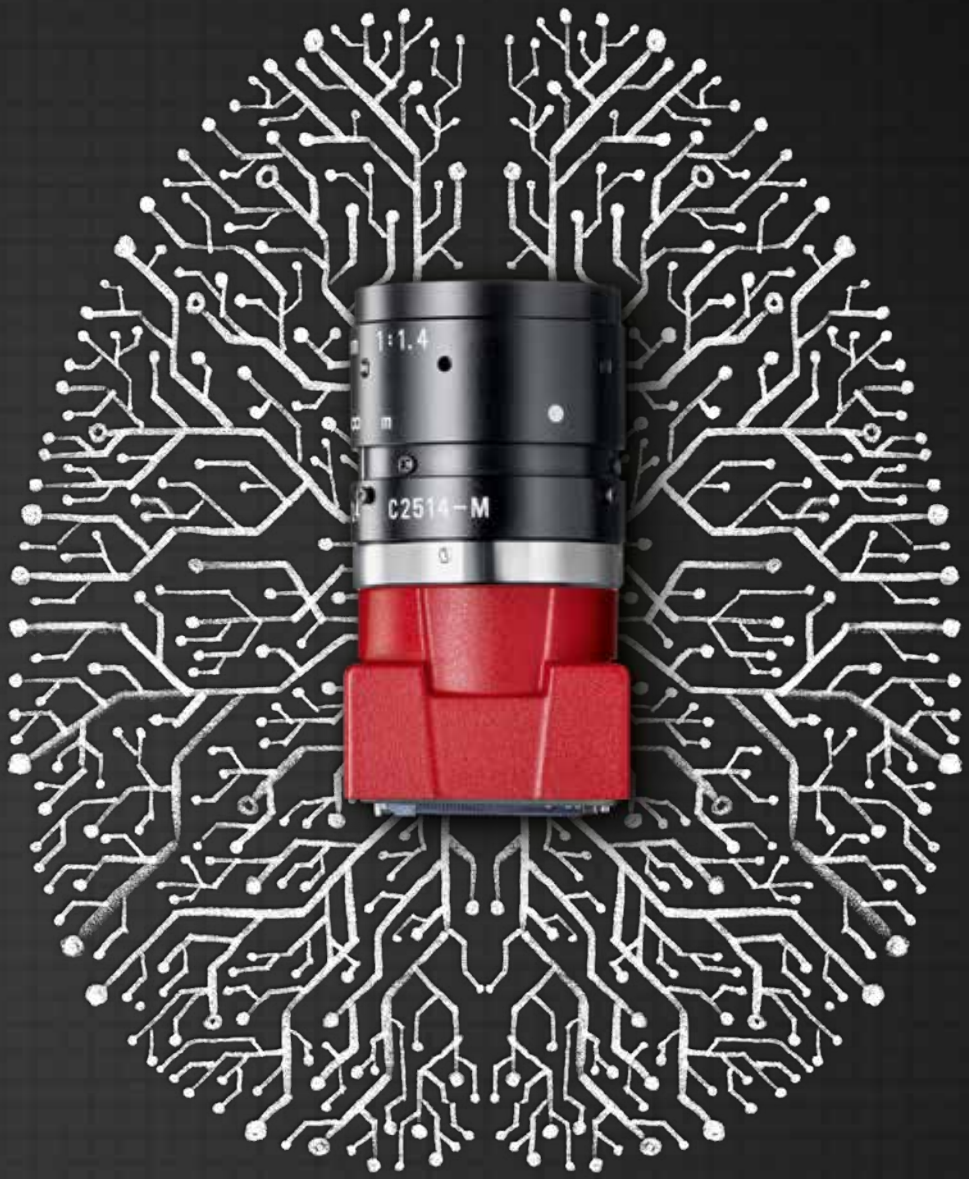
Allied Vision



// ALVIUM INDUSTRIAL-GRADE EMBEDDED VISION CAMERAS

Rethink Embedded Vision

alliedvision.com/alvium

powered by ALVIUM® TECHNOLOGY

// ALVIUM CAMERA SERIES

More freedom than ever before

The Alvium Series is different. It redefines what embedded vision cameras can do. It was designed from scratch to create value for our customers and offers system designers a previously unknown level of freedom. Produced in high quality in Germany, Alvium builds on Allied Vision's 30 years of machine vision expertise to set new benchmarks in the embedded world.

