

April 2024

Industry Insight: Vision Technology Sector Report

Vision Technology M&A: Metrology and Low-Light Vision to Grow

Introduction to the ARTHOS Vision Technology Sector Report

We are pleased to present the ARTHOS Vision Technology Sector Report for April 2024. This report provides comments and analysis on current market trends, valuation developments, and M&A transactions focusing on vision metrology and other strongly growing vision market segments.

Besides the current market challenges in the automotive and consumer industries, we see Vision Metrology, low-light imaging, and space as market segments in which double-digit growth rates can be expected. Market opportunities are huge; the challenge is not identifying interesting markets but attractive vision companies. If you are interested, don't hesitate to call.

ARTHOS is an international M&A advisory firm focusing on international technology transactions. Its managing partners have closed more than 200 M&A transactions over the past 20 years. In 2023 ARTHOS and its international AICA M&A alliance partners have advised on 50+ technology M&A transactions.

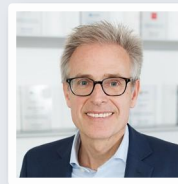
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Vision Technology M&A: Metrology and Low-Light Vision to Grow



Personal Note

Last year I highlighted in one of the ARTHOS sector reports that vision markets in the non-visible light spectrums are outgrowing other market segments, and therefore, more

M&A transactions were to be expected. This became true, and quite some vision M&A transactions in the areas of UV, X-ray, IR, and hyperspectral are highlighted on pages 9 ff.

In this report, I want to draw your attention to segments that are also expecting double-digit market growth: Metrology for semiconductor equipment low-light imaging, and space. Unfortunately, in my experience, it is difficult to identify reliable market reports for those vision market sub-segments as related markets are small. Therefore, broader market trends need to be analyzed and factored in. E.g. Yole Group forecasts that “2024 will be a transition year for the semi-equipment subsystems market: revenue is not expected to decline as it did in 2023 ... it will .. take several quarters and very likely most of 2024 to fully digest these high inventory levels, and **to see all the equipment suppliers growing as strongly as we saw in 2021 or 2022.**” **This means double-digit growth and Valuations for Vision Metrology companies are reflecting this view by showing NTM EV/EBITDA multiples of > 20!**

According to Spherical Insights, **low-light imaging markets are expected to grow at a CAGR of 13.7%** in a range of industries, including consumer electronics, security and surveillance, automotive, and medical. Breakthroughs in improving image quality are the main driver. Furthermore, the inclusion of AI, as well as the possibility of AR and VR applications, broadens market opportunities.

Another example is the **space industry**. The World Economic Forum reveals a \$1.8 trillion opportunity for global economic growth by 2035. In the coming years, space technology will help us monitor the effects of climate change, warn of impending natural disasters, and streamline the flow of global trade through more efficient supply chains, and vision technologies are a driving factor of that. Market opportunities are undoubtedly huge; in my view, the greater challenge is identifying attractive companies addressing these strongly growing vision segments.

The vision industry remains an attractive environment for M&A, and **identifying attractive vision companies stays critical**. If you are interested in more details, don't hesitate to call, even if you don't target a transaction soon!

* CAGR: Compound annual growth rate

Market trends



Metrology services market size estimated to grow at a CAGR of 15% between 2023 and 2028.

(Technavio 2024)



Low Light Imaging Market to grow at CAGR of 13.7%

(Spherical Insights, Nov 2023)



2024 will be a transition year for semiconductor equipment subsystems market

(Yole, Feb 2024)



The space industry is growing at 9% per annum

(World Economic Forum, April 2024)

By far highest valuation multiples for Vision Metrology sub-sector

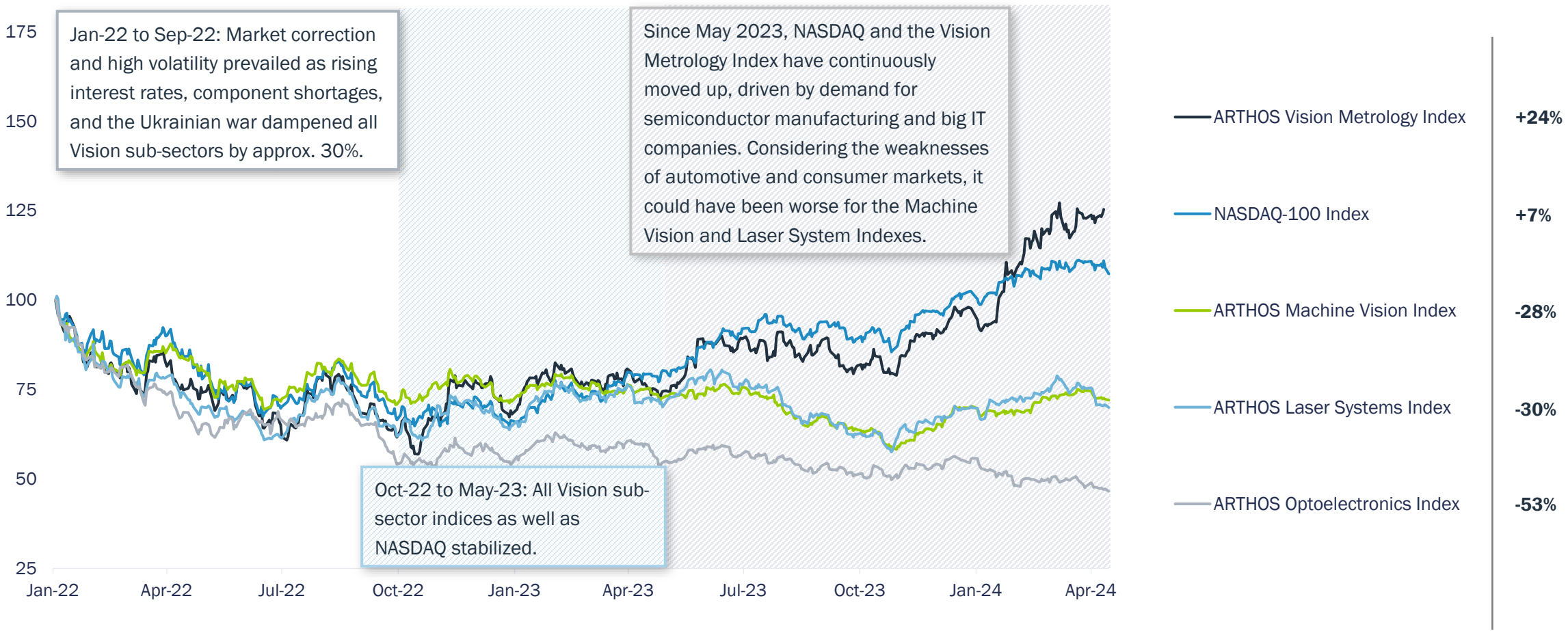
Vision technology sub-sectors	■ NTM EV/Sales* ■ NTM EV/EBITDA*	5y. EPS p.a. growth	Important players
Laser Systems Laser System technology companies utilize laser components for applications in material processing, communications, sensing, medical, instrumentation & many other segments. Laser System companies are valued lower compared to its peers in other verticals but have the highest growth expectation according to analysts.	■ 2,1x ■ 12,1x	12%	 COHERENT  KEYENCE  IPG LASER  Novanta
Machine Vision Machine Vision companies provide imaging-based automatic inspection and analysis for process control in industry and other markets. Despite current demand weaknesses Machine Vision companies experience in general high valuations. Note: Currently, valuations and expected growth vary more than seen historically.	■ 1,9x ■ 13,6x	10%	 COGNEX  HEXAGON  TELEDYNE TECHNOLOGIES Everywhere you look  TK GROUP
Vision Metrology Vision companies in this segment master high-end vision technologies, including metrology, nano inspection, and/or lithography, for semiconductor equipment or low-light life science applications. Valuations of Vision Metrology companies are by far the champions with the highest multiples based on NTM EV/ EBITDA.	■ 4,7x ■ 22,2x	13%	 APPLIED MATERIALS  ASML  KLA  OLYMPUS
Optoelectronics The Optoelectronics sub-sector includes optoelectronic components & systems companies offering components for vision applications. Valuation multiples and corresponding growth expectations vary a lot in this sub-sector, so the informative value of this segment is low right now. Note: Chinese companies are valued highly.	■ 1,8x ■ 12,0x	1y. EPS growth -3%	 ROHM SEMICONDUCTOR  三安光电 Sanan Optoelectronics  HAMAMATSU  amul

Sources: Capital IQ (as of 16 April 2024)

* NTM EV/Sales; NTM EV/EBITDA: Current enterprise value/next twelve months median estimates

NASDAQ and Metrology Indices have risen significantly since May 2023 and left others behind

Stock market performance by vision technology sub-sector indices since January 2022



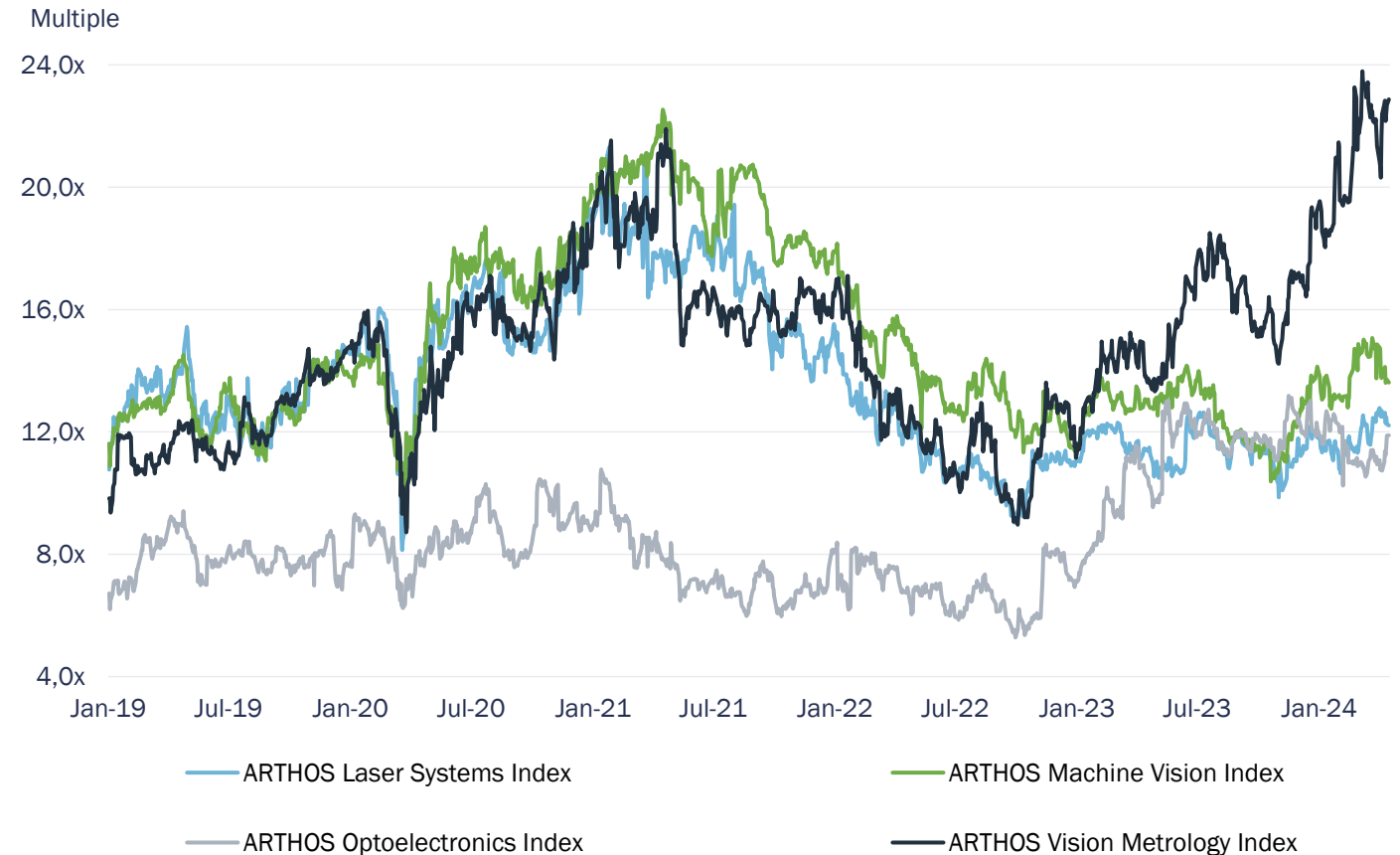
Sources: Capital IQ (as of 16 April 2024)
The composition of ARTHOS vision indices is outlined in the appendix, p. 22ff.

NTM EV/EBITDA multiples of Vision Metrology significantly above all other Vision sectors

NTM EV/EBITDA multiple development

- ➔ Most technology indices usually trade between 12x and 16x EV/NTM EBITDA. They vary significantly over time and are mainly driven by the expectation of individual company performance and industry growth expectations.
- ➔ When valuations in specific industry segments are high, the appetite for acquisitions and the willingness to pay higher prices increase. **As a result, purchase prices for private companies are also influenced by stock market valuations in the same industry.**
- ➔ Throughout 2021, EV/NTM EBITDA multiples have dropped to ~12x in line with the overall stock market due to rising interest rates, the war in Ukraine, and the resulting depressed market sentiment.
- ➔ **Starting in October 2022, NTM EV/EBITDA multiples of Vision Metrology rose significantly to above 20x, leaving all other sub-sectors behind, which have fluctuated around 12x since then.**

NTM EV/EBITDA* multiple development since January 2019



Sources: Capital IQ (as of 16 April 2024)

* NTM EV/EBITDA: Current enterprise value / next twelve months EBITDA estimates [median]

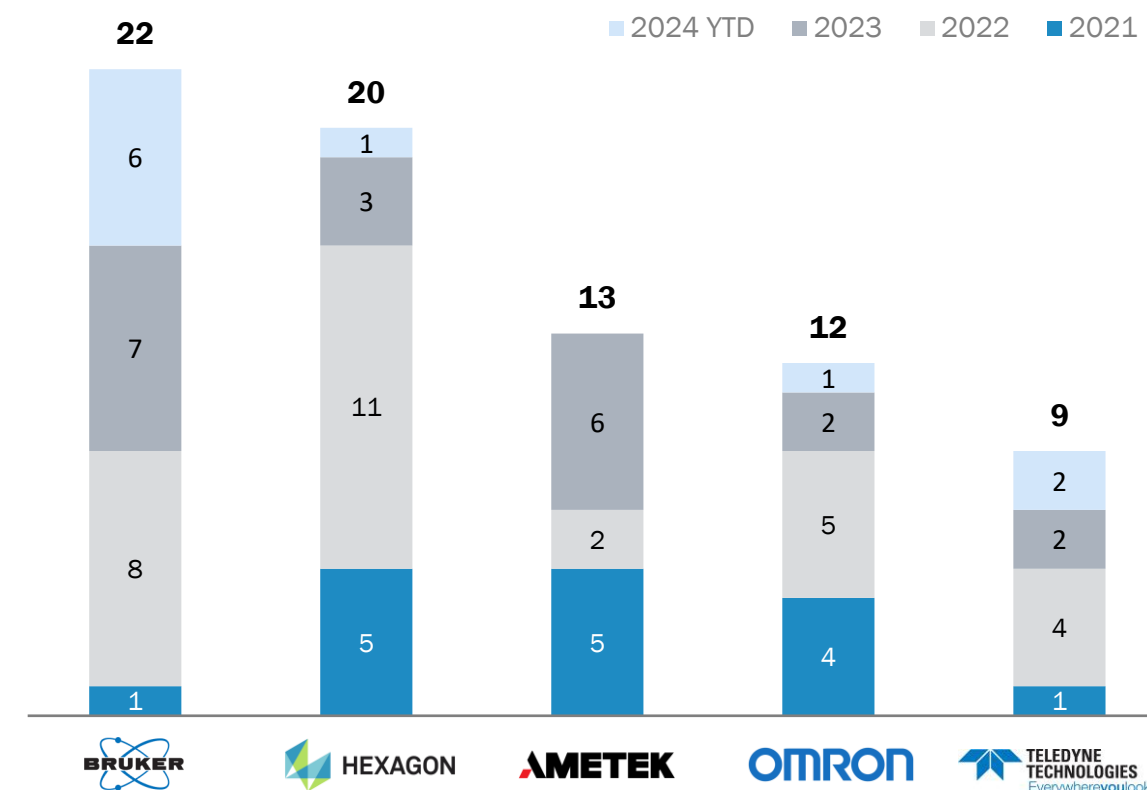
Machine Vision sub-sector analysis: All Machine Vision Players are very acquisitive