Incorporating ALVIUM® Technology, Allied Vision's unique application-specific integrated circuit (ASIC), the Alvium Camera Series provides outstanding performance that is unique in the industry. Thanks to its modular design, it meets a wide variety of manufacturing and industrial needs.

// **ALVIUM® Technology** – Allied Vision's revolutionary processor for on-camera image processing and an unprecedented level of freedom

// **Industrial-grade single board design** offering outstanding robustness as part of a compact lightweight package

// **Various housings, including a bare board option,** available for best integration into your systems

// **Multiple lens mounts:** C-, CS-, and S/M12-mount versions with a highly accurate sensor alignment to create crisp images even at the edges

// **A broad range of state-of-the-art sensors** provide the image quality your application needs

// **Easy software integration** reducing your NRE (non-recurring engineering costs) efforts and supporting a fast go-to-market

powered by

ALVIUM®

TECHNOLOGY

// ALVIUM® TECHNOLOGY

The powerhouse behind the Alvium Camera Series

At the heart of the Alvium Camera Series is Allied Vision's revolutionary ALVIUM® Technology – a custom ASIC packed with exciting features and 30 years of machine vision industry expertise.

ALVIUM® Technology offers our customers outstanding value by combining high performance with huge versatility.

// **Utmost flexibility –** As a platform for the Alvium Camera Series, ALVIUM® Technology provides infinite flexibility to adjust and upgrade your system and offers great connectivity within the Alvium world.

// **Energy-efficient –** Low power architecture and intelligent power management. Unlike the FPGAs commonly used in machine vision cameras, the ALVIUM® Technology ASIC is very power-efficient thanks to its much higher integration density. Intelligent power management ensures that it shuts down functionality that is not in use and only draws power when necessary.

// **Higher performance, lower costs –** A collection of image processing and control features for perfect images right from the camera. These allow system engineers to transfer specific image corrections and preprocessing tasks from the host to the camera in order to improve performance or reduce system costs.

// **Cost-optimized design –** With its standardized interfaces and the provided drivers, cameras using the ALVIUM® Technology ASIC are easy to integrate and can save the engineer much time. And switching from one model to another does not require any change of code.

// NEXT GENERATION VISION

Introducing Alvium

Alvium 1500 Series – Embedded vision made easy

Alvium 1800 Series – Bridging embedded and machine vision

// TWO SERIES – ONE INNOVATION

Designed to do more

All Allied Vision Alvium cameras share the same platform. This makes it easy to switch from one feature set or sensor to another when prototyping, upgrading or downgrading your system. Currently, there are two Alvium Camera Series available: Alvium 1500 and Alvium 1800.

Alvium 1500 Series

A powerful and energy-efficient MIPI CSI-2 camera, optimized for embedded vision applications where the camera just needs to stream. The ISP (image signal processing) of ALVIUM® Technology can take over some tasks from the embedded board, so the full performance of the board can be used for the image processing algorithms. Standardized drivers independent of the camera model ensure a quick integration and the flexibility to change camera models easily.

Alvium 1800 Series

This camera series provides machine vision performance in a small package with an attractive price. With its USB3-Vision-compliant interface, it brings the benefits of the industrial GenICam standard to the embedded world. In addition to providing sophisticated image control and triggering features, it can be operated with embedded and PC-based platforms.

Alvium on-board image processing features

	Application	Feature	Alvium 1500 C Series	Alvium 1800 U Series
Image control	Auto control	Auto exposure	●	●
		Auto gain	●	●
		Auto white balance	●	●
	Basic control	Black level	●	●
		Exposure time	●	●
		Frame rate	-	●
		Gain	●	●
		Gamma	●	●
		White balance	●	●
	Image size	Region of interest	●	●
	Image enhancement	Debayering	●	●
		Hue	●	●
		Saturation	●	●
		Color transform matrix	-	●
		Contrast	-	●
	Image correction	Defect pixel correction[1]	●[4]	●[4]
		FPNC[2]	●[4]	●[4]
		Mirror image	●	●
Camera control	Maintenance	Firmware update	●	●
		Temperature monitoring	●[3]	●
	Triggering	by external events	-	●
		by software	-	●

[1] factory calibrated [2] fixed pattern noise correction, factory calibrated [3] DRA only [4] valid for selected models

// ALVIUM 1500 SERIES

Unleashing your embedded board's performance

To reduce your total system costs, the Alvium 1500 Series combines affordability with a design that offers more performance than previously available from an embedded system. Thanks to its integrated ISP, the series not only outperforms sensor modules but is also capable of doing basic image processing tasks internally.