ARTHOS Machine Vision peers

in € mn

Company Name	EV	LTM Sales	Annual	EBITDA	NTM	
			Exp. 5Y		EV/Sales	EV/EBITDA
			EPS Growth	Margin		
AMETEK, Inc.	41,893	5,968	9%	31%	6.0x	19.8x
Antares Vision S.p.A.	271	240	NM	12%	1.2x	12.3x
Basler Aktiengesellschaft	389	203	3%	-7%	1.9x	14.3x
Bruker Corporation	11,939	2,682	18%	20%	3.9x	19.5x
Carl Zeiss Meditec AG	9,407	2,094	13%	17%	4.0x	19.6x
Cognex Corporation	6,219	758	NM	17%	7.1x	38.7x
Datalogic S.p.A.	338	537	NM	6%	0.6x	7.0x
FARO Technologies, Inc.	339	325	30%	-3%	1.0x	13.0x
Hexagon AB (publ)	32,374	5,435	14%	27%	5.6x	15.1x
Jenoptik AG	1,895	1,066	17%	19%	1.7x	8.5x
Kapsch TrafficCom AG	287	539	NM	-1%	0.5x	3.2x
Nynomic AG	195	115	NM	12%	NM	9.8x
Olympus Corporation	15,652	5,880	2%	15%	2.7x	12.0x
OMRON Corporation	7,390	5,430	-2%	10%	1.5x	15.2x
OPT Machine Vision Tech	950	123	11%	23%	6.3x	21.0x
Stemmer Imaging AG	193	146	5%	18%	1.3x	7.0x
Teledyne Inc.	20,415	5,098	8%	24%	3.7x	14.9x
TKH Group N.V.	2,175	1,848	NM	13%	1.2x	7.2x
Tomra Systems ASA	4,114	1,317	-4%	12%	3.2x	16.1x
Varex Imaging Corporation	938	794	10%	12%	1.2x	8.4x
Viscom AG	84	119	NM	6%	0.8x	6.9x
Zebra Technologies Corporation	15,816	4,147	NM	17%	3.6x	18.4x
Mean			10%	14%	2.8x	14.0x
Median			10%	14%	1.9x	13.6x

No. of acquisitions per year of most active buyers



Sources: Capital IQ (as of 16 April 2024)

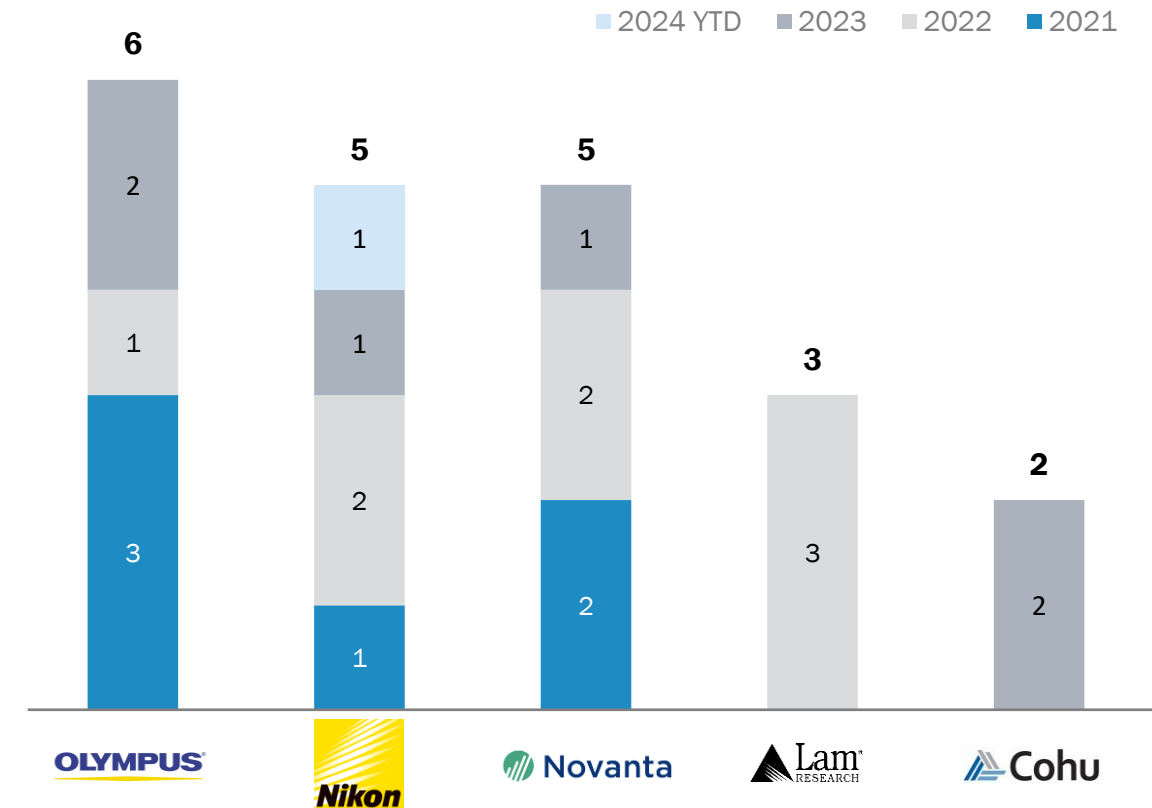
Vision Metrology sub-sector analysis: Fewer M&A Transactions than in other Vision segments

ARTHOS Vision Metrology peers

in € mn

Company Name	EV	LTM Sales	Annual	EBITDA	NTM	
			Exp. 5Y EPS Growth		EV/Sales	EV/EBITDA
Park Systems Corp.	725	101	NM	22%	6.2x	23.5x
AUROS Technology, Inc.	190	32	NM	13%	4.2x	19.5x
Renishaw plc	3,348	774	NM	20%	4.2x	17.8x
Onto Innovation Inc.	7,834	738	NM	22%	9.0x	33.4x
Camtek Ltd.	3,117	285	14%	23%	8.5x	29.1x
Lasertec Corporation	22,150	1,237	25%	42%	16.1x	35.0x
Applied Materials, Inc.	159,317	24,377	11%	31%	6.2x	20.3x
KLA Corporation	88,873	8,750	13%	41%	9.3x	22.2x
Lam Research Corporation	116,050	13,004	13%	31%	7.8x	24.7x
Nova Ltd.	4,285	469	8%	29%	7.8x	24.4x
NEXTIN, Inc.	410	61	NM	45%	4.7x	13.7x
Tokyo Seimitsu Co., Ltd.	2,701	851	9%	22%	3.0x	13.1x
JEOL Ltd.	2,172	1,039	13%	16%	1.9x	11.0x
ASML Holding N.V.	356,080	27,559	21%	35%	12.8x	37.7x
Cohu, Inc.	1,104	576	20%	15%	2.4x	35.8x
FormFactor, Inc.	2,954	600	20%	7%	4.4x	26.4x
PVA TePla AG	392	263	18%	15%	1.4x	8.0x
Novanta Inc.	5,722	798	NM	19%	6.2x	28.0x
Nikon Corporation	2,943	4,499	6%	11%	0.7x	6.3x
Olympus Corporation	15,652	5,880	2%	15%	2.7x	12.0x
Prioritech Ltd	548	26	NM	NM	NM	NM
Jenoptik AG	1,895	1,066	17%	19%	1.7x	8.5x
Mean			14%	23%	5.8x	21.4x
Median			13%	22%	4.7x	22.2x

No. of acquisitions per year of most active buyers



Sources: Capital IQ (as of 16 April 2024)

Notable Vision M&A transactions in 2023/24 (1 of 8)

Date*	Buyer	Target	Comment	Country
Mar 2024	MYCRONIC	→ vanguard AUTOMATION	➤ Mycronic AB (publ) (OM:MYCR) signed an agreement on Mar 22 to acquire 3D microfabrication equipment supplier Vanguard Automation GmbH for an undisclosed amount. ➤ With this acquisition, Mycronic can offer a wider range of die bonding and optical packaging related solutions to its customers.	
Mar 2024	NEWSPACE CAPITAL KNIFE CAPITAL	→ SIMERA SENSE	➤ Simera Sense, world leader in providing end-to-end optical payload solutions for satellite earth observations, has raised €13.5 million from NewSpace Capital and Knife Capital on Mar 12. ➤ Simera will use the funds to further develop its product range, increase production capacity and accelerate on-board processing to meet the growing demand for its high-resolution cameras.	
Mar 2024		→ 	➤ On Mar 07, Nikon Corporation (TSE:7731) has announced to acquire RED.com LLC for an undisclosed amount, planning to make RED.com a wholly-owned subsidiary of Nikon. ➤ Nikon will combine its expertise with RED.com's unique image compression technology and color science to develop distinctive products in the professional digital cinema camera market.	
Mar 2024	VECTOR >	→ 	➤ VECTOR Informatik GmbH acquires the Austrian specialist for AI and camera sensor technology EYES GmbH as a strategic partner for an undisclosed amount on Mar 04. ➤ With the acquisition of EYES, VECTOR realizes synergies especially in the technological environment of driver assistance systems for rail and commercial vehicles.	
Feb 2024	Lightspeed® promusventures	→ CROBCO	➤ On Feb 26, RobCo GmbH announced that it has raised \$42.5 million from Lightspeed Ventures LLC, Promus Venture Management LLC, Sequoia Capital Operations LLC and Kindred Capital LLP. ➤ The expert in connected robotics automatics solutions will use the newly acquired capital to invest in further expanding distribution channels and advancing product development.	
Feb 2024	SIEMENS	→ 	➤ On Feb 13, Siemens (XTRA:SIE) has acquired the AI-enabled machine vision software company Inspekto for an undisclosed transaction value. ➤ Siemens leverages Inspekto's technology globally and utilizes the easy-to-use automated visual quality inspection software based on image processing, to drive digital transformation forward.	

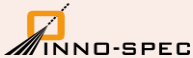
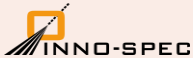
Sources: Capital IQ (as of 16 April 2024), Press releases

* Transaction announcement

 Vision Metrology and Low-Light M&A Transactions

 M&A Transactions in the invisible light spectrum

Notable Vision M&A transactions in 2023/24 (2 of 8)

Date*	Buyer	Target	Comment	Country
Feb 2024			- On Feb 13, Teledyne Technologies Incorporated (NYSE:TDY) announced that it has entered into an agreement to acquire Adimec Holding B.V. for an undisclosed amount. - With the acquisition of Adimec, Teledyne gains access to complementary technology, products and customers in the focus areas of global defense, semiconductor and electronics inspection.	
Feb 2024	 → 		- Pinnacle X-Ray Solutions LLC acquired Willick Engineering Co, Inc., a supplier of nondestructive testing (NDT) X-ray equipment and provider of related services on Feb 06. - The acquisition expands Pinnacle's product and service portfolio, and Willick's west coast presence and diversified customer base, will enhance Pinnacle's capacity and national footprint.	
Jan 2024	 → 		- On Jan 31, ITIS Holding a.s., a PPF Group company, announced to acquire the innovator in the field of machine vision, VITRONIC Group for an undisclosed amount. - The acquisition will strengthen ITIS Holding's ability to enhance its portfolio of various technologies, strengthen its R&D and innovation capabilities and accelerate its global growth.	
Jan 2024	 → 		- Headwall Photonics, Inc. acquired Inno-Spec GmbH, the manufacturer of industrial hyperspectral imaging systems, from Oliver Grass and Assemblify GmbH for an undisclosed amount on Jan 23. - Headwall's cutting-edge optical components and remote sensing technologies together with inno-spec's industrial applications enables the development of powerful hyperspectral imaging systems.	
Jan 2024	 → 		- ABB Ltd (SWX:ABBN) acquired the remaining majority stake in Sevensense Robotics AG, a leading provider of AI-enabled 3D vision navigation technology for autonomous mobile robots on Jan 11. - The acquisition makes ABB a leader in next-generation AMR with Visual SLAM for autonomous mobile robots and provides a comprehensive portfolio of robotics and automation solutions.	
Jan 2024	 → 		- On Jan 10, Oxford Instruments plc (LSE:OXIG) acquired First Light Imaging SAS for €18.7 million, consisting of €15.7 million on a cash and debt free basis and a €3 million earn-out. - First Light's high-speed, low-noise scientific cameras for infrared and visible imaging complement Oxford Instruments' existing portfolio and enable the expansion into adjacent markets.	

Sources: Capital IQ (as of 16 April 2024), Press releases

* Transaction announcement

 Vision Metrology and Low-Light M&A Transactions

 M&A Transactions in the invisible light spectrum

Notable Vision M&A transactions in 2023/24 (3 of 8)

Date*	Buyer	Target	Comment	Country
Jan 2024	XOVIS → Hella Aglaia		- Xovis AG signed an agreement to acquire the “People Sensing Business” of Hella Aglaia Mobile Vision GmbH for an undisclosed amount on Jan 09. - The acquisition enhances Xovis’ capabilities in the people sensing business through Hella Aglaia’s leading high-precision people counting sensors product offering.	
Dec 2023	GreatStar → HEXAGON		- On Dec 19, Hangzhou Great Star Industrial Co., Ltd. agreed to acquire Hexagon AB’s Tesa PMI (Precision Measurement Instruments) business for a total consideration of \$44 million. - The divestment of one non-core business unit reflects Hexagon’s commitment to focus on core business activities directly accretive to its mid-term growth, margin and cash generation targets.	
Dec 2023	NFC New Future Capital LVC PARTNERS → Blickfeld		- Blickfeld GmbH announced that it has received €7.5 million in a round of funding co-led by the investors New Future Capital and Unternehmertum Venture Capital Partners GmbH on Dec 18. - The additional funds are used to fuel sales dynamics, double revenue in the upcoming year and beyond, and enhance Blickfeld’s market presence mainly in Europe, North America, and China.	
Dec 2023	NYNOMIC THE PHOTONICS GROUP → art photonics broad spectra fiber solutions		- On Dec 14, Nynomic AG (XTRA:M7U) acquired the established company in the fiber optic technologies market segment, art photonics GmbH for an undisclosed amount. - With this acquisition, Nynomic is expanding its technology portfolio with photonics’ polycrystalline mid-infrared (MIR) and metal-coated silica fibers, used to assemble various spectroscopy probes.	
Nov 2023	Novanta → MOTION SOLUTIONS Confidence. Engineered.		- Novanta Corporation completed the acquisition of Bearing Engineers, Inc. (doing business as Motion Solutions) for \$189 million, on January 02, 2024. - The acquisition adds complementary motion subsystem solutions to Novanta’s product portfolio, increasing the exposure to leading OEM customers in spatial biology, genomics and proteomics.	
Nov 2023	TIBIDABO SCIENTIFIC INDUSTRIES → LLA instruments SCAN • SORT • SUSTAIN		- On Nov 13, Tibidabo Scientific Industries Limited acquired LLA Instruments GmbH & Co. Kg, which specializes in support products for the detection and identification of materials. - With this acquisition, Tibidabo can expand its product and service offerings to meet the growing needs of the industry and strengthen its R&D capabilities.	

Sources: Capital IQ (as of 16 April 2024), Press releases

* Transaction announcement

 Vision Metrology and Low-Light M&A Transactions

 M&A Transactions in the invisible light spectrum

Notable Vision M&A transactions in 2023/24 (4 of 8)

Date*	Buyer	Target	Comment	Country
Nov 2023	 Voima Ventures NORDIC FoodTech VC	→ KUVA SPACE	➤ The Finnish earth observation company Kuva Space announced that it has raised €16.6 million from Voima Ventures, Nordic FoodTech VC and Earth VC, on Nov 02. ➤ The company will use the capital to accelerate the development of its patented hyperspectral camera and space technology, double its team size, and launch its AI analytics platform.	
Oct 2023	 DENSO MITSUBISHI	→  COHERENT	➤ On Dec. 04, DENSO CORPORATION and Mitsubishi Electric Corporation invested a total of \$1 billion in Coherent Corp.'s (NYSE: COHR) silicon carbide business for a 25% stake. ➤ With the transaction, Coherent receives greater financial and operational flexibility to execute its capital allocation priorities, as it expects to use the capital for capital expenditure requirements.	
Sep 2023	 GUARDIAN CAPITAL™	→  Q-FREE	➤ Guardian Capital Group Limited (TSX:GCG.A) acquired an additional 62.8% stake in Q-Free ASA (OB:QFR) from Rieber & Søn As for approximately NOK 840 million (€72 million) on Oct 03. ➤ The acquisition of the additional stake allows Guardian to have greater financial and strategic influence and to leverage its network to enhance the business.	
Sep 2023	 Camtek See Beyond	→  FRT the art of metrology™	➤ Camtek Ltd. (NasdaqGM:CAMT) closed the acquisition of FRT GmbH from FormFactor, Inc. (NasdaqGS:FORM) for \$100 million on Nov 01. ➤ The acquisition allows Camtek to offer more advanced solutions to additional process steps in semiconductor manufacturing and comprehensive metrology solutions.	
Sep 2023	 EXCELITAS TECHNOLOGIES	→  Heraeus Noblelight	➤ On Jan 01, Excelitas Technologies Corp. acquired Heraeus Noblelight GmbH from Heraeus Holding GmbH for an undisclosed amount. ➤ Heraeus Noblelight's specialty light sources and solutions complement Excelitas' extensive line of plasma and LED products to drive growth and provide innovative integrated solutions.	
Sep 2023	 wenglor the innovative family	→  dv% deevio	➤ On Sep 12, Wenglor Sensoric Elektronische Geräte GmbH acquired Deevio GmbH, a software developer specializing in automating visual inspection processes, for an undisclosed amount. ➤ The acquisition allows Wenglor to utilize Deevio's AI capabilities to improve their products and develop more sustainable image processing solutions.	