Ensuring that the same driver works across every model in the range, the Alvium 1500 Series comes with a standard interface to the embedded board. Its ISP capabilities can also help to reduce system load.

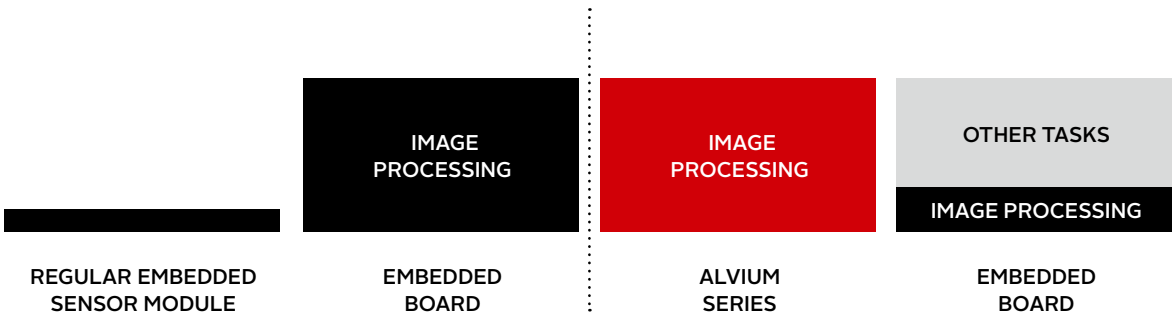
A flexible solution

The Alvium Series provides system developers with the freedom and flexibility to get the most out of their embedded solutions. Additionally, the Alvium Series' intelligent power management system makes it possible to design low-power or even battery-powered systems. This makes the Alvium 1500 Series the most adaptable embedded camera on the market and provides system developers with an unprecedented level of versatility.

Created to perform

Since the Alvium Series is way more powerful than regular embedded sensor modules, it can run basic image processing tasks. This frees up your embedded board for other processes such as inspection or identification tasks, or even more sophisticated algorithms.

Conventional embedded vision system vs. embedded vision system with Alvium camera module



Great connectivity and easy access

To connect to the CSI-2 interface of Alvium 1500 Series cameras, Allied Vision provides open-source CSI-2 drivers on GitHub for different boards and System on Chips (SoCs). This ensures efficient use based on V4L2 with tools such as GStreamer and OpenCV. We provide open-source drivers for SoCs such as the NXP i.MX6. For camera evaluation, we provide easy-to-install precompiled kernels and an SD card image.

Supporting you with much more than just the camera module, our established network of partners will guide you through everything from prototyping your system right through to production launch.

Supported boards

// Wandboard's i.MX6-based development boards
// Nitrogen6_MAX with i.MX6QP from Boundary Devices
// NVIDIA Jetson TX2
// NVIDIA AGX Xavier
// NVIDIA Jetson Nano

Available soon

// Toradex' NXP-i.MX8QM-based Apalis iMX8
// Google's NXP-i.MX8M-based Coral SoM and development board

Additionally, Allied Vision provides comprehensive sets of examples for quick and easy setup of Alvium. For further information and all current drivers visit:
www.alliedvision.com/embedded-software

One driver fits all

The Alvium Camera Series guarantees fast turnaround times and huge versatility when it comes to exchanging one module for another. By using one driver for Alvium, it is possible to exchange your camera module with a different one within the Alvium Series easily. This allows an easy upgrade to new sensors that will be integrated to the Alvium Series in the near future to keep it close to the latest technology. Additionally, you can upgrade to a different series to get enhanced functionality of your camera without any effort. The result is a highly flexible, future-proof, and modular system that quickly adapts to the demands of your application.