Sources: Capital IQ (as of 16 April 2024), Press releases

* Transaction announcement

 Vision Metrology and Low-Light M&A Transactions

 M&A Transactions in the invisible light spectrum

Notable Vision M&A transactions in 2023/24 (5 of 8)

Date*	Buyer	Target	Comment	Country
Sep 2023	 → 	➤ Advantech (TWSE:2395) agreed to acquire the North American image capturing solutions provider BitFlow on Sep 08 in an all-cash transaction for an undisclosed amount. ➤ With BitFlow's high-speed image capture technology, Advantech expects to expand its offerings of advanced industrial computer vision products and markets, and strengthen its AI business.		
Aug 2023	 → 	➤ Alder acquired an unknown majority stake in Insort GmbH, a hyperspectral imaging technology provider within the food processing industry, for an undisclosed amount. ➤ Alder has, as a new majority owner of Insort, partnered with the founder and management to support the growth journey of Insort.		
Aug 2023	 → 	➤ On Oct 18, Cognex Corporation (NasdaqGS:CGNX) closed the acquisition of Moritex Corporation from Trustar Capital for ¥40 billion in an all-cash transaction. ➤ The acquisition allows Cognex to use Moritex's complementary capabilities to develop high-accuracy solutions for equipment manufacturers to improve its machine vision solutions.		
Aug 2023	 → 	➤ On Sep 05, Sensys Networks, Inc. acquired the "RTMS Radar Products Division" of Image Sensing Systems, Inc. for approximately \$4.8 million on a debt- and cash-free basis. ➤ With this acquisition, Sensys Networks further strengthens its industry-leading in-ground sensing solutions with a suite of high-performance radar-based above-ground sensors from RTMS.		
Jul 2023	 → 	➤ Atlas Copco AB acquired Extend3D GmbH, a company that develops and produces augmented reality worker guidance, for an undisclosed amount on Jul 04. ➤ This acquisition enhances Atlas Copco's offering in process and quality control by leveraging Extend3D's augmented reality products designed specifically for assembly.		
Jun 2023	 → 	➤ On Nov 03, Keysight Technologies, Inc. (NYSE:KEYS) acquired a 50.6% stake in ESI Group SA (ENXTPA:ESI) from a group of shareholders for approximately €480 million. ➤ By bringing ESI Group into its electronic design and test portfolio, Keysight will further expand its software prototyping capabilities into computer-aided engineering.		

Sources: Capital IQ (as of 16 April 2024), Press releases

* Transaction announcement

 Vision Metrology and Low-Light M&A Transactions

 M&A Transactions in the invisible light spectrum

Notable Vision M&A transactions in 2023/24 (6 of 8)

Date*	Buyer	Target	Comment	Country
Jun 2023	LeddarTech® →	 Prospector Capital Partners	- On Dec 21, LeddarTech Inc. became a publicly traded company after completing a merger with Prospector Capital Corp with a total transaction size of \$260 million. - The transaction enables LeddarTech, the real-time 3D view of automotive surroundings software provider, to accelerate their growth and future expansion.	
Jun 2023	DERMALOG →	 JENETRIC	- DERMALOG Identification Systems GmbH signed an agreement to acquire JENETRIC GmbH, a provider of fingerprint capturing solutions for an undisclosed amount on Jun 13. - The acquisition allows DERMALOG to combine JENETRIC's advanced TFT technology with its own solutions, such as its proven liveness detection, to provide significantly more value.	
Jun 2023	 Q-SYS® →	 SEERVISION	- On Aug 03, Q.SYS International, Inc. acquired the industry pioneer in AI-driven camera automation software Seervision AG for an undisclosed amount. - The acquisition accelerates the Q-SYS strategy to develop a platform with audio, video and control that supports integration with leading unified communications & video conferencing applications.	
May 2023	 TKH →	 euresys	- TKH Group N.V. (ENXTAM:TWEKA) acquired Euresys s.a., a leading innovative high-tech designer and provider of software for 2D and 3D image analysis, for an undisclosed amount on May 09. - The acquisition enhances TKH's existing proprietary machine vision technologies with Euresys' frame grabber and adds strong software expertise and interface technologies to its capabilities.	
Apr 2023	 Nikon →	 AVONIX IMAGING	- On Jul 07, Nikon Americas Inc. closed the acquisition of Avonix Imaging, LLC, a provider of services and solutions related to X-ray and CT systems, for an undisclosed amount. - With the acquisition, Nikon aims to provide innovative solutions for various measurement needs and challenges in the field of X-ray and CT inspection at manufacturing sites.	
Apr 2023	 PHOTONIS Reveal the Invisible →	 PROXI VISION	- Photonis announced the acquisition of ProxiVision, a manufacturer of high-grade optoelectronic components and detectors for UV, visible light, x-rays and particles (>60 FTEs). - With the acquisition, Photonis strengthens its positioning in ultra-violet and solar blind imaging devices with further expertise and manufacturing capabilities.	

Sources: Capital IQ (as of 16 April 2024), Press releases

* Transaction announcement

 Vision Metrology and Low-Light M&A Transactions

 M&A Transactions in the invisible light spectrum

Notable Vision M&A transactions in 2023/24 (7 of 8)

Date*	Buyer	Target	Comment	Country
Apr 2023	 PHOTONIS Reveal the invisible	→  T E L O P S	- Photonis announced the acquisition of Telops, a specialist developer and manufacturer of high-performance hyperspectral imaging systems and infrared cameras (>100 FTEs). - Through the acquisition, Photonis extends its technology expertise by adding hyperspectral capabilities to the portfolio.	
Mar 2023	 UNION PARK CAPITAL KPM	→  SMARTVISIONWORKS Bringing Automation the Power of Sight	- Union Park completed the acquisition of Smart Vision Works, a technology company providing AI and machine learning platforms for vision systems for agriculture and food industries (~40 FTEs). - With this closed acquisition, Union park capital's portfolio company KPM Analytics has significantly expanded its vision inspection portfolio with new AI technologies.	
Mar 2023		→ XXII	- Startup XXII, specialized on video analytics software enabled by AI, has raised €22m in a series A funding round led by Fonds Innovation Défense (>50 FTEs). - The company plans to use the additional funding to enable the mass deployment of its technology and to expand its footprint in the US, Europe and the Middle East.	
Feb 2023	 ANTARES VISION ANTARES VISION GROUP	→  pygsaGROUP	- Antares Vision (BIT:AV) closed a binding agreement to acquire 30% of PYGSA, a designer and manufacturer of complete industrial vision systems. - With the acquisition, Antares is expanding its presence in the Spanish and Portuguese markets and named PYGSA as exclusive distributor of Antares' solutions.	
Feb 2023	 EXCELITAS TECHNOLOGIES	→  Phoseon TECHNOLOGY	- Excelitas completed the acquisition of Phoseon, a designer and manufacturer of industrial UV LED curing systems and UV LED illumination solutions (~120 FTEs), on Feb 15. - Excelitas adds further alternatives in UV lighting solutions across industrial curing, scientific illumination and non-contact UVC disinfection to its illumination technologies portfolio.	
Feb 2023	 resideo	→  teknique.	- Resideo Technologies Inc. (NYSE:REZI) announced that it has completed the acquisition of Teknique, a provider of Ambarella-based vision components and camera modules (>50 FTEs). - Founded in 2004 and based in New Zealand, the company is expected to expand the video product portfolio and accelerate providing actionable intelligence for customers.	

Sources: Capital IQ (as of 16 April 2024), Press releases
* Transaction announcement

 Vision Metrology and Low-Light M&A Transactions

 M&A Transactions in the invisible light spectrum

Notable Vision M&A transactions in 2023/24 (8 of 8)

Date*	Buyer	Target	Comment	Country
Jan 2023		➔ 	➤ ZEISS announced the acquisition of LENZO, a specialist for 3D line-scan optical measurement systems in quality control, development, and production (>30 FTEs). ➤ By acquiring LENZO, ZEISS expands its market presence in Poland and improves its Industrial Quality & Research segment.	
Jan 2023		➔ 	➤ Bruker (NasdaqGS:BRKR) closed the acquisition of ACQUIFER Imaging, a manufacturer of cell-based automated microscopy imaging systems and secure data storage hardware (EV €7m). ➤ ACQUIFER adds high-performance on-premise processing, secure storage, and networking technology to Bruker's advanced fluorescence microscopy imaging products.	