Alvium 1500 Series models

Model	Sensor	Sensor Size	Shutter	Pixel Size	Resolution	Frame Rate
1500 C-050	ON Semi PYTHON 480	Type 1/3.6	Global	4.8µm x 4.8µm	808 x 608	116fps
1500 C-120	ON Semi AR0135CS	Type 1/3	Global	3.75µm x 3.75µm	1280 x 960	52fps
1500 C-210	ON Semi AR0521HD	Type 1/3.3	Rolling	2.2µm x 2.2µm	1928 x 1088	118fps
1500 C-500	ON Semi AR0521SR	Type 1/2.5	Rolling	2.2µm x 2.2µm	2592 x 1944	67fps

1500 Series at a glance

Interface options	MIPI CSI-2 V1.1
Mount options	C-Mount / CS-Mount / S-Mount (M12)
Housing options	Bare board / Open housing
Camera control options	Video4Linux2 Access / Direct Register Access (DRA)
Operating temperature	+5°C to +65°C housing temperature
Power requirements	Power over MIPI CSI-2 (5 VDC)
Body dimensions (L x W x H)	7mm x 26mm x 26mm (bare board)

// ALVIUM 1800 SERIES

Embedded vision meets machine vision

Bridging the gap between machine vision and embedded vision, the Alvium 1800 Series is our crossover camera series. With an industrial-grade design and various triggering functions, the camera series combines the advantages of industrial machine vision cameras with the benefits offered by embedded sensor modules. It opens up new ways for users to switch between machine vision and embedded vision environments.

The perfect setup

The 1800 Series supports the GenICam machine vision standard and provides embedded vision designers with access to the world of industrial machine vision. To provide you with the best setup possible, the 1800 Series offers a whole range of options to choose from.

Supporting the GenICam standard, the USB3 Vision interface provides access to the Allied Vision 1800 Series' sophisticated feature set. This ensures great connectivity to the Allied Vision Vimba SDK as well as many other third-party software solutions.

Migration made easy

The Alvium 1800 Series offers a range of options for migrating from PC-based machine vision to an embedded setup. The ALVIUM® Technology platform not only supports easy sensor and function-ality upgrades within the Alvium world, but also makes it easy to switch from PC-based image processing applications to embedded systems thanks to common standards.

Adapting to suit

The Alvium 1800 Series brings our 30 years of vision expertise to an attractively priced camera, ready to fulfill the demands of embedded and machine vision applications. The GenICam-compliant USB3 Vision interface gives access to the sophisticated feature set of the Alvium 1800 Series.

Industrial-grade design

For maximum versatility, Alvium 1800 Series cameras come with numerous mounting and housing options, including an EMI (electromagnetic interference)-protective, closed housing. Designed and manufactured in Germany according to Allied Vision's ISO-9001- and ISO-13485-certified quality standards, they feature a robust single-board design and precisely aligned sensors. This design philosophy results in a compact yet extremely reliable camera package, with the ALVIUM® Technology platform offering unrivalled power management, easy upgrades, future-proof compatibility, and great on-board preprocessing.

Alvium 1800 Series models

Model	Sensor	Sensor Size	Shutter	Pixel Size	Resolution	Frame Rate
1800 U-040	Sony IMX287	Type 1/2.9	Global	6.9µm x 6.9µm	728 x 544	278fps
1800 U-050	ON Semi PYTHON 480	Type 1/3.6	Global	4.8µm x 4.8µm	808 x 608	115fps
1800 U-120	ON Semi AR0135CS	Type 1/3	Global	3.75µm x 3.75µm	1280 x 960	52fps
1800 U-158	Sony IMX273	Type 1/2.9	Global	3.45µm x 3.45µm	1456 x 1088	149fps
1800 U-319	Sony IMX265	Type 1/1.8	Global	3.45µm x 3.45µm	2064 x 1544	53fps
1800 U-500	ON Semi AR0521SR	Type 1/2.5	Rolling	2.2µm x 2.2µm	2592 x 1944	67fps
1800 U-501 NIR	ON Semi AR0522	Type 1/2.5	Rolling	2.2µm x 2.2µm	2592 x 1944	67fps
1800 U-507	Sony IMX264	Type 2/3	Global	3.45µm x 3.45µm	2464 x 2056	34fps
1800 U-1236	Sony IMX304	Type 1.1	Global	3.45µm x 3.45µm	4112 x 3008	22fps
1800 U-2050	Sony IMX183	Type 1	Rolling, Global reset	2.4µm x 2.4µm	5496 x 3672	17fps