Sources: Capital IQ (as of 16 April 2024), Press releases
 * Transaction announcement

ARTHOS – International Tech M&A advisory

ARTHOS – International M&A advisory firm with a focus on technology transactions



Partner-led and global

ARTHOS Corporate Finance is an independent, owner-managed M&A advisory firm based in Munich and part of a global alliance of 40 M&A advisory firms with 200 managing partners. All our projects are managed by an experienced managing partner who has successfully closed more than 100 company disposals, acquisitions or fundraisings. The majority of ARTHOS transactions have a volume between 10 and 100 million euros.



M&A 360°

With our 360° approach we can advise our customers in a targeted and comprehensive manner – from the initial planning through the detailed preparation to the efficient execution of a transaction. That is why we see ourselves not only as deal makers, but rather as competent M&A experts, experienced process managers and financial advisers for our client's long-term goals.



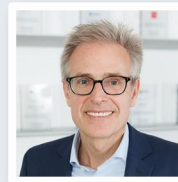
Technology

Our focus on digital media, information technology and high-tech industries provides several powerful advantages to our customers: we know the M&A terms and conditions, business models and decision-makers within these industry sectors. With this knowledge, we are able to implement sustainable, creative solutions. This is why our M&A projects achieve above average results.

ARTHOS TECHNOLOGY TEAM



Arne Tödt
Managing Partner



Arno Pätzold
Managing Partner



Moritz Böck
Senior Analyst

ARTHOS – 20-year track record in international technology M&A transactions



KETEK
Munich, Germany

has sold assets to



Worldwide leading 3D-wideband
Silicon Photomultiplier Technology



Munich, Germany

has been acquired by



Accelerating market presence
in Structured Light Technology



Nürnberg, Germany

has been acquired by



Accelerating growth of inno-spec's
industrial hyperspectral imaging solutions



Amaro, Italy

has acquired



Taufkirchen, Germany

Accelerating Eurotech's growth strategy
in the Edge Computing market in AIoT

MaxxVision

Stuttgart, Germany

has been acquired by



Stockholm, Sweden

Selling to a strategic investor targeting
buy and build in Vision Technology

tacterion

Munich, Germany

has received growth capital from



Gütersloh, Germany

Creating the leading tactile sensor company
to enable the tactile internet of the future

Indutrade

Stockholm, Sweden

has acquired



Villingen-Schwenningen, Germany

Expansion in industry 4.0 conveyor systems
for production process optimization



Munich, Germany

has acquired

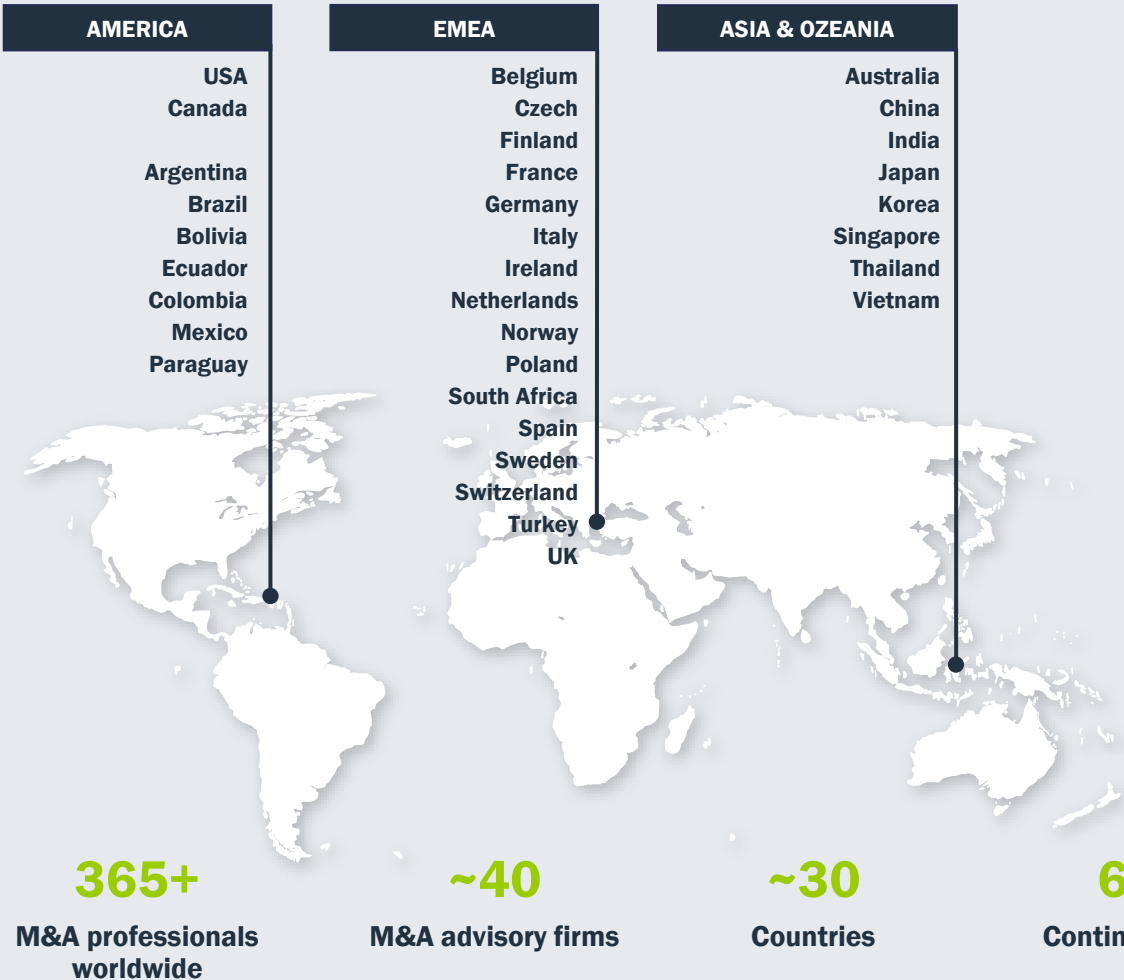


Copenhagen, Denmark

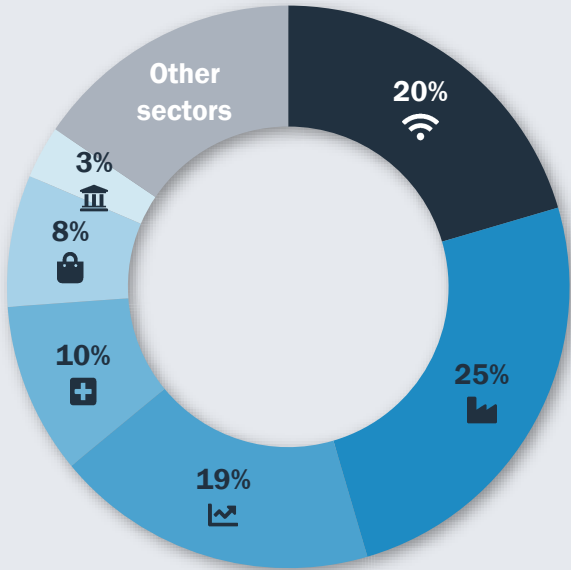
Energy-efficient integrated
audio amplifier solutions

ARTHOS worldwide – partner within the global AICA alliance

Global reach – international cooperation



Transactions by sector in 2023



- Technology
- Industrials
- Business Services
- Healthcare
- Consumer Products
- Financial Services