1800 Series at a glance

Interface options	USB3 Vision
Mount options	C-Mount / CS-Mount / S-Mount (M12)
Housing options	Bare board / Open housing / Closed housing (USB 90° side connector available for all variants)
Camera control options	Vimba-SDK- or GenICam-compliant third-party software
Operating temperature	+5°C to +65°C housing temperature
Power requirements	Power over USB | External power
Body dimensions (L x W x H)	13mm x 26mm x 26mm (bare board)

// ALVIUM 1500 SERIES ACCESSORIES

MIPI CSI-2 accessories

To get the best out of Alvium, we are in the process of establishing partnerships with various component manufacturers. We also offer our own components. All these components are precisely tailored to the Alvium Camera Series. By selecting them, we adhere to existing standards in order to guarantee maximum compatibility.

CSI-2 adapter boards

We offer adapter boards with matching CSI-2 pinning for the Alvium Camera Series. Suitable for NVIDIA's Jetson family, Boundary Device's i.MX6-based NXP's Nitrogen6_MAX, Wandboard's i.MX6 developer boards, and Toradex' Ixora carrier boards these provide a seamless connection with Alvium Cameras via a MIPI CSI-2 cable.

CSI-2 cables

We provide matching CSI-2 cables for the Alvium Camera Series. Offering maximum versatility for your application, these cables are available in 120 mm, 220 mm, and 420 mm lengths.

// ALVIUM 1800 SERIES ACCESSORIES

USB3 Vision accessories

I/O cables
Triggering and controlling is essential. Our I/O cables allow access to all the I/O pins on Alvium USB cameras.

USB 3.1 Gen 1 cables
We deliver tested, lockable, and reliable USB 3.0 cables in 1, 3, 5, and 8 m lengths.

USB PCIe Cards
Interface Alvium cameras with traditional PC systems. Available with 2 and 4 ports.

4-port USB Hub
4 ports, connected to 1 card.

// ALLIED VISION LENS LINEUP

Allied Vision S-Mount lenses

Reliable and tested for vision applications, our portfolio of S-Mount lenses ensures the best results. Offering maximum freedom of choice for your application, all our lenses are available with an additional IR cut filter and with focal lengths from 2.97 mm to 12 mm.

Sensor Size	Resolution	Focal Length	F-Stop	IR Cut Filter
Type 1/2.5"	5 MP	2.97 mm	f/4	Optional
Type 1/2.5"	5 MP	4.1 mm	f/3	Optional
Type 1/2.5"	5 MP	6 mm	f/1.8	Optional
Type 1/2.5"	5 MP	8 mm	f/1.8	Optional
Type 1/2.5"	5 MP	12 mm	f/2.8	Optional

// ALVIUM 1800 SERIES SOFTWARE

Vimba Suite – the easy way of integration, setup, and more

The Alvium Series was not only designed to bring the latest technology to machine and embedded vision applications, but also to reduce integration efforts for a faster go-to-market. The Vimba Suite offers everything needed for a quick and easy integration of the Alvium 1800 Series.

Future-Proof SDK

Vimba is GenICam-based from ground up and provides transport layers for all Allied Vision GigE Vision, USB3 Vision, FireWire, and Camera Link cameras.

Platform Independence

The Vimba SDK supports Windows, Linux, and Linux for ARM. Applications are compatible directly or by cross-compiling.

Support for Third-Party Software

Vimba supports popular third-party image processing libraries including Cognex VisionPro, MathWorks MATLAB, Stemmer Imaging Common Vision Blox, MVTec HALCON and MERLIC, OpenCV, and many more!

APIs for C, C++, and .NET

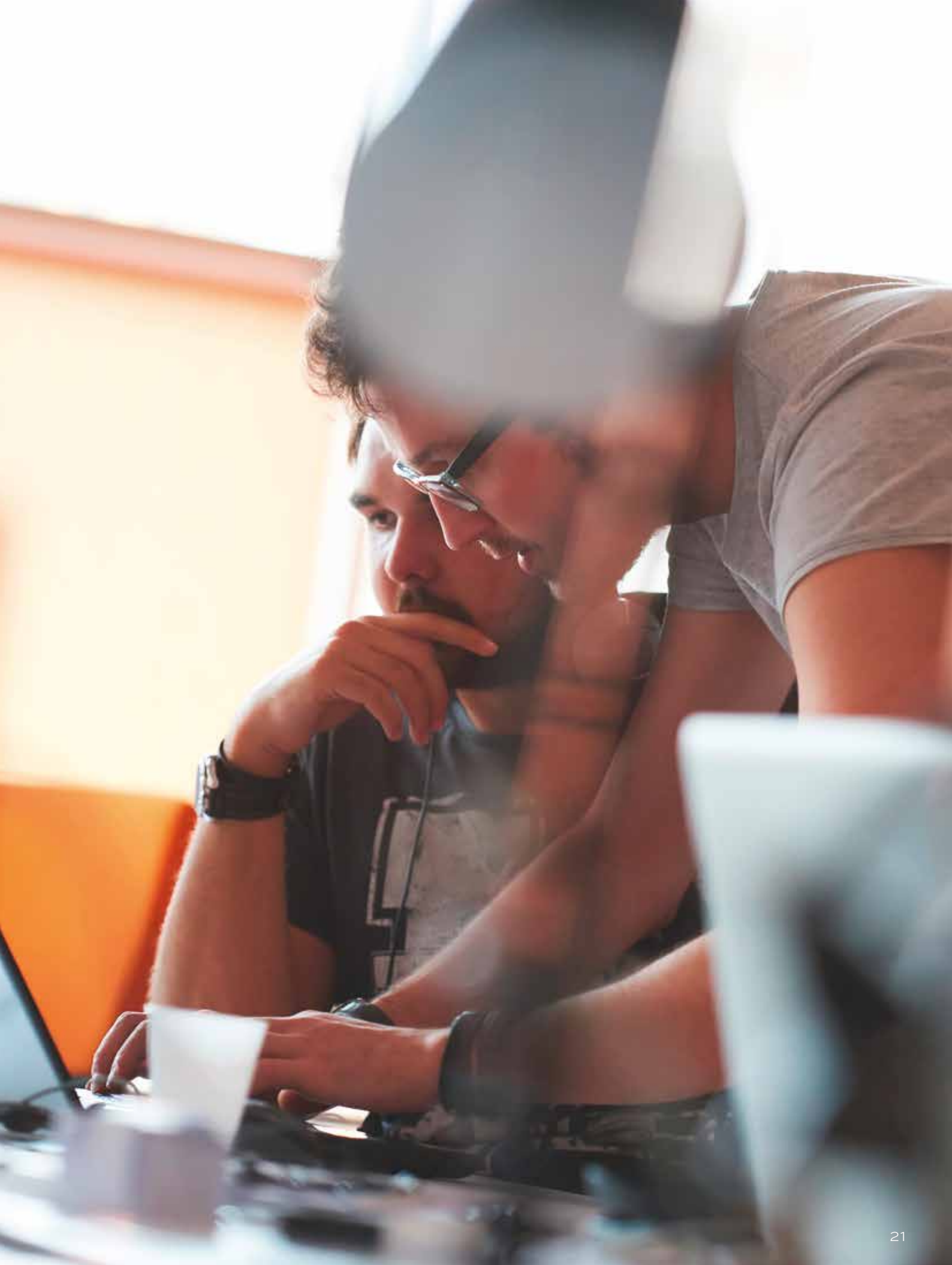
The Vimba SDK offers easy-to-use but powerful C, C++, and .NET APIs. Vimba includes several code examples and comprehensive user documentation.

Comprehensive Suite

The Vimba Suite provides everything you need to start building advanced applications: ready-to-use code examples, the Vimba Viewer application, Vimba's Image Transform Library, Firmware Updater, and Driver Installer.

Download

Get Vimba for Windows, Linux, and Linux for ARM, or contact us if you are looking for other operating system versions.



// PARTNERSHIP

30 years of knowledge

Allied Vision's worldwide support and application engineering team is on call 24 hours a day, five days a week in different time zones to help you whenever you may need assistance. With over 30 years of industry experience, we guide you through the system integration phase, resolving any issues that may arise and making sure you get up and running as quickly as possible. That's what partnership means to us.

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