264
Deals closed

\$6bn
Total transaction value

~\$23m
Ø deal value

Contact us for technology M&A advice

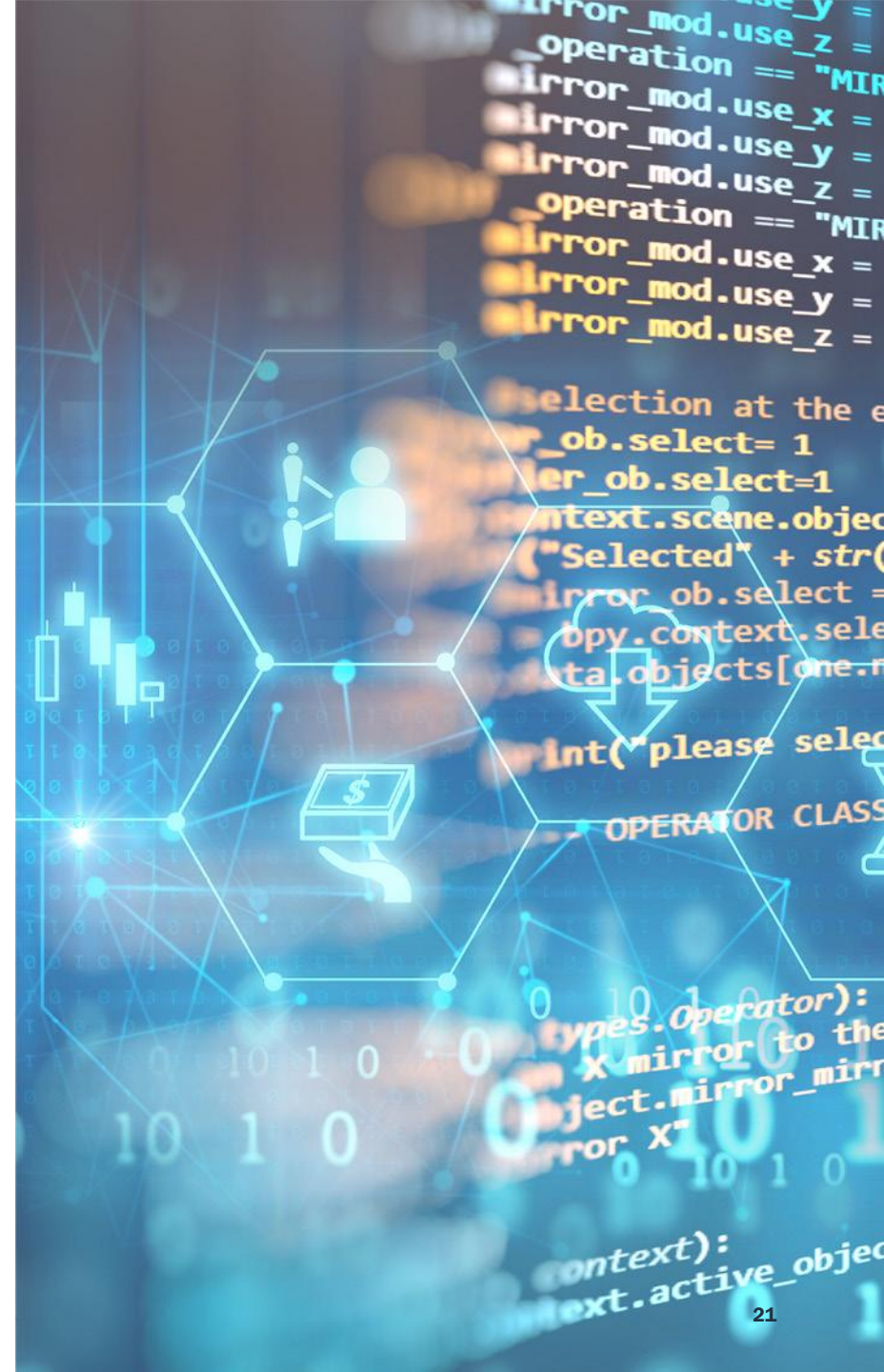


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Appendix: Public comps by sub-sector

Public stock comparison – ARTHOS Laser Systems Index

Currency in EUR

Company Name	HQ	Employees	Share Price	Market Cap	EV	Cash	NTM		Exp. 5Y	Margin		NTM Multiples	
			€	€ mn	€ mn	€ mn	Sales	EBITDA	EPS Growth	Gross	EBITDA	EV/Sales	EV/EBITDA
Bystronic AG	Switzerland	3,573	450.0	941	584	375	807	46.1	NM	56%	8%	0.7x	12.7x
Coherent Corp.	United States	26,622	49.0	7,442	13,264	794	4,776	1,086.5	12%	35%	21%	2.8x	12.2x
EL.En. S.p.A.	Italy	2,261	11.8	967	905	135	728	97.2	NM	37%	12%	1.2x	9.3x
Gooch & Housego PLC	United Kingdom	1,030	6.3	163	200	8	167	24.1	NM	30%	10%	1.2x	8.3x
Hamamatsu Photonics K.K.	Japan	5,795	34.9	5,404	4,751	776	1,362	396.2	NM	54%	31%	3.5x	12.0x
Han's Laser Technology Group	China	18,335	2.3	2,413	2,227	1,195	1,954	189.5	9%	34%	7%	1.1x	11.8x
IPG Photonics Corporation	United States	6,180	79.4	3,659	2,569	1,065	1,099	223.2	2%	42%	23%	2.3x	11.5x
Jenoptik AG	Germany	4,616	25.1	1,465	1,895	68	1,122	221.8	17%	35%	19%	1.7x	8.5x
Keyence Corporation	Japan	10,580	397.5	96,413	90,488	6,162	6,362	3,352.4	6%	82%	53%	14.2x	27.0x
LPKF Laser & Electronics SE	Germany	761	7.9	197	200	11	134	16.1	105%	68%	6%	1.5x	12.4x
Lumentum Holdings Inc.	United States	7,500	39.3	2,650	4,216	1,107	1,372	176.0	10%	31%	3%	3.1x	24.0x
Lumibird SA	France	1,000	13.7	310	399	56	224	42.4	NM	NM	8%	1.8x	9.4x
MKS Instruments, Inc.	United States	10,000	113.3	7,599	11,502	792	3,397	764.6	NM	45%	22%	3.4x	15.0x
NKT A/S	Denmark	4,449	79.2	4,330	3,649	888	2,939	323.8	37%	33%	9%	1.2x	11.3x
nLIGHT, Inc.	United States	930	10.7	505	412	102	199	NM	30%	22%	(14%)	2.1x	NM
Novanta Inc.	United States	2,900	151.6	5,441	5,722	95	918	204.7	NM	45%	19%	6.2x	28.0x
Wuhan Raycus Fiber Laser	China	3,540	2.4	1,369	1,370	85	578	83.8	NM	7%	10%	2.4x	16.3x
Mean									25%	41%	15%	3.0x	14.4x
Median									12%	36%	10%	2.1x	12.1x

Abbreviations:

HQ: Headquarter; NTM: Next twelve months; EPS: Earnings per share; NTM multiples - EV/Estimates: EV as of 16 April 2024 divided by NTM estimates (mean of analysts)

EV: Enterprise Value = share price * outstanding shares + total debt + preferred stock + minority interest – cash & short-term investments

Sources: Capital IQ (as of 16 April 2024)

Public stock comparison – ARTHOS Machine Vision Index

Currency in EUR

Company Name	HQ	Employees	Share Price €	Market Cap € mn	EV € mn	Cash € mn	NTM		Exp. 5Y EPS Growth	Margin		NTM Multiples	
							Sales	EBITDA		Gross	EBITDA	EV/Sales	EV/EBITDA
AMETEK, Inc.	United States	21,500	168.4	38,933	41,893	371	6,963	2,117.1	9%	36%	31%	6.0x	19.8x
Antares Vision S.p.A.	Italy	1,340	2.5	178	271	77	225	22.0	NM	78%	12%	1.2x	12.3x
Basler Aktiengesellschaft	Germany	1,059	10.8	337	389	32	210	27.3	3%	43%	(7%)	1.9x	14.3x
Bruker Corporation	United States	9,707	80.6	11,103	11,939	453	3,069	612.0	18%	51%	20%	3.9x	19.5x
Carl Zeiss Meditec AG	Germany	4,823	102.1	9,248	9,407	11	2,330	479.5	13%	57%	17%	4.0x	19.6x
Cognex Corporation	United States	2,992	37.6	6,457	6,219	300	877	160.5	NM	72%	17%	7.1x	38.7x
Datalogic S.p.A.	Italy	2,910	5.5	300	338	71	523	48.4	NM	42%	6%	0.6x	7.0x
FARO Technologies, Inc.	United States	1,243	18.2	345	339	87	343	26.1	30%	49%	(3%)	1.0x	13.0x
Hexagon AB (publ)	Sweden	24,581	10.5	28,944	32,374	547	5,731	2,143.2	14%	65%	27%	5.6x	15.1x
Jenoptik AG	Germany	4,616	25.1	1,465	1,895	68	1,122	222	17%	35%	19%	1.7x	8.5x
Kapsch TrafficCom AG	Austria	4,020	8.2	119	287	NM	550	90.7	NM	57%	(1%)	0.5x	3.2x
Nynomic AG	Germany	528	29.1	191	195	25	NM	19.9	NM	27%	12%	NM	9.8x
Olympus Corporation	Japan	32,844	13.7	15,920	15,652	2,422	5,901	1,307.8	2%	67%	15%	2.7x	12.0x
OMRON Corporation	Japan	28,034	31.8	6,261	7,390	830	5,000	485.0	(2%)	43%	10%	1.5x	15.2x
OPT Machine Vision Tech Co., Ltd.	China	2,098	9.4	1,151	950	198	151	45.2	11%	NM	23%	6.3x	21.0x
Stemmer Imaging AG	Germany	295	34.8	223	193	38	152	27.5	5%	40%	18%	1.3x	7.0x
Teledyne Technologies Inc.	United States	14,900	376.2	17,824	20,415	587	5,518	1,370.2	8%	43%	24%	3.7x	14.9x
TKH Group N.V.	Netherlands	6,465	40.3	1,620	2,175	94	1,868	301.1	NM	50%	13%	1.2x	7.2x
Tomra Systems ASA	Norway	5,370	12.5	3,769	4,114	104	1,271	256.1	(4%)	59%	12%	3.2x	16.1x
Varex Imaging Corporation	United States	2,300	16.4	665	938	175	806	111.6	10%	32%	12%	1.2x	8.4x
Viscom AG	Germany	595	5.1	46	84	5	105	12.2	NM	63%	6%	0.8x	6.9x
Zebra Technologies Corporation	United States	9,750	266.2	13,680	15,816	155	4,409	857.3	NM	46%	17%	3.6x	18.4x
Mean									10%	50%	14%	2.8x	14.0x
Median									10%	49%	14%	1.9x	13.6x

Abbreviations:

HQ: Headquarter; NTM: Next twelve months; EPS: Earnings per share; NTM multiples - EV/Estimates: EV as of 16 April 2024 divided by NTM estimates (mean of analysts)

EV: Enterprise Value = share price * outstanding shares + total debt + preferred stock + minority interest – cash & short-term investments

Sources: Capital IQ (as of 16 April 2024)

Public stock comparison – ARTHOS Vision Metrology Index

Currency in EUR

Company Name	HQ	Employees	Share Price €	Market Cap € mn	EV € mn	Cash € mn	NTM		Exp. 5Y EPS Growth	Margin		NTM Multiples	
							Sales	EBITDA		Gross	EBITDA	EV/Sales	EV/EBITDA
Advanced Process Corp.	South Korea	308	108.9	754	725	50	118	30.9	NM	64%	22%	6.2x	23.5x
AUROS Technology, Inc.	South Korea	188	21.5	199	190	10	45	9.7	NM	67%	13%	4.2x	19.5x
Renishaw plc	United Kingdom	5,166	47.7	3,541	3,348	205	799	188.4	NM	49%	20%	4.2x	17.8x
Onto Innovation Inc.	United States	1,497	172.2	8,471	7,834	631	869	234.6	NM	52%	22%	9.0x	33.4x
Camtek Ltd.	Israel	565	73.8	3,330	3,117	320	369	107.1	14%	47%	23%	8.5x	29.1x
Circuit Fabology Microelectronics	Japan	859	247.7	22,337	22,150	197	1,376	633.7	25%	51%	42%	16.1x	35.0x
Applied Materials, Inc.	United States	34,000	193.4	160,730	159,317	6,896	25,600	7,856.9	11%	47%	31%	6.2x	20.3x
KLA Corporation	United States	15,105	638.1	86,295	88,873	3,024	9,511	3,995.8	13%	60%	41%	9.3x	22.2x
Lam Research Corporation	United States	17,200	889.9	116,665	116,050	5,121	14,894	4,701.6	13%	46%	31%	7.8x	24.7x
Nova Ltd.	Israel	1,202	160.3	4,653	4,285	401	546	175.9	8%	57%	29%	7.8x	24.4x
NEXTIN, Inc.	South Korea	117	41.0	418	410	9	87	29.9	NM	71%	45%	4.7x	13.7x
Tokyo Seimitsu Co., Ltd.	Japan	2,468	68.2	2,755	2,701	225	911	206.5	9%	41%	22%	3.0x	13.1x
JEOL Ltd.	Japan	3,351	43.5	2,220	2,172	150	1,123	198.4	13%	44%	16%	1.9x	11.0x
ASML Holding N.V.	Netherlands	40,309	900.6	358,102	356,080	7,010	27,779	9,438.5	21%	51%	35%	12.8x	37.7x
Cohu, Inc.	United States	3,191	29.0	1,364	1,104	304	457	30.9	20%	48%	15%	2.4x	35.8x
FormFactor, Inc.	United States	2,115	41.5	3,218	2,954	297	667	111.7	20%	39%	7%	4.4x	26.4x
PVA TePla AG	Germany	730	17.8	394	392	20	284	49.0	18%	29%	15%	1.4x	8.0x
Novanta Inc.	United States	2,900	151.6	5,441	5,722	95	918	204.7	NM	45%	19%	6.2x	28.0x
Nikon Corporation	Japan	18,790	9.3	3,225	2,943	1,270	4,079	463.9	6%	43%	11%	0.7x	6.3x
Olympus Corporation	Japan	32,844	13.7	15,920	15,652	2,422	5,901	1,307.8	2%	67%	15%	2.7x	12.0x
Priortech Ltd	Israel	1,861	41.1	491	548	7	NM	NM	NM	NM	94%	NM	NM
Jenoptik AG	Germany	4,616	25.1	1,465	1,895	68	1,122	221.8	17%	35%	19%	1.7x	8.5x
Mean									14%	50%	27%	5.8x	21.4x
Median									13%	48%	22%	4.7x	22.2x

Abbreviations:

HQ: Headquarter; NTM: Next twelve months; EPS: Earnings per share; NTM multiples - EV/Estimates: EV as of 16 April 2024 divided by NTM estimates (mean of analysts)

EV: Enterprise Value = share price * outstanding shares + total debt + preferred stock + minority interest – cash & short-term investments

Sources: Capital IQ (as of 16 April 2024)

Public stock comparison – ARTHOS Optoelectronics Index

Currency in EUR

Company Name	HQ	Employees	Share Price €	Market Cap € mn	EV € mn	Cash € mn	NTM		Exp. 1Y EPS Growth	Margin		NTM Multiples	
							Sales	EBITDA		Gross	EBITDA	EV/Sales	EV/EBITDA
ams-OSRAM AG	Austria	20,000	1.0	981	2,870	1,152	3,477	651.5	(70%)	23%	50%	0.8x	4.4x
Everlight Electronics Co., Ltd.	Taiwan	4,312	1.7	768	493	308	559	107.9	23%	29%	16%	0.9x	4.6x
Focuslight Technologies Inc	China	799	8.6	774	576	NM	128	24.3	78%	NM	21%	4.5x	23.7x
GalaxyCore Inc.	China	1,443	2.0	5,173	5,935	542	863	175.4	590%	NM	2%	6.9x	33.8x
Hamamatsu Photonics K.K.	Japan	5,795	34.9	5,404	4,751	776	1,362	396.2	(17%)	54%	31%	3.5x	12.0x
Himax Technologies, Inc.	Taiwan	2,164	4.8	846	1,134	187	848	91.7	(31%)	28%	6%	1.3x	12.4x
Jiangxi Lian Chuang Optoelectronic	China	5,042	3.6	1,643	1,696	NM	472	89.6	NM	13%	16%	3.6x	18.9x
LG Innotek Co., Ltd.	South Korea	10,572	127.9	3,027	3,955	970	14,210	1,435.2	14%	9%	9%	0.3x	2.8x
Lumentum Holdings Inc.	United States	7,500	39.3	2,650	4,216	1,107	1,372	176.0	(78%)	31%	3%	3.1x	24.0x
OFILM Group Co., Ltd.	China	12,555	1.2	3,767	4,550	251	2,534	79.2	NM	(2%)	(14%)	1.8x	57.4x
Radiant Opto-Electronics Corp.	Taiwan	733	5.1	2,379	1,537	1,064	1,499	233.8	17%	20%	14%	1.0x	6.6x
ROHM Co., Ltd.	Japan	23,754	13.3	5,130	5,710	1,577	3,029	789.7	(39%)	34%	26%	1.9x	7.2x
Samsung Electro-Mechanics	South Korea	11,949	100.7	7,454	7,430	1,165	6,663	1,198.8	NM	19%	16%	1.1x	6.2x
Sanan Optoelectronics Co.,Ltd	China	14,883	1.4	7,228	7,396	1,085	2,159	559.7	(45%)	8%	22%	3.4x	13.2x
SMART Global Holdings, Inc.	United States	3,000	17.7	928	1,252	430	1,257	165.9	(51%)	30%	10%	1.0x	7.5x
Sunny Optical Technology (Group)	China	29,524	4.5	4,863	2,842	2,744	4,632	533.4	71%	14%	8%	0.6x	5.3x
Universal Display Corporation	United States	456	150.1	7,110	6,651	465	617	281.8	11%	75%	45%	10.8x	23.6x
Mean									34%	26%	17%	2.7x	15.5x
Median									(3%)	23%	16%	1.8x	12.0x

Abbreviations:

HQ: Headquarter; NTM: Next twelve months; EPS: Earnings per share; NTM multiples - EV/Estimates: EV as of 16 April 2024 divided by NTM estimates (mean of analysts)

EV: Enterprise Value = share price * outstanding shares + total debt + preferred stock + minority interest – cash & short-term investments

Sources: Capital IQ (as of 16 April 2024)